



## - CITY OF CLOVIS - REPORT TO THE PLANNING COMMISSION

TO: Clovis Planning Commission

FROM: Planning and Development Services

DATE: May 31, 2018

SUBJECT: Consider items associated with properties located on the north and south sides of Herndon Avenue and the west and east sides of Temperance Avenues. Clovis Community Medical Center, owner/applicant.

1. Consider Approval, Res. 18-\_\_, A request to approve a Program Environmental Impact Report for CUP85-18A11, and widening of Herndon Avenue.
2. Consider Approval, Res. 18-\_\_, CUP85-18A11, A request to approve a conditional use permit amendment for the expansion of the Clovis Medical Center Master Plan located on the north and south sides of Herndon Avenue at Temperance Avenues. Clovis Community Medical Center, owner/applicant.

**ATTACHMENTS:**

|               |  |
|---------------|--|
| Figure 1:     | Location Map   |
| Exhibit "A:"  | Conditions of Approval   |
| Attachment 1: | Draft Environmental Impact Report <ul style="list-style-type: none"><li>• Appendices to the Draft EIR</li></ul>  |
|               | Final Environmental Impact Report <ul style="list-style-type: none"><li>• Response to Comments</li><li>• Mitigation Monitoring/Reporting Program</li></ul> |
| Attachment 2: | Draft Resolutions  |
| Exhibit "B:"  | Master Site Plan   |

**CONFLICT OF INTEREST**

None

## RECOMMENDATION

Staff recommends that the Planning Commission:

1. Approve Resolution 18-\_\_\_\_, A Resolution of the Planning Commission of the City of Clovis recommending the City Council:
  - a. Certify the Clovis Community Medical Center Environmental Impact Report; and
  - b. Adopt the Mitigation Monitoring Program; and
2. Approve CUP85-18A11, subject to the conditions listed in Exhibit "A."

## EXECUTIVE SUMMARY

The City of Clovis retained Odell Planning and Research, Inc. to prepare an Environmental Impact Report (EIR) for the Clovis Community Medical Center (CCMC) Master Plan project. CCMC is requesting approval to amend their Master Plan to expand the boundaries of their hospital campus to include the commercial zoned property on the west side of Temperance Avenue, and office zoned properties on the south side of Herndon Avenue.

The EIR includes the Medical Center Master Plan expansion as well as the Capital Investment Project for the Herndon Avenue widening. The Planning Commission is being requested to consider the EIR, and the Medical Center Master Plan expansion. The Herndon Avenue Widening Project will be considered at a later date by the City Council.

## BACKGROUND

- General Plan Designation: Office and Mixed Use
- Specific Plan Designation: Herndon-Shepherd Specific Plan (Office)
- Existing Zoning: C-P (Professional Office) and R-A (Single-Family Residential – 24,000 sq. ft. min.)
- Adjacent Land Uses:
  - North: State Route 168 and Commercial R-T Park
  - South: Single-Family Residential and School
  - East: Rural Residential
  - West: Mixed Use Commercial
- Previous Entitlements:
  - CUP85-18, Medical Center Campus
  - CUP85-18A, Helipad
  - CUP85-18A2 & A3, Sign Amendments
  - CUP85-18A4, Outpatient Expansion
  - CUP85-18A5, Temporary Modular Building
  - CUP85-18A6, Administrative Office Building
  - CUP85-18A7, Expansion of Campus and EIR
  - CUP85-18A8, Medical Office Building
  - CUP85-18A9, Community Center
  - CUP85-18A10, Medical Office Buildings



## **PROPOSAL AND ANALYSIS**

### *Project*

The Master Plan will be implemented in two phases: a 10-year expansion plan and a 20-year long-range master plan. The Master Plan includes development at the northeast corner of Herndon and Temperance Avenues as well as across Temperance Avenue to the west and Herndon Avenue to the south (see Figure A, below).

The project evaluated in the EIR includes two separate projects: the proposed Clovis Community Medical Center (CCMC) Master Plan, and the proposed widening of Herndon Avenue between Temperance Avenue and DeWolf Avenue. This conditional use permit is to memorialize the CCMC Master Plan. The Herndon Avenue widening project will be considered at a later time.

### *2009 EIR*

On July 13, 2009, the City Council certified a Program EIR and approved a conditional use permit for a Master Plan for the expansion of CCMC. The Master Plan was similar in nature to the proposed, with a 10-year, 20-year and Long Range Plan. The acute care bed tower, parking garage, and GSB shown on the current Master Plan were part of the 2009 EIR and remain as 2 to 20-year development within the current EIR. However, the parking garage has changed locations in this proposal moving from the southeast area of the campus to the east side of the inner looped road.

### *CCMC Expansion*

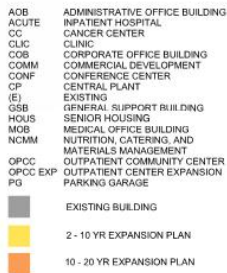
The CCMC Project consists of a 10-year expansion plan for additional facilities and improvements and includes a long-range site development master plan for a 20 year projection.

The Project is made up of approximately 148 acres located on the north and south sides of Herndon Avenue, east and west of N. Temperance Avenue. Adjacent land uses include urban residential development and an elementary school to the south, the Enterprise Canal and rural residential to the east, Highway 168, agricultural land and commercial development to the north, and rural residential to the west.

The proposed expansion is divided into two major phases; a 10-year expansion plan and a 20-year expansion plan. Construction of these components will increase the building square footage of the medical center by approximately 410,172 square feet to a total of 1,129,720 square feet. The number of licensed beds will increase from 208 to 358. The 2 to 10 year expansion plan also includes the addition of up to 150,000 square feet of commercial space west of Temperance Avenue, as well as a 150 room hotel.

Implementation of the 20-year plan will result in a net increase of 413,769 square feet of medical center building area, taking into account that two of the existing medical office buildings will be replaced by future construction. The total square footage of the medical

The existing CCMC Master Plan was authorized through the approval of a Conditional Use Permit. This amended Conditional Use Permit (CUP) must be processed and approved by the City to authorize the proposed expansion plan.



### Figure A – 2018 Master Plan

## Phasing Summary

### 2 to 10-Year Expansion Plan

- **New Five Story Acute Care Bed Tower (133,672 sq. ft. / 148 private beds)**
  - 140 Medical Surgical patient rooms (30 on the 1st, 3rd, 4th, and 5th floors and 20 on 2nd floor)
  - 8-bed Intensive Care Unit patient rooms (2nd floor)
  - All second floor rooms will be Telemetry Ready
- **New Cancer Center (96,500 sq. ft.)** (Construction completed May, 2018)
- **D & T Expansion (30,000 sq. ft.) (Radiology, Surgery, Emergency & Materials Management)**
  - Emergency Department expansion and improvements
    - Enlarged and improved waiting area and public facilities
    - 2 new multiple bay triage rooms
    - 2 new double bay resuscitation rooms and 1 airborne infection room
    - New imaging suite shell space (X-ray, MRI, CT-Scan)
    - New covered ambulance loading area
    - New Department support spaces
  - New Surgical Operating Room Suite (Level 2)
    - 2 Surgical Operating rooms
    - 4 additional Operating Rooms (shelled)
    - Support spaces (equipment, storage, sub-sterile rooms) & exit stairs
  - Expanded Materials Management (Level 1)
    - Expansion of existing loading dock
    - New clean materials storage, clean linen storage and support spaces
- **New General Services Building (45,000 sq. ft.)**
- **Expansion of existing Outpatient Community Center (40,000 sq. ft.)**
- **New parking garage (677 spaces)**
- **New medical office building (65,000 sq. ft.)**
- **New commercial area including 150,000 sq. ft. and 150 room hotel**

### 20-Year Expansion plan

- **Future Five Story Acute Care Bed Tower (approx. 133,672 sq. ft.) (150 beds)**
- **Future Expansion of Central Plant (approx. 35,000 sq. ft.)**
- **Four future medical office buildings (approx. 65,000 sq. ft. each, total of 260,000 sq. ft.)**
- **New commercial area (70,000 sq. ft.) and 100-unit Assisted Living or Memory Care Center**

### Development Entitlements

As development occurs over the life of the EIR, each individual building will be required to be evaluated through a conditional use permit and/or site plan review. Details regarding specific site layout, floor plans, building mass, and architectural elevations will be evaluated and considered at that time. A condition of approval is included to address the entitlement requirements.

### Consistency with Adopted Plans and Policies

The hospital campus site as well as properties on the south side of Herndon Avenue are designated Professional Office. The properties on the west side of Temperance Avenue are located within Mixed Use Area 5, allowing for commercial and business office related uses.

The Project (on the north side of Herndon Avenues), lies within the Herndon Shepherd Specific Plan. Goals and objectives of the Herndon-Shepherd Specific Plan support the proposed site planning for the Project.

The development of the Project with medical services, commercial, and office uses is consistent with the General Plan, Herndon Shepherd Specific Plan, and Development Code.

### Public Comments

The Project was distributed through the EIR process where a Notice of Availability was mailed to property owners within 300 feet of the Project boundaries. Staff received comments from nearby property owners who expressed concerns of various issues. The Final EIR includes a summary of the comments and responses to each (see the Final EIR, Attachment 1, Chapter 4).

### **California Environmental Quality Act (CEQA)**

The City of Clovis retained Odell Planning and Research, Inc., to prepare an Environmental Impact Report (EIR) for the proposed Clovis Community Medical Center (CCMC) Expansion Project and the Herndon Avenue Widening Capital Investment Project. The purpose of an EIR is to provide public agencies and the public in general, detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to identify and evaluate alternatives to the project. An EIR must also identify impacts found to be less than significant, growth-inducing impacts, and cumulative impacts.

The EIR prepared for this project is a "Program" EIR in that the project will be developed in phases over a substantial period of time. For this type of project, CEQA Guidelines Section 15165 requires that a lead agency prepare a single program EIR for the ultimate project.

The Final Program Environmental Impact Report consists of the following documents:

- The Draft Program Environmental Impact Report;
- Comments and recommendations received on the Draft EIR;
- The responses of the Lead Agency to significant environmental points raised in the review and consultation process; and
- Mitigation Monitoring and Reporting Program

## **FISCAL IMPACT**

None

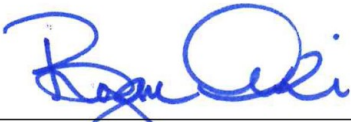
## **REASONS FOR RECOMMENDATION**

The Clovis Community Medical Center Master Plan expansion will provide additional services that will benefit the community and its surroundings. The proposed Medical Center campus is consistent with the General Plan, zoning Herndon Shepherd Specific Plan, and the Clovis Development Code. Off-site improvements to the streets, sidewalks, landscaping, sewer, water, and storm system, required as part of this expansion will provide additional infrastructure for future development in the area. The requirements for off-site improvements will also complete much of the unimproved length of Herndon and Temperance Avenues. Staff therefore recommends that the Planning Commission recommendation to the Council, is to certify the EIR prepared for the CCMC Expansion and Herndon Avenue Widening Projects, as well as approve CUP85-18A11 subject to the conditions of approval attached at Exhibit "A."

## **ACTIONS FOLLOWING APPROVAL**

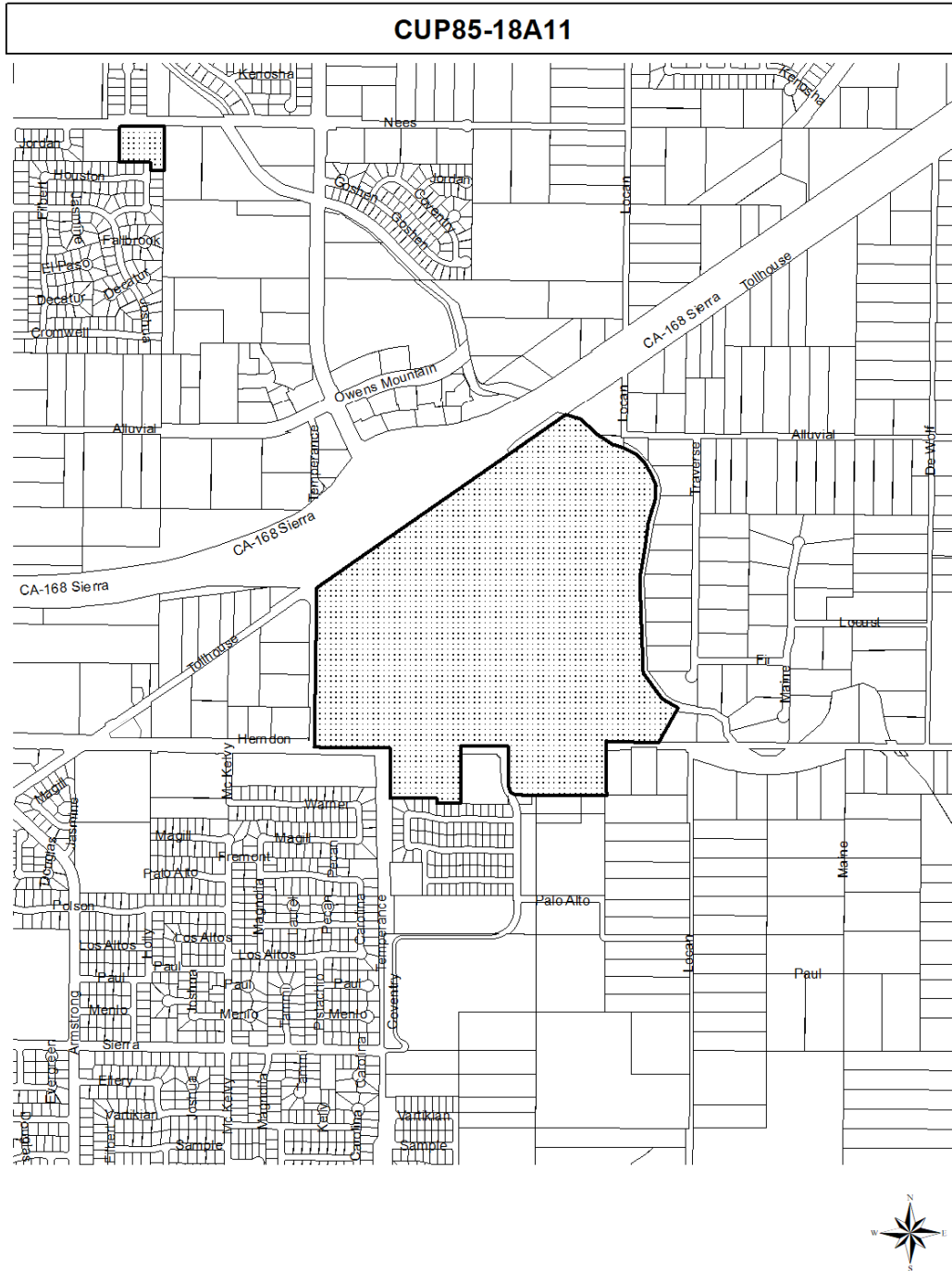
This item will continue on to the City Council for final consideration.

Prepared by: Bryan Araki, City Planner

Reviewed by:   
Bryan Araki  
City Planner

Document181

**FIGURE 1  
PROJECT LOCATION MAP**



**EXHIBIT A**  
**Conditions of Approval – CUP85-18A11**

**PLANNING DIVISION COMMENTS**

(Bryan Araki, Division Representative – (559) 324-2346)

1. The applicant shall comply with Section 9.56.020 of the Clovis Zone Ordinance requiring a Site Plan Review.
2. As development occurs, each use will be evaluated subject to the zoning use schedule on the Development Code. Some specific uses identified in the Master Plan may require a conditional use permit, prior to site plan review approval.
3. This use permit approval is granted for the site plan, Exhibit “B,” attached to this application.
4. Any development of this site shall comply with the development standards of the Herndon-Shepherd Specific Plan.
5. All new surface parking areas shall be planted with trees that provide 50% shade covering within 30 years. Specific details shall be reviewed during the plan check process.
6. Prior to the development of the bed tower and/or parking garage the developer shall compete the planting of perimeter trees along the west side of the Enterprise Canal to match the existing trees.
7. Commercial development at the southeast corner of Herndon and Temperance Avenues will require a General Plan Amendment and rezone. The General Plan Amendment will require the applicant to provide a justification and compelling reason for the change to the General Plan Land Use Diagram.
8. Commercial development on the west side of Temperance Avenue will require a rezone to a commercial zone district.

**FRESNO METROPOLITAN FLOOD CONTROL DISTRICT CONDITIONS**

(Neda Shakeri, FMFCD Representative - 456-3292)

9. The Applicant shall refer to and address FMFCD requirements attached to the Final EIR.

**FRESNO IRRIGATION DISTRICT CONDITIONS**

(Laurence Kimura, FID Representative - 233-7161)

10. The Applicant shall refer to and address FID correspondence attached to the Final EIR.

**SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT**

(Brian Clements, SJVAPCD Representative- 230-5888)

11. The Applicant shall refer to and address SJVAPCD correspondence attached to the Final EIR.

**COUNTY OF FRESNO HEALTH DEPARTMENT**

(Kevin Tsuda, County of Fresno Health Department Representative – 600-3271)

12. The Applicant shall refer to and address County Health Department correspondence attached to the Final EIR.

**CALIFORNIA DEPARTMENT OF TRANSPORTATION**

(Michael Navarro, Caltrans Representative – (559) 488-7303)

13. The Applicant shall refer to and address Caltrans correspondence attached to the Final EIR.



**Draft Program Environmental Impact Report**  
**Appendices to the Draft EIR**  
**Final Environmental Impact Report**  
**Response to Comments**  
**Mitigation Monitoring/Reporting Program**



## **Draft Program Environmental Impact Report**

# **Clovis Community Medical Center Expansion and Herndon Avenue Widening Project**

**State Clearinghouse No. 2016101005**

*Lead Agency*

**City of Clovis  
Planning and Development Services Department**

**February 2018**



**Clovis Community Medical Center Expansion  
and Herndon Avenue Widening Project  
Draft Program Environmental Impact Report**  
State Clearinghouse No. 2016101005

*Prepared for:*

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**February 2018**

# Table of Contents

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|                       |  |                    |
|-----------------------|--|--------------------|
|                       | Introduction                                 | i-1                |
|                       | Definitions                                  | ii-1               |
|                       | EIR Authors                                  | iii-1              |
| <b><u>CHAPTER</u></b> |  | <b><u>PAGE</u></b> |
| 1                     | Summary                                      | 1-1                |
| 2                     | Project Description                          | 2-1                |
| 3                     | Aesthetics                                   | 3-1                |
| 4                     | Agricultural and Forestry Resources          | 4-1                |
| 5                     | Air Quality                                  | 5-1                |
| 6                     | Biological Resources                         | 6-1                |
| 7                     | Cultural Resources                           | 7-1                |
| 8                     | Energy                                       | 8-1                |
| 9                     | Greenhouse Gas Emissions                     | 9-1                |
| 10                    | Geology and Soils                            | 10-1               |
| 11                    | Hazards and Hazardous Materials              | 11-1               |
| 12                    | Hydrology and Water Quality                  | 12-1               |
| 13                    | Land Use, Public Land Use Policy, and Zoning | 13-1               |
| 14                    | Mineral Resources                            | 14-1               |
| 15                    | Noise  | 15-1               |
| 16                    | Population and Housing                       | 16-1               |
| 17                    | Public Services                              | 17-1               |
| 18                    | Parks and Recreation                         | 18-1               |
| 19                    | Transportation and Traffic                   | 19-1               |
| 20                    | Tribal Cultural Resources                    | 20-1               |
| 21                    | Utilities and Service Systems                | 21-1               |
| 22                    | Alternatives to the Proposed Project         | 22-1               |

*Table of Contents*

**APPENDICES**

|             |  |
|-------------|--|
| Appendix 5  | Air Quality and Greenhouse Gas Impact Analysis         |
| Appendix 6A | Biological Resources Assessment                        |
| Appendix 6B | Clovis Healthcare Campus Expansion Biotic Study (2008) |
| Appendix 7  | Cultural Resources Assessment                          |
| Appendix 15 | Noise Impact Assessment                                |
| Appendix 19 | Traffic Impact Analysis                                |
| Appendix 21 | Water Supply Assessment                                |

# Introduction

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## PURPOSE FOR ENVIRONMENTAL IMPACT REPORT

This Draft Program Environmental Impact Report (Draft EIR) presents a comprehensive assessment of the potential environmental impacts of the proposed Clovis Community Medical Center (CCMC) Expansion and Herndon Avenue Widening Project (project). CCMC is proposing to undertake the medical center expansion component of the project, which consists of a ten-year expansion plan for additional facilities and improvements that will be constructed during the next ten years and a long-range site development master plan for 20 years in the future. The medical center expansion site comprises approximately 148 acres and is located in the City of Clovis, Fresno County, California. In conjunction with the proposed medical center expansion, the City of Clovis is proposing to undertake the Herndon Avenue road widening component of the project, which consists of widening the current five-lane section of Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the Enterprise Canal Bridge from two lanes to a four-lane divided roadway.

The City of Clovis (City), as the Lead Agency for the project, has prepared this Draft EIR following the requirements of the California Environmental Quality Act (CEQA) and the Guidelines for Implementation of the California Environmental Quality Act (State CEQA Guidelines or CEQA Guidelines).

The fundamental role of an EIR in CEQA is described in State CEQA Guidelines Section 15121:

- (a) An EIR is an informational document which will inform public agency decision-makers and the public generally of the significant environmental effect[s] of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. The public agency shall consider the information in the EIR along with other information which may be presented to the agency.
- (b) While the information in the EIR does not control the agency's ultimate discretion on the project, the agency must respond to each significant effect identified in the EIR by making findings under Section 15091 and if necessary by making a statement of overriding consideration under Section 15093.
- (c) The information in an EIR may constitute substantial evidence in the record to support the agency's action on the project if its decision is later challenged in court.

## PROGRAM EIR

The development activities encompassed by the Clovis Community Medical Center Expansion Project would be undertaken in phases over a number of years. Because the activities will be phased, this EIR has been prepared as a program EIR. State CEQA Guidelines Section 15165 specifies: "Where individual projects are, or a phased project is, to be undertaken and where the total undertaking comprises a project with significant environmental effect, the Lead Agency shall prepare a single program EIR for the ultimate project as described in Section 15168."

Based upon Section 15168, preparation a program EIR enables the City to examine the overall effects of the project and to take steps to avoid unnecessary adverse environmental effects. Following this approach, when individual activities within the project are proposed, the city will be required to examine the individual activities to determine whether their effects were fully analyzed in this EIR. If

the activities will have no effects beyond those analyzed in this EIR, the city can find that the activities are part of the program which has been approved earlier, and no further CEQA compliance will be required.

## **INDEPENDENT JUDGMENT**

As required by Public Resources Code Section 21082.1, the City of Clovis has reviewed and analyzed this Draft EIR and has determined that it reflects the City's independent judgment.

## **SCOPE AND CONTENT OF ENVIRONMENTAL IMPACT REPORT**

### **Introduction**

The EIR for the Clovis Community Medical Center Expansion and Herndon Avenue Widening Project will be comprised of two documents: this Draft EIR and a Final EIR. The scope and contents for the Draft and Final EIRs are described below.

### **Draft EIR**

The Draft EIR is divided into 22 chapters. Chapter 1 presents a summary of the findings of the Draft EIR. Chapter 2 provides a description of the project and its location. Chapters 3 through 21 present the existing setting, potential impacts, and mitigation measures for the project; these chapters also discuss the cumulative impacts and significant irreversible environmental changes that may result from the project. Chapter 22 addresses alternatives to the project.

Appendices are attached to the Draft EIR containing background and technical information for resources and conditions addressed in the EIR.

### **Final EIR**

The Final EIR will be completed after the public review period for the Draft EIR. It will include the Draft EIR (as a separate document); comments and recommendations received on the Draft EIR during the public review period; a list of persons, organizations, and public agencies commenting on the Draft EIR; the responses of the City to significant environmental issues identified in the review process; and any other information added by the City.

# Definitions

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The following terms from the State CEQA Guidelines (California Code of Regulations Title 14, Sections 15000 et seq.) are used in this EIR:

## **15352. APPROVAL**

“Approval” means the decision by a public agency which commits the agency to a definite course of action in regard to a project intended to be carried out by any person. The exact date of approval of any project is a matter determined by each public agency according to its rules, regulations, and ordinances. Legislative action in regard to a project often constitutes approval.

## **15353 CEQA**

“CEQA” means the California Environmental Quality Act, California Public Resources Code Sections 21000 et seq.

## **15355 CUMULATIVE IMPACTS**

“Cumulative impacts” refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.

## **15358 EFFECTS**

“Effects” and “impacts” as used in these Guidelines are synonymous.

(a) Effects include:

- (1) Direct or primary effects which are caused by the project and occur at the same time and place.
- (2) Indirect or secondary effects which are caused by the project and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect or secondary effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.

(b) Effects analyzed under CEQA must be related to a physical change.

## **15360 ENVIRONMENT**

“Environment” means the physical conditions which exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. The area involved shall be the area in which significant effects would occur either directly or indirectly as a result of the project. The “environment” includes both natural and man-made conditions.

## **15362 EIR or ENVIRONMENTAL IMPACT REPORT**

“EIR” or “Environmental Impact Report” means a detailed statement prepared under CEQA describing and analyzing the significant environmental effects of a project and discussing ways to mitigate or avoid



the effects. The contents of an EIR are discussed in Article 9, commencing with Section 15120 of these Guidelines. The term “EIR” may mean either a draft or a final EIR depending on the context.

#### **15364. FEASIBLE**

“Feasible” means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.

#### **15367. LEAD AGENCY**

“Lead Agency” means the public agency which has the principal responsibility for carrying out or approving a project. The Lead Agency will decide whether an EIR or Negative Declaration will be prepared for the project and will cause the document to be prepared. (The City of Clovis Planning and Development Services Department is the Lead Agency for the Clovis Community Medical Center Expansion and Herndon Avenue Widening Project.)

#### **15370. MITIGATION**

“Mitigation” includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

#### **15375. NOTICE OF PREPARATION**

“Notice of Preparation” means a brief notice sent by a Lead Agency to notify the Responsible Agencies, Trustee Agencies, the Office of Planning and Research, and involved federal agencies that the Lead Agency plans to prepare an EIR for the project. The purpose of the notice is to solicit guidance from those agencies as to the scope and content of the environmental information to be included in the EIR.

#### **15378. PROJECT**

“Project” means the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and that is any of the following:

- (1) An activity directly undertaken by any public agency including but not limited to public works construction and related activities clearing or grading of land, improvements to existing public structures, enactment and amendment of zoning ordinances, and the adoption and amendment of local General Plans or elements thereof pursuant to Government Code Sections 65100–65700.
- (2) An activity undertaken by a person which is supported in whole or in part through public agency contacts, grants, subsidies, loans, or other forms of assistance from one or more public agencies.
- (3) An activity involving the issuance to a person of a lease, permit, license, certificate or other entitlement for use by one or more public agencies

**15381. RESPONSIBLE AGENCY**

“Responsible Agency” means a public agency which proposes to carry out or approve a project, for which a Lead Agency is preparing or has prepared an EIR or Negative Declaration. For the purposes of CEQA, the term “Responsible Agency” includes all public agencies other than the Lead Agency which have discretionary approval power over the project.

**15382. SIGNIFICANT EFFECT ON THE ENVIRONMENT**

“Significant effect on the environment” means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant.

# EIR Authors

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### Study

Air Quality, Greenhouse Gas and Noise

Biological Resources

Cultural Resources

Traffic and Transportation

# CHAPTER 1

## Summary

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### INTRODUCTION

This chapter presents a summary description of the proposed Clovis Community Medical Center Expansion and Herndon Avenue Widening Project. This chapter briefly describes the project, its environmental impacts, and the mitigation measures and alternatives identified in this EIR that would reduce or avoid the impacts. This chapter also describes any known areas of controversy including issues raised by agencies and the public, and issues to be resolved, including the choice among alternatives and whether or how to mitigate significant impacts.

### PROJECT DESCRIPTION AND SETTING

The project evaluated in this EIR includes two components: the proposed Clovis Community Medical Center (CCMC) Expansion Project, and the proposed widening of Herndon Avenue between Temperance Avenue and DeWolf Avenue.

#### *CCMC Expansion*

The Clovis Community Medical Center Project consists of a 2-10 year expansion plan for additional facilities and improvements and a long-range site development master plan for 20 years in the future.

The project site comprises approximately 148 acres located on the north and south sides of Herndon Avenue, east and west of N. Temperance Avenue. Adjacent land uses include urban residential development and an elementary school to the south, the Enterprise Canal and rural residential to the east, Highway 168, agricultural land and commercial development to the north, and rural residential to the west.

The proposed expansion is divided into two major phases: a 2-10 year expansion plan and a 20 year expansion plan. Construction of these components will increase the building square footage of the medical center by approximately 410,172 square feet to a total of 1,129,720 square feet. The number of licensed beds will increase from 208 to 358. The 2-10 year expansion plan also includes the addition of up to 150,000 square feet of commercial space west of Temperance Avenue, as well as a 150 room hotel.

Implementation of the 20-year plan will result in a net increase of 413,769 square feet of medical center building area, taking into account that two of the existing medical office buildings will be replaced by future construction. The total square footage of the medical center upon implementation of the long-range plan will be approximately 1,543,489 square feet. The number of licensed beds will increase to a total of 508. The 20-year plan also includes up to 70,000 square feet of retail and/or office development and a 100-unit Assisted Living or Memory Care facility south of Herndon Avenue.

The existing medical center was authorized through the approval of a Conditional Use Permit. An amended Conditional Use Permit (CUP) must be processed and approved by the City to authorize the proposed expansion plan.

#### *Herndon Avenue Widening*

The proposed Herndon Avenue widening would extend from Temperance Avenue on the west to the southern leg of DeWolf Avenue on the east, encompassing a distance of one mile. This widening is necessary to implement the Clovis General Plan circulation element, which designates Herndon

Avenue as an arterial street, and to accommodate traffic from planned land uses, including the CCMC project.

The project would widen the current five-lane section of Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the Enterprise Canal Bridge from two lanes to a four-lane divided roadway. At the Enterprise Canal Bridge the roadway will have tapered to two lanes and the widening between the bridge and the southern leg of DeWolf Avenue will be minor. The project includes the installation of sidewalks, curb and gutter, street lights, median improvements and striping overlay. Existing overhead utilities on the south side of Herndon Avenue between Temperance and Locan Avenues will be placed underground. East of Locan Avenue, the overhead utilities will be relocated outside the roadway. The project will include traffic signals at Locan Avenue and at DeWolf Avenue.

## LEAD AGENCY

The City of Clovis is the lead agency for Clovis Community Medical Center Expansion and Herndon Avenue Widening Project. The lead agency is the public agency that has the principal responsibility for carrying out or approving a project.

## INTRODUCTION TO IMPACTS AND MITIGATION MEASURES

Listed in this section are the significant environmental effects of the proposed project. These include the significant impacts of the project that cannot be avoided (significant unavoidable impacts) and those that are potentially significant and can be avoided or mitigated through the implementation of mitigation measures. Impacts that were determined to be less than significant without mitigation are not listed but are discussed in the chapters of this EIR addressing specific resources and conditions.

The project would have significant impacts in relation to several resources and conditions. Implementation of the mitigation measures presented in this EIR would either prevent the impacts or render them insignificant, with three exceptions involving impacts from greenhouse gas emissions and noise. Tables 1.1 and 1.2 summarizes the significant impacts and lists the mitigation measures associated with each.

## SIGNIFICANT IMPACTS AND MITIGATION MEASURES

### Significant Unavoidable Impacts

The following significant environmental impacts cannot be avoided if the proposed project is implemented, even with the implementation of listed mitigation measures.

(The numbering of the following sections corresponds with the numbering used in the chapters in which this EIR addresses the significant impact.)

**Table 1.1**  
**Significant Unavoidable Impacts**

| <b>EIR Section</b>                             | <b>Impact/Mitigation Measure/Significance</b>  |
|--|--|
| <b>GH-1</b><br><b>Greenhouse Gas Emissions</b> | <b>Impact:</b> The project would increase the generation of greenhouse gas emissions.<br><b>Level of Significance without Mitigation:</b> Potentially significant<br><b>Mitigation Measures:</b> |

|   |  |
|---|--|
|   | <p><b>GH-1:</b> During construction and operation of the project, the following measures shall be implemented to reduce greenhouse gas (GHG) emissions:</p> <ul style="list-style-type: none"> <li>(a) Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.</li> <li>(b) Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50 percent tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.</li> <li>(c) Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.</li> <li>(d) Incorporate outdoor electrical outlets to encourage the use of electric landscape maintenance equipment.</li> <li>(e) Install high-efficiency heating and cooling systems.</li> <li>(f) Utilize high-efficiency gas or solar water heaters.</li> <li>(g) Utilize built-in energy-efficient appliances (i.e., Energy Star rated).</li> <li>(h) Utilize double- or triple-paned windows.</li> <li>(i) Utilize low energy street lights (i.e., sodium, light-emitting diode [LED]).</li> <li>(j) Utilize energy-efficient interior lighting.</li> <li>(k) Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.</li> <li>(l) Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.</li> <li>(m) Provide a minimum of one designated parking space for alternatively fueled vehicles.</li> <li>(n) Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.</li> <li>(o) Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.</li> <li>(p) Provide on-site bicycle parking beyond those required by California Green Building Standards Code and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).</li> <li>(q) Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)</li> </ul> <p><b>Level of Significance with Mitigation:</b> Implementation of the above mitigation measures would reduce emissions associated with motor vehicle use, energy use, waste generation, and area sources. In addition, Mitigation Measure AQ-1.2 (see Table 1.2, Below) would require the project proponent to enter into a Developer Mitigation Contract (DMC) with the SJVAPCD, which would reduce operational criteria air pollutants (i.e., ROG, NOX, PM10) through various means, including implementation of additional on-site or off-site mitigation and/or the funding of off-site mitigation. These additional measures have not yet been identified, but would likely have the added benefit of reducing project-generated GHG emissions. However, because the GHG emission reductions to be achieved through implementation of the DMC and other mitigation measures cannot be quantified at this time, increased GHG emissions associated with the proposed project would be considered to have a significant impact. This impact is thus considered significant and unavoidable.</p> |
| <p><b>GH-2</b></p> <p><b>Greenhouse Gas Emissions</b></p> | <p><b>Impact:</b> The project may conflict with an applicable greenhouse gas reduction plan, policy or regulation.</p> <p><b>Level of Significance:</b> Potentially Significant</p> <p><b>Mitigation Measures:</b></p> <p>Implement Mitigation Measure GH-1.</p> <p><b>Level of Significance with Mitigation:</b> The recommended mitigation measures for the project would require the project proponent to enter into a Developer Mitigation Contract (DMC) with SJVAPCD and additionally incorporate a number of design and operational elements to curb and reduce generation of GHG emissions.</p>  |

|                       |  |
|-----------------------|--|
|                       | While a DMC would function to reduce operational air pollutants to a specified level, it does not include a directly mandate a specific level. Consequently, the project could conflict with GHG-reduction planning efforts because the emission reductions to be achieved cannot be quantified at this time, and increased GHG emissions associated with the proposed project would be considered to have a significant impact. This impact is therefore considered significant and unavoidable.  |
| <b>NO-2<br/>Noise</b> | <p><b>Impact:</b> The project would result in an increase in long-term ambient noise levels from traffic sources.</p> <p><b>Level of Significance:</b> Potentially Significant</p> <p><b>Mitigation Measures:</b></p> <p><b>NO-2:</b> Once detailed plans for lane configurations and alignments for the widening of Herndon Avenue are prepared, the City of Clovis shall have an acoustical analysis prepared. The acoustical analysis shall evaluate changes in traffic noise levels that would result from the proposed widening in comparison to the City of Clovis General Plan noise standards. Noise-reduction measures (e.g., sound walls) shall be evaluated and implemented, where feasible, to reduce traffic noise levels to below applicable noise standards.</p> <p><b>Level of Significance with Mitigation:</b> The acoustical analysis would be required to evaluate changes in traffic noise levels in comparison to the City of Clovis General Plan noise standards and noise-reduction measures (e.g., sound walls) will be evaluated and implemented, where feasible. However, in some instances, the use of noise-reduction measures, such as sound walls, may not be feasible due to the need to preserve access to noise sensitive properties. Therefore, the impact is considered significant and unavoidable.</p> |

## Significant Impacts That Can Be Mitigated

The following significant environmental impacts can be avoided or reduced to a level of insignificance with the implementation of the mitigation measures listed with each impact.

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

| <b>EIR<br/>Section</b>     | <b>Impact/Mitigation Measure/Significance</b>   |
|----------------------------|---|
| <b>AE-1<br/>Aesthetics</b> | <p><b>Impact:</b> Clearing and construction activity would temporarily degrade the visual quality of the project site.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>AE-1.1:</b> During the project clearing, grading, and construction phases, a chain-link fence six feet in height shall be maintained around the project sites and a solid fence or wall at least six feet in height shall be maintained around the construction staging area. A chain-link fence draped with heavy plastic is suitable for this purpose.</p> <p><b>AE-1.2:</b> The project contractor shall store construction materials that may be on the site for more than 48 hours within the construction staging area, and the project contractor shall park or store construction equipment within the construction staging area. Construction materials or equipment shall not be stored on public streets, and the project contractor shall remove construction materials and equipment from the site when no further need exists for materials or equipment.</p> <p><b>AE-1.3:</b> The project contractor shall keep properties and streets surrounding the project site free from project-related rubbish and debris by removing any rubbish or debris the day it appears.</p> <p><b>AE-1.4:</b> Any excess excavated material shall be removed from the site immediately following completion of the excavation activity that resulted in the material.</p> <p><b>AE-1.5:</b> The project contractor shall remove any graffiti on the project sites within 48 hours of the time it appears.</p> <p><b>AE-1.6:</b> The project contractor shall place all portable restrooms within the construction staging area.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

|   |   |
|---|---|
| <p><b>AE-2</b><br/><b>Aesthetics</b></p>  | <p><b>Issue and Threshold of Significance:</b> The project would increase in illumination and glare due to project lighting, building surfaces and parking areas.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>AE-2.1:</b> Parking lot lighting shall employ full cut-off type fixtures. A full cut-off type fixture is a luminaire or light fixture that, by design of the housing, does not allow light dispersion or direct glare to shine above a 90-degree horizontal plane from the base of the fixture. Full cut-off type fixtures must be installed in a horizontal position as designed.</p> <p><b>AE-2.2:</b> The design of external signs and lighting shall prevent direct glare on adjoining properties.</p> <p><b>AE-2.3:</b> The design for the buildings east of Medical Center Drive East shall incorporate exterior materials designed to minimize reflective glare from the exterior surfaces.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>AQ-1</b><br/><b>Air Quality</b></p> | <p><b>Impact:</b> The project would increase long-term operational emissions of particulate matter and ozone precursor emissions.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>AQ-1.1:</b> Operation of the proposed project shall comply with SJVAPCD's ISR rule (Rule 9510). Accordingly, an Air Impact Assessment (AIA) shall be prepared for the proposed Project. The AIA shall be submitted to and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The AIA shall include: an estimate of operational emissions prior to the implementation of mitigation measures; a list of the mitigation measures to be applied to the project; an estimate of emissions for each applicable pollutant for the project, or each phase thereof, following the implementation of mitigation; and a calculation of the applicable off-site fee, if required by Rule 9510. Measures that may be implemented to reduce operational emissions may include, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>(a) Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.</li> <li>(b) Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50% tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.</li> <li>(c) Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.</li> <li>(d) Incorporate outdoor electrical outlets to encourage the use of electric landscape maintenance equipment.</li> <li>(e) Install high-efficiency heating and cooling systems.</li> <li>(f) Utilize high-efficiency gas or solar water heaters.</li> <li>(g) Utilize built-in energy-efficient appliances (i.e., Energy Star rated).</li> <li>(h) Utilize double- or triple-paned windows.</li> <li>(i) Utilize low energy street lights (i.e., sodium, light-emitting diode [LED]).</li> <li>(j) Utilize energy-efficient interior lighting.</li> <li>(k) Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.</li> <li>(l) Provide a minimum of one designated parking space for alternatively fueled vehicles.</li> <li>(m) Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.</li> </ul> |



**Table 1.2**  
**Significant Impacts and Mitigation Measures**

|   |   |
|---|---|
|   | <p>(n) Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.</p> <p>(o) Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.</p> <p>(p) Provide on-site bicycle parking beyond those required by California Green Building Standards Code and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).</p> <p>(q) Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)</p> <p><b>AQ-1.2:</b> A Developer Mitigation Contract (DMC) shall be entered into with the SJVAPCD to reduce operational emissions of ROG and NOX to less than 10 tons/year and emissions of PM10 to below 15 tons/year. Operational emissions of ROG, NOX and PM10 (inclusive of PM2.5) shall be reduced in excess of the reductions required per compliance with SJVAPCD's ISR Rule (Refer to Mitigation Measure AQ-1). Emission reductions may be achieved by use of newer, low-emission equipment, implementation of on-site or off-site mitigation, and/or the funding of off-site mitigation, through participation in the SJVAPCD's off-site mitigation program. The DMC shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming compliance with the DMC, prior to issuance of final discretionary approval (e.g., approval of the grading permit). Development and implementation of the DMC shall be fully funded by the project proponent/owner. With approval by SJVAPCD, the DMC may also be used to demonstrate compliance with emission reductions required by SJVAPCD's ISR Rule (Rule 9510).</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>AQ-2</b><br/><b>Air Quality</b></p> | <p><b>Impact:</b> Impacts to sensitive receptors may occur due to localized PM concentrations from construction activities and air emissions from stationary sources.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>AQ-2:</b> Implement Measures to Reduce Localized Pollutant Concentrations</p> <p>(a) Potential health risks associated with permitted stationary sources (e.g., emergency generators) shall be evaluated prior to installation and operation, once more detailed equipment specifications have been identified and in accordance with SJVAPCD's permitting requirements. Emissions control measures and/or operational limitations shall be incorporated, to the extent deemed necessary, to ensure that operational emissions would not exceed applicable SJVAPCD's significance thresholds for cancer risk of 20 in one million or an acute/chronic hazard index of one.</p> <p>(b) The following measures shall be implemented to reduce potential expose of sensitive receptors to localized concentrations of construction-generated PM at nearby sensitive receptors and land uses during project construction:</p> <ol style="list-style-type: none"> <li>On-road diesel vehicles shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles: <ul style="list-style-type: none"> <li>Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location, except as noted in Subsection (d) of the regulation; and,</li> <li>Shall not operate a diesel-fueled auxiliary power system to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation.</li> </ul> </li> <li>Off-road diesel equipment shall comply with the 5-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use Off-road Diesel regulation.</li> </ol> |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|-----------------------------------|---|
|                                   | <p>The specific requirements and exceptions in the regulations can be reviewed at the following web sites: <a href="http://www.arb.ca.gov/msprog/truck-idling/2485.pdf">www.arb.ca.gov/msprog/truck-idling/2485.pdf</a> and <a href="http://www.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf">www.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf</a>.</p> <ol style="list-style-type: none"> <li>3. Signs shall be posted at the project site construction entrance to remind drivers and operators of the state's five-minute idling limit.</li> <li>4. To the extent available, replace fossil-fueled equipment with alternatively-fueled (e.g., natural gas) or electrically-driven equivalents.</li> <li>5. Construction truck trips shall be scheduled, to the extent possible, to occur during non-peak hours.</li> <li>6. The burning of vegetative material shall be prohibited.</li> <li>7. The proposed project shall comply with SJVAPCD Regulation VIII for the control of fugitive dust emissions. Regulation VIII can be obtained on the SJVAPCD's website at website URL: <a href="https://www.valleyair.org/rules/1ruleslist.htm">https://www.valleyair.org/rules/1ruleslist.htm</a>. At a minimum, the following measures shall be implemented: <ul style="list-style-type: none"> <li>• All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.</li> <li>• All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.</li> <li>• All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut &amp; fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.</li> <li>• When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.</li> <li>• Trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)</li> <li>• Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.</li> <li>• On-road vehicle speeds on unpaved surfaces of the project site shall be limited to 15 mph.</li> <li>• Sandbags or other erosion control measures shall be installed sufficient to prevent silt runoff to public roadways from sites with a slope greater than one percent.</li> <li>• Excavation and grading activities shall be suspended when winds exceed sustained speeds of 20 miles per hour (Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation).</li> </ul> </li> <li>8. The above measures for the control of construction-generated emissions shall be included on site grading and construction plans.</li> </ol> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <b>AQ-3</b><br><b>Air Quality</b> | <p><b>Impact:</b> The project may be inconsistent with the applicable air quality plan.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p>   |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|  | <p><b>Mitigation Measures:</b></p> <p>Implement Measures AQ-1.1 through AQ-2.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>   |
| <b>BR-1<br/>Biological<br/>Resources</b> | <p><b>Impact:</b> The project would potentially impact Special Status Species including Vernal Pool Fairy Shrimp (VPFS), Burrowing Owl, Swainson's Hawk and other bird species.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>BR-1.1:</b> The City of Clovis shall either:</p> <p>(a) Conduct surveys for VPFS following USFWS survey guidelines (2015) to determine presence of the species within the project area [A complete survey includes at least one wet season survey and one dry season survey, completed within a 3-year period. If VPFS are not detected, and if approved by USFWS, the City may be exempt from further mitigation measures for VPFS. If VPFS are detected in the roadside depression, an Incidental Take Permit would be required, as detailed in VPFS-1]; or</p> <p>(b) Elect to skip the surveys and immediately begin the consultation process for an Incidental Take Permit with USFWS and US Army Corps of Engineers (ACOE). A Biological Assessment to review the proposed action (the project) and its effects on the VPFS, in accordance with the legal requirements set forth in Section 7 of the Federal Endangered Species Act, would be required.</p> <p><b>BR-1.2:</b> An Incidental Take Permit for VPFS and shall be obtained from the USFWS prior to construction. All conditions of the permit required by USFWS shall be implemented. Appropriate mitigation credit ratios and other measures should be determined in consultation with USFWS and ACOE. At a minimum, the following conservation measures shall be implemented to minimize impacts to the federally listed VPFS and/or other non-listed vernal pool branchiopods including midvalley fairy shrimp and California linderiella:</p> <p>(a) Effects of permanent losses and degradation of VPFS habitat shall be minimized and, to the greatest extent practicable, habitat restored. Before discharge of fill material, creation and/or preservation credits (amount TBD with consultation with USFWS) will be obtained from a USFWS-approved mitigation bank for every acre of habitat directly or indirectly impacted.</p> <p>(b) Staging areas shall be located away from the seasonal wetlands and channels.</p> <p>(c) Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be used onsite or disposed of at a regional landfill or other appropriate facility.</p> <p>(d) A USFWS-approved biologist conduct habitat sensitivity training related to VPFS for all project contractors and personnel.</p> <p><b>BR-1.3:</b> Avoidance.</p> <p>If feasible, any vegetation removal will take place between September 1 and February 1 to avoid impacts to nesting birds in compliance with the Migratory Bird Treaty Act. If vegetation removal must occur during the nesting season, project construction may be delayed due to actively nesting birds and their required protective buffers.</p> <p><b>BR-1.4:</b> Pre-Construction Surveys.</p> <p>(a) If vegetation removal or ground disturbance will commence between February 1 and August 31, a qualified biologist will conduct a pre-construction survey for nesting birds within 14 days of the initiation of disturbance activities. This survey will cover:</p> <p>(1) Potential nest sites in trees, bushes, or grass within species-specific buffers of the project area (Swainson's hawk – 0.5 mile, other raptor species such as white-tailed kite – 500 ft, non-raptor species (loggerhead shrike, magpie etc. – 250 ft).</p> <p>(2) Survey protocol developed by the Swainson's Hawk Technical Advisory Committee (TAC) should be followed (CDFG 2000), which includes survey timing and requirements for repeated visits.</p> |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|---|--|
|   | <p>(b) Surveys for burrowing owl will occur within 14 days prior to any ground disturbance, no matter the season. This survey will cover potential burrowing owl burrows in the project area and suitable habitat within 150 m (500 ft). Evaluation of use by owls shall be in accordance with California Department of Fish and Wildlife survey guidelines (CBOC 1993, CDFG 1995, CDFG 2012). Surveys will document if burrowing owls are nesting or using habitat in or directly adjacent to the project area. Survey results will be valid only for the season (breeding (Feb 1-Aug 31) or non-breeding (Sept 1-Jan 31) during which the survey is conducted.</p> <p>(c) If no active nests or burrows are detected during the pre-construction survey, then no further action is required. If an active nest or burrow is detected, then the minimization measures described in MM BR-5 shall be implemented.</p> <p><b>BR-1.5: Minimization/Establish Buffers.</b></p> <p>(a) Swainson's hawk, white-tailed kite, loggerhead shrike, yellow-billed magpie, Nuttall's woodpecker, oak titmouse, and MBTA-protected species:</p> <p>If any active nests are discovered (and if construction will occur during bird breeding season), the USFWS and/or CDFW will be contacted to determine protective measures required to avoid take. These measures could include fencing off an area where a nest occurs, or shifting construction work temporally or spatially away from the nesting birds. Biologists are required on site to monitor construction while protected migratory birds are nesting in the project area. If an active nest is found after the completion of the pre-construction surveys and after construction begins, all construction activities will stop until a qualified biologist has evaluated the nest and erected the appropriate buffer around the nest.</p> <p>(b) Burrowing owl:</p> <p>If burrowing owls are detected within the survey area, CDFW should be consulted to determine the suitable buffer. These buffers will take into account the level of disturbance of the project activity, existing disturbance of the site (vehicle traffic, humans, pets, etc.), and time of year (nesting vs. wintering). If avoidance is not feasible, the City will work with CDFW to determine appropriate mitigation, such as passive exclusion or translocation, and associated mitigation land offset (CDFG 2012).</p> <p>If avoidance is not feasible, as per the General Plan Update PEIR (City of Clovis 2014), "A qualified biologist will develop appropriate mitigations that will reduce project impacts to sensitive or protected biological resources to a less than significant level. The type and amount of mitigation will depend on the resources impacted, the extent of the impacts, and the quality of habitats to be impacted. Mitigations may include, but are not limited to: 1) Compensation for lost habitat or waters in the form of preservation or creation of in-kind habitat or waters, either onsite or offsite, protected by conservation easement; 2) Purchase of appropriate credits from an approved mitigation bank servicing the Clovis General Plan Update Area; 3) Payment of in-lieu fees."</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <p><b>BR-2</b></p> <p><b>Biological Resources</b></p> | <p><b>Impact:</b> The widening of Herndon Avenue would impact 0.204 acres of wetlands.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>BR-2.1:</b> The City of Clovis shall obtain a Section 404 CWA Nationwide Permit (#14 for linear transportation projects) from the ACOE for impacts to wetlands and waters of the United States and comply with the mitigation measures identified in the permit to prevent discharge of pollutants to surface waters during construction. This shall include complying with the State's National Pollution Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit) issued by the Central Valley Regional Water Quality Control Board (CVRWQCB). A Section 401 Water Quality Certification must be obtained from the RWQCB for all proposed impacts to Waters of the State. A Section 1602 Lake and Streambed Alteration Agreement, if required by CDFW, must be obtained prior to the placement of any fill within the seasonal swale in the Project Area. Though the Nationwide Permit process, the ACOE will also submit a Biological Assessment to USFWS to initiate formal consultation under Section 7 of FESA to determine if the action could result in the incidental take of a federal listed species (in this case VPFS).</p>  |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

|  |   |
|--|---|
|  | <p><b>BR-2.2:</b> To mitigate for impacts to waters and/or wetlands, at least one of the following measures shall be incorporated:</p> <p>(a) credits will be purchased from an approved mitigation bank (typically at a 2:1 or 3:1 ratio; to be determined in consultation with ACOE and USFWS); or</p> <p>(b) a creation, restoration, or preservation project will be identified in the vicinity; or</p> <p>(c) mitigation performed as otherwise directed by regulatory agencies during permit preparation.</p> <p>Mitigation will be implemented prior to or concurrent with filling jurisdictional waters and/or wetlands. Since the waters to be impacted by the road widening overlap with potential VPFS habitat, VPFS mitigation may incorporate a portion of the required wetland/waters mitigation acreage.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>BR-3</b><br/><b>Biological Resources</b></p> | <p><b>Impact:</b> The widening of Herndon Avenue would impact a small wetland swale riparian habitat.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p>Implement Mitigation Measures BR-2.1 and BR-2.2.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>   |
| <p><b>CR-1</b><br/><b>Cultural Resources</b></p>   | <p><b>Impact:</b> Potential disturbance of subsurface cultural and/or paleontological resources may result from project construction activities.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>CR-1.1:</b> All contractors and subcontractors for the project shall be informed, in writing, of the possibility that cultural or paleontological resources may be discovered during project activities. If any cultural or paleontological materials are uncovered during project activities, work in the area or any area reasonably suspected to overlie adjacent remains shall halt until a professional evaluation and/or data recovery excavation can be planned and implemented. Appropriate measures to protect remains from accidents, looting, and vandalism shall be implemented immediately.</p> <p><b>CR-1.2:</b> After they have been professionally recorded in their place of discovery, archaeological or paleontological materials shall be transferred to an appropriate regional repository for preservation, research, and/or use in interpretive exhibits.</p> <p><b>CR-1.3:</b> If human remains are discovered, the Fresno County Coroner must be notified immediately. The Coroner has two working days to examine the remains and 24 hours to notify the Native American Heritage Commission (NAHC) if the remains are Native American (Health and Safety Code Section 7050.5). Once the NAHC is notified, the procedures set forth in CEQA Guidelines Section 15064.5(d) and Public Resources Code Section 5097.98 shall be followed.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <p><b>NO-1</b><br/><b>Noise</b></p>                | <p><b>Impact:</b> Temporary or periodic increases in ambient noise levels would result from construction activities.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>NO-1:</b> The following measures shall be implemented to reduce construction-generated noise levels:</p> <p>(a) Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 7:00 p.m.</p> <p>(b) Construction equipment shall be properly maintained and equipped exhaust mufflers and engine shrouds in accordance with manufacturers' recommendations.</p> <p>(c) Construction equipment staging areas shall be located at the furthest distance possible from nearby noise-sensitive land uses.</p>  |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

|  |  |
|--|--|
|  | <p><b>Level of Significance with Mitigation:</b> Less than significant</p>   |
| <p><b>NO-3</b><br/><b>Noise</b></p>                      | <p><b>Impact:</b> An increase in long-term ambient noise levels from operational features would result from the project.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>NO-3:</b> The following measures shall be implemented to reduce operational noise levels:</p> <p>(a) An acoustical analysis shall be prepared for the proposed central plant prior to final design. The acoustical analysis shall identify building/equipment noise-reduction measures to be incorporated sufficient to achieve an exterior average-hourly noise-level of 50 dBA Leq, or less, at the property line of the nearest noise-sensitive land use. This average-hourly noise levels performance standard would equate to an average-daily noise level of approximately 58 dBA CNEL, which would ensure compliance with the City of Clovis exterior and interior noise level standards of 65 and 45 dBA CNEL, respectively. Noise-reduction measures to be incorporated may include, but are not limited to, the selection of alternative or quieter equipment, use of sound enclosures, and shielding building intake and exhaust vents from direct line of sight of nearby noise-sensitive land uses. The acoustical analysis shall be submitted to the City of Clovis Planning Department for review and approval prior to issuance of construction/grading permits for the construction of the central plant.</p> <p>(b) Emergency generators shall be enclosed and fitted with exhaust silencers.</p> <p>(c) Building air conditioning units for proposed structures shall be located on building rooftops and shielded from direct line-of-sight of adjacent noise-sensitive land uses. Building parapets shall be constructed, when necessary, to shield nearby land uses from direct line-of-site of air conditioning units.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <p><b>TT-1</b><br/><b>Transportation and Traffic</b></p> | <p><b>Impact:</b> The “Existing Conditions plus Project” Scenario would result in unacceptable levels of service at the following intersection:</p> <ul style="list-style-type: none"> <li>SR 168 EB Ramps at Temperance Avenue</li> </ul> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>TT-1:</b> To improve the LOS at the intersection of SR 168 EB Ramps at Temperance Avenue, a second eastbound right-turn lane and third northbound through lane shall be added, and the existing traffic signal shall be modified to accommodate the added lane geometrics.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>TT-2</b><br/><b>Transportation and Traffic</b></p> | <p><b>Impact:</b> The “Near Term Projects plus Project” Scenario would result in unacceptable levels of service at the following intersections:</p> <ul style="list-style-type: none"> <li>SR 168 EB Ramps at Temperance Avenue</li> <li>Alluvial Avenue at Temperance Avenue</li> <li>Herndon Avenue at Temperance Avenue</li> <li>Herndon Avenue at De Wolf Avenue (South Leg)</li> </ul> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>TT-2:</b> The project shall participate on a pro rata basis in making improvements to the intersections of 1) Alluvial Avenue at Temperance Avenue, 2) Herndon Avenue at Temperance Avenue, and 3) Herndon Avenue at De Wolf Avenue (south leg) listed under the “Near Term Projects plus Project” scenario for any improvements that are not covered by local and regional impact fee programs. The fair share percentages are calculated in Table 19.14 [see Chapter 19, Transportation and Traffic].</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

|  |  |
|--|--|
| <p><b>TT-3</b><br/><b>Transportation and Traffic</b></p> | <p><b>Impact:</b> The “Cumulative Year 2035 with Project” Scenario would result in unacceptable levels of service at the following intersections:</p> <ul style="list-style-type: none"> <li>• SR 168 EB Ramps at Temperance Avenue</li> <li>• Herndon Avenue at Armstrong Avenue</li> <li>• Herndon Avenue at Temperance Avenue</li> <li>• Herndon Avenue at Locan Avenue</li> <li>• Herndon Avenue at DeWolf Avenue (north leg)</li> <li>• Herndon Avenue at DeWolf Avenue (south leg)</li> <li>• Herndon Avenue at Leonard Avenue</li> <li>• Herndon Avenue at McCall Avenue</li> <li>• Herndon Avenue at Academy Avenue</li> <li>• Bullard Avenue at Locan Avenue</li> <li>• Bullard Avenue at De Wolf Avenue</li> <li>• Alluvial Avenue at Temperance Avenue</li> <li>• Herndon Avenue at Tollhouse Road</li> <li>• New Access Road/Temperance Avenue</li> </ul> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><i>TT-3:</i> The project shall participate on a pro-rata fair share basis in street improvements listed under the “Cumulative Year 2035 with Project Conditions” scenario for any improvements that are not covered by local and regional impact fee programs. The fair share percentages are calculated in Table 19.14 [see Chapter 19, Transportation and Traffic].</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <p><b>TT-4</b><br/><b>Transportation and Traffic</b></p> | <p><b>Impact:</b> The “Cumulative Year 2035 With Project” Conditions Would Result in the Need for Additional Turn Lane Storage Capacity at the following intersections:</p> <ul style="list-style-type: none"> <li>• Nees Avenue/Temperance Avenue</li> <li>• Alluvial Avenue/Temperance Avenue</li> <li>• SR 168 EB Ramps/Temperance Avenue</li> <li>• Fir Avenue/Temperance Avenue</li> <li>• Herndon Avenue/Armstrong Avenue</li> <li>• Herndon Avenue/Temperance Avenue</li> <li>• Herndon Avenue/Coventry Avenue</li> <li>• Herndon Avenue/Locan Avenue</li> <li>• Herndon Avenue/DeWolf Avenue (north leg)</li> <li>• Herndon Avenue/DeWolf Avenue (south leg)</li> <li>• Herndon Avenue/Leonard Avenue</li> <li>• Herndon Avenue/McCall Avenue</li> <li>• Herndon Avenue/Academy Avenue</li> </ul>  |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

|   |  |
|---|--|
|   | <ul style="list-style-type: none"> <li>• New Access Road/Temperance Avenue</li> <li>• Bullard Avenue/Locan Avenue</li> <li>• Bullard Avenue/DeWolf Avenue</li> </ul> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>TT-4:</b> The project shall participate on a pro-rata fair share basis in the improvements identified in the Queuing Analysis of the Traffic Impact Analysis (Draft EIR Appendix 19).</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <b>TR-1</b><br><b>Tribal Cultural Resources</b> | <p><b>Impact:</b> Disturbance of subsurface tribal cultural resources would potentially result from construction activities.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p>Incorporate Mitigation Measures CR-1.1 through 1.3.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |

## ALTERNATIVES TO THE PROPOSED PROJECT

This EIR identifies and evaluates four alternatives to the proposed project, including a “no project” alternative and three other alternatives which entail limiting development of the CCMC expansion to the ten-year plan and/or forgoing the widening of Herndon Avenue. Chapter 22 provides a description of the alternatives, including the bases for their selection, and tables that compare the significant impacts of the project to those of the alternatives. The conclusions from the evaluation are as follows:

- The “no project” alternative would almost entirely avoid the environmental effects of the project. However, this EIR has shown that this alternative cannot feasibly attain the objectives of the project.
- Of the remaining alternatives, the environmentally superior alternative is the “Limit CCMC Expansion to Ten-Year Expansion Plan” alternative. This alternative, however, would substantially impede the attainment of the project objectives related to developing a medical campus capable of meeting the growing health care needs of Clovis and the surrounding area and provision a coordinated long-term expansion plan for the medical campus.
- Development of the project at an alternative site instead of expanding the existing campus is not considered feasible location, as doing so would constitute an enormous waste of an existing publicly beneficial investment, as well as require substantial additional investment in land, buildings and infrastructure at another location.
- Modifications to the design of the campus expansion (e.g. relocating buildings, reducing capacity of buildings) are not evaluated among the alternatives, as none of the potentially significant impacts identified as part of this EIR were linked to specific design elements of the proposed CCMC campus expansion.



## **AREAS OF CONTROVERSY**

CEQA Guidelines Section 15123 requires that this summary identify any “areas of controversy known to the Lead Agency including issues raised by agencies and the public.” At this time, there are no known controversies related to the potential environmental impacts of the project, including any issues raised by agencies and the public.

## **ISSUES TO BE RESOLVED**

CEQA Guidelines Section 15123 requires that this summary “identify issues to be resolved including the choice among alternatives and whether or how to mitigate the significant effects.” This Draft EIR has not identified any issues that remain to be resolved other than for the City of Clovis to determine if it should approve the proposed medical campus expansion and road widening despite their impacts on noise or should adopt the environmentally superior alternative. If the environmentally superior alternative were adopted, the project applicant would have to determine how to provide adequate long-term capacity for health care services for the area which it serves.

The City of Clovis and the project applicant have determined that the project will incorporate all of the mitigation measures presented in this EIR.

# CHAPTER 2

## Project Description

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### INTRODUCTION

The project evaluated in this EIR includes two components. The first component is the proposed Clovis Community Medical Center (CCMC) Expansion Project, which is a phased project over the next 20 years. The CCMC expansion plan includes construction of new inpatient bed towers, medical office buildings, a general support building, a cancer center, a central plant and a parking garage, as well as expansion of the emergency department, surgical facilities, kitchen, materials management and the outpatient community center. In addition, the CCMC project includes the potential development of areas adjacent to the main campus, primarily with retail commercial buildings, as well as a hotel and an assisted living center.

The second project component addressed in this EIR is the proposed widening of Herndon Avenue from Temperance to DeWolf Avenues. This widening is necessary to implement the Clovis General Plan circulation element, which designates Herndon Avenue as an arterial street, and to accommodate traffic from planned land uses, including the CCMC project.

This chapter describes the location of the proposed project, the design and operational characteristics of the project, and the project objectives. This chapter also describes the agencies that are expected to use the EIR in their decision-making and the permits and other approvals required to implement the project.

### PROJECT LOCATION AND SETTING

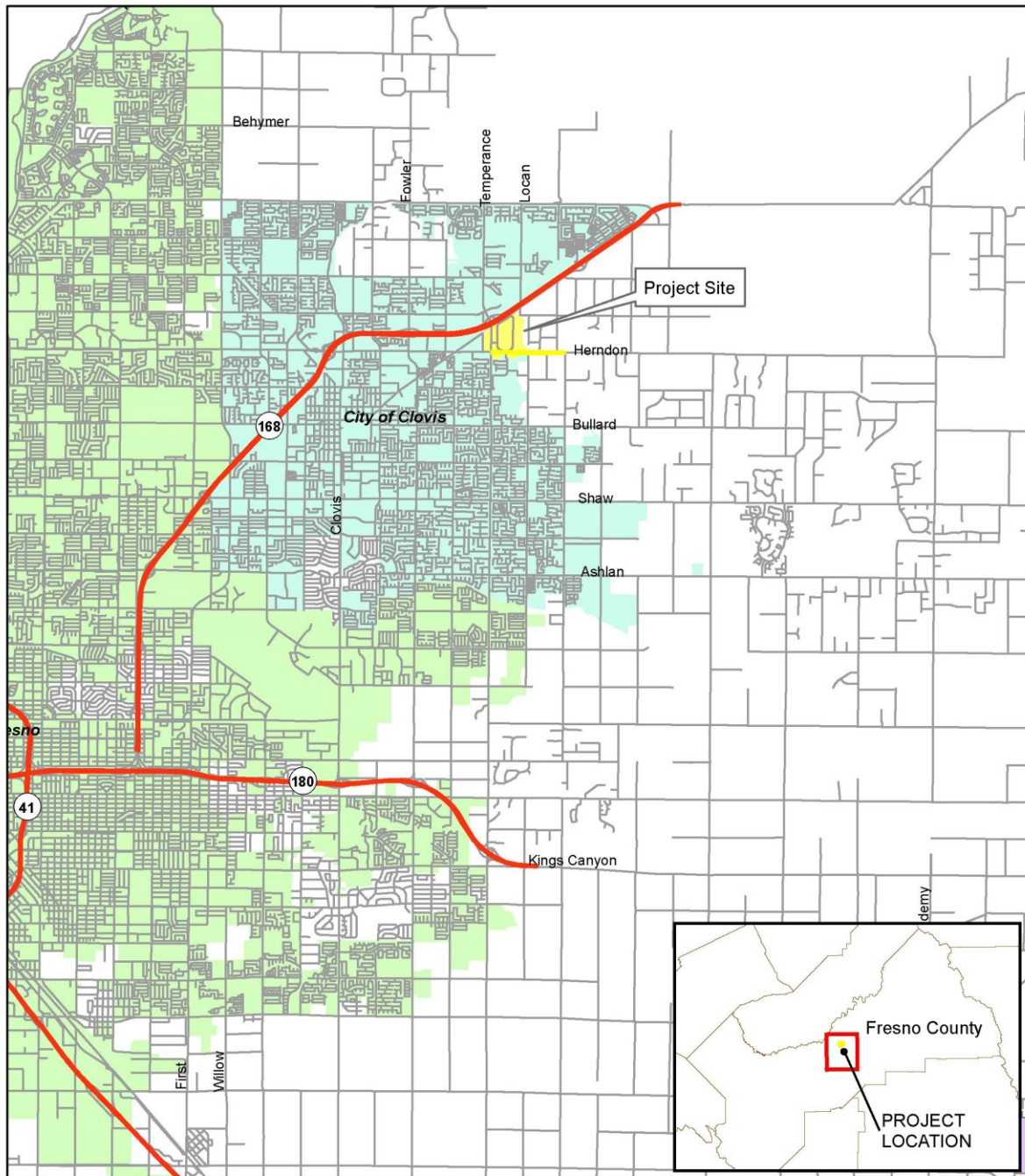
#### Project Location – CCMC

The project site comprises approximately 148 acres located on the north and south sides of Herndon Avenue, east and west of N. Temperance Avenue. The Enterprise Canal forms the eastern boundary of the project site. A description of the project site location and key locational characteristics is provided in Table 2.1, with Figures 2.1, and 2.2 depicting the project location. Table 2.1 summarizes key locational characteristics of the site. Figure 2.1 identifies the location of the project in relation to surrounding Clovis/Fresno region. Figure 2.2 identifies the boundaries of the project site.

**Table 2.1**  
**CCMC Project Location**

|                              |   |
|------------------------------|---|
| City, County, and State      | Clovis, Fresno County, California                   |
| Adjacent Major Cross Streets | E. Herndon and N. Temperance Avenues                |
| Site Area                    | 133 acres total                                     |
| USGS Map                     | Clovis, California Quadrangle 7.5 Minute Series     |
| Latitude & Longitude         | 36°50'34.05"N; 119°39'13.33"W                       |
| Section, Township, and Range | Section 34, Township 12 South, Range 21 East, MDB&M |
| Elevation                    | 391 feet above mean sea level                       |

Figure 2.1 – Project Location



Source: County of Fresno, City of Clovis, ESRI

## Project Location

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis

ODELL Planning & Research, Inc.

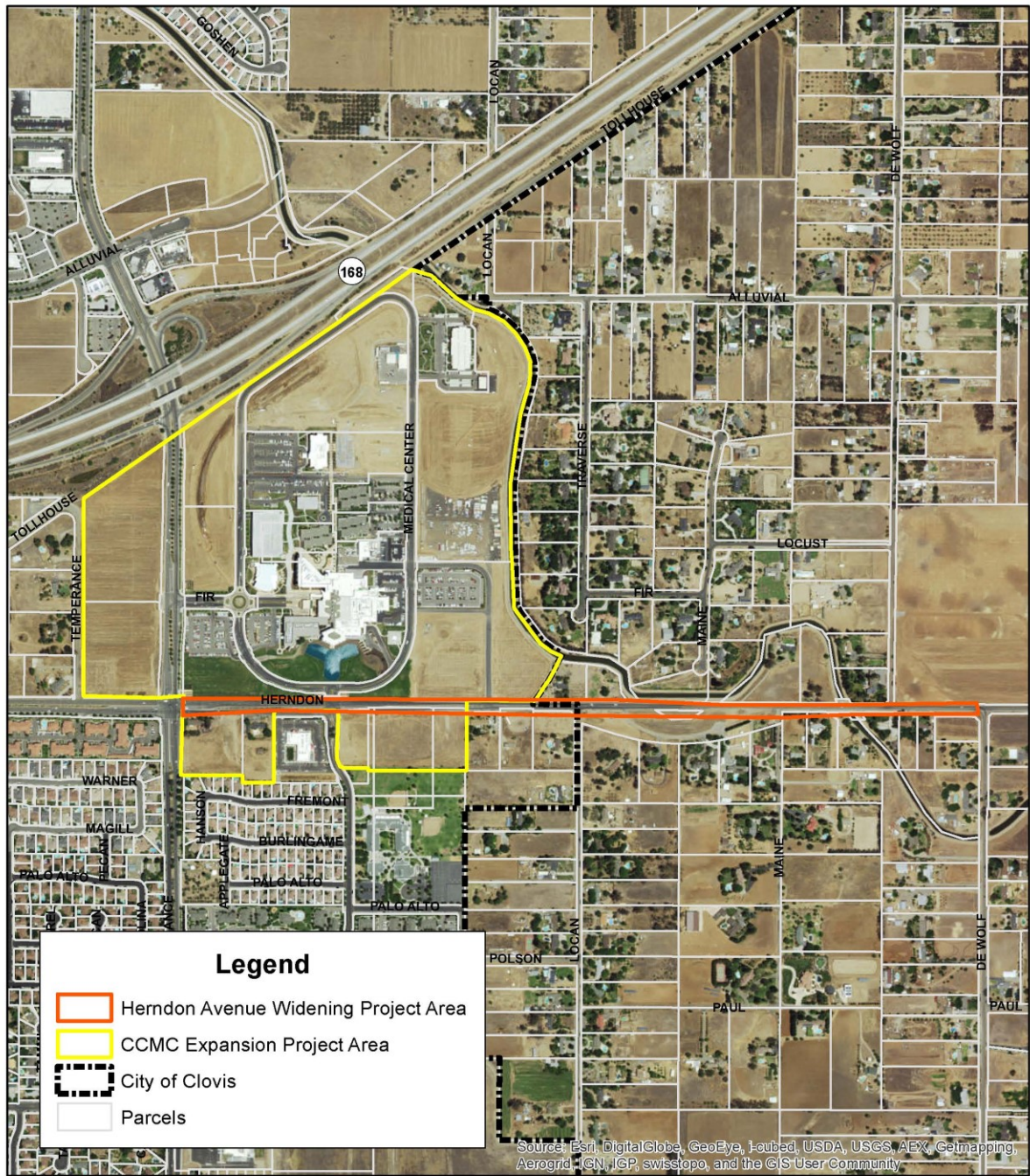
Figure 1



0 0.5 1 2 3 4 Miles



Figure 2.2 – Project Area



## Project Area

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis

ODELL Planning & Research, Inc.

Figure 2



0 500 1,000 2,000 Feet

### **Project Setting – CCMC Expansion**

Located at the eastern edge of the City of Clovis, this area in general is developing to urban and residential uses; however, residual rural residential uses and vacant parcels remain in the vicinity. Adjacent land uses include urban residential development and an elementary school to the south, the Enterprise Canal and rural residential to the east, Highway 168, agricultural land and commercial development to the north, and rural residential to the west.

The CCMC project site is designated in the City of Clovis General Plan as Office and Mixed Use/Business Campus. The project site is a part of a large area planned as a Mixed Use/Business Campus, which extends to the north and west. Residential and Public Facilities are designated land uses to the south and Rural Residential to the east (Fresno County designation outside of Clovis City Limits).

### **Project Location – Herndon Avenue Widening**

The proposed Herndon Avenue widening would extend from Temperance Avenue on the west to the southern leg of DeWolf Avenue on the east, encompassing a distance of one mile (see Figure 2).

### **Project Setting – Herndon Avenue Widening**

Aside from the CCMC campus located on the north side of Herndon Avenue east of Temperance Avenue and an office building at the southwest corner of Herndon and Coventry Avenues, the existing land uses adjacent to Herndon Avenue in the project area consist of rural residences and vacant land. The Clovis General Plan designates the land north and south of Herndon Avenue between Temperance and Locan Avenues for Office use and the land on both sides of Herndon Avenue between Locan and DeWolf Avenues for Rural Residential use.

## **PROJECT DESCRIPTION**

### **Project Facilities and Operational Characteristics – CCMC**

Clovis Community Medical Center is proposing to expand its healthcare facilities on its campus located east of Temperance Avenue between Herndon Avenue and State Route 168. In addition, commercial uses and a hotel are proposed on land owned by CCMC west of Temperance Avenue, and commercial uses and an assisted living facility are proposed on land south of Herndon Avenue.

The existing medical center comprises 719,548 square feet of building area, including the main hospital building (223,521 square feet), a bed tower (138,726 square feet), the outpatient care center (70,300 square feet), a conference center (21,814 square feet), a central plant (17,354 square feet), a parking garage (659 spaces), and administrative, corporate, and medical office buildings (247,833 square feet total). The existing medical center includes 208 licensed beds.

The proposed expansion is divided into two major phases: a 2-10 year expansion plan and a 20 year expansion plan. The components of the 2-10 year expansion plan are listed in Table 2.2 and shown in Figure 2.3. Construction of these components will increase the building square footage of the medical center by approximately 410,172 square feet to a total of 1,129,720 square feet. The number of licensed beds will increase from 208 to 358. The 2-10 year expansion plan also includes the addition of up to 150,000 square feet of commercial space west of Temperance Avenue, as well as a 150 room hotel.

The 20 year expansion plan components are listed in Table 2.3 and shown in Figure 2.3. Implementation of the 20 year plan will result in a net increase of 413,769 square feet of medical center building area, taking into account that two of the existing medical office buildings will be replaced by future construction. The total square footage of the medical center upon implementation of the long

range plan will be approximately 1,543,489 square feet. The number of licensed beds will increase to a total of 508. The 20 year plan also includes up to 70,000 square feet of retail and/or office development and a 100-unit Assisted Living or Memory Care facility south of Herndon Avenue.

As presently conceived, the additional medical buildings would be located throughout the campus property, primarily on the outside of the Medical Center Drive loop road. The retail buildings would be located west of Temperance Avenue and south of Herndon Avenue. Parking lot revisions will be made to accommodate new ambulance drop-off, expanded loading dock circulation, and fire truck access throughout the campus. Parking facilities and walking paths may be lighted. The helicopter landing pad location will remain the same.

**Table 2.2**  
**2-10 Year Expansion Plan**

|   |  |  |
|---|--|--|
| <b>New Five Story Bed Tower (133,672 sq. ft. and 148 private beds)</b>                                  |  |  |
|   | 140 Medical Surgical patient rooms (30 on the 1st, 3rd, 4th, and 5th floors and 20 on 2 <sup>nd</sup> floor) |  |
|   | 8-bed Intensive Care Unit patient rooms (2nd floor)  |  |
|   | All second floor rooms will be Telemetry Ready   |  |
| <b>New Cancer Center (96,500 sq. ft.)</b>   |  |  |
| <b>D &amp; T* Expansion (30,000 sq. ft.) (Radiology, Surgery, Emergency &amp; Materials Management)</b> |  |  |
|   | Emergency Department expansion and improvements  |  |
|   |  | Enlarged and improved waiting area and public facilities             |
|   |  | 2 new multiple bay triage rooms                                      |
|   |  | 2 new double bay resuscitation rooms and 1 airborne infection room   |
|   |  | New imaging suite shell space (X-ray, MRI, CT-Scan)                  |
|   |  | New covered ambulance loading area                                   |
|   |  | New Department support spaces  |
|   | New Surgical Operating Room Suite (Level 2)  |  |
|   |  | 2 Surgical Operating rooms   |
|   |  | 4 additional Operating Rooms (shelled)                               |
|   |  | Support spaces (equipment, storage, sub-sterile rooms) & exit stairs |
|   | Expanded Materials Management (Level 1)  |  |
|   |  | Expansion of existing loading dock                                   |
|   |  | New clean materials storage, clean linen storage and support spaces  |
| <b>New General Services Building (45,000 sq. ft.)</b>   |  |  |
| <b>Expansion of existing Outpatient Community Center (40,000 sq. ft.)</b>                               |  |  |
| <b>New parking garage (677 spaces)</b>  |  |  |
| <b>New medical office building (65,000 sq. ft.)</b>   |  |  |
| <b>New commercial area including 150,000 sq. ft. and 150 room hotel</b>                                 |  |  |

Source: Clovis Community Medical Center – Facilities Management

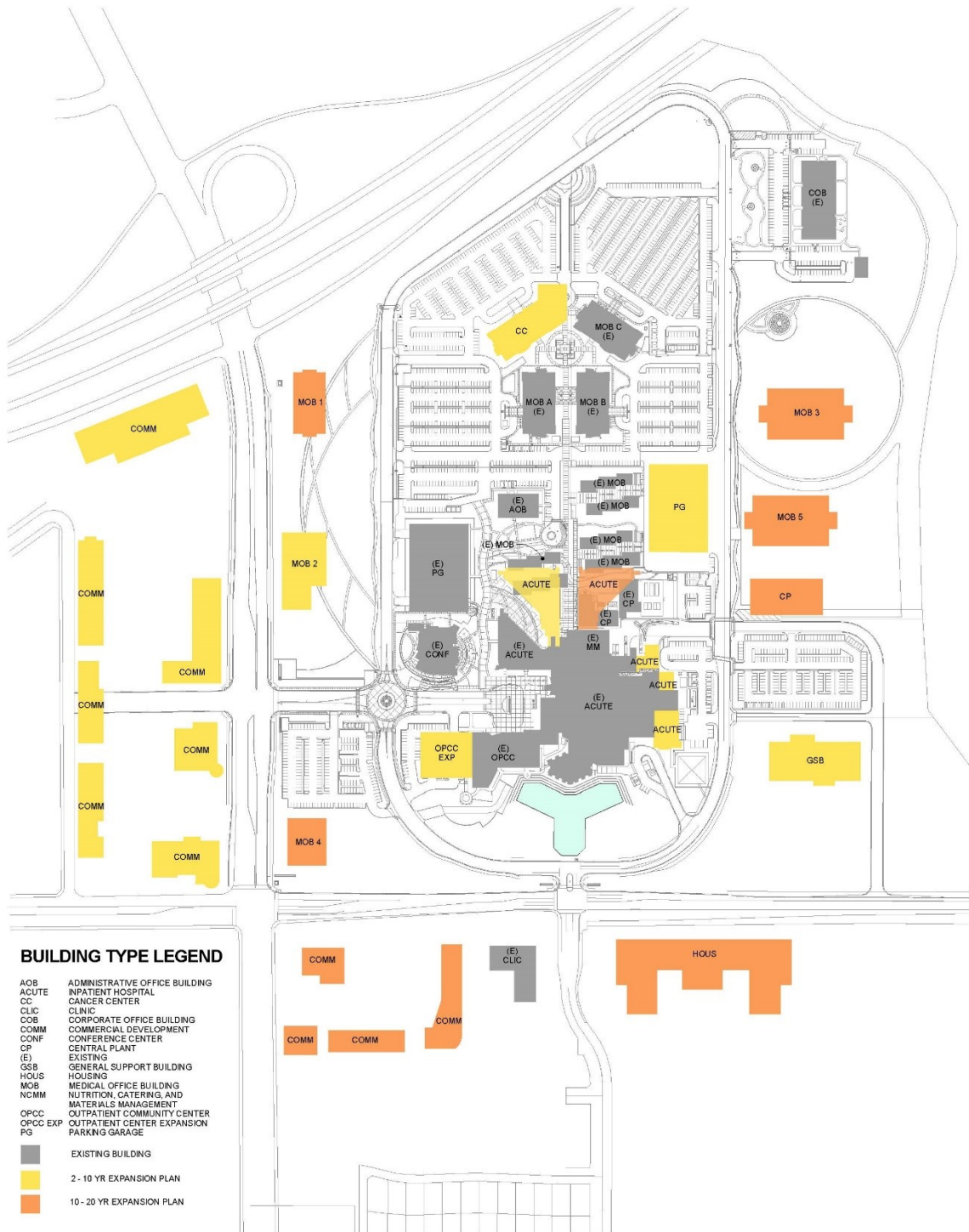
**Table 2.3**  
**20 Year Expansion Plan**

|   |
|---|
| <b>Future 5 Story Bed Tower (approx. 133,672 sq. ft.) (150 beds)</b>                                |
| <b>Future Expansion of Central Plant (approx. 35,000 sq. ft.)</b>                                   |
| <b>Four future medical office buildings (approx. 65,000 sq. ft. each, total of 260,000 sq. ft.)</b> |
| <b>New commercial area (70,000 sq. ft.) and 100-unit Assisted Living or Memory Care Center</b>      |

Source: Clovis Community Medical Center – Facilities Planning-Construction



Figure 2.3 – Expansion Plan Diagram



## **Project Description – Herndon Avenue Widening**

The project would widen the current five-lane section of Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the Enterprise Canal Bridge from two lanes to a four-lane divided roadway. At the Enterprise Canal Bridge the roadway will have tapered to two lanes and the widening between the bridge and the southern leg of DeWolf Avenue will be minor. The project includes the installation of sidewalks, curb and gutter, street lights, median improvements and striping overlay. Existing overhead utilities on the south side of Herndon Avenue between Temperance and Locan Avenues will be placed underground. East of Locan Avenue, the overhead utilities will be relocated outside the roadway. The project will include traffic signals at Locan Avenue and at DeWolf Avenue.

## **PROJECT IMPLEMENTATION ACTIONS AND INTENDED USES FOR THE EIR**

### **Lead Agency**

The City of Clovis is the Lead Agency<sup>1</sup> for the project. Certification of this EIR by the City would be necessary to allow the proponent to carry out the project. The City of Clovis must review and approve plans and accept improvements related to the provision of public street access, water supply, sewage collection, and fire protection improvements for the CCMC site. The City of Clovis is also the primary agency responsible for approving and carrying out the proposed improvements to Herndon Avenue.

The existing medical center was authorized through the approval of a Conditional Use Permit. An amended Conditional Use Permit (CUP) must be processed and approved by the City to authorize the proposed expansion plan.

### **Responsible Agencies**

Under CEQA, the following state and local agencies will be Responsible Agencies<sup>2</sup> for the project. The agencies and discretionary approvals necessary from each are as follows:

- a. The California Office of Statewide Health Planning and Development must review and approve the construction plans and geotechnical reports for the CCMC expansion.
- b. The County of Fresno must review and approve the Herndon Avenue Widening project improvements within its jurisdiction.
- c. The Fresno Irrigation District must review and approve any project improvements that may encroach upon or adversely affect the Enterprise Canal.
- d. The Fresno Metropolitan Flood Control District must review and approve any plans for storm drainage improvements or modifications.

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<sup>1</sup>State CEQA Guidelines section 15367 defines the lead agency as the “public agency which has the principal responsibility for carrying out or approving a project.”

<sup>2</sup>State CEQA Guidelines section 15381 defines a responsible agency as a “public agency which proposes to carry out or approve a project, for which a Lead Agency is preparing or has prepared an EIR or Negative Declaration. For purposes of CEQA, the term ‘Responsible Agency’ includes all public agencies other than the Lead Agency which have discretionary approval power over the project.”



### **Trustee Agencies<sup>3</sup>**

The California Department of Fish and Wildlife would be a Trustee Agency for the project with regard to biological resources on the site.

## **PROJECT OBJECTIVES AND NEED**

### **Project Objectives and Need – CCMC**

The objectives of Clovis Community Medical Center in proposing the project are to:

- Develop a medical campus capable of meeting the growing health care needs of Clovis and the surrounding area;
- Provide a coordinated long-term expansion plan for the medical campus that provides for the modernization and upgrading of existing facilities in concert with the provision of necessary new facilities;
- Provide an efficient vehicular and pedestrian campus circulation system in conjunction with adequate and well-located parking facilities for patients, visitors and staff;
- Continue to provide a well-designed medical campus that is inviting and remains attractive over time, being harmonious with the existing context of the hospital and keeping with the desired aesthetic character of Clovis;
- Provide medical office buildings at locations that will be conducive to the related functions to be provided at the hospital; and
- Provide for future development on land adjacent to the CCMC campus that is compatible and complimentary to the function of CCMC and consistent with the goals and policies of the Clovis General Plan.

Health care facilities are a fundamental and essential component of providing for the health and welfare of a community. Clovis Community Medical Center is the only full service medical facility within the City of Clovis, population 110,762 (CA Dept. of Finance, 2017). CCMC not only serves the City of Clovis, but also draws patients from the surrounding area, including Fresno, the Fresno County foothill and mountain areas, the communities of Sanger, Selma and Reedley, and Madera County.

The expansion of CCMC is needed to keep up with the health care needs of a growing population. The population of Fresno County is projected to grow from 995,975 in 2017 to 1,088,963 in 2025 and 1,201,416 in 2035. Madera County's population is projected to increase from 156,492 in 2017 to 174,156 in 2025 and 199,556 in 2035 (CA Dept. of Finance, 2017).

### **Project Objectives and Need – Herndon Avenue Widening**

The objectives of the City of Clovis in proposing the Herndon Avenue widening project are to:

- Widen and improve Herndon Avenue as an important component of the City's planned circulation system (Herndon Avenue is designated as an arterial street in the Circulation Element of the Clovis General Plan).

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<sup>3</sup> State CEQA Guidelines section 15386 defines a trustee agency as "a state agency having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California."

- Provide for a street that can accommodate projected traffic from the CCMC expansion and other planned land uses such that the Level of Service is D or less for the City of Clovis portion of Herndon Avenue and Level of Service C or less within the Fresno County portion of the project.
- Provide traffic signals at Locan Avenue and at both legs of DeWolf Avenue to improve access and safety for rural residential areas to the north and south of Herndon Avenue and improved safety for through traffic on Herndon Avenue.
- Minimize or avoid any encroachment or impact to the Enterprise Canal

The need for the Herndon Avenue Widening project is reflected in the first three bullet points above.

## **SOURCES CONSULTED**

California Department of Finance (2017). *E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2016 and 2017. P-1: State and County Population Projections*. (<http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/>)

City of Clovis (2014). *City of Clovis General Plan*. Adopted August 25, 2014.

Clovis Community Medical Center. John Hall, Director, Facilities Planning-Construction, Plant Maintenance and Alex Torres, Manager, Facilities Planning-Construction, Plant Maintenance. August and September 2016.

# CHAPTER 3

## Aesthetics

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### INTRODUCTION

This chapter identifies and discusses potential environmental effects the project may have related to aesthetics. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to aesthetics; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of the project on aesthetics; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### ENVIRONMENTAL SETTING

#### **Project Site – CCMC Expansion**

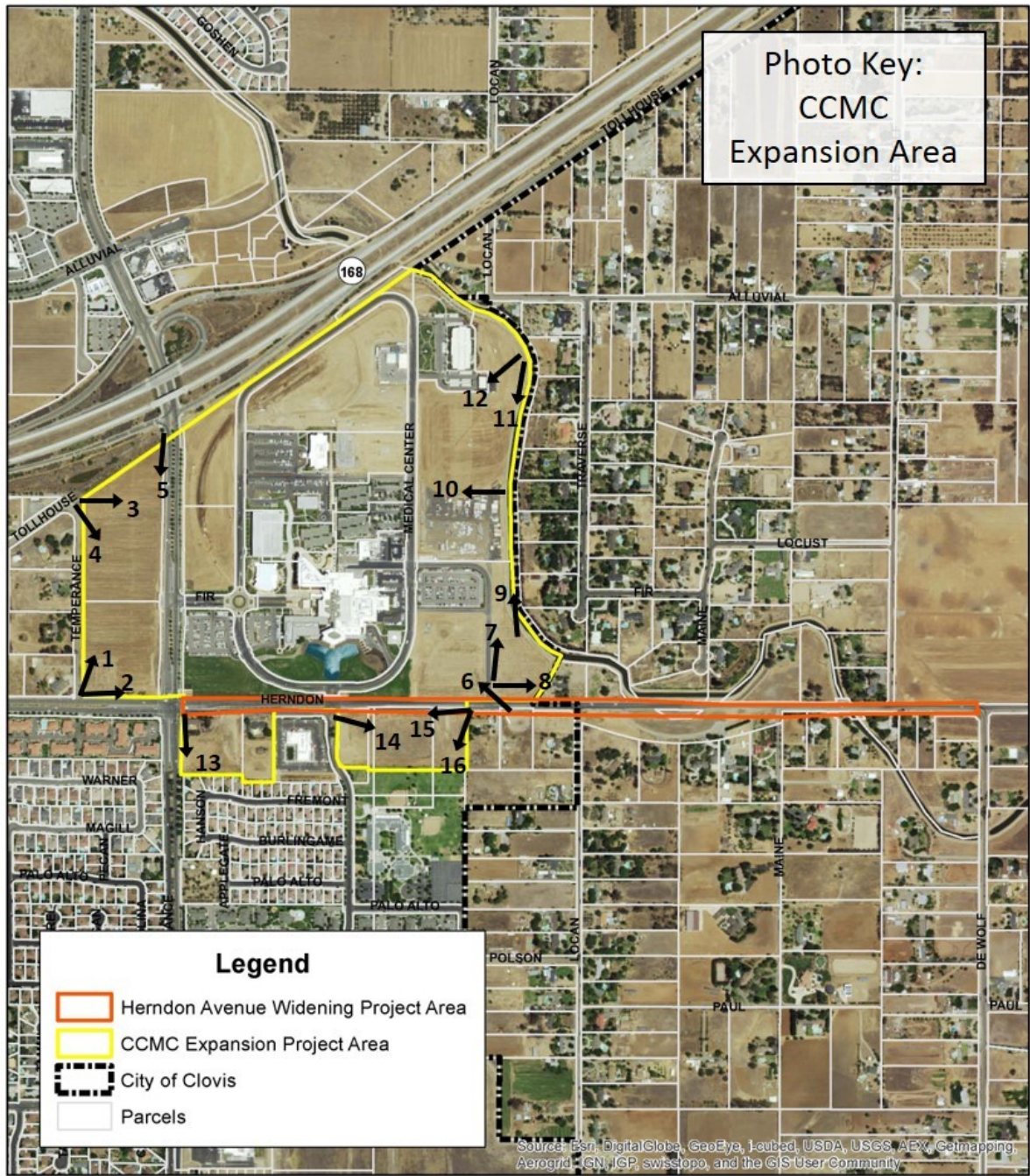
The project site encompasses 148 acres and is bounded by State Route 168 to the north, the Enterprise Canal to the east, single-family residential development and an elementary school to the south, and the older western leg of Temperance Avenue that joins Tollhouse Road to the west.

The central portion of the project site contains the existing Clovis Community Medical Center campus which is comprised of 719,548 square feet of building area, including the main hospital building (223,521 square feet), five-story bed tower (138,726 square feet), outpatient care center (70,300 square feet), conference center (21,814 square feet), central plant (17,354 square feet), three-story parking garage (659 spaces), and several multi-story buildings used for administrative, corporate, and medical office purposes (247,833 square feet total). Several asphalt-paved surface parking lots are located throughout the developed portion of the project site. The remainder of the developed area is landscaped with ornamental trees, shrubs, flowers, grass, and a concrete-lined landscape pond located just north of Herndon Avenue. The balance of project site located south and west of the developed area consists of fallow/vacant land. Existing views of the project site are provided in Figure 3.1.

#### **Project Site – Herndon Avenue Widening**

The proposed Herndon Avenue widening would affect a one-mile segment from Temperance Avenue on the west to the southern leg of De Wolf Avenue on the east. Aside from the existing CCMC campus located on the north side of Herndon Avenue and an office building at the southwest corner of Herndon and Coventry Avenues, the existing land uses adjacent to Herndon Avenue in the project area consist of rural residences and vacant land. Existing views are pictured in Figure 3.2.

Figure 3.1 – CCMC Expansion Area Photos



### Project Area

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis

ODELL Planning & Research, Inc.









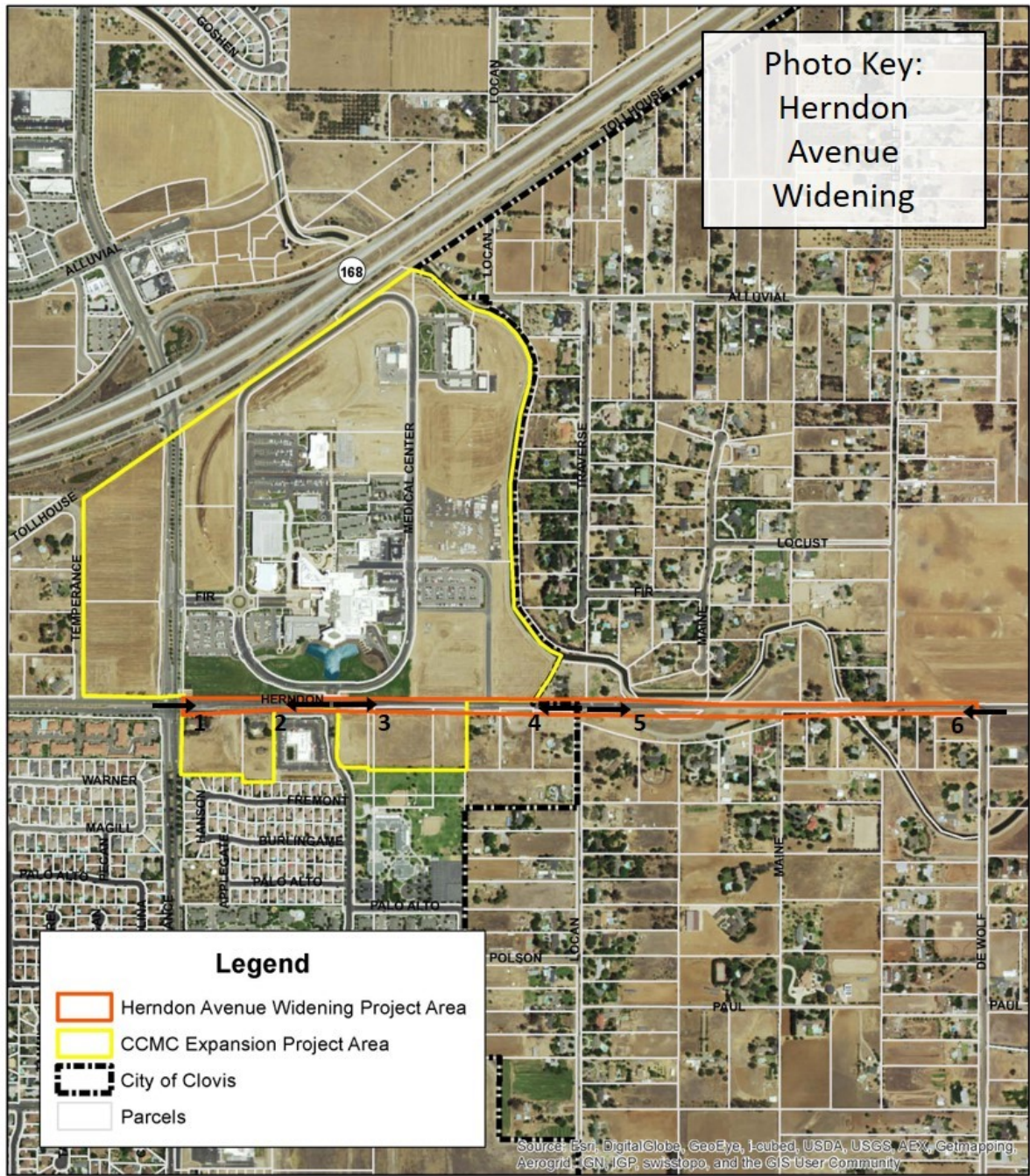




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Figure 3.2 –Herndon Avenue Widening Area Photos



### Project Area

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis

ODELL Planning & Research, Inc.







## **Surrounding Area**

The project site is located on the eastern edge of the City of Clovis in an area where rural residential and agricultural uses have been transitioning to urban residential and mixed use/office uses. The predominant visual elements in the area include State Route 168, Herndon Avenue and Temperance Avenue (including landscaping and streetlights), Cedarwood Elementary School, the Enterprise Canal, and a mixture of medium-density and rural-density residential development.

The City of Clovis General Plan identifies views of the Sierra Nevada Mountain Range, foothills, and Owens Mountain as a scenic backdrop for the eastern portion City of Clovis. On clear days, the foothills and higher elevation mountains offer spectacular views from the project site. No other scenic vistas near the project site were identified in the General Plan or through field observations.

According to Caltrans' Scenic Highway Mapping System, there are not currently any designated scenic highways within the greater area. It is noted, however, that a section of State Route 168 near the project site is eligible for nomination as a scenic highway.

The EIR prepared for the City of Clovis General Plan identified two locations within one-half mile of the project site as containing recorded historical resources: 1) The Truman Kahler Property, a site associated with the Fresno Flume and Lumber Company, which played an early role in the development of Clovis; and 2) The Hays Home, an Eastlake-style residence built in 1903. However, neither of these structures appears to be present as both sites appear to be vacant and/or redeveloped. Additionally, the Cultural Resources Assessment prepared for this project by Sierra Valley Cultural Planning identified the Enterprise Canal as a historic feature. No other historic buildings or resources are located near the Project Site.

## **Light and Glare**

Existing sources of light on and near the project site include interior and exterior lighting from the hospital; interior and exterior lighting from neighboring residential and commercial uses; street lighting along public streets; and lighting from vehicles on the streets. The same general types of light and glare sources are found outside the project site. None of these sources appears to generate light or glare beyond the levels expected in an urban residential environment.

## **REGULATORY AND POLICY SETTING**

### **State Regulations**

#### *California Scenic Highway Program*

Caltrans' California Scenic Highway Program was created in 1963, and it maps and describes all scenic highways within the state. The program protects these state scenic highway and adjacent corridors through special conservation treatment. As discussed above, although the Scenic Highway Mapping System indicates that a section of State Route 168 near the project site is eligible for nomination as a scenic highway, there are not currently any designated scenic highways within the greater area.

### **Local Regulations**

#### *City of Clovis General Plan*

The Clovis General Plan includes goals and policies which aim to promote aesthetically appealing public areas. The goals and policies below are most directly applicable to the proposed CCMC expansion and widening of Herndon Avenue:

### Circulation Element

Goal 3: A multimodal transportation network that is safe and comfortable in the context of adjacent neighborhoods.

*Policy 3.11 Right-of-way design.* Design landscaped parkways, medians, and right-of-ways as aesthetic buffers to improve the community's appearance and encourage non-motorized transportation.

### Open Space and Conservation Element

Goal 2: Natural, agricultural, and historic resources that are preserved and promoted as key features for civic pride and identity.

*Policy 2.3 Visual resources.* Maintain public views of open space, parks, and natural features. Enhance views along roadways and trails. Preserve Clovis' viewshed of the surrounding foothills and orient new development to capitalize on views of the Sierra Nevada.

### *Herndon-Shepherd Specific Plan*

The Herndon-Shepherd Specific Plan, which functions to complement the City of Clovis General Plan, contains a number of provisions related to aesthetics, particularly the "Community Character" subsection which outlines objectives such as encouraging development that maintains consistency with the surrounding environment, creating developments that are in scale with their surroundings, promoting a variety of architectural and landscape expressions which are diverse within a theme and consistent overall, and preserving trees of significant aesthetic or historic quality.

### *City of Clovis Design Guidelines*

The City of Clovis maintains multiple design guidelines and standards to assist developers and project designers in understanding the City's goals and objectives for achieving, enhancing, and maintaining high-quality development in various areas of the City. The design guidelines are area-specific. The project falls within the Central Valley Research and Technology Business Park Design Standards, which guide architectural development in the northeast region of the City along State Route 168 between Armstrong Avenue and Owens Mountain Parkway.

### *Fresno County Code of Ordinances*

The County of Fresno Code of Ordinances identifies development standards, land use categories, and other general provisions that ensure consistency between the County's General Plan and proposed development projects. Title 17, Chapter 17.48 (Design and Development Standards) outlines design and improvement standards for roads, lots, easements, and waterways in the county to provide for adequate traffic circulation and extension of aesthetic values.

### *Fresno County General Plan*

Regarding the section of Herndon Avenue located beyond the Clovis city limits, Policy TR-A.16 in the Fresno County General Plan's Transportation Element states the County shall require that plans for County road improvement projects consider the preservation of unique existing landscaping to the extent that it will be consistent with user safety.

## **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and

compliance with which means the effect normally will be determined to be less than significant.” The thresholds of significance used for this EIR to determine the significance of environmental effects related to aesthetics are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form:

Would the project:

- (a) Have a substantial adverse effect on a scenic vista?
- (b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?
- (c) Substantially degrade the existing visual character or quality of the site and its surroundings?
- (d) Create a new source of light and glare which would adversely affect day or nighttime views in the area?

## **POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION MEASURES**

### **AE-1: Clearing and Construction Activity May Degrade Visual Quality of the Project Site**

Project clearing, grading, and construction activities may temporarily degrade the visual quality of the project site as these activities can result in unsightly conditions for nearby residents and people traveling through the area, including but not limited to, litter, dust, graffiti, equipment parking, and materials storage and stockpiling. Incorporation of the mitigation measures below would reduce this potentially significant temporary impact to an insignificant level.

#### **Mitigation Measures**

- AE-1.1 During the project clearing, grading, and construction phases, a chain-link fence six feet in height shall be maintained around the project sites and a solid fence or wall at least six feet in height shall be maintained around the construction staging area. A chain-link fence draped with heavy plastic is suitable for this purpose.
- AE-1.2 The project contractor shall store construction materials that may be on the site for more than 48 hours within the construction staging area, and the project contractor shall park or store construction equipment within the construction staging area. Construction materials or equipment shall not be stored on public streets, and the project contractor shall remove construction materials and equipment from the site when no further need exists for materials or equipment.
- AE-1.3 The project contractor shall keep properties and streets surrounding the project site free from project-related rubbish and debris by removing any rubbish or debris the day it appears.
- AE-1.4 Any excess excavated material shall be removed from the site immediately following completion of the excavation activity that resulted in the material.
- AE-1.5 The project contractor shall remove any graffiti on the project sites within 48 hours of the time it appears.
- AE-1.6 The project contractor shall place all portable restrooms within the construction staging area.

## **AE-2: Increase in Illumination and Glare Due to Project Lighting, Building Surfaces and Parking Areas**

Buildout of the CCMC expansion would replace the previous vacant land with structures and other site improvements that will create interior operational lighting and exterior lighting for vehicle parking areas, pathways, and site security. Street lighting and lighting from vehicles accessing the hospital will increase on the public streets accessing the project site. Light reflecting off building surfaces and parking areas during daylight hours has the potential to create a source of glare in the vicinity of the project site. However, it is important to note that the CCMC project site already partially developed and within an urbanizing area; thus, these impacts are more incremental in nature rather than new impacts to an undeveloped area.

Installation of streetlights and the additional traffic from the project could also incrementally increase light and glare within the context of a developing urban area. The street lights would be subject to City design standards, which require that the light fixtures preclude sky-reflected and direct glare and concentrate illumination on the street and sidewalk areas and not on adjoining residential properties.

The following mitigation measures have been added to the project to reduce potential impacts related to visual impacts. Incorporation of the mitigation measures will reduce the impact to a less than significant level.

### **Mitigation Measures**

- AE-2.1 Parking lot lighting shall employ full cut-off type fixtures. A full cut-off type fixture is a luminaire or light fixture that, by design of the housing, does not allow light dispersion or direct glare to shine above a 90-degree horizontal plane from the base of the fixture. Full cut-off type fixtures must be installed in a horizontal position as designed.
- AE-2.2 The design of external signs and lighting shall prevent direct glare on adjoining properties.
- AE-2.3 The design for the buildings east of Medical Center Drive East shall incorporate exterior materials designed to minimize reflective glare from the exterior surfaces.

## **LESS THAN SIGNIFICANT IMPACTS**

### **AE-3: Effects on Scenic Vistas, Resources, and Existing Visual Character**

The project would have no significant long-term detrimental impacts on scenic vistas, scenic resources, or the visual character or quality of the site. No state-designated scenic highways or locally-designated scenic routes exist near the site, and visual reconnaissance of the project site did not identify any scenic resources on or near the project site including, but not limited to, specimen or heritage trees, rock outcroppings, or historic buildings. Based on visual reconnaissance, there are no aesthetic impacts related to proximity to the Enterprise Canal. Consistent with the Clovis General Plan, the development is oriented to capitalize on views of the Sierra Nevada while generally preserving existing views of the surrounding foothills and mountains. Further, from an aesthetic and design standpoint the proposed facilities will be appropriate in the context of the existing medical complex and will not appreciably impact views from residential properties to the east of the Enterprise Canal.

Regarding the widening of Herndon Avenue, while the proposal would likely change the visual character of the existing mostly rural streetscape along Herndon Avenue east of the CCMC campus, such a change would not necessarily result in a degradation of visual character or quality. This section of Herndon Avenue has been planned as an arterial roadway, and the road widening would be consistent with that designation and with the existing design of Herndon Avenue to the west. Further,

conformance to design guidelines and land use policies should act to prevent any significant detrimental impacts on views and visual character along Herndon Avenue.

### **CUMULATIVE IMPACTS**

The environmental impact report for the City of Clovis General Plan concluded that the cumulative adverse impacts upon the community's aesthetic conditions anticipated to occur due to the projected urban growth and development would not be considerable. This determination was based upon the provisions of numerous General Plan goals and policies and implementing requirements of the City's Zoning Ordinance which promote the visual quality and compatibility of new development. The project would have no impacts that would be inconsistent with the analysis and findings of the EIR for the general plan.

### **SOURCES CONSULTED**

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. SCH No. 2012061069. June 2014.

California State Department of Transportation, Office of State Landscape Architecture. "Officially Designated State Scenic Highways and Officially Designated County Scenic Highways." <http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm>. Accessed July 10, 2017.

Sierra Valley Cultural Planning. *A Cultural Resources Assessment for the Proposed Clovis Community Medical Center Expansion and Herndon Avenue Widening Project, Herndon and Temperance Avenues, City of Clovis, Fresno County, California*. January 26, 2017.

# **CHAPTER 4**

## **Agricultural and Forestry Resources**

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### **INTRODUCTION**

This chapter identifies and discusses potential environmental effects the project may have related to agricultural and forestry resources. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to agricultural and forestry resources; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of the project on agricultural and forestry resources; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### **ENVIRONMENTAL SETTING**

#### **Regional**

Fresno County is home to 1.88 million acres of the world's most productive farmland, with agricultural operations covering nearly half of the county's entire land base of 3.84 million acres and producing more than 400 different crops. Like most counties in the San Joaquin Valley, Fresno County is experiencing rapid non-agricultural growth, which is causing the loss of significant amounts of agricultural acreage. According to the Department of Conservation, 3,323 acres of agricultural land in Fresno County were converted to non-agricultural use between 2010 and 2012, and an additional 1,150 acres of agricultural land were converted to non-agricultural use between 2012 and 2014.

Eastern Fresno County is home to forest and timberlands located within the Sierra National Forest and the northern part of the Sequoia National Forest. Both National Forests lie partially within neighboring counties and encompass just over 1 million acres within Fresno County. Forest and timberlands are also found within Sequoia and Kings Canyon National Parks, but these resources are protected from harvesting by the U.S. Department of the Interior.

#### **Project Site and Surrounding Area**

The area encompassed in the CCMC expansion and Herndon Avenue widening does not contain any agricultural land, nor are there any lands immediately adjacent to the project site that are currently under agricultural cultivation. Approximately 42 acres of the project site are vacant/fallow land. Previously, the portion of the vacant project area west of Temperance Avenue was cultivated as citrus orchards; however, these orchards were slated for removal and analyzed under the previous CCMC Expansion Master Plan EIR (2009), and those areas have been fallow since 2014. The nearest significant agricultural lands are located approximately two miles east of the easternmost part of the Herndon Avenue widening area. There are no forests or timberlands located within or adjacent to the project site.

#### **Soils**

Eight soil types have been identified on the project site. The soils are listed in Table 4.1 and their locations within the project site are shown on Figure 4.1.

The United States Department of Agriculture uses several methods for describing the capability of a given soil to support various uses. One description of the breadth of uses supported by a soil is its Capability Class, designated by Roman numerals I through VIII. Class I soils have few limitations

that restrict their use, while Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both. Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both. Subclass “s” is made up of soils that have soil limitations within the rooting zone, such as shallowness of the rooting zone, stones, low moisture-holding capacity, low fertility that is difficult to correct, and salinity or sodium content. Subclass “e” is made up of soils for which the susceptibility to erosion is the dominant problem or hazard affecting their use. Erosion susceptibility and past erosion damage are the major soil factors that affect soils in this subclass (USDA NRCS 2016).

Another useful description of the suitability of a given soil for intensive agriculture is the Storie Index rating. This index considers soil characteristics, texture, slope, and other limiting factors, and assigns a rating of up to 100. A rating of 100 expresses the most favorable conditions for crop production. For simplification, Storie Index ratings have been combined into six grade classes as follows: Grade 1 (excellent), 81 to 100; grade 2 (good), 61 to 80; grade 3 (fair), 41 to 60; grade 4 (poor), 21 to 40; grade 5 (very poor), 11 to 20; and grade 6 (nonagricultural), 10 or less. The Storie Index ratings of the on-site soils range from excellent (1) to very poor (5) (USDA NRCS 2016).

**Table 4.1**  
**Project Site Soils and Agricultural Capability**

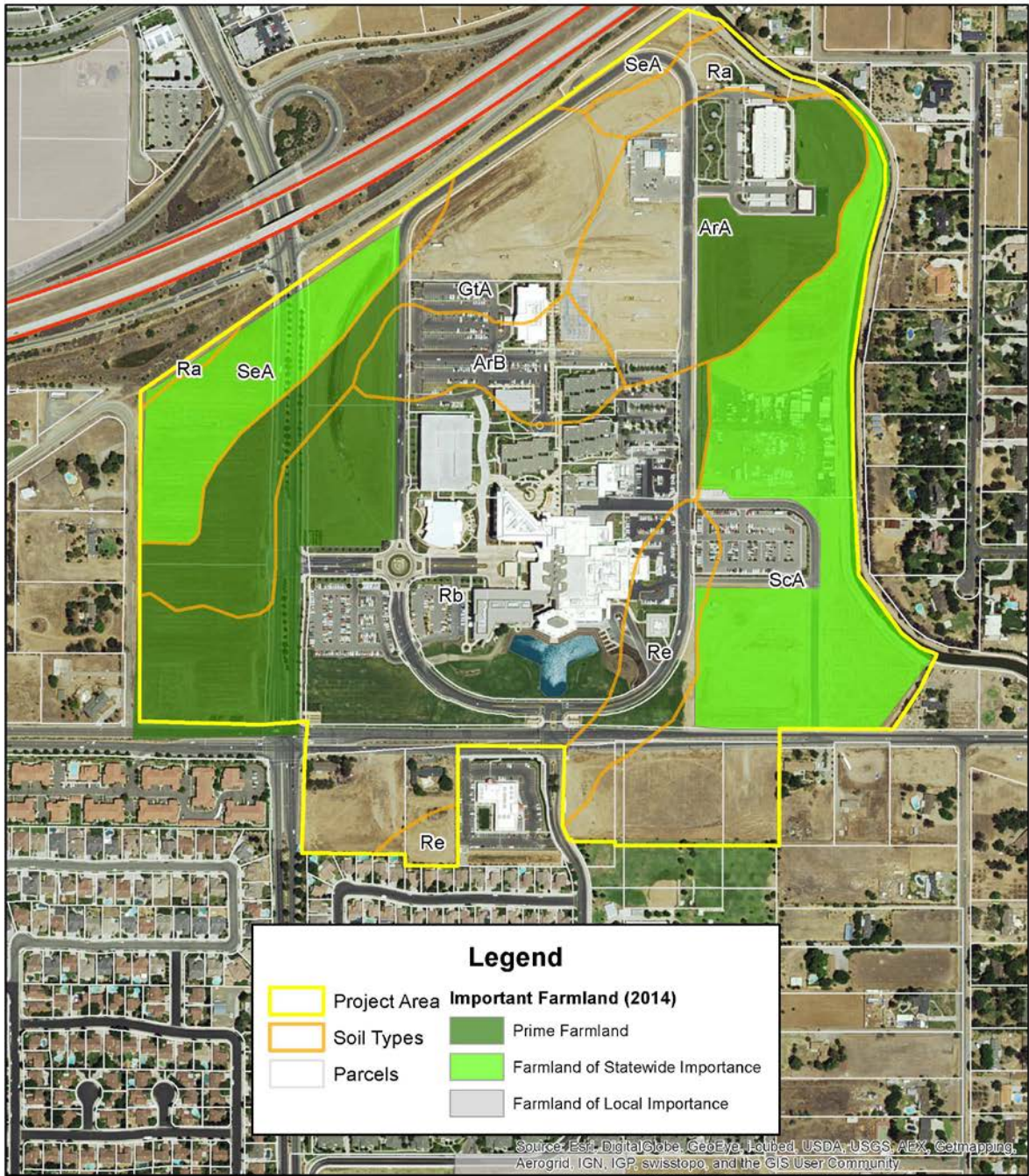
| <b>Soil</b>   | <b>Approximate Site Area (acres)</b> | <b>Capability Classification</b> | <b>CA Revised Storie Index Rating - Grade</b> | <b>FMMP Rating<sup>a</sup></b>   | <b>Acres of FMMP in Project Area</b> |
|---|--------------------------------------|----------------------------------|---|----------------------------------|--------------------------------------|
| Atwater sandy loam, 0 to 3 percent slopes (ArA)     | 20.5                                 | IIs                              | 1   | Prime Farmland                   | 7.4                                  |
| Atwater sandy loam, 3 to 9 percent slopes (ArB)     | 7.8                                  | Ile                              | 1   | Prime Farmland                   | 0.9                                  |
| Greenfield sandy loam, 0 to 3 percent slopes (GtA)  | 18.3                                 | I                                | 1   | Prime Farmland                   | 8.2                                  |
| Ramona sandy loam (Ra)                              | 3.9                                  | I                                | 1   | Farmland of Statewide Importance | 0.3                                  |
| Ramona sandy loam, hard substratum (Rb)             | 54.2                                 | IIs                              | 3   | Prime Farmland                   | 12.7                                 |
| Ramona loam, hard substratum (Re)                   | 8.1                                  | IIs                              | 3   | Farmland of Statewide Importance | 0.2                                  |
| San Joaquin sandy loam, 0 to 3 percent slopes (ScA) | 33.3                                 | IVs                              | 5   | Farmland of Statewide Importance | 22.3                                 |
| San Joaquin loam, 0 to 3 percent slopes (SeA)       | 12.0                                 | IIIs                             | 4   | Farmland of Statewide Importance | 9.1                                  |

Source: USDA Natural Resources Conservation Service, Web Soil Survey

a – FMMP Ratings / Farmland Classification definitions are given in Table 4.2



**Figure 4.1 – Important Farmland and Soils Map**



Source: NRCS Web Soil Survey, County of Fresno, City of Clovis, ESRI

### Important Farmland and Soils Map

Clovis Community Medical Center Master Plan Expansion Project  
City of Clovis

ODELL Planning & Research, Inc.

**Figure 4.1**



## REGULATORY SETTING

### State Regulations

#### *Farmland Mapping and Monitoring Program*

The California Department of Conservation administers the Farmland Mapping and Monitoring Program (FMMP), which evaluates the quality of farmlands throughout the State. The suitability of the local soil resources plays a crucial part in the FMMP's farmland classifications. The FMMP uses the U.S. Department of Agriculture Natural Resource Conservation Service (USDA NRCS) soil survey information, land inventory, and monitoring criteria to classify most of the state's agricultural regions into five agricultural and three nonagricultural land types. Every two years, the FMMP publishes this information in its Important Farmland map series. The five agricultural and three nonagricultural land classifications are described in Table 4.2 below. Figure 4.1 above displays farmland classifications for the project area.

**Table 4.2**  
**FMMP Farmland Classifications**

| <b>Land Classification</b>       | <b>Class Description</b>   |
|----------------------------------|--|
| Prime Farmland                   | Prime farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.   |
| Farmland of Statewide Importance | Farmland of Statewide Importance is similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.   |
| Unique Farmland                  | Unique Farmland consists of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.   |
| Farmland of Local Importance     | Farmland of Local Importance is land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee  |
| Grazing Land                     | Grazing Land is land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.  |
| Urban and Built-up Land          | Urban and Built-up Land is occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures.   |
| Water                            | Water is defined as perennial water bodies with an extent of at least 40 acres.  |
| Other Land                       | Other Land is land not included in any other mapping category. Common examples include low density rural developments, vegetative and riparian areas not suitable for livestock grazing, confined animal agriculture facilities, strip mines, borrow pits, and water bodies smaller than 40 acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land. |

Source: State of California, Department of Conservation

*California Land Conservation Act (Williamson Act):*

The California Land Conservation Act, better known as the Williamson Act, has been the state's premier agricultural land protection program since its enactment in 1965. The Williamson Act preserves agricultural and open space lands through property tax incentives and voluntary restrictive use contracts. Private landowners voluntarily restrict their land to agricultural and compatible open-space uses under minimum 10-year rolling term contracts with local governments. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual income-producing use, rather than potential market value.

According to the Department of Conservation's most current map of Williamson Act land in Fresno County, none of the land within the project site is under Williamson Act contract. The nearest land under Williamson Act contract is located approximately one mile southeast of the project site.

**Local Regulations**

*City of Clovis General Plan and Zoning Ordinance*

The City of Clovis General Plan contains several references throughout its text that emphasize the importance of protecting and preserving agriculture, including in the Land Use Element, Circulation Element, and Open Space and Conservation Element. The City of Clovis' Zoning Ordinance does not include any zoning designations for agricultural use.

*Fresno County General Plan*

The Agriculture and Land Use Element of the Fresno County General Plan contains policies that seek to sustain agriculture by protecting agricultural activities from incompatible land uses, promoting agricultural land preservation programs, developing programs to preserve or maintain soil conditions or improve soil productivity, facilitating agricultural production by supplying adequate land for support services, and controlling expansion of non-agricultural development onto productive agricultural lands.

*Fresno County Zoning Ordinance*

The Fresno County Zoning Ordinance includes two primary zoning designations for agricultural areas: the "AE" (Exclusive Agricultural) Zone District and the "AL" (Limited Agricultural) Zone District. The AE Zone District is intended to be an exclusive district for agriculture and for those uses which are necessary and an integral part of the agricultural operation. This district is intended to protect the general welfare of the agricultural community from encroachments of non-related agricultural uses which by their nature would be injurious to the physical and economic well-being of the agricultural district. There are no AE-zoned parcels in the vicinity of the project site.

The AL Zone District is a limited agricultural district intended to protect the general welfare of the agricultural community by limiting intensive uses in agricultural areas where such uses may be incompatible with, or injurious to, other less intensive agricultural operations. The District is also intended to reserve and hold certain lands for future urban use by permitting limited agriculture and by regulating those more intensive agricultural uses which, by their nature, may be injurious to non-agricultural uses in the vicinity or inconsistent with the express purpose of reservation for future urban use. While the CCMC expansion area does not include any agriculturally-zoned parcels, some of the parcels along Herndon Avenue between Locan Avenue and the southern leg of De Wolf Avenue are zoned AL-20 (Limited Agricultural, 20-acre minimum parcel size).

## **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.” The thresholds of significance used for this EIR to determine the significance of environmental effects related to agricultural and forestry resources are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section II, a through e:

Would the project:

- (a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
- (b) Conflict with existing zoning for agricultural use, or with a Williamson Act contract?
- (c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?
- (d) Result in loss of forest land or conversion of forest land to non-forest use?
- (e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

## **LESS THAN SIGNIFICANT IMPACTS**

### **AG-1: Conversion of Mapped Farmland on the Project Site to Non-Agricultural Use**

### **AG-2: Conversion of Other Farmland to Non-Agricultural Use Due to Changes to the Existing Environment**

Although portions of the project site are still identified as Prime Farmland (29.2 acres) and Farmland of Statewide Importance (31.9 acres) in the 2014 California Important Farmland Finder, this land has not been used for agricultural purposes since 2014 when the citrus orchards occupying these lands were removed. The land is not planned by CCMC to ever be used for agricultural purposes, and much of this land has been converted to turfed open space for the CCMC campus, which will be used for building purposes as the campus expands. The project vicinity is not agricultural in nature, and as discussed in Chapter 13 of this EIR (Land Use), the areas to the north, south, and west of the project site are urbanized and the area to the east of the project site has been substantially developed with rural residential uses. The nearest significant agricultural lands are located approximately two miles east of the project site. Based on the above, the project’s impacts related to the conversion of agricultural land are considered less than significant.

## **NO IMPACT**

The CCMC expansion area does not include any agriculturally-zoned land. While portions of the Herndon Avenue widening area are zoned Limited Agricultural, the proposed road widening does not contradict or conflict with any provisions of Fresno County’s AL Zone District. Additionally, none of the land within the project site is under Williamson Act contract.

No impacts to forest land, timberland, or timberland zoned Timberland Production would result from the project as there are no forests or timberlands located within or adjacent to the project site.

## CUMULATIVE IMPACTS

The Clovis General Plan EIR (2014) identified the loss of agricultural land resulting from General Plan implementation as a significant and unavoidable impact. Since the cumulative effect of the project site development was taken into account in the General Plan EIR, the analysis and conclusions of the General Plan EIR would not change as a result of the project. The project is also consistent with the goals and policies of the Fresno County General Plan directing growth toward existing urban areas in order to preserve agricultural areas. Based on the above, plus the conclusion of this EIR that the impacts of the project related to conversion of agricultural land are less than significant, the impact of the project on agricultural resources would not be cumulatively considerable.

## SOURCES CONSULTED

California, State of, Department of Conservation (2016). California Agricultural Land Evaluation and Site Assessment Model. Available at [http://www.conservation.ca.gov/dlrp/Pages/qh\\_lesa.aspx](http://www.conservation.ca.gov/dlrp/Pages/qh_lesa.aspx)

California, State of. Department of Conservation, Division of Land Resource Protection. Farmland Mapping and Monitoring Program. 2014.

California, State of. Department of Conservation, Division of Land Resource Protection, *Farmland Mapping and Monitoring Program: Fresno County Important Farmland 2014* (map and mapper available at <http://maps.conservation.ca.gov/>).

California, State of. Department of Conservation, Division of Land Resource Protection. *Williamson Act Program: Fresno County Williamson Act FY 2015-2016* (map).

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. SCH No. 2012061069. June 2014.

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Fresno County Farm Bureau. *2013 Annual Agricultural Crop and Livestock Report*. Accessed November 16, 2015.

Fresno County Farm Bureau. 2015. *Press Kit*. Accessed November 16, 2015. <http://www.fcfb.org/PDF-Files/Fresno%20Ag/Press%20Kit%202014.pdf>

Fresno, County of. *Fresno County General Plan Update, Public Review Draft Background Report*. January 2000.

Google Earth (Version 5.2.1.1588) [Software]. Mountain View, CA: Google Inc. (2016). Available from <http://www.google.com/earth/index.html>

Natural Resources Conservation Service, United States Department of Agriculture. *Web Soil Survey*. Accessed June 15, 2016. <http://websoilsurvey.nrcs.usda.gov/>

# CHAPTER 5

## Air Quality

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### INTRODUCTION

This chapter identifies and evaluates the potential environmental effects of the project related to air quality. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to air quality; (2) the thresholds of significance used to determine the significance of any environmental effects; (3) the direct and indirect effects of project related to air quality; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

The analysis in this chapter is based upon an Air Quality and Greenhouse Gas Impact Analysis prepared for this EIR by Ambient Air Quality & Noise Consulting. (*Air Quality & Greenhouse Gas Analysis for the Master Plan Expansion of the Clovis Community Medical Center Project, Clovis, California – July 2017*). The report is included in the Draft EIR as Appendix 5.

### ENVIRONMENTAL SETTING

The project is located in the San Joaquin Valley Air Basin (SJVAB) and is subject to the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Air quality in the SJVAB is influenced by a variety of factors, including topography, local and regional meteorology. Factors affecting regional and local air quality are discussed below.

#### **Topography, Meteorology, and Pollutant Dispersion**

The dispersion of air pollution in an area is determined by such natural factors as topography, meteorology, and climate, coupled with atmospheric stability conditions and the presence of inversions. The factors affecting the dispersion of air pollution with respect to the SJVAB are discussed below.

##### *Topography*

The SJVAB occupies the southern half of the Central Valley. The SJVAB is open to the north, and is surrounded by mountain ranges on all other sides. The Coast Ranges, which have an average elevation of 3,000 feet, are along on the western boundary of the SJVAB, while the Sierra Nevada Mountains (8,000 to 14,000 feet in elevation) are along the eastern border. The San Emigdio Mountains, which are part of the Coast Ranges, and the Tehachapi Mountains, which are part of the Sierra Nevada, form the southern boundary, and have an elevation of 6,000 to 8,000 feet. The SJVAB is mostly flat with a downward gradient in terrain to the northwest.

##### *Meteorology and Climate*

The SJVAB has an inland Mediterranean climate that is strongly influenced by the presence of mountain ranges. The mountain ranges to the west and south induce winter storms from the Pacific Ocean to release precipitation on the western slopes producing a partial rain shadow over the valley. In addition, the mountain ranges block the free circulation of air to the east, trapping stable air in the valley for extended periods during the cooler half of the year.

Winter in the SJVAB is characterized as mild and fairly humid, while the summer is typically hot, dry, and cloudless. The climate is a result of the topography and the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer months, the Pacific high-pressure cell



is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below to the surface as a result of the northwesterly flow produces a band of cold water off the California coast. In winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms.

The annual temperature, humidity, precipitation, and wind patterns reflect the topography of the SJVAB and the strength and location of the semi-permanent, subtropical high-pressure cell. Summer temperatures that often exceed 100 degrees Fahrenheit (°F) and clear sky conditions are favorable to ozone formation. Most of the precipitation in the valley occurs as rainfall during winter storms. The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions, which can result in higher pollutant concentrations. The orientation of the wind flow pattern in the SJVAB is parallel to the valley and mountain ranges. Summer wind conditions promote the transport of ozone and precursors from the San Francisco Bay Area through the Carquinez Strait, a gap in the Coast Ranges, and low mountain passes such as Altamont Pass and Pacheco Pass. During the summer, predominant wind direction is from the northwest. During the winter, the predominant wind direction is from the southeast. Calm conditions are also predominant during the winter.

The climate is semi-arid, with an annual normal precipitation of approximately 11 inches. Temperatures in the project area range from a normal minimum of 38°F, in January, to a normal maximum of 98°F, in July.

#### *Atmospheric Stability and Inversions*

Stability describes the resistance of the atmosphere to vertical motion. The stability of the atmosphere is dependent on the vertical distribution of temperature with height. Stability categories range from “Extremely Unstable” (Class A), through Neutral (Class D), to “Stable” (Class F). Unstable conditions often occur during daytime hours when solar heating warms the lower atmospheric layers sufficiently. Under Class A stability conditions, large fluctuations in horizontal wind direction occur coupled with large vertical mixing depths. Under Class B stability conditions, wind direction fluctuations and the vertical mixing depth are less pronounced because of a decrease in the amount of solar heating. Under Class C stability conditions, solar heating is weak along with horizontal and vertical fluctuations because of a combination of thermal and mechanical turbulence. Under Class D stability conditions, vertical motions are primarily generated by mechanical turbulence. Under Class E and Class F stability conditions, air pollution emitted into the atmosphere travels downwind with poor dispersion. The dispersive power of the atmosphere decreases with progression through the categories from A to F.

With respect to the SJVAB, Classes D through F are predominant during the late fall and winter because of cool temperatures and entrapment of cold air near the surface. March and August are transition months with equally occurring percentages of Class F and Class A. During the spring months of April and May and the summer months of June and July, Class A is predominant. The fall months of September, October, and November have comparable percentages of Class A and Class F.

An inversion is a layer of warmer air over a layer of cooler air. Inversions influence the mixing depth of the atmosphere, which is the vertical depth available for diluting air pollution near the ground, thus significantly affecting air quality conditions. The SJVAB experiences both surface-based and elevated inversions. The shallow surface-based inversions are present in the morning but are often broken by daytime heating of the air layers near the ground. The deep elevated inversions occur less frequently than the surface-based inversions but generally result in more severe stagnation. The surface-based

inversions occur more frequently in the fall, and the stronger elevated inversions usually occur during December and January.

### Criteria Air Pollutants

For the protection of public health and welfare, the Federal Clean Air Act (FCAA) required that the United States Environmental Protection Agency (US EPA) establish National Ambient Air Quality Standards (NAAQS) for various pollutants. These pollutants are referred to as "criteria" pollutants because the US EPA publishes criteria documents to justify the choice of standards. These standards define the maximum amount of an air pollutant that can be present in ambient air without harm to the public's health. An ambient air quality standard is generally specified as a concentration averaged over a specific time period, such as one hour, eight hours, 24 hours, or one year. The different averaging times and concentrations are meant to protect against different exposure effects. The FCAA allows states to adopt additional or more health-protective standards. The air quality regulatory framework and ambient air quality standards are discussed in greater detail later in this report.

The following provides a summary discussion of the primary and secondary criteria air pollutants of primary concern. In general, primary pollutants are directly emitted into the atmosphere, and secondary pollutants are formed by chemical reactions in the atmosphere.

**Ozone ( $O_3$ )** is a reactive gas consisting of three atoms of oxygen. In the troposphere, it is a product of the photochemical process involving the sun's energy. It is a secondary pollutant that is formed when  $NO_x$  and volatile organic compounds (VOC) react in the presence of sunlight. Ozone at the earth's surface causes numerous adverse health effects and is a criteria pollutant. It is a major component of smog. In the stratosphere, ozone exists naturally and shields Earth from harmful incoming ultraviolet radiation.

High concentrations of ground level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments. Ozone also damages natural ecosystems such as forests and foothill communities, agricultural crops, and some man-made materials, such as rubber, paint, and plastics.

**Reactive Organic Gas (ROG)** is a reactive chemical gas, composed of hydrocarbon compounds that may contribute to the formation of smog by their involvement in atmospheric chemical reactions. No separate health standards exist for ROG as a group. Because some compounds that make up ROG are also toxic, like the carcinogen benzene, they are often evaluated as part of a toxic risk assessment. Total Organic Gases (TOGs) includes all of the ROGs, in addition to low reactivity organic compounds like methane and acetone. ROGs and VOC are subsets of TOG.

**Volatile Organic Compounds (VOC)** are hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and may also be toxic. VOC emissions are a major precursor to the formation of ozone. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

**Oxides of Nitrogen ( $NO_x$ )** are a family of gaseous nitrogen compounds and is a precursor to the formation of ozone and particulate matter. The major component of  $NO_x$ , nitrogen dioxide ( $NO_2$ ), is a reddish-brown gas that is toxic at high concentrations.  $NO_x$  results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

**Particulate Matter (PM)**, also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components,



including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. U.S. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. U.S. EPA groups particle pollution into three categories based on their size and where they are deposited:

- "Inhalable coarse particles (PM<sub>2.5-10</sub>)," such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. PM<sub>2.5-10</sub> is deposited in the thoracic region of the lungs.
- "Fine particles (PM<sub>2.5</sub>)," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.
- "Ultrafine particles (UFP)," are very small particles less than 0.1 micrometers in diameter largely resulting from the combustion of fossil fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of PM<sub>2.5</sub>, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM<sub>10</sub>, PM<sub>2.5</sub>, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, PM<sub>2.5</sub> and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM<sub>10</sub> sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust.

Numerous scientific studies have linked both long- and short-term particle pollution exposure to a variety of health problems. Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and also acute (short-term) bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short term exposures, although they may experience temporary minor irritation when particle levels are elevated.

**Carbon Monoxide (CO)** is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air (unlike ozone). The main source of CO is on-road motor vehicles. Other CO sources include other mobile sources, miscellaneous processes, and fuel combustion from stationary sources. Because of the local nature of CO problems, CARB and U.S. EPA designate urban areas as CO nonattainment areas instead of the entire basin as with ozone and PM<sub>10</sub>. Motor vehicles are by far the largest source of CO emissions. Emissions from motor vehicles have been declining since 1985, despite increases in vehicle miles traveled, with the introduction of new automotive emission controls and fleet turnover.

**Sulfur Dioxide (SO<sub>2</sub>)** is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. However, like airborne NO<sub>x</sub>, suspended SO<sub>x</sub> particles contribute to the poor visibility. These SO<sub>x</sub> particles can also combine with other pollutants to form PM<sub>2.5</sub>. The prevalence of low-sulfur fuel use has minimized problems from this pollutant.

**Lead (Pb)** is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. The health effects of lead poisoning include loss of appetite, weakness, apathy, and miscarriage. Lead can also cause lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically.

**Hydrogen Sulfide (H<sub>2</sub>S)** is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations; especially in enclosed spaces (800 ppm can cause death). OSHA regulates workplace exposure to H<sub>2</sub>S.

### Other Pollutants

The State of California has established air quality standards for some pollutants not addressed by Federal standards. The California Air Resources Board (CARB or the ARB) has established State standards for hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. The following section summarizes these pollutants and provides a description of the pollutants' physical properties, health and other effects, sources, and the extent of the problems.

**Sulfates (SO<sub>4</sub><sup>2-</sup>)** are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO<sub>2</sub> during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO<sub>2</sub> to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The ARB sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilator function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property.

**Visibility Reducing Particles:** Are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

**Vinyl Chloride (C<sub>2</sub>H<sub>3</sub>Cl or VCM)** is a colorless gas that does not occur naturally. It is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC) which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

## Odors

Typically, odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from the psychological (i.e. irritation, anger, or anxiety) to the physiological, including circulatory and respiratory effects, nausea, vomiting, and headache.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor and in fact an odor that is offensive to one person may be perfectly acceptable to another (e.g., a fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Neither the state nor the federal governments have adopted rules or regulations for the control of odor sources. The San Joaquin Valley Air Pollution Control District (SJVAPCD) does not have an individual rule or regulation that specifically addresses odors; however, odors would be applicable to SJVAPCD's Rule 4102, Nuisance. Any actions related to odors would be based on citizen complaints to local governments and the SJVAPCD.

## Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants that may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air, but due to their high toxicity, they may pose a threat to public health even at very low concentrations. Because there is no threshold level below which adverse health impacts are not expected to occur, TACs differ from criteria pollutants for which acceptable levels of exposure can be determined and for which state and federal governments have set ambient air quality standards. TACs, therefore, are not considered "criteria pollutants" under either the FCAA or the California Clean Air Act (CCAA), and are thus not subject to National or California ambient air quality standards (NAAQS and CAAQS, respectively). TACs are not considered criteria pollutants in that the federal and California Clean Air Acts do not address them specifically through the setting of NAAQS or CAAQS; instead, the US EPA and CARB regulate Hazardous Air Pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology to limit emissions. In conjunction with District rules, these federal and state statutes and regulations establish the regulatory framework for TACs. At the national levels, the US EPA has established National Emission Standards for HAPs (NESHAPs), in accordance with the requirements of the FCAA and subsequent amendments. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

Within California, TACs are regulated primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for CARB to designate substances as TACs.

#### *Diesel Particulate Matter (DPM)*

The Air Quality Analysis prepared for the project particularly identifies and discusses Diesel Particulate Matter (DPM). Identified as a TAC by CARB in August 1998, DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute approximately 40 percent of the statewide total, with an additional 57 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about 3 percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations. Emissions from these sources are from diesel-fueled internal combustion engines. Stationary sources that report DPM emissions also include heavy construction, manufacturers of asphalt paving materials and blocks, and diesel-fueled electrical generation facilities (CARB 2013).

In October 2000, CARB issued a report entitled: “Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles”, which is commonly referred to as the Diesel Risk Reduction Plan (DRRP). The DRRP provides a mechanism for combating the DPM problem. The goal of the DRRP is to reduce concentrations of DPM by 85 percent by the year 2020, in comparison to year 2000 baseline emissions. The key elements of the DRRP are to clean up existing engines through engine retrofit emission control devices, to adopt stringent standards for new diesel engines, and to lower the sulfur content of diesel fuel to protect new, and very effective, advanced technology emission control devices on diesel engines. When fully implemented, the DRPP will significantly reduce emissions from both old and new diesel fueled motor vehicles and from stationary sources that burn diesel fuel. In addition to these strategies, the ARB continues to promote the use of alternative fuels and electrification. As a result of these actions, DPM concentrations and associated health risks in future years are projected to decline (CARB 2013).

Exposure to DPM can have immediate health effects. DPM can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. Exposure to DPM also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Because children’s lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, DPM has been identified as a carcinogen.

#### **Asbestos**

Asbestos is a term used for several types of naturally-occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. Serpentine rock often contains chrysotile asbestos. Serpentine rock, and its parent material, ultramafic rock, is abundant in the Sierra foothills, the Klamath Mountains, and Coast Ranges. The project site, however, is not located in an area of known ultramafic rock.

Asbestos is commonly found in ultramafic rock, including serpentine, and near fault zones. The amount of asbestos that is typically present in these rocks range from less than one percent up to about 25 percent, and sometimes more. Asbestos is released from ultramafic and serpentine rock when it is broken or crushed. This can happen when cars drive over unpaved roads or driveways which are surfaced with these rocks, when land is graded for building purposes, or at quarrying operations. It is

also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time.

Additional sources of asbestos include building materials and other manmade materials. The most common sources are heat-resistant insulators, cement, furnace or pipe coverings, inert filler material, fireproof gloves and clothing, and brake linings. Asbestos has been used in the United States since the early 1900's; however, asbestos is no longer allowed as a constituent in most home products and materials. Many older buildings, schools, and homes still have asbestos containing products.

Naturally-occurring asbestos was identified by CARB as a TAC in 1986. CARB has adopted two statewide control measures which prohibits the use of serpentine or ultramafic rock for unpaved surfacing and controls dust emissions from construction, grading, and surface mining in areas with these rocks. Various other laws have also been adopted, including laws related to the control of asbestos-containing materials during the renovation and demolition of buildings.

All types of asbestos are hazardous and may cause lung disease and cancer. Health risks to people are dependent upon their exposure to asbestos. The longer a person is exposed to asbestos and the greater the intensity of the exposure, the greater the chances for a health problem. Asbestos-related disease, such as lung cancer, may not occur for decades after breathing asbestos fibers. Cigarette smoking increases the risk of lung cancer from asbestos exposure.

### **Valley Fever**

Valley fever is an infection caused by the fungus *Coccidioides*. The scientific name for valley fever is “coccidioidomycosis,” and it is also sometimes called “desert rheumatism.” The term “valley fever” usually refers to *Coccidioides* infection in the lungs, but the infection can spread to other parts of the body in severe cases.

*Coccidioides* spores circulate in the air after contaminated soil and dust are disturbed by humans, animals, or the weather. The spores are too small to see without a microscope. When people breathe in the spores, they are at risk for developing valley fever. After the spores enter the lungs, the person's body temperature allows the spores to change shape and grow into spherules. When the spherules get large enough, they break open and release smaller pieces (called endospores) which can then potentially spread within the lungs or to other organs and grow into new spherules. In extremely rare cases, the fungal spores can enter the skin through a cut, wound, or splinter and cause a skin infection.

Symptoms of valley fever may appear between 1 and 3 weeks after exposure. Symptoms commonly include: fatigue, coughing, fever, shortness of breath, headaches, night sweats, muscle aches and joint pain, and rashes on the upper body or legs.

Approximately 5 to 10 percent of people who get valley fever will develop serious or long-term problems in their lungs. In an even smaller percent of people (about 1 percent), the infection spreads from the lungs to other parts of the body, such as the central nervous system (brain and spinal cord), skin, or bones and joints. Certain groups of people may be at higher risk for developing the severe forms of valley fever, such as people who have weakened immune systems. The fungus that causes valley fever, *Coccidioides*, cannot spread from the lungs between people or between people and animals. However, in extremely rare instances, a wound infection with *Coccidioides* can spread valley fever to someone else, or the infection can be spread through an organ transplant with an infected organ.

For many people, the symptoms of valley fever will go away within a few months without any treatment. Healthcare providers choose to prescribe antifungal medication for some people to try to reduce the severity of symptoms or prevent the infection from getting worse. Antifungal medication

is typically given to people who are at higher risk for developing severe valley fever. The treatment typically occurs over a period of roughly 3 to 6 months. In some instances, longer treatment may be required. If valley fever develops into meningitis, life-long antifungal treatment is typically necessary.

Scientists continue to study how weather and climate patterns affect the habitat of the fungus that causes valley fever. *Coccidioides* is thought to grow best in soil after heavy rainfall and then disperse into the air most effectively during hot, dry conditions. For example, hot and dry weather conditions have been shown to correlate with an increase in the number of valley fever cases in Arizona and in California. The ways in which climate change may be affecting the number of valley fever infections, as well as the geographic range of *Coccidioides*, is not known yet, but is a subject for further research (CDC 2016).

## REGULATORY AND POLICY SETTING

### Federal

#### *U. S. Environmental Protection Agency (US EPA)*

At the federal level, the US EPA is charged with implementing national air quality programs. The US EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (FCAA), which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990.

#### *Federal Clean Air Act (FCAA)*

The FCAA required the US EPA to establish National Ambient Air Quality Standards (NAAQS), and also set deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions. NAAQS are summarized in Table 5.1.

The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The FCAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The US EPA has responsibility to review all state SIPs to determine conformance with the mandates of the FCAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If the US EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures.

**Table 5.1**  
**Summary of Ambient Air Quality Standards**

| Pollutant                                    | Averaging Time | California Standards* | National Standards* (Primary) |
|--|----------------|-----------------------|-------------------------------|
| Ozone (O <sub>3</sub> )                      | 1-hour         | 0.09 ppm              | —                             |
|  | 8-hour         | 0.070 ppm             | 0.070 ppm                     |
| Particulate Matter (PM <sub>10</sub> )       | AAM            | 20 µg/m <sup>3</sup>  | —                             |
|  | 24-hour        | 50 µg/m <sup>3</sup>  | 150 µg/m <sup>3</sup>         |
| Fine Particulate Matter (PM <sub>2.5</sub> ) | AAM            | 12 µg/m <sup>3</sup>  | 12 µg/m <sup>3</sup>          |
|  | 24-hour        | No Standard           | 35 µg/m <sup>3</sup>          |
|  | 1-hour         | 20 ppm                | 35 ppm                        |

| Pollutant  | Averaging Time          | California Standards*  | National Standards* (Primary) |
|--|-------------------------|--|-------------------------------|
| Carbon Monoxide (CO)   | 8-hour                  | 9 ppm  | 9 ppm                         |
|  | 8-hour (Lake Tahoe)     | 6 ppm  | –                             |
| Nitrogen Dioxide (NO <sub>2</sub> )  | AAM                     | 0.030 ppm  | 53 ppb                        |
|  | 1-hour                  | 0.18 ppm   | 100 ppb                       |
| Sulfur Dioxide (SO <sub>2</sub> )  | AAM                     | –  | 0.03 ppm                      |
|  | 24-hour                 | 0.04 ppm   | 0.14 ppm                      |
|  | 3-hour                  | –  | 0.5 ppm (1300 µg/m3)***       |
|  | 1-hour                  | 0.25 ppm   | 75 ppb                        |
| Lead   | 30-day Average          | 1.5 µg/m3  | –                             |
|  | Calendar Quarter        | –  | 1.5 µg/m3                     |
|  | Rolling 3-Month Average | –  | 0.15 µg/m3                    |
| Sulfates   | 24-hour                 | 25 µg/m3   | No Federal Standards          |
| Hydrogen Sulfide   | 1-hour                  | 0.03 ppm (42 µg/m3)  |                               |
| Vinyl Chloride   | 24-hour                 | 0.01 ppm (26 µg/m3)  |                               |
| Visibility-Reducing Particle Matter  | 8-hour                  | Extinction coefficient: 0.23/kilometer-visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70%. |                               |
| <i>* For more information on standards visit :http://www.arb.ca.gov/research/aaqs/aaqs2.pdf</i><br><i>** No federal 1-hour standard. Reclassified extreme nonattainment for the federal 8-hour standard May 5, 2010.</i><br><i>***Secondary Standard</i><br><i>Source: ARB 2017b</i> |                         |  |                               |

### *Toxic Substances Control Act*

The Toxic Substances Control Act (TSCA) first authorized the US EPA to regulate asbestos in schools and Public and Commercial buildings under Title II of the law, which is also known as the Asbestos Hazard Emergency Response Act (AHERA). AHERA requires Local Education Agencies (LEAs) to inspect their schools for ACM and prepare management plans to reduce the asbestos hazard. The Act also established a program for the training and accreditation of individuals performing certain types of asbestos work.

### *National Emission Standards for Hazardous Air Pollutants*

Pursuant to the FCAA of 1970, the US EPA established the National Emission Standards for Hazardous Air Pollutants (NESHAP). These are technology-based source-specific regulations that limit allowable emissions of HAPs.

## State

### *California Air Resources Board*

The California Air Resources Board (CARB, or alternatively ARB) is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act of 1988. Other CARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts and air quality management districts, establishing California Ambient Air Quality Standards (CAAQS), which in many cases are more stringent than the NAAQS, and setting emissions standards for new motor vehicles. The CAAQS are summarized in Table 5.1 above. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

### *California Clean Air Act (CCAA)*

The CCAA requires that all air districts in the state endeavor to achieve and maintain CAAQS for Ozone, CO, SO<sub>2</sub>, and NO<sub>2</sub> by the earliest practical date. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with authority to regulate indirect sources. Each district plan is required to either (1) achieve a five percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each non-attainment pollutant or its precursors, or (2) to provide for implementation of all feasible measures to reduce emissions. Any planning effort for air quality attainment would thus need to consider both state and federal planning requirements.

### *California Assembly Bill 170*

Assembly Bill 170, Reyes (AB 170), was adopted by state lawmakers in 2003 creating Government Code Section 65302.1 which requires cities and counties in the San Joaquin Valley to amend their general plans to include data and analysis, comprehensive goals, policies and feasible implementation strategies designed to improve air quality.

### *California Assembly Bills 1807 & 2588 – Toxic Air Contaminants*

Within California, TACs are regulated primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics Hot Spots Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before CARB designates a substance as a TAC. Existing sources of TACs that are subject to the Air Toxics Hot Spots Information and Assessment Act are required to: (1) prepare a toxic emissions inventory; (2) prepare a risk assessment if emissions are significant; (3) notify the public of significant risk levels; and (4) prepare and implement risk reduction measures.

### *Assembly Bill 3205 – Toxic Emissions Near Schools*

Assembly Bill (AB) 3205 (Health and Safety Code Sections 42301.6–42301.9) addresses stationary sources of TACs near schools. This requirement is triggered if an application for a permit to construct or modify a source which emits hazardous air emissions is located within 1,000 feet from the outer boundary of a school site. In such cases, the air pollution control officer must prepare a public notice in which the proposed project or modification for which the application for a permit is made is fully described. The notice is required to be sent to the parents or guardians of children enrolled in any school located within one-quarter mile of the source and to each address within a 1,000-foot radius of a TAC source.



## Regional

### *San Joaquin Valley Air Pollution Control District*

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the agency primarily responsible for ensuring that NAAQS and CAAQS are not exceeded and that air quality conditions are maintained in the San Joaquin Valley Air Basin (SJVAB), within which the proposed project is located. Responsibilities of the SJVAPCD include, but are not limited to, preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, issuing permits for stationary sources of air pollution, inspecting stationary sources of air pollution and responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing programs and regulations required by the FCAA and the CCAA.

The SJVAPCD Rules and Regulations that are applicable to the proposed project include, but are not limited to, the following:

Regulation VIII (Fugitive Dust Prohibitions). Regulation VIII (Rules 8011-8081): This regulation is a series of rules designed to reduce particulate emissions generated by human activity, including construction and demolition activities, carryout and trackout, paved and unpaved roads, bulk material handling and storage, unpaved vehicle/traffic areas, open space areas, etc. NOT IN CONSULTANT'S DRAFT If a non-residential area is 5.0 or more acres in area, a Dust Control Plan must be submitted as specified in Section 6.3.1 of Rule 8021. Additional requirements may apply, depending on total area of disturbance.

Rule 4002 (National Emissions Standards for Hazardous Air Pollutants): This rule may apply to projects in which portions of an existing building would be renovated, partially demolished or removed. With regard to asbestos, the NESHAP specifies work practices to be followed during renovation, demolition or other abatement activities when friable asbestos is involved. Prior to demolition activity, an asbestos survey of the existing structure may be required to identify the presence of any asbestos containing building materials (ACBM). Removal of identified ACBM must be removed by a certified asbestos contractor in accordance with CAL-OSHA requirements.

Rule 4102 (Nuisance): Applies to any source operation that emits or may emit air contaminants or other materials.

Rule 4103 (Open Burning): This rule regulates the use of open burning and specifies the types of materials that may be open burned. Section 5.1 of this rule prohibits the burning of trees and other vegetative (non-agricultural) material whenever the land is being developed for non-agricultural purposes.

Rule 4601 (Architectural Coatings): Limits volatile organic compounds from architectural coatings.

Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations): This rule applies to the manufacture and use of cutback, slow cure, and emulsified asphalt during paving and maintenance operations.

Rule 9510 (Indirect Source Review – ISR): Requires developers of larger residential, commercial, recreational, and industrial projects to reduce smog-forming and particulate emissions from their projects' baselines. If project emissions still exceed the minimum baseline reductions, a project's developer will be required to mitigate the difference by paying an off-site fee to the District, which would then be used to fund clean-air projects. For projects subject to this rule, the ISR rule requires developers to mitigate and/or offset emissions sufficient to

achieve: (1) 20-percent reduction of construction equipment exhaust NO<sub>x</sub>; (2) 45-percent reduction of construction equipment exhaust PM<sub>10</sub>; (3) 33-percent reduction of operational NO<sub>x</sub> over 10 years; and (4) 50-percent reduction of operational PM<sub>10</sub> over 10 years. SJVAPCD ISR applications must be filed “no later than applying for a final discretionary approval with a public agency.”

## Local

### *City of Clovis General Plan*

The Air Quality Element of the *Clovis General Plan* addresses the role of local land use planning in improving regional air quality and provides goals and policy statements directing actions of the City to support improvement of air quality conditions. Specific goals and policies are identified below:

Goal 1: A local environment that is protected from air pollution and emissions.

*Policy 1.1 Land use and transportation.* Reduce greenhouse gas and other local pollutant emissions through mixed use and transit-oriented development and well-designed transit, pedestrian, and bicycle systems.

*Policy 1.2 Sensitive Land Uses.* Prohibit, without sufficient mitigation, the future siting of sensitive land uses within the distances of emission sources as defined by the California Air Resources Board.

*Policy 1.3 Construction activities.* Encourage the use of best management practices during construction activities to reduce emissions of criteria pollutants as outlined by the San Joaquin Valley Air Pollution Control District (SJVAPCD).

*Policy 1.4 City buildings.* Require that municipal buildings be designed to exceed energy and water conservation and greenhouse gas reduction standards set in the California Building Code.

*Policy 1.5 Fleet operations.* Purchase low- or zero-emission vehicles for the city’s fleet where feasible. Use clean fuel sources for city-owned mass transit vehicles, automobiles, trucks, and heavy equipment where feasible.

*Policy 1.6 Alternative fuel infrastructure.* Encourage public and private activity and employment centers to incorporate electric charging and alternative fuel stations.

*Policy 1.7 Employment measures.* Encourage employers to provide programs, scheduling options, incentives, and information to reduce vehicle miles traveled by employees.

*Policy 1.8 Trees.* Maintain or plant trees where appropriate to provide shade, absorb carbon, improve oxygenation, slow stormwater runoff, and reduce the heat island effect.

Goal 2: A region with healthy air quality and lower greenhouse gas emissions.

*Policy 2.1 Regional coordination.* Support regional efforts to reduce air pollution (criteria air pollutants and greenhouse gas emissions) and collaborate with other agencies to improve air quality at the emission source and reduce vehicle miles traveled.

*Policy 2.2 Cross-jurisdictional issues.* Collaborate with regional agencies and surrounding jurisdictions to address cross-jurisdictional transportation and air quality issues.

*Policy 2.3 Valleywide programs.* Establish parallel air quality programs and implementation measures with other communities across the San Joaquin Valley.

*Policy 2.4 Public participation.* Encourage participation of local citizens, the business community, and interested groups and individuals in air quality planning and implementation.

*Policy 2.5 Public education.* Promote programs that educate the public about regional air quality issues and solutions.

*Policy 2.6 Innovative mitigation.* Encourage innovative mitigation measures to reduce air quality impacts by coordinating with the SJVAPCD, project applicants, and other interested parties.

### *Fresno County General Plan*

The Fresno County General Plan's Open Space and Conservation Element contains an Air Quality chapter which discusses air quality considerations affecting the County and means by which the County can address air quality issues. The Open Space and Conservation Element's Air Quality chapter states that "the linkages between land use patterns, transportation systems, and air quality are the primary means for local governments to address air quality issues," and "the main method of local control over air quality in Fresno County is the reduction of the number of vehicular miles traveled (VMT) and resulting vehicular emissions." The primary role for Fresno County in this strategy is to direct development to population centers; to encourage jobs-housing balance; to avoid proliferation of scattered low-density residential development projects; and to minimize further parcelization and designation of land for rural-residential development.

### **Regulatory Attainment Designations**

Under the CCAA, CARB is required to designate areas of the state as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data does not support either an attainment or nonattainment designation. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The US EPA designates areas for ozone, CO, and NO<sub>2</sub> as "does not meet the primary standards," "cannot be classified," or "better than national standards." For SO<sub>2</sub>, areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, the CARB terminology of attainment, nonattainment, and unclassified is more frequently used. The US EPA uses the same sub-categories for nonattainment status: serious, severe, and extreme. In 1991, US EPA assigned new nonattainment designations to areas that had previously been classified as Group I, II, or III for PM<sub>10</sub> based on the likelihood that they would violate national PM<sub>10</sub> standards. All other areas are designated "unclassified."

The state and national attainment status designations pertaining to the SJVAB are summarized in Table 5.2 below. The SJVAB is currently designated as a nonattainment area with respect to the state PM<sub>10</sub> standard, ozone, and PM<sub>2.5</sub> standards. The SJVAB is designated nonattainment for the national 8-hour ozone and PM<sub>2.5</sub> standards. On September 25, 2008, the US EPA redesignated the San Joaquin Valley to attainment for the PM<sub>10</sub> NAAQS and approved the PM<sub>10</sub> Maintenance Plan (SJVAPCD 2015).

**Table 5.2**  
**SJVAB Attainment Status Designations**

| <b>Pollutant</b>                 | <b>National Designation</b>   | <b>State Designation</b> |
|----------------------------------|-------------------------------|--------------------------|
| Ozone, 1 hour                    | No Standard*                  | Nonattainment/Severe     |
| Ozone, 8 hour                    | Nonattainment/Extreme         | Nonattainment            |
| PM <sub>10</sub>                 | Attainment                    | Nonattainment            |
| PM <sub>2.5</sub>                | Nonattainment                 | Nonattainment            |
| Carbon Monoxide                  | Attainment                    | Unclassified/Attainment  |
| Nitrogen dioxide                 | Unclassified/Attainment       | Attainment               |
| Sulfur dioxide                   | Unclassified/Attainment       | Attainment               |
| Lead (particulate)               | No Designation/Classification | Attainment               |
| Hydrogen sulfide                 | No Federal Standard           | Unclassified             |
| Sulfates                         | No Federal Standard           | Attainment               |
| Visibility-reducing particulates | No Federal Standard           | Unclassified             |
| Vinyl Chloride                   | No Federal Standard           | Attainment               |

Source: SJVAPCD 2017

### **Ambient Air Quality**

Air pollutant concentrations are measured at several monitoring stations in Fresno County. The Clovis-N. Villa Avenue Monitoring Station is the closest representative monitoring stations to the proposed project site with sufficient data to meet U.S. EPA and/or ARB criteria for quality assurance. This monitoring station monitors ambient concentrations of ozone and PM<sub>2.5</sub>. Ambient monitoring data for nitrogen dioxide and PM<sub>10</sub> was obtained from the Fresno-Garland Monitoring Station. Ambient monitoring data was obtained for the last three years of available measurement data (i.e., 2013 through 2015) and are summarized in Table 5.3. As depicted in the table, the state and national ozone and PM<sub>2.5</sub> standards as well as the national PM<sub>10</sub> standards were exceeded on numerous occasions during the past three years. The state and national standards for NOX and national standards for PM<sub>10</sub> have not been exceeded during the past three years, based on available data.

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**Table 5.3**  
**Summary of Ambient Air Quality Monitoring Data<sup>1</sup>**

|   | 2013        | 2014        | 2015        |
|---|-------------|-------------|-------------|
| <b>Ozone</b>  |             |             |             |
| Maximum concentration (1-hour/8-hour average)                                 | 0.118/0.103 | 0.116/0.98  | 0.113/0.095 |
| Number of days state/national 1-hour standard exceeded                        | 26/NA       | 18/NA       | 26/NA       |
| Number of days state/national 8-hour standard exceeded                        | 0/82        | 0/50        | 0/62        |
| <b>Nitrogen Dioxide (NO<sub>2</sub>)</b>                                      |             |             |             |
| Maximum 1-hour concentration (state/national)                                 | 59/59       | 59/59       | 49/49.8     |
| Annual average  | NA          | 10          | NA          |
| Number of days state standard exceeded  | 0/0         | 0/0         | 0/0         |
| <b>Suspended Particulate Matter (PM<sub>10</sub>)</b>                         |             |             |             |
| Maximum concentration (state/national)  | 84.3/82.3   | 101.3/105.3 | 70.8/72.8   |
| Annual Average (state/national)   | NA/30.4     | 33.7/33.9   | NA/NA       |
| Number of days national standard exceeded (measured/calculated <sup>2</sup> ) | 0/0         | 0/0         | 0/NA        |
| Number of days state standard exceeded (measured/calculated <sup>2</sup> )    | 5/NA        | 8/50.3      | 3/NA        |
| <b>Suspended Particulate Matter (PM<sub>2.5</sub>)</b>                        |             |             |             |
| Maximum concentration (state/national)  | 72.8/72.8   | 80.7/80.7   | 50.4/50.4   |
| Number of days national standard exceeded (measured/calculated <sup>2</sup> ) | 26/40.4     | 14/15.4     | 8/8.2       |

ppm = parts per million by volume, µg/m<sup>3</sup> = micrograms per cubic meter, NA=Not Available

<sup>1</sup> Ambient data was obtained from the Clovis-N. Villa Avenue Monitoring Station.

<sup>2</sup> Measured days are those days that an actual measurement was greater than the standard. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day.

Source: ARB 2017a

## Sensitive Receptors

One of the most important reasons for air quality standards is the protection of those members of the population who are most sensitive to the adverse health effects of air pollution, termed "sensitive receptors." The term sensitive receptors refer to specific population groups, as well as the land uses where individuals would reside for long periods. Commonly identified sensitive population groups are children, the elderly, the acutely ill, and the chronically ill. Commonly identified sensitive land uses would include facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Residential dwellings, schools, parks, playgrounds, childcare centers, convalescent homes, and hospitals are examples of sensitive land uses.

Nearby sensitive land uses consist of residential land uses, the nearest of which are located adjacent to the eastern and southern boundaries of the project site. Cedarwood Elementary School is also located to the south of the project site, across Herndon Avenue.

## THRESHOLDS OF SIGNIFICANCE

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects

related to air quality are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Section III.

Would the Project:

- (a) Conflict with or obstruct implementation of any applicable air quality plan?
- (b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
- (c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?
- (d) Expose sensitive receptors to substantial pollutant concentrations?
- (e) Create objectionable odors affecting a substantial number of people?

*San Joaquin Valley Air Pollution Control District*

Appendix G of the State CEQA Guidelines provides that, where available, the significance criteria established by an applicable air quality management or air pollution control district may be relied upon for the evaluation of air quality impacts in addition to criteria “a” through “e” listed in the guidelines.

To assist local jurisdictions in the evaluation of air quality impacts, the SJVAPCD has published the Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2015). This guidance document includes recommended thresholds of significance to be used for the evaluation of short-term construction, long-term operational, odor, toxic air contaminant, and cumulative air quality impacts. Accordingly, the SJVAPCD-recommended thresholds of significance are used to determine whether implementation of the proposed project would result in a significant air quality impact. The thresholds of significance are summarized below.

- Short-term Emissions of Particulate Matter (PM<sub>10</sub>) – Construction impacts associated with the proposed project would be considered significant if the feasible control measures for construction in compliance with Regulation VIII as listed in the SJVAPCD guidelines are not incorporated or implemented, or if project-generated emissions would exceed 15 tons per year (TPY).
- Short-term Emissions of Ozone Precursors (ROG and NO<sub>x</sub>) – Construction impacts associated with the proposed project would be considered significant if the project generates emissions of ROG or NO<sub>x</sub> that exceeds 10 TPY.
- Long-term Emissions of Particulate Matter (PM<sub>10</sub>) – Operational impacts associated with the proposed project would be considered significant if the project generates emissions of PM<sub>10</sub> that exceed 15 TPY.
- Long-term Emissions of Ozone Precursors (ROG and NO<sub>x</sub>) – Operational impacts associated with the proposed project would be considered significant if the project generates emissions of ROG or NO<sub>x</sub> that exceeds 10 TPY.
- Conflict with or Obstruct Implementation of Applicable Air Quality Plan – Due to the region’s non-attainment status for ozone, PM<sub>2.5</sub>, and PM<sub>10</sub>, if the project-generated emissions of either of the ozone precursor pollutants (i.e., ROG and NO<sub>x</sub>) or PM<sub>10</sub> would exceed the SJVAPCD’s significance thresholds, then the project would be considered to conflict with the attainment plans.

- Local Mobile-Source CO Concentrations – Local mobile source impacts associated with the proposed project would be considered significant if the project contributes to CO concentrations at receptor locations in excess of the CAAQS (i.e., 9.0 ppm for 8 hours or 20 ppm for 1 hour).
- Exposure to toxic air contaminants (TAC) would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual (i.e., maximum individual risk) would exceed 10 in 1 million or would result in a Hazard Index greater than 1.
- Odor impacts associated with the proposed project would be considered significant if the project has the potential to frequently expose members of the public to objectionable odors.

In addition to the above thresholds, the SJVAPCD also recommends the use of daily emissions thresholds for the evaluation of project impacts on localized ambient air quality. Accordingly, the proposed project would also be considered to result in a significant contribution to localized ambient air quality if onsite emissions of ROG, NO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO, or SO<sub>2</sub> associated with either short-term construction or long-term operational activities would exceed a daily average of 100 pounds per day (lbs/day) for each of the pollutants evaluated (SJVAPCD 2015).

## METHODOLOGY

### *Short-term Impacts*

Short-term construction emissions associated with development of the proposed land uses were calculated using the CalEEMod computer program, version 2016.3.1. Emissions were quantified for site preparation/grading, asphalt paving, facility construction, and application of architectural coatings. Construction schedules were based on information provided by the project proponent. Other construction information, including equipment usage, worker vehicle trips, and haul truck trips, were based on the default assumptions contained in the CalEEMod model. Construction emissions associated with the widening of Herndon Avenue were quantified using the Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model, version 8.1.0. Modeling assumptions for the proposed widening were based on data obtained from similar widening projects in the area and default modeling assumptions contained in the model. The import/export of soil is not anticipated to be required for this project. Modeling assumptions and output files are included in the Air Quality & Greenhouse Gas Impact Analysis included as Appendix 5 of this Draft EIR.

### *Long-term Impacts*

Long-term operational emissions of criteria air pollutants associated with the proposed project were calculated using the CalEEMod computer program, version 2016.3.1. Modeling was conducted based on traffic data derived, in part, from the traffic analysis prepared for the proposed project (JLB 2017). All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model. Mobile source emissions were conservatively based on the default fleet distribution assumptions contained in the model. The widening of Herndon Avenue would not be anticipated to result in changes in vehicle miles traveled, fleet mix, or vehicle speeds. As a result, no changes in operational emissions associated with the proposed widening of Herndon Avenue are anticipated to occur. Modeling assumptions and output files are included in the Air Quality & Greenhouse Gas Impact Analysis attached Appendix 5 of this Draft EIR. Localized concentrations of TACs, mobile-source CO, and odors were qualitatively assessed.

## POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION MEASURES

### AQ-1: Long-Term Operational Increase in Particulate Matter and Ozone Precursor Emissions

Estimated annual operational emissions for the proposed project are summarized in Table 5.3. As indicated, Phase I of the proposed project would generate approximately 6.3 tons/year of ROG, 38.6 tons/year of NO<sub>x</sub>, 23.8 tons/year of CO, 10.7 tons/year of PM<sub>10</sub>, and 3.0 tons/year of PM<sub>2.5</sub>. At project buildout, the proposed project would generate approximately 10.8 tons/year of ROG, 71.8 tons/year of NO<sub>x</sub>, 37.7 tons/year of CO, 20.3 tons/year of PM<sub>10</sub>, and 5.6 tons/year of PM<sub>2.5</sub>. Operational emissions of SO<sub>x</sub> would be negligible (i.e., less than 0.3 tons/year). Annual operational emissions of ROG, NO<sub>x</sub>, and PM<sub>10</sub> would exceed SJVAPCD's mass-emissions significance thresholds. A majority of the emissions generated would be associated with non-worker vehicle commute trips. Emissions associated with onsite permitted stationary sources (e.g., emergency generators) would not exceed SJVAPCD's mass-emissions significance thresholds. The highest average-daily onsite emissions for both Phase I and Phase II operations would not exceed the SJVAPCD's recommended localized ambient air quality significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated.

**Table 5.3**  
**Long-term Operational Emissions**

| Project Phase/Land Use  | Operational Year | Uncontrolled Annual Emissions (tons/year) <sup>1</sup> |                 |      |                 |                  |                   |
|---|------------------|--|-----------------|------|-----------------|------------------|-------------------|
|   |                  | ROG  | NO <sub>x</sub> | CO   | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Phase I (2-10 Year Plan)  |                  |  |                 |      |                 |                  |                   |
| Cancer Center   | 2019             | 0.9  | 5.7             | 4.5  | 0.0             | 1.2              | 0.3               |
| Hotel & Shopping Center   | 2020             | 4.2  | 28.8            | 20.2 | 0.1             | 4.6              | 1.3               |
| Bed Tower, D&T Expansion, Parking Garage                                    | 2022             | 1.4  | 6.8             | 5.9  | 0.0             | 2.0              | 0.6               |
| Medical-Dental Office Building  | 2024             | 1.1  | 7.6             | 5.6  | 0.0             | 2.0              | 0.5               |
| Outpatient Center Expansion   | 2027             | 0.3  | 1.5             | 1.1  | 0.0             | 0.5              | 0.1               |
| Phase II (10-20 Year Plan)  |                  |  |                 |      |                 |                  |                   |
| Hospital Expansion, Assisted Living, Shopping Center, Medical-Dental Office | 2030             | 5.3  | 34.2            | 22.3 | 0.1             | 9.8              | 2.9               |
| Permitted Stationary Sources <sup>2</sup>                                   | 2030             | 0.3  | 1.1             | 0.6  | 1.2             | 0.0              | 0.0               |
| Highest Annual Emissions  |                  |  |                 |      |                 |                  |                   |
| Phase I at Buildout Year 2029 <sup>3</sup>                                  |                  | 6.3  | 38.6            | 23.8 | 0.2             | 10.7             | 3.0               |
| Phases I & II at Buildout Year 2035 <sup>3</sup>                            |                  | 10.8   | 71.8            | 37.7 | 0.3             | 20.3             | 5.6               |
| Permitted Stationary Sources <sup>2</sup>                                   |                  | 0.3  | 1.1             | 0.6  | 1.2             | 0.0              | 0.0               |
| Significance Thresholds (tons):   |                  | 10   | 10              | 100  | 27              | 15               | 15                |
| Exceeds Thresholds/Significant Impact?:                                     |                  | Yes  | Yes             | No   | No              | Yes              | No                |
| Highest Average-Daily Onsite Emissions (lbs) <sup>2</sup>                   |                  |  |                 |      |                 |                  |                   |
| Phase I   |                  | 26.0   | 0.0             | 0.1  | 0.0             | 0.0              | 0.0               |
| Phases I & II (Buildout)  |                  | 44.1   | 0.4             | 5.9  | 0.0             | 0.1              | 0.1               |
| Significance Thresholds (lbs):  |                  | 100  | 100             | 100  | 100             | 100              | 100               |
| Exceeds Thresholds/Significant Impact?:                                     |                  | No   | No              | No   | No              | No               | No                |



1. *Based on CalEEMod emissions modeling. Does not include implementation of emissions control measures. Totals may not sum due to rounding.*
  2. *Includes the installation of three emergency generators. Detailed specifications for the generators are not yet available. To be conservative, generators were assumed to be diesel-fueled, 1,000 bhp, 100 hours per year.*
  3. *Based on buildout operational years for Phase I and Phase II conditions. Does not reflect the sum of emissions reported for interim operational years.*
  4. *Average daily onsite emissions are based on total onsite emissions divided by the total of 260 average annual operational days.*
- Refer to Appendix A of the Air Quality Analysis for modeling assumptions and results.*

As stated in the Air Quality & Greenhouse Gas Analysis, it is important to note that estimated operational emissions are conservatively based on the default vehicle fleet distribution assumptions contained in the CalEEMod model, which include contributions from medium and heavy-duty trucks. Mobile sources associated with hospitals and related facilities typically consist largely of light-duty vehicles. As a result, actual operational emissions would likely be slightly less than indicated. Nonetheless, because annual emissions of ROG, NO<sub>x</sub>, and PM<sub>10</sub> would exceed SJVAPCD's mass-emissions significance thresholds, this impact is considered potentially significant.

### **Mitigation Measures**

AQ-1.1: Operation of the proposed project shall comply with SJVAPCD's ISR rule (Rule 9510). Accordingly, an Air Impact Assessment (AIA) shall be prepared for the proposed Project. The AIA shall be submitted to and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The AIA shall include: an estimate of operational emissions prior to the implementation of mitigation measures; a list of the mitigation measures to be applied to the project; an estimate of emissions for each applicable pollutant for the project, or each phase thereof, following the implementation of mitigation; and a calculation of the applicable off-site fee, if required by Rule 9510. Measures that may be implemented to reduce operational emissions may include, but are not limited to, the following:

- a. Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.
- b. Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50% tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.
- c. Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.
- d. Incorporate outdoor electrical outlets to encourage the use of electric landscape maintenance equipment.
- e. Install high-efficiency heating and cooling systems.
- f. Utilize high-efficiency gas or solar water heaters.
- g. Utilize built-in energy-efficient appliances (i.e., Energy Star rated).
- h. Utilize double- or triple-paned windows.
- i. Utilize low energy street lights (i.e., sodium, light-emitting diode [LED]).
- j. Utilize energy-efficient interior lighting.

- k. Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.
- l. Provide a minimum of one designated parking space for alternatively fueled vehicles.
- m. Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.
- n. Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.
- o. Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.
- p. Provide on-site bicycle parking beyond those required by California Green Building Standards Code and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).
- q. Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)

AQ-1.2: A Developer Mitigation Contract (DMC) shall be entered into with the SJVAPCD to reduce operational emissions of ROG and NOX to less than 10 tons/year and emissions of PM10 to below 15 tons/year. Operational emissions of ROG, NOX and PM10 (inclusive of PM2.5) shall be reduced in excess of the reductions required per compliance with SJVAPCD's ISR Rule (Refer to Mitigation Measure AQ-1). Emission reductions may be achieved by use of newer, low-emission equipment, implementation of on-site or off-site mitigation, and/or the funding of off-site mitigation, through participation in the SJVAPCD's off-site mitigation program. The DMC shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming compliance with the DMC, prior to issuance of final discretionary approval (e.g., approval of the grading permit). Development and implementation of the DMC shall be fully funded by the project proponent/owner. With approval by SJVAPCD, the DMC may also be used to demonstrate compliance with emission reductions required by SJVAPCD's ISR Rule (Rule 9510).

### **Level of Significance after Mitigation**

Mitigation Measure AQ-1.1 would require compliance with SJVAPCD's Indirect Source Review Rule (Rule 9510). With implementation of Mitigation Measure AQ-1.2, a DMC would be required to reduce operational emissions of ROG, NOX and PM10 to below the SJVAPCD's significance thresholds. With mitigation, this impact would be considered less than significant.

### **AQ-2: Potential Impacts to Sensitive Receptors**

Nearby sensitive land uses consist of residential land uses, the nearest of which are located adjacent to the eastern and southern boundaries of the project site. Cedarwood Elementary School is also located to the south of the proposed land uses located south of Herndon Avenue. The following is a discussion of short-term and long-term localized air quality impacts.

### *Short-term Construction*

#### Naturally Occurring Asbestos:

Naturally-occurring asbestos, which was identified by ARB as a TAC in 1986, is located in many parts of California and is commonly associated with ultramafic rock. The project site is not located near any areas that are likely to contain ultramafic rock (DOC 2000). As a result, risk of exposure to asbestos during the construction process would be considered less than significant.

#### Diesel-Exhaust Emissions:

Construction of the proposed project would result in the generation of DPM emissions associated with the use of off-road diesel equipment for site grading and excavation, paving and other construction activities. Health-related risks associated with diesel-exhaust emissions are primarily associated with long-term exposure and associated risk of contracting cancer. The calculation of cancer risk associated with exposure to TACs are typically calculated based on a 25- to 30-year period of exposure. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Assuming that construction activities involving the use of diesel-fueled equipment would occur over an approximate two-year period, project-related construction activities would constitute less than eight percent of the typical exposure period. In addition, construction of the proposed facilities would not be anticipated to require extensive site grading or other more intensive site preparation activities that would involve extensive use of diesel-fueled off-road equipment or on-road vehicles. Furthermore, as noted in Impact AQ-1, construction-generated emissions of PM would not exceed the SJVAPCD's localized significance thresholds. As a result, exposure to construction-generated DPM would not be anticipated to exceed applicable thresholds (i.e., incremental increase in cancer risk of 20 in one million). As a result, this impact would be considered less than significant.

#### Localized PM Concentrations:

Construction of the proposed project may contribute to localized PM concentrations, including emissions from onsite construction equipment and fugitive dust. Fugitive dust emissions would be primarily associated with earth-moving, and material handling activities, as well as, vehicle travel on unpaved and paved surfaces. Uncontrolled emissions of fugitive dust may contribute to increased occurrences of Valley Fever and may also result in increased nuisance impacts to nearby land uses and receptors. As a result, localized uncontrolled concentrations of construction-generated PM would be considered to have a potentially-significant impact.

### *Long-term Operation*

#### Localized Mobile-Source CO Emissions:

Carbon monoxide is the primary criteria air pollutant of local concern associated with the project. Under specific meteorological and operational conditions, such as being near areas of heavily congested vehicle traffic, CO concentrations may reach unhealthy levels. Mobile-source emissions of CO are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. For this reason, modeling of mobile-source CO concentrations is typically recommended for sensitive land uses located near signalized roadway intersections that are projected to operate at unacceptable levels of service (i.e., LOS E or F). Localized CO concentrations associated with the proposed project would be considered less-than-significant impact if: (1) traffic generated by the proposed project would not result in deterioration of a signalized intersection to a level of service (LOS) of E or F; or (2) the

project would not contribute additional traffic to a signalized intersection that already operates at LOS of E or F.

Under near-term Phase I project conditions, the signalized intersections of Alluvial Avenue/Temperance Avenue, Herndon Avenue/Temperance Avenue, and SR 168 WB Ramps/Temperance Avenue are projected to operate at unacceptable LOS. Under future cumulative 2035/project buildout conditions the signalized intersections of Alluvial Avenue/Temperance Avenue, Herndon Avenue/Temperance Avenue, and Herndon Avenue/Armstrong Avenue are projected to operate at unacceptable LOS. With implementation of the proposed traffic improvements, all signalized intersections would operate at LOS D, or better. With implementation of the proposed traffic improvements, the proposed project would not be anticipated to contribute substantially to localized CO concentrations that would exceed applicable standards. For this reason, the project's contribution to localized CO concentrations would be considered less than significant.

#### Toxic Air Contaminants:

##### Mobile Sources:

As noted earlier in this report, diesel-exhaust particulate matter (DPM) is the pollutant of primary concern with regard to mobile sources. Based on recommended land-use guidance issued by the ARB, new sensitive land uses should not be located within approximately 500 feet of high-volume transportation corridors, which are generally defined as having 100,000 vehicles/day within urban environments or 50,000 vehicles/day within rural environments. The proposed project site is not located within 500 feet of a major transportation corridor having a high volume of diesel-fueled trucks. The highest volume roadway in the vicinity of the project site is Highway 168, which is located north of the project site. Traffic volumes along Highway 168 average approximately 16,000 total vehicles/day. Truck volumes along this roadway typically average roughly eight percent of the total volume. Based on these estimates, total trucks along nearby Highway 168 would be approximately 12,500/day. Of these trucks, fewer than 1,800 are heavy-duty trucks (i.e., more than two axles) (Caltrans 2017). In addition, no long-term care facilities (e.g., assisted living) would be located within 500 feet of Highway 168. As a result, exposure of onsite receptors to mobile-source TACs would be considered a less-than-significant impact.

##### Stationary Sources:

The proposed future expansion of the onsite central plant, would include the installation of emergency generators. Expansion of the central plant would occur at a future date as part of the 10-20 year development plan. The proposed plant would be centrally located within the eastern portion of the project site. The nearest sensitive land uses include residential dwellings located approximately 375 feet to the east and the existing medical center located approximately 360 feet to the southwest. It is anticipated that up to three additional emergency generators would be installed. However, detailed information regarding engine specifications and fuel sources for the proposed emergency generators have not yet been identified.

A screening-impact assessment was conducted to evaluate the potential for incremental increases in cancer risk associated with the proposed generators at nearby sensitive land uses. The screening assessment was conducted using the SJVAPCD's screening worksheet for internal combustion engines and provides a conservative estimation of predicted cancer risk. For screening purposes, each of the proposed emergency generators were assumed to be 1,000 brake horsepower (bhp) in size and diesel fueled. Each generator was assumed to operate up to a maximum of 100 hours per year for routine testing and maintenance purposes, in accordance with current SJVAPCD permitting limitations. Based on the screening assessment conducted, the total predicted cancer risk for the three generators would

be approximately 20.3 in one million at these nearest sensitive receptors. Depending on the type, size, and operational requirements for the proposed generators, predicted cancer risks at the nearest sensitive receptors could potentially exceed SJVAPCD's significance threshold of 20 in one million. It is also important to note that as part of the permitting process, the SJVAPCD would independently evaluate the health risks based on final plans before issuing any permits. Depending on the analysis to be conducted at the time of permitting, additional limitations may be imposed, such as hourly limitations or use of best available control technology. The SJVAPCD would not issue a permit to operate if health risks would exceed applicable thresholds. As a result, exposure to onsite sources of TACs would be considered a potentially significant impact.

## Mitigation Measures

### AQ-2: Implement Measures to Reduce Localized Pollutant Concentrations

- a. Potential health risks associated with permitted stationary sources (e.g., emergency generators) shall be evaluated prior to installation and operation, once more detailed equipment specifications have been identified and in accordance with SJVAPCD's permitting requirements. Emissions control measures and/or operational limitations shall be incorporated, to the extent deemed necessary, to ensure that operational emissions would not exceed applicable SJVAPCD's significance thresholds for cancer risk of 20 in one million or an acute/chronic hazard index of one.
- b. The following measures shall be implemented to reduce potential exposure of sensitive receptors to localized concentrations of construction-generated PM at nearby sensitive receptors and land uses during project construction:
  1. On-road diesel vehicles shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles:
    - Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location, except as noted in Subsection (d) of the regulation; and,
    - Shall not operate a diesel-fueled auxiliary power system to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation.
  2. Off-road diesel equipment shall comply with the 5-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use Off-road Diesel regulation. The specific requirements and exceptions in the regulations can be reviewed at the following web sites: [www.arb.ca.gov/msprog/truck-idling/2485.pdf](http://www.arb.ca.gov/msprog/truck-idling/2485.pdf) and [www.arb.ca.gov/regact/2007/ordiesl07/froal.pdf](http://www.arb.ca.gov/regact/2007/ordiesl07/froal.pdf).
  3. Signs shall be posted at the project site construction entrance to remind drivers and operators of the state's five-minute idling limit.

4. To the extent available, replace fossil-fueled equipment with alternatively-fueled (e.g., natural gas) or electrically-driven equivalents.
5. Construction truck trips shall be scheduled, to the extent possible, to occur during non-peak hours.
6. The burning of vegetative material shall be prohibited.
7. The proposed project shall comply with SJVAPCD Regulation VIII for the control of fugitive dust emissions. Regulation VIII can be obtained on the SJVAPCD's website at website URL: <https://www.valleyair.org/rules/1ruleslist.htm>. At a minimum, the following measures shall be implemented:
  - All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
  - All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
  - All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut & fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
  - When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.
  - Trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)
  - Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
  - On-road vehicle speeds on unpaved surfaces of the project site shall be limited to 15 mph.
  - Sandbags or other erosion control measures shall be installed sufficient to prevent silt runoff to public roadways from sites with a slope greater than one percent.
  - Excavation and grading activities shall be suspended when winds exceed sustained speeds of 20 miles per hour (Regardless of wind

speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation).

8. The above measures for the control of construction-generated emissions shall be included on site grading and construction plans.

### **Level of Significance After Mitigation:**

With mitigation, the installation of permitted stationary sources would be required to demonstrate that potential health risks would not exceed applicable SJVAPCD significance thresholds. In addition, short-term construction activities would be required to comply with SJVAPCD Regulation VIII (Fugitive PM<sub>10</sub> Prohibitions). Mandatory compliance with SJVAPCD Regulation VIII would reduce emissions of fugitive dust from the project site, and minimize the project's potential to adversely affect nearby sensitive receptors. With compliance with SJVAPCD Regulation VIII, maximum annual emissions of PM would be reduced by approximately 50 percent, or more. With mitigation, this impact would be considered less than significant.

### **AQ-3: Potential Inconsistency with Applicable Air Quality Plan**

In accordance with SJVAPCD-recommended methodology for the assessment of air quality impacts, projects that result in significant air quality impacts at the project level are also considered to have a significant cumulative air quality impact. As noted in Impact AQ-2, long-term operational emissions would exceed applicable thresholds. Construction activities may also result in short-term increases of criteria air pollutants. Increased emissions could result in a significant cumulative contribution of criteria pollutants for which the SJVAB is currently designated non-attainment. For this reason, implementation of the proposed project could conflict with air quality attainment or maintenance planning efforts. This impact would be considered potentially significant.

Mitigation Measure AQ-1.1 would require compliance with SJVAPCD's Indirect Source Review Rule (Rule 9510). With implementation of Mitigation Measure AQ-1.2, a DMC would be required to reduce operational emissions of ROG, NO<sub>x</sub> and PM<sub>10</sub> to below the SJVAPCD's significance thresholds. Mitigation Measure AQ-3 would ensure compliance with SJVAPCD requirements for the control of construction-generated emissions. With adoption of the recommended mitigation measures, this impact would be considered less than significant.

## **LESS THAN SIGNIFICANT IMPACTS**

### **AQ-4: Short-Term Increases of Construction-Generated Particulate Matter and Ozone Precursor Emissions**

Short-term increases in emissions would occur during the construction process. Construction-generated emissions are of temporary duration, lasting only as long as construction activities occur, but have the potential to represent a significant air quality impact. Construction of the project would result in the temporary generation of emissions associated with site grading and excavation, paving, motor vehicle exhaust associated with construction equipment and worker trips, as well as the movement of construction equipment on unpaved surfaces. Short-term construction emissions would result in increased emissions of ozone-precursor pollutants (i.e., ROG and NO<sub>x</sub>) and emissions of PM. Emissions of ozone-precursors would result from the operation of on-road and off-road motorized vehicles and equipment. Emissions of airborne PM are largely dependent on the amount of ground disturbance associated with site preparation activities and can result in increased concentrations of PM that can adversely affect nearby sensitive land uses. Estimated annual and daily construction-generated emissions are discussed in greater detail, as follows:

### *Annual Construction Emissions*

Projected construction emissions generated by the project are summarized in Table 5.4. Assuming construction of the proposed cancer center, hotel, and shopping center were to occur simultaneously, Phase I of the project would generate maximum uncontrolled annual emissions of approximately 3.6 tons/year of ROG, 7.3 tons/year of NO<sub>x</sub>, 5.3 tons/year of CO, 0.7 tons/year of PM<sub>10</sub>, and 0.5 tons/year of PM<sub>2.5</sub>. The specific construction periods for Phase II have not yet been identified. Assuming that all Phase II land uses would be constructed simultaneously, Phase II would generate maximum uncontrolled annual emissions of approximately 4.6 tons/year of ROG, 3.0 tons/year of NO<sub>x</sub>, 3.0 tons/year of CO, 0.6 tons/year of PM<sub>10</sub>, and 0.3 tons/year of PM<sub>2.5</sub>. The widening of Herndon Avenue would generate maximum uncontrolled annual emissions of approximately 0.4 tons/year of ROG, 3.8 tons/year of NO<sub>x</sub>, 2.7 tons/year of CO, 0.5 tons/year of PM<sub>10</sub>, and 0.2 tons/year of PM<sub>2.5</sub>. Emissions of SO<sub>2</sub> would be negligible. Estimated construction-generated emissions would not exceed the SJVAPCD's significance thresholds of 10 tons/year of ROG, 10 tons/year of NO<sub>x</sub>, or 15 tons/year of PM<sub>10</sub>. Given that project-generated emissions would not exceed applicable SJVAPCD significance thresholds, regional air quality impacts would be considered less than significant.

### *Daily Construction Emissions*

Average-daily construction emissions projected to be generated by the project are summarized in Table 5.5. Assuming the simultaneous construction of the proposed cancer center, hotel, and shopping center, Phase I of the proposed project would generate maximum uncontrolled average-daily emissions of approximately 21.4 lbs/day of ROG, 61.0 lbs/day of NO<sub>x</sub>, 45.4 lbs/day of CO, 3.0 lbs/day of PM<sub>10</sub>, and 2.0 lbs/day of PM<sub>2.5</sub>. Average-daily construction emissions for Phase II would total 37.9 lbs/day of ROG, 25.9 lbs/day of NO<sub>x</sub>, 32.0 lbs/day of CO, 3.0 lbs/day of PM<sub>10</sub>, and 2.2 lbs/day of PM<sub>2.5</sub>. Emissions of SO<sub>2</sub> would be negligible (i.e., less than 0.1 lbs/day). Estimated construction-generated emissions would not exceed the SJVAPCD's significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated. Localized air quality impacts associated with project construction would be considered less than significant.

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**Table 5.4**  
**Annual Construction-Generated Emissions**

| Land Use  | Construction Period | Uncontrolled Maximum Annual Emissions (TPY) <sup>1</sup> |     |     |     |      |       |
|---|---------------------|--|-----|-----|-----|------|-------|
|   |                     | ROG  | NOx | CO  | SO2 | PM10 | PM2.5 |
| Phase I (2-10 Year Plan)  |                     |  |     |     |     |      |       |
| Cancer Center   | 2017-2018           | 1.0  | 3.3 | 2.3 | 0.0 | 0.3  | 0.2   |
| Hotel & Shopping Center   | 2018-2019           | 2.7  | 4.3 | 3.1 | 0.0 | 0.5  | 0.3   |
| Bed Tower, D&T Expansion, Parking Garage & Parking Lots   | 2020-2021           | 2.0  | 4.1 | 3.2 | 0.0 | 0.5  | 0.3   |
| Medical-Dental Office   | 2022-2023           | 0.8  | 2.1 | 1.9 | 0.0 | 0.2  | 0.1   |
| Outpatient Center Expansion   | 2025-2026           | 0.3  | 0.8 | 0.9 | 0.0 | 0.1  | 0.1   |
| Phase II (10-20 Year Plan)  |                     |  |     |     |     |      |       |
| Hospital Expansion, Assisted Living Facility, Shopping Center, Medical-Dental Office & Parking Lots <sup>3</sup>  | 2028-2030           | 4.6  | 3.0 | 3.0 | 0.0 | 0.6  | 0.3   |
| Herndon Avenue Widening   |                     |  |     |     |     |      |       |
|   | 2020                | 0.4  | 3.8 | 2.7 | 0.0 | 0.5  | 0.2   |
| Maximum Annual Emissions  |                     |  |     |     |     |      |       |
| Phase I <sup>2</sup>  |                     | 3.7  | 7.6 | 5.4 | 0   | 0.8  | 0.5   |
| Phase II <sup>3</sup>   |                     | 4.6  | 3.0 | 3.0 | 0.0 | 0.6  | 0.3   |
| Significance Thresholds:  |                     | 10   | 10  | 100 | 27  | 15   | 15    |
| Exceeds Thresholds/Significant Impact?:   |                     | No   | No  | No  | No  | No   | No    |
| 1. Based on CalEEMod emissions modeling. Does not include emission control measures.<br>2. Phase I maximum annual emissions assumes construction of the cancer center, hotel, and shopping center could potentially occur simultaneously.<br>3. To be conservative, Phase II maximum annual construction of the hospital expansion, assisted living facility, shopping center, and medical-dental office were assumed to occur simultaneously.<br>Refer to Appendix A of the Air Quality Analysis for modeling results and assumptions. |                     |  |     |     |     |      |       |

**Table 5.5**  
**Average Daily Construction-Generated Emissions**

| Project Phase/Land Use   | Construction Year | Uncontrolled Average Daily Onsite Emissions (lbs/day) <sup>4</sup> |       |      |                 |                  |                   |
|--|-------------------|--|-------|------|-----------------|------------------|-------------------|
|  |                   | ROG  | NOx   | CO   | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Phase I (2-10 Year Plan)   |                   |  |       |      |                 |                  |                   |
| Cancer Center  | 2017              | 0.7  | 6.2   | 3.8  | 0.0             | 0.9              | 0.7               |
|  | 2018              | 4.9  | 35.0  | 27.2 | 0.0             | 2.1              | 2.0               |
| Hotel & Shopping Center  | 2018              | 2.9  | 26.0  | 18.2 | 0.0             | 2.8              | 2.2               |
|  | 2019              | 21.4   | 8.6   | 7.1  | 0.0             | 0.5              | 0.5               |
| Bed Tower, D&T Expansion, Parking Garage & Parking Lots  | 2020              | 2.6  | 24.2  | 20.0 | 0.0             | 2.1              | 1.8               |
|  | 2021              | 11.1   | 14.2  | 13.7 | 0.0             | 0.8              | 0.7               |
| Medical-Dental Office Building   | 2022              | 1.9  | 15.34 | 14.5 | 0.0             | 1.3              | 0.9               |
|  | 2023              | 6.1  | 6.3   | 6.6  | 0.0             | 0.2              | 0.2               |
| Outpatient Center Expansion  | 2025              | 0.5  | 5.5   | 7.1  | 0.0             | 0.3              | 0.3               |
|  | 2026              | 2.5  | 2.3   | 3.1  | 0.0             | 0.1              | 0.1               |
| Phase II (10-20 Year Plan)   |                   |  |       |      |                 |                  |                   |
| Hospital Expansion, Assisted Living, Shopping Center, Medical-Dental Office & Parking Lots   | 2028              | 1.8  | 16.7  | 20.5 | 0.0             | 2.6              | 1.9               |
|  | 2029              | 38.2   | 27.3  | 34.4 | 0.1             | 3.0              | 2.3               |
| Herndon Avenue Widening  |                   |  |       |      |                 |                  |                   |
|  | 2020              | 6.4  | 60.8  | 43.2 | 0.0             | 8.0              | 3.2               |
| Highest Average-Daily Onsite Emissions   |                   |  |       |      |                 |                  |                   |
| Phase I  |                   | 21.4   | 61.0  | 45.4 | 0.1             | 4.9              | 4.2               |
| Phase II   |                   | 38.2   | 27.3  | 34.4 | 0.1             | 3.0              | 2.3               |
| Significance Thresholds:   |                   | 100  | 100   | 100  | 100             | 100              | 100               |
| Exceeds Thresholds/Significant Impact?:  |                   | No   | No    | No   | No              | No               | No                |
| 1. Based on CalEEMod emissions modeling. Does not include emission control measures. Totals may not sum due to rounding.<br>2. Average daily onsite emissions are based on total onsite emissions divided by the total number of construction days. Assumes 250 construction days per year.<br>Refer to Appendix A of the Air Quality Analysis for modeling results and assumptions. |                   |  |       |      |                 |                  |                   |

### AQ-5: Generation of Objectionable Odors

The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies.

No major sources of odors have been identified in the project area. However, construction of the proposed project would involve the use of a variety of gasoline or diesel-powered equipment that would emit exhaust fumes. Exhaust fumes, particularly diesel-exhaust, may be considered objectionable by some people. In addition, pavement coatings and architectural coatings used during project construction would also emit temporary odors. However, construction-generated emissions would occur intermittently throughout the workday and would dissipate rapidly within increasing distance from the source. As a result, short-term construction activities would not expose a substantial number of people to frequent odorous emissions. This impact would be considered less than significant.

## CUMULATIVE IMPACTS

The SJVAB is currently designated non-attainment for the state and federal ozone and PM<sub>2.5</sub> ambient air quality standards and the state PM<sub>10</sub> standard. As discussed under Impacts AQ-1 and AQ-2, annual operational emissions of ozone-precursor pollutants (e.g., ROG and NO<sub>x</sub>) and PM would exceed SJVAPCD's significance thresholds. Long-term increases in operational emissions could contribute, on a cumulative basis, to existing non-attainment conditions. In addition, short-term construction activities may also result in increased emissions of fugitive dust. As a result, this impact is considered potentially significant.

Mitigation Measure AQ-1.1 would require compliance with SJVAPCD's Indirect Source Review Rule (Rule 9510). With implementation of Mitigation Measure AQ-1.2, a DMC would be required to reduce operational emissions of ROG, NO<sub>x</sub> and PM<sub>10</sub> to below the SJVAPCD's significance thresholds. Mitigation Measure AQ-2 would ensure compliance with SJVAPCD requirements for the control of construction-generated emissions. With mitigation, the project's contribution toward air quality impacts would not be cumulatively considerable.

## SOURCES CONSULTED

This chapter is based upon the following report:

Ambient Air Quality and Noise Consulting. *Air Quality & Greenhouse Gas Impact Analysis for Master Plan Expansion of the Clovis Community Medical Center Project, Clovis, CA – July 2017*. July 2017

Sources cited by Ambient Air Quality and Noise Consulting are as follows:

California Air Resources Board (CARB). *California Almanac of Emissions and Air Quality – 2013 Edition*. 2013.

California Air Resources Board (CARB). "iADAM Air Quality Data Statistics". Accessed June 23, 2017. Website URL: <http://www.arb.ca.gov/adam/index.html>

California Air Resources Board (CARB). "Air Quality Standards and Area Designations". Accessed: June 23, 2017. Website URL: <http://www.arb.ca.gov/desig/desig.htm>

California Air Resources Board (CARB). Diesel Risk Reduction Plan. 2000. Website URL: <http://www.arb.ca.gov/diesel/documents/rrpapp.htm>

California Building Standards Commission (BSC). April 2016. CalGreen. Website URL: <http://www.bsc.ca.gov>

California Department of Conservation (DOC). Division of Mines and Geology. August 2000. A General Location Guide for Ultramafic Rocks in California-Areas More Likely to Contain Naturally Occurring Asbestos.

California Department of Transportation (Caltrans). Accessed: June 29, 2017. Traffic Census Program, Traffic Counts. Website url: <http://www.dot.ca.gov/trafficops/census/>

California Energy Commission (CEC). Accessed: April 2016. Energy Commission Approves More Efficient Buildings for California's Future. Website URL: [http://www.energy.ca.gov/releases/2012\\_releases/2012-0531\\_energy\\_commission\\_approves\\_more\\_efficient\\_buildings\\_nr.html](http://www.energy.ca.gov/releases/2012_releases/2012-0531_energy_commission_approves_more_efficient_buildings_nr.html)

Centers for Disease Control and Prevention (CDC). Accessed: April 2016. Valley Fever: Awareness is Key. Website URL: <http://www.cdc.gov/features/valleyfever/>

JLB Traffic Engineering, Inc. 2017. Draft Traffic Impact Analysis: Master Plan Expansion of the Clovis Community Medical Center.

San Joaquin Valley Air Pollution Control District (SJVAPCD). March 19, 2015. Guidance for Assessing and Mitigating Air Quality Impacts.

San Joaquin Valley Air Pollution Control District (SJVAPCD). Accessed: June 21, 2017. Ambient Air Quality Standards and Valley Attainment Status. Website URL: <http://www.valleyair.org/aqinfo/attainment.htm>

Western Regional Climate Center (WRCC). Accessed: July 2, 2017. Western U.S. Climate Historical Summaries: Fresno Yosemite International Airport, California. Website url: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3257>

# CHAPTER 6

## Biological Resources

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### INTRODUCTION

This chapter identifies and discusses potential environmental effects of the project on biological resources, including vegetation, wildlife, aquatic resources and associated habitats. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to biological resources; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect environmental effects of the project on biological resources; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

The analysis in this chapter is based upon the following two reports, which are included in the Draft EIR as Appendices 6A and 6B:

- *Biological Resources Assessment, Herndon Avenue Widening Project, City of Clovis* prepared by Odell Planning & Research (“Biological Resources Assessment”)
- *Clovis Healthcare Campus Expansion Biotic Study* prepared by H.T. Harvey & Associates. (“Biotic Study”)

### ENVIRONMENTAL SETTING

#### Field Surveys

The biological setting of the project area has been evaluated as part of two field surveys: the Biotic Study prepared as part of a prior EIR for the 2008 CCMC expansion, and the Biological Resources Assessment which evaluated the Herndon Avenue widening area that was not previously evaluated.

On August 27, 2008, a reconnaissance field survey was conducted that encompassed the campus expansion area included in the current proposal. The purpose of the survey was to document biotic resources associated with the site that may pose constraints to the proposed development. Specifically, surveys were conducted to: 1) describe existing biotic habitats; 2) assess the site for its potential to support special-status species and their habitats; and 3) identify potential jurisdictional habitats, including those regulated by the United States Army Corps of Engineers (ACOE) and the CDFG.

On October 16, 2016, a reconnaissance-level site visit was conducted within the Herndon Avenue widening area footprint and a 100-foot radius buffer (study area), where accessible, to assess/map potential special status biological resources. The project site was surveyed on foot and evaluated to determine its ability to support the special status species under consideration. Wildlife observations, plant species, and habitat types encountered were documented. Focus was placed on searching for large burrows or burrow complexes and any potential wetland features, as well as potential wildlife corridors.

#### Existing Conditions

The area where the project is situated is generally developed with urban and residential uses, with agricultural and rural residential uses remaining in the vicinity. With the development of the area, more urban influences also are prevalent, including frequent human disturbance, feral animals, rodent poisoning, and debris. Adjacent land uses include residential development, offices, and an elementary school to the south; existing Clovis Community Medical Center facilities, the Enterprise Canal, and

rural residential to the north; agricultural land and rural residential development to the east; and residential and fallow agricultural land to the west.

## **Wetlands**

Wetlands are defined as “areas that are inundated or saturated by surface or ground water at a frequency and duration to support a prevalence of vegetation adapted for life in saturated soil conditions” (33 CFR Section 328.8[b]). Wetlands usually must possess hydrophytic vegetation (i.e., plants adapted to inundated or saturated conditions), wetland hydrology (e.g., topographic low areas, exposed water tables, stream channels), and hydric soils (i.e., soils that are periodically or permanently saturated, inundated, or flooded) to be regulated by the US Army Corps of Engineers (ACOE). Additionally, under Clean Water Act Section 404 (discussed in more detail under “Regulatory and Policy Setting” below), the ACOE’s jurisdiction may extend to “other waters” such as lakes, ponds, and streams, extends to the upward limit of the ordinary high-water mark (OHWM) or the upward extent of any adjacent wetland. The OHWM on a nontidal water is the “line on shore established by the fluctuations of water and indicated by physical characteristics such as a clear natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter or debris; or other appropriate means that consider the characteristics of the surrounding areas” (33 CFR Section 328.3[e]).

A preliminary delineation of potential jurisdictional waters of the United States was completed by Live Oak Associates on August 8, 2017. A total of approximately 8,900 square feet (0.204 acre) of potential waters of the U.S. has been identified within the project area, and includes a wetland swale (1,059 square feet [0.024 acre]) and an isolated roadside wetland depression (7,841 square feet [0.18 acre]). No traditional vernal pool habitats were observed, although the roadside depression may provide habitat for large branchiopods (fairy shrimp). Artificial topographic features such as tire ruts, agricultural ditches, borrow pits, and roadside pools, can mimic the ephemeral aquatic habitat of natural vernal pools (USFWS 2015). In fact, the US Fish & Wildlife Service considers a seasonally inundated depression that holds water of sufficient depth and duration for a large branchiopod life cycle to be potential habitat for a species. Conversely, habitats with flowing water (e.g., creeks, streams, and ephemeral drainages) or those that are semi-to-permanently inundated and support perennial population of predators (e.g. bullfrogs, fish, and crayfish) generally are not considered suitable habitat for listed large branchiopods (USFWS 2015).

## **Plants**

Plant species observed within the study area were those typical of disturbed land and landscaped/developed land, such as non-native grasses (*Avena* spp., *Bromus* spp., *Cynodon dactylon*, *Hordeum* sp., in part), and weedy forbs (*Brassica nigra*, *Centaurea solstitialis*, *Croton setiger*, *Erodium* spp., *Helianthus annuus*, *Holocarpha* sp., *Malva parviflora*, *Plantago* sp., *Rumex crispus*, *Salsola tragus*, *Sonchus* sp., *Tribulus terrestris*, *Trichostema lanceolatum*, in part). There were several ornamental and non-native trees and shrubs associated with residences present such as coast redwood (*Sequoia sempervirens*), eucalyptus, weeping willow (*Salix × sepulcralis*), cactus, palm trees, fig (*Ficus carica*), English walnut (*Juglans regia*), oleander (*Nerium oleander*), lemon, orange, bamboo, Japanese maple, pines (*Pinus* spp.), and roses (*Rosa* spp.). Adjacent to the project area (north) along the canal are large mature eucalyptus trees.

### *Special Status Plants*

Database queries performed as part of the Biological Resources Assessment indicated 15 plant species with special status occur or have historically occurred within the 9-quadrant search area (see Biological

Resources Assessment Appendices A and B). However, none of the potentially occurring plants were found within the project area.

### **Wildlife Species and Habitat**

Habitat present within the project footprint was classified as developed/landscaped areas, ruderal/fallow agricultural land, and seasonal wetland swale. The immediate site vicinity is visited frequently by humans (vehicles, residents, farmers), meaning wildlife sensitive to human disturbance are less likely to use the project site. A few rodent burrows (none larger than 5 inches in diameter) were present within the study area, along the side of Herndon Avenue. No active rodent poisoning was evident. Rodent burrows provide habitat for several secondary inhabitant wildlife species, including snakes, lizards, and burrowing owls.

Busy roadways, landscaped areas, residential areas, and agricultural fields ordinarily provide low to marginal habitat for some terrestrial wildlife, primarily due to the amount of regular ground disturbance, pesticide/herbicide use, heavy foot and vehicle traffic, and feral or domestic animal presence. Wildlife species and sign (tracks and scat) observed on or near the project site during the visit included a species from various taxa.

Wildlife species which may occur or use the project site for foraging or breeding include:

- bird species such as European starlings (*Sturnus vulgaris*), American crow (*Corvus brachyrhynchos*), black phoebe (*Sayornis nigricans*), mourning dove (*Zenaidura macroura*), northern mockingbird (*Mimus polyglottos*), killdeer (*Charadrius vociferus*), great blue heron (*Ardea herodias*), great horned owl (*Bubo virginianus*), mallard (*Anas platyrhynchos*) and various passerine species;
- small mammals such as California ground squirrel (*Spermophilus beecheyi*), desert cottontail (*Sylvilagus audubonii*), fox squirrel (*Sciurus niger*), Botta's pocket gopher (*Thomomys bottae*), broad-handed mole (*Scapanus latimanus*), deer mouse (*Peromyscus maniculatus*), California vole (*Microtus californicus*), old-world rats (*Rattus* sp.), and house mouse (*Mus musculus*).
- various bat species may forage on insects above the adjacent Enterprise Canal and landscaped areas, near street lights, and possibly roost in crevices of nearby overpasses and houses or in large trees at neighboring residences;
- medium-sized mammals accustomed to human disturbance which seek rodent prey such as raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), feral and domestic cats (*Felis domesticus*);
- reptile and amphibian species Pacific gopher snake (*Pituophis catenifer catenifer*), western fence lizard (*Sceloporus occidentalis*), California toad (*Anaxyrus boreas halophilus*), and Sierran treefrog (*Pseudocris sierra*).

### *Special Status Species*

Database queries performed as part of the Biological Resources Assessment indicated 38 animal species with special status occur or have historically occurred within the 9-quad search area (see Biological Resources Assessment Appendices A and B). Many of the species from the generated list either were historic, extirpated occurrences, or were species with very specialized habitat requirements that were not present on the site or within the vicinity. Subsequently, the majority of the species were "ruled out" per the study.

Based on the habitat types present within the study area, nine special status wildlife species have the potential to occur on the site. The species are described in more detail below:

#### Vernal Pool Fairy Shrimp (VPFS)

VPFS are known from counties throughout California and in southern Oregon. This species inhabits vernal pools ranging from 10-290 meters in elevation, primarily in the Central Valley and Coast Ranges of California. VPFS are commonly found in small swales, earth slumps, or basalt-flow depression basins with grassy or muddy bottoms in unplowed soils, and sometimes in very small depressions (<1 meter diameter) in sandstone outcrops. Artificial topographic features such as tire ruts, agricultural ditches, borrow pits, and roadside pools, can mimic the ephemeral aquatic habitat of natural vernal pools, and can provide suitable habitat depending on inundation period and depth (USFWS 2015). Water temperatures between 4.5 and 23 C, with low to moderate total dissolved solids (48 to 481 parts per million (ppm)), and a pH between 6.3 and 8.5 are required by VPFS (Syrdaahl, 1993; Eriksen and Belk, 1999). VPFS hatch from eggs (shell-covered dormant embryos) present in the soil from previous years of breeding, initiated when a pool fills with rainwater. They can reach maturity in approximately 18 days when temperatures are warmer (daytime temperatures of 20 C), but development can be delayed to 41 days when water is cooler (15 C) (Gallagher 1996, Helm 1998).

#### Special Status Birds

Eight special status avian species (Swainson's hawk, white-tailed kite, loggerhead shrike, fox sparrow [wintering], yellow-billed magpie, Nuttall's woodpecker, oak titmouse, and burrowing owl) have the potential to nest and/or forage within the project area. Swainson's hawk, white-tailed kite, yellow-billed magpie, Nuttall's woodpecker on, and oak titmouse could nest in the large trees within and adjacent to the project area. Loggerhead shrike could nest in shrubs or trees within and adjacent to the project area and forage in the open fields. Although none were detected during reconnaissance survey, burrowing owls could move into the area prior to construction, and occupy any large burrows during the nesting and wintering seasons. Fox sparrows may use the shrubs and landscaped areas of the project site and surrounding area for foraging habitat winter and/or migration.

## **REGULATORY AND POLICY SETTING**

### **Federal**

#### *Federal Endangered Species Act*

The Federal Endangered Species Act (FESA) of 1973, as amended, was promulgated to protect and conserve any species of plant or animal that is endangered or threatened with extinction and the habitats in which these species are found. "Take" of endangered species is prohibited under Section 9 of the FESA. "Take," as defined under the FESA, means to "harass, harm, pursue, hunt, wound, kill, trap, capture, collect, or attempt to engage in any such conduct." Section 7 of the FESA requires federal agencies to consult with the US Fish and Wildlife Service (USFWS) on proposed federal actions which may affect any endangered, threatened, or proposed (for listing) species or critical habitat that may support the species. Section 4(a) of the FESA requires that critical habitat be designated by the USFWS "to the maximum extent prudent and determinable, at the time a species is determined to be endangered or threatened." Critical habitat is formally designated by USFWS to provide guidance for planners/managers and biologists with an indication of where suitable habitat may occur and where high priority of preservation for a particular species should be given. Section 10 of the FESA provides the regulatory mechanism that allows the incidental take of a listed species by private interests and non-federal government agencies during lawful activities. Habitat conservation plans for the impacted



species must be developed in support of incidental take permits for nonfederal projects to minimize impacts to the species and develop viable mitigation measures to offset the unavoidable impacts.

#### *Migratory Bird Treaty Act*

The Migratory Bird Treaty Act of 1918 (MBTA) is the domestic law that affirms and implements the United States' commitment to four international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. It prohibits the take, possession, import, export, transport, sale, purchase, barter, or offer of these activities, except under a valid permit or as permitted in the implementing regulations. Migratory birds include geese, ducks, shorebirds, raptors, songbirds, wading birds, seabirds, and passerine birds (such as warblers, flycatchers, swallows, etc.). USFWS administers permits to take migratory birds in accordance with the regulations by the MBTA.

#### *Clean Water Act, Section 404*

The United States Army Corps of Engineers (ACOE) regulates discharges of dredged or fill material into "waters of the United States" (including wetlands and nonwetland bodies of water that meet specific criteria). Pursuant to Section 404 of the federal Clean Water Act (CWA), a permit is required for any filling or dredging in waters of the United States. The permit review process entails an assessment of potential adverse impacts to ACOE wetlands and jurisdictional waters, wherein the ACOE may require mitigation measures. Where a federally listed species may be affected, a Section 7 consultation with USFWS may be required. If there is potential for cultural resources to be present, Section 106 review may be required. Also, where a Section 404 permit is required, a Section 401 Water Quality Certification would also be required from the Regional Water Quality Control Board (RWQCB).

### **State**

#### *California Endangered Species Act*

The California Endangered Species Act (CESA) generally parallels the main provisions of the FESA and is administered by the CDFW. Its intent is to prohibit take and protect state-listed endangered and threatened species of fish, wildlife, and plants. Unlike its federal counterpart, CESA also applies the take prohibitions to species petitioned for listing (state candidates). Candidate species may be afforded temporary protection as though they were already listed as threatened or endangered at the discretion of the Fish and Game Commission. Unlike the FESA, CESA does not include listing provisions for invertebrate species. Under certain conditions, CESA has provisions for take through a 2081 permit or Memorandum of Understanding. In addition, some sensitive mammals and birds are protected by the State as Fully Protected Species. California Species of Special Concern are species designated as vulnerable to extinction due to declining population levels, limited ranges, and/or continuing threats. This list is primarily a working document for the CDFW's California Natural Diversity Data Base (CNDDB) project which maintains a database of known and recorded occurrences of sensitive species. Informally listed taxa are not protected per se, but warrant consideration in the preparation of biological resources assessments.

#### *California Fish and Game Code*

California Fish and Game Code Sections 3503, 3503.5, 3511, and 3513 prohibit the "take, possession, or destruction of birds, their nests or eggs." Disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered "take." Such a take would also violate federal law protecting migratory birds (MBTA). All raptors (e.g., hawks, eagles, owls)

and their nests, eggs, and young are protected under California Fish and Game Code (Section 3503.5). Additionally, “fully protected” birds, such as the white-tailed kite (*Elanus leucurus*), are protected under California Fish and Game Code Section 3511. “Fully protected” birds may not be taken or possessed (i.e. kept in captivity) at any time.

## **Local**

### *Clovis General Plan*

Policy 2.6 of the Clovis General Plan directs the City to support the protection of biological resources through the conservation of high quality habitat area.

### *Fresno County General Plan*

The Fresno County General Plan’s Open Space and Conservation Element contains several provisions addressing fish and wildlife habitat, wetland and riparian areas, and vegetation. The following policies were identified as relevant to the project:

*Policy OS-D.1* The County shall support the “no-net-loss” wetlands policies of the US Army Corps of Engineers, the US Fish and Wildlife Service, and the California Department of Fish and Game. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed.

*Policy OS-D.2* The County shall require new development to fully mitigate wetland loss for function and value in regulated wetlands to achieve “no-net-loss” through any combination of avoidance, minimization, or compensation. The County shall support mitigation banking programs that provide the opportunity to mitigate impacts to rare, threatened, and endangered species and/or the habitat which supports these species in wetland and riparian areas.

*Policy OS-D.3* The County shall require development to be designed in such a manner that pollutants and siltation do not significantly degrade the area, value, or function of wetlands. The County shall require new developments to implement the use of Best Management Practices (BMPs) to aid in this effort.

*Policy OS-E.1* The County shall support efforts to avoid the “net” loss of important wildlife habitat where practicable. In cases where habitat loss cannot be avoided, the County shall impose adequate mitigation for the loss of wildlife habitat that is critical to supporting special-status species and/or other valuable or unique wildlife resources. Mitigation shall be at sufficient ratios to replace the function, and value of the habitat that was removed or degraded. Mitigation may be achieved through any combination of creation, restoration, conservation easements, and/or mitigation banking. Conservation easements should include provisions for maintenance and management in perpetuity. The County shall recommend coordination with the US Fish and Wildlife Service and the California Department of Fish and Game to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed. Important habitat and habitat components include nesting, breeding, and foraging areas, important spawning grounds, migratory routes, migratory stopover areas, oak woodlands, vernal pools, wildlife movement corridors, and other unique wildlife habitats (e.g., alkali scrub) critical to protecting and sustaining wildlife populations.

*Policy OS-E.2* The County shall require adequate buffer zones between construction activities and significant wildlife resources, including both onsite habitats that are purposely avoided and significant habitats that are adjacent to the project site, in order to avoid the degradation and disruption of critical life cycle activities such as breeding and feeding. The width of the buffer

zone should vary depending on the location, species, etc. A final determination shall be made based on informal consultation with the US Fish and Wildlife Service and/or the California Department of Fish and Game.

*Policy OS-E.3* The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the value of the habitat for wildlife is maintained.

*Policy OS-E.4* The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by the California Department of Fish and Game officials and the U.S. Fish and Wildlife Service.

*Policy OS-E.13* The County should protect to the maximum extent practicable wetlands, riparian habitat, and meadows since they are recognized as essential habitats for birds and wildlife.

*Policy OS-E.16* Areas that have unusually high value for fish and wildlife propagation should be preserved in a natural state to the maximum possible extent.

*Policy OS-E.17* The County should preserve, to the maximum possible extent, areas defined as habitats for rare or endangered animal and plant species in a natural state consistent with State and Federal endangered species laws.

*Policy OS-F.5* The County shall establish procedures for identifying and preserving rare, threatened, and endangered plant species that may be adversely affected by public or private development projects. As part of this process, the County shall require, as part of the environmental review process, a biological resources evaluation of the project site by a qualified biologist. The evaluation shall be based on field reconnaissance performed at the appropriate time of year to determine the presence or absence of significant plant resources and/or special-status plant species. Such evaluation shall consider the potential for significant impact on these resources and shall either identify feasible mitigation measures or indicate why mitigation is not feasible.

## THRESHOLDS OF SIGNIFICANCE

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.” The thresholds of significance used for this EIR to determine the significance of environmental effects related to population and housing are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form:

Would the project:

- (a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?
- (b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

- (c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?
- (d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?
- (e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?
- (f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

## POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION MEASURES

### BR-1: Potential Project Impacts on Special Status Species

#### *Vernal Pool Fairy Shrimp (VPFS)*

The roadside wetland depression within the project area provides potential habitat for VPFS. Although VPFS have the potential to inhabit this feature, the roadside wetland depression in the project area provides only marginal habitat. No vernal pool branchiopod surveys have been conducted.

Federally listed VPFS and other non-listed vernal pool branchiopods, including midvalley fairy shrimp (*Branchinecta mesoamericana*) and California linderiella (*Linderiella occidentalis*), have the potential to occur within the proposed project area. Approximately 0.18 acres (7,841 square feet) of potential habitat would be directly impacted as a result of the road widening (note: this measure includes the entire pool, although the entire pool is not completely within the project footprint; see Figure 4 in Appendix C of the Biological Resources Assessment). The implementation of the mitigation measures identified below, including the purchase of preservation and/or creation credits required for impacts to federally listed VPFS, would offset removal of marginal habitat and would enhance habitat for VPFS. Therefore, impacts to VPFS would be reduced to a less than significant level.

#### Mitigation Measures

BR-1.1: The City of Clovis shall either:

- (a) Conduct surveys for VPFS following USFWS survey guidelines (2015) to determine presence of the species within the project area [A complete survey includes at least one wet season survey and one dry season survey, completed within a 3-year period. If VPFS are not detected, and if approved by USFWS, the City may be exempt from further mitigation measures for VPFS. If VPFS are detected in the roadside depression, an Incidental Take Permit would be required, as detailed in VPFS-1]; or
- (b) Elect to skip the surveys and immediately begin the consultation process for an Incidental Take Permit with USFWS and US Army Corps of Engineers (ACOE). A Biological Assessment to review the proposed action (the project) and its effects on the VPFS, in accordance with the legal requirements set forth in Section 7 of the Federal Endangered Species Act, would be required.

BR-1.2: An Incidental Take Permit for VPFS and shall be obtained from the USFWS prior to construction. All conditions of the permit required by USFWS shall be implemented. Appropriate mitigation credit ratios and other measures should be determined in consultation with USFWS and ACOE. At a minimum, the following conservation

measures shall be implemented to minimize impacts to the federally listed VPFS and/or other non-listed vernal pool branchiopods including midvalley fairy shrimp and California linderiella:

- (a) Effects of permanent losses and degradation of VPFS habitat shall be minimized and, to the greatest extent practicable, habitat restored. Before discharge of fill material, creation and/or preservation credits (amount TBD with consultation with USFWS) will be obtained from a USFWS-approved mitigation bank for every acre of habitat directly or indirectly impacted.
- (b) Staging areas shall be located away from the seasonal wetlands and channels.
- (c) Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be used onsite or disposed of at a regional landfill or other appropriate facility.
- (d) A USFWS-approved biologist conduct habitat sensitivity training related to VPFS for all project contractors and personnel.

### ***Special Status Birds***

Since CDFW usually requires a various sized “no disturbance” buffers around nesting sites for these species, construction-related disturbance could be considered “take” under CESA and MBTA. Specific impacts to burrowing owl according to the Staff Report on Burrowing Owl Mitigation (CDFG 1995) include any “disturbance within 50 meters (approx. 160 ft) [75 m (250 ft) during breeding season] which may result in harassment of owls at occupied burrows; destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s)”.

In addition, other migratory birds will likely be nesting in the study area and vicinity, most of which are protected by the Migratory Bird Treaty Act. Both construction related disturbance and the removal of vegetation within the project area could result in nest abandonment or direct mortality of eggs, chicks, and/or fledglings. This type of impact to migratory birds, including special status bird species, would be considered take under the MBTA and CESA, and therefore, is a potentially significant impact. In order to avoid impacts to avian species, nests and nesting habitat should not be disturbed or destroyed. The following measures will reduce potential impacts to a less than significant level.

### **Mitigation Measures**

#### **BR-1.3: Avoidance.**

If feasible, any vegetation removal will take place between September 1 and February 1 to avoid impacts to nesting birds in compliance with the Migratory Bird Treaty Act. If vegetation removal must occur during the nesting season, project construction may be delayed due to actively nesting birds and their required protective buffers.

#### **BR-1.4: Pre-Construction Surveys.**

- (a) If vegetation removal or ground disturbance will commence between February 1 and August 31, a qualified biologist will conduct a pre-construction survey for nesting birds within 14 days of the initiation of disturbance activities. This survey will cover:
  - (1) Potential nest sites in trees, bushes, or grass within species-specific buffers of the project area (Swainson’s hawk – 0.5 mile, other raptor species such as white-tailed kite – 500 ft, non-raptor species (loggerhead shrike, magpie etc. – 250 ft).

- (2) Survey protocol developed by the Swainson's Hawk Technical Advisory Committee (TAC) should be followed (CDFG 2000), which includes survey timing and requirements for repeated visits.
  - (b) Surveys for burrowing owl will occur within 14 days prior to any ground disturbance, no matter the season. This survey will cover potential burrowing owl burrows in the project area and suitable habitat within 150 m (500 ft). Evaluation of use by owls shall be in accordance with California Department of Fish and Wildlife survey guidelines (CBOC 1993, CDFG 1995, CDFG 2012). Surveys will document if burrowing owls are nesting or using habitat in or directly adjacent to the project area. Survey results will be valid only for the season (breeding (Feb 1-Aug 31) or non-breeding (Sept 1-Jan 31) during which the survey is conducted.
  - (c) If no active nests or burrows are detected during the pre-construction survey, then no further action is required. If an active nest or burrow is detected, then the minimization measures described in MM BR-5 shall be implemented.
- BR-1.5 Minimization/Establish Buffers.

- (a) Swainson's hawk, white-tailed kite, loggerhead shrike, yellow-billed magpie, Nuttall's woodpecker, oak titmouse, and MBTA-protected species:

If any active nests are discovered (and if construction will occur during bird breeding season), the USFWS and/or CDFW will be contacted to determine protective measures required to avoid take. These measures could include fencing off an area where a nest occurs, or shifting construction work temporally or spatially away from the nesting birds. Biologists are required on site to monitor construction while protected migratory birds are nesting in the project area. If an active nest is found after the completion of the pre-construction surveys and after construction begins, all construction activities will stop until a qualified biologist has evaluated the nest and erected the appropriate buffer around the nest.

- (b) Burrowing owl:

If burrowing owls are detected within the survey area, CDFW should be consulted to determine the suitable buffer. These buffers will take into account the level of disturbance of the project activity, existing disturbance of the site (vehicle traffic, humans, pets, etc.), and time of year (nesting vs. wintering). If avoidance is not feasible, the City will work with CDFW to determine appropriate mitigation, such as passive exclusion or translocation, and associated mitigation land offset (CDFG 2012).

If avoidance is not feasible, as per the General Plan Update PEIR (City of Clovis 2014), "A qualified biologist will develop appropriate mitigations that will reduce project impacts to sensitive or protected biological resources to a less than significant level. The type and amount of mitigation will depend on the resources impacted, the extent of the impacts, and the quality of habitats to be impacted. Mitigations may include, but are not limited to: 1) Compensation for lost habitat or waters in the form of preservation or creation of in-kind habitat or waters, either onsite or offsite, protected by conservation easement; 2) Purchase of appropriate credits from an approved mitigation bank servicing the Clovis General Plan Update Area; 3) Payment of in-lieu fees."

### ***Special Status Plants***

Per the Biological Resources Assessment, of the 15 potentially occurring special status plant species none were found within the project area. Although the site survey was not conducted at the peak blooming period for some potentially occurring special status plants, all plants could be ruled out because their elevation range, required habitat, and/or soil type differed from the site conditions. Similarly, the prior Biotic Study encompassing the campus expansion area stated that special-status plant species were determined to be absent from the project site due to lack of suitable habitat. Based on this information, the project will not impact any special status plant species.

### **BR-2: Impacts to Wetlands Due to Herndon Avenue Widening**

Hydrologic features that may be considered waters of the United States were limited to a disturbed roadside depression and a seasonal wetland swale. A preliminary delineation was completed for the project and is included as Appendix C of the Biological Resources Assessment (Appendix 6A of this EIR).

The project would impact approximately 0.204 acres of federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means. A Department of the Army Nationwide Permit Number (NWP) 14 application for linear transportation projects shall be required for the fill of the 0.204 acres of wetland features. With the incorporation of Mitigation Measures BR-6 and BR-7, which includes the purchase of, creation, and/or preservation credits for VPFS wetland habitat, to be determined in consultation with ACOE and USFWS, impacts to federally protected wetlands would be considered less than significant.

### **Mitigation Measures**

- BR-2.1: The City of Clovis shall obtain a Section 404 CWA Nationwide Permit (#14 for linear transportation projects) from the ACOE for impacts to wetlands and waters of the United States and comply with the mitigation measures identified in the permit to prevent discharge of pollutants to surface waters during construction. This shall include complying with the State's National Pollution Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit) issued by the Central Valley Regional Water Quality Control Board (CVRWQCB). A Section 401 Water Quality Certification must be obtained from the RWQCB for all proposed impacts to Waters of the State. A Section 1602 Lake and Streambed Alteration Agreement, if required by CDFW, must be obtained prior to the placement of any fill within the seasonal swale in the Project Area. Though the Nationwide Permit process, the ACOE will also submit a Biological Assessment to USFWS to initiate formal consultation under Section 7 of FESA to determine if the action could result in the incidental take of a federal listed species (in this case VPFS).
- BR-2.2 To mitigate for impacts to waters and/or wetlands, at least one of the following measures shall be incorporated:
- (a) credits will be purchased from an approved mitigation bank (typically at a 2:1 or 3:1 ratio; to be determined in consultation with ACOE and USFWS); or
  - (b) a creation, restoration, or preservation project will be identified in the vicinity; or
  - (c) mitigation performed as otherwise directed by regulatory agencies during permit preparation.

Mitigation will be implemented prior to or concurrent with filling jurisdictional waters and/or wetlands. Since the waters to be impacted by the road widening overlap with potential VPFS habitat, VPFS mitigation may incorporate a portion of the required wetland/waters mitigation acreage.

### **BR-3: Impacts to Riparian Habitat due to Herndon Avenue Widening**

As mentioned above under Impact BR-2, there is one seasonal wetland swale within the project area. This swale passes through the project area and crosses adjacent private land to the southwest. According to the Wetland Delineation prepared by Live Oak Associates, the swale is extremely ephemeral, only carrying water when provided from upstream sources. A review of the historic Google Earth imagery provided no evidence of inundation. The seasonal wetland swale may be considered a “tributary water” because it can be argued that at one time it connected to the San Joaquin River, a navigable water (note: additional detail on this point is provided in the Wetland Delineation document). There is a roadside depression that holds water seasonally; however, this feature is not considered to be a sensitive natural community. With incorporation of Mitigation Measures BR-6 and BR-7 discussed above, impacts to riparian habitat would be considered less than significant.

### **Mitigation Measures**

Implement Mitigation Measures BR-2.1 and BR-2.2.

## **LESS THAN SIGNIFICANT IMPACTS**

### **BR-4: Impacts from the Project on Wildlife Corridors or Movement of Fish and Wildlife**

Per the Biological Resources Assessment, the site does not appear to constitute a “movement corridor” for native wildlife that would attract wildlife to move through the site any more than the surrounding developed and agricultural lands. The project site is bordered by residential and commercial development, and busy streets, which restricts access for wildlife. Smaller wildlife species and birds are not expected to be further inhibited by the project as compared with residential and agricultural uses. Additionally, no impacts to wildlife corridors or movement of fish and/or wildlife were identified in the Biotic Study from 2008. Therefore, the project will have a less than significant effect on regional wildlife movements.

## **NO IMPACT**

The project is consistent with relevant biological resources policies of the City of Clovis and would not conflict with local policies or ordinances protecting biological resources. Compliance with Mitigation Measures 4-1, 4-2, 4-3, and 4-4 of the City of Clovis General Plan EIR will be ensured by adhering to the previously mentioned avoidance, minimization, and mitigation measures.

The City of Clovis and Fresno County are not part of any Habitat Conservation Plan or Natural Community Conservation Plan, so the project would not conflict any provisions of any local, regional, or state habitat conservation plan.

## **CUMULATIVE IMPACTS**

The 2014 City of Clovis General Plan EIR previously determined that no significant impacts to biological resources would result from buildout of the Plan Area given adherence to the General Plan EIR’s mitigation measures. The project is located entirely within the Plan Area and entails development consistent with the General Plan. Furthermore, the impacts of the project would be less



than significant with the implementation of the mitigation measures. Therefore, implementation of the project would not result in significant cumulative impacts to biological resources.

#### **SOURCES CONSULTED**

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. June 2014.

H. T. Harvey & Associates. *Clovis Healthcare Campus Expansion Biotic Study*. September 16, 2008.

Odell Planning & Research, Inc. *Biological Resources Assessment, Herndon Avenue Widening Project, City of Clovis*. September 11, 2017.

Paoli & Odell, Inc. *Draft Program Environmental Impact Report, Clovis Community Medical Center Healthcare Campus Expansion Project*. March 2009.

# CHAPTER 7

## Cultural Resources

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### INTRODUCTION

This chapter identifies and discusses potential environmental effects the project may have on cultural resources, including historical, archaeological and paleontological resources. This chapter is based primarily upon a report prepared for the project site by C. Kristina Roper, M.A., RPA, Sierra Valley Cultural Planning (*A Cultural Resources Assessment for the Proposed Clovis Community Medical Center Expansion and Herndon Avenue Widening Project, Herndon and Temperance Avenues, City of Clovis, Fresno County, California*. January 26, 2017). The report is included in the Draft EIR as Appendix 7. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to cultural resources; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of the project on cultural resources; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### ENVIRONMENTAL SETTING

#### Cultural Resources Concepts and Terminology

The following definitions are common terms used to discuss the regulatory requirements and treatment of cultural resources:

**Cultural Resources:** Cultural resources is an overarching term used to describe physical manifestations of past human behavior, including archaeological resources and historic built environment resources. The California Office of Historic Preservation (OHP) recommends that all resources greater than 45 years of age be identified and assessed within a project area. Cultural resources include resource areas identified by Native Americans as containing traditional and/or sacred values and do not necessarily exhibit physical manifestations.

**Historical Resources:** A historical resource is a resource that is eligible for listing or is listed in the California Register of Historical Resources (California Register) and includes buildings, sites, structures, objects, or districts that are historically or archaeologically significant. A resource may be listed as a historical resource in the California Register if it meets any of the following National Register of Historic Places criteria:

- It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- It is associated with the lives of persons important in our past.
- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- It has yielded, or may be likely to yield, information important in prehistory or history. Historical resources are considered part of the environment and a project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment. The definition of historical resources is contained in Section 15064.5 of the CEQA Guidelines.

**Paleontological Resource:** A Paleontological resource is defined as including fossilized remains of vertebrate and invertebrate organisms, fossil tracks and track ways, and plant fossils. A unique paleontological site would include a known area of fossil-bearing rock strata.

### **Methods and Findings of Cultural Resources Assessment**

Prior to field inspection, a records search was completed on May 26, 2016, by the Southern San Joaquin Valley Information Center (SSJV) of the California Historical Resources Information System staff to identify areas previously investigated and to identify known cultural resources present within or in close proximity to the Project APE. According to the Information Center records, there are no prehistoric or historic-period sites or structures identified within the project APE.

On November 15, 2016, Sierra Valley Cultural Planning (SVCP) archaeologist Douglas S. McIntosh completed a systematic archaeological pedestrian survey of the project Area of Potential Effect (see Map 3 included as part of Appendix 7). The field survey sought to identify archaeological sites, features or artifacts which might be present on the ground surface. Items such as chipped stone tools, grinding implements, and midden soils are indicators of prehistoric activities. The survey also sought to identify any historic artifacts, features, and structures over 50 years old.

One historic feature was identified adjacent to the project study area: The Enterprise Canal, built in the 1870s and now part of the Fresno Irrigation District, bounds the project area on the east. Per the Cultural Resources Assessment, it is unlikely that expansion of the medical center will have an effect on the canal, and no further management actions to protect this potentially significant feature are recommended at this time. Other than the Enterprise Canal, no archaeological or other cultural resources were identified in the Cultural Resources Assessment.

The Native American Heritage Commission (NAHC) was contacted on November 20, 2016 in order to determine whether Native American sacred sites have been identified either within or in close proximity to the project APE. No response was received from the NAHC as of January 27, 2017.

## **REGULATORY AND POLICY SETTING**

### **Federal Regulations**

**National Historic Preservation Act of 1966 (NHPA):** The NHPA of 1966, as amended, is the primary mandate governing projects under federal jurisdiction that may affect cultural resources. Section 106 of the NHPA requires federal agencies, or those they fund or permit, to consider the effects of their actions on the properties that may be eligible for listing or are listed in the National Register of Historic Places. The regulations implementing Section 106 are codified in 36 CFR 800 (2001).

### **State Regulations**

**California Office of Historic Preservation (OHP):** The OHP is the governmental agency primarily responsible for the statewide administration of the historic preservation program in California. The chief administrative officer for the OHP is the SHPO. The SHPO is also the Executive Secretary of the State Historical Resources Commission. In addition to their role in the identification of National Register properties, OHP and SHPO are responsible for administering the State Historical Landmark, State Point of Historical Interest, California Register of Historical Resources (California Register), California Historical Resources Information Systems, and the California Heritage Fund programs. In accordance with federal and state laws and regulations, OHP comments on the impact of proposed projects and programs on historic resources, including those owned by the State of California. The OHP assists project sponsors in identifying historic resources; evaluating their significance; determining a project's impact on the resources; and finding ways to avoid or satisfactorily mitigate

any adverse effects. In addition, OHP develops guidelines and standards for cultural resource planning and management.

**California Environmental Quality Act (CEQA):** CEQA requires that public or private projects financed or approved by public agencies be assessed to determine the effects of the projects on historical resources (defined under “Introduction”). CEQA states that if implementation of a project would result in significant effects on historical resources, then alternative plans or mitigation measures must be considered; however, only significant historical resources need to be addressed (CCR 15064.5, 15126.4). Therefore, before impacts and mitigation measures can be identified, the significance of historical resources must be determined. The CEQA Guidelines define three ways that a property may qualify as a historical resource for the purposes of CEQA review.

- if the resource is listed in or determined eligible for listing in the California Register of Historic Resources (CRHR);
- if the resource is included in a local register of historical resources, as defined in PRC 5020.1(k), or identified as significant in an historical resource survey meeting the requirements of PRC 5024.1(g), unless the preponderance of evidence demonstrates that it is not historically or culturally significant; or
- the lead agency determines the resource to be significant, as supported by substantial evidence in light of the whole record (14 CCR 15064.5[a]).

Each of these ways of qualifying as an historical resource for the purpose of CEQA is related to the eligibility criteria for inclusion in the CRHR (PRC 5020.1[k], 5024.1, 5024.1[g]). A historical resource may be eligible for inclusion in the CRHR if it:

- is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
- is associated with the lives of persons important in our past;
- embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- has yielded, or may be likely to yield, information important in prehistory or history. (CEQA Guidelines 15064.5[a][d].)

Properties that are listed or eligible for listing in the NRHP are considered eligible for listing in the CRHR and are therefore significant historical resources for the purpose of CEQA (PRC 5024.1[d][1]).

### **Local Regulations**

The Open Space and Conservation Element of the Clovis General Plan includes policies to preserve and promote the City’s cultural and historic resources. The Clovis General Plan EIR identifies the policies listed below as relevant to reducing potential impacts on cultural resources from future development in the Plan Area:

- *Policy 2.9 National and state historic resources* - Preserve historical sites and buildings of state or national significance in accordance with the Secretary of Interior Standards for Historic Rehabilitation.
- *Policy 2.10 Local historic resources* - Encourage property owners to maintain the historic integrity of the site by (listed in order of preference): preservation, adaptive reuse, or memorialization.

- *Policy 2.11 Old Town* - Prioritize the preservation of the historic character and resources of Old Town.
- *Policy 2.12 Public education* - Support public education efforts for residents and visitors about the unique historic, natural, and cultural resources in Clovis.

## **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.” The thresholds of significance used for this EIR to determine the significance of environmental effects related to cultural resources are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section V, a through d:

Would the project:

- (a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the State CEQA Guidelines?
- (b) Cause a substantial adverse change in the significance of an archaeological resource as defined in Section 15064.5 of the State CEQA Guidelines?
- (c) Directly or indirectly destroy a unique paleontological resource or site?
- (d) Disturb any human remains, including those interred outside of formal cemeteries?

## **POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION MEASURES**

### **CR-1: Potential Disturbance of Subsurface Cultural and/or Paleontological Resources by Construction Activities**

As discussed in the cultural resources assessment prepared for the project, only one historic feature (the Enterprise Canal) was identified adjacent to the project study area, and the assessment determined it would be unlikely that expansion of the medical center or widening of Herndon Avenue will have an effect on the canal. No archaeological or other cultural resources were identified in the cultural resources assessment, and no further cultural resources investigation was recommended.

Although no cultural resources were discovered on the surface of the project site, subsurface resources may be present that could be disturbed or damaged by construction activities. These resources might include buried archaeological deposits such as tools or weapons from a gathering or hunting site or a cache of artifacts, which could provide important time, territory, and cultural pattern markers in the reconstruction of prehistory and history. Paleontological resources in the form of fossilized animal remains could also be discovered. With incorporation of the mitigation measures listed below, this impact will be less than significant.

### **Mitigation Measures**

- CR-1.1 All contractors and subcontractors for the project shall be informed, in writing, of the possibility that cultural or paleontological resources may be discovered during project activities. If any cultural or paleontological materials are uncovered during project activities, work in the area or any area reasonably suspected to overlie adjacent remains shall halt until a professional evaluation and/or data recovery excavation can be planned

and implemented. Appropriate measures to protect remains from accidents, looting, and vandalism shall be implemented immediately.

- CR-1.2 After they have been professionally recorded in their place of discovery, archaeological or paleontological materials shall be transferred to an appropriate regional repository for preservation, research, and/or use in interpretive exhibits.
- CR-1.3 If human remains are discovered, the Fresno County Coroner must be notified immediately. The Coroner has two working days to examine the remains and 24 hours to notify the Native American Heritage Commission (NAHC) if the remains are Native American (Health and Safety Code Section 7050.5). Once the NAHC is notified, the procedures set forth in CEQA Guidelines Section 15064.5(d) and Public Resources Code Section 5097.98 shall be followed.

### **CUMULATIVE IMPACTS**

The EIR prepared for the Clovis General Plan generally concluded that the impacts to cultural resources would be less than significant, as future development within the Plan Area would be subject to mitigation measures from the Clovis General Plan EIR, which would to avoid or lessen impacts on these resources to a less than significant level. Similarly, the project would be subject to mitigation measures that would lessen potential impacts to a less than significant level, thereby preventing any significant contribution to cumulative impacts. However, the Clovis General Plan EIR did find that development would be allowed in areas that have identified historic resources and potentially cause the disturbance of historic resources. This impact was determined to be significant and unavoidable. The project, however, would make no contribution to this cumulative impact in that it would not affect any identified historical resources and will mitigate its potential impact on subsurface resources.

### **SOURCES CONSULTED**

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. June 2014.

Sierra Valley Cultural Planning. *A Cultural Resources Assessment for the Proposed Clovis Community Medical Center Expansion and Herndon Avenue Widening Project, Herndon and Temperance Avenues, City of Clovis, Fresno County, California*. January 26, 2017.

# CHAPTER 8

## Energy

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### INTRODUCTION

This chapter identifies and discusses potential environmental effects the project may have related to energy. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to energy; (2) the thresholds of significance used to determine the significance of any environmental effects; (3) the direct and indirect effects of the project on energy; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### ENVIRONMENTAL SETTING

#### Electricity

Pacific Gas & Electric Company (PG&E) provides electricity to the project site and to about 16 million people throughout a 70,000 square-mile service area covering most of northern and central California. PG&E operates approximately 42,141 circuit miles of electric distribution lines and 18,466 circuit miles of interconnected transmission lines, serving 5.4 million electric customer accounts. In 2015 (the most recent year for which data is available), PG&E customers used 85,988 gigawatt-hours of electricity, 7,687 gigawatt-hours of which were used in Fresno County (CEC, California Energy Consumption Database). Sources of electrical generation within California in 2016 were renewable (33 percent; this category includes wind, geothermal, biomass, solar and small hydroelectric), nuclear (24 percent), natural gas (17 percent), large hydroelectric (12 percent), and unspecified (14 percent). California obtained approximately 68.2 percent of its electrical energy during 2016 from in-state sources, with 17.2 percent imported from sources the U.S. Southwest and 14.5 percent imported from sources in the Pacific Northwest.

#### Natural Gas

In addition to electricity, PG&E provides natural gas to the project site. PG&E operates 42,141 miles of natural gas distribution pipelines and 6,438 miles of transportation pipelines, serving 4.3 million customer accounts. In 2015 (the most recent year for which data is available), PG&E customers used 4.434 billion therms of natural gas; Fresno County used 298 million therms of natural gas from all suppliers combined (CEC, California Energy Consumption Database). Statewide, nearly 45 percent of the natural gas burned is used for electricity generation, with much of the remainder consumed in the residential (21 percent), industrial (25 percent), and commercial (9 percent) sectors. According to the California Energy Commission, California depends upon out-of-state imports for nearly 90 percent of its natural gas supply.

#### Petroleum

Petroleum usage in California includes products such as motor gasoline, distillate fuel, liquefied petroleum gases, and jet fuel. In California, petroleum fuels refined from crude oil are the dominant source of energy for transportation sources. According to the US Energy Information Administration (EIA), California used approximately 651 million barrels of petroleum in 2015, with over 558 million barrels consumed for transportation uses. The EIA forecasts a decrease in the share of petroleum fuels for transportation energy between 2017 and 2030, although future demand for petroleum fuels is subject to a number of factors including crude energy price, energy costs and costs per mile, availability

of alternative fuels (electricity, natural gas, hydrogen, E85), availability of transportation means such as high-speed rail, and changing land use and urban design to reduce the need for transportation.

In 2016, 34.1 percent of crude oil refined within the state came from California, 11.41 percent came from Alaska, and 54.49 percent came from foreign sources such as Saudi Arabia (34 percent), Ecuador (23 percent), Colombia (14 percent), and Kuwait (9 percent).

## **REGULATORY AND POLICY SETTING**

### **State**

#### *California Energy Code (California Code of Regulations Title 24, Part 6)*

The California Energy Code comprises Title 24, Part 6 of the California Code of Regulations. It provides energy conservation standards for all new and renovated commercial and residential buildings constructed in California. The provisions of Title 24 apply to the building envelope, space-conditioning systems, water-heating and lighting systems of buildings and appliances, and give guidance on construction techniques to maximize energy conservation. Minimum efficiency standards are given for a variety of building elements, including appliances, water and space heating and cooling equipment, and insulation for doors, pipes, walls, and ceilings.

Title 24 standards were most recently revised in 2016 and became effective January 1, 2017. The most significant efficiency improvements to the nonresidential standards include alignment with the ASHRAE 90.1 2013 national standards. The 2016 Standards also include changes made throughout all of its sections to improve the clarity, consistency, and readability of the regulatory language. The 2016 update is described as a major step towards meeting the Zero Net Energy (ZNE) goal by the year 2020 and is the second of three updates to move California toward achieving that goal, building on the 2013 Energy Standards and setting the stage for the upcoming 2019 update.

Certain hospital facilities (namely, general acute care hospitals and acute psychiatric hospitals) are currently not subject to the energy efficiency requirements applied to other non-residential building types specified in Title 24, Part 6. However, the non-hospital facilities proposed as part of the project (including, but not limited to, administrative offices and commercial development) are subject to requirements of the code.

#### *California Green Building Standards Code (California Code of Regulations Title 24, Part 11)*

The California Green Building Standards Code (CALGreen) is the first-in-the-nation mandatory green building standards code. CBSC was directed to develop green building standards in 2007 in an effort to meet the goals of California AB 32, which established a comprehensive program of cost-effective reductions of greenhouse gases (GHG) to 1990 levels by 2020. A voluntary CALGreen Code was published in 2008 and had an effective date of August 2009. The first mandatory measures were adopted in the 2010 triennial code publication, which went into effect in January 2011. CALGreen was developed to (1) reduce GHG from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to the environmental directives at the state government level. CALGreen includes both mandatory and voluntary measures and also distinguishes between residential and nonresidential uses. The criteria encompassed within the standards include planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, environmental air quality, referenced standards, and installer and inspector qualifications.

The 2016 version of CALGreen took effect on January 1, 2017 and applies to all new construction in California. Key updates to the mandatory measures for commercial occupancies in this iteration of the



code include specified parking clean air vehicles and increased requirements for electric vehicle charging infrastructure; a new universal waste code section for additions and alterations; clarification concerning ‘I’ and ‘L’ occupancies, which are not under the Office of Statewide Health Planning and Development or California Energy Commission authority; a new section for food waste disposers; and carryover of water-conserving measures that were amended due to the Model Water Efficient Landscape Ordinance (MWELO) emergency standards.

## **Local**

### *City of Clovis Municipal Code*

The Clovis Municipal Code adopts by reference the 2016 California Energy Code and the 2016 California Green Building Standards Code as they are fully set forth.

### *City of Clovis General Plan*

In addition to provisions throughout the General Plan that promote sustainability and conservation of resources, the Clovis General Plan’s Open Space and Conservation Element includes the following goals and policies specifically addressing energy consumption:

Goal 3: A built environment that conserves and protects the use and quality of water and energy resources.

*Policy 3.5 Energy and water conservation.* Encourage new development and substantial rehabilitation projects to exceed energy and water conservation and reduction standards set in the California Building Code.

*Policy 3.6 Renewable Energy.* Promote the use of renewable and sustainable energy sources to serve public and private sector development.

*Policy 3.7 Construction and design.* Encourage new construction to incorporate energy efficient building and site design strategies.

## **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.” The thresholds of significance used for this EIR to determine the significance of environmental effects concerning energy are based on State CEQA Guidelines section 15126.2 and Appendix F, Energy Conservation.

A project may be determined to have a significant effect on the environment relating to energy if it would:

- Result in wasteful, inefficient and unnecessary consumption of energy;
- Substantially affect local or regional energy supplies; or
- Fail to comply with existing energy standards.

## LESS THAN SIGNIFICANT IMPACTS

### EN-1: WASTEFUL, INEFFICIENT, AND UNNECESSARY CONSUMPTION OF ENERGY

The buildings and facilities included in the project will use electricity and natural gas for a variety of purposes such as lighting, machinery and equipment, and heating and cooling. Estimates for operational electrical and natural gas consumption are provided in Table 8.1.

**Table 8.1**  
**Estimated Electricity and Natural Gas Use (Annual)**  
**2-10 Year Expansion (Operational Year 2029)**

| Land Use                       | Floor Surface Area<br>(square feet) | Electricity Use<br>(Megawatt-hours) | Natural Gas Use<br>(Therms) |
|--------------------------------|-------------------------------------|-------------------------------------|-----------------------------|
| Hospital                       | 300,172                             | 3,891                               | 127,843                     |
| Hotel                          | 217,800                             | 1,728                               | 54,973                      |
| Medical Office Building        | 94,392                              | 835                                 | 12,384                      |
| Shopping Center                | 150,000                             | 1,161                               | 16,110                      |
| <b>Net Energy Use Increase</b> |                                     | <b>7,615</b>                        | <b>211,310</b>              |

Source: Ambient Air Quality and Noise Consulting. Appendix to Air Quality & Greenhouse Gas Impact Analysis; July 2017.

**Table 8.2**  
**Estimated Electricity and Natural Gas Use (Annual)**  
**Full Buildout (Operational Year 2030)**

| Land Use                             | Floor Surface Area<br>(square feet) | Electricity Use<br>(Megawatt-hours) | Natural Gas Use<br>(Therms) |
|--------------------------------------|-------------------------------------|-------------------------------------|-----------------------------|
| Hospital                             | 468,844                             | 6,077                               | 199,681                     |
| Hotel                                | 217,800                             | 1,728                               | 54,973                      |
| Medical Office Building              | 354,392                             | 3,134                               | 46,496                      |
| Shopping Center                      | 220,000                             | 1,703                               | 23,628                      |
| Congregate Care<br>(Assisted Living) | 100,000                             | 473                                 | 15,923                      |
| <b>Net Energy Use Increase</b>       |                                     | <b>13,115</b>                       | <b>340,701</b>              |

Source: Ambient Air Quality and Noise Consulting. Appendix to Air Quality & Greenhouse Gas Impact Analysis; July 2017.

As indicated above, the project would ultimately result in a projected net annual increase in energy use of approximately 13,115 megawatt-hours of electricity and 340,701 therms of natural gas. As discussed in the Environmental Setting section of this chapter, 7,687,000 megawatt hours of electricity and 298,000,000 therms of natural gas were used in Fresno County in 2015 and 85,988,000 megawatt hours of electricity and 4,974,000,000 therms of natural gas were used in the PG&E service area in 2015. (Note: the gigawatt-hour and million therm unit values mentioned in the Environmental Setting section have been converted to megawatt hours and therms for comparison here.) The increase in project energy use at its ultimate buildout would amount to 0.17 percent of the electricity and 0.11 percent of the natural gas used in Fresno County in 2015, and 0.015 percent of the electricity and 0.007 of the natural gas used in the PG&E service area in 2015. The widening of Herndon Avenue would

additionally entail a relatively minor degree of energy consumption from improvements requiring electricity such as street lighting and traffic signal equipment.

The project includes various characteristics and features which demonstrate that it will not result in wasteful, inefficient, or unnecessary consumption of energy. The majority of the mitigation measures included to address impacts to Air Quality and Greenhouse Gas Emissions (Chapters 5 and 10, respectively) entail energy-efficient and/or energy reducing qualities. These measures include: utilizing green building materials in construction of facilities; utilizing drought-resistant shade trees to reduce sun exposure of buildings and parking areas; installing high-efficiency heating and cooling systems; utilizing high-efficiency gas or solar water heaters; utilizing built-in energy-efficient appliances (i.e., Energy Star rated); utilizing double- or triple-paned windows; utilizing energy-efficient interior lighting; utilizing low-energy street lights (i.e., sodium, light-emitting diode [LED]); and installing energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern. The project is also generally subject to the California Green Building Standards Code (Title 24, Part 11) and the California Energy Code (Title 24, Part 6 – with some exceptions for acute care medical facilities included in the proposal). The standards collectively include additional requirements to improve the energy efficiency of buildings, including more efficient windows, insulation, lighting, ventilation systems and numerous other improvements.

Energy will also be used for construction activities on the site. Project equipment will be subject to several air quality- and greenhouse gas-related requirements that would also minimize fuel consumption and reduce energy use. These requirements, coupled with the temporary nature of the construction activities, will ensure that these construction activities will not constitute a wasteful, inefficient and unnecessary consumption of energy.

The project is expected to generate an increased number of vehicle trips in the vicinity of the project site, which entails energy use related to vehicle transportation. However, the following factors would support a conclusion that the project would not be result in a wasteful, inefficient and unnecessary consumption of energy in relation to transportation:

- CCMC is at a location that is central to its service area, with access to major transportation routes: State Route 168, Temperance Avenue and Herndon Avenue. As the City of Clovis continues to grow in accordance with its General Plan, CCMC's central location will provide medical services to the growing population while minimizing vehicular trip length.
- Continued expansion of CCMC, with many associated medical offices, labs, a cancer center and other related functions will provide a comprehensive medical campus that will lessen the number and length of vehicular trips as compared to having such functions dispersed throughout the community.
- The proposal for commercial development adjacent to the medical campus to the west and south, providing such facilities such as a hotel, shops, restaurants and services, will be convenient to hospital visitors and employees, thereby reducing and number and length of vehicular trips compared to going to further commercial facilities.
- The project will be subject to a number of mitigation measures for the improvement of the street system (traffic signals, modified lane configurations and widening). Implementation of these measures will keep traffic moving efficiently thereby minimizing gasoline consumption as compared to congested traffic conditions.
- The project includes measures which support alternative modes of transportation, such as providing designated parking space for alternatively fueled vehicles, providing bicycle parking

and related facilities to support long-term use, and providing a pedestrian access network that links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.

## **EN-2: SUBSTANTIAL EFFECT ON LOCAL OR REGIONAL ENERGY SUPPLIES**

As discussed above, the increase in project energy use would amount to 0.17 percent of the electricity and 0.11 percent of the natural gas used in Fresno County in 2015, and 0.015 percent of the electricity and 0.007 percent of the natural gas used in the PG&E service area in 2015. Additionally, PG&E was notified of this project and has not provided a response during the review process indicating that the project could not be served or that the project would substantially affect local or regional energy supplies. Thus, the project would not substantially affect local or regional energy supplies.

## **EN-3: COMPLIANCE WITH ENERGY STANDARDS**

As previously described in this chapter, the project will include a number of energy conservation and site design measures in conjunction with Title 24 requirements and in complying with the California Green Building Code. Additionally, the project is consistent with local General Plan policies in that it includes the use of renewable and sustainable energy sources and energy-efficient building and site design characteristics. This impact is therefore considered less than significant.

## **CUMULATIVE IMPACTS**

The 2014 City of Clovis General Plan EIR includes analysis of energy impacts as part of its Utilities and Services chapter, which found impacts regarding energy supplies and compliance with energy standards would be less than significant for both the 2035 Scenario and Full Buildout Scenario. As the subject proposal is consistent with the type of development contemplated in the General Plan scenarios, development of the project would not change the conclusions reached in the General Plan EIR. Further, based on the analysis presented in this chapter, which indicates that impacts related to energy resources would be less than significant, the project would not have a cumulatively considerable impact with regard to energy resources.

## **SOURCES CONSULTED**

Ambient Air Quality and Noise Consulting. *Air Quality & Greenhouse Gas Impact Analysis for Master Plan Expansion of the Clovis Community Medical Center Project*, Clovis, CA. July 2017.

California Building Standards Commission. "Guide to the 2016 California Green Building Standards Code." January 2017. <https://www.documents.dgs.ca.gov/bsc/CALGreen/CALGreen-Guide-2016-FINAL.pdf>

*California Energy Code*. California Code of Regulations, Title 24, Part 6.

*California Green Building Standards Code*. California Code of Regulations, Title 24, Part 11.

California Energy Commission (CEC). California Energy Consumption Database. <http://www.ecdms.energy.ca.gov/> (accessed August 10, 2017)

California Energy Commission (CEC). "Nonresidential Compliance Manual for the 2016 Building Energy Efficiency Standards." November 2015.

California Energy Commission (CEC). Supply and Demand of Natural Gas in California. [http://www.energy.ca.gov/almanac/naturalgas\\_data/overview.html](http://www.energy.ca.gov/almanac/naturalgas_data/overview.html) (accessed August 10, 2017)

California Energy Commission (CEC). Total Electric System Generation.

[http://www.energy.ca.gov/almanac/electricity\\_data/total\\_system\\_power.html](http://www.energy.ca.gov/almanac/electricity_data/total_system_power.html) (accessed August 10, 2017)

California Energy Commission (CEC). “Transportation Energy Demand Forecast, 2017-2030.” June 20, 2017. [http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-](http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-05/TN219810_20170620T141018_Transportation_Energy_Demand_Forecast_20172030.pdf)

[05/TN219810\\_20170620T141018\\_Transportation\\_Energy\\_Demand\\_Forecast\\_20172030.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-05/TN219810_20170620T141018_Transportation_Energy_Demand_Forecast_20172030.pdf)

Clovis, City of. *City of Clovis General Plan 2014 Update*. August 25, 2014.

Pacific Gas and Electric Company. “Company Profile.” <http://www.pge.com/about/company/profile/> (accessed August 10, 2017)

U.S. Energy Information Administration (EIA). “Total Petroleum Consumption Estimates, 2015.”

[https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep\\_fuel/html/fuel\\_use\\_pa.html&sid=US](https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_fuel/html/fuel_use_pa.html&sid=US&sid=CA) &sid=CA (accessed August 15, 2017)

# CHAPTER 9

## Geology and Soils

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### INTRODUCTION

This chapter identifies and discusses potential environmental effects the project may have related to geologic, soil, and seismic conditions. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to geology and soils; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of the project related to geology and soils; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter. The analysis is based primarily upon the Geotechnical Investigation Report prepared for the project by BSK Associates (*Geologic & Seismic Hazards Evaluation, Clovis Community Medical Center Expansion, 2755 Herndon Avenue, Clovis, California*. February 12, 2015). This report is included in the Draft EIR as Appendix 9.

### ENVIRONMENTAL SETTING

#### Geologic Setting and Soils

The project site is situated in the Great Valley geomorphic province and lies within the structural region identified as the San Joaquin Valley portion of the southern Sierran block. This area forms a broad syncline with deposits of marine and overlying continental sediments, Jurassic to Holocene in age. The thickness of the sediments increases to the west and reach a thickness of as much as 20,000 feet on the west side of the San Joaquin syncline.

The project site is generally underlain by medium dense to very dense silty sands and sandy silt soils with occasional sandy clay layers. According to the Geotechnical Investigation Report, the soils underlying the project site can be classified as Site Class “D” (Stiff Soil Profile) using the standards set forth in the 2013 California Building Code (CBC) and Table 20.3-1 of ASCE 7-10, and the peak horizontal acceleration at the site due to a design level earthquake is 0.284g. The soils are generally non-expansive or have a very low expansion potential.

#### Surface Fault Rupture

The project site does not lie within a Fault Rupture Hazard Zone as identified by the Alquist-Priolo Fault Zoning Act, and the site is not in a Seismic Hazard Zone as specified by the State of California. The nearest mapped fault in the vicinity is the Clovis Fault, which is located approximately 1.5 miles from the project site. As indicated in the Clovis General Plan EIR, the Clovis Fault is not mapped as active and is mapped as showing no recognized displacement in the Quaternary Period (i.e. within the last 1.6 million years). No other mapped faults are located within 50 miles of the project site. Per the findings of the Geotechnical Investigation Report, there is no significant risk of ground rupture at the project site.

#### Liquefaction and Seismic Settlement

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. A low relative density of the granular materials, shallow groundwater table (generally less than 50 feet below ground), long duration, and high acceleration of seismic shaking are some of the factors associated with liquefaction. The project site is not at significant risk for liquefaction due to the soil conditions and depth of groundwater in the area. Also, given that the project

site topography is flat and that there is an unlikelihood of liquefaction, the potential for lateral spreading is considered very low.

### **Subsidence**

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. Soils that are particularly susceptible to subsidence include those with high silt or clay contents. The Clovis General Plan EIR discusses subsidence in the Clovis area and identifies the main local cause of subsidence as withdrawal of groundwater. The most damaging effects of subsidence have been ground fissures in areas of differential ground subsidence. No significant land subsidence is known to have occurred in the last 50 years as a result of land development, water resources development, groundwater pumping, or oil drilling. The project site is not located in an area at risk from subsidence.

### **Slope Stability and Potential for Slope Failure**

The project site and surrounding areas are essentially flat and the potential hazard due to landslides from adjacent properties is virtually nonexistent.

### **Soil Erosion**

Development and redevelopment projects can disturb large amounts of soil, as grading and construction of projects typically expose bare soil temporarily. The main natural agents of erosion in the region are wind and flowing water. Soil can be tracked off construction sites by vehicles and carried off sites by wind and water. Erosion can be accelerated dramatically by ground-disturbing activities if effective erosion control measures are not used. Projects larger than one acre are subject to state and local regulations pertaining to erosion and must implement Storm Water Pollution Prevention Plan (SWPPP) and best management practices (BMPs) accounting for erosion.

## **REGULATORY AND POLICY SETTING**

### **State Regulations**

#### *Alquist-Priolo Earthquake Fault Zoning Act*

The Alquist-Priolo Earthquake Fault Zoning Act requires the delineation of zones along active faults in California. The purpose of the Alquist-Priolo Act is to regulate development on or near active fault traces to reduce the hazards associated with fault rupture and to prohibit the location of most structures for human occupancy across these traces. Cities and counties must regulate certain development projects within these zones, which include withholding development permits until geologic investigations demonstrate that development sites are not threatened by future surface displacement. Surface fault rupture is not necessarily restricted to the area within an Alquist-Priolo Zone.

#### *Hospital Facilities Seismic Safety Act of 1983 and Senate Bill 1953*

The Hospital Facilities Seismic Safety Act of 1983 (HFSSA) requires that acute care hospitals be designed and constructed to withstand a major earthquake and remain operational immediately after such an event. The HFSSA requires that construction and design plans for acute care hospitals in California be in full compliance with the regulations and standards developed by the California Office of Statewide Health Planning and Development (OSHPD) pursuant to the HFSSA. Senate Bill 1953 (SB 1953) is an amendment to the HFSSA which requires that all general acute care inpatient hospital buildings in the state be structurally sound enough to remain standing after a major earthquake. One of the main provisions of SB 1953 is the development of earthquake or seismic performance categories, specifically the Structural Performance Categories (SPC) found in Article 2 and the Nonstructural

Performance Categories (NPC) found in Article 11. Under the HFSSA, local jurisdictions are preempted from the enforcement of all building standards published in the California Building Standards Code relating to the regulation of hospital buildings and the enforcement of other regulations adopted pursuant to this chapter, and all other applicable state laws, including plan checking and inspection of the design and details of the architectural, structural, mechanical, plumbing, electrical, and fire and panic safety systems, and the observation of construction; OSHPD assumes these responsibilities.

The HFSSA seismic safety standards apply only to the hospital-building portion of a project; non-hospital buildings, including medical office buildings and parking garages as well as any non-hospital commercial development, would be required to meet the standards of the local building code. Because portions of the CCMC expansion include acute care facilities, HFSSA requires that buildings which house acute care patients must meet its heightened seismic safety standards. The project is designed to comply with the HFSSA.

#### *Seismic Hazards Mapping Act*

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong groundshaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a seismic hazard zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design.

#### *California Building Code*

The California Building Code is certified in the California Code of Regulations (CCR), Title 24, Part 2, which is a portion of the California Building Standards Code. Title 24 is assigned to the California Building Standards Commission (CBSC), which, by law, is responsible for coordinating all building standards. Published by the International Conference of Building Officials, the International Building Code (IBC) is a widely adopted model building code in the United States. The California Building Code incorporates by reference the IBC with necessary California amendments. About one-third of the text within the California Building Code has been tailored to respond to California earthquake conditions.

### **Local Regulations**

#### *City of Clovis General Plan*

The following goals and policies from the Clovis General Plan pertain to geologic and seismic factors in the context of land development:

Goal 1: Minimized risk of injury, loss of life, property damage, and economic and social disruption caused by natural hazards.

*Policy 1.3 Geologic and seismic risk.* Prohibit development on unstable terrain, excessively steep slopes, and other areas deemed hazardous due to geologic and seismic hazards unless acceptable mitigation measures are implemented. Require that underground utilities be designed to withstand seismic forces and accommodate ground settlement.

*Policy 1.5 Critical and public facilities.* Locate and design critical and public facilities to minimize their exposure and susceptibility to flooding, seismic and geological effects, fire, and



explosions. Ensure critical use facilities (e.g., hospital, police, and fire facilities) can remain operational during an emergency.

#### *City of Clovis Building Code*

The City of Clovis adopts the California Building Code with minor amendments that do not directly relate to geologic or soil conditions.

### **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.” The thresholds of significance used for this EIR to determine the significance of environmental effects related to geology and soils are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section VI, a through e:

Would the project:

- (a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - (i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.
  - (ii) Strong seismic ground shaking?
  - (iii) Seismic-related ground failure, including liquefaction?
  - (iv) Landslides?
- (b) Result in substantial soil erosion or the loss of topsoil?
- (c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?
- (d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?
- (e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

### **LESS THAN SIGNIFICANT IMPACTS**

#### **GS-1: Potential Impacts Related to Seismic Activity, Soil Erosion, Subsidence and Expansive Soils**

No known or potentially active faults cross or project across the project site, and the potential for ground rupture due to faulting or the generation of strong ground motion at the project site is considered low. Potential hazards from liquefaction, lateral spreading, seismically induced settlement, and subsidence are considered unlikely given the stiff soil conditions underlying the project site. Because the topography of the project site is flat, it is not at risk for landslides or geologic hazards resulting from steep slopes. Additionally, all new structures will be required to conform to current seismic

protection standards in the California Building Code (California Code of Regulations Title 24) and/or the Hospital Facilities Seismic Safety Act (HFSSA). Consideration of soil adequacy for septic tanks is not applicable to the project since the City of Clovis' existing sewer system is available to serve the project.

It is possible that grading and construction activities related to development of the CCMC expansion and road widening could contribute to soil erosion. However, with implementation of erosion control measures as required by state and local regulation, erosion will be less than significant.

Based on these factors, impacts pertaining to geology and soil factors resulting from both the CCMC expansion and the widening of Herndon Avenue are less than significant.

## **CUMULATIVE IMPACTS**

The Clovis General Plan EIR concluded that the cumulative impact of the general plan on geology and soil resources is less than significant. The basis for this conclusion was that the Clovis Plan Area is not prone to earthquakes or other geological hazards. In addition, the City's standard practice and procedures, local and state laws and regulations, and the goals and policies of the Clovis General Plan reduce effects related to geology and soils.

The project would have no impacts that would change the conclusion in the general plan. As discussed above, the project-specific geologic and soil impacts are expected to be less than significant, and the project will be subject to existing regulations which are intended to ensure that the project site soils and structures are able to withstand any ground shaking that could occur at the project site. Therefore, implementation of the proposed project combined with other projects in the area would result in a less than significant cumulative impact.

## **SOURCES CONSULTED**

BSK Associates. *Geologic & Seismic Hazards Evaluation, Clovis Community Medical Center Expansion, 2755 Herndon Avenue, Clovis, California*. February 12, 2015.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. SCH No. 2012061069. June 2014. Prepared for the City of Clovis by Placeworks.

Fresno, County of. *Fresno County General Plan Update, Public Review Draft Background Report*. January 2000. Prepared for Fresno County by J. Laurence Mintier & Associates.

"Seismic Compliance Unit – Program Overview." Office of Statewide Health Planning and Development, State of California. April 24, 2017.

[https://www.oshpd.ca.gov/FDD/seismic\\_compliance/SB1953/SB1953Overview.html](https://www.oshpd.ca.gov/FDD/seismic_compliance/SB1953/SB1953Overview.html)

Hospital Facilities Seismic Safety Act. California Health and Safety Code §129680

# CHAPTER 10

## Greenhouse Gas Emissions

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### INTRODUCTION

This chapter identifies and evaluates the potential environmental effects of the project related to greenhouse gas emissions. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to greenhouse gas emissions; (2) the thresholds of significance used to determine the significance of any environmental effects; (3) the direct and indirect effects of the project on greenhouse gas emissions; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

The analysis in this chapter is based upon an Air Quality and Greenhouse Gas Impact Analysis prepared for this EIR by Ambient Air Quality & Noise Consulting. (*Air Quality & Greenhouse Gas Analysis for the Master Plan Expansion of the Clovis Community Medical Center Project, Clovis, California – July 2017*). The report is included in the Draft EIR as Appendix 5.

### ENVIRONMENTAL SETTING

#### Introduction

To fully understand global climate change, it is important to recognize the naturally occurring “greenhouse effect” and to define the greenhouse gases (GHGs) that contribute to this phenomenon. Various gases in the earth’s atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth’s surface temperature. Solar radiation enters the earth’s atmosphere from space and a portion of the radiation is absorbed by the earth’s surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Primary GHGs attributed to global climate change, are discussed, as follows:

**Carbon dioxide (CO<sub>2</sub>):** Carbon dioxide (CO<sub>2</sub>) is a colorless, odorless gas. CO<sub>2</sub> is emitted in a number of ways, both naturally and through human activities. The largest source of CO<sub>2</sub> emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO<sub>2</sub> emissions. The atmospheric lifetime of CO<sub>2</sub> is variable because it is so readily exchanged in the atmosphere (U.S. EPA 2016).

**Methane (CH<sub>4</sub>):** Methane (CH<sub>4</sub>) is a colorless, odorless gas that is not flammable under most circumstances. CH<sub>4</sub> is the major component of natural gas, about 87% by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (enteric fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere.

Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane's atmospheric lifetime is about 12 years (U.S. EPA 2016).

**Nitrous oxide (N<sub>2</sub>O):** Nitrous oxide (N<sub>2</sub>O) is a clear, colorless gas with a slightly sweet odor. N<sub>2</sub>O is produced by both natural and human-related sources. Primary human-related sources of N<sub>2</sub>O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N<sub>2</sub>O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N<sub>2</sub>O is approximately 120 years (U.S. EPA 2016).

**Fluorinated Gases:** Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 260 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes of less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years) (U.S. EPA 2016).

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Gases with high global warming potential, such as HFCs, PFCs, and SF<sub>6</sub>, are the most heat-absorbent. Over a 100-year timeframe, CH<sub>4</sub> traps roughly 25 times more heat per molecule than CO<sub>2</sub>, and N<sub>2</sub>O absorbs approximately 298 times more heat per molecule than CO<sub>2</sub>. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO<sub>2</sub>e), which weight each gas by its global warming potential. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO<sub>2</sub> were being emitted (ARB 2017d).

### Sources of GHG Emissions

On a global scale, GHG emissions are predominantly associated with activities related to energy production; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. World-wide, energy production including the burning of coal, natural gas, and oil for electricity and heat is the largest single source of global GHG emissions (U.S. EPA 2016).

In 2015, GHG emissions within California totaled 440.4 million metric tons of carbon dioxide equivalents (MMTCO<sub>2</sub>e). Within California, the transportation sector is the largest contributor, accounting for roughly 39 percent of the total state-wide GHG emissions. Emissions associated with the industrial sector are the second largest contributor, totaling approximately 23 percent. Emissions from in-state electricity generation, imported electricity, agriculture, residential, and commercial uses constitute the remaining major sources on GHG emissions.

### Effects of Climate Change

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and

frequency of storms, extreme heat events, increased air pollution episodes, and the consequence of these effects on the economy.

Within California, climate changes would likely alter the ecological characteristics of many ecosystems throughout the state. Such alterations would likely include increases in surface temperatures and changes in the form, timing, and intensity of precipitation. For instance, historical records are depicting an increasing trend toward earlier snowmelt in the Sierra Nevada. This snow pack is a principal supply of water for the state, providing roughly 50 percent of state's annual runoff. If this trend continues, some areas of the state may experience an increased danger of floods during the winter months and possible exhaustion of the snowpack during spring and summer months. An earlier snowmelt would also impact the State's energy resources. Currently, approximately 20 percent of California's electricity comes from hydropower. An early exhaustion of the Sierra snowpack, may force electricity producers to switch to more costly or non-renewable forms of electricity generation during spring and summer months. A changing climate may also impact agricultural crop yields, coastal structures, and biodiversity. As a result, resultant changes in climate will likely have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry.

## REGULATORY AND POLICY SETTING

### Federal

#### *International Regulation and the Kyoto Protocol*

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC). While the United States signed the Kyoto Protocol, which would have required reductions in GHGs, Congress never ratified the protocol. The federal government chose voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science. In 2002, the United States announced a strategy to reduce the greenhouse gas intensity of the American economy by 18 percent over a 10-year period from 2002 to 2012.

As part of the commitments to the UNFCCC, the United States Environmental Protection Agency (U.S. EPA) has developed an inventory of anthropogenic emissions by sources and removals by sinks of all GHGs. This inventory is periodically updated, with the latest update in 2010. The U.S. EPA reports that total US emissions rose by 14 percent from 1990 to 2007, while the US gross domestic product increased by 59 percent over the same period. A 2.9 percent decrease in emissions was noted from 2007 to 2008, which is reported to be attributable to climate conditions, reduced use of petroleum products for transportation, and increased use of natural gas over other fuel sources. The inventory notes that the transportation sector emits about 32 percent of CO<sub>2</sub> emissions, with 53 percent of those emissions coming from personal automobile use. Residential uses, primarily from energy use, accounted for 21 percent of CO<sub>2</sub> emissions (U.S. EPA 2010).

As a part of the US EPA's responsibility to develop and update an inventory of US greenhouse gas emissions and sinks, the US EPA compared trends of other various US data. Over the period between 1990 and 2008, GHG emissions grew at an average rate of about 0.7 percent per year. Population growth was slightly higher at 1.1 percent, while energy and fossil fuel consumption grew at 0.9 and 0.8 percent, respectively. Gross domestic product and energy generation grew at much higher rates.

#### *United States Environmental Protection Agency (US EPA)*

The US EPA's authority to regulate greenhouse gas emissions through the Federal Clean Air Act was clarified in the U.S. Supreme Court decision in *Massachusetts v. Environmental Protection Agency* (2007). The Supreme Court ruled that greenhouse gases meet the definition of air pollutants under the

existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, the US EPA finalized an endangerment finding in December 2009. Based on overwhelming scientific evidence it found that six greenhouse gases constitute a threat to public health and welfare. The US EPA adopted greenhouse gas emission standards for new cars and light-duty vehicles in April 2010. The Clean Air Act gives California special authority to enact stricter air pollution standards for motor vehicles than the federal government's, subject to approval by the US EPA of a waiver before California's rules may go into effect.

#### *Executive Order 13693*

Executive Order (EO) 13693 (Planning for Federal Sustainability in the Next Decade) was signed by President Obama on March 19, 2015. The goal of EO 13693 is to maintain Federal leadership in sustainability and greenhouse gas emission reductions. EO 13693 promotes building energy conservation and efficiency, and improves environmental performance. The EO also includes the establishment of sustainability goals and GHG-reduction targets for federal agencies.

#### **State**

##### *Assembly Bill 1493 – Reduction of GHGs from Passenger Vehicles/Light Duty Trucks*

Assembly Bill (AB) 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the California Air Resources Board (CARB) to develop and adopt regulations to achieve "the maximum feasible reduction of greenhouse gases" emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the State. Additional background information regarding AB 1493 is included in the Air Quality and Greenhouse Gas Impact Analysis attached as Appendix 5 to this Draft EIR.

##### *Executive Order No. S-3-05*

EO S-3-05 proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

EO S-3-05 directed the secretary of the California Environmental Protection Agency to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The secretary will also submit biannual reports to the governor and state legislature describing (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the secretary of CalEPA created a Climate Action Team made up of members from various state agencies and commissions. The Climate Action Team released its first report in March 2006 and continues to release periodic reports on progress. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

##### *Executive Order No. S-01-07*

EO S-1-07, the Low Carbon Fuel Standard (LCFS) was issued on January 18, 2007 and called for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. This order instructed the CalEPA to coordinate activities between the University of California, the California Energy Commission (CEC) and other state agencies to develop and propose a draft

compliance schedule to meet the 2020 target. Furthermore, it directed ARB to consider initiating regulatory proceedings to establish and implement the LCFS. In response, ARB adopted the LCFS regulation in 2010.

#### *Assembly Bill 32 – California Global Warming Solutions Act of 2006*

AB 32 requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride. The reduction to 1990 levels will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

#### *Climate Change Scoping Plan*

In October 2008, ARB published its *Climate Change Proposed Scoping Plan*, which is the State's plan to achieve GHG reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementation of the Low Carbon Fuel Standard program, energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems, and a renewable portfolio standard for electricity production.

A key component of the Scoping Plan is the Renewable Portfolio Standard, which is intended to increase the percentage of renewables in California's electricity mix to 33 percent by year 2020, resulting in a reduction of 21.3 MMTCO<sub>2</sub>e. Sources of renewable energy include, but are not limited to, biomass, wind, solar, geothermal, hydroelectric, and anaerobic digestion. Increasing the use of renewables will decrease California's reliance on fossil fuels, thus reducing GHG emissions.

The Scoping Plan states that land use planning and urban growth decisions will play important roles in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. CARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. With regard to land use planning, the Scoping Plan expects approximately 5.0 MMTCO<sub>2</sub>e will be achieved associated with implementation of Senate Bill 375, which is discussed further below.

The initial Scoping Plan was first approved by CARB on December 11, 2008, and is updated every five years. The first update of the Scoping Plan was approved by the ARB on May 22, 2014, which looked past 2020 to set mid-term goals (2030-2035) on the road to reaching the 2050 goals. ARB is

moving forward with a second update to the Scoping Plan to reflect the 2030 target established in SB 32 and EO B-30-15.

#### *Senate Bill 1368*

Senate Bill (SB) 1368 (codified at Public Utilities Code Chapter 3) is the companion bill of AB 32. SB 1368 required the California Public Utilities Commission (CPUC) to establish a greenhouse gas emissions performance standard for baseload generation from investor-owned utilities by February 1, 2007. The bill also required the California Energy Commission (CEC) to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural-gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and the CEC.

#### *Senate Bill 1078 and Governor's Order S-14-08 (California Renewables Portfolio Standards)*

SB 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. Executive Order S-14-08 was later superseded by Executive Order S-21-09 on September 15, 2009. Executive Order S-21-09 directed CARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. This Executive Order was superseded by statute SB X1-2 in 2011, which obligates all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020, with interim targets of 20 percent by 2013 and 25 percent by 2016.

CARB is required by current law, AB 32 of 2006, to regulate sources of GHGs to meet a state goal of reducing greenhouse gas emissions to 1990 levels by 2020 and an 80 percent reduction of 1990 levels by 2050. The CEC and CPUC serve in advisory roles to help ARB develop the regulations to administer the 33 percent by 2020 requirement. ARB is also authorized to increase the target and accelerate and expand the time frame.

#### *Mandatory Reporting of Greenhouse Gas Emissions*

Reporting of GHGs by major sources is required by the California Global Warming Solutions Act (AB 32, 2006). Revisions to the existing CARB mandatory GHG reporting regulation were considered at the board hearing on December 16, 2010. The revised regulation was approved by the California Office of Administrative Law and became effective on January 1, 2012. The revised regulation affects industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

#### *Cap-and-Trade Regulation*

The cap-and-trade regulation is a key element in California's climate plan. It sets a statewide limit on sources responsible for 85 percent of California's greenhouse gas emissions, and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The cap-and-trade rules came into effect on January 1, 2013 and apply to large electric power plants and large industrial plants. In 2015, they will extend to fuel distributors (including distributors of heating and



transportation fuels). At that stage, the program will encompass around 360 businesses throughout California and nearly 85 percent of the state's total greenhouse gas emissions.

Under the cap-and-trade regulation, companies must hold enough emission allowances to cover their emissions, and are free to buy and sell allowances on the open market. California held its first auction of greenhouse gas allowances on November 14, 2012. California's GHG cap-and-trade system will reduce GHG emissions from regulated entities by approximately 16 percent, or more, by 2020.

### *California Building Code*

The California Building Code (CBC) contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Code is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

### *Green Building Standards*

Green buildings standards are in essence indistinguishable from any other building standards. Both are contained in the California Building Code and regulate the construction of new buildings and improvements. The only practical distinction between the two is that whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

AB 32, which mandates the reduction in greenhouse gas emissions in California to 1990 levels by 2020, increased the urgency around the adoption of green building standards. In its scoping plan for the implementation of AB 32, CARB identified energy use as the second largest contributor to California's GHG emissions, constituting roughly 25 percent of all such emissions. In recommending a green building strategy as one element of the scoping plan, CARB estimated that green building standards would reduce GHG emissions by approximately 26 million metric tons of CO<sub>2e</sub> (MMTCO<sub>2e</sub>) by 2020.

The green buildings standards, commonly referred to as CalGreen standards, were most recently updated in 2016. The 2016 updates include provisions addressing clean air vehicles and increased requirements for electric vehicle charging infrastructure; a new universal waste code section has been incorporated for additions and alterations; clarification concerning commissioning 'I' and 'L' occupancies, which are not under the Office of Statewide Health Planning and Development or California Energy Commission authority; a new water efficiency and conservation section applicable to food waste disposers; and adoption of outdoor water use conservation measures that had been implemented as part of the Model Water Efficient Landscape Ordinance (MWELO) emergency standards in 2015.

### *Senate Bill 32*

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG-reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs the ARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target.

*Senate Bill 375 (Sustainable Communities and Climate Protection Act)*

SB 375 supports the State's climate action goals to reduce GHG emissions through coordinated transportation and land use planning with the goal of developing more sustainable communities. Under SB 375, CARB sets regional targets for GHG emissions reductions associated with passenger vehicle use. Each of California's metropolitan planning organizations (MPO) must prepare a "Sustainable Communities Strategy" (SCS) as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets. The Sustainable Communities Act also establishes incentives to encourage local governments and developers to implement the identified GHG-reduction strategies.

**Regional**

*San Joaquin Air Pollution Control District Climate Change Action Plan*

On August 21, 2008, the SJVAPCD Governing Board approved the SJVAPCD's *Climate Change Action Plan* with the following goals and actions:

Goals:

- Assist local land-use agencies with California Environmental Quality Act (CEQA) issues relative to projects with GHG emissions increases.
- Assist Valley businesses in complying with mandates of AB 32.
- Ensure that climate protection measures do not cause increase in toxic or criteria pollutants that adversely impact public health or environmental justice communities.

Actions:

- Authorize the Air Pollution Control Officer to develop GHG significance threshold(s) or other mechanisms to address CEQA projects with GHG emissions increases. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in the spring of 2009.
- Authorize the Air Pollution Control Officer to develop necessary regulations and instruments for establishment and administration of the San Joaquin Valley Carbon Exchange Bank for voluntary GHG reductions created in the Valley. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in spring 2009.
- Authorize the Air Pollution Control Officer to enhance the SJVAPCD's existing criteria pollutant emissions inventory reporting system to allow businesses subject to AB32 emission reporting requirements to submit simultaneous streamlined reports to the SJVAPCD and the state of California with minimal duplication.
- Authorize the Air Pollution Control Officer to develop and administer voluntary GHG emission reduction agreements to mitigate proposed GHG increases from new projects.
- Direct the Air Pollution Control Officer to support climate protection measures that reduce GHG emissions as well as toxic and criteria pollutants. Oppose measures that result in a significant increase in toxic or criteria pollutant emissions in already impacted area.

*San Joaquin Valley Air Pollution Control District CEQA Greenhouse Gas Guidance.*

On December 17, 2009, the SJVAPCD Governing Board adopted “Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA” and the policy, “District Policy—Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency.” The SJVAPCD concluded that the existing science is inadequate to support quantification of the impacts that project specific greenhouse gas emissions have on global climatic change. The SJVAPCD found the effects of project-specific emissions to be cumulative, and without mitigation, that their incremental contribution to global climatic change could be considered cumulatively considerable. The SJVAPCD found that this cumulative impact is best addressed by requiring all projects to reduce their greenhouse gas emissions, whether through project design elements or mitigation.

The SJVAPCD’s approach is intended to streamline the process of determining if project-specific greenhouse gas emissions would have a significant effect. Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources and have a certified final CEQA document.

Best performance standards (BPS) would be established according to performance-based determinations. Projects complying with BPS would not require specific quantification of greenhouse gas emissions and would be determined to have a less than significant cumulative impact for greenhouse gas emissions. Projects not complying with BPS would require quantification of greenhouse gas emissions and demonstration that greenhouse gas emissions have been reduced or mitigated by 29 percent, as targeted by ARB’s AB 32 Scoping Plan. Furthermore, quantification of greenhouse gas emissions would be required for all projects for which the lead agency has determined that an Environmental Impact Report is required, regardless of whether the project incorporates Best Performance Standards.

For stationary source permitting projects, best performance standards are “the most stringent of the identified alternatives for control of greenhouse gas emissions, including type of equipment, design of equipment and operational and maintenance practices, which are achieved-in-practice for the identified service, operation, or emissions unit class.” For development projects, best performance standards are “any combination of identified greenhouse gas emission reduction measures, including project design elements and land use decisions that reduce project specific greenhouse gas emission reductions by at least 29 percent compared with business as usual.” The SJVAPCD proposes to create a list of all approved Best Performance Standards to help in the determination as to whether a proposed project has reduced its GHG emissions by 29 percent.

## **Local**

### *Clovis General Plan*

The Air Quality Element of the *Clovis General Plan* addresses the role of local land use planning in improving regional air quality, including greenhouse gases. In addition to policies generally discussing air quality, the following goals and policies from the Air Quality Element specifically address greenhouse gases:

Goal 1: A local environment that is protected from air pollution and emissions.

*Policy 1.4 City buildings.* Require that municipal buildings be designed to exceed energy and water conservation and greenhouse gas reduction standards set in the California Building Code.

Goal 2: A region with healthy air quality and lower greenhouse gas emissions.

*Policy 2.1 Regional coordination.* Support regional efforts to reduce air pollution (criteria air pollutants and greenhouse gas emissions) and collaborate with other agencies to improve air quality at the emission source and reduce vehicle miles traveled.

#### *Fresno County General Plan*

Regarding the portion of the Herndon Avenue widening located within Fresno County, the Open Space and Conservation Element of the *Fresno County General Plan* includes an Air Quality chapter which identifies goals and policies pertaining to air quality that relate to greenhouse gas emissions. The Air Quality chapter states the main method of local control over air quality in Fresno County is the reduction of the number of vehicular miles traveled (VMT) and resulting vehicular emissions, which entails a reduction in greenhouse gases. Additionally, the Transportation and Circulation Element includes a goal of reducing travel demand on the County's roadway system and maximizing the operating efficiency of transportation facilities so as to reduce the quantity of motor vehicle emissions.

### **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects related to greenhouse gas emissions are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section VII:

Would the project:

- (a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or,
- (b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

#### *San Joaquin Valley Air Pollution Control District*

In accordance with the SJVAPCD's *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects Under CEQA* (SJVAPCD 2009), a project would be considered to have a less than significant impact on climate change if it would comply with at least one of the following criteria:

- Comply with an approved GHG emission reduction plan or GHG mitigation program which avoids or substantially reduces GHG emissions within the geographic area in which the project is located. Such plans or programs must be specified in law or approved by the lead agency with jurisdiction over the affected resource and supported by a CEQA-compliant environmental review document adopted by the lead agency;
- Implement approved Best Performance Standards (BPS); or
- Quantify project GHG emissions and demonstrate that project-specific GHG emissions would be reduced or mitigated by at least 29 percent, compared to "business as usual" BAU. including GHG emission reductions achieved since the 2002-2004 baseline period, consistent with GHG emission reduction targets established in CARB's AB 32 Scoping Plan.

It is important to note the threshold of evidence required when relying on quantification of project-generated GHG emissions in comparison to BAU conditions to determine consistency with AB 32's reduction goals. Based on the California Supreme Court's decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming* (2015) 224 Cal.App.4th 1105 (CBD vs. CDFW; also known as the "Newhall Ranch case"), substantial evidence would need to be provided to document that project-level reductions in comparison to a BAU approach would be consistent with achieving AB 32's overall statewide reduction goal. Given that AB 32's statewide goal includes reductions that are not necessarily related to an individual development project, the use of this approach may be difficult to support given the lack of substantial evidence to adequately demonstrate a link between the data contained in the AB 32 Scoping Plan and individual development projects. Alternatively, the Court identified potential options for evaluating GHG impacts for individual development projects, which included the use of GHG numeric thresholds, such as a numeric, mass-emissions threshold.

The SJVAPCD has not yet adopted revised GHG-significance thresholds. For purposes of this analysis, the Greenhouse Gas Analysis prepared for the project by Ambient Air Quality & Noise Consulting (see Appendix 5) considered project-generated emissions that would exceed 900 MTCO<sub>2</sub>e/year to have a potentially significant impact. This threshold is based on the methodology identified in the 2008 California Air Pollution Control Officers Association (CAPCOA) *CEQA and Climate Change* white paper. The threshold reflects the amount of emissions that ninety percent of development projects surveyed in four cities within California would generate. By comparison, various air districts in California have also adopted mass-emission GHG significance thresholds, including the Bay Area Air Quality Management District (BAAQMD), the Sacramento Metropolitan Air Quality Management District (SMAQMD), and the South Coast Air Quality Management District (SCAQMD), which range from 1,100 to 3,000 MTCO<sub>2</sub>e/year. Use of the 900 MTCO<sub>2</sub>e/year threshold would be considered conservative.

## **METHODOLOGY**

### **Short-term Impacts**

Short-term construction emissions associated with the proposed project were calculated using the CalEEMod computer program. Emissions were quantified for site preparation/grading, asphalt paving, facility construction, and application of architectural coatings. Construction schedules were based on information provided by the project proponent. Other construction information, including equipment usage, worker vehicle trips, and haul truck trips, were based on the default assumptions contained in the CalEEMod model. The import/export of soil is not anticipated to be required for this project. Modeling assumptions and output files are included in Appendix A of the Air Quality and GHG Impact Analysis (Appendix 5 of this Draft EIR).

### **Long-term Impacts**

Long-term operational GHG emissions associated with the proposed project were calculated using the CalEEMod computer program. Modeling was conducted based on traffic data derived, in part, from the traffic analysis prepared for the proposed project (JLB 2017). Energy-usage rates were adjusted to account to implementation of the State's Renewable Portfolio Standards and compliance with current building standards. All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model. Mobile-source emissions were conservatively based on the default fleet distribution assumptions contained in the model, which include heavy-duty vehicles. Given that a majority of the vehicle trips generated by the proposed land uses would involve light-duty vehicles, actual mobile-source emissions would likely be lower than estimated. Modeling assumptions and

output files are included in Appendix A of the Air Quality and GHG Impact Analysis (Appendix 5 of this Draft EIR).

## POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION MEASURES

### GH-1: Direct or Indirect Generation of Greenhouse Gas Emissions

Implementation of the proposed project would contribute to increases of GHG emissions that are associated with global climate change. Short-term and long-term GHG emissions associated with the development of the proposed project are discussed in greater detail, as follows:

#### Short-term Greenhouse Gas Emissions

Short-term annual GHG emissions for the proposed project as calculated in the Greenhouse Gas Analysis are summarized in Table 10.1. Based on the modeling conducted, the highest annual emissions of GHGs associated with construction of the proposed project would total approximately 744.0 MTCO<sub>2e</sub>. In total, construction activities would generate approximately 5,383.2 MTCO<sub>2e</sub>. There would also be a small amount of GHG emissions from waste generated during construction; however, this amount is speculative. It is important to note that emissions were quantified based on the conservative assumption that all proposed facilities would occur simultaneously; actual emissions would vary depending on various factors including construction schedules, equipment required, and activities conducted. Assuming an average project life of 30 years, amortized construction-generated GHG emissions would total approximately 179.4 MTCO<sub>2e</sub>/year. Amortized construction-generated GHG emissions were included in the operational GHG emissions inventory for the evaluation of project-generated GHG emissions). As the short-term emissions would not exceed the 900 MTCO<sub>2e</sub>/year threshold, this impact is considered less than significant.

#### Long-term Greenhouse Gas Emissions

Estimated long-term operational GHG emissions as calculated in the Greenhouse Gas Analysis are summarized in Table 10.2. Operational GHG emissions were totaled for year 2020 and year 2030 conditions, as well as Phase I buildout year 2029 and Phase II buildout year 2035. As depicted, annual operational GHG emissions would range from approximately 13,518.8 MTCO<sub>2e</sub>/year at year 2020 to approximately 38,496.7 MTCO<sub>2e</sub>/year at year 2030. Operational emissions are projected to decrease in future years, totaling approximately 37,524.5 MTCO<sub>2e</sub> under year 2035 operational conditions. With the inclusion of amortized construction emissions, the project would result in maximum annual GHG emissions of approximately 38,676 MTCO<sub>2e</sub>/year. A majority of the emissions generated, roughly 75 percent, would be associated with motor vehicle use. The remaining emissions would be largely associated with energy use and waste generation. It is important to note that mobile-source emissions were conservatively calculated based on the default fleet distribution assumptions contained in the model for Fresno County, which includes medium and heavy-duty vehicles. Mobile sources associated with medical facilities and related land uses (e.g., medical-dental offices, assisted living facilities) typically consist largely to light-duty vehicles with relatively few heavy-duty truck trips, which would generate fewer overall emissions. As a result, actual operational GHG emissions would likely be slightly less. Nonetheless, GHG emissions associated with the proposed project would exceed the significance threshold of 900 MTCO<sub>2e</sub>/year. As a result, this impact would be considered potentially significant.

**Table 10.1**  
**Annual Construction-Generated GHG Emissions**

| <b>Project Phase/Land Use</b>   | <b>Construction Year</b> | <b>Total GHG Emissions (MTCO<sub>2</sub>e)</b> |
|---|--------------------------|--|
| Phase I – Cancer Center   | 2017                     | 357.5  |
|   | 2018                     | 289.6  |
| Phase I – Hotel & Shopping Center   | 2018                     | 631.9  |
|   | 2019                     | 256.4  |
| Phase I – Bed Tower, D&T Expansion, Parking Garage  | 2020                     | 677.9  |
|   | 2021                     | 546.5  |
| Phase I – Medical-Dental Office   | 2022                     | 337.0  |
|   | 2023                     | 153.5  |
| Phase I – Outpatient Community Center Expansion   | 2025                     | 158.4  |
|   | 2026                     | 67.8   |
| Phase II – Assisted Living Center, Medical Center Expansion, Medical-Dental Office, Shopping Center   | 2028                     | 744.0  |
|   | 2029                     | 618.7  |
| Widening of Herndon Avenue  | 2020                     | 544.0  |
| Total:  |                          | 5,383.2  |
| Amortized Emissions:  |                          | 179.4  |
| <i>Based on CalEEMod computer modeling. Amortized emissions assume an average project life of 30 years. Refer to Appendix A for modeling results and assumptions.</i> |                          |  |

**Table 10.2**  
**Annual Operational GHG Emissions**

| <b>Project Phase</b>   | <b>Annual Emissions (MTCO<sub>2</sub>e/year) <sup>1</sup></b> |
|--|---|
| Phase I –Year 2020 <sup>2</sup>  | 13,518.8  |
| Phase I –Year 2029 <sup>3</sup>  | 21,103.3  |
| Phase II –Year 2030 <sup>4</sup>   | 38,496.7  |
| Phase II –Year 2035 <sup>5</sup>   | 37,524.5  |
| Maximum Annual Operational Emissions:  | 38,496.7  |
| Amortized Construction Emissions:  | 179.4   |
| Net Increase:  | 38,676.1  |
| Significance Threshold   | 900   |
| Exceeds Threshold/Significant Impact?  | Yes   |
| <p><i>1. Project-generated emissions were quantified using the CalEEMod computer program.</i></p> <p><i>2. Includes emissions associated with development of 150,000-sf shopping center, 150-room hotel, and 96,500-sf medical center expansion.</i></p> <p><i>3. Includes emissions associated with development of 150,000-sf shopping center, 150-room hotel, and 300.17-sf medical center expansion, and 94.39-sf medical-dental office building.</i></p> <p><i>4. Includes emissions associated with development of 220,000-sf shopping center, 150-room hotel, and 468.84-sf medical center expansion, 100-room assisted living center, and 354.39-sf medical-dental office building</i></p> <p><i>5. Includes emissions associated with development of 220,000-sf shopping center, 150-room hotel, and 468.84-sf medical center expansion, 100-room assisted living center, and 354.39-sf medical-dental office building</i></p> <p><i>Refer to Appendix A for modeling results and assumptions.</i></p> |   |

## Mitigation Measures

GH-1: During construction and operation of the project, the following measures shall be implemented to reduce greenhouse gas (GHG) emissions:

- a. Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.
- b. Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50 percent tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.
- c. Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.
- d. Incorporate outdoor electrical outlets to encourage the use of electric landscape maintenance equipment.
- e. Install high-efficiency heating and cooling systems.
- f. Utilize high-efficiency gas or solar water heaters.
- g. Utilize built-in energy-efficient appliances (i.e., Energy Star rated).
- h. Utilize double- or triple-paned windows.
- i. Utilize low energy street lights (i.e., sodium, light-emitting diode [LED]).



- j. Utilize energy-efficient interior lighting.
- k. Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.
- l. Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.
- m. Provide a minimum of one designated parking space for alternatively fueled vehicles.
- n. Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.
- o. Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.
- p. Provide on-site bicycle parking beyond those required by California Green Building Standards Code and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).
- q. Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)

### **Level of Significance with Mitigation**

Implementation of the above mitigation measures would reduce emissions associated with motor vehicle use, energy use, waste generation, and area sources. In addition, Mitigation Measure AQ-1.2 (see Chapter 5, Air Quality) would require the project proponent to enter into a Developer Mitigation Contract (DMC) with the SJVAPCD, which would reduce operational criteria air pollutants (i.e., ROG, NO<sub>x</sub>, PM<sub>10</sub>) through various means, including implementation of additional on-site or off-site mitigation and/or the funding of off-site mitigation. These additional measures have not yet been identified, but would likely have the added benefit of reducing project-generated GHG emissions. However, because the GHG emission reductions to be achieved through implementation of the DMC and other mitigation measures cannot be quantified at this time, increased GHG emissions associated with the proposed project would be considered to have a significant impact. This impact is thus considered significant and unavoidable.

### **GH-2: Potential Conflict with Applicable Greenhouse Gas Reduction Plan, Policy or Regulation**

As noted in the Greenhouse Gas Analysis, the increased long-term GHG emissions from the project (see Impact GH-1 above) would also potentially conflict with GHG-reduction planning efforts, specifically those administered by SJVAPCD. Because the net GHG emissions to be achieved after implementation of the DMC and other mitigation measures cannot be quantified at this time, the project potentially conflicts with SJVAPCD's policy of reducing or mitigating project-specific GHG emissions by at least 29 percent compared to BAU.

The project is consistent with the Clovis General Plan and Fresno County General Plan policies concerning greenhouse gas emissions and reductions. The City and County General Plans do not include a bright-line threshold for reductions in GHG emissions but rather identify methods and practices that serve to curb GHG emissions. Construction and operation of the proposed hospital and

other facilities encompassed in the development would incorporate design elements, policies and programs that promote the use of clean and renewable energy sources, facilitate alternative modes of transportation, reduce vehicle miles traveled, reduce waste, conserve water, and promote the efficient and sustainable use of energy. Adherence to the recommended Mitigation Measures would further ensure the project's consistency with these policies.

### **Mitigation Measures**

Implement Mitigation Measure GH-1.

### **Level of Significance with Mitigation**

As discussed above under Impact GH-1, the recommended mitigation measures for the project would require the project proponent to enter into a Developer Mitigation Contract (DMC) with SJVAPCD and additionally incorporate a number of design and operational elements to curb and reduce generation of GHG emissions. While a DMC would function to reduce operational air pollutants to a specified level, it does not include a directly mandate a specific level. Consequently, the project could conflict with GHG-reduction planning efforts because the emission reductions to be achieved cannot be quantified at this time, and increased GHG emissions associated with the proposed project would be considered to have a significant impact. This impact is therefore considered significant and unavoidable.

### **CUMULATIVE IMPACTS**

Emissions of GHGs and their contribution to global climate change is inherently a cumulative impact. Although project-generated emissions would be considered nominal when compared to state-wide, national or world-wide GHG emissions inventories, the cumulative contribution from multiple such projects could conceivably result in a substantial overall contribution to the GHG inventory. Because the operational GHG emissions from the project exceed the significance threshold by a substantial degree and because GHG emissions from the project, as well as the Clovis General Plan, are considered significant and unavoidable, the impact of the project is considered significant on a cumulative basis.

### **SOURCES CONSULTED**

This chapter is based upon the following report:

Ambient Air Quality and Noise Consulting. *Air Quality & Greenhouse Gas Impact Analysis for Master Plan Expansion of the Clovis Community Medical Center Project, Clovis, CA*. July 2017

Center for Climate and Energy Solutions. "EPA Greenhouse Gas Regulation FAQ." Accessed September 8, 2017. <https://www.c2es.org/federal/executive/epa/greenhouse-gas-regulation-faq>

Sources cited by Ambient are as follows:

California Air Resources Board (CARB). *California Almanac of Emissions and Air Quality – 2013 Edition*. 2013.

California Air Resources Board (CARB). "iADAM Air Quality Data Statistics". Accessed June 23, 2017. Website URL: <http://www.arb.ca.gov/adam/index.html>

California Air Resources Board (CARB). "Air Quality Standards and Area Designations". Accessed: June 23, 2017. Website URL: <http://www.arb.ca.gov/desig/desig.htm>

California Air Resources Board (CARB). Diesel Risk Reduction Plan. 2000. Website URL: <http://www.arb.ca.gov/diesel/documents/rrpapp.htm>

California Building Standards Commission (BSC). April 2016. CalGreen. Website URL: <http://www.bsc.ca.gov>

California Department of Conservation (DOC). Division of Mines and Geology. August 2000. A General Location Guide for Ultramafic Rocks in California-Areas More Likely to Contain Naturally Occurring Asbestos.

California Department of Transportation (Caltrans). Accessed: June 29, 2017. Traffic Census Program, Traffic Counts. Website url: <http://www.dot.ca.gov/trafficops/census/>

California Energy Commission (CEC). Accessed: April 2016. Energy Commission Approves More Efficient Buildings for California's Future. Website URL: [http://www.energy.ca.gov/releases/2012\\_releases/2012-0531\\_energy\\_commission\\_approves\\_more\\_efficient\\_buildings\\_nr.html](http://www.energy.ca.gov/releases/2012_releases/2012-0531_energy_commission_approves_more_efficient_buildings_nr.html)

Centers for Disease Control and Prevention (CDC). Accessed: April 2016. Valley Fever: Awareness is Key. Website URL: <http://www.cdc.gov/features/valleyfever/>

JLB Traffic Engineering, Inc. 2017. Draft Traffic Impact Analysis: Master Plan Expansion of the Clovis Community Medical Center.

San Joaquin Valley Air Pollution Control District (SJVAPCD). March 19, 2015. "Guidance for Assessing and Mitigating Air Quality Impacts."

San Joaquin Valley Air Pollution Control District (SJVAPCD). Accessed: June 21, 2017. Ambient Air Quality Standards and Valley Attainment Status. Website URL: <http://www.valleyair.org/aqinfo/attainment.htm>

Western Regional Climate Center (WRCC). Accessed: July 2, 2017. Western U.S. Climate Historical Summaries: Fresno Yosemite International Airport, California. Website url: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3257>

# CHAPTER 11

## Hazards and Hazardous Materials

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### INTRODUCTION

This chapter evaluates potential significant environmental effects of the project resulting from hazards and hazardous materials, including the transport, use, and disposal of hazardous materials; historical presence of hazardous materials; hazards faced by schools; aviation-related hazards; wildland fire hazards; and consistency with emergency response and evacuation plans. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to hazards and hazardous materials; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of hazards and hazardous materials on the project; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### ENVIRONMENTAL SETTING

#### Definitions

For purposes of this chapter, the term “hazardous materials” refers to both hazardous substances and hazardous wastes. A “hazardous material” is defined in the Code of Federal Regulations (CFR) as “a substance or material that...is capable of posing an unreasonable risk to health, safety, and property when transported in commerce” (49 CFR 171.8). California Health and Safety Code Section 25501 defines a hazardous material as follows:

“Hazardous material” means any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. “Hazardous materials” include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

“Hazardous wastes” are defined in California Health and Safety Code Section 25141(b) as wastes that:

... because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause or significantly contribute to an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

#### Hazardous Materials History

Existing and past land use activities are potential indicators of hazardous materials use or contamination. Some examples include sites where industrial or agricultural activities have occurred, which may contain soil or groundwater contaminated by hazardous substances. Other hazardous material sources include leaking underground tanks in commercial and industrial areas, surface runoff from contaminated sites, and migration of contaminated groundwater into areas that may be excavated as part of the project.

Historically, the project area (both the existing CCMC campus and the proposed expansion areas) was developed with agricultural uses, with the areas immediately east and west of the existing CCMC campus being farmed up until 2014. Operation of hospital and medical services began at the existing CCMC campus site in 1988, with substantial expansions occurring in 2002, 2009, and 2012. Uses and/or generation of hazardous materials at the medical facilities include imaging, biohazards, nuclear medicine, laboratory, and chemicals.

Based on review of the project area using the federal Environmental Protection Agency's NEPAAssist tool and the EnviroStor data management tool administered by the California Department of Toxic Substances Control, the project site is not located on a hazardous materials site.

### **Schools**

Cedarwood Elementary School is located immediately south of the southernmost portion of the expansion area on the south of Herndon Avenue. No other existing schools or future school sites are located within one-quarter of the project site.

### **Aviation and Helipad**

The existing CCMC campus includes a helipad which is utilized as part of the medical and emergency services provided at the hospital. The helipad is located at grade in the southeast portion of the campus (approximately 350 feet north of Herndon Avenue and 200 feet east of the reflecting pond). The subject proposal does not involve development of any additional aviation facilities or expansion of the existing helipad, and no other airports or private airstrips within a two-mile vicinity of the project site.

## **REGULATORY AND POLICY SETTING**

### **Federal Regulations**

Federal agencies that regulate hazardous and toxic materials include the United States Environmental Protection Agency (US EPA), the Federal Occupational Safety and Health Administration (Fed/OSHA), the Nuclear Regulatory Commission (NRC), the U.S. Department of Transportation (DOT), and the National Institutes of Health (NIH). The following federal laws and guidelines govern transport, use, and disposal of hazardous materials:

- Federal Water Pollution Control Act
- Clean Air Act
- Occupational Safety and Health Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Comprehensive Environmental Response, Compensation, and Liability Act
- Guidelines for Carcinogens and Biohazards
- Superfund Amendments and Reauthorization Act Title III
- Resource Conservation and Recovery Act (RCRA)
- Safe Drinking Water Act
- Toxic Substances Control Act

Additionally, the Federal Aviation Administration (FAA) provides oversight for aviation safety and administers regulations applicable to helicopter and helipad operations, including the existing helipad facilities.

## State Regulations

The project is also subject to laws and regulations established by State of California. The California Environmental Protection Agency (Cal-EPA) and Department of Toxic Substances Control (DTSC) generally govern the use of hazardous materials and the management of hazardous waste. The California Highway Patrol (CHP) and the California Department of Transportation (Caltrans) enforce hazardous substance transportation regulations. Chemical suppliers must comply with all applicable packaging, labeling and shipping regulations.

Applicable state and local laws include the following:

- Public Safety/Fire Regulations/Building Codes
- Hazardous Waste Control Law
- Hazardous Substances Information and Training Act
- Hazardous Materials Release Response Plans and Inventory Act
- Medical Waste Management Act
- California Occupational Safety and Health Act
- Porter-Cologne Water Quality Control Act
- Toxic Air Contaminant Identification and Control Act

Additionally, the project is subject to regulations administered by Caltrans Division of Aeronautics regarding aviation hazards.

## Local Regulations

### *City of Clovis*

The City of Clovis General Plan Program addresses hazardous materials issues in the Environmental Safety Element, which sets forth the goal of establishing “A community that protects the public and environment from hazardous materials and waste.” To accomplish this goal, all projects within the City of Clovis involving the disposal, transport, manufacture, storage, or handling of hazardous materials are required to abide by the implementation programs or actions established for the purpose of meeting this goal. Generally, the existing federal, State, and County laws and regulations governing the transport, use, and disposal hazardous materials are adequate to meet the requirements established by the local municipality under the general plan.

The Clovis Fire Department (CFD) is responsible for emergency preparedness and urban search and rescue. The CFD Special Projects Manager/Emergency Preparedness Manager is the Emergency Operations Center coordinator and is responsible for management of the Emergency Operations Plan.

### *Fresno County*

The Fresno County Department of Public Health, Environmental Health Division is responsible for the implementation and enforcement of hazardous materials programs in the county under the Certified Unified Program Agency (CUPA) Program. The Environmental Health Division implements a Hazardous Waste Generator Program and a Hazardous Waste Treatment/Tiered Permit Program to help ensure that all hazardous waste generated in Fresno County businesses is handled, recycled, treated, stored and disposed of properly. The program includes inspection of facilities that generate hazardous waste, investigation of reports of illegal hazardous waste disposal, and response to emergency spills of hazardous chemicals. There are also public education programs to inform industries and residents about the laws and regulations relating to the safe disposal of hazardous waste. Hazardous waste generators must submit to the County and implement a Hazardous Materials Business

Plan and are also subject to a variety of requirements pertaining to employee training, equipment maintenance, labeling requirements, storage limits, and recordkeeping.

Emergency preparedness and planning in the unincorporated areas is the responsibility of the Fresno County Department of Public Health's Office of Emergency Services (OES). The Fresno County Operational Area Master Emergency Services Plan, developed and managed by OES, is the emergency response plan in effect in unincorporated areas of the Plan Area. The Fresno County Multi-Jurisdictional Local Hazard Mitigation Plan, approved by the County Board of Supervisors in 2009, provides additional information on potential natural and man-made hazards in Fresno County, resources available for disaster response and recovery, and specifies agencies' responsibilities for emergency responses. The City of Clovis, along with the 14 other incorporated cities in Fresno County, coordinate with OES regarding disaster preparedness, response, and recovery activities.

## THRESHOLDS OF SIGNIFICANCE

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects related to hazards and hazardous materials are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section VIII.

Would the project:

- a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
- b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?
- c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
- d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?
- e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?
- f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?
- g. Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?
- h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

## **LESS THAN SIGNIFICANT IMPACTS**

### **HA-1: Transport, Storage, Use, And Disposal of Hazardous Materials**

CCMC currently transports, uses, and disposes of hazardous materials in compliance with federal, State, and local law and regulations. This practice will continue as part of the proposed expansion. The introduction of additional hazardous materials other than those already currently handled by the existing hospital is not anticipated. However, should any changes occur in the future resulting in additional or an increase in the amount of hazardous materials being transported, used, and disposed of, they must be in compliance with existing hospital policies and local, state and federal regulations.

Regarding development of the nonmedical facilities included as part of the project (i.e. the proposed assisted living center, hotel, and other office and commercial development), the utilization of any hazardous materials entailed with these uses is expected to present an equal or lesser risk of impact than the hazardous materials risks associated with the development and uses at the existing CCMC campus. Further, the nonmedical development will be similarly subject to local, State and federal regulations concerning hazardous materials. As the project is subject to existing laws and regulations governing the transport, use, and disposal of hazardous materials, the potential for significant impacts resulting from the use of these hazardous materials is not considered significant.

### **HA-2: Hazards Affecting Schools**

Potential impacts from hazards or hazardous materials to Cedarwood Elementary School will be less than significant. In general, the use of hazardous materials at medical facilities is dependent upon the number of patients and various operational uses (i.e. imaging, nuclear medicine, laboratory), so with the increase in overall square footage proposed for the CCMC campus there would be a natural increase in the amount and use of hazardous materials. However, the use of these materials would be subject to applicable federal, State, and local law and regulations. Additionally, CCMC has operated its existing facilities in proximity to the school without issue. Further, the types of uses planned for the proposed development adjacent to Cedarwood Elementary School (currently planned as assisted living housing facilities) will not present a substantial risk of impact from hazards and/or hazardous materials.

### **HA-3: Hazards Related to Helipad**

Impacts related to the helipad located on the hospital campus were previously analyzed in the EIR prepared for the 2009 Medical Center Expansion. The analysis in the previous EIR determined that impacts of the helipad were less than significant due to the low number of operations at CCMC, the low frequency of helicopter accidents within one mile of a heliport takeoff/landing location, the type of helicopters operated at CCMC (multi-engine turbine helicopters with redundant engine capabilities), and the highly regulated nature of helipad operations. While the proposed expansion would involve increased development within the vicinity of the helipad, the operational and regulatory factors cited in the prior EIR are essentially the same and no new significant risks of hazard from the helipad would result from the expansion. As such, impacts from the helipad are less than significant.

## **NO IMPACT**

No impacts were identified regarding criterion “d” as the project is not located on a site that is a current or former hazardous waste disposal site or solid waste disposal site. No impacts were identified regarding “e” and “f” since, apart from the hospital’s helipad (see discussion above), the project site is not within vicinity of any airport or private airstrip and thus would not generate any aviation-related safety hazards. No impacts were identified regarding criteria “g” and “h”, respectively, as the project



site is not located in a wildland fire area and the project would not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.

### **CUMULATIVE IMPACTS**

The proposed CCMC campus expansion and road widening, in conjunction with current and probable future projects in the area, would not result in a significant cumulative impact related to hazardous materials and conditions. Existing regulations ensure that the cumulative impacts associated with generation, handling, storage and disposal of hazardous materials would be less than significant. The proposed project would be required to comply with all applicable federal, state, and local regulations.

### **SOURCES CONSULTED**

California, State of. Department of Toxic Substances Control, Envirostor Database. Accessed May 16, 2017. <http://www.envirostor.dtsc.ca.gov/public/>

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. June 2014.

Fresno, County of. Department of Public Health, Environmental Health Division website. Accessed May 16, 2017. <http://www.co.fresno.ca.us/DivisionPage.aspx?id=2982>

Paoli & Odell, Inc. *Clovis Community Medical Center Healthcare Campus Expansion Project, Draft Environmental Impact Report*. February 2009.

United States Environmental Protection Agency, NEPAassist tool. Accessed May 16, 2017. <https://nepassisttool.epa.gov/nepassist/>

# **CHAPTER 12**

## **Hydrology and Water Quality**

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### **INTRODUCTION**

This chapter identifies and evaluates potential environmental effects of the project related to surface and groundwater resources, drainage characteristics, and flooding. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to hydrology and water quality; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of the project related to hydrology and water quality; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### **ENVIRONMENTAL SETTING**

#### **Hydrologic Setting**

The project site is located within the Kings Groundwater Subbasin of the San Joaquin Basin Hydrologic Area (Groundwater Basin 5-022.08). Groundwater in the project area is reported to be first encountered at depths ranging from 66 feet below ground surface (bgs) immediately north of the project site to 75 feet bgs east of the project site. The flow of groundwater is generally in a southwesterly direction. The Kings Subbasin has been identified as a critically overdrafted basin by the California Department of Water Resources, meaning it is required to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2020, pursuant to the State of California's Sustainable Groundwater Management Act (SGMA). The Kings Subbasin has been identified as a critically overdrafted basin by the California Department of Water Resources.

Notable surface water features in the vicinity of the project site include the Enterprise Canal, which forms the eastern boundary of the CCMC campus, and tributaries of Pup Creek. These surface water features are components of the stormwater drainage system maintained by the Fresno Metropolitan Flood Control District (FMFCD), discussed more below.

The City of Clovis relies upon groundwater, surface water, and recycled water for its water supply. Potable water is supplied by underground aquifers as well as the City's Surface Water Treatment Plant. More information about the City's water supply is included in Chapter 20, Utilities and Service Systems.

#### **Regional Drainage**

Stormwater runoff in the City of Clovis is conveyed through a system of street gutters, underground storm drains, retention/detention basins, pumping stations, and open channels that are maintained by the Fresno Metropolitan Flood Control District (FMFCD). FMFCD's responsibilities include planning, constructing, and maintaining the stormwater drainage collection and disposal facilities necessary for urban development within the Fresno metropolitan area. FMFCD is divided into numerous drainage zones that have (or are planned to have) a system of underground gravity flow pipelines that drain to stormwater retention basins or drainage outfalls. The City of Clovis Public Utilities Department maintains streets and gutters that convey stormwater to storm drain inlets.

The project site is located within FMFCD Drainage Zone "7H". The existing retention basin for Drainage Zone "7H" is located approximately one-quarter mile south of the project site between

Temperance and Locan Avenues. The site is not located in a 100-year floodplain, as mapped by the Federal Emergency Management Agency (FEMA).

## **REGULATORY AND POLICY SETTING**

### **Federal Regulations**

#### *Clean Water Act and National Pollution Discharge Elimination System*

The Clean Water Act (CWA) is the primary law governing pollution of the nation's surface waters. The CWA requires states to adopt water quality standards and prohibits discharge of pollutants into waters of the United States from any point source unless it complies with the National Pollution Discharge Elimination System (NPDES) permit. The CWA establishes the framework for regulating municipal and industrial point source discharges under the NPDES program. In California, the NPDES program is administered through the nine Regional Water Quality Control Boards, including the Central Valley Regional Water Quality Control Board (RWQCB). Non-point stormwater pollution sources are regulated by the RWQCB through the General Construction Activity NPDES permits. Construction activities subject to this general permit include clearing, grading, and disturbances to the ground, such as stockpiling or excavation that result in soil disturbances. Stormwater pollution prevention plans (SWPPPs) are required for the issuance of a construction NPDES permit and typically include Best Management Practices (BMPs) to reduce water quality impacts.

### **State Regulations**

#### *Porter-Cologne Water Quality Control Act*

The Porter-Cologne Water Quality Control Act assigns overall responsibility for water rights and water quality protection to the State Water Resource Control Board (SWRCB) and directs the nine statewide Regional Water Quality Control Boards (RWQCBs) to develop and enforce water quality standards within their boundaries. California has been delegated permit authority for the National Pollutant Discharge Elimination System (NPDES) permit program including stormwater permits for all areas except Indian lands. Additionally, each RWQCB must prepare a Basin Plan, which establishes beneficial uses of water designated for each water body to be protected; water quality standards, known as water quality objectives, for both surface water and groundwater; and actions necessary to maintain these standards in order to control non-point and point sources of pollution to the State's waters.

#### *Sustainable Groundwater Management Act (SGMA)*

The 2014 Sustainable Groundwater Management Act (SGMA) mandates a framework for ensuring sustainable management of groundwater in California's groundwater basins by local public agencies and newly-formed groundwater sustainability agencies (GSAs). In basins designated by the state Department of Water Resources (DWR) as medium and high priority, local public agencies and GSAs are required to develop and implement groundwater sustainability plans (GSPs) or alternatives to GSPs (Alternatives). The required components of a GSP include: measurable objectives and incremental milestones to achieve the sustainability goal in the basin within 20 years of the implementation of the plan; provisions for monitoring and management of groundwater levels, groundwater quality, inelastic land surface subsidence, and changes in surface flow and surface water quality that directly affect groundwater levels or quality; and mitigation of overdraft. Formation of GSAs within the Kings Subbasin is currently underway and GSPs are to be developed by 2020.

## Local Regulations

### *City of Clovis*

Below are policies and regulations administered by the City of Clovis pertaining to hydrology and water quality:

#### City of Clovis Urban Water Management Plan

Enacted pursuant to California Assembly Bill 797 and subsequent legislative amendments, the 2015 Urban Water Management Plan (UMWP) was adopted to address the projected water demands of urban development anticipated by the 2014 Clovis General Plan. The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions. The UMWP classifies four stages of water shortage and provides a list of mandatory prohibitions on end users which the City can enforce at the time each water shortage stage is reached. The UMWP also includes a summary of Demand Management Measures which the City has implemented, is currently implementing, and plans to implement in the future in order to meet its urban water use reduction targets.

#### City of Clovis General Plan

The Clovis General Plan's Open Space and Conservation Element of the Clovis General Plan includes the following policies related to hydrology and water quality. The project will be consistent with these policies.

Goal 3: A built environment that conserves and protects the use and quality of water and energy resources.

*Policy 3.1 Stormwater management.* Encourage the use of low impact development techniques that retain or mimic natural features for stormwater management.

*Policy 3.2 Stormwater pollution.* Minimize the use of non-point source pollutants and stormwater runoff.

*Policy 3.3 Well water.* Prohibit the use of new private wells in new development.

*Policy 3.4 Drought-tolerant landscaping.* Promote water conservation through the use of drought-tolerant landscaping on existing and new residential properties. Require drought-tolerant landscaping for all new commercial and industrial development and city-maintained landscaping, unless used for recreation purposes.

*Policy 3.5 Energy and water conservation.* Encourage new development and substantial rehabilitation projects to exceed energy and water conservation and reduction standards set in the California Building Code.

#### City of Clovis Municipal Code

Clovis Municipal Code Chapter 8.7 requires payment of Local Drainage Fees to fund construction of local drainage facilities before approval of a final subdivision map or, where land is not subdivided, before the beginning of any work on such land development.

### *County of Fresno*

#### Fresno County General Plan

The Open Space and Conservation Section of the Fresno County General Plan includes a "Water Resources" subsection composed of policies aimed at protecting and enhancing surface water and

groundwater resources in the county. The policies address broad water planning issues, groundwater recharge, the relationship of land use decisions to water issues, and water quality problems. Related policies are included in Section HS-C, Flood Hazards; Section PF-C, Water Supply and Delivery; and Section PF-E, Storm Drainage and Flood Control. The proposed Herndon Avenue widening will be consistent with these policies.

#### Fresno County Code of Ordinances

Fresno County Code of Ordinances Chapter 17.64 requires payment of local drainage fees for costs of construction of FMFCD drainage facilities before beginning of work on a land development or, where land is subdivided for development, before recordation of a final subdivision map.

#### *Fresno Metropolitan Flood Control District*

Discharges of stormwater to the storm drainage system within FMFCD's Storm Drainage and Flood Control Master Plan area must meet are subject to the requirements of FMFCD's Fresno-Clovis Storm Water Quality Master Plan (SWQMP). The cities of Clovis and Fresno, Fresno County, FMFCD, and California State University Fresno, are co-permittees on this permit. The SWQMP incorporates a series of control measures, performance standards, and implementation schedules to achieve water quality standards and protect beneficial uses of the San Joaquin River, creeks and canals.

### **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects related to hydrology and water quality are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section XI, a through j:

Would the project:

- (a) Violate any water quality standards or waste discharge requirements?
- (b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
- (c) Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner that would result in substantial on- or off-site erosion or siltation?
- (d) Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?
- (e) Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
- (f) Otherwise substantially degrade water quality?
- (g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

- (h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?
- (i) Expose people or structures to significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?
- (j) Inundation by seiche, tsunami, or mudflow?

## **LESS THAN SIGNIFICANT IMPACTS**

### **HY-1: Consistency with Water Quality Standards and Waste Discharge Requirements**

The project could potentially degrade water quality by causing erosion and siltation during construction activities and by generating pollutants during both construction and operation that would be carried away in storm runoff to drainage facilities. Construction activities would potentially generate dust, litter, chemicals, paint fragments and stucco flakes, as well as pollutants from construction vehicles and processes. These materials have the potential to be carried away by stormwater runoff into the drainage system. Operation of the project would increase the potential for stormwater runoff to transport contaminants from parking areas and other impervious surfaces into the drainage system. Potential contaminants include fuel, oil, transmission fluids, petroleum hydrocarbons and heavy metals. Runoff from landscaped areas may contain pesticides and nutrients. Since stormwater will be directed into ponding basins rather than surface water bodies, sediments and urban pollutants may eventually collect and settle to the bottom of stormwater drainage basins.

As discussed in the Regulatory and Policy Setting section above, construction activities of the project are subject to several regulations that address erosion and sediment control, and minimize the resulting effects of erosion on water quality. These requirements include adherence to the existing General Construction Permit requirements (pursuant to the NPDES General Permit for Discharges of Stormwater Runoff Associated with Construction Activity), which are specifically aimed at reducing impacts on surface waters that may occur due to construction activities. Specifically, the Permit requires preparation of a stormwater pollution prevention plan (SWPPP) that would incorporate best management practices (BMPs) to improve water retention and vegetation on project sites. Given the extent of existing regulations and mandated compliance that the project would be required to comply with that address reducing or avoiding the erosion of disturbed soils during construction activities, the impact would be less than significant.

### **HY-2: Project Effects on Groundwater Supplies and Recharge**

The project is served by the City of Clovis' public water system and will not directly utilize groundwater in its construction or operation. As the City of Clovis relies in part on groundwater for its municipal water supply, the project may have an indirect impact on groundwater supplies. However, based on the 2015 Urban Water Management Plan, the City is forecast to have adequate water supplies to meet estimated water demands generated by buildout of the General Plan Update under the 2035 Scenario, which included development of the project area with new hospital facilities and other business and commercial uses consistent with the subject proposal. Further, the City has diversified its water supply over time to utilize surface water and recycled water while proportionally decreasing groundwater usage (additional information regarding the City's water supply is included in Chapter 20, Utilities and Service Systems).

Regarding groundwater recharge, the project will increase impervious surfaces in the project area. However, the increase in the amount of impervious surfaces in the area was previously addressed in the Clovis General Plan EIR. As discussed in the Clovis General Plan EIR, most of the areas where

development is anticipated are already served by the FMFCD urban drainage system, and new development would be required to pay Local Drainage Fees to fund drainage improvements pursuant to the FMFCD Master Plan serving the affected drainage areas before the beginning of any work on such developments. Additionally, onsite infrastructure needed such as additional curbs and gutters, storm drain inlets, and underground stormwater pipelines will be constructed as part of the project.

Given that the project would be adequately served by water supplies already designated for use by the City of Clovis and would not require additional groundwater supply entitlements, and given that the design and operational characteristics of the project would not substantially deplete groundwater resources or interfere with groundwater recharge, impacts to groundwater supplies and recharge would be less than significant.

### **HY-3: Project Effects on Drainage Patterns and Runoff**

The CCMC campus expansion area is presently made up of primarily vacant and turfed land, which typically does not result in notable stormwater runoff except when soils are saturated during periods of extended above-normal rainfall. The generation of stormwater runoff from the project site will be increase when developed with the additional hospital facilities and related uses.

CCMC's existing stormwater collection and drainage service needs are provided by the Fresno Metropolitan Flood Control District. The existing off-site stormwater infrastructure from the project site to Basin 7H was installed when the existing CCMC was constructed. According to comments received from FMFCD, much of the Master Plan storm drainage system for the area is complete. These facilities are adequate to serve CCMC's existing stormwater drainage needs and the additional stormwater runoff created as a result of the expansion plan and long-term master plan with additional excavation of Basin 7H as needed to provide storage for the additional runoff generated. The project will also be subject to the required drainage fees. Onsite infrastructure such as additional curbs and gutters, storm drain inlets, and underground stormwater pipelines will be constructed as part of the proposed project. The stormwater management needs of the project area and other areas within the City of Clovis were considered in the adoption of the Clovis General Plan and the Fresno Metropolitan Flood Control District's Storm Drainage and Flood Control Master Plan. Compliance with existing plans and regulations will assure that any impacts associated with the project related to drainage and runoff will be less than significant.

### **NO IMPACT**

No impacts regarding criteria "g" through "j" were identified as the project site is not within a 100-year flood hazard area, within a potential dam failure inundation area, or an area subject to hazards from seiche, tsunami, or mudflow.

### **CUMULATIVE IMPACTS**

The project would not generate a significant cumulative impact related to hydrology and water quality. As discussed throughout this chapter, the proposed expansion of hospital uses and development of other professional and commercial uses have been contemplated in the City of Clovis' urban growth plans, including the City's General Plan and Urban Water Management Plan. These plans include implementation of improvements and policies which contribute to preservation of the groundwater aquifer, capture and percolation of surface water runoff, and protection against water quality degradation.

It is noted that the Clovis General Plan EIR determined that development of both the "2035 Scenario" and "Full Buildout Scenario" could result in a significant and unavoidable impact upon groundwater

resources due to increased demand for groundwater and increased impervious surfaces affecting recharge. However, this determination was based on the potential for development beyond the area served by the Fresno Irrigation District (FID), i.e. development on the periphery of Clovis. The project site is within a highly developed area of the city that is served by water and drainage infrastructure. For this reason, the project and any other development in the vicinity would not result in the type of development considered as significant in the General Plan EIR and thus would not be cumulatively considerable.

## SOURCES CONSULTED

California Department of Water Resources. Groundwater Information Center Interactive Map Application (GICIMA). Accessed May 25, 2017. <https://gis.water.ca.gov/app/gicima/>

California Department of Water Resources. “Groundwater Sustainability Plan Emergency Regulations”. Accessed May 25, 2017. <http://www.water.ca.gov/groundwater/sgm/gsp.cfm>

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. June 2014.

City of Clovis. *2015 Urban Water Management Plan*. July 5, 2016  
<https://www.ci.clovis.ca.us/Portals/0/Documents/PublicUtilities/FINAL%202015%20UWMP.pdf?ver=2016-08-02-080200-277>

Fresno Metropolitan Flood Control District. Letter from Robert Villalobos, Engineering Technician III. November 7, 2016.



# CHAPTER 13

## Land Use, Public Land Use Policy, and Zoning

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### INTRODUCTION

This chapter identifies and discusses potential environmental effects of the project related to land use, public land use policy, and zoning. Information presented includes: (1) the environmental, regulatory, and public policy setting of the project; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of the project related to land use, public land use policy, and zoning; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### ENVIRONMENTAL SETTING

#### Existing Land Use

##### *Clovis Community Medical Center (CCMC)*

The entire CCMC project site (including existing facilities and the proposed expansion area) comprises approximately 148 acres located on the north and south sides of Herndon Avenue, east and west of Temperance Avenue. Approximately 120 acres of the 148-acre project site have been developed with existing CCMC facilities; the remaining acreage is currently vacant land. Most of the existing development is on the northeast corner of Herndon Avenue and Temperance Avenue, with some development on the south side of Herndon Avenue; the area west of Temperance has not yet been developed. The total CCMC area encompasses 22 separate parcels (see Table 13.1 for more detail).

The existing medical center comprises 719,548 square feet of building area, including the main hospital building (223,521 square feet), a bed tower (138,726 square feet), the outpatient care center (70,300 square feet), a conference center (21,814 square feet), a central plant (17,354 square feet), a parking garage (659 spaces), and administrative, corporate, and medical office buildings (247,833 square feet total). The existing medical center includes 208 licensed beds.

##### *Herndon Avenue*

Herndon Avenue is currently a five-lane divided roadway between Temperance and Coventry Avenue, with three lanes on the westbound section and two lanes on the eastbound section. East of Coventry Avenue, Herndon Avenue reduces to a two-lane roadway and remains as such as it continues to De Wolf Avenue and beyond the project site. There are traffic signals at the intersection of Herndon and Temperance and the intersection of Herndon and Coventry. Additionally, there are existing Class II bike lanes on both sides of Herndon. Streetlights are installed along the north side of Herndon from Temperance Avenue to the eastern boundary of the CCMC property, and to the east of the CCMC property there are some wood utility poles present. Along the south side of Herndon there are currently wood utility poles for entire length of the area to be widened. There are currently no sidewalks on either side of Herndon within the project area.

#### Surrounding Land Uses

The project site is located on the eastern edge of the City of Clovis in an area where rural residential and agricultural uses of land have been transitioning to urban residential and mixed use/office uses (see Figure 13.1).

The northern boundary of the project site abuts State Route 168. Beyond the highway to the north is vacant land and rural residences, with a few commercial and light industrial developments. When fully developed, it is anticipated that these areas will consist of a high-intensity mix of employment-generating land uses permitted in the Office and Industrial designations.

The eastern boundary of the CCMC expansion site is generally formed by the Enterprise Canal. East of the canal are numerous rural residences. The area east of the site is outside of the city limits of Clovis and is planned to remain as rural residential.

Existing land uses to the south include urban residential development, an elementary school, a ponding basin, and rural residences. This area is planned to remain the same as it is currently developed.

The area immediately west of the project site is a mixture of rural residential uses and vacant land. Further west towards Armstrong Avenue are commercial uses such as a gas station, auto towing yard, used car dealership, and an equipment storage yard, plus additional vacant land. Per the Clovis General Plan, the entire area between the western edge of the project site and Armstrong Avenue is planned as Mixed Use/Business Campus, and it is anticipated that these areas will eventually consist of a mix of employment-generating land uses as are permitted in the Office and Industrial designations.

Herndon Avenue is a major east-west thoroughfare for the City of Clovis and functions to connect the City with State Route 41 and State Route 99. West of the proposed CCMC expansion and widening area, Herndon Avenue is a divided roadway that varies from two to three lanes on each side until Armstrong Avenue; west of Armstrong Avenue, Herndon is a divided roadway with three lanes on each side plus sidewalks, streetlights, and Class II bike lanes; west of State Route 168, Herndon becomes a divided expressway with three lanes on each side. East of the proposed widening area, Herndon is a two-lane undivided roadway and does not have sidewalks, streetlights, or traffic signals.

## **TABLES AND FIGURES**

The following tables and figures provide existing land use, planned land use, and zoning information for the project site and nearby land:

- (1) Table 13.1 identifies the Fresno County Assessor's Parcel Numbers, acreage, existing land use, General Plan designation, and City of Clovis or County of Fresno zoning for every parcel on the project site.
- (2) Table 13.2 identifies the existing land uses, General Plan designations, and zoning for land surrounding the project site.
- (3) Table 13.3 provides definitions for the zoning districts that apply to the project site and surrounding land.
- (4) Figure 13.1 shows the existing land uses on and near the project site.
- (5) Figure 13.2 provides an aerial view of the project site and nearby land.
- (6) Figure 13.3 shows the *Clovis General Plan* land use designations for the project site and nearby land.
- (7) Figure 13.4 shows the existing zoning for the project site and nearby land.

**TABLE 13.1**  
**Project Site**  
**Existing Land Uses, General Plan Designations, and Zoning**

| <b>CCMC Expansion Portion of Project Site</b>   |                            |                             |   |                                     |
|---|----------------------------|-----------------------------|---|-------------------------------------|
| <b>Fresno County Assessor's Parcel Numbers</b>  | <b>Parcel Size (Acres)</b> | <b>Existing Land Uses</b>   | <b>Clovis General Plan Land Use Designation</b> | <b>City or County Zone District</b> |
| 564-042-42S                                     | 9.93                       | Vacant                      | Mixed Use/<br>Business Campus                   | C-P                                 |
| 564-042-41S                                     | 7.16                       | Vacant                      | Mixed Use/<br>Business Campus                   | C-P                                 |
| 564-042-86S                                     | 4.80                       | CCMC Landscaped             | Office  | C-P                                 |
| 564-042-55S                                     | 4.39                       | CCMC Landscaped             | Office  | C-P                                 |
| 564-042-58S                                     | 5.71                       | CCMC Parking,<br>Landscaped | Office  | C-P                                 |
| 564-042-92S                                     | 10.17                      | CCMC Streets                | Office  | C-P                                 |
| 564-042-91S                                     | 13.90                      | CCMC Offices, Parking       | Office  | C-P                                 |
| 564-042-82S                                     | 10.59                      | CCMC Offices, Parking       | Office  | C-P                                 |
| 564-042-31S                                     | 2.21                       | CCMC Offices, Parking       | Office  | C-P                                 |
| 564-042-49S                                     | 1.80                       | CCMC Offices, Parking       | Office  | C-P                                 |
| 564-042-04S                                     | 2.62                       | CCMC Offices, Parking       | Office  | C-P                                 |
| 564-042-70S                                     | 20.45                      | CCMC Offices, Parking       | Office  | C-P                                 |
| 564-042-43S                                     | 1.56                       | CCMC Landscaped             | Office  | C-P                                 |
| 564-042-73S                                     | 5.86                       | CCMC Offices                | Office  | C-P                                 |
| 564-042-74S                                     | 19.55                      | CCMC Landscaped             | Office  | C-P                                 |
| 564-042-52S                                     | 16.79                      | CCMC Parking,<br>Landscaped | Office  | C-P                                 |
| 553-020-78                                      | 3.47                       | Vacant                      | Office  | R-A                                 |
| 553-020-69                                      | 1.95                       | Vacant                      | Office  | C-P                                 |
| 553-020-71                                      | 1.50                       | Vacant                      | Office  | C-P                                 |
| 553-020-72                                      | 0.25                       | Vacant                      | Office  | C-P                                 |
| 553-020-70S                                     | 3.13                       | Vacant                      | Office  | C-P                                 |
| 553-020-73S                                     | 1.59                       | Vacant                      | Office  | C-P                                 |
| <b>Herndon Widening Portion of Project Site</b> |                            |                             |   |                                     |
| <b>Fresno County Assessor's Parcel Numbers</b>  | <b>Parcel Size (Acres)</b> | <b>Existing Land Uses</b>   | <b>General Plan Land Use Designation</b>        | <b>City or County Zone District</b> |
| 553-020-78                                      | 3.47                       | Vacant                      | Office  | R-A                                 |
| 553-020-69                                      | 1.95                       | Vacant                      | Office  | C-P                                 |
| 553-020-71                                      | 1.50                       | Vacant                      | Office  | C-P                                 |
| 553-020-72                                      | 0.25                       | Vacant                      | Office  | C-P                                 |
| 553-020-70S                                     | 3.13                       | Vacant                      | Office  | C-P                                 |

|  |      |                          |                    |          |
|--|------|--------------------------|--------------------|----------|
| 553-020-73S  | 1.59 | Vacant                   | Office             | C-P      |
| 553-020-66S  | 1.84 | Rural Residence          | Office             | R-1-7500 |
| 553-020-76S  | 1.71 | Rural Residence          | Office             | R-1-7500 |
| 553-020-68S  | 2.32 | Rural Residence          | Office             | R-1-7500 |
| 553-030-35T  | 0.09 | Vacant-Public Facilities | Rural Residential* | AL-20    |
| 553-030-16   | 1.47 | Rural Residence          | Rural Residential* | R-R      |
| 553-030-17   | 1.45 | Rural Residence          | Rural Residential* | R-R      |
| 553-030-18   | 2.44 | Rural Residence          | Rural Residential* | R-R      |
| 553-030-19T  | 0.06 | Vacant-Public Facilities | Rural Residential* | R-R      |
| 553-030-20T  | 0.06 | Vacant-Public Facilities | Rural Residential* | AL-20    |
| 553-030-21   | 1.17 | Rural Residence          | Rural Residential* | AL-20    |
| 553-030-22   | 1.07 | Rural Residence          | Rural Residential* | AL-20    |
| 553-030-23   | 1.06 | Rural Residence          | Rural Residential* | AL-20    |
| 553-030-31   | 1.06 | Vacant-Agriculture       | Rural Residential* | AL-20    |
| 565-042-14   | 78.8 | Vacant-Agriculture       | Rural Residential* | AL-20    |
| 565-043-29   | 1.56 | Rural Residence          | Rural Residential* | AL-20    |
| 565-043-25   | 2.44 | Rural Residence          | Rural Residential* | AL-20    |
| 565-043-26   | 3.56 | Rural Residence          | Rural Residential* | AL-20    |
| 565-043-17   | 2.49 | Rural Residence          | Rural Residential* | AL-20    |
| 565-043-16   | 1.89 | Rural Residence          | Rural Residential* | AL-20    |
| 565-044-01   | 0.48 | Rural Residence          | Rural Residential* | AL-20    |
| 565-044-02   | 2.06 | Rural Residence          | Rural Residential* | AL-20    |
| *Fresno County General Plan land use designation<br>Legend: See Table 13.3 |      |                          |                    |          |

Sources: Fresno County Assessor's Office, Clovis General Plan, Clovis Development Code, Fresno County Zoning Ordinance, Odell Planning & Research, Inc., Google

**TABLE 13.2**  
**Land Surrounding Project Site**  
**Existing Land Uses, General Plan Designations, and Zoning**

| Location                             | Existing Land Use       | Clovis General Plan Land Use Designation   | City or County Zone District |
|--------------------------------------|-------------------------|--|------------------------------|
| North of CCMC Expansion Project Area | State Route 168         | N/A  | R-A                          |
| West of CCMC Expansion Project Area  | Rural Residential       | Mixed Use/Business Campus                  | C-2                          |
| South of CCMC Expansion Project Area | Vacant, Offices         | Office, Medium Density Residential, School | C-P, R-A, R-1-7500           |
| East of CCMC Expansion Project Area  | Canal, Rural Residences | Rural Residential                          | R-R, AL-20                   |

|  |                                    |   |  |
|--|------------------------------------|---|--|
| North of Herndon Widening Project Area | CCMC, Rural Residences             | Office (City), Rural Residential (County) | C-P (City), AL-20 (County)                       |
| South of Herndon Widening Project Area | Vacant, Offices, Rural Residential | Office (City), Rural Residential (County) | R-A, C-P, R-1-7500 (City)<br>R-R, AL-20 (County) |
| Legend: See Table 13.3                 |                                    |   |  |

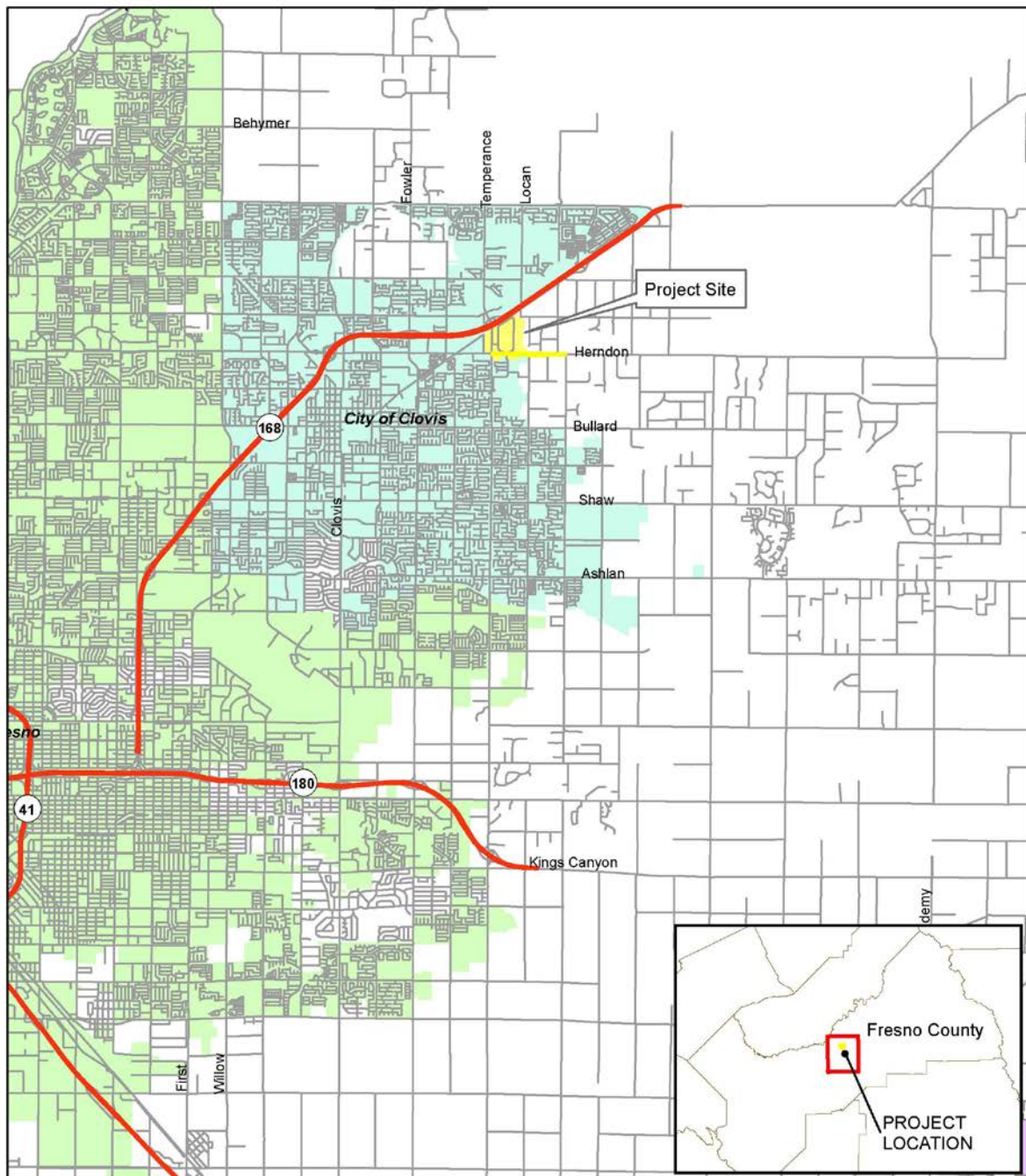
Sources: Fresno County Assessor's Office, Clovis General Plan, Clovis Development Code, Fresno County Zoning Ordinance, Odell Planning & Research, Inc., Google

**TABLE 13.3**  
**Zoning Districts Applicable to Project**

| <b>Zoning District</b>  | <b>Purpose and Population Density</b>   |
|---|---|
| "R-R" Rural Residential<br>(Fresno County)                                    | The "R-R" District is intended to create or preserve rural or very large lot residential homesites where a limited range of agricultural activities may be conducted. The "R-R" District is intended to be applied to areas designated as Rural Residential by the General Plan. The minimum lot size that may be created within the "R-R" District without a special acreage designation shall be two (2) acres. The "R-R" District accompanied by the acreage designation of five (5) establishes that the minimum lot size that may be created within the District shall be five (5) acres.  |
| "AL-20" Limited Agricultural District<br>(Fresno County)                      | The "AL" District is a limited agricultural district. It is intended to protect the general welfare of the agricultural community by limiting intensive uses in agricultural areas where such uses may be incompatible with, or injurious to, other less intensive agricultural operations. The District is also intended to reserve and hold certain lands for future urban use by permitting limited agriculture and by regulating those more intensive agricultural uses which, by their nature, may be injurious to non-agricultural uses in the vicinity or inconsistent with the express purpose of reservation for future urban use. |
| "R-A" Single-Family Residential Very Low Density District<br>(City of Clovis) | The R-A District identifies areas appropriate for large lot single-family uses. The allowable maximum density is one dwelling unit per twenty-four thousand (24,000) square feet in the R-A District, with a density range of 0.6 to 2.0 dwelling units per acre.   |
| "R-1-7500" Single-Family Residential<br>(City of Clovis)                      | The R-1 District identifies areas appropriate for conventional single-family uses. The allowable density range is 2.1 to 4.0 units per acre, with not more than one dwelling unit per parcel.   |
| "C-P" Administrative/Professional Office<br>(City of Clovis)                  | The C-P District is applied to areas appropriate for integrated, professional office uses including administrative, corporate, financial, government, institutional, legal, and medical.  |
| "C-2" Community Commercial<br>(City of Clovis)                                | The C-2 District is applied to areas appropriate to serve the daily shopping needs of the community, including larger, community scale shopping centers, and regional malls, which may be anchored by several department stores or other large scale retail outlets, restaurants, hotels, and entertainment uses.   |

Source: Clovis Development Code, Fresno County Zoning Ordinance

**Figure 13.1**  
**Project Location**



Source: County of Fresno, City of Clovis, ESRI

### Project Location

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis

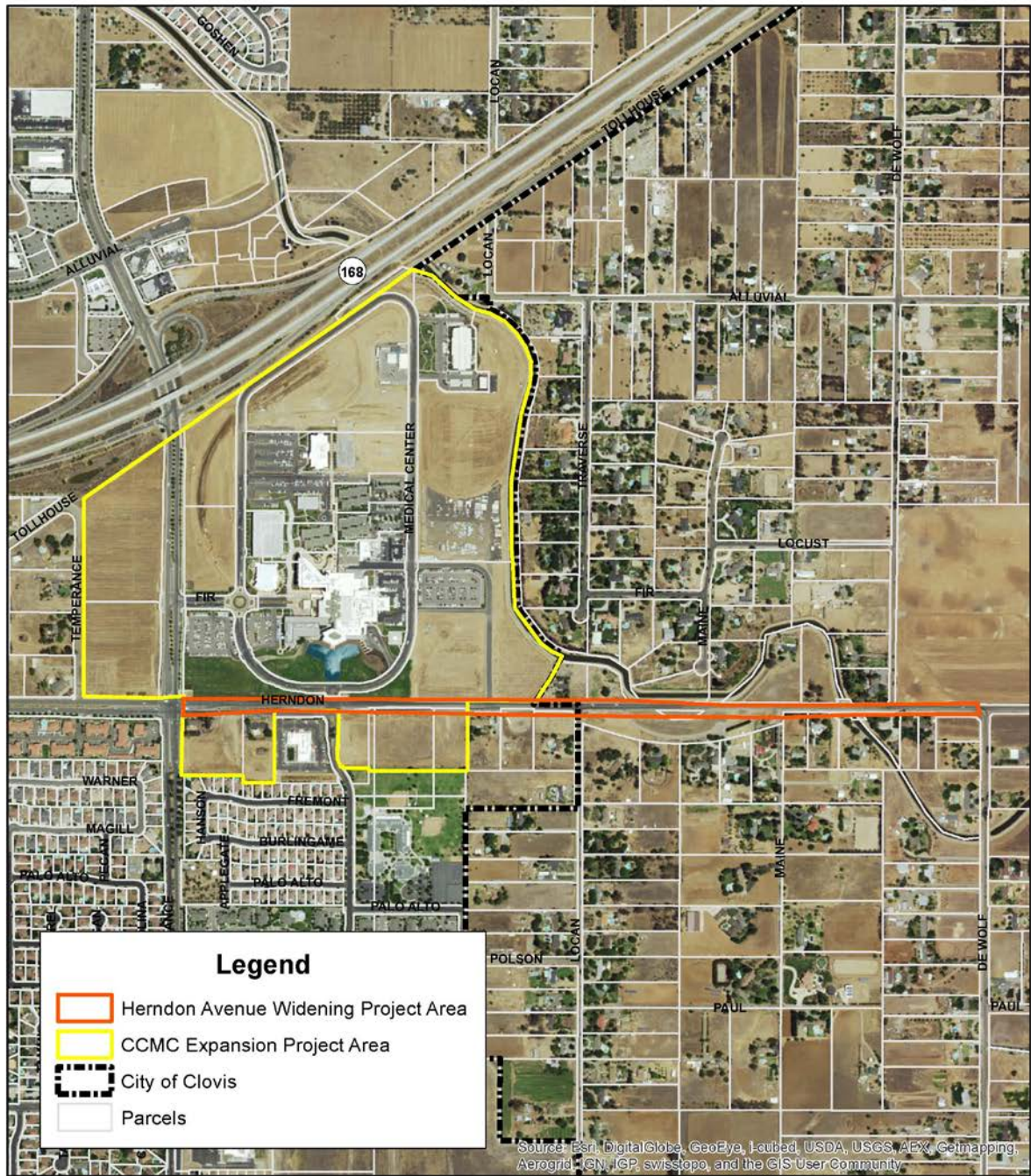
ODELL Planning & Research, Inc.

**Figure 1**





**Figure 13.2**  
**Aerial View of Project Site and Nearby Land**



Source: County of Fresno, City of Clovis, ESRI

## Project Area

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis

ODELL Planning & Research, Inc.

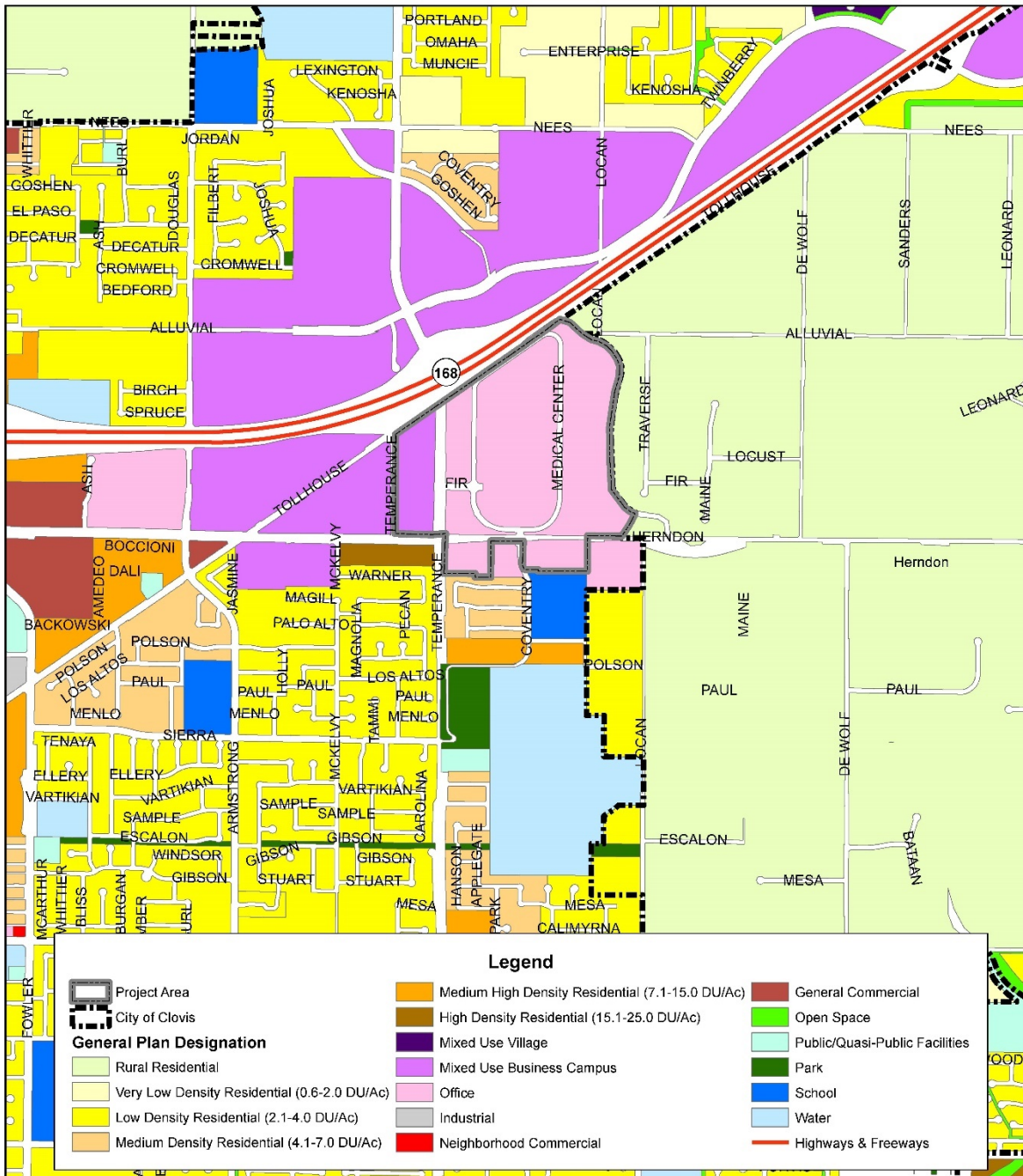
**Figure 2**



0 500 1,000 2,000 Feet



**Figure 13.3**  
**Clovis General Plan Land Use Designations**



Source: County of Fresno, City of Clovis, ESRI

### Clovis General Plan Land Use Designations

**Figure 13.1**

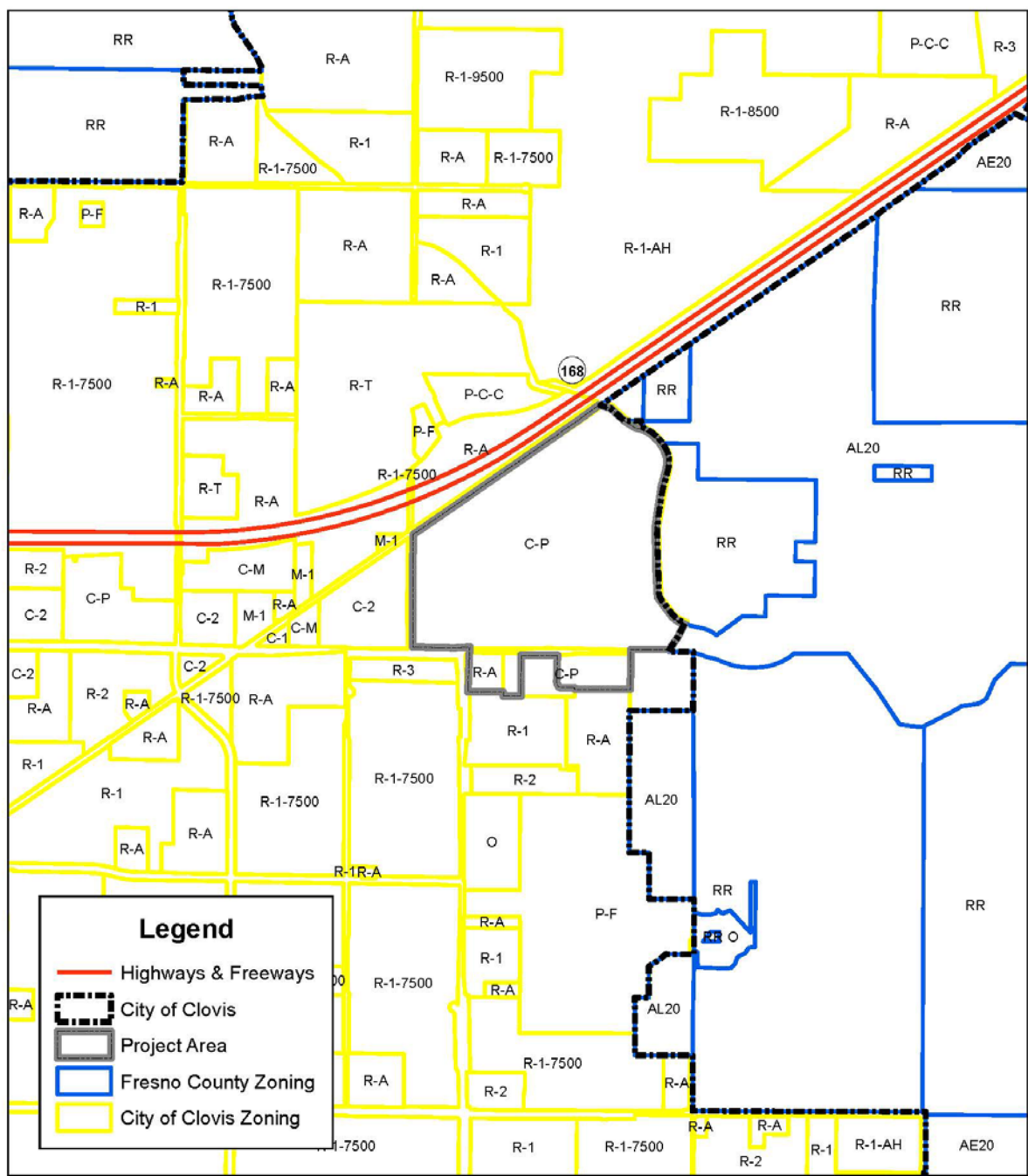
Clovis Community Medical Center Expansion Project  
City of Clovis

**ODELL Planning & Research, Inc.**





### Figure 13.4 Zoning Designations



Source: County of Fresno, City of Clovis, ESRI

## Zoning Designations - City of Clovis and Fresno County

**Figure 13.2**

Clovis Community Medical Center Expansion Project  
City of Clovis

ODELL Planning  Research, Inc.

0 875 1,750 3,500 Feet

## REGULATORY AND POLICY SETTING

### General

The development of properties located within the City of Clovis' incorporated boundaries is subject to the City's land use plans, policies, ordinances and standards. These processes and requirements may also apply to the proposed development of properties located outside of the City's incorporated boundaries but within its adopted Sphere of Influence (SOI). Jurisdiction over proposed development within the City's SOI is guided by provisions of California State Statutes referred to as the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000. Under the provisions of this law, the Fresno County Local Agency Formation Commission (LAFCO) is responsible for adopting an appropriate SOI and establishing standards of annexation. Application of these laws and standards determines the jurisdiction under which a property is developed and how important public services are to be provided.

The area encompassed by the CCMC expansion and Herndon Avenue widening project is almost entirely within the City of Clovis' Sphere of Influence and, therefore, the City has jurisdiction over planning for the area. An approximately 600-foot section of Herndon Avenue between the northern leg of De Wolf Avenue and the southern leg of De Wolf Avenue is not currently within the Clovis city limits or Clovis' Sphere of Influence but rather is unincorporated land in the County of Fresno. Subject to approval by the County, the City can widen Herndon Avenue in this unincorporated area because it is mostly within the City's Sphere of Influence. The City does not propose to annex any land as part of the project.

### City of Clovis General Plan

Future development of all land in the City of Clovis is guided by the *City of Clovis General Plan* (hereinafter referred to as the Clovis General Plan). The Clovis City Council adopted the Clovis General Plan on August 25, 2014. The Clovis General Plan expresses the community's development goals and embodies public policy relative to the distribution of future land uses, both public and private. The Clovis General Plan consists of a series of state-mandated and optional elements. Elements within the Clovis General Plan include Land Use, Economic Development, Circulation, Housing, Public Facilities and Services, Environmental Safety, Open Space/Conservation, and Air Quality.

In the Land Use Element of the Clovis General Plan (see Figure 13.1), the CCMC expansion area is designated in the Clovis General Plan as Office and Mixed Use/Business Campus. The project site is a part of a large area planned as a Mixed Use/Business Campus, which extends to the north and west. Typical uses in areas designated Office are described as including "professional offices, corporate headquarters, research and development, medical facilities, hotels, and limited related retail uses." Typical uses in areas designated Mixed Use/Business Campus are described as including a "higher intensity mix of employment generating businesses drawing from land uses permitted in the Office and Industrial designations." Per the Land Use Element, commercial uses in Mixed Use/Business Campus areas are generally prohibited except as uses clearly ancillary to the employment-generating office and industrial uses.

The Circulation Element of the Clovis General Plan designates the section of Herndon Avenue within the project area an arterial roadway.

### Specific Plans and Other Policies

#### *Herndon-Shepherd Specific Plan*

The Herndon-Shepherd Specific Plan (HSSP), adopted by the Clovis City Council on June 27, 1988, provides additional land use guidance for the project site. As defined in the California Government

Code (Section 65450), the purpose of a specific plan is to provide for the “systematic implementation of the general plan for all or part of the area covered by the general plan.” The HSSP area contains approximately 5,800 acres and is bounded by Herndon Avenue on the south, Shepherd Avenue on the north, Willow Avenue on the west, and De Wolf Avenue on the east.

Per the 2014 City of Clovis General Plan, land use designations for areas within the HSSP are to be dictated by the General Plan while the policies in the HSSP shall remain in effect, and any conflict between the specific plan and General Plan is to be resolved by the City of Clovis’ Director of Planning and Development Services. While the land use designations in the HSSP are superseded by the most recent update of the City of Clovis General Plan, the project area is subject to policies of the HSSP. However, the policies and development pattern planned in the HSSP are generally consistent with the Clovis General Plan.

### *Focus Areas*

The Clovis General Plan identifies certain areas throughout the Planning Area as Focus Areas. Per the Land Use Element, a Focus Area assignment complements a property’s General Plan land use designation and may expand permissible uses, introduce new policy requirements, augment development standards, or simply call attention to a complex property. There are 14 Focus Areas identified in Table LU-4 of the Clovis General Plan.

### *City of Clovis Active Transportation Plan*

The City of Clovis adopted its Active Transportation Plan on October 17, 2016. The vision of the Active Transportation Plan is to promote “a connected and complete network of trails, walkways, and bikeways that provides safe, convenient, and enjoyable connections to key destinations and neighborhoods around the city along major collectors and arterials with minimal gaps and interruptions.” The Active Transportation Plan complements the City of Clovis General Plan, which makes many references to bicycle and pedestrian travel.

### **City of Clovis Zoning Ordinance**

According to the City of Clovis Zoning Map (see Figure 13.2), all but one of the parcels encompassed in the project area are zoned C-P (Administrative and Professional Office). The C-P District is applied to areas appropriate for integrated, professional office uses including administrative, corporate, financial, government, institutional, legal, and medical. The C-P District is consistent with the Office land use designation of the General Plan.

One parcel included in the project, located at the southeast corner of Herndon and Temperance, is zoned R-A (Single Family Residential). The R-A District, while being primarily intended for residential uses, allows certain non-residential uses subject to the approval of a CUP, including “Medical Services – Hospitals” and “Senior Congregate Care”. As defined in the zoning ordinance, those uses are generally consistent with the type of development and facilities proposed within the hospital expansion area. It is noted that if the parcel was sought to be used in a way that is not permitted in the R-A District, it would be possible to rezone this parcel to C-P zoning since it is adjacent to other parcels zoned C-P and the C-P District is consistent with the underlying land use designation of the subject parcel (Office) in the Clovis General Plan.

### **Fresno County General Plan**

An approximately 600-foot section of Herndon Avenue included in the project is located within an unincorporated area of Fresno County beyond Clovis’ Sphere of Influence. The Transportation and Circulation Element of the Fresno County General Plan designates this section of Herndon Avenue as an arterial roadway, which according to the Transportation and Circulation Element are meant to

emphasize high mobility for through-traffic but also still allow for improvements such as bike lanes and sidewalks. The Herndon Avenue widening is consistent with this designation as it conforms to the policies related to arterial roadways.

## **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. The thresholds of significance used for this EIR to determine the significance of environmental effects related to land use, public land use policy, and zoning are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form and the California Code of Regulations:

Would the project:

- (1) Physically divide an established community?
- (2) Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?
- (3) Conflict with any applicable habitat conservation plan or natural community conservation plan?

## **LESS THAN SIGNIFICANT IMPACTS**

### **LU-1: Compatibility with Land Use and Zoning Designations and Other Planning Policies**

#### *General Plan*

As discussed in the Project Description (Chapter 2 of this EIR), the CCMC expansion plan entails construction of new medical facilities and office buildings, and the proposal also includes potential development of areas adjacent to the main campus with retail commercial buildings, a hotel, and an assisted living center. The proposed uses are generally consistent with the uses allowed under the Office and Mixed Use/Business Campus designations. However, the proposed commercial uses would be required to be developed in a way that are ancillary to the primary CCMC hospital and office uses in order to be consistent with the Mixed Use/Business Campus designation; otherwise, a general plan amendment would be required to change the land use designation to one that is more permissive of commercial uses. This determination will be made by the City of Clovis Department of Planning and Development at the time of development. Additionally, the General Plan consistency of the project depends in part on the zoning of the project area, which is discussed in more detail below.

Regarding the widening of Herndon Avenue, the Circulation Element of the Clovis General Plan designates the section of Herndon Avenue within the project area an arterial roadway. The Herndon Avenue widening is consistent with this designation as it conforms to the policies related to arterial roadways. Additionally, the project will maintain and/or add bike lanes and sidewalks within the widening area, consistent with the provisions of the Circulation Element promoting active multimodal transportation. The land use designation for the widening area east of the CCMC expansion area to the southern leg of De Wolf Avenue is Rural Residential, and there are no provisions of the Rural Residential designation that conflict with the proposed road widening.

### *Herndon-Shepherd Specific Plan and Focus Areas*

As discussed above, the policies and development pattern planned in the HSSP are generally consistent with the Clovis General Plan. Additionally, while CCMC had not yet been constructed when the HSSP was adopted, the HSSP specifically contemplated development of the hospital campus and calls for “office professional, commercial and rental multiple family-uses compatible with the hospital and contributory to its success.” The proposed CCMC expansion and road widening are thus consistent with the HSSP.

The project site is located within Focus Area 5, which allows Medium High Density Residential as an additional possible type of use on land designated Business Park Commercial Office if certain requirements are met (i.e. the residential use is limited to 25 percent of the focus area acreage, and a Master plan is required). There is no residential development included with the subject proposal, though, so the provisions of Focus Area 5 are not applicable.

### *Active Transportation Plan*

The subject proposal is consistent with the Active Transportation Plan as it will maintain and/or add bike lanes and sidewalks within the project area that matches where bike lanes and sidewalks have been proposed to be added in the Active Transportation Plan.

### *Zoning Ordinance*

Regarding the proposed commercial retail space included in the project, the C-P Zone District allows a limited number of commercial uses – including restaurants, hotels, bars, coffee shops, banks, beauty shops and bakeries – some of which require approval of a CUP or administrative use permit. While the exact commercial uses have not yet been determined, as a general matter the inclusion of space for commercial uses in the project would not conflict with C-P zoning.

One parcel included in the project, located at the southeast corner of Herndon and Temperance, is zoned R-A (Single Family Residential). The R-A District, while being primarily intended for residential uses, allows certain non-residential uses subject to the approval of a CUP, including “Medical Services – Hospitals” and “Senior Congregate Care”. As defined in the zoning ordinance, those uses are generally consistent with the type of development and facilities proposed within the hospital expansion area. It is noted that if the parcel was sought to be used in a way that is not permitted in the R-A District, it would be possible to rezone this parcel to C-P zoning since it is adjacent to other parcels zoned C-P and the C-P District is consistent with the underlying land use designation of the subject parcel (Office) in the Clovis General Plan.

## **NO IMPACT**

The CCMC expansion and road widening are situated in such a manner that the locational, design, and operational characteristics would not cause a physical division of an existing community. The project is consistent with the existing development pattern and the planned development of the area. Moreover, the project will not displace any existing housing or people and necessitate the construction of replacement housing elsewhere.

The research conducted for this EIR has not identified any habitat conservation plan or natural community conservation plans that would apply to the project, thus the project would not conflict with any such plans.

## **SOURCES CONSULTED**

Clovis, City of. *City of Clovis General Plan*. August 25, 2014

Clovis, City of. *City of Clovis Municipal Code, Title 9 – Development Code*. October 3, 2016

Clovis, City of. *Herndon-Shepherd Specific Plan*. June 27, 1988

Fresno, County of. *Fresno County General Plan*. October 3, 2000

Fresno, County of. 2017 Fresno County Assessor's Maps. Book 564, Page 04; Book 553, Pages 02-03; Book 565, Page 04. Retrieved May 29, 2017.

# CHAPTER 14

## Mineral Resources

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### INTRODUCTION

This chapter identifies and evaluates the potential environmental effects of the project related to mineral resources. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to mineral resources; (2) the thresholds of significance used to determine the significance of any environmental effects; (3) the direct and indirect effects of the project on mineral resources; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### ENVIRONMENTAL SETTING

Fresno County contains abundant aggregate and petroleum resources which are vital to the physical and economic development of the County. These resources include aggregate products (sand and gravel), fossil fuels (oil and coal), metals (chromite, copper, gold, mercury, and tungsten), and other minerals used in construction or industrial applications (asbestos, high-grade clay, diatomite, granite, gypsum, and limestone). Aggregate products and extraction operations are located primarily along the San Joaquin and Kings Rivers. Oil fields are located west of State Route 99 within both the valley and coastal foothill regions. Coal extraction operations are located in the extreme western end of the County in the coastal foothills. Metal extraction locations are within both the Sierra Nevada mountains/foothills and coastal foothills regions (Fresno County General Plan Background Report 2000).

The only regionally significant mineral resource areas located near the City of Clovis are aggregate materials along the San Joaquin River corridor. Other mineable aggregate materials are located along the Kings River corridor located southeast the City of Clovis. No mineral resource areas are located within or in close proximity to the project site.

### REGULATORY AND POLICY SETTING

#### State Regulations

##### *Surface Mining and Reclamation Act*

The regulatory setting regarding mineral resources consists of the California Geological Survey Mineral Resources Project, as authorized under the Surface Mining and Reclamation Act of 1975 (SMARA; California Public Resources Code Sections 2710 et seq.). The Mineral Resources Project requires the State Geologist to classify land according to the presence or absence of significant mineral deposits and categorized into a system of Mineral Resource Zone (MRZ) classifications including one of the four mineral resource zones, a scientific resource zone, or an identified resource area (City of Clovis 2014). The classifications are as follows:

- MRZ-1: Adequate information indicates that no significant mineral deposits are present or likely to be present
- MRZ-2: Adequate information indicates that significant mineral deposits are present, or a likelihood of their presence, and development should be controlled.
- MRZ-3: The significance of mineral deposits cannot be determined from the available data.

- MRZ-4: There is insufficient data to assign any other MRZ designation.
- SZ Areas: Contains unique or rare occurrences of rocks, minerals, or fossils that are of outstanding scientific significance.
- IRA Areas: Areas identified by the County or State Division of Mines and Geology, where adequate production and information indicates that significant minerals are present.

According to the 2014 City of Clovis General Plan EIR, the entire Plan Area is mapped as MRZ-3 by the California Geological Survey, which means the significance of mineral deposits cannot be determined from available data (see Figure 5.11-1, Mineral Resource Zones).

### **Local Regulations**

#### *Clovis General Plan and Development Code Update*

There are no relevant Clovis General Plan and Development Code Update policies related to mineral resources.

#### *Fresno County General Plan*

The Fresno County General Plan Background Report indicates that there are no mineral resources or mineral resources recovery sites within or near the project site.

### **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.” The thresholds of significance used for this EIR to determine the significance of environmental effects related to mineral resources are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section XI, a and b:

Would the project:

- (a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?
- (b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

### **NO IMPACT**

Based on the information provided in this chapter, the project would not result in the direct loss of availability of a known mineral resource that would be of value to the region and the residents of the state. The project site not located within a locally-important mineral resource recovery site as delineated in the City of Clovis General Plan or the Fresno County General Plan.

Additionally, the 2014 City of Clovis General Plan EIR (which encompasses the entire project area) concluded that the cumulative impact of the implementation of the General Plan would not contribute to a cumulative loss of availability of state or locally designated mineral resources. The basis for this conclusion was that the sphere of influence does not contain known or designated mineral resources. Therefore, implementation of the proposed project would not result in a discernable cumulative impact.



**SOURCES CONSULTED**

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. June 2014.

Clovis, City of. *2014 City of Clovis General Plan*. August 2014.

Fresno, County of. *Fresno County General Plan Public Review Draft Policy Document*. January 2000.

Fresno, County of. *Fresno County General Plan Update, Public Review Draft Background Report*. January 2000.

# CHAPTER 15

## Noise

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### INTRODUCTION

This chapter identifies and evaluates the potential environmental effects of the project related to noise. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to noise; (2) the thresholds of significance used to determine the significance of any environmental effects; (3) the direct and indirect effects of the project related to noise; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

The analysis in this chapter is based upon a Noise Impact Assessment prepared for this EIR by Ambient Air Quality & Noise Consulting. (*Noise Impact Assessment for the Master Plan Expansion of the Clovis Community Medical Center Project, Clovis, California – July 2017*). The report is included in the Draft EIR as Appendix 15.

### ENVIRONMENTAL SETTING

#### Concepts and Terminology

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency.

##### *Amplitude*

Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

##### *Frequency*

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as “A-weighted decibels” (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA (US EPA 1971). Common community noise sources and associated noise levels, in dBA, are depicted in Figure 1 of Draft EIR Appendix 15.

##### *Addition of Decibels*

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting

sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

### *Geometric Spreading*

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level decreases (attenuates) at a rate of approximately 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 decibels for each doubling of distance from a line source, depending on ground surface characteristics. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water,), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation for soft surfaces results in an overall attenuation rate of 4.5 decibels per doubling of distance from the source.

### *Atmospheric Effects*

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

### *Shielding by Natural or Human-Made Features*

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in minimum 5 dB of noise reduction. Taller barriers provide increased noise reduction.

Noise reductions afforded by building construction can vary depending on construction materials and techniques. Standard construction practices typically provide approximately 15 dBA exterior-to-interior noise reductions for building facades, with windows open, and approximately 20-30 dBA, with windows closed. With compliance with current Title 24 energy efficiency standards, which require increased building insulation and inclusion of an interior air ventilation system to allow windows on noise-impacted façades to remain closed, exterior-to-interior noise reductions typically average approximately 25 dBA. The absorptive characteristics of interior rooms, such as carpeted floors, draperies and furniture, can result in further reductions in interior noise.

### *Noise Descriptors*

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the

intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the sound-pressure level in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the “A-weighted” sound level (expressed in units of dBA). The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are typically used. For the evaluation of environmental noise, the most commonly used descriptors are  $L_{eq}$ ,  $L_{dn}$ , CNEL and SEL. The energy-equivalent noise level,  $L_{eq}$ , is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level,  $L_{dn}$ , is the 24-hour average of the noise intensity, with a 10-dBA “penalty” added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to  $L_{dn}$  but adds an additional 5-dBA penalty for evening noise (7 p.m. to 10 p.m.) Another descriptor that is commonly discussed is the single-event noise exposure level, also referred to as the sound-exposure level, expressed as SEL. The SEL describes a receiver’s cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 second), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle. Common noise level descriptors are summarized in Table 15.1.

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**Table 15.1**  
**Common Acoustical Descriptors**

| <b>Descriptor</b>                                | <b>Definition</b>  |
|--|--|
| Energy Equivalent Noise Level ( $L_{eq}$ )       | The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.   |
| Minimum Noise Level ( $L_{min}$ )                | The minimum instantaneous noise level during a specific period of time.  |
| Maximum Noise Level ( $L_{max}$ )                | The maximum instantaneous noise level during a specific period of time.  |
| Day-Night Average Noise Level (DNL or $L_{dn}$ ) | The DNL was first recommended by the US EPA in 1974 as a “simple, uniform and appropriate way” of measuring long term environmental noise. DNL takes into account both the frequency of occurrence and duration of all noise events during a 24-hour period with a 10 dBA “penalty” for noise events that occur between the more noise-sensitive hours of 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is “added” to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours. |
| Community Noise Equivalent Level (CNEL)          | The CNEL is similar to the $L_{dn}$ described above, but with an additional 5 dBA “penalty” added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated $L_{dn}$ .   |
| Single Event Level (SEL)                         | The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.   |

### *Human Response to Noise*

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person’s subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called “ambient” environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans;
- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial;
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

A limitation of using a single noise-level increase value to evaluate noise impacts as discussed above is that it fails to account for pre-project noise conditions. With this in mind, the Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of project-generated increases in noise levels that take into account the ambient noise level. The FICON recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (i.e., CNEL,  $L_{dn}$ ). FICON-recommended noise evaluation criteria are summarized in Table 15.2.

**Table 15.2**  
**Federal Interagency Committee on Noise**  
**Recommended Criteria for Evaluation of Increases in Ambient Noise Levels**

| Ambient Noise Level Without Project | Increase Required for Significant Impact |
|-------------------------------------|--|
| < 60 dB                             | 5.0 dB, or greater                       |
| 60-65 dB                            | 3.0 dB, or greater                       |
| > 65 dB                             | 1.5 dB, or greater                       |
| <i>Source: FICON 2000</i>           |  |

As depicted in Table 15.2, an increase in the traffic noise level of 5.0, or greater, would typically be considered to result in increased levels of annoyance where existing ambient noise levels are less than 60 dB. Within areas where the ambient noise level ranges from 60 to 65 dB, increased levels of annoyance would be anticipated at increases of 3 dB, or greater. Increases of 1.5 dB, or greater, could result in increased levels of annoyance in areas where the ambient noise level exceeds 65 dB. The rationale for the FICON-recommended criteria is that as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause significant increases in annoyance (FICON 2000).

#### *Effects of Noise on Human Activities*

The extent to which environmental noise is deemed to result in increased levels of annoyance, activity interference, and sleep disruption varies greatly from individual to individual depending on various factors, including the loudness or suddenness of the noise, the information value of the noise (e.g., aircraft overflights, child crying, fire alarm), and an individual's sleep state and sleep habits. Over time, adaptation to noise events and increased levels of noise may also occur. The Noise Impact Assessment specifically addresses the effects of noise on speech communication, learning, annoyance, and sleep disruption as follows:

**Speech Communication:** For most noise-sensitive land uses, an interior noise level of 45 dB  $L_{eq}$  is typically identified for the protection of speech communication in order to provide for

100-percent intelligibility of speech sounds. Assuming a minimum 20-dB reduction in sound level between outdoors and indoors, with windows closed, this interior noise level of 45 dBA  $L_{eq}$  would equate to an exterior noise level of 65 dBA  $L_{eq}$ . For outdoor voice communication, an exterior noise level of 60 dBA  $L_{eq}$  allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility (US EPA 1974.) Based on this information, speech interference begins to become a problem when steady noise levels reach approximately 60 to 65 dBA. Within interior noise environments, an average-hourly background noise level of 45 dBA  $L_{eq}$  is typically recommended for noise-sensitive land uses, such as educational facilities (Caltrans 2002[a].)

**Learning:** Closely related to speech interference are the effects of noise on learning and, more broadly, on cognitive tasks. Recent studies have shown a strong relationship between noise and children's reading ability. Children's attention spans also appear to be adversely affected by noise. Adults are affected as well. Some studies indicate that, in a noisy environment, adults have increased difficulty accomplishing complex tasks. One of the issues associated with assessment of these effects is which noise metric correlates most closely with the impacts. For example, the average-daily noise level (i.e., CNEL/ $L_{dn}$ ), which incorporates a nighttime weighting, may not be the best measure of noise impacts on schools given that operational activities are often limited to the daytime hours (Caltrans 2002(a).)

Various standards and recommended criteria have been developed to specifically address classroom noise. For instance, with regard to transportation sources, the California Department of Transportation has adopted abatement criteria that limit the maximum interior average-hourly noise level within classrooms, as well as other noise-sensitive interior uses, to 52 dBA  $L_{eq}$  (Caltrans 2006.) In June 2002, the American National Standards Institute, Inc. (ANSI) released a new classroom acoustics standard entitled "Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools" (ANSI S12.60-2002). For schools exposed to intermittent background noise sources, such as airport and other transportation noise, the ANSI standards recommend that interior noise levels not exceed 40 dBA  $L_{eq}$  during the noisiest hour of the day. At present complying with the ANSI-recommended standard is voluntary in most locations.

**Annoyance and Sleep Disruption:** With regard to potential increases in annoyance, activity interference, and sleep disruption, land use compatibility determinations are typically based on the use of the cumulative noise exposure metrics (i.e., CNEL or  $L_{dn}$ ). Perhaps the most comprehensive and widely accepted evaluation of the relationship between noise exposure and the extent of annoyance was one originally developed by Theodore J. Schultz in 1978. In 1978 the research findings of Theodore J. Schultz provided support for  $L_{dn}$  as the descriptor for environmental noise. Research conducted by Schultz identified a correlation between the cumulative noise exposure metric and individuals who were highly annoyed by transportation noise. The Schultz curve, expressing this correlation, became a basis for noise standards. When expressed graphically, this relationship is typically referred to as the Schultz curve. The Schultz curve indicates that approximately 13 percent of the population is highly annoyed at a noise level of 65 dBA  $L_{dn}$ . It also indicates that the percent of people describing themselves as being highly annoyed accelerates smoothly between 55 and 70 dBA  $L_{dn}$ . A noise level of 65 dBA  $L_{dn}$  is a commonly referenced dividing point between lower and higher rates of people describing themselves as being highly annoyed (Caltrans 2002[a].)

The Schultz curve and associated research became the basis for many of the noise criteria subsequently established for federal, state, and local entities. Most federal and state of California regulations and policies related to transportation noise sources establish a noise level

of 65 dBA CNEL/L<sub>dn</sub> as the basic limit of acceptable noise exposure for residential and other noise-sensitive land uses. For instance, with respect to aircraft noise, both the Federal Aviation Administration (FAA) and the State of California have identified a noise level of 65 dBA L<sub>dn</sub> as the dividing point between normally compatible and normally incompatible residential land use generally applied for determination of land use compatibility. For noise-sensitive land uses exposed to aircraft noise, noise levels in excess of 65 dBA CNEL/L<sub>dn</sub> are typically considered to result in a potentially significant increase in levels of annoyance (Caltrans 2002[a].)

Allowing for an average exterior-to-interior noise reduction of 20 dB, an exterior noise level of 65 dBA CNEL/L<sub>dn</sub> would equate to an interior noise level of 45 dBA CNEL/L<sub>dn</sub>. An interior noise level of 45 dB CNEL/L<sub>dn</sub> is generally considered sufficient to protect against activity interference at most noise-sensitive land uses, including residential dwellings, and would also be sufficient to protect against sleep interference (US EPA, 1974.) Within California, the California Building Code establishes a noise level of 45 dBA CNEL as the maximum acceptable interior noise level for residential uses (other than detached single-family dwellings). Use of the 45 dBA CNEL threshold is further supported by recommendations provided in the State of California Office of Planning and Research's *General Plan Guidelines*, which recommend an interior noise level of 45 dB CNEL/L<sub>dn</sub> as the maximum allowable interior noise level sufficient to permit "normal residential activity" (OPR 2003.)

The cumulative noise exposure metric is currently the only noise metric for which there is a substantial body of research data and regulatory guidance defining the relationship between noise exposure, people's reactions, and land use compatibility. However, when evaluating environmental noise impacts involving intermittent noise events, such as aircraft overflights and train passbys, the use of cumulative noise metrics may not provide a thorough understanding of the resultant impact. The general public often finds it difficult to understand the relationship between intermittent noise events and cumulative noise exposure metrics. In such instances, supplemental use of other noise metrics, such as the L<sub>eq</sub> or L<sub>max</sub> descriptor, may be helpful as a means of increasing public understanding regarding the relationship between these metrics and the extent of the resultant noise impact (Caltrans 2002[a].)

## **Project Location and Setting**

### *Sensitive Land Uses*

Noise-sensitive land uses generally include those uses where exposure to noise would result in adverse effects, as well as uses where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other noise-sensitive land uses include hospitals, convalescent facilities, parks, hotels, churches, libraries, and other uses where low interior noise levels are essential.

Noise-sensitive land uses located near the project site consist predominantly of residential land uses. The nearest existing residential uses are located approximately 650 feet east of the Clovis Community Medical Center (CCMC) and to the south, across Herndon Avenue. The Cedarwood Elementary School is located along Coventry Avenue, approximately 700 feet south of Herndon Avenue.

### *Ambient Noise Levels*

To document the existing noise environment, ambient noise surveys were conducted at various locations in the project area. Short-term (10-minute) noise measurements were conducted on May 16, 2017 using a Larson Davis model 820 sound-level meter placed at a height of approximately 5 feet above the ground surface. Based on the measurements conducted, ambient noise levels are



predominantly influenced by vehicle traffic on area roadways. Measured average daytime noise levels (in dBA Leq) in the project area generally range from the mid to upper 60s, dependent primarily on distance from area roadways. Average nighttime noise levels are generally approximately 5 to 10 dBA less than daytime noise levels. Intermittent noise levels in the project area associated with vehicle traffic on area roadways and can reach levels of approximately 80 dBA Lmax along area roadway corridors. To a lesser extent, occasional aircraft overflights also contribute on an intermittent basis to the ambient noise environment. Measurement survey results are summarized in Table 15.3.

The dominant noise source in the project area is vehicular traffic on area roadways. Table 15.3 summarizes the existing traffic noise levels (in dBA Ldn/CNEL) for existing roadways located in the project area. Existing roadway traffic noise levels were calculated using the Federal Highway Administration (FHWA) roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. As depicted in Table 15.4, predicted noise levels (in dBA CNEL/Ldn) at approximately 50 feet from area roadways range from the mid to upper 60's.

**Table 15.3**  
**Project Area Ambient Daytime Noise Levels**

| Monitoring Location  | Monitoring Period | Measured Noise Level (dBA) |      |      |
|--|-------------------|----------------------------|------|------|
|  |                   | Leq                        | Lmax | Lmin |
| N. Temperance Avenue, North of Herndon Avenue, Approximately 62 feet from the roadway centerline   | 07:20-07:30       | 66.3                       | 74.6 | 54.2 |
| Herndon Avenue west of N. Temperance Avenue, Approximately 57 feet from the roadway centerline   | 07:50-08:00       | 67.4                       | 76.1 | 55.6 |
| Herndon Avenue at Locan Avenue, Approximately 30 feet from the roadway centerline  | 08:15-08:25       | 72.1                       | 78.8 | 56.4 |
| <i>Noise measurements were conducted on May 16, 2017 using a Larson Davis Laboratories Model 820 Type I integrating sound meter positioned at a height of approximately 5 feet above ground surface.</i> |                   |                            |      |      |

*(This space intentionally left blank).*

**Table 15.4**  
**Project Area Existing Traffic Noise Levels**

| Roadway Segment  | Predicted Noise Level (dBA<br>CNEL/Ldn)      |
|--|--|
|  | 50 ft from Centerline<br>of Near Travel Lane |
| Herndon Avenue, Armstrong Avenue to Tollhouse Road   | 67.8   |
| Herndon Avenue, Tollhouse Road to Temperance Avenue  | 68.0   |
| Herndon Avenue, Temperance Avenue to Coventry Avenue   | 67.9   |
| Herndon Avenue, Coventry Avenue to CCMC Access Road  | 67.3   |
| Herndon Avenue, CCMC Access Road to Locan Avenue   | 67.3   |
| Herndon Avenue, Locan Avenue to De Wolf Avenue   | 68.2   |
| Herndon Avenue, De Wolf Avenue (DL) to De Wolf Avenue (SL)   | 67.5   |
| Herndon Avenue, De Wolf Avenue (SL) to Leonard Avenue  | 67.9   |
| Locan Avenue, Herndon Avenue to Bullard Avenue   | 61.8   |
| Traffic noise levels were predicted using the FHWA roadway noise prediction model based on traffic information obtained from the traffic analysis prepared for this project. Modeled traffic noise levels assume no natural or man-made shielding (e.g., vegetation, berms, walls, buildings). |  |

### *Groundborne Vibration*

No major existing sources of groundborne vibration were identified in the project area. Vehicle traffic on area roadways, particularly heavy-duty trucks, can result in increased groundborne vibration. However, groundborne vibration levels associated with vehicle traffic is typically considered minor and would not exceed applicable criteria at the project site boundaries.

## **REGULATORY AND POLICY SETTING**

### **State Regulations**

#### *California Public Utilities Code*

Section 21669, Article 3, Chapter 4, Part 1, Division 9 of the California Public Utilities Code (PUC) (Aeronautics Law) provides the legislative authority to adopt noise standards governing the operation of aircraft and aircraft engines for airports. Caltrans Division of Aeronautics is the agency responsible for compliance with this PUC section. Section 21662.4 (a), Article 3, Chapter 4, Part 1, Division 9 of the PUC exempts emergency service helicopters from local ordinances.

#### *California General Plan Guidelines*

The State of California General Plan Guidelines, published by the Governor's Office of Planning and Research (OPR 2003), also provides guidance for the acceptability of projects within specific CNEL/L<sub>dn</sub> contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

### **Local Regulations**

#### *Clovis General Plan*

The Environmental Safety Element of the City of Clovis General Plan contains policies designed to protect the community from the harmful and annoying effects of exposure to excessive noise. The City's General Plan identifies maximum allowable noise standards for noise sources, as well as land use compatibility noise standards for newly proposed land uses. The City's Interior and Exterior Noise Standards are summarized in Table 15.5, and the City's Land Use and Noise Compatibility Matrix is included as Table 15.6.

As depicted in Table 15.5, the City's maximum acceptable exterior and interior noise standards for residential and school land uses is 65 and 45 dBA CNEL respectively. For newly proposed land uses, hospitals are considered "normally compatible" within noise environments up to 65 dBA CNEL, offices are considered normally compatible up to 75 dBA CNEL, and residential land uses and hotels are considered normally compatible up to 70 dBA CNEL.

**Table 15.5**  
**City of Clovis Interior and Exterior Noise Standards**

| Land Use Categories   | Additional Uses Allowed                                      | Noise Level (dBA, CNEL)          |                       |
|-----------------------|--|----------------------------------|-----------------------|
|                       |  | Interior <sup>1</sup>            | Exterior <sup>2</sup> |
| Residential           | Single Family, Multifamily                                   | 45 <sup>3</sup> /55 <sup>4</sup> | 65 <sup>7</sup>       |
|                       | Mobile Home  | --                               | 65 <sup>5</sup>       |
| Commercial/Industrial | Hotel, Motel, Transient Lodging                              | 45                               | 65 <sup>6</sup>       |
|                       | Commercial, Retail, Bank, Restaurant                         | 55                               | --                    |
|                       | Office Building, Professional Office, Research & Development | 50                               | --                    |
|                       | Gymnasium (Multipurpose)                                     | 50                               | --                    |
|                       | Health Clubs   | 55                               | --                    |
|                       | Manufacturing, Warehousing, Wholesale, Utilities             | 65                               | --                    |
| Institutional         | Hospital, School Classroom                                   | 45                               | 65                    |
|                       | Church, Library  | 45                               | --                    |
| Open Space            | Parks  | --                               | 65                    |

*Notes:*

1. Interior environment excludes bathrooms, toilets, closets, and corridors.
2. Outdoor environment limited to private yard of single family or multifamily residences private patio which is accessed by a means of exit from inside the unit; mobile home park; hospital patio; park picnic area; school playground; and hotel and motel recreation area.
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided pursuant to Appendix Chapter 12, Section 1208 of UBC.
4. Noise level requirement with open windows, if they are used to meet natural ventilation requirement.
5. Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.
6. Exterior noise level shall be such that interior noise level will not exceed 45 CNEL.
7. Except those areas affected by aircraft noise.

**Table 15.6**  
**City of Clovis Land Use and Noise Combability Matrix**

| Land Uses  | Noise Level (dBA CNEL) |    |    |    |    |    |     |
|--|------------------------|----|----|----|----|----|-----|
|  | <50                    | 55 | 60 | 65 | 70 | 75 | 80> |
| Amphitheater, concert hall, auditorium, meeting hall   | B                      | B  | C  | C  | D  | D  | D   |
| Mobile home  | A                      | A  | B  | C  | C  | D  | D   |
| Hospital, library, school, faith/religious uses  | A                      | A  | B  | C  | C  | D  | D   |
| Hotel, motel, transient lodging  | A                      | A  | B  | B  | C  | C  | D   |
| Single family, multifamily, faith/religious uses   | A                      | A  | B  | B  | C  | D  | D   |
| Parks  | A                      | A  | A  | B  | C  | D  | D   |
| Office building, research & development, professional office, city office building, and hotel  | A                      | A  | A  | B  | B  | C  | D   |
| Amusement park, miniature golf, go-cart track, health club, equestrian center  | A                      | A  | A  | B  | B  | D  | D   |
| Golf courses, nature centers, cemeteries, wildlife reserves, wildlife habitat  | A                      | A  | A  | A  | B  | C  | C   |
| Commercial retail, bank, restaurant, movie theater   | A                      | A  | A  | A  | B  | B  | C   |
| Automobile service station, auto dealer, manufacturing, warehousing, wholesale, utilities  | A                      | A  | A  | A  | B  | B  | B   |
| Agriculture  | A                      | A  | A  | A  | A  | A  | A   |
| <p><i>Notes:</i><br/> <i>Compatibility zones indicate the degree to which the land uses listed are compatible with the noise levels (CNEL) shown in the table.</i><br/> <i>Zone A. Clearly Compatible. Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.</i><br/> <i>Zone B. Normally Compatible. New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.</i><br/> <i>Zone C. Normally Incompatible. New construction or development should normally be discouraged. If new construction or development does proceed, a detailed analysis or noise reduction requirements must be made and needed noise insulation features must be included in the design.</i><br/> <i>Zone D. Clearly Incompatible. New construction or development should generally not be undertaken.</i></p> |                        |    |    |    |    |    |     |

### *City of Clovis Municipal Code*

The City of Clovis Municipal Code includes restrictions related to noise-generating construction activities. Accordingly, construction activities that occur between the hours of 9:00 p.m. and 7:00 a.m. on weekdays (Monday through Saturday) or at any time on Sundays or holidays and result in sound that creates a noise disturbance at residential land uses would be deemed to be in violation of the Municipal Code. In addition, per the Municipal Code, stationary equipment (e.g., generators) shall not be located adjacent to any existing residences unless it is enclosed in a noise-attenuating structure, subject to the approval of the City Public Works Director.

### *Fresno County General Plan*

The Health and Safety Element of the Fresno County General Plan establishes noise standards for the purpose of protecting noise-sensitive uses from excessive noise either through noise-reducing project design features or by allowing noise sensitive land uses to only locate in areas with ambient noise

levels below specific thresholds. Applicable goals and policies related to the proposed project are summarized below:

*Policy HS-G.4:* So that noise mitigation may be considered in the design of new projects, the County shall require an acoustical analysis as part of the environmental review process where:

- a. Noise sensitive land uses are proposed in areas exposed to existing or projected noise levels that are “generally unacceptable” or higher according to the Chart HS-1: “Land Use Compatibility for Community Noise Environments;”
- b. Proposed projects are likely to produce noise levels exceeding the levels shown in the County’s Noise Control Ordinance at existing or planned noise sensitive uses.

*Policy HS-G.5:* Where noise mitigation measures are required to achieve acceptable levels according to land use compatibility or the Noise Control Ordinance, the County shall place emphasis of such measures upon site planning and project design. These measures may include, but are not limited to, building orientation, setbacks, earthen berms, and building construction practices. The County shall consider the use of noise barriers, such as soundwalls, as a means of achieving the noise standards after other design-related noise mitigation measures have been evaluated or integrated into the project.

*Policy HS-G.7:* Where existing noise-sensitive uses may be exposed to increased noise levels due to roadway improvement projects, the County shall apply the following criteria to determine the significance of the impact: a. Where existing noise levels are less than 60 dBLdn at outdoor activity areas of noise-sensitive uses, a 5 dBLdn increase in noise levels will be considered significant; b. Where existing noise levels are between 60 and 65 dBLdn at outdoor activity areas of noise-sensitive uses, a 3 dBLdn increase in noise levels will be considered significant; and c. Where existing noise levels are greater than 65 dBLdn at outdoor activity areas of noise-sensitive uses, a 1.5 dBLdn increase in noise levels will be considered significant.

*Policy HS-G.8:* The County shall evaluate the compatibility of proposed projects with existing and future noise levels through a comparison to Chart HS-1, “Land Use Compatibility for Community Noise Environments.”

Per Chart HS-1, “Land Use Compatibility for Community Noise Environments,” areas of residential land use exterior noise levels up to 65 dBA CNEL/L<sub>dn</sub> are considered “conditionally acceptable” provided noise reduction features have been incorporated sufficient to ensure that interior noise levels would be within acceptable levels. Noise levels from 65 to 75 dBA CNEL/L<sub>dn</sub> are categorized as “generally discouraged,” and noise levels above 75 dBA CNEL/L<sub>dn</sub> are categorized as “Land Use Discouraged.”

## **Other Regulations**

### *Groundborne Vibration*

There are no federal, state, or local regulatory standards for groundborne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance. Caltrans-recommended criteria for the evaluation of groundborne vibration levels, with regard to structural damage and human annoyance, are summarized in Table 15.7 and Table 15.8, respectively. The criteria differentiate between transient and continuous/frequent sources. Transient sources of groundborne vibration include intermittent events,

such as blasting; whereas, continuous and frequent events would include the operations of equipment, including construction equipment, and vehicle traffic on roadways (Caltrans 2013).

The groundborne vibration criteria recommended by Caltrans for evaluation of potential structural damage is based on building classifications, which take into account the age and condition of the building. For residential structures and newer buildings, Caltrans considers a minimum peak-particle velocity (ppv) threshold of 0.25 inches per second (in/sec) for transient sources and 0.04 in/sec for continuous/frequent sources to be sufficient to protect against building damage. Continuous groundborne vibration levels below approximately 0.02 in/sec ppv are unlikely to cause damage to any structure. In terms of human annoyance, continuous vibrations in excess of 0.04 in/sec ppv and transient sources in excess of 0.25 in/sec ppv are identified by Caltrans as the minimum perceptible level for ground vibration. Short periods of ground vibration in excess of 2.0 in/sec ppv can be expected to result in severe annoyance to people. Short periods of ground vibration in excess of 0.1 in/sec ppv (0.2 in/sec ppv within buildings) can be expected to result in increased levels of annoyance (Caltrans 2013).

**Table 15.7**  
**Damage Potential to Buildings at Various Groundborne Vibration Levels**

| Structure and Condition   | Vibration Level<br>(in/sec ppv) |  |
|---|---------------------------------|--|
|   | Transient Sources               | Continuous/Frequent Intermittent Sources |
| Extremely Fragile Historic Buildings, Ruins, Ancient Monuments  | 0.12                            | 0.08                                     |
| Fragile Buildings   | 0.2                             | 0.1                                      |
| Historic and Some Old Buildings   | 0.5                             | 0.25                                     |
| Older Residential Structures  | 0.5                             | 0.3                                      |
| New Residential Structures  | 1.0                             | 0.5                                      |
| Modern Industrial/Commercial Buildings  | 2.0                             | 0.5                                      |
| <i>Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.</i><br><i>Source: Caltrans 2013</i> |                                 |  |

**Table 15.8**  
**Annoyance Potential to People at Various Groundborne Vibration Levels**

| Human Response  | Vibration Level<br>(in/sec ppv) |  |
|---|---------------------------------|--|
|   | Transient Sources               | Continuous/Frequent Intermittent Sources |
| Barely Perceptible  | 0.04                            | 0.01                                     |
| Distinctly Perceptible  | 0.25                            | 0.04                                     |
| Strongly Perceptible  | 0.9                             | 0.10                                     |
| Severe  | 2.0                             | 0.4                                      |
| <i>Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.</i><br><i>Source: Caltrans 2013</i> |                                 |  |

## THRESHOLDS OF SIGNIFICANCE

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. The thresholds of significance used for this EIR to determine the significance of environmental effects related to noise are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section XII, a through f.:

Would the project result in:

- (a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
- (b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?
- (c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- (d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?
- (e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
- (f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

In addition to the thresholds for noise impacts identified in the CEQA Guidelines, the City of Clovis noise standards were used for evaluation of project-related noise impacts. Significance thresholds used in this analysis are discussed in greater detail, as follows:

*Short-term Exposure to Construction-Generated Noise:* No standardized criteria have been developed by the State of California or the City of Clovis for assessing construction noise impacts. However, the Federal Transit Administration (FTA) has identified criteria for the assessment of construction-generated noise levels. For noise-sensitive land uses, such as residential land uses, the FTA criteria identify daytime and nighttime average-hourly noise limits of 90 and 80 dBA  $L_{eq}^{(8)}$ , respectively. Project-generated average-hourly construction noise levels that would exceed these limits at nearby noise-sensitive land uses would be considered to have a potentially significant impact. In addition, construction-generated noise levels that would exceed a commonly applied interior noise standard of 45 dBA  $L_{eq}$  within nearby classrooms would be considered to have a potentially significant impact.

*Long-term Exposure to Project-Generated Noise:* Long-term operational noise impacts would be considered significant if the proposed project would result in a noticeable increase in ambient noise levels that would exceed applicable City of Clovis' noise standards (Table 3). Accordingly, predicted noise levels that would exceed the City's exterior and interior noise standards of 65 and 45 dBA CNEL, respectively, at nearby residential land uses and Cedarwood Elementary School would be considered to have a potentially significant impact.

*Groundborne Vibration:* Groundborne vibration levels would be considered significant if predicted short-term construction or long-term operational groundborne vibration levels attributable to the proposed project would exceed recommended criteria (Tables 5 and 6) at nearby existing or proposed onsite structures.

*Increases in Ambient Noise Levels:* For purposes of this analysis, significant increases in the ambient noise levels were based on FICON-recommended criterion (Table 2). Accordingly, significant increases in ambient noise levels would be defined as an increase of 5 dBA, or greater, where the ambient noise environment is less than 60 dBA; 3.0 dBA, or greater, where the ambient noise environment is between 60 and 65 dBA; and an increase of 1.5 dBA, or greater, where the ambient noise environment exceeds 65 dBA. The rationale for these criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause significant annoyance (FICON 2000).

## **Methodology**

### *Short-Term Construction Noise*

Short-term noise impacts associated with construction activities were analyzed based on typical construction equipment noise levels and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on an average noise-attenuation rate of 6 dB per doubling of distance from the source.

### *Long-term Traffic Noise*

Traffic noise levels were calculated using the Federal Highway Administration (FHWA) roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. Future cumulative traffic noise levels, with project implementation, were calculated to include the planned widening of Herndon Avenue. The project's contribution to traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic.

Noise levels associated with parking lots and the proposed parking structure were calculated in accordance with Federal Transit Administration's (FHWA) *Transit Noise and Vibration Impact Assessment Guidelines* (2006) assuming a reference noise level of 92 dBA SEL. Average-hourly noise levels associated with vehicle parking-related activities were calculated based on the capacity of the parking facility and traffic volumes derived from the traffic analysis prepared for this project.

### *Non-Transportation Noise*

Non-transportation noise source noise levels were calculated based on representative noise levels obtained from existing environmental documentation and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on an average noise-attenuation rate of 6 dB per doubling of distance from the source.

### *Groundborne Vibration*

Groundborne vibration levels were assessed based on representative equipment vibration levels derived from existing environmental documentation and distances to nearby existing structures. Construction-related vibration levels were evaluated in comparison to Caltrans-recommended criteria for structural damage and human annoyance.



## POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION MEASURES

### NO-1: Temporary or Periodic Increase in Ambient Noise Levels from Construction Activities

Project implementation will result in the generation of noise from activities associated with the removal of remaining vegetation; regrading and compaction of the site; construction of street improvements adjacent or in the vicinity of the project site; and construction of structures, outdoor activity areas, and vehicle access and parking areas. Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading and excavation, erection) of construction. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels.

Although noise ranges were found to be similar for all construction phases, the initial site preparation phase tended to involve the most equipment. As noted in Table 15.9, noise levels generated by individual pieces of construction equipment typically range from approximately 74 dBA to 89 dBA  $L_{max}$  at 50 feet (FTA 2006). Typical operating cycles may involve two minutes of full power, followed by three-to-four minutes at lower settings. Average hourly noise levels at construction sites and road improvement projects typically range from approximately 65 to 87 dBA  $L_{eq}$  at 50 feet, depending on the activities performed.

**Table 15.9**  
**Typical Construction Equipment Noise Levels**

| Equipment               | Typical Noise Level (dBA $L_{max}$ )<br>50 feet from Source |
|-------------------------|---|
| Air Compressor          | 81  |
| Backhoe                 | 80  |
| Compactor               | 82  |
| Concrete Mixer          | 85  |
| Concrete Vibrator       | 76  |
| Crane, Mobile           | 83  |
| Dozer                   | 85  |
| Generator               | 81  |
| Grader                  | 85  |
| Impact Wrench           | 85  |
| Jack Hammer             | 88  |
| Loader                  | 85  |
| Truck                   | 88  |
| Paver                   | 89  |
| Pneumatic Tool          | 85  |
| Roller                  | 74  |
| Saw                     | 76  |
| <i>Source: FTA 2006</i> |   |

Noise from localized point sources, such as construction sites, typically decreases by approximately 6 dBA with each doubling of distance from source to receptor. Given this noise attenuation rate and based on the noise levels presented in Table 15.9, predicted noise levels at residential land uses located adjacent to and within approximately 50 feet of proposed road improvements and development sites, such as the proposed commercial development located to the south and west of the existing medical center, could reach levels of up to approximately 89 dBA  $L_{eq}$ . Predicted construction noise levels at residential land uses located within approximately 50 feet of the construction site would not exceed

the commonly applied daytime noise standard of 90 dBA  $L_{eq}$  but would exceed the nighttime noise standard of 80 dBA  $L_{eq}$ .

Based on the same assumptions identified above, predicted exterior noise levels at Cedarwood Elementary School would be approximately 70 dBA  $L_{eq}$ . Assuming a minimum exterior-to-interior noise reduction of 20 dBA, predicted interior classroom noise levels could reach levels of approximately 50 dBA  $L_{eq}$ . Predicted interior classroom noise levels would exceed normally recommended noise standards (i.e., 40 dBA  $L_{eq}$ ) and, therefore, could result in speech interference with normal classroom instructional activities.

With regard to residential land uses, noise levels associated with construction activities occurring during the more noise-sensitive nighttime hours (i.e., 10 p.m. to 7 a.m.) are also of increased concern. Because exterior ambient noise levels typically decrease during the nighttime hours as community activities (e.g., commercial activities, vehicle traffic) decrease, construction activities performed during these more noise-sensitive periods of the day can result in increased annoyance and potential sleep disruption for occupants of nearby residential dwellings. The proposed project does not include restrictions on the hours during which construction activities would occur. As a result, construction activities occurring during the more noise-sensitive nighttime hours could result in increased levels of annoyance and potential sleep disruption for occupants of nearby residential land uses. Because predicted construction noise levels would exceed applicable noise standards at nearby residential land uses, as well as, at Cedarwood Elementary School, this impact would be considered potentially significant.

### **Mitigation Measures**

NO-1: The following measures shall be implemented to reduce construction-generated noise levels:

- (a) Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 7:00 p.m.
- (b) Construction equipment shall be properly maintained and equipped exhaust mufflers and engine shrouds in accordance with manufacturers' recommendations.
- (c) Construction equipment staging areas shall be located at the furthest distance possible from nearby noise-sensitive land uses.

### **Level of Significance with Mitigation**

Implementation of the above mitigation measures would limit construction activities to the less noise-sensitive periods of the day. Predicted construction noise levels at nearby residential land uses would not exceed the commonly applied daytime noise standard of 90 dBA  $L_{eq}$ . Use of mufflers and engine shrouds would reduce equipment noise levels by approximately 10 dBA. With mitigation, predicted noise levels within the interior of the nearest classroom would be reduced to approximately 40 dBA  $L_{eq}$ , or less. With implementation of the above mitigation measures, this impact would be considered less than significant.

### **NO-2: Increase in Long-Term Ambient Noise Levels from Traffic Sources**

Implementation of the proposed project would result in increased traffic volumes on area roadways, which would in turn contribute to predicted increases in traffic noise levels. The FHWA roadway noise prediction model was used to predict traffic noise levels along primarily affected roadway segments, with and without implementation of the proposed project. Modeling was conducted based on predicted traffic volumes obtained from the traffic analysis prepared for this project. Accordingly, traffic noise

levels were evaluated for existing conditions, with and without implementation of Phase I land uses; as well as, future cumulative year 2035 conditions, with and without project buildout. The project's contribution to traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic. Predicted traffic noise levels for existing and future cumulative conditions are discussed separately, as follows:

#### *Existing Conditions*

Predicted existing traffic noise levels and increases associated with Phase I implementation of the proposed project are summarized in Table 15.10. As depicted, implementation of the proposed project would result in predicted increases in traffic noise levels of approximately 1.0 dBA, or less, along primarily affected area roadway segments. As noted in the Environmental Setting section, perceptible changes in ambient noise levels do not typically occur at levels below 3 dBA. Based on the modeling conducted, implementation of the proposed project would not result in a significant increase in traffic noise levels at nearby noise-sensitive land uses. As a result, the impact from predicted increases in traffic noise levels associated with implementation of the project would be less than significant.

**Table 15.10**  
**Predicted Increases in Traffic Noise Levels**  
**Existing Conditions**

| Roadway  | Predicted CNEL, 50 Feet from Near-Travel Lane Centerline |                      | Predicted Increase | Significant Increase? |
|--|--|----------------------|--------------------|-----------------------|
|  | Without Project  | With Project Phase I |                    |                       |
| Herndon Avenue, Armstrong Avenue to Tollhouse Road   | 67.8   | 68.4                 | 0.6                | No                    |
| Herndon Avenue, Tollhouse Road to Temperance Avenue  | 68.0   | 68.8                 | 0.8                | No                    |
| Herndon Avenue, Temperance Avenue to Coventry Avenue   | 67.9   | 68.2                 | 0.3                | No                    |
| Herndon Avenue, Coventry Avenue to CCMC Access Road  | 67.3   | 67.5                 | 0.2                | No                    |
| Herndon Avenue, CCMC Access Road to Locan Avenue   | 67.3   | 67.6                 | 0.3                | No                    |
| Herndon Avenue, Locan Avenue to De Wolf Avenue   | 68.2   | 68.5                 | 0.3                | No                    |
| Herndon Avenue, De Wolf Avenue (DL) to De Wolf Avenue (SL)   | 67.5   | 68.0                 | 0.5                | No                    |
| Herndon Avenue, De Wolf Avenue (SL) to Leonard Avenue  | 67.9   | 68.1                 | 0.2                | No                    |
| Locan Avenue, Herndon Avenue to Bullard Avenue   | 61.8   | 62.8                 | 1.0                | No                    |
| <i>Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on data obtained from the traffic analysis prepared for this project.</i> |  |                      |                    |                       |

#### *Future Cumulative Year 2035*

Predicted future cumulative traffic noise levels and increases attributable to buildout of the proposed Master Plan are summarized in Table 15.11. Based on the traffic noise modeling conducted, implementation of the proposed Master Plan would result in predicted increases in traffic noise levels of up to approximately 0.7 dBA or less, which falls below 3-dBA threshold for perceptible changes in ambient noise levels. As a result, predicted increases in future cumulative traffic noise levels associated with buildout of the proposed project would be considered less than significant.

**Table 15.11**  
**Predicted Increases in Traffic Noise Levels**  
**Future Cumulative Year 2035 Conditions**

| Roadway  | Predicted CNEL, 50 Feet from Near-Travel Lane Centerline |                       | Predicted Increase | Significant Increase? |
|--|--|-----------------------|--------------------|-----------------------|
|  | Without Project  | With Project Buildout |                    |                       |
| Herndon Avenue, Armstrong Avenue to Tollhouse Road   | 69.5   | 69.8                  | 0.3                | No                    |
| Herndon Avenue, Tollhouse Road to Temperance Avenue  | 70.0   | 70.3                  | 0.3                | No                    |
| Herndon Avenue, Temperance Avenue to Coventry Avenue   | 70.2   | 70.9                  | 0.7                | No                    |
| Herndon Avenue, Coventry Avenue to CCMC Access Road  | 70.8   | 71.1                  | 0.3                | No                    |
| Herndon Avenue, CCMC Access Road to Locan Avenue   | 70.8   | 71.1                  | 0.3                | No                    |
| Herndon Avenue, Locan Avenue to De Wolf Avenue   | 71.8   | 71.9                  | 0.1                | No                    |
| Herndon Avenue, De Wolf Avenue (DL) to De Wolf Avenue (SL)   | 71.6   | 71.7                  | 0.1                | No                    |
| Herndon Avenue, De Wolf Avenue (SL) to Leonard Avenue  | 71.0   | 71.1                  | 0.1                | No                    |
| Locan Avenue, Herndon Avenue to Bullard Avenue   | 70.8   | 71.2                  | 0.4                | No                    |
| <i>Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on data obtained from the traffic analysis prepared for this project.</i> |  |                       |                    |                       |

### *Herndon Avenue Widening*

The proposed project would also include the widening of the current five-lane Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the southern leg of DeWolf Avenue from two lanes to a four-lane divided roadway. Detailed plans for lane configurations and alignments for the proposed widened segments of Herndon Avenue have not yet been developed. Based on traffic noise modeling conducted for similar projects and depending on the final alignment and distances to nearby noise sensitive receptors, predicted traffic noise levels could potentially exceed the City's noise standards. Depending on changes in distance from roadway travel lanes to receptors, significant increases in traffic noise levels may also occur. As a result, exposure to traffic noise levels associated with the future widening of Herndon Avenue would be considered to have a potentially significant impact.

### **Mitigation Measures**

NO-2: Once detailed plans for lane configurations and alignments for the widening of Herndon Avenue are prepared, the City of Clovis shall have an acoustical analysis prepared. The acoustical analysis shall evaluate changes in traffic noise levels that would result from the proposed widening in comparison to the City of Clovis General Plan noise standards. Noise-reduction measures (e.g., sound walls) shall be evaluated and implemented, where feasible, to reduce traffic noise levels to below applicable noise standards.

### **Level of Significance with Mitigation**

Mitigation Measure NO-2 would require the preparation of an acoustical analysis for the planned future widening of Herndon Avenue once detailed plans for lane configurations and alignments become available. The acoustical analysis would be required to evaluate changes in traffic noise levels in

comparison to the City of Clovis General Plan noise standards and noise-reduction measures (e.g., sound walls) will be evaluated and implemented, where feasible. However, in some instances, the use of noise-reduction measures, such as sound walls, may not be feasible due to the need to preserve access to noise sensitive properties. As a result, increases in traffic noise associated with the future widening of Herndon Avenue would be considered significant and unavoidable.

### **NO-3: Increase in Long-Term Ambient Noise Levels from Operational Features**

Noise sources commonly associated with medical facilities and commercial facilities like those proposed in the project can include occasional parking lot activities (e.g., opening and closing of vehicle doors, people talking), and use of onsite building equipment, such as HVAC systems, boilers, and power generators. Building equipment is typically located within a central plant or located on rooftops. Noise levels associated with these noise sources for both the proposed 10-year expansion plan and the 20-year Master Plan are discussed separately, as follows:

#### *Parking Structure*

The project would include construction of an approximate 677-space multi-story parking structure. The parking structure would be located northeast of the existing medical center, approximately 1,000 feet north of Herndon Avenue. The nearest residential dwellings are located approximately 725 feet to the east. As previously discussed, noise levels commonly associated with vehicle parking areas are often associated with the starting of vehicles, the opening and closing of vehicle doors, playing of amplified music, and the occasional sound of vehicle alarms and horns. Noise levels associated with large parking structures can reach levels of approximately 92 dBA SEL at 50 feet (FTA 2006).

Parking structure noise levels were calculated assuming that all vehicles parking spaces would be accessed within a one-hour period. Based on this assumption, peak-hour noise levels associated with the proposed parking structure would be 59 dBA  $L_{eq}$  at 50 feet. Predicted peak-hour noise levels at the nearest residential land use located to the east of the proposed parking structure would be approximately 30 dBA  $L_{eq}$ . Predicted average-daily noise levels at this nearest residence would be approximately 37 dBA CNEL, or less. Predicted noise levels at other offsite noise sensitive receptors located south of Herndon Avenue would be less than 25 dBA CNEL. Predicted noise levels at nearby land uses would not exceed the City's exterior or interior noise standards of 65 and 45 dBA CNEL, respectively, and would be largely masked by ambient noise levels. Consequently, noise generated from the proposed parking structure would be considered less than significant.

#### *Parking Lots*

The proposed project would include construction of surface parking lots to serve proposed development, including the proposed hotel, shopping centers, medical-office buildings, and assisted living facility. Based on the traffic analysis prepared for this project, these proposed land uses would generate a maximum of approximately 100 vehicle trips during the peak-hour. Based on this traffic volume, parking lots associated with the proposed land uses would generate peak-hour noise levels of approximately 25 dBA  $L_{eq}$ , or less. Proposed parking lots would be largely shielded from direct exposure of nearby sensitive land uses and resultant noise levels would be largely masked by ambient traffic noise levels. Furthermore, operational noise levels would typically be limited to the daytime hours. Predicted operational noise levels at nearby sensitive land uses would not exceed the City's exterior or interior noise standards of 65 and 45 dBA CNEL, respectively. As such, noise generated by surface parking lot activities would be considered less than significant.

### *Central Plant Expansion*

Phase II of the proposed medical center expansion project would include expansion of the central plant located within the eastern portion of the site. Building and equipment specifications for the future plant expansion have not yet been identified. However, potential noise-generating equipment associated with central plant would be anticipated to include chillers, boilers, and emergency-use power generators. Additionally, up to three emergency generators would likely be installed. Noise levels associated with chillers and boilers can reach levels of approximately 85 dBA Leq at 3 feet, and noise levels associated with the generators would be approximately 89 dBA Leq at 50 feet.

The nearest residential land uses are located approximately 375 feet east of the proposed central plant. Based on the operational noise levels discussed above, and assuming a minimum noise reduction of 15 dB for the building enclosure, predicted operational noise levels at the property line of the nearest residential land uses would be approximately 35 dBA Leq during normal plant operations. During periods when operation of the emergency generators would be required, predicted noise levels at the nearest residential land uses would be approximately 61 dBA Leq. Assuming that all equipment were to operate continuously over a 24-hour period, predicted maximum exterior noise levels at the nearest residential land uses would be approximately 72 dBA CNEL. Based on this noise level and assuming an average exterior-to-interior noise reduction of 20 dBA, predicted interior noise levels at the nearest residential dwellings would be approximately 52 dBA CNEL.

Predicted operational noise levels at the nearest residential land uses located east of the medical center could potentially exceed the City's exterior or interior noise standards of 65 dBA and 45 dBA CNEL, respectively. Given increased distance from the source and shielding provided by intervening structures, predicted noise levels at noise-sensitive receptors located south of Herndon Avenue, including Cedarwood Elementary School, would not exceed applicable noise standards. This impact would be considered potentially significant.

### *Building Mechanical Equipment*

The project includes construction of commercial buildings generally located along Herndon Avenue, to the west and south of the existing medical center and adjacent to existing residential land uses. In addition to adjacent residential land uses, nearby noise-sensitive land uses also includes Cedarwood Elementary School, which is located south of Herndon Avenue, approximately 230 feet south of proposed assisted living facility.

Noise-generating building mechanical equipment associated with commercial-use buildings would be primarily associated with the operation of exterior air conditioning units, which are generally limited to the daytime hours of operation. According to the Noise Impact Assessment, noise levels associated with larger commercial-use air conditioning systems can reach levels of up to approximately 78 dBA at 3 feet. Assuming that HVAC units were to be located at ground level and within approximately 30 feet of nearby residential land uses, operational noise levels at the nearest residential land uses would be approximately 58 dBA Leq. Assuming that the air conditioning units were to run continuously over a 24-hour period, predicted average-daily noise levels at the residential land uses located within approximately 30 feet could potentially exceed the City's exterior noise standard of 65 dBA CNEL. Based on these same assumptions, predicted operational noise levels at Cedarwood Elementary School would be approximately 46 dBA CNEL, would not exceed the City's noise standards and would be largely masked by ambient noise levels. Because predicted operational noise levels at residential land uses located within 30 feet of proposed commercial development could potentially exceed the City's noise standards, this impact would be considered potentially significant.

### *On-Site Helistop*

The project would not include changes that would affect operation of the existing onsite helistop or require the relocation of the existing helistop. Helistop noise levels were evaluated in the previously prepared Clovis Community Medical Center Master Plan. Based on the analysis previously prepared, the projected 60 dBA and 65 dBA CNEL operational noise contours for the helistop would extend approximately 550 and 260 feet from the center of the landing pad, respectively. Proposed new land uses located within the projected 60 dBA CNEL contour would include the proposed central plant, general services building, and future expansion of the acute care unit located along the eastern side of the existing medical center. Predicted helistop noise levels at the central plant and general services buildings would not exceed the City's exterior noise standard of 80 dBA CNEL for similar land uses (e.g., maintenance, manufacturing, utility uses). Predicted exterior noise levels at the proposed acute care unit would be approximately 67 dBA. The acute care unit would be a transient use and would not include long-term care of patients, similar to that of a medical office. In accordance with the City's noise standards, offices are considered "normally compatible" up to 75 dBA CNEL. Predicted helistop noise levels at other proposed land uses would be less than 60 dBA CNEL and would not exceed the City's noise standards. For these reasons, exposure to helistop noise levels would be considered less than significant.

### **Mitigation Measures**

NO-3: The following measures shall be implemented to reduce operational noise levels:

- (a) An acoustical analysis shall be prepared for the proposed central plant prior to final design. The acoustical analysis shall identify building/equipment noise-reduction measures to be incorporated sufficient to achieve an exterior average-hourly noise-level of 50 dBA Leq, or less, at the property line of the nearest noise-sensitive land use. This average-hourly noise levels performance standard would equate to an average-daily noise level of approximately 58 dBA CNEL, which would ensure compliance with the City of Clovis exterior and interior noise level standards of 65 and 45 dBA CNEL, respectively. Noise-reduction measures to be incorporated may include, but are not limited to, the selection of alternative or quieter equipment, use of sound enclosures, and shielding building intake and exhaust vents from direct line of sight of nearby noise-sensitive land uses. The acoustical analysis shall be submitted to the City of Clovis Planning Department for review and approval prior to issuance of construction/grading permits for the construction of the central plant.
- (b) Emergency generators shall be enclosed and fitted with exhaust silencers.
- (c) Building air conditioning units for proposed structures shall be located on building rooftops and shielded from direct line-of-sight of adjacent noise-sensitive land uses. Building parapets shall be constructed, when necessary, to shield nearby land uses from direct line-of-site of air conditioning units.

### **Level of Significance with Mitigation**

Implementation of Mitigation Measure NO-3(a) would require that acoustical analysis be prepared for the proposed future central plant expansion prior to its construction. This analysis would be required to meet the City of Clovis noise performance standards and, where necessary, incorporate noise-reduction measures to achieve these standards. Mitigation Measure NO-3(b) would require the installation of exhaust silencers for newly installed emergency generators, which would reduce exhaust noise by a minimum of approximately 15 dB. Mitigation Measure NO-3(c) would require building air conditioning units to be located on rooftop areas and shielded from direct line-of-sight of nearby noise-

sensitive land uses. The shielding of building air conditioning units from direct line of sight would reduce operational noise levels at nearby land uses by approximately 5 to 10 dBA. With mitigation, non-transportation noise levels would not exceed City of Clovis noise standards.

## **LESS THAN SIGNIFICANT IMPACTS**

### **No-4: Groundborne Vibration During Project Construction and Operation**

No major stationary sources of groundborne vibration were identified in the project area that would result in the long-term exposure of proposed onsite land uses to unacceptable levels of ground vibration. In addition, the proposed project would not involve the use of any major equipment or processes that would result in potentially significant levels of ground vibration that would exceed these standards at nearby existing land uses.

Construction activities associated with the proposed project would require the use of various tractors, trucks, and jackhammers that could result in intermittent increases in groundborne vibration levels. Predicted groundborne vibration levels commonly associated with construction equipment (summarized in Table 12 of the Noise Impact Assessment included as Appendix 15) would measure up to approximately 0.09 in/sec ppv at 25 feet. The predicted groundborne vibration levels would not exceed recommended criteria for structural damage and human annoyance (0.2 and 0.1 in/sec ppv, respectively) at nearby land uses. Further, the use of major groundborne vibration-generating construction equipment/processes (i.e., blasting, pile driving) is not anticipated to be required for construction of future onsite land uses. As a result, this impact would be considered less than significant.

## **NO IMPACTS**

No noise impacts related to aviation (refer to Thresholds of Significance criteria “e” and “f”) were identified in this analysis. The project site is not within a two-mile vicinity of any public or private airstrip or located within an airport land use plan area. The nearest airport/airstrip is the Fresno-Yosemite International Airport, which is located approximately 3.2 miles southwest of the project site.

## **CUMULATIVE IMPACTS**

As noted earlier, ambient noise levels in the project area are influenced primarily by traffic noise emanating from area roadways. No major stationary sources of noise have been identified in the project area, and the primary factor for cumulative noise impact analysis is the consideration of future traffic noise levels. Cumulative development conditions were evaluated as part of the Noise Impact Assessment for the project and reflected in Impacts NO-2 and NO-3. Projected impacts related to onsite operational noise sources were determined to be less than significant with the implementation of Mitigation Measures NO-3(a) through (c). Predicted increases in traffic noise levels under future cumulative conditions, with construction of the proposed land uses, would measure approximately 0.7 dBA CNEL or less. Therefore, development of the proposed land uses would not significantly contribute to cumulative increases in traffic noise levels at sensitive land uses located along primarily affected area roadways. It is possible, however, that the widening of Herndon Avenue may result in significant increases in traffic noise levels at some nearby existing noise-sensitive land uses depending on the final design of the proposed road widening. An acoustical analysis will be required once more detailed plans for lane configurations and alignments become available. It is possible that in some instances, noise-reduction measures, such as sound walls, may not be feasible due to the need to maintain access to properties on Herndon. As a result, increases in traffic noise associated with the



future widening of Herndon Avenue would be considered a potentially significant and unavoidable cumulative impact.

## SOURCES CONSULTED

This chapter is based upon the following report:

Ambient Air Quality and Noise Consulting. *Noise Impact Assessment for Master Plan Expansion of the Clovis Community Medical Center Project, Clovis, CA*. July 2017.

Sources cited by Ambient Air Quality and Noise Consulting are as follows:

American National Standards Institute, Inc. (ANSI). 2002. ANSI S12.60-2002: Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools.

California Department of Transportation (Caltrans). 1998. California Department of Transportation (Caltrans). Technical Noise Supplement.

California Department of Transportation (Caltrans). September 2013. Transportation and Construction Vibration Guidance Manual.

California Department of Transportation (Caltrans). May 2016. EIR/EA Annotated Outline.

California Department of Transportation (Caltrans). April 2015. Transportation Concept Report, State Route 168.

California Department of Transportation (Caltrans). Accessed: June 29, 2017. Traffic Census Program, Traffic Counts. Website url: <http://www.dot.ca.gov/trafficops/census/>.

Caterpillar. Manufacturer Specifications and Technical Data: Diesel Generator Set: 2,000 kW. LEHE8746-00. Accessed: December 12, 2008. Website url: <http://www.cat.com/cda/components/securedFile/displaySecuredFileServletJSP?fileId=98752&languageId=7>.

City of Clovis. August 25, 2014. City of Clovis General Plan.

Federal Interagency Committee on Noise (FICON). October 22, 2000. Discussion of Methodologies of Measuring Noise Impact.

JLB Traffic Engineering, Inc. 2017. Draft Traffic Impact Analysis: Master Plan Expansion of the Clovis Community Medical Center.

United States Department of Transportation, Federal Transit Administration (FTA). April 2006. Transit Noise and Vibration Impact Assessment.

United States Environmental Protection Agency (EPA). December 31, 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.

United States Environmental Protection Agency (EPA). May 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.

# **CHAPTER 16**

## **Population and Housing**

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### **INTRODUCTION**

This chapter identifies and discusses potential environmental effects of the project related to population and housing, including the potential for the project to induce urban growth. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to population, housing, and growth; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect environmental effects of the project on population, housing, and growth; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### **ENVIRONMENTAL SETTING**

#### **Project Site**

The entire CCMC project site (including existing facilities and the proposed expansion area) comprises approximately 148 acres located on the north and south sides of Herndon Avenue, east and west of Temperance Avenue. Development surrounding the project site includes State Route 168 to the north; the Enterprise Canal to the east; single-family residential development and an elementary school to the south; and a mixture of rural residential development and vacant land to the west. The section of Herndon Avenue to be widened spans a distance of one mile between Temperance Avenue and the southern leg of DeWolf Avenue and is bordered by a mixture of existing CCMC facilities, rural residential development, and vacant land.

#### **Regional Setting**

The Clovis General Plan EIR discusses population and housing trends in the City of Clovis and Fresno County. Between the 2000 and 2010 Census, Fresno County experienced a population increase of 16.4 percent and the City of Clovis grew by 39.7 percent, to 930,450 and 95,631, respectively. Since the 2010 Census, the California Department of Finance estimates the County's population, as of January 1, 2017, to be 995,975 and the City's population to be 110,762, an increase of 7.0 and 15.8 percent, respectively.

The rate of housing growth in the City of Clovis and Fresno County gradually grew through the first half of the 2000s and peaked in the middle of the decade. Clovis grew at a slightly higher rate than the rest of Fresno County. During the recession and resulting housing market downturn (2008-2012), the housing growth rate dropped in both jurisdictions. Nevertheless, Clovis gained 11,324 dwelling units and Fresno County gained 49,876 dwelling units between 2000 and 2013, an increase of approximately 44.8 and 18.4 percent, respectively. Since 2013, the number of housing starts in Fresno County and the City of Clovis has grown substantially.

The Clovis General Plan EIR also discusses the jobs-housing ratio in the City of Clovis and Fresno County. The jobs-housing ratio is a general measure of the total number of jobs and housing units in a defined geographic area, without regard to economic constraints or individual preferences, and can serve as an indicator of a project's effect on growth and quality of life in the project area. The California Department of Finance defines a healthy jobs-housing balance as one new home built for every 1.5 jobs created. Using numbers from 2013, the jobs-housing ratio for the Clovis General Plan Area was calculated as 0.74, while the jobs-housing ratio for all of Fresno County was 1.32. Both

measures are considered "housing rich" because its ratio is less than 1.50. Projections for 2035 are provided by Fresno Council of Governments (Fresno COG) and show that both Clovis and Fresno County's jobs-housing ratio are anticipated to decrease from 2013 ratios to 0.60 and 1.06, respectively. However, development in accordance with the Clovis General Plan is projected to increase the jobs-housing ratio to 0.93 for the 2035 scenario and 1.00 for full buildout.

## REGULATORY AND POLICY SETTING

### Local

#### *Regional Housing Needs Allocation*

The Fresno County Regional Housing Needs Allocation (RHNA) Plan is a state-mandated document, updated every eight years, that helps determine the number of housing units that cities and counties must plan for in the housing element sections of their general plans. The California Department of Housing and Community Development (HCD) allocates RHNA units to the Fresno COG, who then develops a methodology to allocate the units to individual jurisdictions within Fresno County. The Fresno COG 2013–2023 RHNA Plan indicates a projected need of 6,263 housing units in the City of Clovis.

#### *City of Clovis Housing Element*

The Housing Element assesses current and projected housing needs and sets out policies and proposals for the improvement of housing and the provision of adequate sites for housing to meet the needs of all economic segments of the City. This element is a stand-alone document that was approved by the California Department of Housing and Community Development in July 2008 and updated in 2010, separately from the rest of the general plan elements included in the 2014 Clovis General Plan. Other general plan elements under the updated General Plan are consistent with the goals and policies of the Housing Element.

## THRESHOLDS OF SIGNIFICANCE

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects related to population and housing are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form:

Would the project:

- (a) Induce substantial population growth either in an area, directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?
- (b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?
- (c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

## **LESS THAN SIGNIFICANT IMPACTS**

### **PH-1: Potential Inducement of Population and Housing Growth from the Project**

The addition of hospital and administration facilities at the CCMC campus, as well as new commercial uses and an assisted living facility, are employment-creating developments capable of inducing population growth. Some of the new employment would likely be absorbed by the local and regional employment market as opposed to outside the area, but employees could also be drawn from outside the area, increasing the need for housing employees and their families. The CCMC expansion project is consistent with the City's land use plans and the Clovis General Plan has anticipated housing and population growth resulting from increased employment opportunities. Such increases in employment is beneficial to the jobs-housing balance in the community. Any growth in the community induced by the project would be consistent with the growth anticipated in adopted City plans and policies and is, therefore, less than significant.

The widening of Herndon Avenue would generate temporary construction jobs, but is not considered a significant employment generator. No inducement of population growth would result from the widening of Herndon Avenue as it is consistent with the general plan, would improve traffic circulation in the community and enhance access to CCMC, rather than providing access to currently undeveloped or unserved areas.

### **NO IMPACT**

No existing housing units or residents will be displaced by the project, and no construction of replacement housing will be necessitated elsewhere.

## **CUMULATIVE IMPACTS**

The proposed CCMC expansion and road widening are consistent with development evaluated in the Clovis General Plan EIR, which concluded that growth inducement related to the 2035 scenario would be less than significant. The employment opportunities provided by the project would improve the jobs-housing balance. The project, therefore, would not result in significant cumulative impacts related to population or housing.

## **SOURCES CONSULTED**

California Department of Finance, Demographic Research Unit. *Report E-1, Population Estimates for Cities, Counties and the State, January 1, 2016 and 2017*. May 1, 2017.

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. SCH No. 2012061069. June 2014.

Clovis, City of. *General Plan Housing Element*. July 7, 2008 (revised September 7, 2010)

# **CHAPTER 17**

## **Public Services**

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### **INTRODUCTION**

This chapter addresses potential environmental effects the project may have related to fire protection, law enforcement, schools, and other public services. Parks and public recreational facilities are discussed and analyzed in Chapter 18, Parks and Recreation. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to public services; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of the project on public services; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### **ENVIRONMENTAL SETTING**

#### **Fire Protection and Emergency Services**

Fire protection services for the City of Clovis are provided by the Clovis Fire Department (CFD). CFD serves an area of 24.36 square miles and a population of approximately 108,000 residents from five fire stations. Current staffing levels consist of 61 sworn personnel, five non-sworn full-time personnel, and three non-sworn part-time personnel. In addition to fire suppression duties, CFD also provides technical rescue, hazardous materials spill/release mitigation, emergency medical services (EMS), life safety and enforcement services, and emergency preparedness for the citizens of Clovis. The closest CFD fire station to the project site is Station 5, which is located approximately one-quarter mile to the north.

The Fresno County Fire Protection District (FCFPD) provides fire services on the City's fringe and unincorporated areas in the City's Sphere of Influence, including the section of Herndon Avenue to be widened that is currently beyond the Clovis city limits. CFD and FCFPD have an automatic aid agreement which defines dispatch parameters for the closest available resource to the scene of a fire or medical emergency within the defined automatic aid response area.

#### **Law Enforcement**

The Clovis Police Department (CPD) provides police service within the existing City boundaries. Currently, CPD has 140 full-time employees, including 92 sworn officers. CPD also has an 18-person volunteer reserve program. CPD headquarters, where all personnel are stationed and respond from, is located at 1233 Fifth Street, approximately two miles southwest of the project site. The city is divided into seven service areas; the CCMC expansion area is located within Area 7.

The Fresno County Sheriff's Department and the California Highway Patrol provide police protection to the unincorporated areas outside the city limits. The City has a mutual aid assistance agreement with both agencies.

#### **Schools**

The project site is located within the boundaries of the Clovis Unified School District (CUSD). CUSD serves more than 40,000 students and includes 33 elementary schools, five middle schools, five high schools, four alternative education schools, an adult school, and two specialty schools (Center for Advanced Research and Technology and the Sierra Outdoor School).

Most of the project site north of Herndon Avenue is within the enrollment areas for Buchanan High School, Alta Sierra Intermediate, and Century Elementary; a small section of the Herndon Avenue widening area east of Locan Avenue is within the enrollment area for Dry Creek Elementary. The project site south of Herndon Avenue is within the enrollment area for Clovis High School, Clark Intermediate, and Cedarwood Elementary.

## **REGULATORY AND POLICY SETTING**

### **State Regulations**

#### *California Occupational Safety and Health Administration (Cal OSHA)*

In accordance with California Code of Regulations, Title 8 sections 1270 “Fire Prevention” and 6773 “Fire Protection and Fire Equipment”, the California Occupational Safety and Health Administration (Cal OSHA) has established minimum standards for fire suppression and emergency medical services. The standards include, but are not limited to, guidelines on the handling of highly combustible materials, fire hosing sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance and use of all firefighting and emergency medical equipment.

#### *California Health and Safety Code*

State fire regulations are set forth in sections 13000 et seq. of the California Health and Safety Code, which includes regulations for building standards (as set forth in the California Building Code), fire protection and notification systems, fire protection devices such as extinguishers, smoke alarms, high-rise building, childcare facility standards, and fire suppression training.

#### *California Fire Code*

The California Fire Code (Title 24 California Code of Regulations, Part 9) is based on the 2012 International Fire Code and includes amendments from the State of California fully integrated into the code. The California Fire Code has fire safety-related building standards that are referenced in other parts of Title 24 of the California Code of Regulations.

### **Local Regulations**

#### *City of Clovis Municipal Code*

The City of Clovis Municipal Code identifies land use categories, development standards, and other general provisions that ensure consistency between the City’s General Plan and proposed development projects. The following provisions from the City’s Municipal Code focuses on police services impacts associated with new development projects and are relevant to the proposed project:

*Title 4 (Public Safety), Chapter 4.2 (Emergency Services):* Provides for the preparation and carrying out of plans for the protection of persons and property within the City in the event of an emergency; the direction of the Emergency Organization; and the coordination of the emergency functions of the City with all other public agencies, corporations, organizations, and affected private persons.

*Title 4 (Public Safety), Chapter 4.4 (Fire Prevention):* Prescribes regulations governing conditions hazardous to life and property from fire or explosion; the 2016 California Fire Code (CFC), including Appendix Chapter 1, as promulgated by the California Building Standards Commission, which incorporates the adoption of the 2015 Edition of the International Fire Code with California amendments, including Appendix Chapters E and F,

*Title 4 (Public Safety), Chapter 4.3 (Fire Department Water Tender Fee):* Establishes a financing mechanism to construct, equip, and furnish fire stations to serve the City and its sphere of influence as community growth requires.

*Title 4 (Public Safety), Chapter 4.11 (Police Department Fee):* Establishes a financing mechanism to construct, equip, and furnish police stations to serve the newly developed service areas around the City and its sphere of influence as community growth requires.

### *City of Clovis General Plan*

The Public Facilities and Services Element of the Clovis General Plan contains goals and policies related to the City's provision of public facilities, services, and activities. While the primary goal stated in the Public Facilities and Services Element is "to align funding resources with the level of service the community expects," the Public Facilities and Services Element contains policies intended to maintain public safety, quality of schools, and other public facilities. The following provisions are relevant to the proposed project:

*Policy 6.1 Fire and police service.* Maintain staffing, facilities, and training activities to effectively respond to emergency and general public service calls.

*Policy 6.2 Resource allocation.* Periodically conduct service level studies to analyze crime and emergency service performance data, to evaluate the effectiveness of prevention and reduction strategies, and to allocate resources accordingly.

*Policy 6.3 Emergency medical calls.* Explore options to lessen the demand on fire and police services or expand reimbursement programs to ensure the service pays for measured impacts.

## **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects related to fire protection services are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section XIV:

- (a) Would the project result in adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:
1. Fire protection?
  2. Police protection?
  3. Schools?
  4. Parks?
  5. Other public facilities?

## **LESS THAN SIGNIFICANT IMPACTS**

### **PS-1: Impacts to Fire Protection and Emergency Services from Construction and Operation of the Project**

The project primarily consists of the expansion of an existing facility in a largely urbanized area and is located approximately one-quarter mile from Clovis Fire Station No. 5, would provide for convenient and expedient service by existing fire protection facilities. Development of the project site will be subject to review by the Clovis Fire Department, which will ensure that buildings and facilities have adequate emergency access and site- and building-design characteristics which are conducive to safe environment during both project construction and operation. The buildings and facilities constructed at the project site will also be subject to existing development impact fees to help offset the costs for additional fire protection equipment, facilities, and personnel. Based on the above, impacts to fire protection services will be less than significant.

Regarding impacts to emergency services, development of the project would increase the availability of medical services in the area, supporting existing emergency services and providing a beneficial effect.

CCMC and Herndon widening construction activities, if it were to involve lane closures or detours, could potentially affect response times for fire and emergency services. However, City department staffs routinely coordinate on street construction activities to minimize any disruption to traffic circulation. In addition, construction activities are temporary in nature and the general area is served by alternative means of access. Therefore, potential interference with fire and emergency services due to construction activity is considered less than significant.

### **PS-2: Impacts to Law Enforcement Services from Construction and Operation of the Project**

The project is located in an urbanized area around the site of the existing CCMC campus, an area that The Clovis Police Department already serves. There would be some potential increased demand for law enforcement services due to increased traffic, increased employee population at the project site, and potential vandalism and theft related to construction activities. However, CCMC has a private on-site security force that would continue to serve the project in combination with the Clovis Police Department. Further, development of the project is subject to review by the Clovis Police Department, and buildings and facilities developed on the project site will be subject to development impact fees to help offset the costs to law enforcement services. Based on the above, impacts to law enforcement services will be less than significant.

Similar to fire and emergency services, construction activities on streets involving lane closures or detours could potentially affect law enforcement response times. However, City department staffs routinely coordinate on street construction activities to minimize any disruption to traffic circulation. In addition, construction activities are temporary in nature and the general area is served by alternative means of access. Therefore, potential interference with law enforcement services due to construction activity is considered less than significant.

### **PS-3: Impacts to Schools from Construction and Operation of the Project**

As discussed in Chapter 16, Population and Housing, the proposed CCMC expansion and road widening would not directly induce population growth, but would increase employment opportunities, which could induce people to move into the area due to new job opportunities. Children of any new employees moving from out of the area would potentially attend District schools. New development on the project site would be required to pay commercial/industrial school fees at the time of



construction, which, accordance with Government Code Section 65995(h), is deemed to be full and complete mitigation related to the provision of adequate school facilities. In addition, the developers of any new homes in which new employees may live will also have to pay residential school fees. Therefore, impacts related to the provision of adequate school facilities would be less than significant.

### **CUMULATIVE IMPACTS**

In discussing impacts to Public Services, the Clovis General Plan EIR distinguishes noncontiguous development (i.e. new development that, on all sides, is adjacent to or immediately across the street from vacant or agricultural land uses or other uses that do not have existing City water and sewer service) as capable of adverse impacts to public services due to factors like increased response times and further distances over which to provide services; conversely, impacts from contiguous development are not emphasized. Since the project primarily entails expansion of an existing facility in a substantially urbanized area, the cumulative impacts on service levels, response times, and other public services will be less than significant.

### **SOURCES CONSULTED**

Clovis, City of. City of Clovis General Plan. August 25, 2014

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. SCH No. 2012061069. June 2014.

Clovis Fire Department website. <https://www.ci.clovis.ca.us/Departments-Services/Fire-Department>

Clovis Police Department website. <https://www.ci.clovis.ca.us/Departments-Services/Police-Department>

Clovis Unified School District website. <http://www.cusd.com/>

# CHAPTER 18

## Parks and Recreation

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### INTRODUCTION

This chapter identifies and discusses potential environmental effects of the project on parks and recreation facilities, including the extent to which the project will contribute to the physical deterioration of publicly provided recreation facilities and whether the project will result in substantial increased demand for recreation facilities on or near the project site. Information presented includes: (1) the environmental, regulatory, and public policy setting of the project related to park and recreation facilities; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect environmental effects of the project (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

### ENVIRONMENTAL SETTING

#### Regional Setting

The City of Clovis maintains approximately 285 acres of parks and open space (including a series of recreational trails), as well as a variety of public recreational facilities such as the City of Clovis Batting Cages, the Clovis Rotary Skatepark, and the Clovis Recreation Center. These parks, trails, and recreational facilities are dispersed throughout the City.

#### Project Site and Surrounding Area

There are no existing or planned public parks or recreation facilities located on the project site, although some de facto recreational use occurs on landscaped areas of the hospital campus by visitors and residents of the surrounding area. Within one mile of the project site there is one public park: Sierra Meadows Park (approximately 14 acres in size) is located one-third of a mile south of the project site and provides an open grassy area with some concrete pathways and benches. Approximately 900 feet north of the project site on the opposite side of State Route 168 is one end of the existing Enterprise Canal Trail. The Clovis General Plan shows a planned future extension of the Enterprise Canal Trail along the section of the canal immediately east of the project site (see Figure OS-1 in the Clovis General Plan). Additionally, there are a number of school sites within the Clovis Unified School District located in the area, including Cedarwood Elementary School located immediately south of the project site, which contain recreational facilities that are available for community recreational use during non-school hours.

### REGULATORY SETTING

#### Local Regulations

##### *City of Clovis General Plan*

The Open Space and Conservation Element of the Clovis General Plan sets forth a variety of goals, policies, and general parameters related to the maintenance and provision of new and existing parks and recreational facilities. Key examples are locating open space resources where people live, work, and play, and ensuring that park and recreation facilities are designed to be environmentally and fiscally sustainable. Per its text, the “primary issue” for the Open Space and Conservation element to

address is “providing sufficient park space and recreation facilities to serve existing residents and planned growth.”

#### *City of Clovis Parks Master Plan*

The City of Clovis is in the process of drafting a Parks Master Plan, which will serve as the guiding document for the implementation of the city’s open space facilities. Figure OS-1 in the Clovis General Plan is reflective of the current draft Parks Master Plan.

### **THRESHOLD OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as “...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.” The threshold of significance used for this EIR to determine the significance of environmental effects related to parks and recreation is from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Section XV, a and b:

Would the project:

- (a) Increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or accelerate?
- (b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

### **LESS THAN SIGNIFICANT IMPACTS**

#### **PR-1: Increase in Parks and Recreational Facilities Usage – CCMC Expansion**

The CCMC expansion project, because of its commercial/office nature, would not directly increase to a substantial degree the use of existing parks or recreational facilities or require that construction of new facilities. The project will increase the number of employees at the site, so employees and their families that move into Clovis due to employment opportunities at CCMC will have a need for parks and recreation facilities. The City of Clovis, through the Quimby Act (Government Code Section 66477) and its Park Acquisition and Development Fees (Municipal Code Section 3.4.03), will provide enough park and recreational space to keep up with projected growth in the Clovis General Plan. As a result, impacts pertaining to parks and recreational facilities are less than significant and no mitigation is required.

### **NO IMPACT**

The project does not include construction of new or expanded recreational facilities. Informal recreational use by employees and visitors occurs on some existing landscaped areas on the existing CCMC campus. These areas are internal to the campus and do not result in any impacts. Neither the CCMC expansion or the Herndon Avenue widening would require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. Additionally, there are no existing or planned park or recreation facilities that are adjacent to or would be affected by the widening of Herndon Avenue.

## **CUMULATIVE IMPACTS**

The CCMC expansion project would contribute to a cumulative need for additional parks and recreation facilities in the City of Clovis. However, due to existing regulatory mechanisms for providing for parks and recreation facilities, the General Plan EIR identified parks and recreation impacts as less than significant and no mitigation was required for the 2035 scenario and full buildout of the General Plan. Therefore, the impacts of the project are not cumulatively considerable.

## **SOURCES CONSULTED**

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. June 2014.

Clovis, City of. *City of Clovis General Plan*. August 25, 2014

# CHAPTER 19

## Transportation and Traffic

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### INTRODUCTION

This chapter discusses and evaluates the impacts of the proposed project on existing and future transportation and traffic conditions, including vehicular traffic conditions as well as conditions for public transportation and alternative modes of transportation such as walking and bicycling. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to transportation and traffic; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect significant effects of the project on transportation and traffic; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

The analysis in this chapter is based upon a Traffic Impact Analysis prepared for this EIR by JLB Traffic Engineering, Inc. (*Traffic Impact Analysis for the Proposed Master Plan Expansion of the Clovis Community Medical Center at Herndon Avenue and Temperance Avenue, Clovis, California – April 17, 2017*). The report is included in the Draft EIR as Appendix 19.

### ENVIRONMENTAL SETTING

#### Existing Roadway System

The project site and surrounding study area are illustrated in Figure 19.1. Important roadways serving the project site are discussed below:

**State Route (SR) 168** is an existing four-lane freeway in the vicinity of the proposed project site. For regional travel, the City of Clovis relies primarily on SR 168 as it connects the City of Clovis to the City of Fresno on the south. SR 168 continues onto SR 180 south of its interchange with McKinley Avenue and later connects to SR 41.

**Nees Avenue** is an existing east-west two- to four-lane roadway in the vicinity of the proposed project site. Nees Avenue is a four-lane divided arterial from the western Clovis city limits at Willow Avenue to its intersection with Temperance Avenue and a two-lane collector that extends approximately one and a half miles east of Temperance Avenue. The 2035 Clovis General Plan Circulation Element designates Nees Avenue as an arterial west of Locan Avenue and a rural collector between Tollhouse Road and Thompson Avenue within the City of Clovis.

**Alluvial Avenue** is an existing east-west collector in the vicinity of the proposed project site. Alluvial Avenue extends westerly from its intersection with Temperance Avenue through the City of Clovis and into the City of Fresno. East of Temperance Avenue, Alluvial Avenue turns into Owens Mountain Parkway. Alluvial Avenue is a four-lane divided collector west of Temperance Avenue and a two-lane undivided roadway east of Temperance Avenue. Based on information provided by the City of Clovis engineering staff, the easterly extension of Alluvial Avenue (Owens Mountain Parkway) will terminate at the interchange of Nees Avenue and SR 168.

**New Temperance Access Road** is a previously approved right-in right-out local access road to Temperance Avenue.

**Fir Avenue** is an existing divided local roadway adjacent to the proposed project site. Fir Avenue connects Temperance Avenue and Medical Center Drive West and serves as the main access to the Clovis Community Medical Center from SR 168. The 2035 Clovis General Plan Circulation Element designates Fir Avenue as a local street within the City of Clovis.

**Herndon Avenue** is an existing arterial in the vicinity of the proposed project site. Herndon Avenue is an east-west major street that extends through the City of Clovis, City of Fresno and beyond for just over twenty miles. It is also the most northerly continuous route on the Fresno County side of the San Joaquin River. Near the project site, Herndon Avenue is a four-lane divided arterial west of Temperance Avenue and a two-lane undivided arterial east of Temperance Avenue. The 2035 Clovis General Plan Circulation Element designates Herndon Avenue as a six-lane divided expressway between Willow Avenue and SR 168, a six-lane divided arterial between SR 168 and Coventry Avenue, and a four-lane divided arterial east of Coventry Avenue within the City of Clovis.

**Bullard Avenue** is an existing east-west two- to four-lane divided roadway in the vicinity of the proposed project site. In this area, Bullard Avenue is a four-lane undivided arterial between Locan Avenue and De Wolf Avenue. The 2035 Clovis General Plan Circulation Element designates Bullard Avenue as a four-lane divided arterial between Willow Avenue and Harvard Avenue and between Purdue Avenue and McCall Avenue in the City of Clovis.

**Armstrong Avenue** is an existing north-south undivided roadway in the vicinity of the proposed project site. Armstrong Avenue is a two- to four-lane undivided collector from the southern Clovis city limits just south of Ashlan Avenue to its northern terminus at Nees Avenue. The 2035 Clovis General Plan Circulation Element designates Armstrong Avenue between Nees Avenue and the southern City limits as an undivided collector within the City of Clovis.

**Tollhouse Road** is an existing two-lane collector in the vicinity of the proposed project site and traverses the City of Clovis in a northeast-southwest direction. Tollhouse Road exists from Sunnyside Avenue to its intersection with the old Temperance Avenue south of SR 168 and between Medical Center Drive East and Thompson Avenue. The 2035 Clovis General Plan Circulation Element designates Tollhouse Road as a collector between Sunnyside Avenue and Herndon Avenue and a rural collector between Clovis Community Medical Center Drive and Cole Avenue within the City of Clovis.

**Temperance Avenue** is an existing north-south four-lane divided limited access expressway in the vicinity of the proposed project site. It connects to Shepherd Avenue on the north and continues over 16 miles to Golden State Boulevard on the south. The 2035 Clovis General Plan Circulation Element designates Temperance Avenue as an arterial north of SR 168 and an expressway south of SR 168 within the City of Clovis.

**Medical Center Drive** is an existing two-lane undivided collector adjacent to the proposed project site. Medical Center Drive runs on the all sides of the Clovis Community Medical Center, encircling the Medical Center. The 2035 Clovis General Plan Circulation Element designates Medical Center Drive as a private local street within the City of Clovis.

**Coventry Avenue** is an existing street adjacent to the proposed project site. North of Herndon Avenue, Coventry Avenue is a four-lane divided collector connecting Herndon Avenue and Medical Center

Drive South and serves as the main access to the Clovis Community Medical Center from Herndon Avenue. South of Herndon Avenue, Coventry Avenue is a two-lane undivided local street.

**CCMC Access Road** is an existing two-lane undivided local roadway in the vicinity of the proposed project site. CCMC Access Road runs north-south in its connection to Herndon Avenue and east-west in its connection to Medical Center Drive.

**Locan Avenue** is an existing north-south two-lane undivided collector in the vicinity of the proposed project site. In this area, Locan Avenue extends south of Herndon Avenue. The 2035 Clovis General Plan Circulation Element designates Locan Avenue as an undivided collector between Shepherd Avenue and Nees Avenue and south of Herndon Avenue within the City of Clovis.

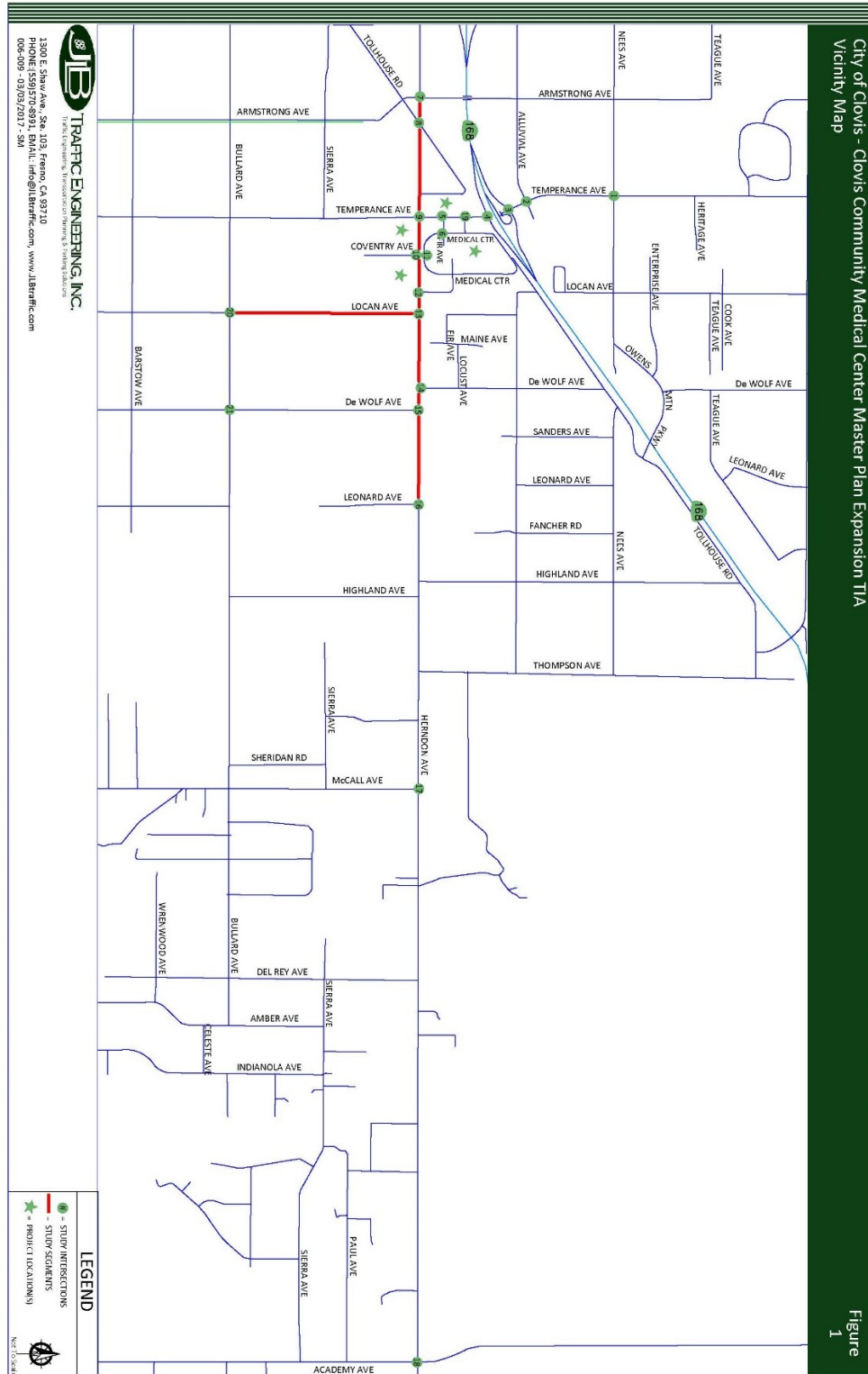
**De Wolf Avenue** is an existing north-south two-lane collector in the vicinity of the proposed project site. In this area, De Wolf Avenue connects Tollhouse Road and Herndon Avenue and continues south of Herndon Avenue approximately five miles to Olive Avenue in the City of Fresno. The 2035 Clovis General Plan Circulation Element designates De Wolf Avenue as an arterial between Shepherd Avenue and Owens Mountain Parkway and a collector between Tollhouse Road and the southern Clovis city limits.

**Leonard Avenue** is an existing north-south two-lane local roadway in the vicinity of the proposed project site. In this area, Leonard Avenue extends southerly from Herndon Avenue approximately one-half mile. The Clovis 2035 General Plan Circulation Element designates Leonard Avenue as a local roadway between Herndon Avenue and Bullard Avenue and a divided arterial between Bullard Avenue and Ashlan Avenue.

**McCall Avenue** is an existing north-south two-lane major roadway in the vicinity of the proposed project site. McCall Avenue extends southerly from Herndon Avenue through the City of Clovis sphere of influence and continues onto the City of Selma beyond SR 99. McCall Avenue is planned to extend northwesterly to the existing intersection of SR 168 and Shepherd Avenue north of Herndon Avenue. The Clovis 2035 General Plan Circulation Element designates McCall Avenue as an arterial within the City of Clovis. Economic and market analysis performed in 2001 for the Southeast Urban Center Specific Plan identified the critical role that the improvement of McCall Avenue will play in the development of commercial properties in the area.

**Academy Avenue** is an existing north-south two-lane major roadway in the vicinity of the proposed project site. Academy Avenue extends southerly from SR 168 through the Cities of Sanger, Parlier, and Kingsburg at the southern edge of Fresno County. The Fresno County General Plan Circulation Element designates Academy Avenue as a rural arterial within the County of Fresno.

Figure 19.1: Vicinity Map





## Existing Traffic Conditions

The Traffic Impact Analysis prepared for the project by JLB Traffic Engineering (discussed in more detail under the “Traffic Impact Analysis” section included later in this chapter) includes an analysis of the existing traffic conditions at intersections and segments that may potentially be impacted by the project. Traffic counts for the existing study intersections and segments are contained in Appendix C of the Traffic Impact Analysis (Draft EIR Appendix 19). Existing traffic volumes, geometrics, and controls are displayed in Figure 19.2

Traffic conditions are evaluated using Level of Service (LOS), which is a qualitative index of the performance of an element of the transportation system. LOS is a rating scale running from “A” to “F”, with “A” indicating no congestion of any kind, and F indicating unacceptable congestion and delays. LOS in this study describes the operating conditions for signalized and unsignalized intersections and roadway segments.

Table 19.1 summarizes the LOS at the study intersections under the existing conditions. Currently, three of the intersections included in the study (Alluvial Avenue and Temperance Avenue, SR 168 WB Ramps and Temperance Avenue, Herndon Avenue and Locan Avenue) were identified as operating at a weekday AM peak level of service more congested than LOS C. All of the study intersections operate at or better than LOS C during the weekday PM peak hours.

Table 19.2 summarizes the LOS on the study roadway segments under the existing conditions. Currently, all of the study roadway segments operate at or better than LOS C.

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**Table 19.1**  
**Existing Intersection LOS Results**

|    | <i>Intersection</i>                    | <i>Intersection Control</i> | <i>(7-9) AM Peak Hour</i>      |            | <i>(2-4) PM Peak Hour</i>      |            |
|----|--|-----------------------------|--------------------------------|------------|--------------------------------|------------|
|    |  |                             | <i>Average Delay (sec/veh)</i> | <i>LOS</i> | <i>Average Delay (sec/veh)</i> | <i>LOS</i> |
| 1  | Nees Avenue / Temperance Avenue        | Signalized                  | 18.0                           | B          | 31.2                           | C          |
| 2  | Alluvial Avenue / Temperance Avenue    | Signalized                  | 44.6                           | D          | 16.0                           | B          |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized                  | 4.9                            | A          | 2.9                            | A          |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized                  | 37.6                           | D          | 32.3                           | C          |
|    |  | Signalized (Mitigated)      | 27.7                           | C          | 14.2                           | B          |
| 5  | Fir Avenue / Temperance Avenue         | Signalized                  | 14.7                           | B          | 9.7                            | A          |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout                  | 6.1                            | A          | 5.6                            | A          |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized                  | 17.8                           | B          | 15.2                           | B          |
| 8  | Herndon Avenue / Tollhouse Road        | Two-Way STOP                | 11.2                           | B          | 13.8                           | B          |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized                  | 33.2                           | C          | 17.0                           | B          |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized                  | 12.8                           | B          | 11.7                           | B          |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP                | 10.3                           | B          | 9.4                            | A          |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP                | 16.5                           | C          | 16.2                           | C          |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP                | 26.7                           | D          | 19.5                           | C          |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP                | 17.2                           | C          | 14.5                           | B          |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP                | 24.1                           | C          | 21.2                           | C          |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP                | 14.1                           | B          | 14.0                           | B          |
| 17 | Herndon Avenue / McCall Avenue         | One-Way STOP                | 15.0                           | C          | 14.3                           | B          |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP                | 13.3                           | B          | 14.3                           | B          |
| 19 | New Access Road / Temperance Avenue    | Does Not Exist              | N/A                            | N/A        | N/A                            | N/A        |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP                | 12.9                           | B          | 10.5                           | B          |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP                | 14.3                           | B          | 11.0                           | B          |

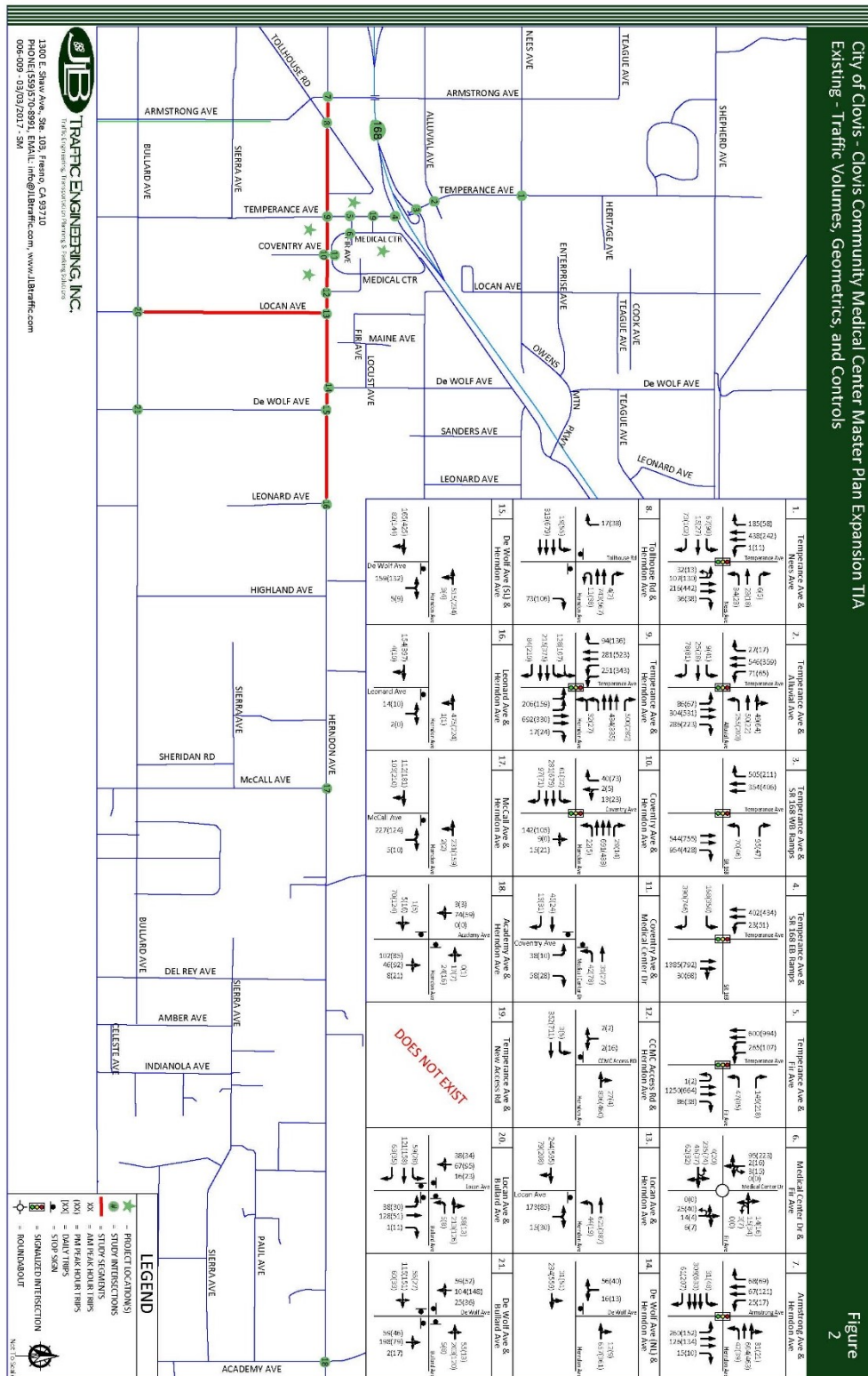
Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls; LOS for Two-Way and One-Way STOP controlled intersections are based on the worst approach/movement of the minor street.

**Table 19.2**  
**Existing Segment LOS Results**

| <i>Study Segment</i> | <i>Limits</i>                               | <i>Lanes</i> | <i>24-hour Volume</i> | <i>LOS</i> |
|----------------------|---|--------------|-----------------------|------------|
| Herndon Avenue       | Armstrong Avenue and Tollhouse Road         | 5            | 14,684                | C          |
| Herndon Avenue       | Tollhouse Road and Temperance Avenue        | 5            | 15,142                | C          |
| Herndon Avenue       | Temperance Avenue and Coventry Avenue       | 5            | 14,937                | C          |
| Herndon Avenue       | Coventry Avenue and CCMC Access Road        | 2            | 12,714                | C          |
| Herndon Avenue       | CCMC Access Road and Locan Avenue           | 2            | 12,878                | C          |
| Herndon Avenue       | Locan Avenue and De Wolf Avenue (NL)        | 2            | 9,654                 | C          |
| Herndon Avenue       | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 2            | 8,637                 | C          |
| Herndon Avenue       | De Wolf Avenue (SL) and Leonard Avenue      | 2            | 7,611                 | C          |
| Locan Avenue         | Herndon Avenue and Bullard Avenue           | 2            | 1,886                 | B          |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

### Figure 19.2: Existing Traffic Volumes, Geometrics, and Controls



## **Public and Alternative Transportation**

### *Bus Service*

Clovis Transit Service is the operator of the Clovis Stageline transit system that serves the City of Clovis. Currently, the nearest transit stop to the project site is the Clovis Stageline Transit Route 50. Route 50 runs in the vicinity of the proposed project via Temperance Avenue. This route provides a direct connection to Cal Skate, Kaiser Medical Center, Sierra Vista Mall, Clovis High School, CART (Center for Applied Research and Technology), Mickey Cox Elementary School, Clovis Community Medical Center, Clovis Civic Center, and Clark Junior High School. Route 50 operates at one-hour intervals Monday through Saturday. The bus stop nearest to the project site is located on Temperance Avenue north of the intersection at Temperance Avenue and Fir Avenue.

### *Bicycle and Pedestrian Transportation*

Within the project area, there are sidewalks generally present along properties where there is existing development. The existing CCMC campus also includes several paved pedestrian walkways. Additionally, the City of Clovis' Active Transportation shows a planned extension of an existing pedestrian trail along the length of the Enterprise Canal to the east of the project site. There are currently no sidewalks along the undeveloped portions of Herndon Avenue or on the west side of Temperance Avenue.

There are existing Class II bike lanes on both sides of Herndon Avenue and Temperance Avenue within the project area. The Circulation Element of the Clovis General Plan designates Herndon Avenue and Temperance Avenue as being improved with Class II bike lanes.

## **REGULATORY AND POLICY SETTING**

### **State Regulations**

#### *California Department of Transportation (Caltrans)*

Caltrans has authority over the state highway system, including freeways, interchanges, and arterial State Routes. Caltrans approves the planning, design, and construction of improvements for all state-controlled facilities, including State Route (SR) 168 and its associated interchanges and intersections in Clovis. Caltrans also provides administrative support for transportation programming decisions made by the CTC for state funding programs. The State Transportation Improvement Program is a multiyear capital improvement program that sets priorities and funds transportation projects envisioned in long-range transportation plans.

Caltrans requirements are described in their Guide for the Preparation of Traffic Impact Studies (Caltrans 2002), which covers the information needed for Caltrans to review the impacts on state highway facilities, including freeway segments. The Guide for the Preparation of Traffic Impact Studies states that "Caltrans endeavors to maintain a target LOS at the transition between LOS 'C' and LOS 'D' on state highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS." The Guide also states that where "an existing State highway facility is operating at less than the appropriate target LOS, the existing measure of effectiveness (MOE) should be maintained."

### Caltrans Level of Service Standard

Caltrans also prepares comprehensive planning documents, including Corridor System Management Plans (CSMPs) and Transportation Concept Reports (TCRs), which are long-range planning documents that establish a planning concept for state facilities. The CSMPs and TCRs identify a concept LOS, or “target” LOS, for the applicable highway facility. A deficiency or need for improvement is triggered when the actual LOS falls below the concept LOS. Caltrans released the most recent TCR for SR-168 in October 2005. For the study area, the SR-168 TCR identifies LOS D as the route concept LOS.

### **Local Regulations**

#### *City of Clovis General Plan*

The following goals and policies from the Clovis General Plan related to transportation and traffic were identified as relevant to the project:

Goal 1: A context-sensitive and “complete streets” transportation network that prioritizes effective connectivity and accommodates a comprehensive range of mobility needs.

*Policy 1.1 Multimodal network.* The city shall plan, design, operate, and maintain the transportation network to promote safe and convenient travel for all users: pedestrians, bicyclists, transit riders, freight, and motorists.

*Policy 1.3 Age and mobility.* The design of roadways shall consider all potential users, including children, seniors, and persons with disabilities

Goal 2: A roadway network that is well planned, funded, and maintained.

*Policy 2.3 Fair share costs.* New development shall pay its fair share of the cost for circulation improvements in accordance with the city’s traffic fee mitigation program.

*Policy 2.4 Right-of-way dedication.* The city may require right-of-way dedication essential to the circulation system in conjunction with any development or annexation. The City shall request the County of Fresno to apply the same requirements in the Clovis planning area

Goal 3: A multimodal transportation network that is safe and comfortable in the context of adjacent neighborhoods.

*Policy 3.7 Conflict points.* Minimize the number of and enhance safety at vehicular, pedestrian, and bicycle conflict points.

*Policy 3.8 Access management.* Minimize access points and curb cuts along arterials and prohibit them within 200 feet of an intersection where possible. Eliminate and/or consolidate driveways when new development occurs or when traffic operation or safety warrants.

Goal 4: A bicycle and transit system that serves as a functional alternative to commuting by car.

*Policy 4.1 Bike and transit backbone.* The bicycle and transit system should connect Shaw Avenue, Old Town, the Medical Center/R&T Park, and the three Urban Centers.

Goal 5: A complete system of trails and pathways accessible to all residents.

*Policy 5.1 Complete street amenities.* Upgrade existing streets and design new streets to include complete street amenities, prioritizing improvements to bicycle and pedestrian connectivity or safety, consistent with the Bicycle Transportation Master Plan and other master plans.

*Policy 5.2 Development-funded facilities.* Require development to fund and construct facilities as shown in the Bicycle Transportation Plan when facilities are in or adjacent to the development.

#### City of Clovis Level of Service Standard

The Clovis General Plan has established LOS D as the acceptable level of traffic congestion during AM and PM peak hours. LOS D is used to evaluate the potential significance of LOS impacts to intersections and segments within the City of Clovis and its sphere of influence (SOI).

#### *City of Clovis Active Transportation Plan*

The City of Clovis has adopted an Active Transportation Plan which sets forth a comprehensive plan of bicycle and pedestrian networks within the City of Clovis. The Active Transportation Plan complements the City of Clovis General Plan, which makes many references to bicycle and pedestrian travel. As discussed in Chapter 13, Land Use and Planning, the subject proposal is consistent with the Active Transportation Plan as it will maintain and/or add bike lanes and sidewalks within the project area in a manner that matches designations within the plan.

#### *City of Clovis Design Guidelines*

The project plans must comply with the City of Clovis' design guidelines for off-site improvements, including but not limited to, dedications, vacations, street and alley paving, bike lanes and paths, curb, gutter, sidewalk, driveway approaches, curb ramps, street lights, traffic signals, and under grounding utilities. The City's Engineering Division administers the review and approval process for the off-site improvement plans.

#### *Fresno County General Plan*

The following goals and policies from the Fresno County General Plan related to transportation and traffic have been identified as relevant to the project:

*Policy TR-A.5.* The County shall require dedication of right-of-way or dedication and construction of planned road facilities as a condition of land development, and require an analysis of impacts of traffic from all land development projects including impacts from truck traffic. Each such project shall construct or fund improvements necessary to mitigate the effects of traffic from the project. The County may allow a project to fund a fair share of improvements that provide significant benefit to others through traffic impact fees.

*Policy TR-A.12.* The County, where appropriate, shall coordinate the multi-modal use of streets and highways to ensure their maximum efficiency and shall consider the need for transit, bikeway, and recreational trail facilities when establishing the Ultimate Right-of-way Plan and Precise Plans of streets and highways.

### Fresno County Level of Service Standard

The Fresno County General Plan states that the County shall strive to meet Level of Service (LOS) D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county. Exceptions to the level of service standards are permitted where the improvements or other measures required to achieve the LOS policy are unacceptable based on established criteria, including: the right-of-way needs and the physical impacts on surrounding properties; construction and right-of-way acquisition costs; the number of hours that the roadway would operate at conditions below the standard; the ability of the required improvement to significantly reduce delay and improve traffic operations; and environmental impacts upon which the County may base findings to allow an exceedance of the standards. The General Plan further states in no case should the County plan for worse than LOS D on rural County roadways, worse than LOS E on urban roadways within the spheres of influence of the cities of Fresno and Clovis, or in cooperation with Caltrans and the Council of Fresno County Governments, plan for worse than LOS E on State highways in the county.

### *Congestion Management Process*

Adopted in October 2009, the Fresno County Congestion Management Process (CMP) identifies and evaluates the performance of the county's transportation system, identifies congestion areas, and evaluates ways to relieve and/or manage congestion within the county. The Fresno County CMP lists several roads in the City of Clovis as regionally significant roads, including Herndon Avenue, Temperance Avenue, and State Route 168. The adopted LOS thresholds applied by geographical area in the Fresno County CMP are consistent with the LOS thresholds adopted by the County of Fresno, City of Fresno, and City of Clovis, according to the area where the facility is located.

### **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects related to transportation and traffic are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section XVI, a through e:

Would the project:

- (a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?
- (b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

- (c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?
- (d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
- (e) Result in inadequate emergency access?
- (f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

## TRAFFIC IMPACT ANALYSIS

A Traffic Impact Analysis (TIA) was prepared by JLB Traffic Engineering to evaluate traffic conditions at the study intersections and segments that may be impacted by the proposed project. The scope of work was prepared via consultation with the City of Clovis, City of Fresno, County of Fresno, and Caltrans staff. Based on the comments received, this study includes in the analysis the additional intersections and segment requested by the City of Clovis and County of Fresno. A complete copy of the Traffic Impact Analysis is included as Appendix 19 to this Draft EIR.

### Study Intersections and Roadway Segments

The study intersections and roadway segments are listed in Tables 19.1 and 19.2, respectively, which are included above as part of the “Environmental Setting” section in this chapter.

### Study Scenarios

The five scenarios described below were addressed in the study:

**Existing Conditions:** This scenario evaluates existing traffic volumes and roadway conditions based on year 2016 traffic.

**Existing plus Phase 1 Project Conditions:** This scenario evaluates total traffic volumes and roadway conditions based on the addition of the Ten-Year Expansion Plan (Phase 1) traffic to the previous scenario. The Project Phase 1 trips to the study intersections were based on JLB’s knowledge of the existing roadway network, engineering judgement, residential and commercial densities, and the City of Clovis Circulation Element in the vicinity of the Project.

**Near Term plus Phase 1 Project Conditions:** This scenario evaluates total traffic volumes and roadway conditions based on the addition of the Near Term traffic to the previous scenario. To derive at the Near Term plus Project Phase 1 traffic volumes, this scenario expands the traffic volumes in the Existing plus Project Phase 1 scenario by adding the Near Term related trips. The list of Near Term projects is included in Table VIII of Draft EIR Appendix 19.

**Cumulative Year 2035 No Project Conditions:** This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2035 without the proposed Project. The Cumulative Year 2035 No Project traffic volumes were obtained by subtracting the Project build-out trips from the Cumulative Year 2035 plus Project scenario.

**Cumulative Year 2035 plus Project Conditions:** This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2035 with the proposed Project. The Cumulative Year 2035 plus Project traffic volumes were obtained from the Fresno COG traffic model runs (Base Year 2016 and the Cumulative Year 2035 plus Project) and existing traffic



counts. Under this scenario, the increment method as recommended by the Model Steering Committee was utilized to determine the Cumulative Year 2035 plus Project traffic volumes. The Fresno COG Traffic Model runs are contained in Appendix D of the Traffic Impact Analysis (Draft EIR Appendix 19).

### Trip Generation

Trip generation for the proposed project is based on information provided by Clovis Community Medical Center, the City of Clovis and the Institute of Transportation Engineers (ITE) reference, *Trip Generation, 9th Edition*. Table 19.3 summarizes the trip generation for the proposed Phase 1 Expansion Plan (Year 2026), and Table 19.4 summarizes the additional trip generation of the Phase 2 Long-Range Master Plan (Year 2035). Phase 1 of the CCMC is estimated to generate a maximum of 15,121 daily trips, 756 AM peak hour trips and 1,278 PM peak hour trips, while Phase 2 of the CCMC is estimated to generate a maximum of 14,887 daily trips, 866 AM peak hour trips and 1,374 PM peak hour trips. Table 19.5 summarizes the cumulative trip generation of the CCMC Phase 1 (Year 2026) and Phase 2 Long-Range (Year 2035) Plans at build-out. At build-out, the CCMC Project is estimated to generate a maximum of 30,008 daily trips, 1,622 AM peak hour trips and 2,652 PM peak hour trips.

**Table 19.3**  
**Phase 1 (2026) Project Only Trip Generation**

| Land Use (ITE CODE)                  | Size    | Unit          | Daily |               | A.M. Peak Hour |            |            |            |            | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|---------|---------------|-------|---------------|----------------|------------|------------|------------|------------|----------------|------------|------------|------------|--------------|
|                                      |         |               | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total      | Trip Rate      | In : Out % | In         | Out        | Total        |
| Hotel (310)                          | 150     | Occupied Beds | 8.92  | 1,338         | 0.67           | 58 : 42    | 59         | 42         | 101        | 0.70           | 49 : 51    | 51         | 54         | 105          |
| Shopping Center (820)                | 150,000 | k.s.f.        | 42.70 | 6,405         | 0.96           | 62 : 38    | 89         | 55         | 144        | 3.71           | 48 : 52    | 267        | 290        | 557          |
| Hospital (610)                       | 300,172 | k.s.f.        | 13.22 | 3,968         | 0.95           | 63 : 37    | 180        | 105        | 285        | 0.93           | 38 : 62    | 106        | 173        | 279          |
| Medical-Dental Office Building (710) | 94,392  | k.s.f.        | 36.13 | 3,410         | 2.39           | 79 : 21    | 179        | 47         | 226        | 3.57           | 28 : 72    | 94         | 243        | 337          |
| <b>Total Project Trips</b>           |         |               |       | <b>15,121</b> |                |            | <b>507</b> | <b>249</b> | <b>756</b> |                |            | <b>518</b> | <b>760</b> | <b>1,278</b> |

Notes: k.s.f. = Thousand Square Feet

**Table 19.4**  
**Phase 2 (2035) Additional Project Only Trip Generation**

| Land Use (ITE CODE)                  | Size    | Unit          | Daily |               | A.M. Peak Hour |            |            |            |            | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|---------|---------------|-------|---------------|----------------|------------|------------|------------|------------|----------------|------------|------------|------------|--------------|
|                                      |         |               | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total      | Trip Rate      | In : Out % | In         | Out        | Total        |
| Assisted Living (254)                | 100     | Occupied Beds | 2.74  | 274           | 0.18           | 68 : 32    | 12         | 6          | 18         | 0.29           | 50 : 50    | 15         | 14         | 29           |
| Hospital (610)                       | 168,672 | k.s.f.        | 13.22 | 2,230         | 0.95           | 63 : 37    | 101        | 59         | 160        | 0.93           | 38 : 62    | 60         | 97         | 157          |
| Medical-Dental Office Building (710) | 260,000 | k.s.f.        | 36.13 | 9,394         | 2.39           | 79 : 21    | 491        | 130        | 621        | 3.57           | 28 : 72    | 260        | 668        | 928          |
| Shopping Center (820)                | 70,000  | k.s.f.        | 42.70 | 2,989         | 0.96           | 62 : 38    | 42         | 25         | 67         | 3.71           | 48 : 52    | 125        | 135        | 260          |
| <b>Total Project Trips</b>           |         |               |       | <b>14,887</b> |                |            | <b>646</b> | <b>220</b> | <b>866</b> |                |            | <b>460</b> | <b>914</b> | <b>1,374</b> |

Notes: k.s.f. = Thousand Square Feet

**Table 19.5**  
**Year 2035 Total Project Only Trip Generation**

|                            | Daily         | A.M. Peak Hour |            |              | P.M. Peak Hour |              |              |
|----------------------------|---------------|----------------|------------|--------------|----------------|--------------|--------------|
|                            | Total         | In             | Out        | Total        | In             | Out          | Total        |
| <b>Total Project Trips</b> | <b>30,008</b> | <b>1,153</b>   | <b>469</b> | <b>1,622</b> | <b>978</b>     | <b>1,674</b> | <b>2,652</b> |

Notes: k.s.f. = Thousand Square Feet  
R = Rates developed from ITE regression equations

## Trip Distribution

The trip distribution assumptions for the study were based on existing travel patterns, the Fresno COG traffic model runs, communication with City of Clovis staff, knowledge of the study area, traffic engineering judgement, and the Clovis General Plan Circulation Element.

## Existing Plus Project Phase 1 Conditions:

As indicated by Table 19.7, except for the intersection of SR 168 EB Ramps at Temperance Avenue, all study intersections are projected to operate at an acceptable LOS during both the AM and PM peak hours. To improve the LOS at the intersection of SR 168 EB Ramps at Temperance Avenue, the study recommended that a second eastbound right-turn lane and third northbound through lane be added and that the existing traffic signal be modified to accommodate the added lane geometrics. With implementation of the recommended improvements, all study segments are projected to operate at an acceptable LOS under this scenario (see Table 19.7).

**Table 19.6**  
**Existing plus Project Phase 1 Intersection LOS Results**

|    | <i>Intersection</i>                    | <i>Intersection Control</i> | <i>(7-9) AM Peak Hour</i>      |            | <i>(2-4) PM Peak Hour</i>      |            |
|----|--|-----------------------------|--------------------------------|------------|--------------------------------|------------|
|    |  |                             | <i>Average Delay (sec/veh)</i> | <i>LOS</i> | <i>Average Delay (sec/veh)</i> | <i>LOS</i> |
| 1  | Nees Avenue / Temperance Avenue        | Signalized                  | 24.2                           | C          | 21.2                           | C          |
| 2  | Alluvial Avenue / Temperance Avenue    | Signalized                  | 37.7                           | D          | 24.8                           | C          |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized                  | 6.4                            | A          | 1.7                            | A          |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized                  | <b>65.0</b>                    | <b>E</b>   | <b>77.6</b>                    | <b>E</b>   |
|    |  | Signalized (Mitigated)      | 17.8                           | B          | 22.6                           | C          |
| 5  | Fir Avenue / Temperance Avenue         | Signalized                  | 33.6                           | C          | 31.1                           | C          |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout                  | 9.2                            | A          | 8.8                            | A          |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized                  | 37.8                           | D          | 46.1                           | D          |
| 8  | Herndon Avenue / Tollhouse Road        | Two-Way STOP                | 11.4                           | B          | 15.3                           | C          |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized                  | 52.4                           | D          | 31.2                           | C          |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized                  | 38.8                           | D          | 22.8                           | C          |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP                | 13.6                           | B          | 10.8                           | B          |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP                | 11.9                           | B          | 9.9                            | A          |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP                | 28.9                           | D          | 22.9                           | C          |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP                | 13.2                           | B          | 11.7                           | B          |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP                | 23.7                           | C          | 19.9                           | C          |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP                | 14.4                           | B          | 14.6                           | B          |
| 17 | Herndon Avenue / McCall Avenue         | One-Way STOP                | 15.5                           | C          | 15.0                           | C          |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP                | 13.5                           | B          | 14.8                           | B          |
| 19 | New Access Road / Temperance Avenue    | One-Way STOP                | 21.0                           | C          | 19.5                           | C          |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP                | 13.7                           | B          | 11.4                           | B          |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP                | 15.1                           | C          | 11.7                           | B          |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
LOS for Two-Way and One-Way STOP controlled intersections are based on the worst approach/movement of the minor street.

**Table 19.7**  
**Existing plus Project Phase 1 Segment LOS Results**

| <i>Study Segment</i> | <i>Limits</i>                               | <i>Lanes</i> | <i>24-hour Volume</i> | <i>LOS</i> |
|----------------------|---|--------------|-----------------------|------------|
| Herndon Avenue       | Armstrong Avenue and Tollhouse Road         | 5            | 16,631                | C          |
| Herndon Avenue       | Tollhouse Road and Temperance Avenue        | 5            | 18,003                | C          |
| Herndon Avenue       | Temperance Avenue and Coventry Avenue       | 6            | 15,597                | C          |
| Herndon Avenue       | Coventry Avenue and CCMC Access Road        | 4            | 13,358                | C          |
| Herndon Avenue       | CCMC Access Road and Locan Avenue           | 4            | 13,744                | C          |
| Herndon Avenue       | Locan Avenue and De Wolf Avenue (NL)        | 4            | 10,077                | C          |
| Herndon Avenue       | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 4            | 9,048                 | B          |
| Herndon Avenue       | De Wolf Avenue (SL) and Leonard Avenue      | 2            | 7,975                 | C          |
| Locan Avenue         | Herndon Avenue and Bullard Avenue           | 2            | 2,329                 | B          |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

### **Near Term Plus Project Phase 1 Conditions:**

Under this scenario, except for the intersections of Alluvial Avenue at Temperance Avenue, SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Temperance Avenue, and Herndon Avenue at De Wolf Avenue (south leg), all intersections are projected to operate at acceptable LOS during both the AM and PM peak hours (see Table 19.8). To improve the LOS at each one of the intersections projected to exceed its LOS threshold, the study recommended that the improvement measures recommended under the “Existing plus Project Phase 1” scenario be implemented along with the following additional improvements:

#### Alluvial Avenue at Temperance Avenue:

- Add a second westbound left-turn lane
- Convert the westbound thru-right lane to a thru lane
- Add a westbound right-turn lane
- Add a second northbound right-turn lane
- Modify the traffic signal to accommodate the added lane geometrics

#### Herndon Avenue at Temperance Avenue:

- Implement overlap phasing of the westbound right-turn with the southbound left-turn phase
- Prohibit southbound to northbound U-turns

#### Herndon Avenue at De Wolf Avenue (south leg):

- Add All-Way STOP traffic controls

With implementation of the recommended improvements, all study segments are projected to operate at an acceptable LOS under this scenario (see Table 19.9).

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**Table 19.8**  
**Near Term plus Project Phase 1 Intersection LOS Results**

|    | <i>Intersection</i>                    | <i>Intersection Control</i> | <i>(7-9) AM Peak Hour</i>          |            | <i>(2-4) PM Peak Hour</i>          |            |
|----|--|-----------------------------|------------------------------------|------------|------------------------------------|------------|
|    |  |                             | <i>Average Delay<br/>(sec/veh)</i> | <i>LOS</i> | <i>Average Delay<br/>(sec/veh)</i> | <i>LOS</i> |
| 1  | Nees Avenue / Temperance Avenue        | Signalized                  | 33.2                               | C          | 29.9                               | C          |
| 2  | Alluvial Avenue / Temperance Avenue    | Signalized                  | >120                               | F          | 112.7                              | F          |
|    |  | Signalized (Mitigated)      | 44.7                               | D          | 51.8                               | D          |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized                  | 4.3                                | A          | 2.5                                | A          |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized                  | 81.9                               | F          | 87.0                               | F          |
|    |  | Signalized (Mitigated)      | 33.1                               | C          | 20.9                               | C          |
| 5  | Fir Avenue / Temperance Avenue         | Signalized                  | 54.3                               | D          | 40.0                               | D          |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout                  | 9.2                                | A          | 8.8                                | A          |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized                  | 38.4                               | D          | 51.3                               | D          |
| 8  | Herndon Avenue / Tollhouse Rodd        | Two-Way STOP                | 11.7                               | B          | 16.0                               | C          |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized                  | 58.3                               | E          | 37.2                               | D          |
|    |  | Signalized (Mitigated)      | 39.9                               | D          | 27.0                               | C          |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized                  | 40.3                               | D          | 48.5                               | D          |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP                | 13.6                               | B          | 10.8                               | B          |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP                | 12.1                               | B          | 10.0                               | B          |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP                | 32.2                               | D          | 25.6                               | D          |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP                | 13.4                               | B          | 12.4                               | B          |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP                | 25.7                               | D          | 21.5                               | C          |
|    |  | All-Way STOP (Mitigated)    | 20.5                               | C          | 15.3                               | C          |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP                | 14.9                               | B          | 14.9                               | B          |
| 17 | Herndon Avenue / McCall Avenue         | One-Way STOP                | 15.7                               | C          | 15.3                               | C          |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP                | 13.6                               | B          | 14.9                               | B          |
| 19 | New Access Rodd / Temperance Avenue    | One-Way STOP                | 30.6                               | D          | 24.3                               | C          |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP                | 15.0                               | B          | 12.2                               | B          |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP                | 16.1                               | C          | 12.4                               | B          |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
 LOS for Two-Way and One-Way STOP controlled intersections are based on the worst approach/movement of the minor street.

**Table 19.9**  
**Near Term plus Project Phase 1 Segment LOS Results**

| <i>Study Segment</i> | <i>Limits</i>                               | <i>Lanes</i> | <i>24-hour<br/>Volume</i> | <i>LOS</i> |
|----------------------|---|--------------|---------------------------|------------|
| Herndon Avenue       | Armstrong Avenue and Tollhouse Road         | 5            | 23,111                    | C          |
| Herndon Avenue       | Tollhouse Road and Temperance Avenue        | 5            | 24,603                    | C          |
| Herndon Avenue       | Temperance Avenue and Coventry Avenue       | 6            | 16,337                    | C          |
| Herndon Avenue       | Coventry Avenue and CCMC Access Road        | 4            | 14,048                    | C          |
| Herndon Avenue       | CCMC Access Road and Locan Avenue           | 4            | 14,434                    | C          |
| Herndon Avenue       | Locan Avenue and De Wolf Avenue (NL)        | 4            | 10,617                    | C          |
| Herndon Avenue       | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 4            | 9,528                     | B          |
| Herndon Avenue       | De Wolf Avenue (SL) and Leonard Avenue      | 2            | 8,355                     | C          |
| Locan Avenue         | Herndon Avenue and Bullard Avenue           | 2            | 2,519                     | B          |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

### **Cumulative Year 2035 No Project Conditions**

Under this scenario, many of the study intersections are expected to exceed their respective LOS thresholds, including the intersections of Alluvial Avenue at Temperance Avenue, SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (north leg), Herndon Avenue at De Wolf Avenue (south leg), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue (see Table 19.10). To improve the LOS at each one of the intersections projected to exceed its LOS threshold, the study recommended that the following improvement measures as presented below be implemented:

#### Alluvial Avenue at Temperance Avenue:

- Add a second westbound left-turn lane
- Convert the westbound thru-right lane to a thru lane
- Add a westbound right-turn lane
- Add a second northbound right-turn lane
- Add an eastbound thru lane
- Modify the traffic signal to accommodate the added lane geometrics

#### SR 168 EB Ramps at Temperance Avenue:

- Add a second eastbound left-turn lane
- Add a second eastbound right-turn lane
- Add a third northbound thru lane
- Modify the traffic signal to accommodate the added lane geometrics

#### Herndon Avenue at Armstrong Avenue:

- Add a third westbound thru lane
- Modify the traffic signal to accommodate the added lane

#### Herndon Avenue at Temperance Avenue:

- Implement overlap phasing of the westbound right-turn with the southbound left-turn phase
- Prohibit southbound to northbound U-turns

#### Herndon Avenue at Locan Avenue:

- Signalize the intersection
- Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue

#### Herndon Avenue at De Wolf Avenue (NL):

- Signalize the intersection
- Limit pedestrian crosswalks across Herndon Avenue to the west leg of Herndon Avenue

#### Herndon Avenue at De Wolf Avenue (SL):

- Convert the westbound left-thru lane to a thru lane
- Add a westbound left-turn lane

- Signalize the intersection
- Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue

Herndon Avenue at Leonard Avenue:

- Convert the westbound left-thru lane to a thru lane
- Add a westbound left-turn lane
- Signalize the intersection
- Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue

Herndon Avenue at McCall Avenue:

- Convert the eastbound left-thru-right lane to a thru-right lane
- Convert the westbound left-thru-right lane to a thru-right lane
- Convert the northbound left-thru-right lane to a thru-right lane
- Convert the southbound left-thru-right lane to a thru-right lane
- Add left-turn lanes to all approaches
- Signalize the intersection

Herndon Avenue at Academy Avenue:

- Convert the eastbound left-thru-right lane to a left-thru lane
- Add an eastbound right-turn lane
- Convert the northbound left-thru-right lane to a thru-right lane
- Add a northbound left-turn lane
- Implement All-Way STOP controls

Bullard Avenue at Locan Avenue:

- Add a second eastbound thru lane
- Add a second westbound thru lane
- Convert the southbound left-thru-right lane to a thru-right lane
- Add a southbound left-turn lane
- Signalize the intersection

Bullard Avenue at De Wolf Avenue:

- Add an eastbound left-turn lane
- Convert the eastbound left-thru-right lane to a thru lane
- Add an eastbound right-turn lane
- Convert the westbound left-thru-right lane to a thru-right lane
- Add a westbound left-turn lane
- Convert the northbound left-thru-right lane to a thru-right lane
- Add a northbound left-turn lane
- Convert the southbound left-thru-right lane to a thru-right lane
- Add a southbound left-turn lane
- Signalize the intersection

With implementation of the recommended improvements, all study segments are projected to operate at an acceptable LOS under this scenario (see Table 19.11).

**Table 19.10**  
**Cumulative Year 2035 No Project Intersection LOS Results**

|    | <i>Intersection</i>                    | <i>Intersection Control</i> | <i>(7-9) AM Peak Hour</i>          |            | <i>(2-4) PM Peak Hour</i>          |            |
|----|--|-----------------------------|------------------------------------|------------|------------------------------------|------------|
|    |  |                             | <i>Average Delay<br/>(sec/veh)</i> | <i>LOS</i> | <i>Average Delay<br/>(sec/veh)</i> | <i>LOS</i> |
| 1  | Nees Avenue / Temperance Avenue        | Signalized                  | 36.1                               | D          | 27.7                               | C          |
| 2  | Alluvial Avenue / Temperance Avenue    | Signalized                  | <b>108.1</b>                       | <b>F</b>   | <b>95.4</b>                        | <b>F</b>   |
|    |  | Signalized (Mitigated)      | 41.6                               | D          | 38.2                               | D          |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized                  | 6.7                                | A          | 4.5                                | A          |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized                  | <b>46.1</b>                        | <b>D</b>   | <b>50.8</b>                        | <b>D</b>   |
|    |  | Signalized (Mitigated)      | 23.5                               | C          | 30.2                               | C          |
| 5  | Fir Avenue / Temperance Avenue         | Signalized                  | 14.3                               | B          | 10.1                               | B          |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout                  | 6.1                                | A          | 5.6                                | A          |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized                  | <b>64.1</b>                        | <b>E</b>   | 28.9                               | C          |
|    |  | Signalized (Mitigated)      | 48.5                               | D          | 42.6                               | D          |
| 8  | Herndon Avenue / Tollhouse Road        | Two-Way STOP                | 15.4                               | C          | 21.9                               | C          |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized                  | <b>65.4</b>                        | <b>E</b>   | 31.7                               | D          |
|    |  | Signalized (Mitigated)      | 49.9                               | D          | 45.8                               | D          |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized                  | 26.8                               | C          | 12.1                               | B          |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP                | 9.8                                | A          | 9.4                                | A          |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP                | 17.3                               | C          | 13.4                               | B          |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP                | <b>&gt;120</b>                     | <b>F</b>   | <b>&gt;120</b>                     | <b>F</b>   |
|    |  | Signalized (Mitigated)      | 21.0                               | C          | 18.5                               | B          |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP                | 19.3                               | C          | <b>37.4</b>                        | <b>E</b>   |
|    |  | Signalized (Mitigated)      | 3.8                                | A          | 3.1                                | A          |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP                | <b>&gt;120</b>                     | <b>F</b>   | <b>&gt;120</b>                     | <b>F</b>   |
|    |  | Signalized (Mitigated)      | 22.0                               | C          | 22.3                               | C          |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP                | <b>69.5</b>                        | <b>F</b>   | <b>&gt;120</b>                     | <b>F</b>   |
|    |  | Signalized (Mitigated)      | 16.9                               | B          | 22.7                               | C          |
| 17 | Herndon Avenue / McCall Avenue         | Two-Way STOP                | <b>&gt;120</b>                     | <b>F</b>   | <b>&gt;120</b>                     | <b>F</b>   |
|    |  | Signalized (Mitigated)      | 40.3                               | D          | 39.5                               | D          |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP                | <b>26.3</b>                        | <b>D</b>   | <b>93.3</b>                        | <b>F</b>   |
|    |  | All-Way STOP (Mitigated)    | 10.9                               | B          | 16.6                               | C          |
| 19 | New Access Road / Temperance Avenue    | Does Not Exist              | N/A                                | N/A        | N/A                                | N/A        |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP                | <b>64.1</b>                        | <b>F</b>   | <b>67.4</b>                        | <b>F</b>   |
|    |  | Signalized (Mitigated)      | 48.5                               | D          | 42.5                               | D          |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP                | <b>68.7</b>                        | <b>F</b>   | <b>78.1</b>                        | <b>F</b>   |
|    |  | Signalized (Mitigated)      | 49.2                               | D          | 40.6                               | D          |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
 LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.



**Table 19.11**  
**Cumulative Year 2035 No Project Segment LOS Results**

| <i><b>Study Segment</b></i> | <i><b>Limits</b></i>                        | <i><b>Lanes</b></i> | <i><b>24-hour Volume</b></i> | <i><b>LOS</b></i> |
|-----------------------------|---|---------------------|------------------------------|-------------------|
| Herndon Avenue              | Armstrong Avenue and Tollhouse Road         | 5                   | 25,960                       | C                 |
| Herndon Avenue              | Tollhouse Road and Temperance Avenue        | 5                   | 29,140                       | C                 |
| Herndon Avenue              | Temperance Avenue and Coventry Avenue       | 6                   | 33,330                       | C                 |
| Herndon Avenue              | Coventry Avenue and CCMC Access Road        | 4                   | 31,400                       | C                 |
| Herndon Avenue              | CCMC Access Road and Locan Avenue           | 4                   | 31,870                       | C                 |
| Herndon Avenue              | Locan Avenue and De Wolf Avenue (NL)        | 4                   | 23,840                       | C                 |
| Herndon Avenue              | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 4                   | 22,870                       | C                 |
| Herndon Avenue              | De Wolf Avenue (SL) and Leonard Avenue      | 2                   | 15,580                       | C                 |
| Locan Avenue                | Herndon Avenue and Bullard Avenue           | 2                   | 14,970                       | C                 |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

### **Cumulative Year 2035 Plus Project Conditions:**

Under this scenario, many of the study intersections are expected to exceed their respective LOS thresholds. These include, in addition to all of the intersections presented in the Cumulative Year 2035 No Project scenario, the intersections of Fir Avenue at Temperance Avenue and Herndon Avenue at Tollhouse Road (see table 19.12). To improve the LOS at each of the intersections projected to exceed its LOS threshold, the study recommended that the improvement measures recommended under the “Cumulative Year 2035 No Project” scenario be implemented along with the following additional improvements:

For the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (NL), Herndon Avenue at De Wolf Avenue (SL), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue, it is recommended that the same improvements presented in the Cumulative 2035 No Project Scenario be implemented.

Alluvial Avenue at Temperance Avenue:

- Implement the recommendations presented for the Cumulative Year 2035 No Project
- Implement overlap phasing of the northbound right-turn with the westbound left-turn phase
- Prohibit westbound to eastbound U-turns
- Modify the traffic signal to accommodate the phasing overlap

Fir Avenue at Temperance Avenue:

- Add a northbound thru lane
- Modify the traffic signal to accommodate the added lane

Herndon Avenue at Tollhouse Road:

- The worst movement is the northbound right. It is anticipated that as the volume of this movement increases, it will experience a higher peak hour factor in the future, which in turn will improve its LOS to D. Should a higher peak hour factor not

materialize, then it is recommended that all truck traffic be prohibited from using Tollhouse Road between Armstrong Avenue and Herndon Avenue.

New Access Road at Temperance Avenue:

- By the year 2035 it is projected that the LOS for this intersection will drop below LOS D. As this intersection is limited to right-in and right-out access, the additions of lanes is not projected to improve its LOS and implementation of a traffic signal or All-Way STOPs are not projected to be warranted. As a result, the projected LOS at this intersection would be considered adverse but not significant and therefore mitigation measures are not recommended.

With implementation of the recommended improvements, all study segments are projected to operate at an acceptable LOS under this scenario (see Table 19.13).

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**Table 19.12**  
**Cumulative Year 2035 plus Project Intersection LOS Results**

|    | Intersection                           | Intersection Control        | (7-9) AM Peak Hour         |          | (2-4) PM Peak Hour         |          |
|----|--|-----------------------------|----------------------------|----------|----------------------------|----------|
|    |  |                             | Average Delay<br>(sec/veh) | LOS      | Average Delay<br>(sec/veh) | LOS      |
| 1  | Nees Avenue / Temperance Avenue        | Signalized                  | 37.2                       | D        | 29.9                       | C        |
| 2  | Alluvial Avenue / Temperance Avenue    | Signalized                  | <b>107.3</b>               | <b>F</b> | <b>117.7</b>               | <b>F</b> |
|    |  | Signalized (Mitigated)      | 41.9                       | D        | 52.3                       | D        |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized                  | 6.4                        | A        | 5.4                        | A        |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized                  | <b>&gt;120</b>             | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)      | 34.8                       | C        | 32.2                       | C        |
| 5  | Fir Avenue / Temperance Avenue         | Signalized                  | <b>104.8</b>               | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)      | 40.6                       | D        | 44.7                       | D        |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout                  | 21.9                       | C        | 12.3                       | B        |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized                  | <b>67.5</b>                | <b>E</b> | 50.5                       | D        |
|    |  | Signalized (Mitigated)      | 48.5                       | D        | 43.2                       | D        |
| 8  | Herndon Avenue / Tollhouse Road        | Two-Way STOP                | 16.1                       | C        | <b>36.7</b>                | <b>E</b> |
|    |  | Two-Way STOP<br>(Mitigated) | 16.1                       | C        | 34.5                       | D        |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized                  | <b>66.8</b>                | <b>E</b> | 44.7                       | D        |
|    |  | Signalized (Mitigated)      | 41.1                       | D        | 36.9                       | D        |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized                  | 29.1                       | C        | 26.2                       | C        |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP                | 12.2                       | B        | 17.6                       | C        |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP                | 18.9                       | C        | 16.8                       | C        |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP                | <b>&gt;120</b>             | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)      | 23.2                       | C        | 21.5                       | C        |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP                | 21.0                       | C        | <b>44.9</b>                | <b>E</b> |
|    |  | Signalized (Mitigated)      | 3.8                        | A        | 3.1                        | A        |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP                | <b>&gt;120</b>             | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)      | 22.4                       | C        | 31.4                       | C        |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP                | <b>95.6</b>                | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)      | 17.6                       | B        | 24.7                       | C        |
| 17 | Herndon Avenue / McCall Avenue         | Two-Way STOP                | <b>&gt;120</b>             | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)      | 40.6                       | D        | 41.4                       | D        |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP                | <b>28.4</b>                | <b>D</b> | <b>112.6</b>               | <b>F</b> |
|    |  | All-Way STOP<br>(Mitigated) | 11.1                       | B        | 17.8                       | C        |
| 19 | New Access Road / Temperance Avenue    | One-Way STOP                | <b>84.2</b>                | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP                | <b>67.3</b>                | <b>F</b> | <b>68.0</b>                | <b>F</b> |
|    |  | Signalized (Mitigated)      | 51.1                       | D        | 43.7                       | D        |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP                | <b>69.0</b>                | <b>F</b> | <b>78.1</b>                | <b>F</b> |
|    |  | Signalized (Mitigated)      | 52.8                       | D        | 45.1                       | D        |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
 LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.

**Table 19.13**  
**Cumulative Year 2035 plus Project Segment LOS Results**

| <i><b>Study Segment</b></i> | <i><b>Limits</b></i>                        | <i><b>Lanes</b></i> | <i><b>24-hour Volume</b></i> | <i><b>LOS</b></i> |
|-----------------------------|---|---------------------|------------------------------|-------------------|
| Herndon Avenue              | Armstrong Avenue and Tollhouse Road         | 5                   | 27,614                       | C                 |
| Herndon Avenue              | Tollhouse Road and Temperance Avenue        | 5                   | 31,255                       | C                 |
| Herndon Avenue              | Temperance Avenue and Coventry Avenue       | 6                   | 38,950                       | C                 |
| Herndon Avenue              | Coventry Avenue and CCMC Access Road        | 4                   | 34,080                       | C                 |
| Herndon Avenue              | CCMC Access Road and Locan Avenue           | 4                   | 33,691                       | C                 |
| Herndon Avenue              | Locan Avenue and De Wolf Avenue (NL)        | 4                   | 24,366                       | C                 |
| Herndon Avenue              | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 4                   | 23,380                       | C                 |
| Herndon Avenue              | De Wolf Avenue (SL) and Leonard Avenue      | 2                   | 15,931                       | C                 |
| Locan Avenue                | Herndon Avenue and Bullard Avenue           | 2                   | 16,265                       | C                 |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

### Queuing Analysis

The study included a queuing analysis for the Cumulative Year 2035 plus Project Conditions scenario which evaluated the storage capacity for turn lanes in the project's vicinity. The queuing analysis for the study intersections and the methodologies used to evaluate these intersections are presented in Appendix 19.

Queuing deficiencies were identified for the following study intersections:

- Nees Avenue/Temperance Avenue
- Alluvial Avenue/Temperance Avenue
- SR 168 EB Ramps/Temperance Avenue
- Fir Avenue/Temperance Avenue
- Herndon Avenue/Armstrong Avenue
- Herndon Avenue/Temperance Avenue
- Herndon Avenue/Coventry Avenue
- Herndon Avenue/Locan Avenue
- Herndon Avenue/DeWolf Avenue (north leg)
- Herndon Avenue/DeWolf Avenue (south leg)
- Herndon Avenue/Leonard Avenue
- Herndon Avenue/McCall Avenue
- Herndon Avenue/Academy Avenue
- New Access Road/Temperance Avenue
- Bullard Avenue/Locan Avenue
- Bullard Avenue/DeWolf Avenue

Recommendations for increased storage capacity based on the Queuing Analysis are listed in the Traffic Impact Analysis (Draft EIR Appendix 19).

### Fair Share Calculation

Table 19.14 lists the recommended rates at which the project contribute its equitable fair share for future improvements necessary to maintain an acceptable LOS, which were calculated pursuant to the Caltrans Guide for the Preparation of Traffic Impact Studies. The study notes, however, that fair share contributions should only be made for those facilities or portion thereof currently not funded by the responsible agencies roadway impact fee program(s) as appropriate; for those improvements not presently covered by local and regional roadway impact fee programs, it is recommended that the project contribute its equitable fair share. Payment of the Project's equitable fair share in addition to the local and regional impact fee programs would satisfy the Project's traffic mitigation measures.

**Table 19.14**  
**Calculation of Project's Fair Share of Future Improvements**

| ID | Intersection                         | Existing 2016<br>Traffic Volumes<br>(PM Peak) | Year 2035 + Project<br>Traffic Volumes<br>(PM Peak) | Project PM<br>Peak Hour Trips | Project Fair<br>Share (%) |
|----|--------------------------------------|---|---|-------------------------------|---------------------------|
| 2  | Alluvial Avenue / Temperance Avenue  | 1,701   | 4,140   | 405                           | 16.61%                    |
| 4  | SR 168 EB Ramps / Temperance Avenue  | 2,441   | 4,910   | 1,290                         | 52.25%                    |
| 5  | Fir Avenue / Temperance Avenue       | 2,108   | 4,465   | 1,341                         | 56.89%                    |
| 7  | Herndon Avenue / Armstrong Avenue    | 1,914   | 4,180   | 368                           | 16.24%                    |
| 8  | Herndon Avenue / Tollhouse Road      | 1,485   | 3,162   | 453                           | 27.01%                    |
| 9  | Herndon Avenue / Temperance Avenue   | 2,851   | 6,290   | 1,040                         | 30.24%                    |
| 13 | Herndon Avenue / Locan Avenue        | 1,324   | 3,219   | 290                           | 15.30%                    |
| 14 | Herndon Avenue / De Wolf Avenue (NL) | 1,033   | 2,304   | 125                           | 9.83%                     |
| 15 | Herndon Avenue / De Wolf Avenue (SL) | 948   | 2,201   | 124                           | 9.90%                     |
| 16 | Herndon Avenue / Leonard Avenue      | 642   | 1,503   | 84                            | 9.76%                     |
| 17 | Herndon Avenue / McCall Avenue       | 686   | 1,808   | 62                            | 5.53%                     |
| 18 | Herndon Avenue / Academy Avenue      | 429   | 1,189   | 37                            | 4.87%                     |
| 20 | Bullard Avenue / Locan Avenue        | 612   | 2,794   | 162                           | 7.42%                     |
| 21 | Bullard Avenue / De Wolf Avenue      | 729   | 2,526   | 155                           | 8.63%                     |

Notes: Project Fair Share = ((Project Traffic) / (Year 2035 plus Project Traffic Volumes - Existing Traffic Volumes)) X 100

## POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION MEASURES

### TT-1: The "Existing Conditions plus Project" Scenario Would Result in Unacceptable Levels of Service at the Intersection of SR 168 EB Ramp and Temperance Avenue

Initial development of the project will necessitate improvements to the intersection of SR 168 EB Ramp and Temperance Avenue. Without these improvements, the project would contribute to unacceptable levels of service at this intersection. With adoption of the mitigation measure included below, impacts of the project to existing traffic conditions will be less than significant.

### Mitigation Measures

- TT-1 To improve the LOS at the intersection of SR 168 EB Ramps at Temperance Avenue, a second eastbound right-turn lane and third northbound through lane shall be added, and the existing traffic signal shall be modified to accommodate the added lane geometrics.

**TT-2: The “Near Term Projects plus Project” Scenario Would Result in Unacceptable Levels of Service at the Following Intersections:**

As discussed in the Traffic Impact Analysis, development of the project in combination with projects identified in the “Near Term” scenario will necessitate additional improvements to the intersections of Alluvial Avenue at Temperance Avenue, Herndon Avenue at Temperance Avenue, and Herndon Avenue at De Wolf Avenue (south leg). Without these improvements, the project would contribute to unacceptable levels of service at these intersections. With adoption of the mitigation measure, impacts of the project to existing traffic conditions will be less than significant.

**Mitigation Measures**

- TT-2     The project shall participate on a pro rata basis in making improvements to the intersections of 1) Alluvial Avenue at Temperance Avenue, 2) Herndon Avenue at Temperance Avenue, and 3) Herndon Avenue at De Wolf Avenue (south leg) listed under the “Near Term Projects plus Project” scenario for any improvements that are not covered by local and regional impact fee programs. The fair share percentages are calculated in Table 19.14.

**TT-3: The “Cumulative Year 2035 with Project” Scenario Would Result in Unacceptable Levels of Service at the Following Intersections:**

Increased vehicle traffic volumes generated by development projected to occur in accordance with adopted plans and policies of the Clovis General Plan will necessitate street improvements and traffic control improvements. These improvements have been anticipated by the General Plan and its accompanying environmental impact report and included within the City’s implementing public street standards and capital improvements plans and programs. Construction of these anticipated traffic control and street improvement can be anticipated as conditions of property development entitlements and the City’s capital improvements programs.

**Mitigation Measures**

- TT-3     The project shall participate on a pro-rata fair share basis in street improvements listed under the “Cumulative Year 2035 with Project Conditions” scenario for any improvements that are not covered by local and regional impact fee programs. The fair share percentages are calculated in Table 19.14.

**TT-4: The “Cumulative Year 2035 with Project” Conditions Would Result in the Need for Additional Turn Lane Storage Capacity**

The traffic study included a queuing analysis for the Cumulative Year 2035 plus Project Conditions scenario which evaluated the storage capacity for turn lanes in the project’s vicinity. Increased traffic volumes will result in the need for additional storage capacity for turn lanes. The impacts will be less than significant with the implementation of the mitigation measures identified in Section 19.10.2.

**Mitigation Measures**

- TT-4     The project shall participate on a pro-rata fair share basis in the improvements identified in the Queuing Analysis of the Traffic Impact Analysis (Draft EIR Appendix 19).

## NO IMPACT

Based on the information provided in this chapter, the project would not conflict with an applicable congestion management program, substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment), or result in inadequate emergency access.

The project will have no impacts on air traffic patterns as it has no design or operational characteristics that relate to air traffic and is not within an airport safety zone. Potential impacts related to existing and future heliport operations are discussed in Chapter 18, Hazards and Hazardous Materials.

No impacts pertaining to public transit, bicycle, or pedestrian facilities will result from the project, as the project is consistent with the City of Clovis' Active Transportation Plan as well as public and active transportation components of the Clovis General Plan Circulation Element and the Fresno County General Plan Circulation Element.

## SOURCES CONSULTED

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. SCH No. 2012061069. June 2014.

Fresno, County of. *Fresno County General Plan*. October 3, 2000

JLB Traffic Engineering, Inc. *Traffic Impact Analysis for the Proposed Master Plan Expansion of the Clovis Community Medical Center at Herndon Avenue and Temperance Avenue, Clovis, California*. April 17, 2017.

Sources cited by JLB Traffic Engineering in preparation of Traffic Impact Analysis:

*Trip Generation*, 9th Edition, Washington D.C., Institute of Transportation Engineers, 2012

Caltrans. *2014 California Manual on Uniform Traffic Control Devices*. November 7, 2014

Caltrans. *Guide for the Preparation of Traffic Impact Studies*. December 2002

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

TJKM Transportation Consultants. *Traffic Impact Analysis for the Proposed Master Plan Expansion of the Clovis Community Medical Center*. May 22, 2009

# CHAPTER 20

## Tribal Cultural Resources

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### INTRODUCTION

This chapter identifies and discusses potential environmental effects of the project related to tribal cultural resources, which can include sites, lands, and artifacts of Native American religious, historical, or cultural significance. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to cultural resources; (2) the thresholds of significance used to determine the significance of environmental effects; (3) the direct and indirect effects of the project on tribal cultural resources; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

This chapter is based primarily upon a Cultural Resources Assessment prepared for the project site by Sierra Valley Cultural Planning (*A Cultural Resources Assessment for the Proposed Clovis Community Medical Center Expansion and Herndon Avenue Widening Project, Herndon and Temperance Avenues, City of Clovis, Fresno County, California*. January 26, 2017). The report is included in the Draft EIR as Appendix 7.

### ENVIRONMENTAL SETTING

As described in the Cultural Resources Assessment, the San Joaquin Valley and adjacent Sierran foothills and Coast Range have a long and complex cultural history with distinct regional patterns that extend back more than 11,000 years. Most of the San Joaquin Valley and the bordering foothills of the Sierra Nevada and Coastal Range were inhabited by speakers of Yokutsan languages. The southern San Joaquin Valley was home of speakers of Yokutsan languages. The bulk of the Valley Yokuts people lived on the eastern side of the San Joaquin Valley. The project area falls within the territory of the Gashowu Yokuts (see Figure 5 in Appendix 7). The Gashowu occupied the area centering on Big Dry Creek. The Pitkachi, a Northern Valley Yokuts tribelet, occupied the southern side of the San Joaquin River extending up and down river from the town of Herndon. No village or other named sites are identified within a one-mile radius of the project's Area of Potential Effect (APE). A map of the APE can be found in the Cultural Resources Assessment (see Map 3 of Appendix 7).

### REGULATORY AND POLICY SETTING

#### State Regulations

##### *Native American Heritage Commission*

The Native American Heritage Commission (NAHC) is a nine-member body appointed by the Governor to identify and catalog cultural resources (i.e., places of special religious or social significance to Native Americans, and known graves and cemeteries of Native Americans on private lands) in California. The Commission is charged with the duty of preserving and ensuring accessibility of sacred sites and burials, the disposition of Native American human remains and burial items, maintain an inventory of Native American sacred sites located on public lands, and review current administrative and statutory protections related to these sacred sites.

##### *California Public Resources Code*

Public Resources Code Section 5097.9–5097.991 provides protection to Native American historic and cultural resources and sacred sites, and identifies the powers and duties of the Native American



Heritage Commission (NAHC). It also requires notification to descendants of discoveries of Native American human remains and provides for treatment and disposition of human remains and associated grave goods.

#### *Assembly Bill (AB) 52*

AB 52 requires as part of CEQA review a consultation process with all California Native American Tribes on the Native American Heritage Commission List. The list includes both federally and non-federally recognized tribes. The bill requires notification be provided to tribes that are traditionally and culturally affiliated with the geographic area of a proposed project if they have requested notice of projects proposed within that area. If a tribe requests consultation within 30 days upon receipt of the notice, the lead agency must consult with the tribe. Consultation may include discussing the type of environmental review necessary, the significance of tribal cultural resources, the significance of the project's impacts on the tribal cultural resources, and alternatives and mitigation measures recommended by the tribe. The parties must consult in good faith, and consultation is deemed concluded when either of the parties agree to measures to mitigate or avoid a significant effect on a tribal cultural resource (if such a significant effect exists) or when a party concludes that mutual agreement cannot be reached.

#### **Local Regulations**

##### *City of Clovis General Plan*

The Open Space and Conservation Element of the Clovis General Plan includes policies to preserve and promote the City's cultural and historic resources, which encompass Tribal Cultural Resources.

#### **THRESHOLDS OF SIGNIFICANCE**

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects related to tribal cultural resources are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section XVII:

- a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
  - (i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or
  - (ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1

#### **POTENTIALLY SIGNIFICANT IMPACTS AND MITIGATION MEASURES**

##### **TR-1: Potential Disturbance of Subsurface Tribal Cultural Resources by Construction Activities**

The City of Clovis identified four tribes which had requested notice for land use projects in the area in accordance with AB 52: Picayune Rancheria of Chukchansi, Santa Rosa Rancheria Tachi Yokut Tribe, Tule River Indian Tribe, Table Mountain Rancheria. At the time the Notice of Preparation (NOP) was distributed for the project, copies of the NOP were sent to local Native American groups on the City's tribal notice list in order to provide information about the project and invite comments. One response letter was received from Table Mountain Rancheria, which indicated that "the Rancheria is very interested in this project as it lies within our cultural area interest" and proposed a meeting to further discuss the project. Attempts to contact the tribe and set up a meeting have not been successful, but the City is open to meeting with the tribe on this project prior to the preparation of the Final EIR. No other responses were provided from any other tribes during the 30-day period for comment. Additionally, the Native American Heritage Commission (NAHC) was contacted during preparation of the Cultural Resources Assessment in order to determine whether Native American sacred sites have been identified either within or in close proximity to the project APE. No response was received from the NAHC regarding the location of any sites within or near the project APE.

The Cultural Resources Assessment did not identify any tribal cultural resources within the project study area, and no further cultural resources investigation was recommended. While no tribal cultural resources were identified as part of the study, there is the potential for undiscovered resources to be present that could be disturbed or damaged by construction activities. These resources might include buried archaeological deposits such as tools or weapons from a gathering or hunting site or a cache of artifacts, which could provide important time, territory, and cultural pattern markers in the reconstruction of prehistory and history. The impact from ground disturbing activities is thus potentially significant.

The Cultural Resources section (Chapter 7) includes mitigation measures which reduce the potential impact of ground disturbing and construction activities on subsurface cultural resources. These measures include 1) providing written notification to all contractors and subcontractors of the possibility that cultural resources (including tribal cultural resources) may be discovered during project activities; 2) requiring that work be halted in areas where any cultural materials are uncovered during project activities; 3) requiring professional evaluation of any finds by a qualified archaeologist; and 4) requiring immediate notification the Fresno County Coroner's Office in the event any human remains are uncovered, and then notification to the Native American Heritage Commission (NAHC) if the remains are determined to be Native American. Application of these measures would similarly mitigate potential impacts to tribal cultural resources that could be caused by ground disturbing and construction activities entailed in development of the planned medical campus expansion and road widening. With incorporation of those mitigation measures, impacts of the project concerning tribal cultural resources will be less than significant.

### **Mitigation Measures**

Incorporate Mitigation Measures CR-1(a) through (c).

### **CUMULATIVE IMPACTS**

The 2014 Clovis General Plan EIR analyzed impacts to cultural resources from development of the City's Plan Area, and tribal cultural resources were considered as part of the analysis. Among the potentially significant impacts identified in the General Plan EIR, the only impact identified as affecting tribal cultural resources was impacts to prehistoric and historic resource sites resulting from ground disturbing and construction activities entailed with development of the Plan Area. The General Plan EIR determined the impact could be mitigated to a less than significant level with adoption of mitigation measures, which include requirements for specialized studies and/or review by qualified

archaeologists in areas requiring grading of undisturbed soil, on properties determined to be moderately to highly sensitive for buried resources, and on properties where resources are identified.

It is also noted that the risk of impact to subsurface resources was primarily attributed to future development near the boundaries of the Plan Area; the medical campus expansion and road widening are located in an area of Clovis that has been highly developed. Additionally, future development within the Plan Area would be subject to the AB 52 tribal consultation process, which would function to avoid or lessen impacts on tribal cultural resources. Based on these factors, the project's contribution to cumulative tribal cultural resource impacts would not be cumulatively considerable.

## **SOURCES CONSULTED**

Clovis, City of. *City of Clovis General Plan*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. June 2014.

Native American Heritage Commission. <http://nahc.ca.gov/> [Accessed September 1, 2017]

Sierra Valley Cultural Planning. *A Cultural Resources Assessment for the Proposed Clovis Community Medical Center Expansion and Herndon Avenue Widening Project, Herndon and Temperance Avenues, City of Clovis, Fresno County, California*. January 26, 2017.

# **CHAPTER 21**

## **Utilities and Service Systems**

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### **INTRODUCTION**

This chapter identifies and evaluates potential environmental effects of the project related to utilities and service systems, including water supply, wastewater, and solid waste disposal. Information presented includes (1) the environmental, regulatory, and public policy setting of the project related to utilities and service systems; (2) the thresholds of significance used to determine the significance of any environmental effects; (3) the direct and indirect significant effects of the project on utilities and service systems; (4) feasible mitigation measures that could minimize or avoid the significant effects; and (5) the sources that were consulted in preparing the chapter.

It is noted that this chapter does not include discussion of the proposed Herndon Avenue widening because no impacts to utilities or service systems were identified resulting from the widening of Herndon Avenue.

### **ENVIRONMENTAL SETTING**

#### **Water Service and Supply**

The City of Clovis' Public Utilities Department (PUD) provides public water service to the City of Clovis (including the project area) and delivers water to approximately 108,000 residents in the City and its Sphere of Influence. The City's water supply is sourced from a combination of groundwater, surface water, and recycled water. According to the City's most recent Self-Certification of Water Supply Reliability (dated July 2016), the City's total annual water supply for the next three years is 56,734 acre-feet in 2017, 48,593 acre-feet in 2018, and 41,207 acre-feet in 2019. Additional discussion of the City's groundwater supply is presented in Chapter 12, Hydrology and Water Quality.

Surface water is supplied to the City through an agreement with the Fresno Irrigation District (FID) by which the City receives a portion of FID's entitlement to water from the Kings River. The water provided by FID is allocated in proportion to the amount of FID land that lies within the City of Clovis. FID is entitled to water based upon a prorated monthly schedule determined by the natural flow of the Kings River. According to the City's 2015 Urban Water Management Plan, approximately 5.9 percent of FID's service area overlaps with the City, and over the past 30 years the City has received an average allocation of 23,609 acre-feet per year. However, due to extended drought conditions throughout California the City's allocation has been lower in recent years, such as in 2015 when the City's allocation from the Kings River was 6,978 acre-feet.

Clovis also receives some additional water from FID's entitlement to water from the Central Valley Project (CVP), with the City's 30-year average entitlement share being 798 acre-feet per year. However, the last year of 100-percent allocation occurred in 1998 and in the last four years (2013-2016) the City has received a zero-percent allocation from this source.

In addition to groundwater and surface water sources, Clovis obtains nonpotable recycled water from the City-owned Water Reuse Facility. According to the Clovis General Plan EIR, the City currently obtains 2,913 acre-feet per year of recycled water from its Water Reuse Facility, and this amount is projected to increase to 6,273 acre-feet annually by 2020. The City's recycled water supply is discussed in more detail under the Wastewater Treatment section below.

## **Wastewater Collection and Treatment**

The City of Clovis' Public Utilities Department provides wastewater collection service to the project area. The City's Wastewater Collection System Master Plan Area measures approximately 27,120 acres, encompassing the entire area within the City boundary and portions of the City's Sphere of Influence. The service area is divided into seven major areas: Herndon, Fowler, Sierra, Peach, Northwest, Northeast, and Southeast. The project site is within the Fowler Service Area, which conveys flows to the Fresno-Clovis Regional Wastewater Treatment Facility.

For wastewater treatment, the City of Clovis utilizes a City-owned Water Reuse Facility and the Fresno-Clovis Regional Wastewater Treatment Facility (RWTF). The City's Water Reuse Facility began service in 2009. The facility produces a disinfected, tertiary-treated water supply, which is used for both landscaping and agricultural uses. The facility is designed to allow multiple phases of future expansion, and at its maximum capacity the recycled water system will be able to produce and reuse up to 8.4 million gallons per day (mgd) of recycled water. Currently, the majority of the City of Clovis' wastewater is treated at the RWTF. The RWTF is owned and operated by the City of Fresno and currently has a maximum capacity of 80 mgd. By agreement with the City of Fresno, the City of Clovis conveys wastewater to the RWTF and is entitled to a maximum capacity of 9.3 mgd. If required, the City has the capability to acquire additional capacity at the RWTF. Per the 2014 General Plan EIR, the City's 2035 Scenario is estimated to generate about 19.7 mgd of wastewater, and expansions of wastewater treatment facilities are planned to accommodate 20.6 mgd of wastewater.

According to the City of Clovis' Wastewater Master Plan Update Phase 3 (dated April 5, 2017), the Fowler Service Area serving the project site is capable of acquiring additional capacity in the regional system for both its planned service area and diversions from other service areas. The Wastewater Master Plan Update notes that "further Wastewater Master Plan Update efforts will be necessary in the future, in response to ongoing community planning and development activity, to the extent that those activities may result in planning and development activity that differs from the 2014 Clovis General Plan, and in response to future general plan updates."

## **Stormwater Management**

Stormwater runoff within the City of Clovis is conveyed through a drainage system operated and maintained by the Fresno Metropolitan Flood Control District (FMFCD). FMFCD's responsibilities include planning, constructing, and maintaining the stormwater drainage collection and disposal facilities necessary for urban development within the Fresno metropolitan area. FMFCD is divided into numerous drainage zones that have (or are planned to have) a system of underground gravity flow pipelines that drain to stormwater retention basins or drainage outfalls. The City of Clovis Public Utilities Department maintains streets and gutters that convey stormwater to storm drain inlets.

The project site is located within FMFCD Drainage Zone "7H". The existing retention basin for Drainage Zone "7H" is located approximately one-quarter mile south of the project site between Temperance and Locan Avenues. According to FMFCD's Master-Planned Urban Storm Drainage System Map, the project site east of Temperance Avenue includes existing storm drainage pipelines. The project area west of Temperance Avenue is planned for additional drainage pipeline infrastructure.

## **Solid Waste Disposal**

Solid waste generated within the City of Clovis is delivered to one of three landfills: the City of Clovis Landfill, the American Avenue Disposal Site, and the Avenal Regional Landfill. Most of the City's solid waste is processed by the City of Clovis Landfill, while the other two facilities are generally only utilized for the waste hauled by City's contractors, self-hauled by homeowners and businesses, or

residual waste from recycling operations going to other landfills. The City of Clovis Landfill has a permitted throughput of 2,000 tons per day, and as of 2014 had a remaining capacity of 7,740,000 cubic yards and an estimated closing date of 2053. The Clovis General Plan EIR determined that the anticipated waste generated by the 2035 Scenario could be accommodated by the City's existing facilities.

## **REGULATORY AND POLICY SETTING**

### **State Regulations**

#### *Urban Water Management Plan Act of 1983 (UWMPA)*

The state Urban Water Management Planning Act requires every urban water supplier in California providing water for municipal purposes either directly or indirectly to more than 3,000 customers, or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an Urban Water Management Plan (UWMP). Each UWMP reports, describes, and evaluates water deliveries and uses, water supply sources, efficient water uses, and demand management measures. Water agencies are required to assess water demand and supply over a 20-year planning horizon which includes drought condition scenarios. These scenarios must address water shortage contingency planning and drought responses. Urban water suppliers are required to include in updated plans a report of daily per capita water use (baseline); identify water use targets; and daily per capita water use compliance. The City of Clovis adopted its 2015 Urban Water Management Plan (UWMP) in July of 2016, subsequent to the adoption of the 2014 Clovis General Plan. The 2015 UWMP, which was prepared in compliance with the UWMPA and other applicable state law requirements, is discussed in more detail below.

#### *Senate Bill (SB) 610, Water Supply Assessment*

Senate Bill (SB) 610 was adopted with the intent of strengthening the process by which local agencies determine the adequacy of existing and planned future water supplies to meet existing and planned future demands on those supplies. SB 610 requires local water providers to conduct a water supply assessment for projects proposing over 500 housing units, 250,000 square feet of commercial office space (or more than 1,000 employees), a shopping center or business establishment with over 500,000 square feet (or more than 1,000 employees), or equivalent usage. Local water suppliers must also prepare or have already prepared an Urban Water Management Plan (UWMP) to guide planning and development in the water supplier's service area, and specifically pursue efficient use of water resources. Issuance of a water supply assessment determination by the local water supplier for a proposed project verifies that the supplier has previously considered a proposed project in its UWMP and has adequate capacity to serve a project in addition to its existing service commitments, or alternatively, measures that would be required to adequately serve the proposed project.

#### *California Integrated Waste Management Act*

California's Integrated Waste Management Act of 1989 (AB 939, Public Resources Code 40050 et seq.) set a requirement for cities and counties throughout the state to divert 50 percent of all solid waste from landfills by January 1, 2000, through source reduction, recycling, and composting. In 2008, the requirements were modified to reflect a per capita requirement rather than tonnage. To help achieve this, the act requires that each city and county prepare and submit a Source Reduction and Recycling Element. AB 939 also requires all California counties to prepare and maintain Countywide Siting Elements identifying how each respective county, and cities therein, would safely dispose of solid wastes generated in the County – i.e. wastes that cannot be reduced, recycled, or composted – for a 15-year planning period. Assembly Bill 341 (Chapter 476, Statutes of 2011) increased the statewide goal

for waste diversion to 75 percent by 2020. Additionally, the bill mandates additional requirements for recycling of waste from commercial and multifamily residential land uses.

*Assembly Bill (AB) 341, Mandatory Commercial Recycling*

As of July 2012, AB 341 requires all businesses in California to recycle. A business is defined as including any commercial or public entity that generates more than four cubic yards of solid waste per week. The law requires that such businesses source separate their recycling and/or compostable materials and donate or haul the material to recycling facilities.

**Local Regulations**

*City of Clovis Urban Water Management Plan*

The City of Clovis' 2015 Urban Water Management Plan (UMWP) was adopted to address the projected water demands of urban development anticipated by the Clovis General Plan. The purpose of the UMWP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions. The UMWP classifies four stages of water shortage and provides a list of mandatory prohibitions on end users which the City can enforce at the time each water shortage stage is reached. The UMWP also includes a summary of Demand Management Measures which the City has implemented, is currently implementing, and plans to implement in the future in order to meet its urban water use reduction targets.

*City of Clovis Water Master Plan Phase III*

The City of Clovis' Water Master Plan Phase III ("Water Master Plan") was prepared in April of 2017 and is preceded by two prior phases of the plan (Phase I and Phase II), which were completed in 1995 and 1999 respectively. The primary purpose put forth in the Water Master Plan is to examine the feasibility of continued growth in the greater Clovis area from a water resource standpoint and develop a plan for implementation of facilities as well as development of a plan for acquisition of water supplies as the City continues to grow in an easterly direction with more limited groundwater supplies. The plan generally forecasts that as the City grows the long-term average of groundwater supplies will remain constant and the increase in demand will be met with increased surface water treatment as well as increased use of recycled water supplies, and from that standpoint makes recommendations for additional facilities necessary to meet the build-out conditions of the General Plan. The plan also includes recommendations regarding service agreements with water suppliers and implementation of cost allocation methods for additional facilities and resources.

*Fresno County Countywide Integrated Waste Management Plan*

The Countywide Integrated Waste Management Plan (CoIWMP) is mandated by state law under AB 939. The CoIWMP provides an overview of the waste management infrastructure for Fresno County and the cities of Clovis, Coalinga, Firebaugh, Fowler, Fresno, Huron, Kerman, Kingsburg, Mendota, Orange Cove, Parlier, Reedley, San Joaquin, Sanger, and Selma. The CoIWMP provides a description of the County infrastructure and plan administration; describes the most recent countywide solid waste management practices; provides a summary of the Source Reduction and Recycling Elements, Household Hazardous Waste Elements, and Nondisposal Facility Elements for the county, and provides financing information for the CoIWMP. The city councils for Clovis, Coalinga, Fresno, Huron, Kingsburg, Parlier, Reedley, Sanger, and Selma, and the Fresno County Board of Supervisors have adopted the Fresno County CoIWMP.

### *City of Clovis Municipal Code*

The Clovis Municipal Code includes several provisions related to public utilities and services:

Water Supply: Clovis Municipal Code Chapter 6.5, Water System, addresses topics such as initiation of water service, water restrictions, water conservation and waste prevention, and water fees. Per this chapter, a written application to the City for water service must be submitted before water shall be supplied to any premises.

Wastewater: Clovis Municipal Code Chapter 6.4, Sewage Disposal, addresses restrictions, fees, and development related to the City's public sewer system. Section 6.4.02 requires that buildings or structures connected to septic tanks or cesspools at the time a public sewer becomes available shall be connected to the public sewer within three years from the date when sewer becomes available. Section 6.4.03 authorizes charges for sewer connections, including charges to fund construction of sewer mains and of house branches extending from sewer mains to property lines. The amounts of such fees are set forth in the City's Master Development Fee Schedule.

Stormwater: Clovis Municipal Code Chapter 8.7 requires payment of local drainage fees to fund construction of drainage facilities before approval of a final subdivision map or, where land is not subdivided, before the beginning of any work on such land development.

Solid Waste: Clovis Municipal Code Chapter 6.3, Garbage and Rubbish, contains regulations pertaining to solid waste collection, residential greenwaste recycling, landfill liner development fees, as well as several other provisions regulating the disposal of solid waste. Chapter 6.3.1, Recycling and Diversion of Construction and Demolition Debris, regulates the disposal of construction and demolition debris and includes provisions regarding diversion requirements, waste management plans, as well as reporting requirements. Additionally, Section 9.24.110 contains standards for the location, design, and construction of solid waste and recyclable materials storage areas in development projects.

### *City of Clovis General Plan*

The Public Facilities and Services Element of the Clovis General Plan contains the following goals and policies related to utilities and service systems:

Goal 1: Reliable and cost-effective infrastructure systems that permit the city to sustainably manage its diverse water resources and needs.

*Policy 1.1 New development.* New development shall pay its fair share of public facility and infrastructure improvements.

*Policy 1.2 Water supply.* Require that new development demonstrate contractual and actual sustainable water supplies adequate for the new development's demands.

*Policy 1.3 Annexation.* Prior to annexation, the city must find that adequate water supply and service and wastewater treatment and disposal capacity can be provided for the proposed annexation. Existing water supplies must remain with the land and be transferred to the City upon annexation approval.

*Policy 1.4 Development-funded facilities.* The City may require developments to install onsite or offsite facilities that are in excess of a development's fair share. However, the City shall establish a funding mechanism for future development to reimburse the original development for the amount in excess of the fair share costs.



*Policy 1.5 Recycled water.* Use recycled water to reduce the demands for new water supplies. Support the expansion of recycled water infrastructure throughout Clovis and require new development to install recycled water infrastructure where feasible.

*Policy 1.6 Master plans.* Periodically update water, recycled water, wastewater, and stormwater master plans and require all new development to be consistent with the current master plans.

*Policy 1.7 Groundwater.* Stabilize groundwater levels by requiring that new development water demands not exceed the sustainable groundwater supply.

*Policy 1.8 Water facility protection.* Protect existing and future water, wastewater, and recycled water facilities from encroachment by incompatible land uses that may be allowed through discretionary land use permits or changes in land use or zoning designations.

Goal 2: A cost-effective, integrated waste management system that meets or exceeds state and federal recycling and waste diversion mandates.

*Policy 2.1 Minimize landfill disposal of solid waste.* Promote solid waste source reduction, reuse, and recycling; composting; and the environmentally-safe transformation of wastes.

*Policy 2.2 Waste diversion rate.* Meet the state's current and future waste diversion goals through the city's recycling and diversion programs.

*Policy 2.3 Expanded recycling.* Increase recycling by commercial, industrial, and multifamily generators.

*Policy 2.4 Green and household hazardous materials waste.* Encourage citywide participation in green waste reduction and household hazardous waste disposal programs.

*Policy 2.5 Clovis landfill.* Maintain at least 15 years of ongoing landfill capacity.

*Policy 2.6 Solid waste facility encroachment.* Protect existing or planned solid waste facilities from encroachment by incompatible land uses that may be allowed through discretionary land use permits or changes in land use or zoning designations.

## THRESHOLDS OF SIGNIFICANCE

State CEQA Guidelines Section 15064.7 defines a threshold of significance as "...an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The thresholds of significance used for this EIR to determine the significance of environmental effects related to utilities and service systems are from the State CEQA Guidelines, Appendix G, Environmental Checklist Form, Evaluation of Environmental Impacts, Section XVII:

Would the project:

- (a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?
- (b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

- (c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?
- (d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?
- (e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?
- (f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?
- (g) Comply with federal, state, and local statutes and regulations related to solid waste?

## **LESS THAN SIGNIFICANT IMPACTS**

### **US-1: Sufficiency of Water Supply and Entitlements**

Combined domestic and irrigation water use is shown on Table 21.1. The projections are based on existing water use data provided CCMC and projections of water consumption by land use type as presented in the City of Clovis' Water Master Plan Update Phase III. Where applicable, measurements have been converted from acre-feet per year (afy) to gallons per year.

The water usage rates for proposed facilities within the current CCMC footprint (north of Herndon Avenue and east of Temperance Avenue) are based on current annual consumption by facility type (e.g. hospital, medical office building [MOB]). Also included is a measure of site recycled water based on the amount of recycled water CCMC currently utilizes at its existing facilities. The rates for the expansion areas west of Temperance Avenue and south of Herndon Avenue are based on the Land Use Unit Demand Factor presented in the Water Master Plan Update (5.0 afy/acre for Mixed Use/Business Campus and 2.7 afy/acre for Office).

It is noted that the project's water demand occurring at the parcels designated Mixed Use/Business Campus is likely to be less than the Water Master Plan rate because development on those parcels is essentially commercial in nature (i.e. the rate is more likely to be in line with the General Commercial factor of 2.9 afy/acre instead of 5.0 afy/acre).

**Table 21.1**  
**CCMC Expansion – Existing and Projected Water Usage**

| <b>Land Use</b>  | <b>Size</b>     | <b>Water Usage (gallons/yr)</b>   | <b>Annual Gallons/Size</b> |
|--|-----------------|-----------------------------------|----------------------------|
| <b>Hospital*</b>   |                 |                                   |                            |
| Existing   | 362,247 sq. ft. | 39,888,000                        | 110.113 gal/sq. ft.        |
| 2-10 Year Expansion  | 300,172 sq. ft. | 59,013,257                        | –                          |
| 10-20 Year Expansion   | 468,844 sq. ft. | 85,440,308                        | –                          |
|  |                 |                                   |                            |
| <b>MOB*</b>  |                 |                                   |                            |
| Existing   | 45,944 sq. ft.  | 552,000                           | 12.015 gal/sq. ft.         |
| 2-10 Year Expansion  | 310,000 sq. ft. | 3,724,534                         | –                          |
| 10-20 Year Expansion   | 360,000 sq. ft. | 4,325,266                         | –                          |
|  |                 |                                   |                            |
| <b>Site Recycled Water*</b>  |                 |                                   |                            |
| Existing   | 8.0 acres       | 490,000                           | 61,250 gal/acre            |
| 2-10 Year Expansion  | 17.8 acres      | 1,090,250                         | –                          |
| 10-20 Year Expansion   | 12 acres        | 735,000                           | –                          |
|  |                 |                                   |                            |
| <b>Mixed Use/Business Campus parcels**</b>   |                 | Water use factor:<br>5.0 afy/acre | 1,629,000 gal/acre         |
| Existing   | N/A             | N/A                               | –                          |
| 2-10 Year Expansion  | 17.09 acres     | 27,839,610                        | –                          |
| 10-20 Year Expansion   | No change       | No change                         | –                          |
|  |                 |                                   |                            |
| <b>Office parcels**</b>  |                 | Water use factor:<br>2.7 afy/acre | 879,798 gal/acre           |
| Existing   | N/A             | N/A                               | –                          |
| 2-10 Year Expansion  | N/A             | N/A                               | –                          |
| 10-20 Year Expansion   | 11.89 acres     | 10,460,798                        | –                          |
|  |                 |                                   |                            |
| <b>TOTAL</b>   |                 |                                   |                            |
| <ol style="list-style-type: none"> <li>1. Residential are measured by rooms; nonresidential are measured by square foot</li> <li>2. Wastewater Generation Rate assumes a 20 percent reduction in residential wastewater generation and a 10 percent reduction in nonresidential wastewater generation (Source: 2014 City of Clovis General Plan Draft EIR)</li> </ol> <p>Sources: Community Medical Providers*; City of Clovis Water Master Plan III**</p> |                 |                                   |                            |

Per SB 610, the project requires a Water Supply Assessment because the expansion would include development of a business establishment having more than 500,000 square feet of floor space as well as office buildings having more than 250,000 square feet of floor space. A Water Supply Assessment (included as Appendix 21) performed by Provost & Pritchard Consulting Group and reviewed by the City of Clovis' Public Utilities Department determined an adequate water supply is available to serve the project. The determination was largely based on the City's 2015 Urban Water Management Plan, which contemplated expansion of the existing hospital campus and development of commercial and office land uses consistent with the development entailed in the subject proposal.

Apart from the Water Supply Assessment, development of the project site is consistent with the City's 2015 Urban Water Management Plan and Water Master Plan Phase III, both of which utilize the City's General Plan to forecast future demand for water. Since the project area is within the General Plan Area and the proposed medical, office, and commercial uses are consistent with the project area's General Plan land use designations, the demand for water that would result from the project has been anticipated and planned for by the City. Additionally, as the project is located within an urbanized area with existing water supply infrastructure in place, development of the project would not require significant expansion of the City's water supply infrastructure. Further, the City of Clovis has established water shortage contingency measures (i.e. measures which allow the City to impose restrictions and prohibitions on end users during defined water shortage conditions) and adopted demand management measures (including a Water Waste Prevention Ordinance, water metering, and conservation pricing); water usage resulting from development and operation of the project can be further managed via these measures. Thus, impacts related to water supply are less than significant.

## US-2: Impacts to Wastewater Treatment Capacity

Tables 21.2 and 21.3 displays the estimated wastewater generation from the project. Utilizing the wastewater generation rates included as part of the 2014 City of Clovis General Plan EIR (0.18 gallons per square foot for nonresidential land uses and 71.3 gallons per person for residential land uses), the project is projected to generate 119,412 gallons per day of wastewater from the 2-10 year expansion and 280,473 gallons per day of wastewater at full buildout.

**Table 21.2**  
**CCMC Expansion – Projected Wastewater Generation (2-10 Year Expansion)**

| Land Use   | Size <sup>1</sup> | Wastewater Generation Rate <sup>2</sup> (Gallons per day) | Projected Total (Gallons per day) |
|--|-------------------|---|-----------------------------------|
| Hospital   | 300,172 sf        | 0.18/sf   | 54,031                            |
| Hotel  | 150 Rooms         | 71.3/person <sup>3</sup>                                  | 21,390                            |
| Medical Office Building  | 94,392 sf         | 0.18/sf   | 16,991                            |
| Regional Shopping Center   | 150,000 sf        | 0.18/sf   | 27,000                            |
| <b>Total</b>   |                   |   | <b>119,412</b>                    |
| <ol style="list-style-type: none"> <li>1. Residential uses are measured by rooms; nonresidential uses are measured by square foot</li> <li>2. Wastewater Generation Rate assumes a 20 percent reduction in residential wastewater generation and a 10 percent reduction in nonresidential wastewater generation.</li> <li>3. The Hotel rate assumes an occupancy of two persons per room.</li> </ol> <p>Source: 2014 City of Clovis General Plan Draft EIR</p> |                   |   |                                   |

**Table 21.3**  
**CCMC Expansion – Projected Wastewater Generation (Full Buildout)**

| <b>Land Use</b>  | <b>Size<sup>1</sup></b> | <b>Wastewater Generation Rate<sup>2</sup> (Gallons per day)</b> | <b>Projected Total (Gallons per day)</b> |
|--|-------------------------|---|--|
| Hospital   | 468,844 sf              | 0.18/sf   | 84,392                                   |
| Hotel  | 150 Rooms               | 71.3/person <sup>3</sup>  | 21,390                                   |
| Medical Office Building  | 354,392 sf              | 0.18/sf   | 63,791                                   |
| Regional Shopping Center   | 220,000 sf              | 0.18/sf <sup>4</sup>  | 39,600                                   |
| Congregate Care (Assisted Living)  | 100 Units               | 71.3/person   | 71,300                                   |
| <b>Total</b>   |                         |   | <b>280,473</b>                           |
| <ol style="list-style-type: none"> <li><i>Residential uses are measured by rooms; nonresidential uses are measured by square foot.</i></li> <li><i>Wastewater Generation Rate assumes a 20 percent reduction in residential wastewater generation and a 10 percent reduction in nonresidential wastewater generation.</i></li> <li><i>The Hotel rate assumes an occupancy of two persons per room.</i></li> <li><i>The Congregate Care (Assisted Living) rate assumes an occupancy of one person per room.</i></li> </ol> <p><i>Source: 2014 City of Clovis General Plan Draft EIR</i></p> |                         |   |  |

Wastewater generated by the project can be accommodated by the City's public sewer system, as both the City's Water Reuse Facility and the Regional Wastewater Treatment Plant have sufficient capacity to absorb wastewater from the new development. The project site is in an urbanized area with existing public sewer infrastructure in place, so no significant expansions or modifications of the City's wastewater infrastructure will be required for the project. As the project site is served by the City of Clovis' public sewer system, it would not exceed any Regional Water Quality Control Board requirements for wastewater treatment. Thus, the project's impacts related to wastewater treatment are less than significant.

### **US-3: Impacts to Stormwater Drainage Facilities**

CCMC's existing stormwater collection and drainage service needs are provided by the Fresno Metropolitan Flood Control District. The existing off-site stormwater infrastructure from the project site to Basin 7H was installed when the existing CCMC was constructed. According to comments received from FMFCD, much of the Master Plan storm drainage system for the area is complete. These facilities are adequate to serve CCMC's existing stormwater drainage needs and the additional stormwater runoff created as a result of the expansion plan and long-term master plan with additional excavation of Basin 7H as needed to provide storage for the additional runoff generated. The project will also be subject to the required drainage fees. Onsite infrastructure such as additional curbs and gutters, storm drain inlets, and underground stormwater pipelines will be constructed as part of the proposed project. The stormwater management needs of the project area and other areas within the City of Clovis were considered in the adoption of the Clovis General Plan and the Fresno Metropolitan Flood Control District's Storm Drainage and Flood Control Master Plan. Compliance with existing plans and regulations will assure that any impacts associated with the project related to drainage and runoff will be less than significant.

#### **US-4: Impacts to Solid Waste Disposal and Landfill Capacity**

The City of Clovis' landfill facilities have sufficient capacity to accommodate new solid waste generated by the project. The project would not result in a substantial change in solid waste generated at the site compared to existing conditions. CCMC has a recycling program in place and the amount of solid waste generated is expected to be reduced over time with increased adherence to state-mandated reductions and implementation of waste reduction and recycling programs. The project would be subject to compliance with the City of Clovis' solid waste and recycling policies and regulations. The project's impacts regarding solid waste disposal are consequently less than significant.

#### **CUMULATIVE IMPACTS**

The Clovis General Plan and other plans and reports have designated the project area for intensive urban development which is planned to be served by municipal public utility systems. Incremental or phased development of the CCMC campus and other project areas, as well as urban development of other vacant properties in the immediate vicinity, will increase demand for public services and necessitate construction of public utility infrastructure improvements.

The Clovis General Plan and other related long-range planning documents – such as the UMWP, the Water Master Plan Phase III, and Sewer System Management Plan – include analysis showing that adequate services for water, sewer, and solid waste disposal can be provided to accommodate the build out of the general plan. Since the project is consistent with general plan policies and its demand on public utilities is within the growth parameters considered in the City's long-range planning documents, the project would not have a cumulatively considerable impact with respect to utilities and service systems.

#### **SOURCES CONSULTED**

Clovis, City of. *City of Clovis General Plan 2014*. August 25, 2014.

Clovis, City of. *Draft Program Environmental Impact Report, General Plan and Development Code Update*. SCH No. 2012061069. June 2014.

City of Clovis. 2015 Urban Water Management Plan. July 5, 2016  
<https://www.ci.clovis.ca.us/Portals/0/Documents/PublicUtilities/FINAL%202015%20UWMP.pdf?ver=2016-08-02-080200-277>

City of Clovis. Draft Wastewater Master Plan Update Phase 3. April 2017.  
<https://www.ci.clovis.ca.us/Portals/0/Documents/Planning/Draft%20WWMP3.pdf?ver=2017-05-01-122629-857>

City of Clovis. City of Clovis Sewer System Management Plan. July 2014.  
<https://www.ci.clovis.ca.us/Portals/0/Documents/PublicUtilities/Wastewater/SSMP%202014%20-%207%2014.pdf?ver=2014-07-14-100126-053>

Fresno Metropolitan Flood Control District. Letter from Robert Villalobos, Engineering Technician III. November 7, 2016.

# CHAPTER 22

## Alternatives to the Proposed Project

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### INTRODUCTION

The purpose of this chapter is to identify and evaluate alternatives to the location, design, and operation of the proposed Clovis Community Center Medical Center Expansion and Herndon Avenue Widening that would feasibly attain most of the basic objectives of the project(s) but would avoid or substantially lessen any of the significant effects of the project. Section 15126.6 of the State CEQA Guidelines governs the evaluation of alternatives in an EIR. Key requirements of section 15126.6 include the following:

- (a) Section 15126.6(b): The discussions of alternatives in an EIR shall focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if those alternatives would impede to some degree the attainment of the project objectives, or would be more costly.
- (b) Section 15126.6(f): The range of alternatives required in an EIR is governed by a “rule of reason” that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project.
- (c) Section 15126.6(d): The EIR shall include sufficient information about each alternative to allow a meaningful evaluation, analysis, and comparison with the proposed project.
- (d) Section 15126.6(e): The specific alternative of “no project” shall be evaluated along with its impacts. The purpose of describing and analyzing a “no project” alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the project.
- (e) Section 15126.6(f)(2): The EIR shall evaluate alternative locations for the project. The key question in addressing alternative locations is whether developing the project at another location would avoid or substantially lessen any of the significant effects of the project.

### SUMMARY OF PROJECT OBJECTIVES AND SIGNIFICANT EFFECTS

#### Project Objectives

State CEQA Guidelines section 15126.6(b) requires that the evaluation of alternatives in this chapter must address the extent to which an alternative would impede to some degree the attainment of the project objectives. Chapter 2 of this EIR describes the project objectives as follows:

#### *Medical Center Expansion*

The objectives of Clovis Community Medical Center in proposing the project are to:

- Develop a medical campus capable of meeting the growing health care needs of Clovis and the surrounding area;
- Provide a coordinated long-term expansion plan for the medical campus that provides for the modernization and upgrading of existing facilities in concert with the provision of necessary new facilities;

- Provide an efficient vehicular and pedestrian campus circulation system in conjunction with adequate and well-located parking facilities for patients, visitors and staff;
- Continue to provide a well-designed medical campus that is inviting and remains attractive over time, being harmonious with the existing context of the hospital and keeping with the desired aesthetic character of Clovis;
- Provide medical office buildings at locations that will be conducive to the related functions to be provided at the hospital; and
- Provide for future development on land adjacent to the CCMC campus that is compatible and complimentary to the function of CCMC and consistent with the goals and policies of the Clovis General Plan.

Health care facilities are a fundamental and essential component of providing for the health and welfare of a community. Clovis Community Medical Center is the only full service medical facility within the City of Clovis, population 110,762 (CA Dept. of Finance, 2017). CCMC not only serves the City of Clovis, but also draws patients from the surrounding area, including Fresno, the Fresno County foothill and mountain areas, the communities of Sanger, Selma and Reedley, and Madera County.

The expansion of CCMC is needed to keep up with the health care needs of a growing population. The population of Fresno County is projected to grow from 995,975 in 2017 to 1,088,963 in 2025 and 1,201,416 in 2035. Madera County's population is projected to increase from 156,492 in 2017 to 174,156 in 2025 and 199,556 in 2035 (CA Dept. of Finance, 2017).

### ***Herndon Avenue Widening***

The objectives of the City of Clovis in proposing the Herndon Avenue widening project are to:

- Widen and improve Herndon Avenue as an important component of the City's planned circulation system (Herndon Avenue is designated as an arterial street in the Circulation Element of the Clovis General Plan).
- Provide for a street that can accommodate projected traffic from the CCMC expansion and other planned land uses such that the Level of Service is D or less for the City of Clovis portion of Herndon Avenue and Level of Service C or less within the Fresno County portion of the project.
- Provide traffic signals at Locan Avenue and at both legs of DeWolf Avenue to improve access and safety for rural residential areas to the north and south of Herndon Avenue and improved safety for through traffic on Herndon Avenue.
- Minimize or avoid any encroachment or impact to the Enterprise Canal

The need for the Herndon Avenue Widening project is reflected in the first three bullet points above.

### **Unavoidable Significant Environmental Impacts**

The following significant environmental impacts cannot be avoided if the proposed project is implemented:

GH-1: The project would increase the generation of greenhouse gas emissions.

GH-2: The project may conflict with an applicable greenhouse gas reduction plan, policy or regulation.

NO-2: The project would result in an increase in long-term ambient noise levels from traffic sources.



### **Avoidable Significant Environmental Impacts**

The following are significant environmental impacts which can be reduced to a less than significant level with the adoption of mitigation measures:

- AE-1: Clearing and construction activity would temporarily degrade the visual quality of the project site.
- AE-2: The project would increase in illumination and glare due to project lighting, building surfaces and parking areas.
- AQ-1: The project would increase long-term operational emissions of particulate matter and ozone precursor emissions.
- AQ-2: Impacts to sensitive receptors may occur due to localized PM concentrations from construction activities and air emissions from stationary sources.
- AQ-3: The project may be inconsistent with the applicable air quality plan.
- BR-1: The project would potentially impact Special Status Species.
- BR-2: The widening of Herndon Avenue would impact 0.204 acres of wetlands.
- BR-3: The widening of Herndon Avenue would impact a small wetland swale riparian habitat.
- CR-1: Potential disturbance of subsurface cultural and/or paleontological resources may result from project construction activities.
- NO-1: Temporary or periodic increases in ambient noise levels would result from construction activities.
- NO-3: An increase in long-term ambient noise levels from operational features would result from the project.
- NO-4: Potential inconsistency with City of Clovis General Plan noise compatibility standards.
- TT-1: The “Existing Conditions plus Project” Scenario would result in unacceptable levels of service at the following intersection:
  - SR 168 EB Ramps at Temperance Avenue
- TT-2: The “Near Term Projects plus Project” Scenario would result in unacceptable levels of service at the following intersections:
  - SR 168 EB Ramps at Temperance Avenue
  - Alluvial Avenue at Temperance Avenue
  - Herndon Avenue at Temperance Avenue
  - Herndon Avenue at De Wolf Avenue (South Leg)
- TT-3: The “Cumulative Year 2035 with Project” Scenario would result in unacceptable levels of service at the following intersections:
  - SR 168 EB Ramps at Temperance Avenue
  - Herndon Avenue at Armstrong Avenue
  - Herndon Avenue at Temperance Avenue

- Herndon Avenue at Locan Avenue
- Herndon Avenue at De Wolf Avenue (North Leg)
- Herndon Avenue at De Wolf Avenue (South Leg)
- Herndon Avenue at Leonard Avenue
- Herndon Avenue at McCall Avenue
- Herndon Avenue at Academy Avenue
- Bullard Avenue at Locan Avenue
- Bullard Avenue at De Wolf Avenue
- Alluvial Avenue at Temperance Avenue
- Fir Avenue at Temperance Avenue
- Herndon Avenue at Tollhouse Road
- New Access Road at Temperance Avenue

TT-4: The “Cumulative Year 2035 With Project” Conditions Would Result in the Need for Additional Turn Lane Storage Capacity at the following intersections:

- Nees Avenue/Temperance Avenue
- Alluvial Avenue/Temperance Avenue
- SR 168 EB Ramps/Temperance Avenue
- Fir Avenue/Temperance Avenue
- Herndon Avenue/Armstrong Avenue
- Herndon Avenue/Temperance Avenue
- Herndon Avenue/Coventry Avenue
- Herndon Avenue/Locan Avenue
- Herndon Avenue/DeWolf Avenue (north leg)
- Herndon Avenue/DeWolf Avenue (south leg)
- Herndon Avenue/Leonard Avenue
- Herndon Avenue/McCall Avenue
- Herndon Avenue/Academy Avenue
- New Access Road/Temperance Avenue
- Bullard Avenue/Locan Avenue
- Bullard Avenue/DeWolf Avenue

TC-1: Disturbance of subsurface tribal cultural resources would potentially result from construction activities.

## **IDENTIFICATION OF ALTERNATIVES**

### **No Project Alternative**

Evaluation of a “no project” alternative is required under State CEQA Guidelines section 15126.6(e). Under this scenario, the hospital would not implement the proposed expansion and the vacant land within the site would remain undeveloped. Additionally, Herndon Avenue would not be widened under this scenario.

### **Limit CCMC Expansion to Ten-Year Expansion Plan (Limited Ten-Year Expansion)**

This alternative would limit development to the ten-year expansion plan as described in Chapter 2, which would exclude the following facilities from development: the second future five-story bed tower (approx. 133,672 sq. ft.) (150 beds), future expansion of Central Plant (approx. 35,000 sq. ft.), four future medical office buildings (approx. 65,000 sq. ft. each, total of 260,000 sq. ft.), and the future commercial area (70,000 sq. ft.) and 100-unit Assisted Living or Memory Care Center sited on the south side of Herndon Avenue. The widening of Herndon Avenue would be carried out as proposed.

### **CCMC Expansion Without Road Widening**

This alternative would result in development of the proposed CCMC expansion but would eliminate the widening of Herndon Avenue.

### **Limited Ten-Year Expansion Plan Without Road Widening**

This alternative would result in reduced development as described above under the Limited Ten-Year Expansion Alternative while additionally eliminating the widening of Herndon Avenue.

## **Alternatives Not Under Consideration**

### *Alternative Site Locations*

The relocation of the project to an alternative site or the construction of a second medical facility at an alternative site instead of expanding the existing campus is not considered feasible. The existing medical center comprises 719,548 square feet of building area, including the main hospital building (223,521 square feet), a bed tower (138,726 square feet), the outpatient care center (70,300 square feet), a conference center (21,814 square feet), a central plant (17,354 square feet), a parking garage (659 spaces), and administrative, corporate, and medical office buildings (247,833 square feet total). CCMC also currently owns all project site lands necessary for planned project expansion. An enormous investment in buildings, site improvements, and infrastructure at this location has already been made over a period of nearly 30 years. Abandonment of the facilities at this location for an alternative location would constitute an enormous waste of an existing publicly beneficial investment, as well as require substantial additional investment in land, buildings and infrastructure at another location. Therefore, moving the project to an alternative site is not considered to be a feasible alternative.

Another potential option under the alternative site heading would be to build a second medical facility at a second location instead of expanding the existing medical campus. This option is not considered feasible for several reasons: 1) Rather than efficiently expanding the core facilities of the existing hospital, redundant facilities at a new location (i.e. emergency, imaging, food service, central plant, helistop, etc.) would need to be established at substantial additional cost. 2) Land and infrastructure to accommodate the long-range expansion plans already exists at the current location; investment in new

land and infrastructure would be cost prohibitive. 3) The time needed to start from scratch at a new site, including site selection, purchase, permitting, environmental review and construction of new infrastructure, would substantially delay needed medical facilities from being available to serve anticipated growth in the CCMC service area.

#### *Alternative Project Designs*

None of the potentially significant impacts identified as part of this EIR were linked to specific design elements of the proposed CCMC campus expansion. For this reason, modifications to the design of the campus expansion (e.g. relocating buildings, reducing capacity of buildings) are not further evaluated among the alternatives.

### **EVALUATION OF ALTERNATIVES**

The evaluation of alternatives in this chapter complies with the requirements of State CEQA Guidelines section 15126.6(d). Specifically, the following subsections provide sufficient information to allow a meaningful evaluation, analysis, and comparison of each alternative in relation to the proposed project.

#### **NO PROJECT ALTERNATIVE**

##### **Avoid or Substantially Lessen Significant Environmental Effects**

Under the No Project Alternative, none of the significant impacts of the project identified in this EIR would occur given existing environmental conditions, except for the impact regarding traffic congestion at the SR 168 EB Ramps at Temperance Avenue intersection, which already currently exceeds the acceptable LOS threshold.

It is likely that future environmental conditions will differ from existing environmental conditions as development occurs in the vicinity, particularly regarding traffic conditions in the project vicinity. As part of the project's Traffic Impact Analysis (attached as Appendix 19 of this Draft EIR), a projection of future traffic conditions was included for a "Cumulative Year 2035 No Project" scenario in which the project would not be built but future growth and development would occur consistent with the land use designations in the project vicinity. According to the Traffic Impact Analysis, several of the study intersections are expected to exceed their respective LOS thresholds under the "Cumulative Year 2035 No Project" scenario. These include the intersections of Alluvial Avenue at Temperance Avenue, SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at DeWolf Avenue (north leg), Herndon Avenue at DeWolf Avenue (south leg), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at DeWolf Avenue. Consequently, the No Project Alternative would not avoid these traffic impacts.

##### **New or Substantially Increased Significant Environmental Effects**

Under the No Project Alternative, no new or substantially increased significant environmental impacts would occur.

##### **Attainment of Project Objectives**

The No Project Alternative would not attain any of the objectives set forth for expanding the CCMC campus or for widening Herndon Avenue because the project would not be developed.

## **LIMITED TEN-YEAR EXPANSION**

### **Avoid or Substantially Lessen Significant Environmental Effects**

The Limited Ten-Year Expansion Alternative would substantially lessen significant impacts attributable to construction of the CCMC campus expansion since this alternative would entail a significant reduction in the amount of construction activity needed to complete the project. The Limited Ten-Year Alternative would also likely offer some reduction in impacts from operational aspects of the project due to the reduced campus footprint. Among the impacts lessened are those related to aesthetics (particularly lighting and glare), air quality, biological resources, cultural resources, greenhouse gas emissions, noise, and tribal cultural resources; the existing proposed mitigation measures would still be required to ensure these respective impacts are less than significant, however. Additionally, this alternative would generate less traffic than the proposed project and thus would lessen traffic impacts.

The impacts resulting from the widening of Herndon Avenue would remain unchanged from those of the project.

### **New or Substantially Increased Significant Environmental Effects**

No new or substantially increased significant impacts have been identified under the Limited Ten-Year Alternative.

### **Attainment of Project Objectives**

The Limited Ten-Year Alternative would make some progress towards the project goals but overall would impede attainment in comparison to the full buildout of the project. The effects on the objectives are discussed in more detail below:

- This alternative would substantially impede the objective of developing a medical campus capable of meeting the growing health care needs of Clovis and the surrounding area. As noted in Chapter 2 of this Draft EIR, the expansion of CCMC is needed to keep up with the health care needs of a growing population. Reducing capacity of the expansion would reduce the hospital's ability to meet the population's health care needs, as it would reduce the number of hospital beds and medical office building space available for health care purposes.
- The Limited Ten-Year Alternative would also impede the objective of providing a coordinated long-term expansion plan for the medical campus that provides for the modernization and upgrading of existing facilities in concert with the provision of necessary new facilities. Specifically, this alternative would not include facilities upgrades such as expansion of the Central Plant and would also impede development of additional hospital beds forecasted to be necessary to meet long-term demands for health care services at the hospital.
- This alternative would impede the objective of providing medical office buildings at locations that will be conducive to the related functions to be provided at the hospital. While the Limited Ten-Year Alternative would include development of some medical office buildings in close proximity to the hospital, limiting the amount of medical office space may induce development of medical offices at locations away from the hospital in order to meet demands for health care services.
- The Limited Ten-Year Alternative would not necessarily impede the objective of providing a well-designed medical campus that is inviting and remains attractive over time, being harmonious with the existing context of the hospital and keeping with the desired aesthetic

character of Clovis. The limited expansion would remain compatible with the aesthetic and land use characteristics of the vicinity.

Attainment of the objectives for widening of Herndon Avenue would remain unchanged under this alternative since the widening would be carried out as proposed.

## **CCMC EXPANSION WITHOUT ROAD WIDENING**

### **Avoid or Substantially Lessen Significant Environmental Effects**

Under this alternative, impacts attributable to construction and operation of the CCMC campus expansion would remain essentially the same as for the proposed project.

Regarding the widening of Herndon Avenue, this alternative would avoid or substantially lessen traffic noise impacts attributable to the widening of Herndon Avenue since there would be no change from existing conditions in distance from traffic lanes to receptors. This alternative would also avoid or substantially lessen biological resources impacts related to the wetlands and riparian habitat located on the south side of Herndon Avenue near Locan Avenue (see Chapter 6, Biological Resources, for additional discussion) since no road widening would be occurring in the area.

### **New or Substantially Increased Significant Environmental Effects**

Under this alternative, it is projected that impacts related to transportation and traffic would be substantially increased. The Traffic Impact Analysis prepared for the project (attached as Appendix 19 of this Draft EIR) includes a “Cumulative Year 2035 No Project” scenario, which projects that a number of intersections will exceed their respective LOS thresholds under future conditions without implementation of the proposed project (see discussion under “No Project Alternative” for the list of affected intersections). Since the widening of Herndon Avenue would in part function to improve future LOS conditions to an acceptable level, this alternative would substantially increase effects on transportation and traffic compared to the proposed project. Additionally, greater traffic congestion may result in increased impacts to air quality and greenhouse gas emissions under this alternative.

As discussed above, impacts attributable to construction and operation of the CCMC campus expansion would remain essentially the same under this alternative as for the proposed project.

### **Attainment of Project Objectives**

Since the widening of Herndon Avenue would not occur under this alternative, none of the objectives would be obtained.

This alternative would also substantially impede the attainment of CCMC project objectives as follows:

- This alternative would impede the objective of providing an efficient vehicular and pedestrian campus circulation system in conjunction with adequate and well-located parking facilities for patients, visitors and staff. While the on-site circulation would not differ from the project as proposed, leaving Herndon Avenue in its existing condition (which is forecast over time to experience LOS beyond an acceptable level) is likely to create traffic circulation impacts at the campus since Herndon Avenue is one of the major roadways serving the project.
- This alternative would impede the objective of providing for future development on land adjacent to the CCMC campus that is compatible and complimentary to the function of CCMC and consistent with the goals and policies of the Clovis General Plan. The subject section of Herndon Avenue is designated as an arterial roadway in both the City of Clovis General Plan and the Fresno County General Plan, and the land use planning designations along this section

of Herndon Avenue are in part predicated on the improvement of Herndon Avenue to a six-lane arterial roadway. Eliminating the widening of Herndon Avenue would detrimentally impact the compatibility and functionality of land uses in the vicinity.

## **LIMITED TEN-YEAR EXPANSION WITHOUT ROAD WIDENING**

### **Avoid or Substantially Lessen Significant Environmental Effects**

The Limited Ten-Year Expansion Without Road Widening Alternative would substantially lessen significant impacts attributable to construction of the CCMC campus expansion since this alternative would entail a significant reduction in the amount of construction activity needed to complete the project. Avoidance and/or reduction would be essentially the same as described under the Limited Ten-Year Alternative located above.

This alternative would also avoid impacts attributable to the widening of Herndon Avenue, as the road widening expansion would not occur.

### **New or Substantially Increased Significant Environmental Effects**

Under this alternative it is projected that impacts related to transportation and traffic would be substantially increased. As discussed under the CCMC Expansion Without Road Widening Alternative, the Traffic Impact Analysis prepared for the project (attached as Appendix 19 of this Draft EIR) includes a “Cumulative Year 2035 No Project” scenario which projects that a number of intersections will exceed their respective LOS thresholds under future conditions without implementation of the proposed project. Since the widening of Herndon Avenue would in part function to improve future LOS conditions to an acceptable level, this alternative would substantially increase effects on transportation and traffic compared to the proposed project. Additionally, greater traffic congestion may result in increased impacts to air quality and greenhouse gas emissions under this alternative.

No new or substantially increased impacts attributable to expansion of the campus under the limited ten-year expansion plan would occur under this alternative.

### **Attainment of Project Objectives**

This alternative would substantially impede the project objectives of the CCMC expansion for the reasons discussed above under the Limited Ten-Year Expansion Alternative. Additionally, this alternative would not obtain any of the project objectives regarding the widening of Herndon Avenue.

## **CONCLUSIONS AND IDENTIFICATION OF ENVIRONMENTALLY SUPERIOR ALTERNATIVE**

State CEQA Guidelines Section 15126.6(e)(2) specifies that if the environmentally superior alternative is a no project alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. The “No Project Alternative” may be environmentally superior to the proposed project because the alternative would almost entirely avoid the environmental effects of the project. However, this EIR has shown that this alternative cannot feasibly attain the objectives of the project.

Of the remaining alternatives, the environmentally superior alternative is the “Limit CCMC Expansion to Ten-Year Expansion Plan” alternative. This alternative would reduce significant impacts related to the long-range master plan by reducing aesthetic impacts (particularly lighting and glare), air quality impacts, biological resources impacts, cultural resource and tribal cultural resource impacts from construction activities, greenhouse gas emissions, traffic impacts to various intersections and street

segments, the future duration of construction noise exposure, and potential noise levels from central plant expansion. This alternative, however, would substantially impede the attainment of the project objectives related to developing a medical campus capable of meeting the growing health care needs of Clovis and the surrounding area and provision a coordinated long-term expansion plan for the medical campus.







**Clovis Community Medical Center Expansion  
and Herndon Avenue Widening Project  
Draft Program Environmental Impact Report**  
State Clearinghouse No. 2016101005

**February 2018**

**List of Appendices**

- Appendix 5 – Air Quality and Greenhouse Gas Impact Analysis
- Appendix 6A – Biological Resources Assessment
- Appendix 6B – Biological Resources Assessment
- Appendix 7 – Cultural Resources Assessment
- Appendix 15 – Noise Impact Assessment
- Appendix 19 – Traffic Impact Analysis
- Appendix 21 – Water Supply Assessment

# **Appendix 5**

## **Air Quality and Greenhouse Gas Impact Analysis**

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# **AIR QUALITY & GREENHOUSE GAS IMPACT ANALYSIS**

**FOR**

## **MASTER PLAN EXPANSION OF THE CLOVIS COMMUNITY MEDICAL CENTER PROJECT**

**CLOVIS, CA**

**JULY 2017**

**PREPARED FOR:**

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## TABLE OF CONTENTS

|   |    |
|---|----|
| Introduction .....                        | 2  |
| Proposed Project Summary .....            | 2  |
| Air Quality .....                         | 2  |
| Existing Setting.....                     | 2  |
| Regulatory Framework .....                | 9  |
| Regulatory Attainment Designations.....   | 12 |
| Ambient Air Quality .....                 | 13 |
| Sensitive Receptors .....                 | 14 |
| Impacts & Mitigation Measures .....       | 14 |
| Greenhouse Gases and Climate Change ..... | 26 |
| Existing Setting.....                     | 26 |
| Regulatory Framework .....                | 28 |
| Impacts & Mitigation Measures .....       | 34 |
| References .....                          | 40 |

### LIST OF TABLES

|         |   |    |
|---------|---|----|
| Table 1 | Summary of Ambient Air Quality Standards.....                     | 10 |
| Table 2 | SJVAB Attainment Status Designations .....                        | 13 |
| Table 3 | Summary of Ambient Air Quality Monitoring Data <sup>1</sup> ..... | 14 |
| Table 4 | Annual Construction-Generated Emissions .....                     | 17 |
| Table 5 | Average Daily Construction-Generated Emissions .....              | 18 |
| Table 6 | Long-term Operational Emissions .....                             | 19 |
| Table 7 | Annual Construction-Generated GHG Emissions.....                  | 36 |
| Table 8 | Annual Operational GHG Emissions .....                            | 38 |

### LIST OF FIGURES

|          |   |    |
|----------|---|----|
| Figure 1 | State of California Greenhouse Gases Emissions Inventory by Main Economic Sector..... | 27 |
| Figure 2 | Annual Operational GHG Emissions Source Contribution (Buildout Year 2035) .....       | 38 |

### APPENDICES

Appendix A: Emissions Modeling & Documentation

## INTRODUCTION

This report describes the existing environment in the project vicinity and identifies potential air quality and greenhouse gas impacts associated with the proposed project. Project impacts are evaluated relative to applicable thresholds of significance. Mitigation measures have been identified for significant impacts.

## PROPOSED PROJECT SUMMARY

Clovis Community Medical Center is proposing to expand its healthcare facilities on its campus located east of Temperance Avenue between Herndon Avenue and State Route 168. In addition, commercial uses and a hotel are proposed on land owned by CCMC west of Temperance Avenue and commercial uses and an assisted living facility are proposed on land south of Herndon Avenue. The proposed improvements would be developed in two phases.

## AIR QUALITY

### EXISTING SETTING

The project is located within the San Joaquin Valley Air Basin (SJVAB). The SJVAB is within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Air quality in the SJVAB is influenced by a variety of factors, including topography, local and regional meteorology. Factors affecting regional and local air quality are discussed below.

### TOPOGRAPHY, METEOROLOGY, AND POLLUTANT DISPERSION

The dispersion of air pollution in an area is determined by such natural factors as topography, meteorology, and climate, coupled with atmospheric stability conditions and the presence of inversions. The factors affecting the dispersion of air pollution with respect to the SJVAB are discussed below.

#### Topography

The SJVAB occupies the southern half of the Central Valley. The SJVAB is open to the north, and is surrounded by mountain ranges on all other sides. The Coast Ranges, which have an average elevation of 3,000 feet, are along on the western boundary of the SJVAB, while the Sierra Nevada Mountains (8,000 to 14,000 feet in elevation) are along the eastern border. The San Emigdio Mountains, which are part of the Coast Ranges, and the Tehachapi Mountains, which are part of the Sierra Nevada, form the southern boundary, and have an elevation of 6,000 to 8,000 feet. The SJVAB is mostly flat with a downward gradient in terrain to the northwest.

#### Meteorology and Climate

The SJVAB has an inland Mediterranean climate that is strongly influenced by the presence of mountain ranges. The mountain ranges to the west and south induce winter storms from the Pacific Ocean to release precipitation on the western slopes producing a partial rain shadow over the valley. In addition, the mountain ranges block the free circulation of air to the east, trapping stable air in the valley for extended periods during the cooler half of the year.

Winter in the SJVAB is characterized as mild and fairly humid, while the summer is typically hot, dry, and cloudless. The climate is a result of the topography and the strength and location of a semi permanent, subtropical high-pressure cell. During the summer months, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below to the surface as a result of the northwesterly flow produces a band of cold water off the California coast. In winter, the Pacific high-pressure cell weakens

and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms.

The annual temperature, humidity, precipitation, and wind patterns reflect the topography of the SJVAB and the strength and location of the semi permanent, subtropical high-pressure cell. Summer temperatures that often exceed 100 degrees Fahrenheit (°F) and clear sky conditions are favorable to ozone formation. Most of the precipitation in the valley occurs as rainfall during winter storms. The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions, which can result in higher pollutant concentrations. The orientation of the wind flow pattern in the SJVAB is parallel to the valley and mountain ranges. Summer wind conditions promote the transport of ozone and precursors from the San Francisco Bay Area through the Carquinez Strait, a gap in the Coast Ranges, and low mountain passes such as Altamont Pass and Pacheco Pass. During the summer, predominant wind direction is from the northwest. During the winter, the predominant wind direction is from the southeast. Calm conditions are also predominant during the winter.

The climate is semi-arid, with an annual normal precipitation of approximately 11 inches. Temperatures in the project area range from a normal minimum of 38°F, in January, to a normal maximum of 98°F, in July (WRCC 2017).

#### Atmospheric Stability and Inversions

Stability describes the resistance of the atmosphere to vertical motion. The stability of the atmosphere is dependent on the vertical distribution of temperature with height. Stability categories range from "Extremely Unstable" (Class A), through Neutral (Class D), to "Stable" (Class F). Unstable conditions often occur during daytime hours when solar heating warms the lower atmospheric layers sufficiently. Under Class A stability conditions, large fluctuations in horizontal wind direction occur coupled with large vertical mixing depths. Under Class B stability conditions, wind direction fluctuations and the vertical mixing depth are less pronounced because of a decrease in the amount of solar heating. Under Class C stability conditions, solar heating is weak along with horizontal and vertical fluctuations because of a combination of thermal and mechanical turbulence. Under Class D stability conditions, vertical motions are primarily generated by mechanical turbulence. Under Class E and Class F stability conditions, air pollution emitted into the atmosphere travels downwind with poor dispersion. The dispersive power of the atmosphere decreases with progression through the categories from A to F.

With respect to the SJVAB, Classes D through F are predominant during the late fall and winter because of cool temperatures and entrapment of cold air near the surface. March and August are transition months with equally occurring percentages of Class F and Class A. During the spring months of April and May and the summer months of June and July, Class A is predominant. The fall months of September, October, and November have comparable percentages of Class A and Class F.

An inversion is a layer of warmer air over a layer of cooler air. Inversions influence the mixing depth of the atmosphere, which is the vertical depth available for diluting air pollution near the ground, thus significantly affecting air quality conditions. The SJVAB experiences both surface-based and elevated inversions. The shallow surface-based inversions are present in the morning but are often broken by daytime heating of the air layers near the ground. The deep elevated inversions occur less frequently than the surface-based inversions but generally result in more severe stagnation. The surface-based inversions occur more frequently in the fall, and the stronger elevated inversions usually occur during December and January.

#### CRITERIA AIR POLLUTANTS

For the protection of public health and welfare, the Federal Clean Air Act (FCAA) required that the United States Environmental Protection Agency (U.S. EPA) establish National Ambient Air Quality Standards (NAAQS) for various pollutants. These pollutants are referred to as "criteria" pollutants because the U.S. EPA publishes criteria documents to justify the choice of standards. These standards define the maximum amount of an air pollutant that can be present in ambient air. An ambient air quality standard is generally

specified as a concentration averaged over a specific time period, such as one hour, eight hours, 24 hours, or one year. The different averaging times and concentrations are meant to protect against different exposure effects. Standards established for the protection of human health are referred to as primary standards; whereas, standards established for the prevention of environmental and property damage are called secondary standards. The FCAA allows states to adopt additional or more health-protective standards. The air quality regulatory framework and ambient air quality standards are discussed in greater detail later in this report.

The following provides a summary discussion of the primary and secondary criteria air pollutants of primary concern. In general, primary pollutants are directly emitted into the atmosphere, and secondary pollutants are formed by chemical reactions in the atmosphere.

**Ozone (O<sub>3</sub>)** is a reactive gas consisting of three atoms of oxygen. In the troposphere, it is a product of the photochemical process involving the sun's energy. It is a secondary pollutant that is formed when NO<sub>x</sub> and volatile organic compounds (VOC) react in the presence of sunlight. Ozone at the earth's surface causes numerous adverse health effects and is a criteria pollutant. It is a major component of smog. In the stratosphere, ozone exists naturally and shields Earth from harmful incoming ultraviolet radiation.

High concentrations of ground level ozone can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments. Ozone also damages natural ecosystems such as forests and foothill communities, agricultural crops, and some man-made materials, such as rubber, paint, and plastics.

**Reactive Organic Gas (ROG)** is a reactive chemical gas, composed of hydrocarbon compounds that may contribute to the formation of smog by their involvement in atmospheric chemical reactions. No separate health standards exist for ROG as a group. Because some compounds that make up ROG are also toxic, like the carcinogen benzene, they are often evaluated as part of a toxic risk assessment. Total Organic Gases (TOGs) includes all of the ROGs, in addition to low reactivity organic compounds like methane and acetone. ROGs and VOC are subsets of TOG.

**Volatile Organic Compounds (VOC)** are hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and may also be toxic. VOC emissions are a major precursor to the formation of ozone. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

**Oxides of Nitrogen (NO<sub>x</sub>)** are a family of gaseous nitrogen compounds and is a precursor to the formation of ozone and particulate matter. The major component of NO<sub>x</sub>, nitrogen dioxide (NO<sub>2</sub>), is a reddish-brown gas that is toxic at high concentrations. NO<sub>x</sub> results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

**Particulate Matter (PM)**, also known as particle pollution, is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. U.S. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. U.S. EPA groups particle pollution into three categories based on their size and where they are deposited:

- "Inhalable coarse particles (PM<sub>2.5-10</sub>)," such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. PM<sub>2.5-10</sub> is deposited in the thoracic region of the lungs.
- "Fine particles (PM<sub>2.5</sub>)," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. They penetrate deeply into the thoracic and alveolar regions of the lungs.



- "Ultrafine particles (UFP)," are very small particles less than 0.1 micrometers in diameter largely resulting from the combustion of fossil fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of PM<sub>2.5</sub>, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM<sub>10</sub>, PM<sub>2.5</sub>, and UFP include primary pollutants (emitted directly to the atmosphere) as well as secondary pollutants (formed in the atmosphere by chemical reactions among precursors). Generally speaking, PM<sub>2.5</sub> and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM<sub>10</sub> sources include these same sources plus roads and farming activities. Fugitive windblown dust and other area sources also represent a source of airborne dust.

Numerous scientific studies have linked both long- and short-term particle pollution exposure to a variety of health problems. Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and also acute (short-term) bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short term exposures, although they may experience temporary minor irritation when particle levels are elevated.

**Carbon Monoxide (CO)** is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air (unlike ozone). The main source of CO is on-road motor vehicles. Other CO sources include other mobile sources, miscellaneous processes, and fuel combustion from stationary sources. Because of the local nature of CO problems, the California Air Resources Board (ARB) and U.S. EPA designate urban areas as CO nonattainment areas instead of the entire basin as with ozone and PM<sub>10</sub>. Motor vehicles are by far the largest source of CO emissions. Emissions from motor vehicles have been declining since 1985, despite increases in vehicle miles traveled, with the introduction of new automotive emission controls and fleet turnover.

**Sulfur Dioxide (SO<sub>2</sub>)** is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. However, like airborne NO<sub>x</sub>, suspended SO<sub>x</sub> particles contribute to the poor visibility. These SO<sub>x</sub> particles can also combine with other pollutants to form PM<sub>2.5</sub>. The prevalence of low-sulfur fuel use has minimized problems from this pollutant.

**Lead (Pb)** is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. The health effects of lead poisoning include loss of appetite, weakness, apathy, and miscarriage. Lead can also cause lesions of the neuromuscular system, circulatory system, brain, and gastrointestinal tract. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically.

**Hydrogen Sulfide (H<sub>2</sub>S)** is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. Hydrogen sulfide is extremely hazardous in high concentrations; especially in enclosed spaces (800 ppm can cause death). OSHA regulates workplace exposure to H<sub>2</sub>S.

### Other Pollutants

The State of California has established air quality standards for some pollutants not addressed by Federal standards. The ARB has established State standards for hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. The following section summarizes these pollutants and provides a description of the pollutants' physical properties, health and other effects, sources, and the extent of the problems.

**Sulfates (SO<sub>4</sub><sup>2-</sup>)** are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO<sub>2</sub> during

the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO<sub>2</sub> to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The ARB sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilator function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property.

**Visibility Reducing Particles:** Are a mixture of suspended particulate matter consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. The standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

**Vinyl Chloride (C<sub>2</sub>H<sub>3</sub>Cl or VCM)** is a colorless gas that does not occur naturally. It is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloro-ethylene are broken down. Vinyl chloride is used to make polyvinyl chloride (PVC) which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

## ODORS

Typically, odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from the psychological (i.e. irritation, anger, or anxiety) to the physiological, including circulatory and respiratory effects, nausea, vomiting, and headache.

The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor and in fact an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Neither the state nor the federal governments have adopted rules or regulations for the control of odor sources. The SJVAPCD does not have an individual rule or regulation that specifically addresses odors; however, odors would be subject to SJVAPCD *Rule 4102, Nuisance*. Any actions related to odors would be based on citizen complaints to local governments and the SJVAPCD.

## TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) are air pollutants that may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air, but due to their high toxicity, they may pose a threat to public health even at very low concentrations. Because there is no threshold level below which adverse health impacts are not expected

to occur, TACs differ from criteria pollutants for which acceptable levels of exposure can be determined and for which state and federal governments have set ambient air quality standards. TACs, therefore, are not considered "criteria pollutants" under either the FCAA or the California Clean Air Act (CCAA), and are thus not subject to National or California ambient air quality standards (NAAQS and CAAQS, respectively). Instead, the U.S. EPA and the ARB regulate Hazardous Air Pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology to limit emissions. In conjunction with SJVAPCD rules, these federal and state statutes and regulations establish the regulatory framework for TACs. At the national levels, the U.S. EPA has established National Emission Standards for HAPs (NESHAPs), in accordance with the requirements of the FCAA and subsequent amendments. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

Within California, TACs are regulated primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. The following provides a summary of the primary TACs of concern within the State of California and related health effects:

**Diesel Particulate Matter (DPM)** was identified as a TAC by the ARB in August 1998. DPM is emitted from both mobile and stationary sources. In California, on-road diesel-fueled vehicles contribute approximately 40% of the statewide total, with an additional 57 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about 3 percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations. Emissions from these sources are from diesel-fueled internal combustion engines. Stationary sources that report DPM emissions also include heavy construction, manufacturers of asphalt paving materials and blocks, and diesel-fueled electrical generation facilities (ARB 2013).

In October 2000, the ARB issued a report entitled: "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles", which is commonly referred to as the Diesel Risk Reduction Plan (DRRP). The DRRP provides a mechanism for combating the DPM problem. The goal of the DRRP is to reduce concentrations of DPM by 85 percent by the year 2020, in comparison to year 2000 baseline emissions. The key elements of the DRRP are to clean up existing engines through engine retrofit emission control devices, to adopt stringent standards for new diesel engines, and to lower the sulfur content of diesel fuel to protect new, and very effective, advanced technology emission control devices on diesel engines. When fully implemented, the DRRP will significantly reduce emissions from both old and new diesel fueled motor vehicles and from stationary sources that burn diesel fuel. In addition to these strategies, the ARB continues to promote the use of alternative fuels and electrification. As a result of these actions, DPM concentrations and associated health risks in future years are projected to decline (ARB 2013, ARB 2000).

Exposure to DPM can have immediate health effects. DPM can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. In studies with human volunteers, Exposure to DPM also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, DPM has been identified as a carcinogen.

## ASBESTOS

Asbestos is a term used for several types of naturally-occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. Serpentine rock often contains chrysotile asbestos. Serpentine rock, and its parent material, ultramafic rock, is abundant in the Sierra foothills, the Klamath Mountains, and Coast Ranges. The project site, however, is not located in an area of known ultramafic rock.

Asbestos is commonly found in ultramafic rock, including serpentine, and near fault zones. The amount of asbestos that is typically present in these rocks range from less than 1 percent up to about 25 percent, and sometimes more. Asbestos is released from ultramafic and serpentine rock when it is broken or crushed. This can happen when cars drive over unpaved roads or driveways which are surfaced with these rocks, when land is graded for building purposes, or at quarrying operations. It is also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time.

Additional sources of asbestos include building materials and other manmade materials. The most common sources are heat-resistant insulators, cement, furnace or pipe coverings, inert filler material, fireproof gloves and clothing, and brake linings. Asbestos has been used in the United States since the early 1900's; however, asbestos is no longer allowed as a constituent in most home products and materials. Many older buildings, schools, and homes still have asbestos containing products.

Naturally-occurring asbestos was identified by ARB as a TAC in 1986. The ARB has adopted two statewide control measures which prohibits the use of serpentine or ultramafic rock for unpaved surfacing and controls dust emissions from construction, grading, and surface mining in areas with these rocks. Various other laws have also been adopted, including laws related to the control of asbestos-containing materials during the renovation and demolition of buildings.

All types of asbestos are hazardous and may cause lung disease and cancer. Health risks to people are dependent upon their exposure to asbestos. The longer a person is exposed to asbestos and the greater the intensity of the exposure, the greater the chances for a health problem. Asbestos-related disease, such as lung cancer, may not occur for decades after breathing asbestos fibers. Cigarette smoking increases the risk of lung cancer from asbestos exposure.

## VALLEY FEVER

Valley fever is an infection caused by the fungus *Coccidioides*. The scientific name for valley fever is "coccidioidomycosis," and it's also sometimes called "desert rheumatism." The term "valley fever" usually refers to *Coccidioides* infection in the lungs, but the infection can spread to other parts of the body in severe cases.

*Coccidioides* spores circulate in the air after contaminated soil and dust are disturbed by humans, animals, or the weather. The spores are too small to see without a microscope. When people breathe in the spores, they are at risk for developing valley fever. After the spores enter the lungs, the person's body temperature allows the spores to change shape and grow into spherules. When the spherules get large enough, they break open and release smaller pieces (called endospores) which can then potentially spread within the lungs or to other organs and grow into new spherules. In extremely rare cases, the fungal spores can enter the skin through a cut, wound, or splinter and cause a skin infection.

Symptoms of valley fever may appear between 1 and 3 weeks after exposure. Symptoms commonly include: fatigue, coughing, fever, shortness of breath, headaches, night sweats, muscle aches and joint pain, and rashes on the upper body or legs.

Approximately 5 to 10 percent of people who get valley fever will develop serious or long-term problems in their lungs. In an even smaller percent of people (about 1 percent), the infection spreads from the lungs to other parts of the body, such as the central nervous system (brain and spinal cord), skin, or bones and joints. Certain groups of people may be at higher risk for developing the severe forms of valley fever, such as people who have weakened immune systems. The fungus that causes valley fever, *Coccidioides*, can't spread from the lungs between people or between people and animals. However, in extremely rare instances, a wound infection with *Coccidioides* can spread valley fever to someone else, or the infection can be spread through an organ transplant with an infected organ.

For many people, the symptoms of valley fever will go away within a few months without any treatment. Healthcare providers choose to prescribe antifungal medication for some people to try to reduce the

severity of symptoms or prevent the infection from getting worse. Antifungal medication is typically given to people who are at higher risk for developing severe valley fever. The treatment typically occurs over a period of roughly 3 to 6 months. In some instances, longer treatment may be required. If valley fever develops into meningitis life-long antifungal treatment is typically necessary.

Scientists continue to study how weather and climate patterns affect the habitat of the fungus that causes valley fever. *Coccidioides* is thought to grow best in soil after heavy rainfall and then disperse into the air most effectively during hot, dry conditions. For example, hot and dry weather conditions have been shown to correlate with an increase in the number of valley fever cases in Arizona and in California. The ways in which climate change may be affecting the number of valley fever infections, as well as the geographic range of *Coccidioides*, isn't known yet, but is a subject for further research (CDC 2016).

## **REGULATORY FRAMEWORK**

Air quality within the SJVAB is regulated by several jurisdictions including the U.S. EPA, ARB, and the SJVAPCD. Each of these jurisdictions develops rules, regulations, and policies to attain the goals or directives imposed upon them through legislation. Although U.S. EPA regulations may not be superseded, both state and local regulations may be more stringent.

### **FEDERAL**

#### *U.S. Environmental Protection Agency*

At the federal level, the U.S. EPA has been charged with implementing national air quality programs. The U.S. EPA's air quality mandates are drawn primarily from the FCAA, which was signed into law in 1970. Congress substantially amended the FCAA in 1977 and again in 1990.

#### *Federal Clean Air Act*

The FCAA required the U.S. EPA to establish National Ambient Air Quality Standards (NAAQS), and also set deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions. NAAQS are summarized in Table 1.

The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The FCAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The U.S. EPA has responsibility to review all state SIPs to determine conformance with the mandates of the FCAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If the U.S. EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures.

#### *Toxic Substances Control Act*

The Toxic Substances Control Act (TSCA) first authorized the U.S. EPA to regulate asbestos in schools and Public and Commercial buildings under Title II of the law, which is also known as the Asbestos Hazard Emergency Response Act (AHERA). AHERA requires Local Education Agencies (LEAs) to inspect their schools for ACBM and prepare management plans to reduce the asbestos hazard. The Act also established a program for the training and accreditation of individuals performing certain types of asbestos work.

#### *National Emission Standards for Hazardous Air Pollutants*

Pursuant to the FCAA of 1970, the U.S. EPA established the National Emission Standards for Hazardous Air Pollutants. These are technology-based source-specific regulations that limit allowable emissions of HAPs.

**Table 1**  
**Summary of Ambient Air Quality Standards**

| Summary of Ambient Air Quality Standards  |                         |  |                                      |
|---|-------------------------|--|--------------------------------------|
| Pollutant   | Averaging Time          | California Standards*  | National Standards* (Primary)        |
| Ozone (O <sub>3</sub> )   | 1-hour                  | 0.09 ppm   | –                                    |
|   | 8-hour                  | 0.070 ppm  | 0.070 ppm                            |
| Particulate Matter (PM <sub>10</sub> )  | AAM                     | 20 µg/m <sup>3</sup>   | –                                    |
|   | 24-hour                 | 50 µg/m <sup>3</sup>   | 150 µg/m <sup>3</sup>                |
| Fine Particulate Matter (PM <sub>2.5</sub> )  | AAM                     | 12 µg/m <sup>3</sup>   | 12 µg/m <sup>3</sup>                 |
|   | 24-hour                 | No Standard  | 35 µg/m <sup>3</sup>                 |
| Carbon Monoxide (CO)  | 1-hour                  | 20 ppm   | 35 ppm                               |
|   | 8-hour                  | 9 ppm  | 9 ppm                                |
|   | 8-hour (Lake Tahoe)     | 6 ppm  | –                                    |
| Nitrogen Dioxide (NO <sub>2</sub> )   | AAM                     | 0.030 ppm  | 53 ppb                               |
|   | 1-hour                  | 0.18 ppm   | 100 ppb                              |
| Sulfur Dioxide (SO <sub>2</sub> )   | AAM                     | –  | 0.03 ppm                             |
|   | 24-hour                 | 0.04 ppm   | 0.14 ppm                             |
|   | 3-hour                  | –  | 0.5 ppm (1300 µg/m <sup>3</sup> )*** |
|   | 1-hour                  | 0.25 ppm   | 75 ppb                               |
| Lead  | 30-day Average          | 1.5 µg/m <sup>3</sup>  | –                                    |
|   | Calendar Quarter        | –  | 1.5 µg/m <sup>3</sup>                |
|   | Rolling 3-Month Average | –  | 0.15 µg/m <sup>3</sup>               |
| Sulfates  | 24-hour                 | 25 µg/m <sup>3</sup>   | No Federal Standards                 |
| Hydrogen Sulfide  | 1-hour                  | 0.03 ppm (42 µg/m <sup>3</sup> )   |                                      |
| Vinyl Chloride  | 24-hour                 | 0.01 ppm (26 µg/m <sup>3</sup> )   |                                      |
| Visibility-Reducing Particle Matter   | 8-hour                  | Extinction coefficient: 0.23/kilometer-visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70%. |                                      |
| * For more information on standards visit : <a href="http://www.arb.ca.gov/research/aaqs/aaqs2.pdf">http://www.arb.ca.gov/research/aaqs/aaqs2.pdf</a> |                         |  |                                      |
| ** No federal 1-hour standard. Reclassified extreme nonattainment for the federal 8-hour standard May 5, 2010.  |                         |  |                                      |
| ***Secondary Standard   |                         |  |                                      |
| Source: ARB 2017b   |                         |  |                                      |

## STATE

### California Air Resources Board

The ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act of 1988. Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts and air quality management districts, establishing California Ambient Air Quality Standards

(CAAQS), which in many cases are more stringent than the NAAQS, and setting emissions standards for new motor vehicles. The CAAQS are summarized in Table 1. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

#### California Clean Air Act

The CCAA requires that all air districts in the state endeavor to achieve and maintain CAAQS for Ozone, CO, SO<sub>2</sub>, and NO<sub>2</sub> by the earliest practical date. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with authority to regulate indirect sources. Each district plan is required to either (1) achieve a five percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each non-attainment pollutant or its precursors, or (2) to provide for implementation of all feasible measures to reduce emissions. Any planning effort for air quality attainment would thus need to consider both state and federal planning requirements.

#### California Assembly Bill 170

Assembly Bill 170, Reyes (AB 170), was adopted by state lawmakers in 2003 creating Government Code Section 65302.1 which requires cities and counties in the San Joaquin Valley to amend their general plans to include data and analysis, comprehensive goals, policies and feasible implementation strategies designed to improve air quality.

#### Assembly Bills 1807 & 2588 - Toxic Air Contaminants

Within California, TACs are regulated primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics Hot Spots Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB designates a substance as a TAC. Existing sources of TACs that are subject to the Air Toxics Hot Spots Information and Assessment Act are required to: (1) prepare a toxic emissions inventory; (2) prepare a risk assessment if emissions are significant; (3) notify the public of significant risk levels; and (4) prepare and implement risk reduction measures.

#### California Building Code

The California Building Code (CBC) contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Code is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

#### Green Building Standards

In essence, green buildings standards are indistinguishable from any other building standards. Both are contained in the California Building Code and regulate the construction of new buildings and improvements. The only practical distinction between the two is that whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

The green buildings standards, commonly referred to as CalGreen standards, were most recently updated in 2016. The 2016 standards address clean air vehicles and increased requirements for electric vehicle charging infrastructure. Additional requirements in areas of energy use, water efficiency, and conservation were also expanded. The 2016 building energy efficiency standards are approximately 28 percent more efficient than the previously adopted 2013 standards for residential construction and roughly 5 percent more efficient for non-residential construction (CEC 2015). The 2016 CalGreen standards became effective on January 1, 2017.

## SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

The SJVAPCD is the agency primarily responsible for ensuring that NAAQS and CAAQS are not exceeded and that air quality conditions are maintained in the SJVAB, within which the proposed project is located. Responsibilities of the SJVAPCD include, but are not limited to, preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, issuing permits for stationary sources of air pollution, inspecting stationary sources of air pollution and responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and implementing programs and regulations required by the FCAA and the CCAA. The SJVAPCD Rules and Regulations that are applicable to the proposed project include, but are not limited to, the following:

- *Regulation VIII (Fugitive Dust Prohibitions). Regulation VIII (Rules 8011-8081).* This regulation is a series of rules designed to reduce particulate emissions generated by human activity, including construction and demolition activities, carryout and trackout, paved and unpaved roads, bulk material handling and storage, unpaved vehicle/traffic areas, open space areas, etc.
- *Rule 4002 (National Emissions Standards for Hazardous Air Pollutants).* This rule may apply to projects in which portions of an existing building would be renovated, partially demolished or removed. With regard to asbestos, the NESHAP specifies work practices to be followed during renovation, demolition or other abatement activities when friable asbestos is involved. Prior to demolition activity, an asbestos survey of the existing structure may be required to identify the presence of any asbestos containing building materials (ACBM). Removal of identified ACBM must be removed by a certified asbestos contractor in accordance with CAL-OSHA requirements.
- *Rule 4102 (Nuisance).* Applies to any source operation that emits or may emit air contaminants or other materials.
- *Rule 4103 (Open Burning).* This rule regulates the use of open burning and specifies the types of materials that may be open burned. Section 5.1 of this rule prohibits the burning of trees and other vegetative (non-agricultural) material whenever the land is being developed for non-agricultural purposes.
- *Rule 4601 (Architectural Coatings).* Limits volatile organic compounds from architectural coatings.
- *Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations).* This rule applies to the manufacture and use of cutback, slow cure, and emulsified asphalt during paving and maintenance operations.
- *Rule 9510 (Indirect Source Review - ISR).* Requires developers of larger residential, commercial, recreational, and industrial projects to reduce smog-forming and particulate emissions from their projects' baselines. If project emissions still exceed the minimum baseline reductions, a project's developer will be required to mitigate the difference by paying an off-site fee to the District, which would then be used to fund clean-air projects. For projects subject to this rule, the ISR rule requires developers to mitigate and/or offset emissions sufficient to achieve: (1) 20-percent reduction of construction equipment exhaust NO<sub>x</sub>; (2) 45-percent reduction of construction equipment exhaust PM<sub>10</sub>; (3) 33-percent reduction of operational NO<sub>x</sub> over 10 years; and (4) 50-percent reduction of operational PM<sub>10</sub> over 10 years. SJVAPCD ISR applications must be filed "no later than applying for a final discretionary approval with a public agency."

## REGULATORY ATTAINMENT DESIGNATIONS

Under the CCAA, ARB is required to designate areas of the state as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria.



Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data does not support either an attainment or nonattainment designation. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The U.S. EPA designates areas for ozone, CO, and NO<sub>2</sub> as "does not meet the primary standards," "cannot be classified," or "better than national standards." For SO<sub>2</sub>, areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, ARB terminology of attainment, nonattainment, and unclassified is more frequently used. The U.S. EPA uses the same sub-categories for nonattainment status: serious, severe, and extreme. In 1991, U.S. EPA assigned new nonattainment designations to areas that had previously been classified as Group I, II, or III for PM<sub>10</sub> based on the likelihood that they would violate national PM<sub>10</sub> standards. All other areas are designated "unclassified."

The state and national attainment status designations pertaining to the SJVAB are summarized in Table 2. The SJVAB is currently designated as a nonattainment area with respect to the state PM<sub>10</sub> standard, ozone, and PM<sub>2.5</sub> standards. The SJVAB is designated nonattainment for the national 8-hour ozone and PM<sub>2.5</sub> standards. On September 25, 2008, the U.S. EPA redesignated the San Joaquin Valley to attainment for the PM<sub>10</sub> NAAQS and approved the PM<sub>10</sub> Maintenance Plan (SJVAPCD 2017).

**Table 2**  
**SJVAB Attainment Status Designations**

| Pollutant                        | National Designation          | State Designation       |
|----------------------------------|-------------------------------|-------------------------|
| Ozone, 1 hour                    | No Standard                   | Nonattainment/Severe    |
| Ozone, 8 hour                    | Nonattainment/Extreme         | Nonattainment           |
| PM <sub>10</sub>                 | Attainment                    | Nonattainment           |
| PM <sub>2.5</sub>                | Nonattainment                 | Nonattainment           |
| Carbon Monoxide                  | Attainment                    | Unclassified/Attainment |
| Nitrogen dioxide                 | Unclassified/Attainment       | Attainment              |
| Sulfur dioxide                   | Unclassified/Attainment       | Attainment              |
| Lead (particulate)               | No Designation/Classification | Attainment              |
| Hydrogen sulfide                 | No Federal Standard           | Unclassified            |
| Sulfates                         | No Federal Standard           | Attainment              |
| Visibility-reducing particulates | No Federal Standard           | Unclassified            |
| Vinyl Chloride                   | No Federal Standard           | Attainment              |
| <i>Source: SJVAPCD 2017</i>      |                               |                         |

## AMBIENT AIR QUALITY

Air pollutant concentrations are measured at several monitoring stations in Fresno County. The Clovis-N. Villa Avenue Monitoring Station is the closest representative monitoring stations to the proposed project site with sufficient data to meet U.S. EPA and/or ARB criteria for quality assurance. This monitoring station monitors ambient concentrations of ozone and PM<sub>2.5</sub>. Ambient monitoring data for nitrogen dioxide and PM<sub>10</sub> was obtained from the Fresno-Garland Monitoring Station. Ambient monitoring data was obtained for the last three years of available measurement data (i.e., 2013 through 2015) and are summarized in Table 3. As depicted, the state and national ozone and PM<sub>2.5</sub> standards, as well as, the national PM<sub>10</sub> standards were exceeded on numerous occasions during the past 3 years. The state and national standards for NO<sub>x</sub> and national standards for PM<sub>10</sub> have not been exceeded during the past 3 years, based on available data.

## SENSITIVE RECEPTORS

One of the most important reasons for air quality standards is the protection of those members of the population who are most sensitive to the adverse health effects of air pollution, termed "sensitive receptors." The term sensitive receptors refer to specific population groups, as well as the land uses where individuals would reside for long periods. Commonly identified sensitive population groups are children, the elderly, the acutely ill, and the chronically ill. Commonly identified sensitive land uses would include facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Residential dwellings, schools, parks, playgrounds, childcare centers, convalescent homes, and hospitals are examples of sensitive land uses.

Nearby sensitive land uses consist of residential land uses, the nearest of which are located adjacent to THE eastern and southern boundaries of the project site. Cedar Wood Elementary School is also located to the south of the project site, across Herndon Avenue.

**Table 3**  
**Summary of Ambient Air Quality Monitoring Data<sup>1</sup>**

|  | 2013        | 2014        | 2015        |
|--|-------------|-------------|-------------|
| <b>Ozone</b>   |             |             |             |
| Maximum concentration (1-hour/8-hour average)  | 0.118/0.103 | 0.116/0.98  | 0.113/0.095 |
| Number of days state/national 1-hour standard exceeded   | 26/NA       | 18/ NA      | 26/ NA      |
| Number of days state/national 8-hour standard exceeded   | 0/82        | 0/50        | 0/62        |
| <b>Nitrogen Dioxide (NO<sub>2</sub>)</b>   |             |             |             |
| Maximum 1-hour concentration (state/national)  | 59/59       | 59/59       | 49/49.8     |
| Annual average   | NA          | 10          | NA          |
| Number of days state/national standard exceeded  | 0/0         | 0/0         | 0/0         |
| <b>Suspended Particulate Matter (PM<sub>10</sub>)</b>  |             |             |             |
| Maximum concentration (state/national)   | 84.3/82.3   | 101.3/105.3 | 70.8/72.8   |
| Annual Average (state/national)  | NA/30.4     | 33.7/33.9   | NA/ NA      |
| Number of days national standard exceeded (measured/calculated <sup>2</sup> )  | 0/0         | 0/0         | 0/NA        |
| Number of days state standard exceeded (measured/calculated <sup>2</sup> )   | 5/NA        | 8/50.3      | 3/NA        |
| <b>Suspended Particulate Matter (PM<sub>2.5</sub>)</b>   |             |             |             |
| Maximum concentration (state/national)   | 72.8/72.8   | 80.7/80.7   | 50.4/50.4   |
| Number of days national standard exceeded (measured/calculated <sup>2</sup> )  | 26/40.4     | 14/15.4     | 8/8.2       |
| <p>ppm = parts per million by volume, µg/m<sup>3</sup> = micrograms per cubic meter, NA=Not Available</p> <p>1 Ambient data was obtained from the Clovis-N. Villa Avenue Monitoring Station.</p> <p>2. Measured days are those days that an actual measurement was greater than the standard. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day.</p> <p>Source: ARB 2017a</p> |             |             |             |

## IMPACTS & MITIGATION MEASURES

### THRESHOLDS OF SIGNIFICANCE

Criteria for determining the significance of air quality impacts were developed based on information contained in the California Environmental Quality Act Guidelines (CEQA Guidelines, Appendix G). According to those guidelines, a project may have a significant effect on the environment if it would result in the following conditions:

1. Conflict with or obstruct implementation of any applicable air quality plan.
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
4. Expose sensitive receptors to substantial pollutant concentrations.
5. Create objectionable odors affecting a substantial number of people.

## METHODOLOGY

### Short-term Impacts

Short-term construction emissions associated with development of the proposed land uses were calculated using the CalEEMod computer program, version 2016.3.1. Emissions were quantified for site preparation/grading, asphalt paving, facility construction, and application of architectural coatings. Construction schedules were based on information provided by the project proponent. Other construction information, including equipment usage, worker vehicle trips, and haul truck trips, were based on the default assumptions contained in the CalEEMod model. Construction emissions associated with the widening of Herndon Avenue were quantified using the Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model, version 8.1.0. Modeling assumptions for the proposed widening were based on data obtained from similar widening projects in the area and default modeling assumptions contained in the model. The import/export of soil is not anticipated to be required for this project. Modeling assumptions and output files are included in Appendix A of this report.

### Long-term Impacts

Long-term operational emissions of criteria air pollutants associated with the proposed project were calculated using the CalEEMod computer program, version 2016.3.1. Modeling was conducted based on traffic data derived, in part, from the traffic analysis prepared for the proposed project (JLB 2017). All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model. Mobile source emissions were conservatively based on the default fleet distribution assumptions contained in the model. The widening of Herndon Avenue would not be anticipated to result in changes in vehicle miles traveled, fleet mix, or vehicle speeds. As a result, no changes in operational emissions associated with the proposed widening of Herndon Avenue are anticipated to occur. Modeling assumptions and output files are included in Appendix A of this report. Localized concentrations of TACs, mobile-source CO, and odors were qualitatively assessed.

## THRESHOLDS OF SIGNIFICANCE

To assist local jurisdictions in the evaluation of air quality impacts, the SJVAPCD has published the Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2015). This guidance document includes recommended thresholds of significance to be used for the evaluation of short-term construction, long-term operational, odor, toxic air contaminant, and cumulative air quality impacts. Accordingly, the SJVAPCD-recommended thresholds of significance are used to determine whether implementation of the proposed project would result in a significant air quality impact. The thresholds of significance are summarized below.

- Short-term Emissions—Construction impacts associated with the proposed project would be considered significant if project-generated emissions would exceed 100 tons per year (TPY) of CO, 10 TPY of ROG or NO<sub>x</sub>, 27 TPY of SO<sub>x</sub>, or 15 TPY of PM<sub>10</sub> or PM<sub>2.5</sub>.
- Long-term Emissions—Operational impacts associated with the proposed project would be considered significant if project generated emissions would exceed 100 tons per year (TPY) of CO, 10 TPY of ROG or NO<sub>x</sub>, 27 TPY of SO<sub>x</sub>, or 15 TPY of PM<sub>10</sub> or PM<sub>2.5</sub>.

- Conflict with or Obstruct Implementation of Applicable Air Quality Plan—Due to the region's non-attainment status for ozone, PM<sub>2.5</sub>, and PM<sub>10</sub>, if project-generated emissions of ozone precursor pollutants (i.e., ROG and NO<sub>x</sub>) or PM would exceed the SJVAPCD's significance thresholds, then the project would be considered to conflict with the attainment plans.
- Local Mobile-Source CO Concentrations—Local mobile source impacts associated with the proposed project would be considered significant if the project contributes to CO concentrations at receptor locations in excess of the CAAQS (i.e., 9.0 ppm for 8 hours or 20 ppm for 1 hour).
- Exposure to toxic air contaminants (TAC) would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual (i.e., maximum individual risk) would exceed 20 in 1 million or would result in a Hazard Index greater than 1.
- Odor impacts associated with the proposed project would be considered significant if the project has the potential to frequently expose members of the public to objectionable odors.

In addition to the above thresholds, the SJVAPCD also recommends the use of daily emissions thresholds for the evaluation of project impacts on localized ambient air quality. Accordingly, the proposed project would also be considered to result in a significant contribution to localized ambient air quality if onsite emissions of ROG, NO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO, or SO<sub>2</sub> associated with either short-term construction or long-term operational activities would exceed a daily average of 100 pounds per day (lbs/day) for each of the pollutants evaluated (SJVAPCD 2015).

## PROJECT IMPACTS

**Impact AQ-1. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?**

### Short-term Construction Emissions

Short-term increases in emissions would occur during the construction process. Construction-generated emissions are of temporary duration, lasting only as long as construction activities occur, but have the potential to represent a significant air quality impact. The construction of the proposed project would result in the temporary generation of emissions associated with site grading and excavation, paving, motor vehicle exhaust associated with construction equipment and worker trips, as well as the movement of construction equipment on unpaved surfaces. Short-term construction emissions would result in increased emissions of ozone-precursor pollutants (i.e., ROG and NO<sub>x</sub>) and emissions of PM. Emissions of ozone-precursors would result from the operation of on-road and off-road motorized vehicles and equipment. Emissions of airborne PM are largely dependent on the amount of ground disturbance associated with site preparation activities and can result in increased concentrations of PM that can adversely affect nearby sensitive land uses. Estimated annual and daily construction-generated emissions are discussed in greater detail, as follows:

### Annual Construction Emissions

Assuming the simultaneous construction of the proposed cancer center, hotel, and shopping center were to occur simultaneously, Phase I of the proposed project would generate maximum uncontrolled annual emissions of approximately 3.6 tons/year of ROG, 7.3 tons/year of NO<sub>x</sub>, 5.3 tons/year of CO, 0.7 tons/year of PM<sub>10</sub>, and 0.5 tons/year of PM<sub>2.5</sub> (refer to Table 4). The specific construction periods for Phase II have not yet been identified. Assuming that all Phase II land uses would be constructed simultaneously, Phase II would generate maximum uncontrolled annual emissions of approximately 4.6 tons/year of ROG, 3.0 tons/year of NO<sub>x</sub>, 3.0 tons/year of CO, 0.6 tons/year of PM<sub>10</sub>, and 0.3 tons/year of PM<sub>2.5</sub>. The widening of Herndon Avenue would generate maximum uncontrolled annual emissions of approximately 0.4 tons/year of ROG, 3.8 tons/year of NO<sub>x</sub>, 2.7 tons/year of CO, 0.5 tons/year of PM<sub>10</sub>, and 0.2 tons/year of PM<sub>2.5</sub>. Emissions of SO<sub>2</sub> would be negligible. Estimated construction-generated emissions would not exceed the SJVAPCD's significance thresholds of 10 tons/year of ROG, 10 tons/year of NO<sub>x</sub>, or 15 tons/year PM<sub>10</sub>. Given that

project-generated emissions would not exceed applicable SJVAPCD significance thresholds, regional air quality impacts would be considered **less than significant**.

#### Daily Construction Emissions

Average-daily construction emissions are summarized in Table 5. the simultaneous construction of the proposed cancer center, hotel, and shopping center were to occur simultaneously, Phase I of the proposed project would generate maximum uncontrolled average-daily emissions of approximately 21.4 lbs/day of ROG, 61.0 lbs/day of NO<sub>x</sub>, 45.4 lbs/day of CO, 3.0 lbs/day of PM<sub>10</sub>, and 2.0 lbs/day of PM<sub>2.5</sub>. Average-daily construction emissions for Phase II would total 37.9 lbs/day of ROG, 25.9 lbs/day of NO<sub>x</sub>, 32.0 lbs/day of CO, 3.0 lbs/day of PM<sub>10</sub>, and 2.2 lbs/day of PM<sub>2.5</sub>. Emissions of SO<sub>2</sub> would be negligible (i.e., less than 0.1 lbs/day). Estimated construction-generated emissions would not exceed the SJVAPCD's significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated. Localized air quality impacts associated with project construction would be considered less than significant.

**Table 4**  
**Annual Construction-Generated Emissions**

| Land Use   | Construction Period                     | Uncontrolled Maximum Annual Emissions (TPY) <sup>1</sup> |                 |     |                 |                  |                   |
|--|---|--|-----------------|-----|-----------------|------------------|-------------------|
|  |   | ROG  | NO <sub>x</sub> | CO  | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Phase I (2-10 Year Plan)   |   |  |                 |     |                 |                  |                   |
| Cancer Center  | 2017-2018                               | 1.0  | 3.3             | 2.3 | 0.0             | 0.3              | 0.2               |
| Hotel & Shopping Center  | 2018-2019                               | 2.7  | 4.3             | 3.1 | 0.0             | 0.5              | 0.3               |
| Bed Tower, D&T Expansion, Parking Garage & Parking Lots  | 2020-2021                               | 2.0  | 4.1             | 3.2 | 0.0             | 0.5              | 0.3               |
| Medical-Dental Office  | 2022-2023                               | 0.8  | 2.1             | 1.9 | 0.0             | 0.2              | 0.1               |
| Outpatient Center Expansion  | 2025-2026                               | 0.3  | 0.8             | 0.9 | 0.0             | 0.1              | 0.1               |
| Phase II (10-20 Year Plan)   |   |  |                 |     |                 |                  |                   |
| Hospital Expansion, Assisted Living Facility, Shopping Center, Medical-Dental Office & Parking Lots <sup>3</sup>   | 2028-2030                               | 4.6  | 3.0             | 3.0 | 0.0             | 0.6              | 0.3               |
| Herndon Avenue Widening  |   |  |                 |     |                 |                  |                   |
|  | 2020                                    | 0.4  | 3.8             | 2.7 | 0.0             | 0.5              | 0.2               |
| Maximum Annual Emissions   |   |  |                 |     |                 |                  |                   |
|  | Phase I <sup>2</sup>                    | 3.7  | 7.6             | 5.4 | 0               | 0.8              | 0.5               |
|  | Phase II <sup>3</sup>                   | 4.6  | 3.0             | 3.0 | 0.0             | 0.6              | 0.3               |
|  | Significance Thresholds:                | 10   | 10              | 100 | 27              | 15               | 15                |
|  | Exceeds Thresholds/Significant Impact?: | No   | No              | No  | No              | No               | No                |
| <div>1. Based on CalEEMod emissions modeling. Does not include emission control measures.</div> <div>2. Phase I maximum annual emissions assumes construction of the cancer center, hotel, and shopping center could potentially occur simultaneously.</div> <div>3. To be conservative, Phase II maximum annual construction of the hospital expansion, assisted living facility, shopping center, and medical-dental office were assumed to occur simultaneously.</div> <div>Refer to Appendix A for modeling results and assumptions.</div> |   |  |                 |     |                 |                  |                   |

### Long-term Operational Emissions

Estimated annual operational emissions for the proposed project are summarized in Table 6. As indicated, Phase I of the proposed project would generate approximately 6.3 tons/year of ROG, 38.6 tons/year of NO<sub>x</sub>, 23.8 tons/year of CO, 10.7 tons/year of PM<sub>10</sub>, and 3.0 tons/year of PM<sub>2.5</sub>. At project buildout, the proposed project would generate approximately 10.8 tons/year of ROG, 71.8 tons/year of NO<sub>x</sub>, 37.7 tons/year of CO, 20.3 tons/year of PM<sub>10</sub>, and 5.6 tons/year of PM<sub>2.5</sub>. Operational emissions of SO<sub>x</sub> would be negligible (i.e., less than 0.3 tons/year). Annual operational emissions of ROG, NO<sub>x</sub>, and PM<sub>10</sub> would exceed SJVAPCD's mass-emissions significance thresholds. A majority of the emissions generated would be associated with non-worker vehicle commute trips. Emissions associated with onsite permitted stationary sources (e.g., emergency generators) would not exceed SJVAPCD's mass-emissions significance thresholds. The highest average-daily onsite emissions for both Phase I and Phase II operations would not exceed the SJVAPCD's recommended localized ambient air quality significance thresholds of 100 lbs/day for each of the criteria air pollutants evaluated.

**Table 5**  
**Average Daily Construction-Generated Emissions**

| Project Phase/Land Use  | Construction Year | Uncontrolled Average Daily Onsite Emissions (lbs/day) <sup>4</sup> |                 |      |                 |                  |                   |
|---|-------------------|--|-----------------|------|-----------------|------------------|-------------------|
|   |                   | ROG  | NO <sub>x</sub> | CO   | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Phase I (2-10 Year Plan)  |                   |  |                 |      |                 |                  |                   |
| Cancer Center   | 2017              | 0.7  | 6.2             | 3.8  | 0.0             | 0.9              | 0.7               |
|   | 2018              | 4.9  | 35.0            | 27.2 | 0.0             | 2.1              | 2.0               |
| Hotel & Shopping Center   | 2018              | 2.9  | 26.0            | 18.2 | 0.0             | 2.8              | 2.2               |
|   | 2019              | 21.4   | 8.6             | 7.1  | 0.0             | 0.5              | 0.5               |
| Bed Tower, D&T Expansion, Parking Garage & Parking Lots   | 2020              | 2.6  | 24.2            | 20.0 | 0.0             | 2.1              | 1.8               |
|   | 2021              | 11.1   | 14.2            | 13.7 | 0.0             | 0.8              | 0.7               |
| Medical-Dental Office Building  | 2022              | 1.9  | 15.34           | 14.5 | 0.0             | 1.3              | 0.9               |
|   | 2023              | 6.1  | 6.3             | 6.6  | 0.0             | 0.2              | 0.2               |
| Outpatient Center Expansion   | 2025              | 0.5  | 5.5             | 7.1  | 0.0             | 0.3              | 0.3               |
|   | 2026              | 2.5  | 2.3             | 3.1  | 0.0             | 0.1              | 0.1               |
| Phase II (10-20 Year Plan)  |                   |  |                 |      |                 |                  |                   |
| Hospital Expansion, Assisted Living, Shopping Center, Medical-Dental Office & Parking Lots  | 2028              | 1.8  | 16.7            | 20.5 | 0.0             | 2.6              | 1.9               |
|   | 2029              | 38.2   | 27.3            | 34.4 | 0.1             | 3.0              | 2.3               |
| Herndon Avenue Widening   |                   |  |                 |      |                 |                  |                   |
|   | 2020              | 6.4  | 60.8            | 43.2 | 0.0             | 8.0              | 3.2               |
| Highest Average-Daily Onsite Emissions  |                   |  |                 |      |                 |                  |                   |
| Phase I   |                   | 21.4   | 61.0            | 45.4 | 0.1             | 4.9              | 4.2               |
| Phase II  |                   | 38.2   | 27.3            | 34.4 | 0.1             | 3.0              | 2.3               |
| Significance Thresholds:  |                   | 100  | 100             | 100  | 100             | 100              | 100               |
| Exceeds Thresholds/Significant Impact?:   |                   | No   | No              | No   | No              | No               | No                |
| 1. Based on CalEEMod emissions modeling. Totals may not sum due to rounding.<br>2. Average daily onsite emissions are based on total onsite emissions divided by the total number of construction days.<br>Assumes 250 construction days per year.<br>Refer to Appendix A for modeling results and assumptions. |                   |  |                 |      |                 |                  |                   |

It is important to note that estimated operational emissions are conservatively based on the default vehicle fleet distribution assumptions contained in the model, which include contributions from medium and heavy-duty trucks. Mobile sources associated with hospitals and related facilities typically consist largely to light-duty vehicles. As a result, actual operational emissions would likely be slightly less than indicated. Nonetheless, because annual emissions of ROG, NO<sub>x</sub>, and PM<sub>10</sub> would exceed SJVAPCD's mass-emissions significance thresholds, this impact is considered potentially significant.

**Table 6  
Long-term Operational Emissions**

| Project Phase/Land Use  | Operational Year | Uncontrolled Annual Emissions (tons/year) <sup>1</sup> |                 |      |                 |                  |                   |
|---|------------------|--|-----------------|------|-----------------|------------------|-------------------|
|   |                  | ROG  | NO <sub>x</sub> | CO   | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Phase I (2-10 Year Plan)  |                  |  |                 |      |                 |                  |                   |
| Cancer Center   | 2019             | 0.9  | 5.7             | 4.5  | 0.0             | 1.2              | 0.3               |
| Hotel & Shopping Center   | 2020             | 4.2  | 28.8            | 20.2 | 0.1             | 4.6              | 1.3               |
| Bed Tower, D&T Expansion, Parking Garage  | 2022             | 1.4  | 6.8             | 5.9  | 0.0             | 2.0              | 0.6               |
| Medical-Dental Office Building  | 2024             | 1.1  | 7.6             | 5.6  | 0.0             | 2.0              | 0.5               |
| Outpatient Center Expansion   | 2027             | 0.3  | 1.5             | 1.1  | 0.0             | 0.5              | 0.1               |
| Phase II (10-20 Year Plan)  |                  |  |                 |      |                 |                  |                   |
| Hospital Expansion, Assisted Living, Shopping Center, Medical-Dental Office   | 2030             | 5.3  | 34.2            | 22.3 | 0.1             | 9.8              | 2.9               |
| Permitted Stationary Sources <sup>2</sup>   | 2030             | 0.3  | 1.1             | 0.6  | 1.2             | 0.0              | 0.0               |
| Highest Annual Emissions  |                  |  |                 |      |                 |                  |                   |
| Phase I at Buildout Year 2029 <sup>3</sup>  | 6.3              | 38.6   | 23.8            | 0.2  | 10.7            | 3.0              |                   |
| Phases I & II at Buildout Year 2035 <sup>3</sup>  | 10.8             | 71.8   | 37.7            | 0.3  | 20.3            | 5.6              |                   |
| Permitted Stationary Sources <sup>2</sup>   | 0.3              | 1.1  | 0.6             | 1.2  | 0.0             | 0.0              |                   |
| Significance Thresholds (tons):   | 10               | 10   | 100             | 27   | 15              | 15               |                   |
| Exceeds Thresholds/Significant Impact?:   | Yes              | Yes  | No              | No   | Yes             | No               |                   |
| Highest Average-Daily Onsite Emissions (lbs) <sup>2</sup>   |                  |  |                 |      |                 |                  |                   |
| Phase I   | 26.0             | 0.0  | 0.1             | 0.0  | 0.0             | 0.0              |                   |
| Phases I & II (Buildout)  | 44.1             | 0.4  | 5.9             | 0.0  | 0.1             | 0.1              |                   |
| Significance Thresholds (lbs):  | 100              | 100  | 100             | 100  | 100             | 100              |                   |
| Exceeds Thresholds/Significant Impact?:   | No               | No   | No              | No   | No              | No               |                   |
| <div>1. Based on CalEEMod emissions modeling. Does not include implementation of emissions control measures. Totals may not sum due to rounding.</div> <div>2. Includes the installation of three emergency generators. Detailed specifications for the generators are not yet available. To be conservative, generators were assumed to be diesel-fueled, 1,000 bhp, 100 hours per year.</div> <div>3. Based on buildout operational years for Phase I and Phase II conditions. Does not reflect the sum of emissions reported for interim operational years.</div> <div>4. Average daily onsite emissions are based on total onsite emissions divided by the total of 260 average annual operational days.</div> <div>Refer to Appendix A for modeling assumptions and results.</div> |                  |  |                 |      |                 |                  |                   |

### **Mitigation Measures**

**Mitigation Measure AQ-1: Comply with SJVAPCD's Indirect Source Review Rule (Rule 9510).** Operation of the proposed project shall comply with SJVAPCD's ISR rule (Rule 9510). Accordingly, an Air Impact Assessment (AIA) shall be prepared for the proposed Project. The AIA shall be submitted to and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The AIA shall

include: an estimate of operational emissions prior to the implementation of mitigation measures; a list of the mitigation measures to be applied to the project; an estimate of emissions for each applicable pollutant for the project, or each phase thereof, following the implementation of mitigation; and a calculation of the applicable off-site fee, if required by Rule 9510. Measures that may be implemented to reduce operational emissions may include, but are not limited to, the following:

- a. Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.
- b. Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50% tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.
- c. Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.
- d. Utilize high-efficiency gas or solar water heaters, beyond that required by current building codes.
- e. Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.
- f. Install parking spaces for alternatively fueled vehicles, beyond that required by current building codes.
- g. Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.
- h. Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.
- i. Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.
- j. Provide on-site bicycle parking beyond those required by current building standards and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).
- k. Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)

**Mitigation Measure AQ-2: Implement a Voluntary Emissions Reduction Agreement (VERA) with the SJVAPCD to Reduce Operational Emissions of ROG, NO<sub>x</sub>, and PM<sub>10</sub>.** A Voluntary Emissions Reduction Agreement (VERA) shall be entered into with the SJVAPCD to reduce operational emissions of ROG and NO<sub>x</sub> to less than 10 tons/year and emissions of PM<sub>10</sub> to below 15 tons/year. Operational emissions of ROG, NO<sub>x</sub> and PM<sub>10</sub> (inclusive of PM<sub>2.5</sub>) shall be reduced in excess of the reductions required per compliance with SJVAPCD's ISR Rule (Refer to Mitigation Measure AQ-1). Emission reductions may be achieved by use of newer, low-emission equipment, implementation of on-site or off-site mitigation, and/or the funding of off-site mitigation, through participation in the SJVAPCD's off-site mitigation program. The VERA shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming compliance with the VERA, prior to issuance of final discretionary approval (e.g., approval of the grading permit). Development and implementation of the VERA shall be fully funded by the project proponent/owner. With approval by SJVAPCD, the VERA may also be used to demonstrate compliance with emission reductions required by SJVAPCD's ISR Rule (Rule 9510).

#### **Level of Significance after Mitigation**

Mitigation Measure AQ-1 would require compliance with SJVAPCD's Indirect Source Review Rule (Rule 9510). With implementation of Mitigation Measure AQ-2, a VERA would be required to reduce operational emissions of ROG, NO<sub>x</sub> and PM<sub>10</sub> to below the SJVAPCD's significance thresholds. With mitigation, this impact would be considered less than significant.



**Impact AQ-2.      *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?***

The SJVAB is currently designated non-attainment for the state and federal ozone and PM<sub>2.5</sub> ambient air quality standards and the state PM<sub>10</sub> standard. As discussed in *Impact AQ-1*, annual operational emissions of ozone-precursor pollutants (e.g., ROG and NO<sub>x</sub>) and PM would exceed SJVAPCD's significance thresholds. Long-term increases in operational emissions could contribute, on a cumulative basis, to existing non-attainment conditions. In addition, short-term construction activities may also result in increased emissions of fugitive dust. As a result, this impact is considered potentially significant. Refer to Impact AQ-1 and AQ-3 for additional discussion of air quality impacts.

**Mitigation Measure AQ-2:** Implement Mitigation Measure AQ-1, AQ-2, and AQ-3.

**Significance after Mitigation:** Mitigation Measure AQ-1 would require compliance with SJVAPCD's Indirect Source Review Rule (Rule 9510). With implementation of Mitigation Measure AQ-2, a VERA would be required to reduce operational emissions of ROG, NO<sub>x</sub> and PM<sub>10</sub> to below the SJVAPCD's significance thresholds. Mitigation Measure AQ-3 would ensure compliance with SJVAPCD requirements for the control of construction-generated emissions. With mitigation, this impact would be considered less than significant.

**Impact AQ-3.      *Would the project expose sensitive receptors to substantial pollutant concentrations?***

Nearby sensitive land uses consist of residential land uses, the nearest of which are located adjacent to the eastern and southern boundaries of the project site. Cedar Wood Elementary School is also located to the south of the proposed land uses located south of Herndon Avenue. The following is a discussion of short-term and long-term localized air quality impacts.

***Short-term Construction***

Naturally Occurring Asbestos

Naturally-occurring asbestos, which was identified by ARB as a TAC in 1986, is located in many parts of California and is commonly associated with ultramafic rock. The project site is not located near any areas that are likely to contain ultramafic rock (DOC 2000). As a result, risk of exposure to asbestos during the construction process would be considered less than significant.

Diesel-Exhaust Emissions

Construction of the proposed project would result in the generation of DPM emissions associated with the use of off-road diesel equipment for site grading and excavation, paving and other construction activities. Health-related risks associated with diesel-exhaust emissions are primarily associated with long-term exposure and associated risk of contracting cancer. The calculation of cancer risk associated with exposure of to TACs are typically calculated based on a 25- to 30-year period of exposure. The use of diesel-powered construction equipment, however, would be temporary and episodic and would occur over a relatively large area. Assuming that construction activities involving the use of diesel-fueled equipment would occur over an approximate two-year period, project-related construction activities would constitute less than eight percent of the typical exposure period. In addition, construction of the proposed facilities would not be anticipated to require extensive site grading or other more intensive site preparation activities that would involve extensive use of diesel-fueled off-road equipment or on-road vehicles. Furthermore, as noted in Impact AQ-1, construction-generated emissions of PM would not exceed the SJVAPCD's localized significance thresholds. As a result, exposure to construction-generated DPM would not be anticipated to exceed applicable thresholds (i.e., incremental increase in cancer risk of 20 in one million). As a result, this impact would be considered less than significant.

### Localized PM Concentrations

Construction of the proposed project may contribute to localized PM concentrations, including emissions from onsite construction equipment and fugitive dust. Fugitive dust emissions would be primarily associated with earth-moving, and material handling activities, as well as, vehicle travel on unpaved and paved surfaces. Uncontrolled emissions of fugitive dust may contribute to increased occurrences of Valley Fever and may also result in increased nuisance impacts to nearby land uses and receptors. As a result, localized uncontrolled concentrations of construction-generated PM would be considered to have a potentially-significant impact.

### **Long-term Operation**

#### Localized Mobile-Source CO Emissions

Carbon monoxide is the primary criteria air pollutant of local concern associated with the proposed project. Under specific meteorological and operational conditions, such as near areas of heavily congested vehicle traffic, CO concentrations may reach unhealthy levels. Mobile-source emissions of CO are a direct function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. For this reason, modeling of mobile-source CO concentrations is typically recommended for sensitive land uses located near signalized roadway intersections that are projected to operate at unacceptable levels of service (i.e., LOS E or F). Localized CO concentrations associated with the proposed project would be considered less-than-significant impact if: (1) traffic generated by the proposed project would not result in deterioration of a signalized intersection to a level of service (LOS) of E or F; or (2) the project would not contribute additional traffic to a signalized intersection that already operates at LOS of E or F.

Under near-term Phase I project conditions, the signalized intersections of Alluvial Avenue/Temperance Avenue, Herndon Avenue/Temperance Avenue, and SR 168 WB Ramps/Temperance Avenue are projected to operate at unacceptable LOS. Under future cumulative 2035/project buildout conditions the signalized intersections of Alluvial Avenue/Temperance Avenue, Herndon Avenue/Temperance Avenue, and Herndon Avenue/Armstrong Avenue are projected to operate at unacceptable LOS. With implementation of the proposed traffic improvements, all signalized intersections would operate at LOS D, or better. With implementation of the proposed traffic improvements, the proposed project would not be anticipated to contribute substantially to localized CO concentrations that would exceed applicable standards. For this reason, the project's contribution to localized CO concentrations would be considered less than significant.

### Toxic Air Contaminants

#### *Mobile Sources*

As noted earlier in this report, diesel-exhaust particulate matter (DPM) is the pollutant of primary concern with regard to mobile sources. Based on recommended land-use guidance issued by the ARB, new sensitive land uses should not be located within approximately 500 feet of high-volume transportation corridors, which are generally defined as having 100,000 vehicles/day within urban environments or 50,000 vehicles/day within rural environments. The proposed project site is not located within 500 feet of a major transportation corridor having a high volume of diesel-fueled trucks. The highest volume roadway in the vicinity of the project site is Highway 168, which is located north of the project site. Traffic volumes along Highway 168 average approximately 16,000 total vehicles/day. Truck volumes along this roadway typically average roughly eight percent of the total volume. Based on these estimates, total trucks along nearby Highway 168 would be approximately 12,500/day. Of these trucks, fewer than 1,800 are heavy-duty trucks (i.e., more than two axles) (Caltrans 2017). In addition, no long-term care facilities (e.g., assisted living) would be located within 500 feet of Highway 168. As a result, exposure of onsite receptors to mobile-source TACs would be considered a less-than-significant impact.

#### *Stationary Sources*

The proposed future expansion of the onsite central plant, would include the installation of emergency generators. Expansion of the central plant would occur at a future date as part of the 10-20 year development plan. The proposed plant would be centrally located within the eastern portion of the project site. The nearest sensitive land uses include residential dwellings located approximately 375 feet to the east and the existing medical center located approximately 360 feet to the southwest. It is anticipated that up to three additional emergency generators would be installed. However, detailed information regarding engine specifications and fuel sources for the proposed emergency generators have not yet been identified.

A screening-impact assessment was conducted to evaluate the potential for incremental increases in cancer risk associated with the proposed generators at nearby sensitive land uses. The screening assessment was conducted using the SJVAPCD's screening worksheet for internal combustion engines and provides a conservative estimation of predicted cancer risk. For screening purposes, each of the proposed emergency generators were assumed to be 1,000 brake horsepower (bhp) in size and diesel fueled. Each generator was assumed to operate up to a maximum of 100 hours per year for routine testing and maintenance purposes, in accordance with current SJVAPCD permitting limitations. Based on the screening assessment conducted, the total predicted cancer risk for the three generators would be approximately 20.3 in one million at these nearest sensitive receptors. Depending on the type, size, and operational requirements for the proposed generators, predicted cancer risks at the nearest sensitive receptors could potentially exceed SJVAPCD's significance threshold of 20 in one million. It is also important to note that as part of the permitting process, the SJVAPCD would independently evaluate the health risks based on final plans before issuing any permits. Depending on the analysis to be conducted at the time of permitting, additional limitations may be imposed, such as hourly limitations or use of best available control technology. The SJVAPCD would not issue a permit to operate if health risks would exceed applicable thresholds. As a result, exposure to onsite sources of TACs would be considered a potentially significant impact.

#### **Mitigation Measure AQ-3: Implement Measures to Reduce Localized Pollutant Concentrations.**

- a. Potential health risks associated with permitted stationary sources (e.g., emergency generators) shall be evaluated prior to installation and operation, once more detailed equipment specifications have been identified and in accordance with SJVAPCD's permitting requirements. Emissions control measures and/or operational limitations shall be incorporated, to the extent deemed necessary, to ensure that operational emissions would not exceed applicable SJVAPCD's significance thresholds for cancer risk of 20 in one million or an acute/chronic hazard index of one.
- b. The following measures shall be implemented to reduce potential exposure of sensitive receptors to localized concentrations of construction-generated PM at nearby sensitive receptors and land uses during project construction:
  1. On-road diesel vehicles shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles:
    - Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location, except as noted in Subsection (d) of the regulation; and,
    - Shall not operate a diesel-fueled auxiliary power system to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation.
  2. Off-road diesel equipment shall comply with the 5-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use Off-road Diesel regulation. The specific requirements and exceptions in the regulations can be reviewed at the following web sites:  
[www.arb.ca.gov/msprog/truck-idling/2485.pdf](http://www.arb.ca.gov/msprog/truck-idling/2485.pdf) and  
[www.arb.ca.gov/regact/2007/ordiesl07/frooad.pdf](http://www.arb.ca.gov/regact/2007/ordiesl07/frooad.pdf).

3. Signs shall be posted at the project site construction entrance to remind drivers and operators of the state's five-minute idling limit.
4. To the extent available, replace fossil-fueled equipment with alternatively-fueled (e.g., natural gas) or electrically-driven equivalents.
5. Construction truck trips shall be scheduled, to the extent possible, to occur during non-peak hours.
6. The burning of vegetative material shall be prohibited.
7. The proposed project shall comply with SJVAPCD Regulation VIII for the control of fugitive dust emissions. Regulation VIII can be obtained on the SJVAPCD's website at website URL: <https://www.valleyair.org/rules/1ruleslist.htm>. At a minimum, the following measures shall be implemented:
  - All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
  - All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
  - All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut & fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
  - When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.
  - Trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)
  - Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
  - On-road vehicle speeds on unpaved surfaces of the project site shall be limited to 15 mph.
  - Sandbags or other erosion control measures shall be installed sufficient to prevent silt runoff to public roadways from sites with a slope greater than one percent.
  - Excavation and grading activities shall be suspended when winds exceed sustained speeds of 20 miles per hour (Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation).
8. The above measures for the control of construction-generated emissions shall be included on site grading and construction plans.

### **Level of Significance After Mitigation**

With mitigation, the installation of permitted stationary sources would be required to demonstrate that potential health risks would not exceed applicable SJVAPCD significance thresholds. In addition, short-term construction activities would be required to comply with SJVAPCD Regulation VIII (Fugitive PM<sub>10</sub> Prohibitions). Mandatory compliance with SJVAPCD Regulation VIII would reduce emissions of fugitive dust from the project site, and minimize the project's potential to adversely affect nearby sensitive receptors. With compliance with SJVAPCD Regulation VIII, maximum annual emissions of PM would be reduced by approximately 50 percent, or more. With mitigation, this impact would be considered less than significant.

**Impact AQ-4. Would the project create objectionable odors affecting a substantial number of people?**

The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies.

No major sources of odors have been identified in the project area. However, construction of the proposed project would involve the use of a variety of gasoline or diesel-powered equipment that would emit exhaust fumes. Exhaust fumes, particularly diesel-exhaust, may be considered objectionable by some people. In addition, pavement coatings and architectural coatings used during project construction would also emit temporary odors. However, construction-generated emissions would occur intermittently throughout the workday and would dissipate rapidly within increasing distance from the source. As a result, short-term construction activities would not expose a substantial number of people to frequent odorous emissions. This impact would be considered less than significant.

**Impact AQ-5. Would the project conflict with or obstruct implementation of the applicable air quality plan?**

In accordance with SJVAPCD-recommended methodology for the assessment of air quality impacts, projects that result in significant air quality impacts at the project level are also considered to have a significant cumulative air quality impact. As noted in Impact AQ-1 long-term operational emissions would exceed applicable thresholds. Construction activities may also result in short-term increases of criteria air pollutants. Increased emissions could result in a significant cumulative contribution of criteria pollutants for which the SJVAB is currently designated non-attainment. For this reason, implementation of the proposed project could conflict with air quality attainment or maintenance planning efforts. This impact would be considered potentially significant. Refer to Impact AQ-1 and AQ-3 for additional discussion of air quality impacts.

**Mitigation Measure:** Implement Mitigation Measure AQ-1, AQ-2 and AQ-3

**Significance after Mitigation:** Mitigation Measure AQ-1 would require compliance with SJVAPCD's Indirect Source Review Rule (Rule 9510). With implementation of Mitigation Measure AQ-2, a VERA would be required to reduce operational emissions of ROG, NO<sub>x</sub> and PM<sub>10</sub> to below the SJVAPCD's significance thresholds. Mitigation Measure AQ-3 would ensure compliance with SJVAPCD requirements for the control of construction-generated emissions. With mitigation, this impact would be considered less than significant.

# GREENHOUSE GASES AND CLIMATE CHANGE

## EXISTING SETTING

To fully understand global climate change, it is important to recognize the naturally occurring “greenhouse effect” and to define the greenhouse gases (GHGs) that contribute to this phenomenon. Various gases in the earth’s atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth’s surface temperature. Solar radiation enters the earth’s atmosphere from space and a portion of the radiation is absorbed by the earth’s surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Primary GHGs attributed to global climate change, are discussed, as follows:

- **Carbon Dioxide.** Carbon dioxide ( $\text{CO}_2$ ) is a colorless, odorless gas.  $\text{CO}_2$  is emitted in a number of ways, both naturally and through human activities. The largest source of  $\text{CO}_2$  emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to  $\text{CO}_2$  emissions. The atmospheric lifetime of  $\text{CO}_2$  is variable because it is so readily exchanged in the atmosphere (U.S. EPA 2016).
- **Methane.** Methane ( $\text{CH}_4$ ) is a colorless, odorless gas that is not flammable under most circumstances.  $\text{CH}_4$  is the major component of natural gas, about 87% by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (enteric fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane’s atmospheric lifetime is about 12 years (U.S. EPA 2016).
- **Nitrous Oxide.** Nitrous oxide ( $\text{N}_2\text{O}$ ) is a clear, colorless gas with a slightly sweet odor.  $\text{N}_2\text{O}$  is produced by both natural and human-related sources. Primary human-related sources of  $\text{N}_2\text{O}$  are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production.  $\text{N}_2\text{O}$  is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of  $\text{N}_2\text{O}$  is approximately 120 years (U.S. EPA 2016).
- **Fluorinated Gases.** Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 260 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes of less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years) (U.S. EPA 2016).

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Gases with high global warming potential, such as HFCs, PFCs, and  $\text{SF}_6$ , are the most heat-absorbent. Over a 100-year timeframe,  $\text{CH}_4$  traps roughly 25 times more heat per molecule than  $\text{CO}_2$ , and  $\text{N}_2\text{O}$  absorbs approximately 298 times more heat per molecule than  $\text{CO}_2$ . Often,

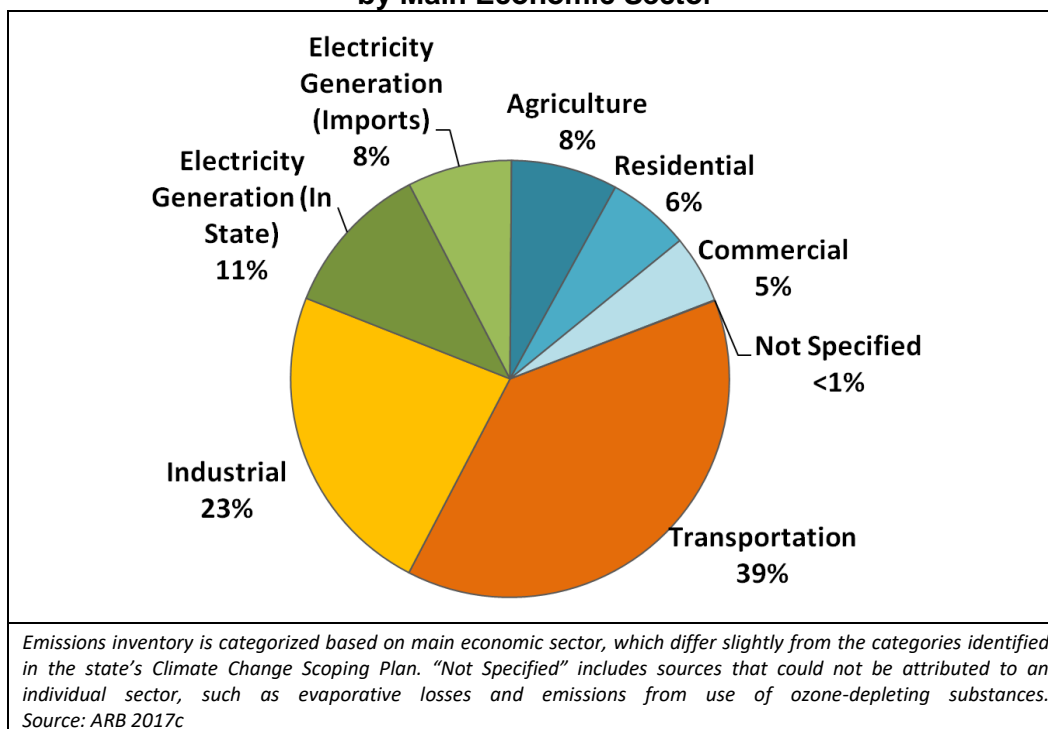
estimates of GHG emissions are presented in carbon dioxide equivalents (CO<sub>2</sub>e), which weight each gas by its global warming potential. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO<sub>2</sub> were being emitted (ARB 2017d).

## SOURCES OF GHG EMISSIONS

On a global scale, GHG emissions are predominantly associated with activities related to energy production; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. World-wide, energy production including the burning of coal, natural gas, and oil for electricity and heat is the largest single source of global GHG emissions (U.S. EPA 2016).

In 2015, GHG emissions within California totaled 440.4 million metric tons of carbon dioxide equivalents (MMTCO<sub>2</sub>e). Within California, the transportation sector is the largest contributor, accounting for roughly 39 percent of the total state-wide GHG emissions. Emissions associated with the industrial sector are the second largest contributor, totaling approximately 23 percent. Emissions from in-state electricity generation, imported electricity, agriculture, residential, and commercial uses constitute the remaining major sources on GHG emissions. The State of California GHG emissions inventory for year 2015, by main economic sector, is depicted in Figure 1.

**Figure 1**  
**State of California Greenhouse Gases Emissions Inventory**  
**by Main Economic Sector**



## EFFECTS OF GLOBAL CLIMATE CHANGE

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on

agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, increased air pollution episodes, and the consequence of these effects on the economy.

Within California, climate changes would likely alter the ecological characteristics of many ecosystems throughout the state. Such alterations would likely include increases in surface temperatures and changes in the form, timing, and intensity of precipitation. For instance, historical records are depicting an increasing trend toward earlier snowmelt in the Sierra Nevada. This snow pack is a principal supply of water for the state, providing roughly 50 percent of state's annual runoff. If this trend continues, some areas of the state may experience an increased danger of floods during the winter months and possible exhaustion of the snowpack during spring and summer months. An earlier snowmelt would also impact the State's energy resources. Currently, approximately 20 percent of California's electricity comes from hydropower. An early exhaustion of the Sierra snowpack, may force electricity producers to switch to more costly or non-renewable forms of electricity generation during spring and summer months. A changing climate may also impact agricultural crop yields, coastal structures, and biodiversity. As a result, resultant changes in climate will likely have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry.

## **REGULATORY FRAMEWORK**

### **FEDERAL**

#### **INTERNATIONAL REGULATION AND THE KYOTO PROTOCOL**

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC). While the United States signed the Kyoto Protocol, which would have required reductions in GHGs, Congress never ratified the protocol. The federal government chose voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science. In 2002, the United States announced a strategy to reduce the greenhouse gas intensity of the American economy by 18 percent over a 10-year period from 2002 to 2012.

As part of the commitments to the UNFCCC, the U.S. EPA has developed an inventory of anthropogenic emissions by sources and removals by sinks of all GHGs. This inventory is periodically updated, with the latest update in 2010. The U.S. EPA reports that total US emissions rose by 14 percent from 1990 to 2007, while the US gross domestic product increased by 59 percent over the same period. A 2.9 percent decrease in emissions was noted from 2007 to 2008, which is reported to be attributable to climate conditions, reduced use of petroleum products for transportation, and increased use of natural gas over other fuel sources. The inventory notes that the transportation sector emits about 32 percent of CO<sub>2</sub> emissions, with 53 percent of those emissions coming from personal automobile use. Residential uses, primarily from energy use, accounted for 21 percent of CO<sub>2</sub> emissions (U.S. EPA 2010).

As a part of the U.S. EPA's responsibility to develop and update an inventory of US greenhouse gas emissions and sinks, the U.S. EPA compared trends of other various US data. Over the period between 1990 and 2008, GHG emissions grew at an average rate of about 0.7 percent per year. Population growth was slightly higher at 1.1 percent, while energy and fossil fuel consumption grew at 0.9 and 0.8 percent, respectively. Gross domestic product and energy generation grew at much higher rates.

#### Executive Order 13693

Executive Order (EO) 13693 (Planning for Federal Sustainability in the Next Decade) was signed by President Obama on March 19, 2015. The goal of EO 13693 is to maintain Federal leadership in sustainability and greenhouse gas emission reductions. EO 13693 promotes building energy conservation and efficiency, and improves environmental performance. The EO also includes the establishment of sustainability goals and GHG-reduction targets for federal agencies.



## STATE

### Assembly Bill 1493

Assembly Bill (AB) 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the California Air Resources Board (ARB) to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as Pavley I. The California Legislature declared in AB 1493 that global warming is a matter of increasing concern for public health and the environment. It cites several risks that California faces from climate change, including a reduction in the state's water supply, an increase in air pollution caused by higher temperatures, harm to agriculture, an increase in wildfires, damage to the coastline, and economic losses caused by higher food, water, energy, and insurance prices. The bill also states that technological solutions to reduce GHG emissions would stimulate California's economy and provide jobs. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as the State is authorized to do under the Clean Air Act, to allow the State to require reduced tailpipe emissions of CO<sub>2</sub>. In late 2007, the U.S. EPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the State brought suit against the U.S. EPA related to this denial.

In January 2009, President Obama instructed the U.S. EPA to reconsider the Bush Administration's denial of California's and 13 other states' requests to implement global warming pollution standards for cars and trucks. In June 2009, the U.S. EPA granted California's waiver request, enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

Also in 2009, President Obama announced a national policy aimed at both increasing fuel economy and reducing GHG pollution for all new cars and trucks sold in the US. The new standards would cover model years 2012 to 2016 and would raise passenger vehicle fuel economy to a fleet average of 35.5 miles per gallon by 2016. When the national program takes effect, California has committed to allowing automakers who show compliance with the national program to also be deemed in compliance with state requirements. California is committed to further strengthening these standards beginning in 2017 to obtain a 45 percent GHG reduction from the 2020 model year vehicles.

### Executive Order No. S-3-05

EO S-3-05 proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

EO No. S-3-05 directed the secretary of the California Environmental Protection Agency to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The secretary will also submit biannual reports to the governor and state legislature describing (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the secretary of CalEPA created a Climate Action Team made up of members from various state agencies and commissions. The Climate Action Team released its first report in March 2006 and continues to release periodic reports on progress. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

### Executive Order No. S-01-07

EO S-1-07, the Low Carbon Fuel Standard (LCFS) was issued on January 18, 2007 and called for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. This order instructed the CalEPA to coordinate activities between the University of California, the California Energy Commission (CEC) and other state agencies to develop and propose a draft compliance schedule to meet the 2020

target. Furthermore, it directed ARB to consider initiating regulatory proceedings to establish and implement the LCFS. In response, ARB adopted the LCFS regulation in 2010.

#### Assembly Bill 32 - California Global Warming Solutions Act of 2006

AB 32 requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride. The reduction to 1990 levels will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

#### Climate Change Scoping Plan

In October 2008, ARB published its *Climate Change Proposed Scoping Plan*, which is the State's plan to achieve GHG reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementation of the Low Carbon Fuel Standard program, energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems, and a renewable portfolio standard for electricity production.

A key component of the Scoping Plan is the Renewable Portfolio Standard, which is intended to increase the percentage of renewables in California's electricity mix to 33 percent by year 2020, resulting in a reduction of 21.3 MMTCO<sub>2</sub>e. Sources of renewable energy include, but are not limited to, biomass, wind, solar, geothermal, hydroelectric, and anaerobic digestion. Increasing the use of renewables will decrease California's reliance on fossil fuels, thus reducing GHG emissions.

The Scoping Plan states that land use planning and urban growth decisions will play important roles in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. With regard to land use planning, the Scoping Plan expects approximately 5.0 MMTCO<sub>2</sub>e will be achieved associated with implementation of Senate Bill 375, which is discussed further below.

The initial Scoping Plan was first approved by ARB on December 11, 2008 and is updated every five years. The first update of the Scoping Plan was approved by the ARB on May 22, 2014, which looked past 2020 to set mid-term goals (2030-2035) on the road to reaching the 2050 goals. ARB is moving forward with a second update to the Scoping Plan to reflect the 2030 target established in SB 32 and EO B-30-15.

#### Senate Bill 1368

Senate Bill (SB) 1368 (codified at Public Utilities Code Chapter 3) is the companion bill of AB 32. SB 1368 required the California Public Utilities Commission (CPUC) to establish a greenhouse gas emissions performance standard for baseload generation from investor-owned utilities by February 1, 2007. The bill also

required the California Energy Commission (CEC) to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural-gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and the CEC.

#### Senate Bill 1078 and Governor's Order S-14-08 (California Renewables Portfolio Standards)

SB 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. Executive Order S-14-08 was later superseded by Executive Order S-21-09 on September 15, 2009. Executive Order S-21-09 directed ARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. This Executive Order was superseded by statute SB X1-2 in 2011, which obligates all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020, with interim targets of 20 percent by 2013 and 25 percent by 2016.

ARB is required by current law, AB 32 of 2006, to regulate sources of GHGs to meet a state goal of reducing greenhouse gas emissions to 1990 levels by 2020 and an 80 percent reduction of 1990 levels by 2050. The CEC and CPUC serve in advisory roles to help ARB develop the regulations to administer the 33 percent by 2020 requirement. ARB is also authorized to increase the target and accelerate and expand the time frame.

#### Mandatory Reporting of Greenhouse Gas Emissions

Reporting of GHGs by major sources is required by the California Global Warming Solutions Act (AB 32, 2006). Revisions to the existing ARB mandatory GHG reporting regulation were considered at the board hearing on December 16, 2010. The revised regulation was approved by the California Office of Administrative Law and became effective on January 1, 2012. The revised regulation affects industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

#### Cap-and-Trade Regulation

The cap-and-trade regulation is a key element in California's climate plan. It sets a statewide limit on sources responsible for 85 percent of California's greenhouse gas emissions, and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The cap-and-trade rules came into effect on January 1, 2013 and apply to large electric power plants and large industrial plants. In 2015, they will extend to fuel distributors (including distributors of heating and transportation fuels). At that stage, the program will encompass around 360 businesses throughout California and nearly 85 percent of the state's total greenhouse gas emissions.

Under the cap-and-trade regulation, companies must hold enough emission allowances to cover their emissions, and are free to buy and sell allowances on the open market. California held its first auction of greenhouse gas allowances on November 14, 2012. California's GHG cap-and-trade system will reduce GHG emissions from regulated entities by approximately 16 percent, or more, by 2020.

#### California Building Code

The California Building Code (CBC) contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The California Building Code is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local

jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

### *Green Building Standards*

In essence, green buildings standards are indistinguishable from any other building standards. Both are contained in the California Building Code and regulate the construction of new buildings and improvements. The only practical distinction between the two is that whereas the focus of traditional building standards has been protecting public health and safety, the focus of green building standards is to improve environmental performance.

California's goals to reduce greenhouse gas emissions resulted in an increased urgency for the adoption of green building standards. In its scoping plan for the implementation of AB 32, ARB identified energy use as the second largest contributor to California's GHG emissions, constituting roughly 25 percent of all such emissions. In recommending a green building strategy as one element of the scoping plan, ARB estimated that green building standards would reduce GHG emissions by approximately 26 million metric tons of CO<sub>2</sub>e (MMTCO<sub>2</sub>e) by 2020.

The green buildings standards, commonly referred to as CalGreen standards, were most recently updated in 2016. The 2016 building energy efficiency standards are approximately 28 percent more efficient than previous standards for residential construction and roughly 5 percent more efficient for non-residential construction (CEC 2015). The 2016 CalGreen standards became effective on January 1, 2017.

### Senate Bill 32

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG-reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs the ARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target.

### Senate Bill 375 (Sustainable Communities and Climate Protection Act)

SB 375 supports the State's climate action goals to reduce GHG emissions through coordinated transportation and land use planning with the goal of developing more sustainable communities. Under SB 375, ARB sets regional targets for GHG emissions reductions associated with passenger vehicle use. Each of California's metropolitan planning organizations must prepare a "sustainable communities strategy" (SCS) as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets. The Sustainable Communities Act also establishes incentives to encourage local governments and developers to implement the identified GHG-reduction strategies.

## SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

### SJVAPCD Climate Change Action Plan

On August 21, 2008, the SJVAPCD Governing Board approved the SJVAPCD's *Climate Change Action Plan* with the following goals and actions:

#### Goals:

- Assist local land-use agencies with California Environmental Quality Act (CEQA) issues relative to projects with GHG emissions increases.
- Assist Valley businesses in complying with mandates of AB 32.
- Ensure that climate protection measures do not cause increase in toxic or criteria pollutants that adversely impact public health or environmental justice communities.

#### Actions:

- Authorize the Air Pollution Control Officer to develop GHG significance threshold(s) or other mechanisms to address CEQA projects with GHG emissions increases. Begin the requisite public

process, including public workshops, and develop recommendations for Governing Board consideration in the spring of 2009.

- Authorize the Air Pollution Control Officer to develop necessary regulations and instruments for establishment and administration of the San Joaquin Valley Carbon Exchange Bank for voluntary GHG reductions created in the Valley. Begin the requisite public process, including public workshops, and develop recommendations for Governing Board consideration in spring 2009.
- Authorize the Air Pollution Control Officer to enhance the SJVAPCD's existing criteria pollutant emissions inventory reporting system to allow businesses subject to AB32 emission reporting requirements to submit simultaneous streamlined reports to the SJVAPCD and the state of California with minimal duplication.
- Authorize the Air Pollution Control Officer to develop and administer voluntary GHG emission reduction agreements to mitigate proposed GHG increases from new projects.
- Direct the Air Pollution Control Officer to support climate protection measures that reduce GHG emissions as well as toxic and criteria pollutants. Oppose measures that result in a significant increase in toxic or criteria pollutant emissions in already impacted area.

#### *SJVAPCD CEQA Greenhouse Gas Guidance.*

On December 17, 2009, the SJVAPCD Governing Board adopted "Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA" and the policy, "District Policy—Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency." The SJVAPCD concluded that the existing science is inadequate to support quantification of the impacts that project specific greenhouse gas emissions have on global climatic change. The SJVAPCD found the effects of project-specific emissions to be cumulative, and without mitigation, that their incremental contribution to global climatic change could be considered cumulatively considerable. The SJVAPCD found that this cumulative impact is best addressed by requiring all projects to reduce their greenhouse gas emissions, whether through project design elements or mitigation.

The SJVAPCD's approach is intended to streamline the process of determining if project-specific greenhouse gas emissions would have a significant effect. Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources and have a certified final CEQA document.

Best performance standards (BPS) would be established according to performance-based determinations. Projects complying with BPS would not require specific quantification of greenhouse gas emissions and would be determined to have a less than significant cumulative impact for greenhouse gas emissions. Projects not complying with BPS would require quantification of greenhouse gas emissions and demonstration that greenhouse gas emissions have been reduced or mitigated by 29 percent, as targeted by ARB's AB 32 Scoping Plan. Furthermore, quantification of greenhouse gas emissions would be required for all projects for which the lead agency has determined that an Environmental Impact Report is required, regardless of whether the project incorporates Best Performance Standards.

For stationary source permitting projects, best performance standards are "the most stringent of the identified alternatives for control of greenhouse gas emissions, including type of equipment, design of equipment and operational and maintenance practices, which are achieved-in-practice for the identified service, operation, or emissions unit class." For development projects, best performance standards are "any combination of identified greenhouse gas emission reduction measures, including project design elements and land use decisions that reduce project specific greenhouse gas emission reductions by at least 29 percent compared with business as usual." The SJVAPCD proposes to create a list of all approved Best Performance Standards to help in the determination as to whether a proposed project has reduced its GHG emissions by 29 percent.

## IMPACTS & MITIGATION MEASURES

### THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines Initial Study Checklist, a project would be considered to have a significant impact to climate change if it would:

- a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or,
- b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

#### *San Joaquin Valley Air Pollution Control District*

In accordance with the SJVAPCD's *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects Under CEQA* (SJVAPCD 2009), a project would be considered to have a less than significant impact on climate change if it would comply with at least one of the following criteria:

- Comply with an approved GHG emission reduction plan or GHG mitigation program which avoids or substantially reduces GHG emissions within the geographic area in which the project is located. Such plans or programs must be specified in law or approved by the lead agency with jurisdiction over the affected resource and supported by a CEQA compliant environmental review document adopted by the lead agency, or
- Implement approved best performance standards, or
- Quantify project GHG emissions and reduce those emissions by at least 29 percent compared to "business as usual" (BAU).

It is important to note that quantification of project-generated GHG emissions in comparison to BAU conditions to determine consistency with AB 32's reduction goals may be considered appropriate in some instances. However, based on the California Supreme Court's decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming* (2015) 224 Cal.App.4<sup>th</sup> 1105 (CBD vs. CDFW; also known as the "Newhall Ranch case"), substantial evidence would need to be provided to document that project-level reductions in comparison to a BAU approach would be consistent with achieving AB 32's overall statewide reduction goal. Given that AB 32's statewide goal includes reductions that are not necessarily related to an individual development project, the use of this approach may be difficult to support given the lack of substantial evidence to adequately demonstrate a link between the data contained in the AB 32 Scoping Plan and individual development projects. Alternatively, the Court identified potential options for evaluating GHG impacts for individual development projects, which included the use of GHG efficiency metrics. In general, GHG efficiency metrics can be used to assess the GHG efficiency of an individual project based on a per capita basis or on a service population basis.

A GHG efficiency threshold based on service population can be calculated by dividing the GHG emissions inventory goal (allowable emissions), by the estimated service population of the individual project. For most development projects, service population is traditionally defined as the sum of the number of jobs and the number of residents provided by a project. The methodology used for quantification of the target efficiency threshold applied to the proposed project is summarized in Table 6. Project-generated GHG emissions that would exceed the efficiency thresholds identified in Table 6 would be considered to have a potentially significant impact on the environment that could conflict with GHG-reduction planning efforts. To be conservative, construction-generated GHG emissions were amortized based on an estimated 30-year project life and included in annual operational GHG emissions estimates.

**Table 7**  
**Project-Level GHG Efficiency Threshold Calculation**

| <b>Year 2020</b>  |             |
|---|-------------|
| Land Use Sectors GHG Emissions Target <sup>1</sup>  | 287,000,000 |
| Population <sup>2</sup>   | 40,619,346  |
| Employment <sup>3</sup>   | 18,195,720  |
| Service Population  | 58,815,066  |
| GHG Efficiency Threshold (MTCO <sub>2</sub> e/SP/yr)  | 4.9         |
| <b>Year 2029</b>  |             |
| Land Use Sectors GHG Emissions Target <sup>1</sup>  | 177,000,000 |
| Population <sup>2</sup>   | 43,756,527  |
| Employment <sup>3</sup>   | 20,620,226  |
| Service Population  | 64,376,753  |
| GHG Efficiency Threshold (MTCO <sub>2</sub> e/SP/yr)  | 2.8         |
| <b>Year 2030</b>  |             |
| Land Use Sectors GHG Emissions Target <sup>1</sup>  | 168,000,000 |
| Population <sup>2</sup>   | 44,085,600  |
| Employment <sup>3</sup>   | 20,908,816  |
| Service Population  | 64,994,416  |
| GHG Efficiency Threshold (MTCO <sub>2</sub> e/SP/yr)  | 2.6         |
| <b>Year 2035</b>  |             |
| Land Use Sectors GHG Emissions Target <sup>1</sup>  | 129,000,000 |
| Population <sup>2</sup>   | 45,747,645  |
| Employment <sup>3</sup>   | 22,413,493  |
| Service Population  | 68,161,138  |
| GHG Efficiency Threshold (MTCO <sub>2</sub> e/SP/yr)  | 1.9         |
| <i>Based on AB 32 Scoping Plan's land use inventory sectors for year 2020; Includes transportation sources.</i><br>1. California Air Resources Board. California 1990 Greenhouse Gas Emissions Level and 2020 Limit — by Sector and Activity (Land Use-driven sectors only) MMT CO <sub>2</sub> e - (based upon IPCC Fourth Assessment Report Global Warming Potentials)<br>2. California Department of Finance Demographic Research Unit Report P-2 "State and County Population Projections by Race/Ethnicity and Age (5-year groups)" 2010 through 2060 (as of July 1). Published 12/15/2014<br>3. California Department of Finance Employment Development Department. Industry Employment Projections Labor Market Information Division 2010-2020 (Published 5/23/2012) and 2012-2022 (Published 9/19/2014) |             |

## METHODOLOGY

### Short-term Impacts

Short-term construction emissions associated with the proposed project were calculated using the CalEEMod computer program. Emissions were quantified for site preparation/grading, asphalt paving, facility construction, and application of architectural coatings. Construction schedules were based on information provided by the project proponent. Other construction information, including equipment usage, worker vehicle trips, and haul truck trips, were based on the default assumptions contained in the CalEEMod model. The import/export of soil is not anticipated to be required for this project. Modeling assumptions and output files are included in Appendix A of this report.

### Long-term Impacts

Long-term operational GHG emissions associated with the proposed project were calculated using the CalEEMod computer program. Modeling was conducted based on traffic data derived, in part, from the traffic analysis prepared for the proposed project (JLB 2017). Energy-usage rates were adjusted to account to implementation of the State's Renewable Portfolio Standards and compliance with current building standards. All other modeling assumptions were based on the default parameters contained in the CalEEMod computer model. Mobile-source emissions were based on the default fleet distribution assumptions contained in the model. Given that a majority of the vehicle trips generated by the proposed land uses would involve light-duty vehicles, actual mobile-source emissions would likely be lower than estimated. The GHG efficiency for the proposed project was calculated based on the estimated number of employees associated with the proposed development (OPR 2017). To be conservative, the service population calculation was conservatively based on the estimated increase in employee growth attributable to the proposed project and does not include estimated in-patients served by the proposed facilities. Modeling assumptions and output files are included in Appendix A of this report.

### PROJECT IMPACTS

**Impact GHG-1. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? and,**

**Would the project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?**

Implementation of the proposed project would contribute to increases of GHG emissions that are associated with global climate change. Short-term and long-term GHG emissions associated with the development of the proposed project are discussed in greater detail, as follows:

#### Short-term Greenhouse Gas Emissions

Short-term annual GHG emissions associated with construction of the proposed facilities are summarized in Table 8.

**Table 8**  
**Annual Construction-Generated GHG Emissions**

| Project Phase/Land Use  | Construction Year | Total GHG Emissions (MTCO <sub>2e</sub> ) |
|---|-------------------|---|
| Phase I – Cancer Center   | 2017              | 357.5                                     |
|   | 2018              | 289.6                                     |
| Phase I – Hotel & Shopping Center   | 2018              | 631.9                                     |
|   | 2019              | 256.4                                     |
| Phase I – Bed Tower, D&T Expansion, Parking Garage  | 2020              | 677.9                                     |
|   | 2021              | 546.5                                     |
| Phase I – Medical-Dental Office   | 2022              | 337.0                                     |
|   | 2023              | 153.5                                     |
| Phase I – Outpatient Community Center Expansion   | 2025              | 158.4                                     |
|   | 2026              | 67.8                                      |
| Phase II – Assisted Living Center, Medical Center Expansion, Medical-Dental Office, Shopping Center   | 2028              | 744.0                                     |
|   | 2029              | 618.7                                     |
| Widening of Herndon Avenue  | 2020              | 544.0                                     |
| Total:  |                   | 5,383.2                                   |
| Amortized Emissions:  |                   | 179.4                                     |
| <i>Based on CalEEMod computer modeling. Amortized emissions assume an average project life of 30 years. Refer to Appendix A for modeling results and assumptions.</i> |                   |   |



Based on the modeling conducted, the highest annual emissions of GHGs associated with construction of the proposed project would total approximately 744.0 MTCO<sub>2</sub>e. In total, construction activities would generate approximately 5,383.2 MTCO<sub>2</sub>e. There would also be a small amount of GHG emissions from waste generated during construction; however, this amount is speculative. It is important to note that emissions were quantified based on the conservative assumption that all proposed facilities would occur simultaneously. Actual emissions would vary, depending on various factors including construction schedules, equipment required, and activities conducted. Assuming an average project life of 30 years, amortized construction-generated GHG emissions would total approximately 179.4 MTCO<sub>2</sub>e/year. Amortized construction-generated GHG emissions were included in the operational GHG emissions inventory for the evaluation of project-generated GHG emissions).

### **Long-term Greenhouse Gas Emissions**

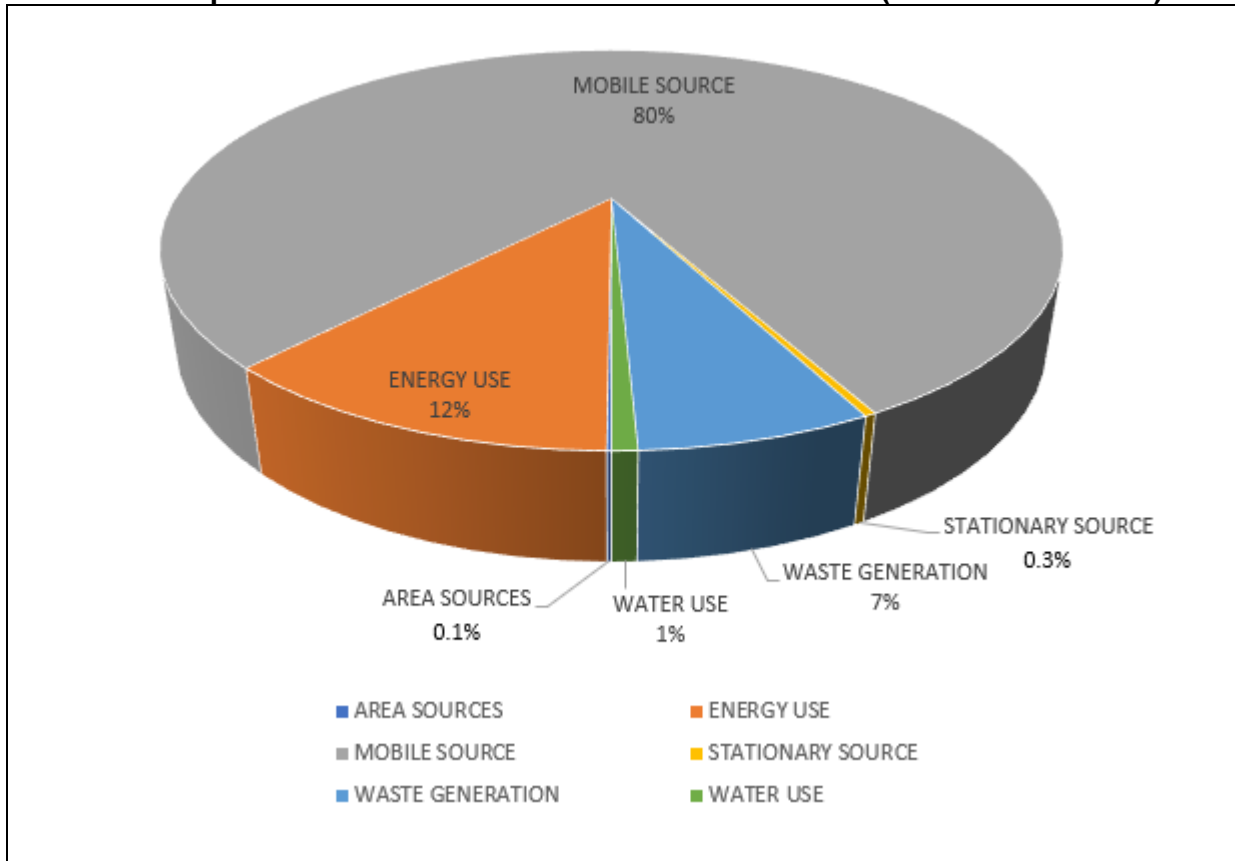
Estimated long-term operational GHG emissions are summarized in Table 9. Operational GHG emissions were totaled for year 2020 and year 2030 conditions, as well as, Phase I buildout year 2029 and Phase II buildout year 2035 conditions. As depicted, annual operational GHG emissions would range from approximately 13,124 MTCO<sub>2</sub>e/year at year 2020 to approximately 35,992 MTCO<sub>2</sub>e/year at year 2030. Operational emissions are projected to decrease in future years, totaling approximately 35,127 MTCO<sub>2</sub>e under year 2035 operational conditions. With the inclusion of amortized construction emissions, the project would result in maximum annual GHG emissions of approximately 36,171 MTCO<sub>2</sub>e/year. Based on the estimated employee growth attributable to the proposed land uses, the calculated GHG efficiency for the project would range from 23.1 MTCO<sub>2</sub>e/SP/Year under year 2020 conditions to 16.9 MTCO<sub>2</sub>e/SP/Year under year 2035 conditions. It is important to note that the estimated GHG efficiencies for the proposed project are conservative and do not include estimated increases in in-patients served by the proposed facilities. Furthermore, as depicted in Figure 2, a majority of the emissions generated, roughly 80 percent, would be associated with motor vehicle use. The remaining emissions would be largely associated with energy use and waste generation. Mobile-source emissions were conservatively calculated based on the default fleet distribution assumptions contained in the model for Fresno County, which includes medium and heavy-duty vehicles. Mobile sources associated with medical facilities and related land uses (e.g., medical-dental offices, assisted living facilities) typically consist largely to light-duty vehicles with relatively few heavy-duty truck trips, which would generate fewer overall emissions. As a result, actual operational GHG emissions and efficiencies would likely be lower than indicated. Nonetheless, GHG emissions associated with the proposed project would be anticipated to exceed the significance thresholds. Increased GHG emissions would also potentially conflict with GHG-reduction planning efforts. As a result, this impact would be considered potentially significant.

**Table 9**  
**Annual Operational GHG Emissions**

| Project Phase                    | Annual GHG Emissions (MTCO <sub>2</sub> e/year) <sup>1</sup> | Total GHGs w/Amortized Construction Emissions | Number of Employees | GHG Efficiency (MTCO <sub>2</sub> e/SP/Year) |                        | Exceeds Threshold? |
|----------------------------------|--|---|---------------------|--|------------------------|--------------------|
|                                  |  |   |                     | Proposed Project                             | Threshold <sup>2</sup> |                    |
| Phase I –Year 2020 <sup>3</sup>  | 13,124   | 13,304  | 575                 | 23.1   | 4.9                    | Yes                |
| Phase I –Year 2029 <sup>4</sup>  | 19,847   | 20,026  | 1,070               | 18.7   | 2.8                    | Yes                |
| Phase II –Year 2030 <sup>5</sup> | 35,992   | 36,171  | 2,085               | 17.3   | 2.6                    | Yes                |
| Phase II –Year 2035 <sup>6</sup> | 35,127   | 35,307  | 2,085               | 16.9   | 1.9                    | Yes                |

1. Project-generated emissions were quantified using the CalEEMod computer program. Includes compliance with current building standards.
  2. Refer to Table 7 of this report.
  3. Includes emissions associated with development of 150,000-sf shopping center, 150-room hotel, and 96,500-sf medical center expansion.
  4. Includes emissions associated with development of 150,000-sf shopping center, 150-room hotel, and 300,170-ksf medical center expansion, and 94.39-sf medical-dental office building.
  5. Includes emissions associated with development of 220,000-sf shopping center, 150-room hotel, and 468,844-sf medical center expansion, 100-room assisted living center, and 354,392-sf medical-dental office building
  6. Includes emissions associated with development of 220,000-sf shopping center, 150-room hotel, and 468,844-sf medical center expansion, 100-room assisted living center, and 354,392-sf medical-dental office building
- Refer to Appendix A for modeling results and assumptions.

**Figure 2**  
**Annual Operational GHG Emissions Source Contribution (Buildout Year 2035)**



**Mitigation Measure GHG-1: Implement Measures to Reduce GHG Emissions.**

Implement Mitigation Measures AQ-1 and AQ-2.

**Level of Significance after Mitigation**

Implementation of Mitigation Measures AQ-1 and AQ-2 would reduce emissions associated with motor vehicle use, energy use, waste generation, and area sources. Furthermore, Mitigation Measure AQ-2, would require the project proponent to enter into a VERA with the SJVAPCD. The VERA would reduce operational criteria air pollutants (i.e., ROG, NO<sub>x</sub>, PM<sub>10</sub>) through various means, including implementation of additional on-site or off-site mitigation and/or the funding of off-site mitigation. These additional measures have not yet been identified, but would likely have the added benefit of reducing project-generated GHG emissions. Because the GHG emission reductions to be achieved through implementation of the VERA cannot be quantified at this time, increased GHG emissions associated with the proposed project would be considered to have a significant impact on the environment that could also conflict with GHG-reduction planning efforts. This impact is considered significant and unavoidable.

## REFERENCES

### Air Quality

California Air Resources Board (ARB). 2000. *Diesel Risk Reduction Plan*. Website URL: <http://www.arb.ca.gov/diesel/documents/rrpapp.htm>.

———. 2013. *California Almanac of Emissions & Air Quality*.

———. Accessed June 23, 2017a. *Air Quality Data*. Website URL: <http://www.arb.ca.gov/adam/index.html>

———. Accessed: June 23, 2017b. *Air Quality Standards and Area Designations*. Website URL: <http://www.arb.ca.gov/desig/desig.htm>.

California Building Standards Commission (BSC). April 2016. *CalGreen*. Website URL: <http://www.bsc.ca.gov>.

California Department of Conservation (DOC). Division of Mines and Geology. August 2000. *A General Location Guide for Ultramafic Rocks in California-Areas More Likely to Contain Naturally Occurring Asbestos*.

California Department of Transportation (Caltrans). Accessed: June 29, 2017. *Traffic Census Program, Traffic Counts*. Website url: <http://www.dot.ca.gov/trafficops/census/>.

California Energy Commission. 2015. 2016 Building Energy Efficiency Standards, Adoption Hearing Presentation. <http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/> June 10.

Centers for Disease Control and Prevention (CDC). Accessed: April 2016. *Valley Fever: Awareness is Key*. Website URL: <http://www.cdc.gov/features/valleyfever/>.

JLB Traffic Engineering, Inc. 2017. *Draft Traffic Impact Analysis: Master Plan Expansion of the Clovis Community Medical Center*.

San Joaquin Valley Air Pollution Control District (SJVAPCD). March 19, 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*.

San Joaquin Valley Air Pollution Control District (SJVAPCD). Accessed: June 21, 2017. *Ambient Air Quality Standards and Valley Attainment Status*. Website URL: <http://www.valleyair.org/aqinfo/attainment.htm>.

Western Regional Climate Center (WRCC). Accessed: July 2, 2017. *Western U.S. Climate Historical Summaries: Fresno Yosemite International Airport, California*. Website url: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3257>

### Greenhouse Gas

California Air Resources Board (ARB). Assembly Bill 32 Overview. Accessed: September 22, 2016. Website url: <http://www.arb.ca.gov/cc/ab32/ab32.htm>.

———. 2017c. *California Greenhouse Gas Emissions Inventory-2017 Edition*. Website URL: <https://www.arb.ca.gov/cc/inventory/data/data.htm>.

———. 2017d. *Global Warming Potentials*. Website URL: <https://www.arb.ca.gov/cc/inventory/background/gwp.htm#transition>.

———. May 22, 2014. *First Update to the Climate Change Scoping Plan*.

California Building Standards Commission (BSC). April 2016. *CalGreen*. Website URL: [http://www.documents.dgs.ca.gov/bsc/CALGreen/2010\\_CA\\_Green\\_Bldg.pdf](http://www.documents.dgs.ca.gov/bsc/CALGreen/2010_CA_Green_Bldg.pdf).

California Air Pollution Control Officers Association (CAPCOA). 2008. *CEQA and Climate Change*.

International Panel on Climate Change (IPCC). 2007. *Fourth Assessment Report: Climate Change 2007*.

JLB Traffic Engineering, Inc. April 2017. *Draft Traffic Impact Analysis: Master Plan Expansion of the Clovis Community Medical Center Project*.

United States Environmental Protection Agency (U.S. EPA). 2016. *Overview of Greenhouse Gas Emissions*. Website URL: <https://www3.epa.gov/climatechange/ghgemissions/gases.html>

———. 2010. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2008*.

San Joaquin Valley Air Pollution Control District (SJVAPCD). December 2009. *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*.

## **APPENDIX A**

### **EMISSIONS MODELING & DOCUMENTATION**

**Average-Daily Onsite Construction-Generated Emissions**

| Land Use                                | Construction<br>Period/Activity | Uncontrolled Average-Daily Onsite Emissions (TPY) <sup>1</sup> |                 |       |                 |                  |                   |
|---|---------------------------------|--|-----------------|-------|-----------------|------------------|-------------------|
|   |                                 | ROG  | NO <sub>x</sub> | CO    | SO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
| Phase I (2-10 Year Plan)                |                                 |  |                 |       |                 |                  |                   |
| Cancer Center                           | 2017                            | 0.7  | 6.2             | 3.8   | 0.0             | 0.9              | 0.7               |
|   | 2018                            | 4.9  | 35.0            | 27.2  | 0.0             | 2.1              | 2.0               |
| Annual Emissions Yr 2017                | Site Prep                       | 0.003  | 0.04            | 0.02  | 0.00004         | 0.004            | 0.002             |
|   | Grading                         | 0.02   | 0.26            | 0.11  | 0.0002          | 0.08             | 0.05              |
|   | Building                        | 0.07   | 0.48            | 0.34  | 0.0005          | 0.03             | 0.03              |
|   | Total                           | 0.093  | 0.78            | 0.47  | 0.00074         | 0.114            | 0.082             |
| Annual Emissions Yr 2018                | Building                        | 0.38   | 2.7             | 2.05  | 0.003           | 0.16             | 0.16              |
|   | Arch. Coating                   | 0.23   | 1.67            | 1.35  | 0.002           | 0.1              | 0.09              |
|   | Total                           | 0.61   | 4.37            | 3.4   | 0.005           | 0.26             | 0.25              |
| Hotel & Shopping Center                 | 2018                            | 2.9  | 26.0            | 18.2  | 0.0             | 2.8              | 2.2               |
|   | 2019                            | 21.4   | 8.6             | 7.1   | 0.0             | 0.5              | 0.5               |
| Annual Emissions Yr 2018                | Site Prep                       | 0.02   | 0.24            | 0.11  | 0.0002          | 0.1              | 0.06              |
|   | Grading                         | 0.03   | 0.31            | 0.17  | 0.0003          | 0.08             | 0.05              |
|   | Building                        | 0.31   | 2.7             | 2     | 0.003           | 0.17             | 0.16              |
|   | Total                           | 0.36   | 3.25            | 2.28  | 0.0035          | 0.35             | 0.27              |
| Annual Emissions Yr 2019                | Building                        | 0.12   | 1.04            | 0.85  | 0.001           | 0.06             | 0.06              |
|   | Arch. Coating                   | 2.56   | 0.04            | 0.04  | 0.00006         | 0.003            | 0.003             |
|   | Total                           | 2.68   | 1.08            | 0.89  | 0.00106         | 0.063            | 0.063             |
| Bed Tower, D&T Expansion, Parking       | 2020                            | 2.6  | 24.2            | 20.0  | 0.0             | 2.1              | 1.8               |
|   | 2021                            | 11.1   | 14.2            | 13.7  | 0.0             | 0.8              | 0.7               |
| Annual Emissions Yr 2020                | Site Prep                       | 0.006  | 0.06            | 0.03  | 0.00006         | 0.03             | 0.02              |
|   | Grading                         | 0.02   | 0.26            | 0.16  | 0.0003          | 0.08             | 0.05              |
|   | Paving                          | 0.05   | 0.41            | 0.3   | 0.0005          | 0.02             | 0.02              |
|   | Building                        | 0.25   | 2.29            | 2.01  | 0.003           | 0.13             | 0.13              |
|   | Total                           | 0.326  | 3.02            | 2.5   | 0.00386         | 0.26             | 0.22              |
| Annual Emissions Yr 2021                | Building                        | 0.19   | 1.75            | 1.67  | 0.003           | 0.1              | 0.09              |
|   | Arch. Coating                   | 1.2  | 0.03            | 0.04  | 0.00006         | 0.002            | 0.002             |
|   | Total                           | 1.39   | 1.78            | 1.71  | 0.00306         | 0.102            | 0.092             |
| Medical-Dental Office Building          | 2022                            | 1.9  | 15.4            | 14.5  | 0.0             | 1.3              | 0.9               |
|   | 2023                            | 6.1  | 6.3             | 6.6   | 0.0             | 0.2              | 0.2               |
| Annual Emissions Yr 2022                | Site Prep                       | 0.007  | 0.08            | 0.05  | 0.0001          | 0.005            | 0.003             |
|   | Grading                         | 0.02   | 0.17            | 0.09  | 0.0002          | 0.07             | 0.04              |
|   | Demolition                      | 0.008  | 0.08            | 0.07  | 0.0001          | 0.01             | 0.005             |
|   | Building                        | 0.2  | 1.6             | 1.6   | 0.003           | 0.08             | 0.07              |
|   | Total                           | 0.235  | 1.93            | 1.81  | 0.0034          | 0.165            | 0.118             |
| Annual Emissions Yr 2023                | Building                        | 0.1  | 0.76            | 0.79  | 0.001           | 0.03             | 0.03              |
|   | Arch. Coating                   | 0.66   | 0.03            | 0.04  | 0.00006         | 0.001            | 0.001             |
|   | Total                           | 0.76   | 0.79            | 0.83  | 0.00106         | 0.031            | 0.031             |
| Outpatient Center Expansion             | 2025                            | 0.5  | 5.5             | 7.1   | 0.0             | 0.3              | 0.3               |
|   | 2026                            | 2.5  | 2.3             | 3.1   | 0.0             | 0.1              | 0.1               |
| Annual Emissions Yr 2025                | Site Prep                       | 0.0007   | 0.007           | 0.006 | 0.00001         | 0.0005           | 0.0003            |
|   | Grading                         | 0.006  | 0.05            | 0.07  | 0.0001          | 0.01             | 0.006             |
|   | Building                        | 0.06   | 0.63            | 0.81  | 0.001           | 0.03             | 0.03              |
|   | Total                           | 0.0667   | 0.687           | 0.886 | 0.00111         | 0.0405           | 0.0363            |
| Annual Emissions Yr 2026                | Building                        | 0.03   | 0.27            | 0.35  | 0.0006          | 0.01             | 0.01              |
|   | Arch. Coating                   | 0.28   | 0.02            | 0.04  | 0.00006         | 0.001            | 0.001             |
|   | Total                           | 0.31   | 0.29            | 0.39  | 0.00066         | 0.011            | 0.011             |
| Significance Thresholds:                |                                 | 100  | 100             | 100   | 100             | 100              | 100               |
| Exceeds Thresholds/Significant Impact?: |                                 | No   | No              | No    | No              | No               | No                |

| Phase II (10-20 Year Plan)  |               |      |      |      |         |       |       |
|---|---------------|------|------|------|---------|-------|-------|
| Hospital Expansion, Assisted Living, Shopping Center, Medical-Dental Office | 2028          | 1.8  | 16.7 | 20.5 | 0.0     | 2.6   | 1.9   |
|   | 2029          | 38.2 | 27.3 | 34.4 | 0.1     | 3.0   | 2.3   |
| Annual Emissions Yr 2028  | Site Prep     | 0.01 | 0.13 | 0.09 | 0.0002  | 0.1   | 0.1   |
|   | Grading       | 0.04 | 0.42 | 0.4  | 0.0009  | 0.15  | 0.07  |
|   | Paving        | 0.03 | 0.17 | 0.3  | 0.0005  | 0.01  | 0.01  |
|   | Building      | 0.15 | 1.37 | 1.77 | 0.003   | 0.06  | 0.06  |
|   | Total         | 0.23 | 2.09 | 2.56 | 0.0046  | 0.32  | 0.24  |
| Annual Emissions Yr 2029  | Building      | 0.14 | 1.3  | 1.7  | 0.003   | 0.06  | 0.05  |
|   | Arch. Coating | 4.4  | 0.02 | 0.04 | 0.00006 | 0.001 | 0.001 |
|   | Total         | 4.77 | 3.41 | 4.3  | 0.00766 | 0.381 | 0.291 |
| Significance Thresholds:  |               | 100  | 100  | 100  | 100     | 100   | 100   |
| Exceeds Thresholds/Significant Impact?:                                     |               | No   | No   | No   | No      | No    | No    |
| Assumes an average of 250 construction days per year.                       |               |      |      |      |         |       |       |



[illegible]

| Daily Emission Estimates for -> <i>Hemdon Widening</i> |               |              |               |                |                |                |                 |                 |                 |                 |               |               |               |               |
|--|---------------|--------------|---------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|---------------|---------------|---------------|---------------|
| Project Phases (Pounds)                                | Total         |              |               |                | Exhaust        |                | Fugitive Dust   |                 | Total           |                 | Exhaust       |               | Fugitive Dust |               |
|  | ROG (lbs/day) | CO (lbs/day) | NOx (lbs/day) | PM10 (lbs/day) | PM10 (lbs/day) | PM10 (lbs/day) | PM2.5 (lbs/day) | PM2.5 (lbs/day) | PM2.5 (lbs/day) | PM2.5 (lbs/day) | SOx (lbs/day) | CO2 (lbs/day) | CH4 (lbs/day) | N2O (lbs/day) |
| Grubbing/Land Clearing                                 | 1.40          | 10.92        | 15.68         | 5.69           | 0.69           | 5.00           | 1.66            | 0.62            | 1.04            | 0.02            | 2,332.22      | 0.59          | 0.03          | 2,354.68      |
| Grading/Excavation                                     | 7.83          | 58.39        | 86.12         | 9.32           | 4.32           | 5.00           | 4.92            | 3.88            | 1.04            | 0.11            | 11,552.35     | 2.86          | 0.15          | 11,667.17     |
| Drainage/Utilities/Sub-Grade                           | 4.71          | 35.92        | 46.01         | 7.63           | 2.63           | 5.00           | 3.43            | 2.39            | 1.04            | 0.07            | 7,321.90      | 1.23          | 0.10          | 7,383.82      |
| Paving   | 2.12          | 18.68        | 20.67         | 1.33           | 1.33           | 0.00           | 1.18            | 1.18            | 0.00            | 0.04            | 3,534.05      | 0.75          | 0.05          | 3,567.85      |
| Maximum (pounds/day)                                   | 7.83          | 58.39        | 86.12         | 9.32           | 4.32           | 5.00           | 4.92            | 3.88            | 1.04            | 0.11            | 11,552.35     | 2.86          | 0.15          | 11,667.17     |
| Total (tons/construction project)                      | 0.36          | 2.70         | 3.78          | 0.48           | 0.20           | 0.28           | 0.24            | 0.18            | 0.06            | 0.01            | 538.46        | 0.12          | 0.01          | 543.58        |

Notes: Project Start Year ->  
Project Length (months) ->  
Total Project Area (acres) ->  
Maximum Area Disturbed/Day (acres) ->  
Water Truck Used? ->

| Total Material Imported/Exported<br>Volume (yd³/day) |         | Daily VMT (miles/day) |                 |                |             |
|--|---------|-----------------------|-----------------|----------------|-------------|
| Soil   | Asphalt | Soil Hauling          | Asphalt Hauling | Worker Commute | Water Truck |
| 0  | 0       | 0                     | 0               | 280            | 40          |
| 275  | 0       | 420                   | 0               | 880            | 40          |
| 275  | 0       | 420                   | 0               | 600            | 40          |
| 0  | 100     | 0                     | 150             | 480            | 40          |

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

| Total Emission Estimates by Phase for -> Herndon/Widening            |                     |                 |                     |                               |                                 |                                       |                                |                                  |  |                     |                     |                     |                     |                    |
|--|---------------------|-----------------|---------------------|-------------------------------|---------------------------------|---------------------------------------|--------------------------------|----------------------------------|--|---------------------|---------------------|---------------------|---------------------|--------------------|
| Project Phases<br>(Tons for all except CO2e. Metric tonnes for CO2e) | ROG<br>(tons/phase) | CO (tons/phase) | NOx<br>(tons/phase) | Total<br>PM10<br>(tons/phase) | Exhaust<br>PM10<br>(tons/phase) | Fugitive Dust<br>PM10<br>(tons/phase) | Total<br>PM2.5<br>(tons/phase) | Exhaust<br>PM2.5<br>(tons/phase) | Fugitive Dust<br>PM2.5<br>(tons/phase) | SOx<br>(tons/phase) | CO2<br>(tons/phase) | CH4<br>(tons/phase) | N2O<br>(tons/phase) | CO2e<br>(MT/phase) |
| Grubbing/Land Clearing   | 0.01                | 0.07            | 0.10                | 0.04                          | 0.00                            | 0.03                                  | 0.01                           | 0.00                             | 0.01                                   | 0.00                | 15.39               | 0.00                | 0.00                | 14.10              |
| Grading/Excavation   | 0.23                | 1.73            | 2.56                | 0.28                          | 0.13                            | 0.15                                  | 0.15                           | 0.12                             | 0.03                                   | 0.00                | 343.10              | 0.08                | 0.00                | 314.36             |
| Drainage/Utilities/Sub-Grade   | 0.09                | 0.71            | 0.91                | 0.15                          | 0.05                            | 0.10                                  | 0.07                           | 0.05                             | 0.02                                   | 0.00                | 144.97              | 0.02                | 0.00                | 132.63             |
| Paving   | 0.02                | 0.18            | 0.20                | 0.01                          | 0.01                            | 0.00                                  | 0.01                           | 0.01                             | 0.00                                   | 0.00                | 34.99               | 0.01                | 0.00                | 32.04              |
| Maximum (tons/phase)   | 0.23                | 1.73            | 2.56                | 0.28                          | 0.13                            | 0.15                                  | 0.15                           | 0.12                             | 0.03                                   | 0.00                | 343.10              | 0.08                | 0.00                | 314.36             |
| Total (tons/construction project)                                    | 0.36                | 2.70            | 3.78                | 0.48                          | 0.20                            | 0.28                                  | 0.24                           | 0.18                             | 0.06                                   | 0.01                | 538.46              | 0.12                | 0.01                | 493.13             |

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO<sub>2</sub>e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1, 25 and 298 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, respectively. Total CO<sub>2</sub>e is then estimated by summing CO<sub>2</sub>e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

|                         | <u>ROG</u> | <u>NOX</u> | <u>CO</u> | <u>SO2</u> | <u>PM10</u> | <u>PM2.5</u> | <u>CO2E</u> |
|-------------------------|------------|------------|-----------|------------|-------------|--------------|-------------|
| ANNUAL EMISSIONS (TONS) | 0.25       | 1.14       | 0.65      | 0.001      | 0.048       | 0.0396       | 141.27      |
| ANNUAL EMISSIONS (LBS)  |            |            |           |            |             | 79.2         |             |
| EMISSIONS (LBS/HR)      |            |            |           |            |             | 0.264        |             |

|                              |                      |                               |
|------------------------------|----------------------|-------------------------------|
| EMERGENCY GENERATORS         | 3                    |                               |
| GENSET SIZE                  | 750 BHP              |                               |
| ANNUAL HOURS/GENSET          | 100                  |                               |
| DISTANCE TO NEAREST RECEPTOR | 100 METERS           | TO NEAREST SENSITIVE RECEPTOR |
| EMISSION FACTOR              | 0.15 G/HP-HR         |                               |
| LOAD FACTOR                  | 0.73                 |                               |
| SCREENING CANCER RISK        | 20.40 IN ONE MILLION |                               |

[illegible]

## CCMC- Phase II Stationary Source - Fresno County, Annual

**CCMC- Phase II Stationary Source**  
**Fresno County, Annual****1.0 Project Characteristics**

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**1.1 Land Usage**

| Land Uses | Size | Metric   | Lot Acreage | Floor Surface Area | Population |
|-----------|------|----------|-------------|--------------------|------------|
| Hospital  | 1.00 | 1000sqft | 0.02        | 1,000.00           | 0          |

**1.2 Other Project Characteristics**

|                          |                                |                          |       |                           |       |
|--------------------------|--------------------------------|--------------------------|-------|---------------------------|-------|
| Urbanization             | Urban                          | Wind Speed (m/s)         | 2.2   | Precipitation Freq (Days) | 45    |
| Climate Zone             | 3                              |                          |       | Operational Year          | 2030  |
| Utility Company          | Pacific Gas & Electric Company |                          |       |                           |       |
| CO2 Intensity (lb/MW hr) | 364.4                          | CH4 Intensity (lb/MW hr) | 0.016 | N2O Intensity (lb/MW hr)  | 0.004 |

**1.3 User Entered Comments & Non-Default Data**

CCMC- Phase II Stationary Source - Fresno County, Annual

Project Characteristics - Stationary source emissions only.

Land Use - .

Construction Phase - Construction emissions not included in this model run.

Off-road Equipment - Equipment based on model defaults.

Off-road Equipment - .

Trips and VMT - .

Demolition -

Vehicle Trips - .

Energy Use - .

Water And Wastewater - .

Solid Waste - .

Construction Off-road Equipment Mitigation - .

Energy Mitigation - .

Water Mitigation - .

Waste Mitigation - .

Stationary Sources - Emergency Generators and Fire Pumps - Assumes 8 hours/day, 100 hours/yr

Stationary Sources - Process Boilers -

## CCMC- Phase II Stationary Source - Fresno County, Annual

| Table Name                      | Column Name                  | Default Value | New Value   |
|---------------------------------|------------------------------|---------------|-------------|
| tblConstDustMitigation          | WaterUnpavedRoadVehicleSpeed | 40            | 15          |
| tblProjectCharacteristics       | CH4IntensityFactor           | 0.029         | 0.016       |
| tblProjectCharacteristics       | CO2IntensityFactor           | 641.35        | 364.4       |
| tblProjectCharacteristics       | N2OIntensityFactor           | 0.006         | 0.004       |
| tblProjectCharacteristics       | OperationalYear              | 2018          | 2030        |
| tblStationaryGeneratorsPumpsEF  | CH4_EF                       | 0.07          | 0.07        |
| tblStationaryGeneratorsPumpsEF  | ROG_EF                       | 2.2480e-003   | 2.2477e-003 |
| tblStationaryGeneratorsPumpsUse | HorsePowerValue              | 0.00          | 1,000.00    |
| tblStationaryGeneratorsPumpsUse | HoursPerDay                  | 0.00          | 8.00        |
| tblStationaryGeneratorsPumpsUse | HoursPerYear                 | 0.00          | 100.00      |
| tblStationaryGeneratorsPumpsUse | NumberOfEquipment            | 0.00          | 3.00        |

## 2.0 Emissions Summary

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## CCMC- Phase II Stationary Source - Fresno County, Annual

## 2.1 Overall Construction

### Unmitigated Construction

|         | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|---------|-------------|--------|--------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Year    | tons/yr     |        |        |             |               |              |             |                |               |             | MT/yr    |           |           |     |     |        |
| 2019    | 3.7200e-003 | 0.0447 | 0.0215 | 5.0000e-005 | 2.8500e-003   | 1.8400e-003  | 4.6900e-003 | 3.4000e-004    | 1.6900e-003   | 2.0300e-003 |          |           |           |     |     | 4.5912 |
| Maximum | 3.7200e-003 | 0.0447 | 0.0215 | 5.0000e-005 | 2.8500e-003   | 1.8400e-003  | 4.6900e-003 | 3.4000e-004    | 1.6900e-003   | 2.0300e-003 |          |           |           |     |     | 4.5912 |

### Mitigated Construction

|         | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|---------|-------------|--------|--------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Year    | tons/yr     |        |        |             |               |              |             |                |               |             | MT/yr    |           |           |     |     |        |
| 2019    | 3.7200e-003 | 0.0447 | 0.0215 | 5.0000e-005 | 2.8500e-003   | 1.8400e-003  | 4.6900e-003 | 3.4000e-004    | 1.6900e-003   | 2.0300e-003 |          |           |           |     |     | 4.5912 |
| Maximum | 3.7200e-003 | 0.0447 | 0.0215 | 5.0000e-005 | 2.8500e-003   | 1.8400e-003  | 4.6900e-003 | 3.4000e-004    | 1.6900e-003   | 2.0300e-003 |          |           |           |     |     | 4.5912 |

[illegible]

## CCMC- Phase II Stationary Source - Fresno County, Annual

| Quarter | Start Date | End Date  | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|-----------|--|--|
| 1       | 1-1-2019   | 3-31-2019 | 0.0484                                       | 0.0484                                     |
|         |            | Highest   | 0.0484                                       | 0.0484                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                    |               |               | MT/yr    |           |           |     |     |                 |
| Area         | 4.6000e-003   | 0.0000        | 1.0000e-005   | 0.0000             |               | 0.0000        | 0.0000        |                    | 0.0000        | 0.0000        |          |           |           |     |     | 2.0000e-005     |
| Energy       | 2.3000e-004   | 2.0900e-003   | 1.7500e-003   | 1.0000e-005        |               | 1.6000e-004   | 1.6000e-004   |                    | 1.6000e-004   | 1.6000e-004   |          |           |           |     |     | 4.5374          |
| Mobile       | 2.4900e-003   | 0.0351        | 0.0231        | 1.7000e-004        | 0.0117        | 8.0000e-005   | 0.0118        | 3.1600e-003        | 7.0000e-005   | 3.2400e-003   |          |           |           |     |     | 16.3635         |
| Stationary   | 0.2461        | 1.1008        | 0.6277        | 1.1800e-003        |               | 0.0362        | 0.0362        |                    | 0.0362        | 0.0362        |          |           |           |     |     | 114.6396        |
| Waste        |               |               |               |                    |               | 0.0000        | 0.0000        |                    | 0.0000        | 0.0000        |          |           |           |     |     | 5.4313          |
| Water        |               |               |               |                    |               | 0.0000        | 0.0000        |                    | 0.0000        | 0.0000        |          |           |           |     |     | 0.2974          |
| <b>Total</b> | <b>0.2535</b> | <b>1.1380</b> | <b>0.6525</b> | <b>1.3600e-003</b> | <b>0.0117</b> | <b>0.0365</b> | <b>0.0482</b> | <b>3.1600e-003</b> | <b>0.0364</b> | <b>0.0396</b> |          |           |           |     |     | <b>141.2692</b> |

## CCMC- Phase II Stationary Source - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                    |               |               | MT/yr    |           |           |     |     |                 |
| Area         | 4.6000e-003   | 0.0000        | 1.0000e-005   | 0.0000             |               | 0.0000        | 0.0000        |                    | 0.0000        | 0.0000        |          |           |           |     |     | 2.0000e-005     |
| Energy       | 2.3000e-004   | 2.0900e-003   | 1.7500e-003   | 1.0000e-005        |               | 1.6000e-004   | 1.6000e-004   |                    | 1.6000e-004   | 1.6000e-004   |          |           |           |     |     | 4.4380          |
| Mobile       | 2.4900e-003   | 0.0351        | 0.0231        | 1.7000e-004        | 0.0117        | 8.0000e-005   | 0.0118        | 3.1600e-003        | 7.0000e-005   | 3.2400e-003   |          |           |           |     |     | 16.3635         |
| Stationary   | 0.2461        | 1.1008        | 0.6277        | 1.1800e-003        |               | 0.0362        | 0.0362        |                    | 0.0362        | 0.0362        |          |           |           |     |     | 114.6396        |
| Waste        |               |               |               |                    |               | 0.0000        | 0.0000        |                    | 0.0000        | 0.0000        |          |           |           |     |     | 5.4313          |
| Water        |               |               |               |                    |               | 0.0000        | 0.0000        |                    | 0.0000        | 0.0000        |          |           |           |     |     | 0.2974          |
| <b>Total</b> | <b>0.2535</b> | <b>1.1380</b> | <b>0.6525</b> | <b>1.3600e-003</b> | <b>0.0117</b> | <b>0.0365</b> | <b>0.0482</b> | <b>3.1600e-003</b> | <b>0.0364</b> | <b>0.0396</b> |          |           |           |     |     | <b>141.1699</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.07</b> |

**3.0 Construction Detail****Construction Phase**

| Phase Number | Phase Name       | Phase Type       | Start Date | End Date  | Num Days Week | Num Days | Phase Description |
|--------------|------------------|------------------|------------|-----------|---------------|----------|-------------------|
| 1            | Site Preparation | Site Preparation | 1/1/2019   | 1/14/2019 | 5             | 1        |                   |



## CCMC- Phase II Stationary Source - Fresno County, Annual

**Acres of Grading (Site Preparation Phase): 0.5****Acres of Grading (Grading Phase): 0****Acres of Paving: 0****Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)****OffRoad Equipment**

| Phase Name       | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|------------------|---------------------------|--------|-------------|-------------|-------------|
| Site Preparation | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Site Preparation | Tractors/Loaders/Backhoes | 1      | 8.00        | 97          | 0.37        |

**Trips and VMT**

| Phase Name       | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation | 2                       | 5.00               | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Clean Paved Roads

## CCMC- Phase II Stationary Source - Fresno County, Annual

**3.2 Site Preparation - 2019****Unmitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 2.6500e-003        | 0.0000             | 2.6500e-003        | 2.9000e-004        | 0.0000             | 2.9000e-004        |          |           |           |     |     | 0.0000        |
| Off-Road      | 3.6000e-003        | 0.0446        | 0.0207        | 5.0000e-005        |                    | 1.8400e-003        | 1.8400e-003        |                    | 1.6900e-003        | 1.6900e-003        |          |           |           |     |     | 4.4126        |
| <b>Total</b>  | <b>3.6000e-003</b> | <b>0.0446</b> | <b>0.0207</b> | <b>5.0000e-005</b> | <b>2.6500e-003</b> | <b>1.8400e-003</b> | <b>4.4900e-003</b> | <b>2.9000e-004</b> | <b>1.6900e-003</b> | <b>1.9800e-003</b> |          |           |           |     |     | <b>4.4126</b> |

**Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.2000e-004        | 8.0000e-005        | 7.8000e-004        | 0.0000        | 2.0000e-004        | 0.0000        | 2.0000e-004        | 5.0000e-005        | 0.0000        | 5.0000e-005        |          |           |           |     |     | 0.1787        |
| <b>Total</b> | <b>1.2000e-004</b> | <b>8.0000e-005</b> | <b>7.8000e-004</b> | <b>0.0000</b> | <b>2.0000e-004</b> | <b>0.0000</b> | <b>2.0000e-004</b> | <b>5.0000e-005</b> | <b>0.0000</b> | <b>5.0000e-005</b> |          |           |           |     |     | <b>0.1787</b> |

## CCMC- Phase II Stationary Source - Fresno County, Annual

**3.2 Site Preparation - 2019****Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 2.6500e-003        | 0.0000             | 2.6500e-003        | 2.9000e-004        | 0.0000             | 2.9000e-004        |          |           |           |     |     | 0.0000        |
| Off-Road      | 3.6000e-003        | 0.0446        | 0.0207        | 5.0000e-005        |                    | 1.8400e-003        | 1.8400e-003        |                    | 1.6900e-003        | 1.6900e-003        |          |           |           |     |     | 4.4126        |
| <b>Total</b>  | <b>3.6000e-003</b> | <b>0.0446</b> | <b>0.0207</b> | <b>5.0000e-005</b> | <b>2.6500e-003</b> | <b>1.8400e-003</b> | <b>4.4900e-003</b> | <b>2.9000e-004</b> | <b>1.6900e-003</b> | <b>1.9800e-003</b> |          |           |           |     |     | <b>4.4126</b> |

**Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.2000e-004        | 8.0000e-005        | 7.8000e-004        | 0.0000        | 2.0000e-004        | 0.0000        | 2.0000e-004        | 5.0000e-005        | 0.0000        | 5.0000e-005        |          |           |           |     |     | 0.1787        |
| <b>Total</b> | <b>1.2000e-004</b> | <b>8.0000e-005</b> | <b>7.8000e-004</b> | <b>0.0000</b> | <b>2.0000e-004</b> | <b>0.0000</b> | <b>2.0000e-004</b> | <b>5.0000e-005</b> | <b>0.0000</b> | <b>5.0000e-005</b> |          |           |           |     |     | <b>0.1787</b> |

**4.0 Operational Detail - Mobile**

## CCMC- Phase II Stationary Source - Fresno County, Annual

## 4.1 Mitigation Measures Mobile

|             | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|-------------|-------------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Category    | tons/yr     |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| Mitigated   | 2.4900e-003 | 0.0351 | 0.0231 | 1.7000e-004 | 0.0117        | 8.0000e-005  | 0.0118     | 3.1600e-003    | 7.0000e-005   | 3.2400e-003 |          |           |           |     |     | 16.3635 |
| Unmitigated | 2.4900e-003 | 0.0351 | 0.0231 | 1.7000e-004 | 0.0117        | 8.0000e-005  | 0.0118     | 3.1600e-003    | 7.0000e-005   | 3.2400e-003 |          |           |           |     |     | 16.3635 |

## 4.2 Trip Summary Information

| Land Use | Average Daily Trip Rate |          |        | Unmitigated | Mitigated  |
|----------|-------------------------|----------|--------|-------------|------------|
|          | Weekday                 | Saturday | Sunday | Annual VMT  | Annual VMT |
| Hospital | 13.22                   | 10.18    | 8.91   | 30,649      | 30,649     |
| Total    | 13.22                   | 10.18    | 8.91   | 30,649      | 30,649     |

## 4.3 Trip Type Information

| Land Use | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|----------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|          | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Hospital | 9.50       | 7.30       | 7.30        | 64.90      | 16.10      | 19.00       | 73             | 25       | 2       |

## 4.4 Fleet Mix

| Land Use | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hospital | 0.517186 | 0.028486 | 0.175263 | 0.093589 | 0.009700 | 0.003404 | 0.033644 | 0.129242 | 0.002306 | 0.001185 | 0.004563 | 0.000998 | 0.000436 |

## CCMC- Phase II Stationary Source - Fresno County, Annual

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

Install High Efficiency Lighting

|                         | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|-------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Category                | tons/yr     |             |             |             |               |              |             |                |               |             | MT/yr    |           |           |     |     |        |
| Electricity Mitigated   |             |             |             |             |               | 0.0000       | 0.0000      |                | 0.0000        | 0.0000      |          |           |           |     |     | 2.1518 |
| Electricity Unmitigated |             |             |             |             |               | 0.0000       | 0.0000      |                | 0.0000        | 0.0000      |          |           |           |     |     | 2.2511 |
| NaturalGas Mitigated    | 2.3000e-004 | 2.0900e-003 | 1.7500e-003 | 1.0000e-005 |               | 1.6000e-004  | 1.6000e-004 |                | 1.6000e-004   | 1.6000e-004 |          |           |           |     |     | 2.2863 |
| NaturalGas Unmitigated  | 2.3000e-004 | 2.0900e-003 | 1.7500e-003 | 1.0000e-005 |               | 1.6000e-004  | 1.6000e-004 |                | 1.6000e-004   | 1.6000e-004 |          |           |           |     |     | 2.2863 |

## CCMC- Phase II Stationary Source - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|              | NaturalGas Use | ROG                | NOx                | CO                 | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Land Use     | kBTU/yr        | tons/yr            |                    |                    |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Hospital     | 42590          | 2.3000e-004        | 2.0900e-003        | 1.7500e-003        | 1.0000e-005        |               | 1.6000e-004        | 1.6000e-004        |                | 1.6000e-004        | 1.6000e-004        |          |           |           |     |     | 2.2863        |
| <b>Total</b> |                | <b>2.3000e-004</b> | <b>2.0900e-003</b> | <b>1.7500e-003</b> | <b>1.0000e-005</b> |               | <b>1.6000e-004</b> | <b>1.6000e-004</b> |                | <b>1.6000e-004</b> | <b>1.6000e-004</b> |          |           |           |     |     | <b>2.2863</b> |

**Mitigated**

|              | NaturalGas Use | ROG                | NOx                | CO                 | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Land Use     | kBTU/yr        | tons/yr            |                    |                    |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Hospital     | 42590          | 2.3000e-004        | 2.0900e-003        | 1.7500e-003        | 1.0000e-005        |               | 1.6000e-004        | 1.6000e-004        |                | 1.6000e-004        | 1.6000e-004        |          |           |           |     |     | 2.2863        |
| <b>Total</b> |                | <b>2.3000e-004</b> | <b>2.0900e-003</b> | <b>1.7500e-003</b> | <b>1.0000e-005</b> |               | <b>1.6000e-004</b> | <b>1.6000e-004</b> |                | <b>1.6000e-004</b> | <b>1.6000e-004</b> |          |           |           |     |     | <b>2.2863</b> |

## CCMC- Phase II Stationary Source - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e          |
|--------------|-----------------|-----------|-----|-----|---------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |               |
| Hospital     | 13560           |           |     |     | 2.2511        |
| <b>Total</b> |                 |           |     |     | <b>2.2511</b> |

**Mitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e          |
|--------------|-----------------|-----------|-----|-----|---------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |               |
| Hospital     | 12961.6         |           |     |     | 2.1518        |
| <b>Total</b> |                 |           |     |     | <b>2.1518</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

## CCMC- Phase II Stationary Source - Fresno County, Annual

|             | ROG         | NOx    | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|-------------|--------|-------------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr     |        |             |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 4.6000e-003 | 0.0000 | 1.0000e-005 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 2.0000e-005 |
| Unmitigated | 4.6000e-003 | 0.0000 | 1.0000e-005 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 2.0000e-005 |

## 6.2 Area by SubCategory

Unmitigated

|                       | ROG                | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|--------------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr            |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 7.0000e-004        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 3.9100e-003        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 0.0000             | 0.0000        | 1.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 2.0000e-005        |
| <b>Total</b>          | <b>4.6100e-003</b> | <b>0.0000</b> | <b>1.0000e-005</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>2.0000e-005</b> |



## CCMC- Phase II Stationary Source - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG                | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|--------------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr            |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 7.0000e-004        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 3.9100e-003        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 0.0000             | 0.0000        | 1.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 2.0000e-005        |
| <b>Total</b>          | <b>4.6100e-003</b> | <b>0.0000</b> | <b>1.0000e-005</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>2.0000e-005</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**

## CCMC- Phase II Stationary Source - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e   |
|-------------|-----------|-----|-----|--------|
| Category    | MT/yr     |     |     |        |
| Mitigated   |           |     |     | 0.2974 |
| Unmitigated |           |     |     | 0.2974 |

**7.2 Water by Land Use****Unmitigated**

|              | Indoor/Outdoor Use   | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------------|-----------|-----|-----|---------------|
| Land Use     | Mgal                 | MT/yr     |     |     |               |
| Hospital     | 0.125481 / 0.0239011 |           |     |     | 0.2974        |
| <b>Total</b> |                      |           |     |     | <b>0.2974</b> |

## CCMC- Phase II Stationary Source - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|              | Indoor/Outdoor Use   | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------------|-----------|-----|-----|---------------|
| Land Use     | Mgal                 | MT/yr     |     |     |               |
| Hospital     | 0.125481 / 0.0239011 |           |     |     | 0.2974        |
| <b>Total</b> |                      |           |     |     | <b>0.2974</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste****Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e   |
|-------------|-----------|-----|-----|--------|
|             | MT/yr     |     |     |        |
| Mitigated   |           |     |     | 5.4313 |
| Unmitigated |           |     |     | 5.4313 |

## CCMC- Phase II Stationary Source - Fresno County, Annual

**8.2 Waste by Land Use****Unmitigated**

|              | Waste Disposed | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------|-----------|-----|-----|---------------|
| Land Use     | tons           | MT/yr     |     |     |               |
| Hospital     | 10.8           |           |     |     | 5.4313        |
| <b>Total</b> |                |           |     |     | <b>5.4313</b> |

**Mitigated**

|              | Waste Disposed | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------|-----------|-----|-----|---------------|
| Land Use     | tons           | MT/yr     |     |     |               |
| Hospital     | 10.8           |           |     |     | 5.4313        |
| <b>Total</b> |                |           |     |     | <b>5.4313</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

## CCMC- Phase II Stationary Source - Fresno County, Annual

**10.0 Stationary Equipment****Fire Pumps and Emergency Generators**

| Equipment Type      | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---------------------|--------|-----------|------------|-------------|-------------|-----------|
| Emergency Generator | 3      | 8         | 100        | 1000        | 0.73        | Diesel    |

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

**10.1 Stationary Sources****Unmitigated/Mitigated**

|  | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Equipment Type                               | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Emergency Generator - Diesel (750 - 9999 HP) | 0.2461        | 1.1008        | 0.6277        | 1.1800e-003        |               | 0.0362        | 0.0362        |                | 0.0362        | 0.0362        |          |           |           |     |     | 114.6396        |
| <b>Total</b>                                 | <b>0.2461</b> | <b>1.1008</b> | <b>0.6277</b> | <b>1.1800e-003</b> |               | <b>0.0362</b> | <b>0.0362</b> |                | <b>0.0362</b> | <b>0.0362</b> |          |           |           |     |     | <b>114.6396</b> |

**11.0 Vegetation**

CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center**  
**Fresno County, Annual**

## 1.0 Project Characteristics

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### 1.1 Land Usage

| Land Uses                         | Size   | Metric        | Lot Acreage | Floor Surface Area | Population |
|-----------------------------------|--------|---------------|-------------|--------------------|------------|
| Hospital                          | 168.67 | 1000sqft      | 3.87        | 168,672.00         | 0          |
| Medical Office Building           | 260.00 | 1000sqft      | 5.97        | 260,000.00         | 0          |
| Congregate Care (Assisted Living) | 100.00 | Dwelling Unit | 6.25        | 100,000.00         | 286        |
| Regional Shopping Center          | 70.00  | 1000sqft      | 1.61        | 70,000.00          | 0          |

### 1.2 Other Project Characteristics

|                          |                                |                          |       |                           |       |
|--------------------------|--------------------------------|--------------------------|-------|---------------------------|-------|
| Urbanization             | Urban                          | Wind Speed (m/s)         | 2.2   | Precipitation Freq (Days) | 45    |
| Climate Zone             | 3                              |                          |       | Operational Year          | 2028  |
| Utility Company          | Pacific Gas & Electric Company |                          |       |                           |       |
| CO2 Intensity (lb/MW hr) | 641.35                         | CH4 Intensity (lb/MW hr) | 0.029 | N2O Intensity (lb/MW hr)  | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

Project Characteristics - Const. Only

Land Use - Assisted Living: 100 rooms; Med. Office: 260.0 KSF, Hospital Expansion: 168.672 KSF, Shopping Ctr: 70.0 KSF

Construction Phase - Site Prep: 10 days; Grading: 30 days; Const: 430 days; Coating: 40 days.

Off-road Equipment - Equipment based on model defaults.

Off-road Equipment - Based on model defaults.

Trips and VMT - Const trips based on model defaults.

Demolition - Demo: 0

Vehicle Trips - Operational emissions not included.

Construction Off-road Equipment Mitigation - T3 offroad equipment & dust control

Area Coating - .

Energy Use -

| Table Name              | Column Name                  | Default Value | New Value |
|-------------------------|------------------------------|---------------|-----------|
| tblAreaCoating          | Area_Nonresidential_Exterior | 249336        | 0         |
| tblAreaCoating          | Area_Residential_Exterior    | 67500         | 0         |
| tblConstDustMitigation  | WaterUnpavedRoadVehicleSpeed | 40            | 15        |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 3.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 4.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 9.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

|                           |                         |            |            |
|---------------------------|-------------------------|------------|------------|
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstEquipMitigation   | Tier                    | No Change  | Tier 3     |
| tblConstructionPhase      | NumDays                 | 20.00      | 40.00      |
| tblConstructionPhase      | NumDays                 | 300.00     | 430.00     |
| tblConstructionPhase      | PhaseEndDate            | 12/13/2019 | 12/14/2029 |
| tblConstructionPhase      | PhaseEndDate            | 10/18/2019 | 10/19/2029 |
| tblConstructionPhase      | PhaseEndDate            | 2/23/2018  | 2/25/2028  |
| tblConstructionPhase      | PhaseEndDate            | 1/12/2018  | 1/14/2028  |
| tblConstructionPhase      | PhaseStartDate          | 10/19/2019 | 10/20/2029 |
| tblConstructionPhase      | PhaseStartDate          | 2/24/2018  | 2/26/2028  |
| tblConstructionPhase      | PhaseStartDate          | 1/13/2018  | 1/15/2028  |
| tblConstructionPhase      | PhaseStartDate          | 1/1/2018   | 1/1/2028   |
| tblLandUse                | BuildingSpaceSquareFeet | 168,670.00 | 168,672.00 |
| tblLandUse                | LandUseSquareFeet       | 168,670.00 | 168,672.00 |
| tblProjectCharacteristics | OperationalYear         | 2018       | 2028       |
| tblVehicleTrips           | ST_TR                   | 2.20       | 0.00       |
| tblVehicleTrips           | ST_TR                   | 10.18      | 0.00       |
| tblVehicleTrips           | ST_TR                   | 8.96       | 0.00       |
| tblVehicleTrips           | ST_TR                   | 49.97      | 0.00       |
| tblVehicleTrips           | SU_TR                   | 2.44       | 0.00       |



## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

|                 |       |       |      |
|-----------------|-------|-------|------|
| tblVehicleTrips | SU_TR | 8.91  | 0.00 |
| tblVehicleTrips | SU_TR | 1.55  | 0.00 |
| tblVehicleTrips | SU_TR | 25.24 | 0.00 |
| tblVehicleTrips | WD_TR | 2.74  | 0.00 |
| tblVehicleTrips | WD_TR | 13.22 | 0.00 |
| tblVehicleTrips | WD_TR | 36.13 | 0.00 |
| tblVehicleTrips | WD_TR | 42.70 | 0.00 |

## 2.0 Emissions Summary

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## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**2.1 Overall Construction****Unmitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2028    | 0.2896  | 2.7599 | 2.7379 | 8.2300e-003 | 0.4947        | 0.0822       | 0.5769     | 0.1780         | 0.0769        | 0.2549      |          |           |           |     |     | 744.0002 |
| 2029    | 4.6288  | 2.1302 | 2.1689 | 6.8300e-003 | 0.2661        | 0.0581       | 0.3242     | 0.0722         | 0.0547        | 0.1269      |          |           |           |     |     | 618.6471 |
| Maximum | 4.6288  | 2.7599 | 2.7379 | 8.2300e-003 | 0.4947        | 0.0822       | 0.5769     | 0.1780         | 0.0769        | 0.2549      |          |           |           |     |     | 744.0002 |

**Mitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2028    | 0.1850  | 2.9528 | 3.1159 | 8.2300e-003 | 0.3602        | 0.1254       | 0.4856     | 0.1148         | 0.1253        | 0.2401      |          |           |           |     |     | 743.9998 |
| 2029    | 4.5538  | 2.3188 | 2.3573 | 6.8300e-003 | 0.2661        | 0.0984       | 0.3646     | 0.0722         | 0.0983        | 0.1705      |          |           |           |     |     | 618.6469 |
| Maximum | 4.5538  | 2.9528 | 3.1159 | 8.2300e-003 | 0.3602        | 0.1254       | 0.4856     | 0.1148         | 0.1253        | 0.2401      |          |           |           |     |     | 743.9998 |

|                   | ROG  | NOx   | CO     | SO2  | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4  | N2O  | CO2e |
|-------------------|------|-------|--------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|------|------|------|
| Percent Reduction | 3.65 | -7.80 | -11.54 | 0.00 | 17.67         | -59.55       | 5.65       | 25.25          | -69.98        | -7.56       | 0.00     | 0.00      | 0.00      | 0.00 | 0.00 | 0.00 |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

| Quarter | Start Date | End Date   | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|------------|--|--|
| 41      | 1-1-2028   | 3-31-2028  | 0.8813                                       | 0.8659                                     |
| 42      | 4-1-2028   | 6-30-2028  | 0.7230                                       | 0.7575                                     |
| 43      | 7-1-2028   | 9-30-2028  | 0.7309                                       | 0.7658                                     |
| 44      | 10-1-2028  | 12-31-2028 | 0.7322                                       | 0.7672                                     |
| 45      | 1-1-2029   | 3-31-2029  | 0.7126                                       | 0.7467                                     |
| 46      | 4-1-2029   | 6-30-2029  | 0.7192                                       | 0.7538                                     |
| 47      | 7-1-2029   | 9-30-2029  | 0.7271                                       | 0.7621                                     |
|         |            | Highest    | 0.8813                                       | 0.8659                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 2.8230        | 0.0649        | 1.9190        | 4.0500e-003        |               | 0.1959        | 0.1959        |                | 0.1959        | 0.1959        |          |           |           |     |     | 73.0496           |
| Energy       | 0.0698        | 0.6296        | 0.4984        | 3.8100e-003        |               | 0.0482        | 0.0482        |                | 0.0482        | 0.0482        |          |           |           |     |     | 2,382.4551        |
| Mobile       | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000        | 0.0000        | 0.0000         | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000            |
| Waste        |               |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 2,411.1060        |
| Water        |               |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 210.5563          |
| <b>Total</b> | <b>2.8928</b> | <b>0.6945</b> | <b>2.4175</b> | <b>7.8600e-003</b> | <b>0.0000</b> | <b>0.2441</b> | <b>0.2441</b> | <b>0.0000</b>  | <b>0.2441</b> | <b>0.2441</b> |          |           |           |     |     | <b>5,077.1670</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 2.8230        | 0.0649        | 1.9190        | 4.0500e-003        |               | 0.1959        | 0.1959        |                | 0.1959        | 0.1959        |          |           |           |     |     | 73.0496           |
| Energy       | 0.0698        | 0.6296        | 0.4984        | 3.8100e-003        |               | 0.0482        | 0.0482        |                | 0.0482        | 0.0482        |          |           |           |     |     | 2,382.4551        |
| Mobile       | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000        | 0.0000        | 0.0000         | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000            |
| Waste        |               |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 2,411.1060        |
| Water        |               |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 210.5563          |
| <b>Total</b> | <b>2.8928</b> | <b>0.6945</b> | <b>2.4175</b> | <b>7.8600e-003</b> | <b>0.0000</b> | <b>0.2441</b> | <b>0.2441</b> | <b>0.0000</b>  | <b>0.2441</b> | <b>0.2441</b> |          |           |           |     |     | <b>5,077.1670</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

**3.0 Construction Detail****Construction Phase**

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

| Phase Number | Phase Name            | Phase Type            | Start Date | End Date   | Num Days Week | Num Days | Phase Description |
|--------------|-----------------------|-----------------------|------------|------------|---------------|----------|-------------------|
| 1            | Site Preparation      | Site Preparation      | 1/1/2028   | 1/14/2028  | 5             | 10       |                   |
| 2            | Grading               | Grading               | 1/15/2028  | 2/25/2028  | 5             | 30       |                   |
| 3            | Building Construction | Building Construction | 2/26/2028  | 10/19/2029 | 5             | 430      |                   |
| 4            | Architectural Coating | Architectural Coating | 10/20/2029 | 12/14/2029 | 5             | 40       |                   |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 75**

**Acres of Paving: 0**

**Residential Indoor: 202,500; Residential Outdoor: 67,500; Non-Residential Indoor: 748,008; Non-Residential Outdoor: 249,336; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

| Phase Name            | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|-----------------------|---------------------------|--------|-------------|-------------|-------------|
| Site Preparation      | Rubber Tired Dozers       | 3      | 8.00        | 247         | 0.40        |
| Site Preparation      | Tractors/Loaders/Backhoes | 4      | 8.00        | 97          | 0.37        |
| Grading               | Excavators                | 2      | 8.00        | 158         | 0.38        |
| Grading               | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Grading               | Rubber Tired Dozers       | 1      | 8.00        | 247         | 0.40        |
| Grading               | Scrapers                  | 2      | 8.00        | 367         | 0.48        |
| Grading               | Tractors/Loaders/Backhoes | 2      | 8.00        | 97          | 0.37        |
| Building Construction | Cranes                    | 1      | 7.00        | 231         | 0.29        |
| Building Construction | Forklifts                 | 3      | 8.00        | 89          | 0.20        |
| Building Construction | Generator Sets            | 1      | 8.00        | 84          | 0.74        |
| Building Construction | Tractors/Loaders/Backhoes | 3      | 7.00        | 97          | 0.37        |
| Building Construction | Welders                   | 1      | 8.00        | 46          | 0.45        |
| Architectural Coating | Air Compressors           | 1      | 6.00        | 78          | 0.48        |

**Trips and VMT**

| Phase Name            | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|-----------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation      | 7                       | 18.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Grading               | 8                       | 20.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Building Construction | 9                       | 232.00             | 92.00              | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Architectural Coating | 1                       | 46.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

**3.2 Site Preparation - 2028****Unmitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |               |               |               |                    | 0.0903        | 0.0000             | 0.0903        | 0.0497         | 0.0000             | 0.0497        |          |           |           |     |     | 0.0000         |
| Off-Road      | 0.0124        | 0.1262        | 0.0896        | 1.9000e-004        |               | 5.4300e-003        | 5.4300e-003   |                | 5.0000e-003        | 5.0000e-003   |          |           |           |     |     | 16.8688        |
| <b>Total</b>  | <b>0.0124</b> | <b>0.1262</b> | <b>0.0896</b> | <b>1.9000e-004</b> | <b>0.0903</b> | <b>5.4300e-003</b> | <b>0.0958</b> | <b>0.0497</b>  | <b>5.0000e-003</b> | <b>0.0547</b> |          |           |           |     |     | <b>16.8688</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.2 Site Preparation - 2028****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.3000e-004        | 1.1000e-004        | 1.3000e-003        | 1.0000e-005        | 7.2000e-004        | 0.0000        | 7.2000e-004        | 1.9000e-004        | 0.0000        | 1.9000e-004        |          |           |           |     |     | 0.4669        |
| <b>Total</b> | <b>2.3000e-004</b> | <b>1.1000e-004</b> | <b>1.3000e-003</b> | <b>1.0000e-005</b> | <b>7.2000e-004</b> | <b>0.0000</b> | <b>7.2000e-004</b> | <b>1.9000e-004</b> | <b>0.0000</b> | <b>1.9000e-004</b> |          |           |           |     |     | <b>0.4669</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 0.0352        | 0.0000             | 0.0352        | 0.0194         | 0.0000             | 0.0194        |          |           |           |     |     | 0.0000         |
| Off-Road      | 4.6600e-003        | 0.0953        | 0.1148        | 1.9000e-004        |               | 4.7300e-003        | 4.7300e-003   |                | 4.7300e-003        | 4.7300e-003   |          |           |           |     |     | 16.8688        |
| <b>Total</b>  | <b>4.6600e-003</b> | <b>0.0953</b> | <b>0.1148</b> | <b>1.9000e-004</b> | <b>0.0352</b> | <b>4.7300e-003</b> | <b>0.0400</b> | <b>0.0194</b>  | <b>4.7300e-003</b> | <b>0.0241</b> |          |           |           |     |     | <b>16.8688</b> |



## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.2 Site Preparation - 2028****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.3000e-004        | 1.1000e-004        | 1.3000e-003        | 1.0000e-005        | 7.2000e-004        | 0.0000        | 7.2000e-004        | 1.9000e-004        | 0.0000        | 1.9000e-004        |          |           |           |     |     | 0.4669        |
| <b>Total</b> | <b>2.3000e-004</b> | <b>1.1000e-004</b> | <b>1.3000e-003</b> | <b>1.0000e-005</b> | <b>7.2000e-004</b> | <b>0.0000</b> | <b>7.2000e-004</b> | <b>1.9000e-004</b> | <b>0.0000</b> | <b>1.9000e-004</b> |          |           |           |     |     | <b>0.4669</b> |

**3.3 Grading - 2028****Unmitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |               |               |               |                    | 0.1301        | 0.0000        | 0.1301        | 0.0540         | 0.0000        | 0.0540        |          |           |           |     |     | 0.0000         |
| Off-Road      | 0.0435        | 0.4191        | 0.3950        | 9.3000e-004        |               | 0.0170        | 0.0170        |                | 0.0156        | 0.0156        |          |           |           |     |     | 82.4204        |
| <b>Total</b>  | <b>0.0435</b> | <b>0.4191</b> | <b>0.3950</b> | <b>9.3000e-004</b> | <b>0.1301</b> | <b>0.0170</b> | <b>0.1471</b> | <b>0.0540</b>  | <b>0.0156</b> | <b>0.0696</b> |          |           |           |     |     | <b>82.4204</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.3 Grading - 2028****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 7.6000e-004        | 3.6000e-004        | 4.3400e-003        | 2.0000e-005        | 2.4000e-003        | 1.0000e-005        | 2.4100e-003        | 6.4000e-004        | 1.0000e-005        | 6.5000e-004        |          |           |           |     |     | 1.5563        |
| <b>Total</b> | <b>7.6000e-004</b> | <b>3.6000e-004</b> | <b>4.3400e-003</b> | <b>2.0000e-005</b> | <b>2.4000e-003</b> | <b>1.0000e-005</b> | <b>2.4100e-003</b> | <b>6.4000e-004</b> | <b>1.0000e-005</b> | <b>6.5000e-004</b> |          |           |           |     |     | <b>1.5563</b> |

**Mitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |               |               |               |                    | 0.0507        | 0.0000        | 0.0507        | 0.0210         | 0.0000        | 0.0210        |          |           |           |     |     | 0.0000         |
| Off-Road      | 0.0229        | 0.4497        | 0.5508        | 9.3000e-004        |               | 0.0195        | 0.0195        |                | 0.0195        | 0.0195        |          |           |           |     |     | 82.4203        |
| <b>Total</b>  | <b>0.0229</b> | <b>0.4497</b> | <b>0.5508</b> | <b>9.3000e-004</b> | <b>0.0507</b> | <b>0.0195</b> | <b>0.0702</b> | <b>0.0210</b>  | <b>0.0195</b> | <b>0.0405</b> |          |           |           |     |     | <b>82.4203</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.3 Grading - 2028****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 7.6000e-004        | 3.6000e-004        | 4.3400e-003        | 2.0000e-005        | 2.4000e-003        | 1.0000e-005        | 2.4100e-003        | 6.4000e-004        | 1.0000e-005        | 6.5000e-004        |          |           |           |     |     | 1.5563        |
| <b>Total</b> | <b>7.6000e-004</b> | <b>3.6000e-004</b> | <b>4.3400e-003</b> | <b>2.0000e-005</b> | <b>2.4000e-003</b> | <b>1.0000e-005</b> | <b>2.4100e-003</b> | <b>6.4000e-004</b> | <b>1.0000e-005</b> | <b>6.5000e-004</b> |          |           |           |     |     | <b>1.5563</b> |

**3.4 Building Construction - 2028****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.1504        | 1.3717        | 1.7693        | 2.9700e-003        |               | 0.0580        | 0.0580        |                | 0.0546        | 0.0546        |          |           |           |     |     | 256.6106        |
| <b>Total</b> | <b>0.1504</b> | <b>1.3717</b> | <b>1.7693</b> | <b>2.9700e-003</b> |               | <b>0.0580</b> | <b>0.0580</b> |                | <b>0.0546</b> | <b>0.0546</b> |          |           |           |     |     | <b>256.6106</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.4 Building Construction - 2028****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0176        | 0.8118        | 0.1097        | 2.6600e-003        | 0.0671        | 7.6000e-004        | 0.0678        | 0.0194         | 7.3000e-004        | 0.0201        |          |           |           |     |     | 253.6885        |
| Worker       | 0.0647        | 0.0307        | 0.3688        | 1.4600e-003        | 0.2040        | 1.0000e-003        | 0.2050        | 0.0542         | 9.2000e-004        | 0.0552        |          |           |           |     |     | 132.3887        |
| <b>Total</b> | <b>0.0824</b> | <b>0.8425</b> | <b>0.4785</b> | <b>4.1200e-003</b> | <b>0.2711</b> | <b>1.7600e-003</b> | <b>0.2729</b> | <b>0.0736</b>  | <b>1.6500e-003</b> | <b>0.0753</b> |          |           |           |     |     | <b>386.0772</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0741        | 1.5649        | 1.9661        | 2.9700e-003        |               | 0.0994        | 0.0994        |                | 0.0994        | 0.0994        |          |           |           |     |     | 256.6103        |
| <b>Total</b> | <b>0.0741</b> | <b>1.5649</b> | <b>1.9661</b> | <b>2.9700e-003</b> |               | <b>0.0994</b> | <b>0.0994</b> |                | <b>0.0994</b> | <b>0.0994</b> |          |           |           |     |     | <b>256.6103</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.4 Building Construction - 2028****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0176        | 0.8118        | 0.1097        | 2.6600e-003        | 0.0671        | 7.6000e-004        | 0.0678        | 0.0194         | 7.3000e-004        | 0.0201        |          |           |           |     |     | 253.6885        |
| Worker       | 0.0647        | 0.0307        | 0.3688        | 1.4600e-003        | 0.2040        | 1.0000e-003        | 0.2050        | 0.0542         | 9.2000e-004        | 0.0552        |          |           |           |     |     | 132.3887        |
| <b>Total</b> | <b>0.0824</b> | <b>0.8425</b> | <b>0.4785</b> | <b>4.1200e-003</b> | <b>0.2711</b> | <b>1.7600e-003</b> | <b>0.2729</b> | <b>0.0736</b>  | <b>1.6500e-003</b> | <b>0.0753</b> |          |           |           |     |     | <b>386.0772</b> |

**3.4 Building Construction - 2029****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.1436        | 1.3093        | 1.6889        | 2.8300e-003        |               | 0.0554        | 0.0554        |                | 0.0521        | 0.0521        |          |           |           |     |     | 244.9465        |
| <b>Total</b> | <b>0.1436</b> | <b>1.3093</b> | <b>1.6889</b> | <b>2.8300e-003</b> |               | <b>0.0554</b> | <b>0.0554</b> |                | <b>0.0521</b> | <b>0.0521</b> |          |           |           |     |     | <b>244.9465</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.4 Building Construction - 2029****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0166        | 0.7702        | 0.1026        | 2.5300e-003        | 0.0640        | 7.2000e-004        | 0.0648        | 0.0185         | 6.9000e-004        | 0.0192        |          |           |           |     |     | 241.1926        |
| Worker       | 0.0574        | 0.0268        | 0.3288        | 1.3600e-003        | 0.1948        | 8.9000e-004        | 0.1956        | 0.0518         | 8.2000e-004        | 0.0526        |          |           |           |     |     | 122.7584        |
| <b>Total</b> | <b>0.0740</b> | <b>0.7970</b> | <b>0.4315</b> | <b>3.8900e-003</b> | <b>0.2588</b> | <b>1.6100e-003</b> | <b>0.2604</b> | <b>0.0703</b>  | <b>1.5100e-003</b> | <b>0.0718</b> |          |           |           |     |     | <b>363.9510</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0708        | 1.4937        | 1.8767        | 2.8300e-003        |               | 0.0949        | 0.0949        |                | 0.0949        | 0.0949        |          |           |           |     |     | 244.9462        |
| <b>Total</b> | <b>0.0708</b> | <b>1.4937</b> | <b>1.8767</b> | <b>2.8300e-003</b> |               | <b>0.0949</b> | <b>0.0949</b> |                | <b>0.0949</b> | <b>0.0949</b> |          |           |           |     |     | <b>244.9462</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.4 Building Construction - 2029****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0166        | 0.7702        | 0.1026        | 2.5300e-003        | 0.0640        | 7.2000e-004        | 0.0648        | 0.0185         | 6.9000e-004        | 0.0192        |          |           |           |     |     | 241.1926        |
| Worker       | 0.0574        | 0.0268        | 0.3288        | 1.3600e-003        | 0.1948        | 8.9000e-004        | 0.1956        | 0.0518         | 8.2000e-004        | 0.0526        |          |           |           |     |     | 122.7584        |
| <b>Total</b> | <b>0.0740</b> | <b>0.7970</b> | <b>0.4315</b> | <b>3.8900e-003</b> | <b>0.2588</b> | <b>1.6100e-003</b> | <b>0.2604</b> | <b>0.0703</b>  | <b>1.5100e-003</b> | <b>0.0718</b> |          |           |           |     |     | <b>363.9510</b> |

**3.5 Architectural Coating - 2029****Unmitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 4.4056        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 3.4200e-003   | 0.0229        | 0.0362        | 6.0000e-005        |               | 1.0300e-003        | 1.0300e-003        |                | 1.0300e-003        | 1.0300e-003        |          |           |           |     |     | 5.1135        |
| <b>Total</b>    | <b>4.4090</b> | <b>0.0229</b> | <b>0.0362</b> | <b>6.0000e-005</b> |               | <b>1.0300e-003</b> | <b>1.0300e-003</b> |                | <b>1.0300e-003</b> | <b>1.0300e-003</b> |          |           |           |     |     | <b>5.1135</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.5 Architectural Coating - 2029****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.1700e-003        | 1.0100e-003        | 0.0124        | 5.0000e-005        | 7.3600e-003        | 3.0000e-005        | 7.3900e-003        | 1.9500e-003        | 3.0000e-005        | 1.9900e-003        |          |           |           |     |     | 4.6362        |
| <b>Total</b> | <b>2.1700e-003</b> | <b>1.0100e-003</b> | <b>0.0124</b> | <b>5.0000e-005</b> | <b>7.3600e-003</b> | <b>3.0000e-005</b> | <b>7.3900e-003</b> | <b>1.9500e-003</b> | <b>3.0000e-005</b> | <b>1.9900e-003</b> |          |           |           |     |     | <b>4.6362</b> |

**Mitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 4.4056        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 1.1900e-003   | 0.0271        | 0.0367        | 6.0000e-005        |               | 1.9000e-003        | 1.9000e-003        |                | 1.9000e-003        | 1.9000e-003        |          |           |           |     |     | 5.1135        |
| <b>Total</b>    | <b>4.4068</b> | <b>0.0271</b> | <b>0.0367</b> | <b>6.0000e-005</b> |               | <b>1.9000e-003</b> | <b>1.9000e-003</b> |                | <b>1.9000e-003</b> | <b>1.9000e-003</b> |          |           |           |     |     | <b>5.1135</b> |



## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**3.5 Architectural Coating - 2029****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.1700e-003        | 1.0100e-003        | 0.0124        | 5.0000e-005        | 7.3600e-003        | 3.0000e-005        | 7.3900e-003        | 1.9500e-003        | 3.0000e-005        | 1.9900e-003        |          |           |           |     |     | 4.6362        |
| <b>Total</b> | <b>2.1700e-003</b> | <b>1.0100e-003</b> | <b>0.0124</b> | <b>5.0000e-005</b> | <b>7.3600e-003</b> | <b>3.0000e-005</b> | <b>7.3900e-003</b> | <b>1.9500e-003</b> | <b>3.0000e-005</b> | <b>1.9900e-003</b> |          |           |           |     |     | <b>4.6362</b> |

**4.0 Operational Detail - Mobile****4.1 Mitigation Measures Mobile**

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

|             | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|-------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Category    | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |        |
| Mitigated   | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000        | 0.0000       | 0.0000     | 0.0000         | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000 |
| Unmitigated | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000        | 0.0000       | 0.0000     | 0.0000         | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000 |

## 4.2 Trip Summary Information

| Land Use                          | Average Daily Trip Rate |          |        | Unmitigated | Mitigated  |
|-----------------------------------|-------------------------|----------|--------|-------------|------------|
|                                   | Weekday                 | Saturday | Sunday | Annual VMT  | Annual VMT |
| Congregate Care (Assisted Living) | 0.00                    | 0.00     | 0.00   |             |            |
| Hospital                          | 0.00                    | 0.00     | 0.00   |             |            |
| Medical Office Building           | 0.00                    | 0.00     | 0.00   |             |            |
| Regional Shopping Center          | 0.00                    | 0.00     | 0.00   |             |            |
| Total                             | 0.00                    | 0.00     | 0.00   |             |            |

## 4.3 Trip Type Information

| Land Use                          | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|-----------------------------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|                                   | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Congregate Care (Assisted Living) | 10.80      | 7.30       | 7.50        | 48.40      | 15.90      | 35.70       | 86             | 11       | 3       |
| Hospital                          | 9.50       | 7.30       | 7.30        | 64.90      | 16.10      | 19.00       | 73             | 25       | 2       |
| Medical Office Building           | 9.50       | 7.30       | 7.30        | 29.60      | 51.40      | 19.00       | 60             | 30       | 10      |
| Regional Shopping Center          | 9.50       | 7.30       | 7.30        | 16.30      | 64.70      | 19.00       | 54             | 35       | 11      |

## 4.4 Fleet Mix

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

| Land Use                          | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|-----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hospital                          | 0.513855 | 0.028800 | 0.174306 | 0.096627 | 0.010686 | 0.003563 | 0.033670 | 0.128811 | 0.002309 | 0.001252 | 0.004642 | 0.001018 | 0.000460 |
| Medical Office Building           | 0.513855 | 0.028800 | 0.174306 | 0.096627 | 0.010686 | 0.003563 | 0.033670 | 0.128811 | 0.002309 | 0.001252 | 0.004642 | 0.001018 | 0.000460 |
| Congregate Care (Assisted Living) | 0.513855 | 0.028800 | 0.174306 | 0.096627 | 0.010686 | 0.003563 | 0.033670 | 0.128811 | 0.002309 | 0.001252 | 0.004642 | 0.001018 | 0.000460 |
| Regional Shopping Center          | 0.513855 | 0.028800 | 0.174306 | 0.096627 | 0.010686 | 0.003563 | 0.033670 | 0.128811 | 0.002309 | 0.001252 | 0.004642 | 0.001018 | 0.000460 |

## 5.0 Energy Detail

Historical Energy Use: N

## 5.1 Mitigation Measures Energy

|                         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category                | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Electricity Mitigated   |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1,687.8735 |
| Electricity Unmitigated |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1,687.8735 |
| NaturalGas Mitigated    | 0.0698  | 0.6296 | 0.4984 | 3.8100e-003 |               | 0.0482       | 0.0482     |                | 0.0482        | 0.0482      |          |           |           |     |     | 694.5817   |
| NaturalGas Unmitigated  | 0.0698  | 0.6296 | 0.4984 | 3.8100e-003 |               | 0.0482       | 0.0482     |                | 0.0482        | 0.0482      |          |           |           |     |     | 694.5817   |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|                                   | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|-----------------------------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use                          | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Congregate Care (Assisted Living) | 1.59234e+006   | 8.5900e-003   | 0.0734        | 0.0312        | 4.7000e-004        |               | 5.9300e-003   | 5.9300e-003   |                | 5.9300e-003   | 5.9300e-003   |          |           |           |     |     | 85.4782         |
| Hospital                          | 7.18374e+006   | 0.0387        | 0.3521        | 0.2958        | 2.1100e-003        |               | 0.0268        | 0.0268        |                | 0.0268        | 0.0268        |          |           |           |     |     | 385.6298        |
| Medical Office Building           | 3.4112e+006    | 0.0184        | 0.1672        | 0.1405        | 1.0000e-003        |               | 0.0127        | 0.0127        |                | 0.0127        | 0.0127        |          |           |           |     |     | 183.1164        |
| Regional Shopping Center          | 751800         | 4.0500e-003   | 0.0369        | 0.0310        | 2.2000e-004        |               | 2.8000e-003   | 2.8000e-003   |                | 2.8000e-003   | 2.8000e-003   |          |           |           |     |     | 40.3573         |
| <b>Total</b>                      |                | <b>0.0698</b> | <b>0.6296</b> | <b>0.4984</b> | <b>3.8000e-003</b> |               | <b>0.0482</b> | <b>0.0482</b> |                | <b>0.0482</b> | <b>0.0482</b> |          |           |           |     |     | <b>694.5817</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Mitigated**

|                                   | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|-----------------------------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use                          | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Congregate Care (Assisted Living) | 1.59234e+006   | 8.5900e-003   | 0.0734        | 0.0312        | 4.7000e-004        |               | 5.9300e-003   | 5.9300e-003   |                | 5.9300e-003   | 5.9300e-003   |          |           |           |     |     | 85.4782         |
| Hospital                          | 7.18374e+006   | 0.0387        | 0.3521        | 0.2958        | 2.1100e-003        |               | 0.0268        | 0.0268        |                | 0.0268        | 0.0268        |          |           |           |     |     | 385.6298        |
| Medical Office Building           | 3.4112e+006    | 0.0184        | 0.1672        | 0.1405        | 1.0000e-003        |               | 0.0127        | 0.0127        |                | 0.0127        | 0.0127        |          |           |           |     |     | 183.1164        |
| Regional Shopping Center          | 751800         | 4.0500e-003   | 0.0369        | 0.0310        | 2.2000e-004        |               | 2.8000e-003   | 2.8000e-003   |                | 2.8000e-003   | 2.8000e-003   |          |           |           |     |     | 40.3573         |
| <b>Total</b>                      |                | <b>0.0698</b> | <b>0.6296</b> | <b>0.4984</b> | <b>3.8000e-003</b> |               | <b>0.0482</b> | <b>0.0482</b> |                | <b>0.0482</b> | <b>0.0482</b> |          |           |           |     |     | <b>694.5817</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|                                   | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                          | kWh/yr          | MT/yr     |     |     |                   |
| Congregate Care (Assisted Living) | 484480          |           |     |     | 141.4930          |
| Hospital                          | 2.28719e+006    |           |     |     | 667.9776          |
| Medical Office Building           | 2.4232e+006     |           |     |     | 707.6988          |
| Regional Shopping Center          | 584500          |           |     |     | 170.7040          |
| <b>Total</b>                      |                 |           |     |     | <b>1,687.8735</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Mitigated**

|                                   | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                          | kWh/yr          | MT/yr     |     |     |                   |
| Congregate Care (Assisted Living) | 484480          |           |     |     | 141.4930          |
| Hospital                          | 2.28719e+006    |           |     |     | 667.9776          |
| Medical Office Building           | 2.4232e+006     |           |     |     | 707.6988          |
| Regional Shopping Center          | 584500          |           |     |     | 170.7040          |
| <b>Total</b>                      |                 |           |     |     | <b>1,687.8735</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

|             | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|-------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Category    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| Mitigated   | 2.8230  | 0.0649 | 1.9190 | 4.0500e-003 |               | 0.1959       | 0.1959     |                | 0.1959        | 0.1959      |          |           |           |     |     | 73.0496 |
| Unmitigated | 2.8230  | 0.0649 | 1.9190 | 4.0500e-003 |               | 0.1959       | 0.1959     |                | 0.1959        | 0.1959      |          |           |           |     |     | 73.0496 |

## 6.2 Area by SubCategory

Unmitigated

|                       | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|-----------------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| SubCategory           | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Architectural Coating | 0.3304        |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Consumer Products     | 2.3381        |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Hearth                | 0.1318        | 0.0563        | 1.1727        | 4.0100e-003        |               | 0.1917        | 0.1917        |                | 0.1917        | 0.1917        |          |           |           |     |     | 71.7982        |
| Landscaping           | 0.0227        | 8.5900e-003   | 0.7464        | 4.0000e-005        |               | 4.1300e-003   | 4.1300e-003   |                | 4.1300e-003   | 4.1300e-003   |          |           |           |     |     | 1.2514         |
| <b>Total</b>          | <b>2.8230</b> | <b>0.0649</b> | <b>1.9190</b> | <b>4.0500e-003</b> |               | <b>0.1959</b> | <b>0.1959</b> |                | <b>0.1959</b> | <b>0.1959</b> |          |           |           |     |     | <b>73.0496</b> |



## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|-----------------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| SubCategory           | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Architectural Coating | 0.3304        |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Consumer Products     | 2.3381        |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Hearth                | 0.1318        | 0.0563        | 1.1727        | 4.0100e-003        |               | 0.1917        | 0.1917        |                | 0.1917        | 0.1917        |          |           |           |     |     | 71.7982        |
| Landscaping           | 0.0227        | 8.5900e-003   | 0.7464        | 4.0000e-005        |               | 4.1300e-003   | 4.1300e-003   |                | 4.1300e-003   | 4.1300e-003   |          |           |           |     |     | 1.2514         |
| <b>Total</b>          | <b>2.8230</b> | <b>0.0649</b> | <b>1.9190</b> | <b>4.0500e-003</b> |               | <b>0.1959</b> | <b>0.1959</b> |                | <b>0.1959</b> | <b>0.1959</b> |          |           |           |     |     | <b>73.0496</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
| Category    | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 210.5563 |
| Unmitigated |           |     |     | 210.5563 |

**7.2 Water by Land Use****Unmitigated**

|                                   | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e            |
|-----------------------------------|--------------------|-----------|-----|-----|-----------------|
| Land Use                          | Mgal               | MT/yr     |     |     |                 |
| Congregate Care (Assisted Living) | 6.5154 / 4.10754   |           |     |     | 23.3634         |
| Hospital                          | 21.1648 / 4.03139  |           |     |     | 66.3760         |
| Medical Office Building           | 32.6249 / 6.21427  |           |     |     | 102.3168        |
| Regional Shopping Center          | 5.18508 / 3.17795  |           |     |     | 18.5001         |
| <b>Total</b>                      |                    |           |     |     | <b>210.5563</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|                                   | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e            |
|-----------------------------------|--------------------|-----------|-----|-----|-----------------|
| Land Use                          | Mgal               | MT/yr     |     |     |                 |
| Congregate Care (Assisted Living) | 6.5154 / 4.10754   |           |     |     | 23.3634         |
| Hospital                          | 21.1648 / 4.03139  |           |     |     | 66.3760         |
| Medical Office Building           | 32.6249 / 6.21427  |           |     |     | 102.3168        |
| Regional Shopping Center          | 5.18508 / 3.17795  |           |     |     | 18.5001         |
| <b>Total</b>                      |                    |           |     |     | <b>210.5563</b> |

**8.0 Waste Detail**

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**8.1 Mitigation Measures Waste**

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e       |
|-------------|-----------|-----|-----|------------|
|             | MT/yr     |     |     |            |
| Mitigated   |           |     |     | 2,411.1060 |
| Unmitigated |           |     |     | 2,411.1060 |

**8.2 Waste by Land Use****Unmitigated**

|                                   | Waste Disposed | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|----------------|-----------|-----|-----|-------------------|
| Land Use                          | tons           | MT/yr     |     |     |                   |
| Congregate Care (Assisted Living) | 91.25          |           |     |     | 45.8898           |
| Hospital                          | 1821.64        |           |     |     | 916.1055          |
| Medical Office Building           | 2808           |           |     |     | 1,412.1475        |
| Regional Shopping Center          | 73.5           |           |     |     | 36.9633           |
| <b>Total</b>                      |                |           |     |     | <b>2,411.1060</b> |

## CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

**8.2 Waste by Land Use****Mitigated**

|                                   | Waste Disposed | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|----------------|-----------|-----|-----|-------------------|
| Land Use                          | tons           | MT/yr     |     |     |                   |
| Congregate Care (Assisted Living) | 91.25          |           |     |     | 45.8898           |
| Hospital                          | 1821.64        |           |     |     | 916.1055          |
| Medical Office Building           | 2808           |           |     |     | 1,412.1475        |
| Regional Shopping Center          | 73.5           |           |     |     | 36.9633           |
| <b>Total</b>                      |                |           |     |     | <b>2,411.1060</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

**10.0 Stationary Equipment****Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center - Fresno County, Annual

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

## 11.0 Vegetation

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## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

## CCMC- Bed Tower, D&T Expansion & Park Garage Construction

### Fresno County, Annual

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses                  | Size   | Metric   | Lot Acreage | Floor Surface Area | Population |
|----------------------------|--------|----------|-------------|--------------------|------------|
| Hospital                   | 163.67 | 1000sqft | 3.76        | 163,672.00         | 0          |
| Enclosed Parking Structure | 677.00 | Space    | 6.09        | 270,800.00         | 0          |

### 1.2 Other Project Characteristics

|                          |                                |                          |       |                           |       |
|--------------------------|--------------------------------|--------------------------|-------|---------------------------|-------|
| Urbanization             | Urban                          | Wind Speed (m/s)         | 2.2   | Precipitation Freq (Days) | 45    |
| Climate Zone             | 3                              |                          |       | Operational Year          | 2023  |
| Utility Company          | Pacific Gas & Electric Company |                          |       |                           |       |
| CO2 Intensity (lb/MW hr) | 641.35                         | CH4 Intensity (lb/MW hr) | 0.029 | N2O Intensity (lb/MW hr)  | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Const. Only

Land Use - 163,672 SF; 677 space parking garage

Construction Phase - Site Prep: 3 days; Grading: 20 days; Const: 440 days; Coating: 40 days.

Off-road Equipment - Equipment based on model defaults.

Trips and VMT - Const trips based on model defaults.

Vehicle Trips - Operational emissions not included.

Construction Off-road Equipment Mitigation - T3 offroad equipment, dust control

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

| Table Name                | Column Name                  | Default Value | New Value  |
|---------------------------|------------------------------|---------------|------------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15         |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00       |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00       |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00       |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 3.00       |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00       |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00       |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 4.00       |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 10.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00       |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3     |
| tblConstructionPhase      | NumDays                      | 20.00         | 40.00      |
| tblConstructionPhase      | NumDays                      | 230.00        | 440.00     |
| tblLandUse                | BuildingSpaceSquareFeet      | 163,670.00    | 163,672.00 |
| tblLandUse                | LandUseSquareFeet            | 163,670.00    | 163,672.00 |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2023       |

## 2.0 Emissions Summary



## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**2.1 Overall Construction****Unmitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2020    | 0.4018  | 3.7263 | 2.9303 | 7.5100e-003 | 0.3089        | 0.1561       | 0.4650     | 0.1073         | 0.1466        | 0.2539      |          |           |           |     |     | 677.8859 |
| 2021    | 1.4806  | 2.6279 | 2.2619 | 6.0500e-003 | 0.1859        | 0.1012       | 0.2872     | 0.0505         | 0.0953        | 0.1458      |          |           |           |     |     | 546.4742 |
| Maximum | 1.4806  | 3.7263 | 2.9303 | 7.5100e-003 | 0.3089        | 0.1561       | 0.4650     | 0.1073         | 0.1466        | 0.2539      |          |           |           |     |     | 677.8859 |

**Mitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2020    | 0.2073  | 2.9831 | 3.0844 | 7.5100e-003 | 0.2524        | 0.1236       | 0.3759     | 0.0777         | 0.1232        | 0.2010      |          |           |           |     |     | 677.8855 |
| 2021    | 1.3541  | 2.3023 | 2.3927 | 6.0500e-003 | 0.1859        | 0.0957       | 0.2817     | 0.0505         | 0.0956        | 0.1461      |          |           |           |     |     | 546.4739 |
| Maximum | 1.3541  | 2.9831 | 3.0844 | 7.5100e-003 | 0.2524        | 0.1236       | 0.3759     | 0.0777         | 0.1232        | 0.2010      |          |           |           |     |     | 677.8855 |

|                   | ROG   | NOx   | CO    | SO2  | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4  | N2O  | CO2e |
|-------------------|-------|-------|-------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|------|------|------|
| Percent Reduction | 17.06 | 16.82 | -5.49 | 0.00 | 11.42         | 14.79        | 12.57      | 18.77          | 9.54          | 13.18       | 0.00     | 0.00      | 0.00      | 0.00 | 0.00 | 0.00 |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

| Quarter | Start Date | End Date   | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|------------|--|--|
| 1       | 1-1-2020   | 3-31-2020  | 1.0166                                       | 0.7185                                     |
| 2       | 4-1-2020   | 6-30-2020  | 1.0232                                       | 0.8150                                     |
| 3       | 7-1-2020   | 9-30-2020  | 1.0345                                       | 0.8240                                     |
| 4       | 10-1-2020  | 12-31-2020 | 1.0386                                       | 0.8281                                     |
| 5       | 1-1-2021   | 3-31-2021  | 0.9213                                       | 0.7788                                     |
| 6       | 4-1-2021   | 6-30-2021  | 0.9286                                       | 0.7845                                     |
| 7       | 7-1-2021   | 9-30-2021  | 0.9388                                       | 0.7932                                     |
|         |            | Highest    | 1.0386                                       | 0.8281                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 0.7769        | 7.0000e-005   | 7.7200e-003   | 0.0000        |               | 3.0000e-005   | 3.0000e-005   |                | 3.0000e-005   | 3.0000e-005   |          |           |           |     |     | 0.0160            |
| Energy       | 0.0376        | 0.3417        | 0.2870        | 2.0500e-003   |               | 0.0260        | 0.0260        |                | 0.0260        | 0.0260        |          |           |           |     |     | 1,540.3981        |
| Mobile       | 0.5696        | 6.4138        | 5.5518        | 0.0325        | 1.9231        | 0.0172        | 1.9403        | 0.5184         | 0.0161        | 0.5345        |          |           |           |     |     | 3,038.7104        |
| Waste        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 888.9488          |
| Water        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 64.4084           |
| <b>Total</b> | <b>1.3840</b> | <b>6.7556</b> | <b>5.8465</b> | <b>0.0346</b> | <b>1.9231</b> | <b>0.0432</b> | <b>1.9663</b> | <b>0.5184</b>  | <b>0.0421</b> | <b>0.5605</b> |          |           |           |     |     | <b>5,532.4818</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 0.7769        | 7.0000e-005   | 7.7200e-003   | 0.0000        |               | 3.0000e-005   | 3.0000e-005   |                | 3.0000e-005   | 3.0000e-005   |          |           |           |     |     | 0.0160            |
| Energy       | 0.0376        | 0.3417        | 0.2870        | 2.0500e-003   |               | 0.0260        | 0.0260        |                | 0.0260        | 0.0260        |          |           |           |     |     | 1,540.3981        |
| Mobile       | 0.5696        | 6.4138        | 5.5518        | 0.0325        | 1.9231        | 0.0172        | 1.9403        | 0.5184         | 0.0161        | 0.5345        |          |           |           |     |     | 3,038.7104        |
| Waste        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 888.9488          |
| Water        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 64.4084           |
| <b>Total</b> | <b>1.3840</b> | <b>6.7556</b> | <b>5.8465</b> | <b>0.0346</b> | <b>1.9231</b> | <b>0.0432</b> | <b>1.9663</b> | <b>0.5184</b>  | <b>0.0421</b> | <b>0.5605</b> |          |           |           |     |     | <b>5,532.4818</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

**3.0 Construction Detail****Construction Phase**

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

| Phase Number | Phase Name            | Phase Type            | Start Date | End Date  | Num Days Week | Num Days | Phase Description |
|--------------|-----------------------|-----------------------|------------|-----------|---------------|----------|-------------------|
| 1            | Site Preparation      | Site Preparation      | 1/1/2020   | 1/3/2020  | 5             | 10       |                   |
| 2            | Grading               | Grading               | 1/4/2020   | 1/31/2020 | 5             | 20       |                   |
| 3            | Building Construction | Building Construction | 2/1/2020   | 10/8/2021 | 5             | 440      |                   |
| 4            | Architectural Coating | Architectural Coating | 10/9/2021  | 12/3/2021 | 5             | 40       |                   |

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 6.09

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 245,508; Non-Residential Outdoor: 81,836; Striped Parking Area: 16,248  
(Architectural Coating – sqft)

#### OffRoad Equipment

| Phase Name            | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|-----------------------|---------------------------|--------|-------------|-------------|-------------|
| Site Preparation      | Rubber Tired Dozers       | 3      | 8.00        | 247         | 0.40        |
| Site Preparation      | Tractors/Loaders/Backhoes | 4      | 8.00        | 97          | 0.37        |
| Grading               | Excavators                | 1      | 8.00        | 158         | 0.38        |
| Grading               | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Grading               | Rubber Tired Dozers       | 1      | 8.00        | 247         | 0.40        |
| Grading               | Tractors/Loaders/Backhoes | 3      | 8.00        | 97          | 0.37        |
| Building Construction | Cranes                    | 1      | 7.00        | 231         | 0.29        |
| Building Construction | Forklifts                 | 3      | 8.00        | 89          | 0.20        |
| Building Construction | Generator Sets            | 1      | 8.00        | 84          | 0.74        |
| Building Construction | Tractors/Loaders/Backhoes | 3      | 7.00        | 97          | 0.37        |
| Building Construction | Welders                   | 1      | 8.00        | 46          | 0.45        |
| Architectural Coating | Air Compressors           | 1      | 6.00        | 78          | 0.48        |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**Trips and VMT**

| Phase Name            | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|-----------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation      | 7                       | 18.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Grading               | 6                       | 15.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Building Construction | 9                       | 166.00             | 71.00              | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Architectural Coating | 1                       | 33.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

**3.2 Site Preparation - 2020****Unmitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 0.0271        | 0.0000             | 0.0271        | 0.0149         | 0.0000             | 0.0149        |          |           |           |     |     | 0.0000        |
| Off-Road      | 6.1100e-003        | 0.0636        | 0.0323        | 6.0000e-005        |               | 3.3000e-003        | 3.3000e-003   |                | 3.0300e-003        | 3.0300e-003   |          |           |           |     |     | 5.0552        |
| <b>Total</b>  | <b>6.1100e-003</b> | <b>0.0636</b> | <b>0.0323</b> | <b>6.0000e-005</b> | <b>0.0271</b> | <b>3.3000e-003</b> | <b>0.0304</b> | <b>0.0149</b>  | <b>3.0300e-003</b> | <b>0.0179</b> |          |           |           |     |     | <b>5.0552</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.2 Site Preparation - 2020****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.2000e-004        | 7.0000e-005        | 7.5000e-004        | 0.0000        | 2.2000e-004        | 0.0000        | 2.2000e-004        | 6.0000e-005        | 0.0000        | 6.0000e-005        |          |           |           |     |     | 0.1870        |
| <b>Total</b> | <b>1.2000e-004</b> | <b>7.0000e-005</b> | <b>7.5000e-004</b> | <b>0.0000</b> | <b>2.2000e-004</b> | <b>0.0000</b> | <b>2.2000e-004</b> | <b>6.0000e-005</b> | <b>0.0000</b> | <b>6.0000e-005</b> |          |           |           |     |     | <b>0.1870</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |               |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 0.0106        | 0.0000             | 0.0106        | 5.8100e-003        | 0.0000             | 5.8100e-003        |          |           |           |     |     | 0.0000        |
| Off-Road      | 1.4000e-003        | 0.0286        | 0.0344        | 6.0000e-005        |               | 1.4200e-003        | 1.4200e-003   |                    | 1.4200e-003        | 1.4200e-003        |          |           |           |     |     | 5.0551        |
| <b>Total</b>  | <b>1.4000e-003</b> | <b>0.0286</b> | <b>0.0344</b> | <b>6.0000e-005</b> | <b>0.0106</b> | <b>1.4200e-003</b> | <b>0.0120</b> | <b>5.8100e-003</b> | <b>1.4200e-003</b> | <b>7.2300e-003</b> |          |           |           |     |     | <b>5.0551</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.2 Site Preparation - 2020****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.2000e-004        | 7.0000e-005        | 7.5000e-004        | 0.0000        | 2.2000e-004        | 0.0000        | 2.2000e-004        | 6.0000e-005        | 0.0000        | 6.0000e-005        |          |           |           |     |     | 0.1870        |
| <b>Total</b> | <b>1.2000e-004</b> | <b>7.0000e-005</b> | <b>7.5000e-004</b> | <b>0.0000</b> | <b>2.2000e-004</b> | <b>0.0000</b> | <b>2.2000e-004</b> | <b>6.0000e-005</b> | <b>0.0000</b> | <b>6.0000e-005</b> |          |           |           |     |     | <b>0.1870</b> |

**3.3 Grading - 2020****Unmitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |               |               |               |                    | 0.0655        | 0.0000        | 0.0655        | 0.0337         | 0.0000        | 0.0337        |          |           |           |     |     | 0.0000         |
| Off-Road      | 0.0243        | 0.2639        | 0.1605        | 3.0000e-004        |               | 0.0127        | 0.0127        |                | 0.0117        | 0.0117        |          |           |           |     |     | 26.2694        |
| <b>Total</b>  | <b>0.0243</b> | <b>0.2639</b> | <b>0.1605</b> | <b>3.0000e-004</b> | <b>0.0655</b> | <b>0.0127</b> | <b>0.0783</b> | <b>0.0337</b>  | <b>0.0117</b> | <b>0.0454</b> |          |           |           |     |     | <b>26.2694</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.3 Grading - 2020****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 6.5000e-004        | 4.1000e-004        | 4.1700e-003        | 1.0000e-005        | 1.2000e-003        | 1.0000e-005        | 1.2100e-003        | 3.2000e-004        | 1.0000e-005        | 3.3000e-004        |          |           |           |     |     | 1.0386        |
| <b>Total</b> | <b>6.5000e-004</b> | <b>4.1000e-004</b> | <b>4.1700e-003</b> | <b>1.0000e-005</b> | <b>1.2000e-003</b> | <b>1.0000e-005</b> | <b>1.2100e-003</b> | <b>3.2000e-004</b> | <b>1.0000e-005</b> | <b>3.3000e-004</b> |          |           |           |     |     | <b>1.0386</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 0.0256        | 0.0000             | 0.0256        | 0.0131         | 0.0000             | 0.0131        |          |           |           |     |     | 0.0000         |
| Off-Road      | 7.2600e-003        | 0.1484        | 0.1899        | 3.0000e-004        |               | 7.5600e-003        | 7.5600e-003   |                | 7.5600e-003        | 7.5600e-003   |          |           |           |     |     | 26.2694        |
| <b>Total</b>  | <b>7.2600e-003</b> | <b>0.1484</b> | <b>0.1899</b> | <b>3.0000e-004</b> | <b>0.0256</b> | <b>7.5600e-003</b> | <b>0.0331</b> | <b>0.0131</b>  | <b>7.5600e-003</b> | <b>0.0207</b> |          |           |           |     |     | <b>26.2694</b> |



## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.3 Grading - 2020****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 6.5000e-004        | 4.1000e-004        | 4.1700e-003        | 1.0000e-005        | 1.2000e-003        | 1.0000e-005        | 1.2100e-003        | 3.2000e-004        | 1.0000e-005        | 3.3000e-004        |          |           |           |     |     | 1.0386        |
| <b>Total</b> | <b>6.5000e-004</b> | <b>4.1000e-004</b> | <b>4.1700e-003</b> | <b>1.0000e-005</b> | <b>1.2000e-003</b> | <b>1.0000e-005</b> | <b>1.2100e-003</b> | <b>3.2000e-004</b> | <b>1.0000e-005</b> | <b>3.3000e-004</b> |          |           |           |     |     | <b>1.0386</b> |

**3.4 Building Construction - 2020****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.2533        | 2.2927        | 2.0134        | 3.2200e-003        |               | 0.1335        | 0.1335        |                | 0.1255        | 0.1255        |          |           |           |     |     | 278.4620        |
| <b>Total</b> | <b>0.2533</b> | <b>2.2927</b> | <b>2.0134</b> | <b>3.2200e-003</b> |               | <b>0.1335</b> | <b>0.1335</b> |                | <b>0.1255</b> | <b>0.1255</b> |          |           |           |     |     | <b>278.4620</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.4 Building Construction - 2020****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0317        | 1.0513        | 0.1679        | 2.4100e-003        | 0.0562        | 5.5800e-003        | 0.0618        | 0.0162         | 5.3400e-003        | 0.0216        |          |           |           |     |     | 229.5219        |
| Worker       | 0.0856        | 0.0543        | 0.5514        | 1.5200e-003        | 0.1586        | 1.0200e-003        | 0.1596        | 0.0422         | 9.4000e-004        | 0.0431        |          |           |           |     |     | 137.3518        |
| <b>Total</b> | <b>0.1173</b> | <b>1.1056</b> | <b>0.7192</b> | <b>3.9300e-003</b> | <b>0.2148</b> | <b>6.6000e-003</b> | <b>0.2214</b> | <b>0.0584</b>  | <b>6.2800e-003</b> | <b>0.0647</b> |          |           |           |     |     | <b>366.8737</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0805        | 1.7000        | 2.1359        | 3.2200e-003        |               | 0.1080        | 0.1080        |                | 0.1080        | 0.1080        |          |           |           |     |     | 278.4617        |
| <b>Total</b> | <b>0.0805</b> | <b>1.7000</b> | <b>2.1359</b> | <b>3.2200e-003</b> |               | <b>0.1080</b> | <b>0.1080</b> |                | <b>0.1080</b> | <b>0.1080</b> |          |           |           |     |     | <b>278.4617</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.4 Building Construction - 2020****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0317        | 1.0513        | 0.1679        | 2.4100e-003        | 0.0562        | 5.5800e-003        | 0.0618        | 0.0162         | 5.3400e-003        | 0.0216        |          |           |           |     |     | 229.5219        |
| Worker       | 0.0856        | 0.0543        | 0.5514        | 1.5200e-003        | 0.1586        | 1.0200e-003        | 0.1596        | 0.0422         | 9.4000e-004        | 0.0431        |          |           |           |     |     | 137.3518        |
| <b>Total</b> | <b>0.1173</b> | <b>1.1056</b> | <b>0.7192</b> | <b>3.9300e-003</b> | <b>0.2148</b> | <b>6.6000e-003</b> | <b>0.2214</b> | <b>0.0584</b>  | <b>6.2800e-003</b> | <b>0.0647</b> |          |           |           |     |     | <b>366.8737</b> |

**3.4 Building Construction - 2021****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.1910        | 1.7519        | 1.6658        | 2.7100e-003        |               | 0.0963        | 0.0963        |                | 0.0906        | 0.0906        |          |           |           |     |     | 234.1996        |
| <b>Total</b> | <b>0.1910</b> | <b>1.7519</b> | <b>1.6658</b> | <b>2.7100e-003</b> |               | <b>0.0963</b> | <b>0.0963</b> |                | <b>0.0906</b> | <b>0.0906</b> |          |           |           |     |     | <b>234.1996</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.4 Building Construction - 2021****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0216        | 0.8032        | 0.1224        | 2.0000e-003        | 0.0473        | 2.1600e-003        | 0.0494        | 0.0137         | 2.0600e-003        | 0.0157        |          |           |           |     |     | 191.1972        |
| Worker       | 0.0665        | 0.0406        | 0.4207        | 1.2300e-003        | 0.1334        | 8.3000e-004        | 0.1342        | 0.0355         | 7.6000e-004        | 0.0362        |          |           |           |     |     | 111.5491        |
| <b>Total</b> | <b>0.0881</b> | <b>0.8438</b> | <b>0.5431</b> | <b>3.2300e-003</b> | <b>0.1807</b> | <b>2.9900e-003</b> | <b>0.1837</b> | <b>0.0491</b>  | <b>2.8200e-003</b> | <b>0.0519</b> |          |           |           |     |     | <b>302.7463</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0677        | 1.4297        | 1.7963        | 2.7100e-003        |               | 0.0908        | 0.0908        |                | 0.0908        | 0.0908        |          |           |           |     |     | 234.1993        |
| <b>Total</b> | <b>0.0677</b> | <b>1.4297</b> | <b>1.7963</b> | <b>2.7100e-003</b> |               | <b>0.0908</b> | <b>0.0908</b> |                | <b>0.0908</b> | <b>0.0908</b> |          |           |           |     |     | <b>234.1993</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.4 Building Construction - 2021****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0216        | 0.8032        | 0.1224        | 2.0000e-003        | 0.0473        | 2.1600e-003        | 0.0494        | 0.0137         | 2.0600e-003        | 0.0157        |          |           |           |     |     | 191.1972        |
| Worker       | 0.0665        | 0.0406        | 0.4207        | 1.2300e-003        | 0.1334        | 8.3000e-004        | 0.1342        | 0.0355         | 7.6000e-004        | 0.0362        |          |           |           |     |     | 111.5491        |
| <b>Total</b> | <b>0.0881</b> | <b>0.8438</b> | <b>0.5431</b> | <b>3.2300e-003</b> | <b>0.1807</b> | <b>2.9900e-003</b> | <b>0.1837</b> | <b>0.0491</b>  | <b>2.8200e-003</b> | <b>0.0519</b> |          |           |           |     |     | <b>302.7463</b> |

**3.5 Architectural Coating - 2021****Unmitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 1.1944        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 4.3800e-003   | 0.0305        | 0.0364        | 6.0000e-005        |               | 1.8800e-003        | 1.8800e-003        |                | 1.8800e-003        | 1.8800e-003        |          |           |           |     |     | 5.1153        |
| <b>Total</b>    | <b>1.1988</b> | <b>0.0305</b> | <b>0.0364</b> | <b>6.0000e-005</b> |               | <b>1.8800e-003</b> | <b>1.8800e-003</b> |                | <b>1.8800e-003</b> | <b>1.8800e-003</b> |          |           |           |     |     | <b>5.1153</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.5 Architectural Coating - 2021****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.6300e-003        | 1.6100e-003        | 0.0166        | 5.0000e-005        | 5.2800e-003        | 3.0000e-005        | 5.3100e-003        | 1.4000e-003        | 3.0000e-005        | 1.4300e-003        |          |           |           |     |     | 4.4130        |
| <b>Total</b> | <b>2.6300e-003</b> | <b>1.6100e-003</b> | <b>0.0166</b> | <b>5.0000e-005</b> | <b>5.2800e-003</b> | <b>3.0000e-005</b> | <b>5.3100e-003</b> | <b>1.4000e-003</b> | <b>3.0000e-005</b> | <b>1.4300e-003</b> |          |           |           |     |     | <b>4.4130</b> |

**Mitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 1.1944        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 1.1900e-003   | 0.0271        | 0.0367        | 6.0000e-005        |               | 1.9000e-003        | 1.9000e-003        |                | 1.9000e-003        | 1.9000e-003        |          |           |           |     |     | 5.1153        |
| <b>Total</b>    | <b>1.1956</b> | <b>0.0271</b> | <b>0.0367</b> | <b>6.0000e-005</b> |               | <b>1.9000e-003</b> | <b>1.9000e-003</b> |                | <b>1.9000e-003</b> | <b>1.9000e-003</b> |          |           |           |     |     | <b>5.1153</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**3.5 Architectural Coating - 2021****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.6300e-003        | 1.6100e-003        | 0.0166        | 5.0000e-005        | 5.2800e-003        | 3.0000e-005        | 5.3100e-003        | 1.4000e-003        | 3.0000e-005        | 1.4300e-003        |          |           |           |     |     | 4.4130        |
| <b>Total</b> | <b>2.6300e-003</b> | <b>1.6100e-003</b> | <b>0.0166</b> | <b>5.0000e-005</b> | <b>5.2800e-003</b> | <b>3.0000e-005</b> | <b>5.3100e-003</b> | <b>1.4000e-003</b> | <b>3.0000e-005</b> | <b>1.4300e-003</b> |          |           |           |     |     | <b>4.4130</b> |

**4.0 Operational Detail - Mobile****4.1 Mitigation Measures Mobile**

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

|             | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category    | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Mitigated   | 0.5696  | 6.4138 | 5.5518 | 0.0325 | 1.9231        | 0.0172       | 1.9403     | 0.5184         | 0.0161        | 0.5345      |          |           |           |     |     | 3,038.7104 |
| Unmitigated | 0.5696  | 6.4138 | 5.5518 | 0.0325 | 1.9231        | 0.0172       | 1.9403     | 0.5184         | 0.0161        | 0.5345      |          |           |           |     |     | 3,038.7104 |

## 4.2 Trip Summary Information

| Land Use                   | Average Daily Trip Rate |          |          | Unmitigated | Mitigated  |
|----------------------------|-------------------------|----------|----------|-------------|------------|
|                            | Weekday                 | Saturday | Sunday   | Annual VMT  | Annual VMT |
| Enclosed Parking Structure | 0.00                    | 0.00     | 0.00     |             |            |
| Hospital                   | 2,163.72                | 1,666.16 | 1458.30  | 5,016,383   | 5,016,383  |
| Total                      | 2,163.72                | 1,666.16 | 1,458.30 | 5,016,383   | 5,016,383  |

## 4.3 Trip Type Information

| Land Use                   | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|----------------------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|                            | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Enclosed Parking Structure | 9.50       | 7.30       | 7.30        | 0.00       | 0.00       | 0.00        | 0              | 0        | 0       |
| Hospital                   | 9.50       | 7.30       | 7.30        | 64.90      | 16.10      | 19.00       | 73             | 25       | 2       |

## 4.4 Fleet Mix

| Land Use                   | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|----------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hospital                   | 0.496766 | 0.030510 | 0.170483 | 0.111467 | 0.014688 | 0.004287 | 0.033704 | 0.127678 | 0.002360 | 0.001460 | 0.004966 | 0.001070 | 0.000562 |
| Enclosed Parking Structure | 0.496766 | 0.030510 | 0.170483 | 0.111467 | 0.014688 | 0.004287 | 0.033704 | 0.127678 | 0.002360 | 0.001460 | 0.004966 | 0.001070 | 0.000562 |



## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

|                         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category                | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Electricity Mitigated   |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1,166.1997 |
| Electricity Unmitigated |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1,166.1997 |
| NaturalGas Mitigated    | 0.0376  | 0.3417 | 0.2870 | 2.0500e-003 |               | 0.0260       | 0.0260     |                | 0.0260        | 0.0260      |          |           |           |     |     | 374.1985   |
| NaturalGas Unmitigated  | 0.0376  | 0.3417 | 0.2870 | 2.0500e-003 |               | 0.0260       | 0.0260     |                | 0.0260        | 0.0260      |          |           |           |     |     | 374.1985   |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|                            | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|----------------------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use                   | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Enclosed Parking Structure | 0              | 0.0000        | 0.0000        | 0.0000        | 0.0000             |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000          |
| Hospital                   | 6.97079e+006   | 0.0376        | 0.3417        | 0.2870        | 2.0500e-003        |               | 0.0260        | 0.0260        |                | 0.0260        | 0.0260        |          |           |           |     |     | 374.1985        |
| <b>Total</b>               |                | <b>0.0376</b> | <b>0.3417</b> | <b>0.2870</b> | <b>2.0500e-003</b> |               | <b>0.0260</b> | <b>0.0260</b> |                | <b>0.0260</b> | <b>0.0260</b> |          |           |           |     |     | <b>374.1985</b> |

**Mitigated**

|                            | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|----------------------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use                   | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Enclosed Parking Structure | 0              | 0.0000        | 0.0000        | 0.0000        | 0.0000             |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000          |
| Hospital                   | 6.97079e+006   | 0.0376        | 0.3417        | 0.2870        | 2.0500e-003        |               | 0.0260        | 0.0260        |                | 0.0260        | 0.0260        |          |           |           |     |     | 374.1985        |
| <b>Total</b>               |                | <b>0.0376</b> | <b>0.3417</b> | <b>0.2870</b> | <b>2.0500e-003</b> |               | <b>0.0260</b> | <b>0.0260</b> |                | <b>0.0260</b> | <b>0.0260</b> |          |           |           |     |     | <b>374.1985</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|                            | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|----------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                   | kWh/yr          | MT/yr     |     |     |                   |
| Enclosed Parking Structure | 1.77374e+006    |           |     |     | 518.0232          |
| Hospital                   | 2.21939e+006    |           |     |     | 648.1765          |
| <b>Total</b>               |                 |           |     |     | <b>1,166.1997</b> |

**Mitigated**

|                            | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|----------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                   | kWh/yr          | MT/yr     |     |     |                   |
| Enclosed Parking Structure | 1.77374e+006    |           |     |     | 518.0232          |
| Hospital                   | 2.21939e+006    |           |     |     | 648.1765          |
| <b>Total</b>               |                 |           |     |     | <b>1,166.1997</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

|             | ROG     | NOx         | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|-------------|---------|-------------|-------------|--------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Category    | tons/yr |             |             |        |               |              |             |                |               |             | MT/yr    |           |           |     |     |        |
| Mitigated   | 0.7769  | 7.0000e-005 | 7.7200e-003 | 0.0000 |               | 3.0000e-005  | 3.0000e-005 |                | 3.0000e-005   | 3.0000e-005 |          |           |           |     |     | 0.0160 |
| Unmitigated | 0.7769  | 7.0000e-005 | 7.7200e-003 | 0.0000 |               | 3.0000e-005  | 3.0000e-005 |                | 3.0000e-005   | 3.0000e-005 |          |           |           |     |     | 0.0160 |

## 6.2 Area by SubCategory

Unmitigated

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| SubCategory           | tons/yr       |                    |                    |               |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Architectural Coating | 0.1194        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Consumer Products     | 0.6567        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Landscaping           | 7.2000e-004   | 7.0000e-005        | 7.7200e-003        | 0.0000        |               | 3.0000e-005        | 3.0000e-005        |                | 3.0000e-005        | 3.0000e-005        |          |           |           |     |     | 0.0160        |
| <b>Total</b>          | <b>0.7769</b> | <b>7.0000e-005</b> | <b>7.7200e-003</b> | <b>0.0000</b> |               | <b>3.0000e-005</b> | <b>3.0000e-005</b> |                | <b>3.0000e-005</b> | <b>3.0000e-005</b> |          |           |           |     |     | <b>0.0160</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| SubCategory           | tons/yr       |                    |                    |               |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Architectural Coating | 0.1194        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Consumer Products     | 0.6567        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Landscaping           | 7.2000e-004   | 7.0000e-005        | 7.7200e-003        | 0.0000        |               | 3.0000e-005        | 3.0000e-005        |                | 3.0000e-005        | 3.0000e-005        |          |           |           |     |     | 0.0160        |
| <b>Total</b>          | <b>0.7769</b> | <b>7.0000e-005</b> | <b>7.7200e-003</b> | <b>0.0000</b> |               | <b>3.0000e-005</b> | <b>3.0000e-005</b> |                | <b>3.0000e-005</b> | <b>3.0000e-005</b> |          |           |           |     |     | <b>0.0160</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e    |
|-------------|-----------|-----|-----|---------|
| Category    | MT/yr     |     |     |         |
| Mitigated   |           |     |     | 64.4084 |
| Unmitigated |           |     |     | 64.4084 |

**7.2 Water by Land Use****Unmitigated**

|                            | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|----------------------------|--------------------|-----------|-----|-----|----------------|
| Land Use                   | Mgal               | MT/yr     |     |     |                |
| Enclosed Parking Structure | 0 / 0              |           |     |     | 0.0000         |
| Hospital                   | 20.5374 / 3.91189  |           |     |     | 64.4084        |
| <b>Total</b>               |                    |           |     |     | <b>64.4084</b> |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|                            | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|----------------------------|--------------------|-----------|-----|-----|----------------|
| Land Use                   | Mgal               | MT/yr     |     |     |                |
| Enclosed Parking Structure | 0 / 0              |           |     |     | 0.0000         |
| Hospital                   | 20.5374 / 3.91189  |           |     |     | 64.4084        |
| <b>Total</b>               |                    |           |     |     | <b>64.4084</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste****Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
|             | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 888.9488 |
| Unmitigated |           |     |     | 888.9488 |

## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

**8.2 Waste by Land Use****Unmitigated**

|                               | Waste<br>Disposed | Total CO2 | CH4 | N2O | CO2e            |
|-------------------------------|-------------------|-----------|-----|-----|-----------------|
| Land Use                      | tons              | MT/yr     |     |     |                 |
| Enclosed Parking<br>Structure | 0                 |           |     |     | 0.0000          |
| Hospital                      | 1767.64           |           |     |     | 888.9488        |
| <b>Total</b>                  |                   |           |     |     | <b>888.9488</b> |

**Mitigated**

|                               | Waste<br>Disposed | Total CO2 | CH4 | N2O | CO2e            |
|-------------------------------|-------------------|-----------|-----|-----|-----------------|
| Land Use                      | tons              | MT/yr     |     |     |                 |
| Enclosed Parking<br>Structure | 0                 |           |     |     | 0.0000          |
| Hospital                      | 1767.64           |           |     |     | 888.9488        |
| <b>Total</b>                  |                   |           |     |     | <b>888.9488</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|



## CCMC- Bed Tower, D&amp;T Expansion &amp; Park Garage Construction - Fresno County, Annual

## 10.0 Stationary Equipment

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### Fire Pumps and Emergency Generators

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

### Boilers

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

### User Defined Equipment

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

## 11.0 Vegetation

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## CCMC- Cancer Center Construction - Fresno County, Annual

## CCMC- Cancer Center Construction

### Fresno County, Annual

## 1.0 Project Characteristics

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### 1.1 Land Usage

| Land Uses | Size  | Metric   | Lot Acreage | Floor Surface Area | Population |
|-----------|-------|----------|-------------|--------------------|------------|
| Hospital  | 96.50 | 1000sqft | 2.22        | 96,500.00          | 0          |

### 1.2 Other Project Characteristics

|                         |                                |                         |       |                           |       |
|-------------------------|--------------------------------|-------------------------|-------|---------------------------|-------|
| Urbanization            | Urban                          | Wind Speed (m/s)        | 2.2   | Precipitation Freq (Days) | 45    |
| Climate Zone            | 3                              |                         |       | Operational Year          | 2019  |
| Utility Company         | Pacific Gas & Electric Company |                         |       |                           |       |
| CO2 Intensity (lb/MWhr) | 641.35                         | CH4 Intensity (lb/MWhr) | 0.029 | N2O Intensity (lb/MWhr)   | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - .

Land Use - 96500 SF

Construction Phase - Assumes an approximate 500-day overall construction schedule. Site Prep: 3 days; Grading: 20 days; Const: 440 days; Coating: 40 days.

Off-road Equipment - Equipment based on model defaults.

Trips and VMT - Const trips based on model defaults.

Vehicle Trips - Operational emissions not included.

Construction Off-road Equipment Mitigation - T3 and dust control

Energy Use -

## CCMC- Cancer Center Construction - Fresno County, Annual

| Table Name                | Column Name                  | Default Value | New Value |
|---------------------------|------------------------------|---------------|-----------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15        |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 4.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 3.00      |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstructionPhase      | NumDays                      | 10.00         | 40.00     |
| tblConstructionPhase      | NumDays                      | 220.00        | 440.00    |
| tblConstructionPhase      | NumDays                      | 6.00          | 20.00     |
| tblGrading                | AcresOfGrading               | 10.00         | 3.00      |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2019      |

## 2.0 Emissions Summary

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## CCMC- Cancer Center Construction - Fresno County, Annual

**2.1 Overall Construction****Unmitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2017    | 0.4561  | 3.3341 | 2.2726 | 4.0700e-003 | 0.1070        | 0.1918       | 0.2988     | 0.0452         | 0.1830        | 0.2282      |          |           |           |     |     | 357.5019 |
| 2018    | 0.9980  | 2.3856 | 1.7899 | 3.3300e-003 | 0.0369        | 0.1327       | 0.1696     | 0.0101         | 0.1273        | 0.1374      |          |           |           |     |     | 289.5588 |
| Maximum | 0.9980  | 3.3341 | 2.2726 | 4.0700e-003 | 0.1070        | 0.1918       | 0.2988     | 0.0452         | 0.1830        | 0.2282      |          |           |           |     |     | 357.5019 |

**Mitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2017    | 0.1242  | 2.0377 | 2.1782 | 4.0700e-003 | 0.0679        | 0.1055       | 0.1733     | 0.0248         | 0.1053        | 0.1301      |          |           |           |     |     | 357.5016 |
| 2018    | 0.7701  | 1.6534 | 1.7580 | 3.3300e-003 | 0.0369        | 0.0870       | 0.1239     | 0.0101         | 0.0869        | 0.0969      |          |           |           |     |     | 289.5585 |
| Maximum | 0.7701  | 2.0377 | 2.1782 | 4.0700e-003 | 0.0679        | 0.1055       | 0.1733     | 0.0248         | 0.1053        | 0.1301      |          |           |           |     |     | 357.5016 |

|                   | ROG   | NOx   | CO   | SO2  | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4  | N2O  | CO2e |
|-------------------|-------|-------|------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|------|------|------|
| Percent Reduction | 38.50 | 35.47 | 3.11 | 0.00 | 27.21         | 40.69        | 36.55      | 37.02          | 38.06         | 37.91       | 0.00     | 0.00      | 0.00      | 0.00 | 0.00 | 0.00 |

## CCMC- Cancer Center Construction - Fresno County, Annual

| Quarter | Start Date | End Date   | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|------------|--|--|
| 1       | 1-1-2017   | 3-31-2017  | 0.9328                                       | 0.4824                                     |
| 2       | 4-1-2017   | 6-30-2017  | 0.9483                                       | 0.5572                                     |
| 3       | 7-1-2017   | 9-30-2017  | 0.9587                                       | 0.5633                                     |
| 4       | 10-1-2017  | 12-31-2017 | 0.9604                                       | 0.5650                                     |
| 5       | 1-1-2018   | 3-31-2018  | 0.8448                                       | 0.5463                                     |
| 6       | 4-1-2018   | 6-30-2018  | 0.8527                                       | 0.5510                                     |
| 7       | 7-1-2018   | 9-30-2018  | 0.8621                                       | 0.5570                                     |
|         |            | Highest    | 0.9604                                       | 0.5650                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 0.4441        | 1.0000e-005   | 9.0000e-004   | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.8400e-003       |
| Energy       | 0.0222        | 0.2015        | 0.1692        | 1.2100e-003   |               | 0.0153        | 0.0153        |                | 0.0153        | 0.0153        |          |           |           |     |     | 602.7860          |
| Mobile       | 0.5144        | 5.7899        | 4.8412        | 0.0209        | 1.1337        | 0.0298        | 1.1636        | 0.3057         | 0.0283        | 0.3340        |          |           |           |     |     | 1,944.7285        |
| Waste        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 524.1240          |
| Water        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 37.9753           |
| <b>Total</b> | <b>0.9806</b> | <b>5.9914</b> | <b>5.0113</b> | <b>0.0221</b> | <b>1.1337</b> | <b>0.0451</b> | <b>1.1789</b> | <b>0.3057</b>  | <b>0.0437</b> | <b>0.3493</b> |          |           |           |     |     | <b>3,109.6155</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 0.4441        | 1.0000e-005   | 9.0000e-004   | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.8400e-003       |
| Energy       | 0.0222        | 0.2015        | 0.1692        | 1.2100e-003   |               | 0.0153        | 0.0153        |                | 0.0153        | 0.0153        |          |           |           |     |     | 602.7860          |
| Mobile       | 0.5144        | 5.7899        | 4.8412        | 0.0209        | 1.1337        | 0.0298        | 1.1636        | 0.3057         | 0.0283        | 0.3340        |          |           |           |     |     | 1,944.7285        |
| Waste        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 524.1240          |
| Water        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 37.9753           |
| <b>Total</b> | <b>0.9806</b> | <b>5.9914</b> | <b>5.0113</b> | <b>0.0221</b> | <b>1.1337</b> | <b>0.0451</b> | <b>1.1789</b> | <b>0.3057</b>  | <b>0.0437</b> | <b>0.3493</b> |          |           |           |     |     | <b>3,109.6155</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

**3.0 Construction Detail****Construction Phase**

## CCMC- Cancer Center Construction - Fresno County, Annual

| Phase Number | Phase Name            | Phase Type            | Start Date | End Date   | Num Days Week | Num Days | Phase Description |
|--------------|-----------------------|-----------------------|------------|------------|---------------|----------|-------------------|
| 1            | Site Preparation      | Site Preparation      | 1/1/2017   | 1/4/2017   | 5             | 3        |                   |
| 2            | Grading               | Grading               | 1/5/2017   | 2/1/2017   | 5             | 20       |                   |
| 3            | Building Construction | Building Construction | 2/2/2017   | 10/10/2018 | 5             | 440      |                   |
| 4            | Architectural Coating | Architectural Coating | 10/11/2018 | 12/5/2018  | 5             | 40       |                   |

**Acres of Grading (Site Preparation Phase): 4.5**

**Acres of Grading (Grading Phase): 3**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 144,750; Non-Residential Outdoor: 48,250; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name            | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|-----------------------|---------------------------|--------|-------------|-------------|-------------|
| Site Preparation      | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Site Preparation      | Scrapers                  | 1      | 8.00        | 367         | 0.48        |
| Site Preparation      | Tractors/Loaders/Backhoes | 1      | 7.00        | 97          | 0.37        |
| Grading               | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Grading               | Rubber Tired Dozers       | 1      | 8.00        | 247         | 0.40        |
| Grading               | Tractors/Loaders/Backhoes | 2      | 7.00        | 97          | 0.37        |
| Building Construction | Cranes                    | 1      | 8.00        | 231         | 0.29        |
| Building Construction | Forklifts                 | 2      | 7.00        | 89          | 0.20        |
| Building Construction | Generator Sets            | 1      | 8.00        | 84          | 0.74        |
| Building Construction | Tractors/Loaders/Backhoes | 1      | 6.00        | 97          | 0.37        |
| Building Construction | Welders                   | 3      | 8.00        | 46          | 0.45        |
| Architectural Coating | Air Compressors           | 1      | 6.00        | 78          | 0.48        |

## CCMC- Cancer Center Construction - Fresno County, Annual

**Trips and VMT**

| Phase Name            | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|-----------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation      | 3                       | 8.00               | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Grading               | 4                       | 10.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Building Construction | 8                       | 31.00              | 16.00              | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Architectural Coating | 1                       | 6.00               | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

**3.2 Site Preparation - 2017****Unmitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 2.3900e-003        | 0.0000             | 2.3900e-003        | 2.6000e-004        | 0.0000             | 2.6000e-004        |          |           |           |     |     | 0.0000        |
| Off-Road      | 3.2000e-003        | 0.0401        | 0.0216        | 4.0000e-005        |                    | 1.6600e-003        | 1.6600e-003        |                    | 1.5300e-003        | 1.5300e-003        |          |           |           |     |     | 3.4395        |
| <b>Total</b>  | <b>3.2000e-003</b> | <b>0.0401</b> | <b>0.0216</b> | <b>4.0000e-005</b> | <b>2.3900e-003</b> | <b>1.6600e-003</b> | <b>4.0500e-003</b> | <b>2.6000e-004</b> | <b>1.5300e-003</b> | <b>1.7900e-003</b> |          |           |           |     |     | <b>3.4395</b> |



## CCMC- Cancer Center Construction - Fresno County, Annual

**3.2 Site Preparation - 2017****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 7.0000e-005        | 5.0000e-005        | 4.9000e-004        | 0.0000        | 1.0000e-004        | 0.0000        | 1.0000e-004        | 3.0000e-005        | 0.0000        | 3.0000e-005        |          |           |           |     |     | 0.0906        |
| <b>Total</b> | <b>7.0000e-005</b> | <b>5.0000e-005</b> | <b>4.9000e-004</b> | <b>0.0000</b> | <b>1.0000e-004</b> | <b>0.0000</b> | <b>1.0000e-004</b> | <b>3.0000e-005</b> | <b>0.0000</b> | <b>3.0000e-005</b> |          |           |           |     |     | <b>0.0906</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 9.3000e-004        | 0.0000             | 9.3000e-004        | 1.0000e-004        | 0.0000             | 1.0000e-004        |          |           |           |     |     | 0.0000        |
| Off-Road      | 9.0000e-004        | 0.0178        | 0.0205        | 4.0000e-005        |                    | 7.5000e-004        | 7.5000e-004        |                    | 7.5000e-004        | 7.5000e-004        |          |           |           |     |     | 3.4395        |
| <b>Total</b>  | <b>9.0000e-004</b> | <b>0.0178</b> | <b>0.0205</b> | <b>4.0000e-005</b> | <b>9.3000e-004</b> | <b>7.5000e-004</b> | <b>1.6800e-003</b> | <b>1.0000e-004</b> | <b>7.5000e-004</b> | <b>8.5000e-004</b> |          |           |           |     |     | <b>3.4395</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**3.2 Site Preparation - 2017****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 7.0000e-005        | 5.0000e-005        | 4.9000e-004        | 0.0000        | 1.0000e-004        | 0.0000        | 1.0000e-004        | 3.0000e-005        | 0.0000        | 3.0000e-005        |          |           |           |     |     | 0.0906        |
| <b>Total</b> | <b>7.0000e-005</b> | <b>5.0000e-005</b> | <b>4.9000e-004</b> | <b>0.0000</b> | <b>1.0000e-004</b> | <b>0.0000</b> | <b>1.0000e-004</b> | <b>3.0000e-005</b> | <b>0.0000</b> | <b>3.0000e-005</b> |          |           |           |     |     | <b>0.0906</b> |

**3.3 Grading - 2017****Unmitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |               |               |               |                    | 0.0618        | 0.0000        | 0.0618        | 0.0333         | 0.0000        | 0.0333        |          |           |           |     |     | 0.0000         |
| Off-Road      | 0.0232        | 0.2616        | 0.1078        | 2.1000e-004        |               | 0.0130        | 0.0130        |                | 0.0120        | 0.0120        |          |           |           |     |     | 19.3082        |
| <b>Total</b>  | <b>0.0232</b> | <b>0.2616</b> | <b>0.1078</b> | <b>2.1000e-004</b> | <b>0.0618</b> | <b>0.0130</b> | <b>0.0748</b> | <b>0.0333</b>  | <b>0.0120</b> | <b>0.0452</b> |          |           |           |     |     | <b>19.3082</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**3.3 Grading - 2017****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 5.9000e-004        | 4.1000e-004        | 4.0600e-003        | 1.0000e-005        | 8.0000e-004        | 1.0000e-005        | 8.1000e-004        | 2.1000e-004        | 1.0000e-005        | 2.2000e-004        |          |           |           |     |     | 0.7549        |
| <b>Total</b> | <b>5.9000e-004</b> | <b>4.1000e-004</b> | <b>4.0600e-003</b> | <b>1.0000e-005</b> | <b>8.0000e-004</b> | <b>1.0000e-005</b> | <b>8.1000e-004</b> | <b>2.1000e-004</b> | <b>1.0000e-005</b> | <b>2.2000e-004</b> |          |           |           |     |     | <b>0.7549</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 0.0241        | 0.0000             | 0.0241        | 0.0130         | 0.0000             | 0.0130        |          |           |           |     |     | 0.0000         |
| Off-Road      | 5.0400e-003        | 0.1022        | 0.1215        | 2.1000e-004        |               | 4.8500e-003        | 4.8500e-003   |                | 4.8500e-003        | 4.8500e-003   |          |           |           |     |     | 19.3082        |
| <b>Total</b>  | <b>5.0400e-003</b> | <b>0.1022</b> | <b>0.1215</b> | <b>2.1000e-004</b> | <b>0.0241</b> | <b>4.8500e-003</b> | <b>0.0290</b> | <b>0.0130</b>  | <b>4.8500e-003</b> | <b>0.0178</b> |          |           |           |     |     | <b>19.3082</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**3.3 Grading - 2017****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 5.9000e-004        | 4.1000e-004        | 4.0600e-003        | 1.0000e-005        | 8.0000e-004        | 1.0000e-005        | 8.1000e-004        | 2.1000e-004        | 1.0000e-005        | 2.2000e-004        |          |           |           |     |     | 0.7549        |
| <b>Total</b> | <b>5.9000e-004</b> | <b>4.1000e-004</b> | <b>4.0600e-003</b> | <b>1.0000e-005</b> | <b>8.0000e-004</b> | <b>1.0000e-005</b> | <b>8.1000e-004</b> | <b>2.1000e-004</b> | <b>1.0000e-005</b> | <b>2.2000e-004</b> |          |           |           |     |     | <b>0.7549</b> |

**3.4 Building Construction - 2017****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.3960        | 2.7289        | 1.9328        | 2.9600e-003        |               | 0.1742        | 0.1742        |                | 0.1667        | 0.1667        |          |           |           |     |     | 253.7777        |
| <b>Total</b> | <b>0.3960</b> | <b>2.7289</b> | <b>1.9328</b> | <b>2.9600e-003</b> |               | <b>0.1742</b> | <b>0.1742</b> |                | <b>0.1667</b> | <b>0.1667</b> |          |           |           |     |     | <b>253.7777</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**3.4 Building Construction - 2017****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000         |
| Vendor       | 0.0114        | 0.2879        | 0.0566        | 5.5000e-004        | 0.0126        | 2.7400e-003        | 0.0153        | 3.6300e-003    | 2.6200e-003        | 6.2500e-003   |          |           |           |     |     | 52.3984        |
| Worker       | 0.0216        | 0.0151        | 0.1493        | 3.1000e-004        | 0.0294        | 2.1000e-004        | 0.0296        | 7.8100e-003    | 1.9000e-004        | 8.0000e-003   |          |           |           |     |     | 27.7325        |
| <b>Total</b> | <b>0.0330</b> | <b>0.3030</b> | <b>0.2059</b> | <b>8.6000e-004</b> | <b>0.0419</b> | <b>2.9500e-003</b> | <b>0.0449</b> | <b>0.0114</b>  | <b>2.8100e-003</b> | <b>0.0143</b> |          |           |           |     |     | <b>80.1310</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0846        | 1.6142        | 1.8259        | 2.9600e-003        |               | 0.0969        | 0.0969        |                | 0.0969        | 0.0969        |          |           |           |     |     | 253.7774        |
| <b>Total</b> | <b>0.0846</b> | <b>1.6142</b> | <b>1.8259</b> | <b>2.9600e-003</b> |               | <b>0.0969</b> | <b>0.0969</b> |                | <b>0.0969</b> | <b>0.0969</b> |          |           |           |     |     | <b>253.7774</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**3.4 Building Construction - 2017****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000         |
| Vendor       | 0.0114        | 0.2879        | 0.0566        | 5.5000e-004        | 0.0126        | 2.7400e-003        | 0.0153        | 3.6300e-003    | 2.6200e-003        | 6.2500e-003   |          |           |           |     |     | 52.3984        |
| Worker       | 0.0216        | 0.0151        | 0.1493        | 3.1000e-004        | 0.0294        | 2.1000e-004        | 0.0296        | 7.8100e-003    | 1.9000e-004        | 8.0000e-003   |          |           |           |     |     | 27.7325        |
| <b>Total</b> | <b>0.0330</b> | <b>0.3030</b> | <b>0.2059</b> | <b>8.6000e-004</b> | <b>0.0419</b> | <b>2.9500e-003</b> | <b>0.0449</b> | <b>0.0114</b>  | <b>2.8100e-003</b> | <b>0.0143</b> |          |           |           |     |     | <b>80.1310</b> |

**3.4 Building Construction - 2018****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.2956        | 2.1018        | 1.5954        | 2.5400e-003        |               | 0.1276        | 0.1276        |                | 0.1223        | 0.1223        |          |           |           |     |     | 215.6794        |
| <b>Total</b> | <b>0.2956</b> | <b>2.1018</b> | <b>1.5954</b> | <b>2.5400e-003</b> |               | <b>0.1276</b> | <b>0.1276</b> |                | <b>0.1223</b> | <b>0.1223</b> |          |           |           |     |     | <b>215.6794</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**3.4 Building Construction - 2018****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                    |                    |               | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000         |
| Vendor       | 8.4000e-003   | 0.2320        | 0.0420        | 4.7000e-004        | 0.0108        | 1.8800e-003        | 0.0127        | 3.1100e-003        | 1.8000e-003        | 4.9100e-003   |          |           |           |     |     | 44.7032        |
| Worker       | 0.0165        | 0.0112        | 0.1112        | 2.6000e-004        | 0.0252        | 1.7000e-004        | 0.0253        | 6.6900e-003        | 1.6000e-004        | 6.8400e-003   |          |           |           |     |     | 23.1738        |
| <b>Total</b> | <b>0.0249</b> | <b>0.2432</b> | <b>0.1532</b> | <b>7.3000e-004</b> | <b>0.0359</b> | <b>2.0500e-003</b> | <b>0.0380</b> | <b>9.8000e-003</b> | <b>1.9600e-003</b> | <b>0.0118</b> |          |           |           |     |     | <b>67.8769</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0725        | 1.3827        | 1.5639        | 2.5400e-003        |               | 0.0830        | 0.0830        |                | 0.0830        | 0.0830        |          |           |           |     |     | 215.6791        |
| <b>Total</b> | <b>0.0725</b> | <b>1.3827</b> | <b>1.5639</b> | <b>2.5400e-003</b> |               | <b>0.0830</b> | <b>0.0830</b> |                | <b>0.0830</b> | <b>0.0830</b> |          |           |           |     |     | <b>215.6791</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**3.4 Building Construction - 2018****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                    |                    |               | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000         |
| Vendor       | 8.4000e-003   | 0.2320        | 0.0420        | 4.7000e-004        | 0.0108        | 1.8800e-003        | 0.0127        | 3.1100e-003        | 1.8000e-003        | 4.9100e-003   |          |           |           |     |     | 44.7032        |
| Worker       | 0.0165        | 0.0112        | 0.1112        | 2.6000e-004        | 0.0252        | 1.7000e-004        | 0.0253        | 6.6900e-003        | 1.6000e-004        | 6.8400e-003   |          |           |           |     |     | 23.1738        |
| <b>Total</b> | <b>0.0249</b> | <b>0.2432</b> | <b>0.1532</b> | <b>7.3000e-004</b> | <b>0.0359</b> | <b>2.0500e-003</b> | <b>0.0380</b> | <b>9.8000e-003</b> | <b>1.9600e-003</b> | <b>0.0118</b> |          |           |           |     |     | <b>67.8769</b> |

**3.5 Architectural Coating - 2018****Unmitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 0.6709        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 5.9700e-003   | 0.0401        | 0.0371        | 6.0000e-005        |               | 3.0100e-003        | 3.0100e-003        |                | 3.0100e-003        | 3.0100e-003        |          |           |           |     |     | 5.1187        |
| <b>Total</b>    | <b>0.6769</b> | <b>0.0401</b> | <b>0.0371</b> | <b>6.0000e-005</b> |               | <b>3.0100e-003</b> | <b>3.0100e-003</b> |                | <b>3.0100e-003</b> | <b>3.0100e-003</b> |          |           |           |     |     | <b>5.1187</b> |



## CCMC- Cancer Center Construction - Fresno County, Annual

**3.5 Architectural Coating - 2018****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 6.3000e-004        | 4.3000e-004        | 4.2400e-003        | 1.0000e-005        | 9.6000e-004        | 1.0000e-005        | 9.7000e-004        | 2.5000e-004        | 1.0000e-005        | 2.6000e-004        |          |           |           |     |     | 0.8838        |
| <b>Total</b> | <b>6.3000e-004</b> | <b>4.3000e-004</b> | <b>4.2400e-003</b> | <b>1.0000e-005</b> | <b>9.6000e-004</b> | <b>1.0000e-005</b> | <b>9.7000e-004</b> | <b>2.5000e-004</b> | <b>1.0000e-005</b> | <b>2.6000e-004</b> |          |           |           |     |     | <b>0.8838</b> |

**Mitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 0.6709        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 1.1900e-003   | 0.0271        | 0.0367        | 6.0000e-005        |               | 1.9000e-003        | 1.9000e-003        |                | 1.9000e-003        | 1.9000e-003        |          |           |           |     |     | 5.1186        |
| <b>Total</b>    | <b>0.6721</b> | <b>0.0271</b> | <b>0.0367</b> | <b>6.0000e-005</b> |               | <b>1.9000e-003</b> | <b>1.9000e-003</b> |                | <b>1.9000e-003</b> | <b>1.9000e-003</b> |          |           |           |     |     | <b>5.1186</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**3.5 Architectural Coating - 2018****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 6.3000e-004        | 4.3000e-004        | 4.2400e-003        | 1.0000e-005        | 9.6000e-004        | 1.0000e-005        | 9.7000e-004        | 2.5000e-004        | 1.0000e-005        | 2.6000e-004        |          |           |           |     |     | 0.8838        |
| <b>Total</b> | <b>6.3000e-004</b> | <b>4.3000e-004</b> | <b>4.2400e-003</b> | <b>1.0000e-005</b> | <b>9.6000e-004</b> | <b>1.0000e-005</b> | <b>9.7000e-004</b> | <b>2.5000e-004</b> | <b>1.0000e-005</b> | <b>2.6000e-004</b> |          |           |           |     |     | <b>0.8838</b> |

**4.0 Operational Detail - Mobile****4.1 Mitigation Measures Mobile**

## CCMC- Cancer Center Construction - Fresno County, Annual

|             | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category    | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Mitigated   | 0.5144  | 5.7899 | 4.8412 | 0.0209 | 1.1337        | 0.0298       | 1.1636     | 0.3057         | 0.0283        | 0.3340      |          |           |           |     |     | 1,944.7285 |
| Unmitigated | 0.5144  | 5.7899 | 4.8412 | 0.0209 | 1.1337        | 0.0298       | 1.1636     | 0.3057         | 0.0283        | 0.3340      |          |           |           |     |     | 1,944.7285 |

## 4.2 Trip Summary Information

| Land Use | Average Daily Trip Rate |          |        | Unmitigated | Mitigated  |
|----------|-------------------------|----------|--------|-------------|------------|
|          | Weekday                 | Saturday | Sunday | Annual VMT  | Annual VMT |
| Hospital | 1,275.73                | 982.37   | 859.82 | 2,957,664   | 2,957,664  |
| Total    | 1,275.73                | 982.37   | 859.82 | 2,957,664   | 2,957,664  |

## 4.3 Trip Type Information

| Land Use | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|----------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|          | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Hospital | 9.50       | 7.30       | 7.30        | 64.90      | 16.10      | 19.00       | 73             | 25       | 2       |

## 4.4 Fleet Mix

| Land Use | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hospital | 0.475203 | 0.033904 | 0.168176 | 0.133649 | 0.019863 | 0.005290 | 0.031901 | 0.120662 | 0.002374 | 0.001757 | 0.005377 | 0.001134 | 0.000710 |

## 5.0 Energy Detail

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Historical Energy Use: N

## CCMC- Cancer Center Construction - Fresno County, Annual

**5.1 Mitigation Measures Energy**

|                         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|-------------------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Category                | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| Electricity Mitigated   |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 382.1609 |
| Electricity Unmitigated |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 382.1609 |
| NaturalGas Mitigated    | 0.0222  | 0.2015 | 0.1692 | 1.2100e-003 |               | 0.0153       | 0.0153     |                | 0.0153        | 0.0153      |          |           |           |     |     | 220.6251 |
| NaturalGas Unmitigated  | 0.0222  | 0.2015 | 0.1692 | 1.2100e-003 |               | 0.0153       | 0.0153     |                | 0.0153        | 0.0153      |          |           |           |     |     | 220.6251 |

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|              | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use     | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Hospital     | 4.10994e+006   | 0.0222        | 0.2015        | 0.1692        | 1.2100e-003        |               | 0.0153        | 0.0153        |                | 0.0153        | 0.0153        |          |           |           |     |     | 220.6251        |
| <b>Total</b> |                | <b>0.0222</b> | <b>0.2015</b> | <b>0.1692</b> | <b>1.2100e-003</b> |               | <b>0.0153</b> | <b>0.0153</b> |                | <b>0.0153</b> | <b>0.0153</b> |          |           |           |     |     | <b>220.6251</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Mitigated**

|              | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use     | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Hospital     | 4.10994e+006   | 0.0222        | 0.2015        | 0.1692        | 1.2100e-003        |               | 0.0153        | 0.0153        |                | 0.0153        | 0.0153        |          |           |           |     |     | 220.6251        |
| <b>Total</b> |                | <b>0.0222</b> | <b>0.2015</b> | <b>0.1692</b> | <b>1.2100e-003</b> |               | <b>0.0153</b> | <b>0.0153</b> |                | <b>0.0153</b> | <b>0.0153</b> |          |           |           |     |     | <b>220.6251</b> |

**5.3 Energy by Land Use - Electricity****Unmitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------|-----------------|-----------|-----|-----|-----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                 |
| Hospital     | 1.30854e+006    |           |     |     | 382.1609        |
| <b>Total</b> |                 |           |     |     | <b>382.1609</b> |

## CCMC- Cancer Center Construction - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Mitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------|-----------------|-----------|-----|-----|-----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                 |
| Hospital     | 1.30854e+006    |           |     |     | 382.1609        |
| <b>Total</b> |                 |           |     |     | <b>382.1609</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

|             | ROG     | NOx         | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|---------|-------------|-------------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr |             |             |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 0.4441  | 1.0000e-005 | 9.0000e-004 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1.8400e-003 |
| Unmitigated | 0.4441  | 1.0000e-005 | 9.0000e-004 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1.8400e-003 |

## CCMC- Cancer Center Construction - Fresno County, Annual

**6.2 Area by SubCategory****Unmitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |                    |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.0671        |                    |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.3769        |                    |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 8.0000e-005   | 1.0000e-005        | 9.0000e-004        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.8400e-003        |
| <b>Total</b>          | <b>0.4441</b> | <b>1.0000e-005</b> | <b>9.0000e-004</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>1.8400e-003</b> |

**Mitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |                    |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.0671        |                    |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.3769        |                    |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 8.0000e-005   | 1.0000e-005        | 9.0000e-004        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.8400e-003        |
| <b>Total</b>          | <b>0.4441</b> | <b>1.0000e-005</b> | <b>9.0000e-004</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>1.8400e-003</b> |

**7.0 Water Detail**

## CCMC- Cancer Center Construction - Fresno County, Annual

**7.1 Mitigation Measures Water**

|             | Total CO2 | CH4 | N2O | CO2e    |
|-------------|-----------|-----|-----|---------|
| Category    | MT/yr     |     |     |         |
| Mitigated   |           |     |     | 37.9753 |
| Unmitigated |           |     |     | 37.9753 |

**7.2 Water by Land Use****Unmitigated**

|              | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|-----------|-----|-----|----------------|
| Land Use     | Mgal               | MT/yr     |     |     |                |
| Hospital     | 12.1089 / 2.30645  |           |     |     | 37.9753        |
| <b>Total</b> |                    |           |     |     | <b>37.9753</b> |



## CCMC- Cancer Center Construction - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|              | Indoor/Outdoor Use   | Total CO2 | CH4 | N2O | CO2e           |
|--------------|----------------------|-----------|-----|-----|----------------|
| Land Use     | Mgal                 | MT/yr     |     |     |                |
| Hospital     | 12.1089 /<br>2.30645 |           |     |     | 37.9753        |
| <b>Total</b> |                      |           |     |     | <b>37.9753</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste****Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
|             | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 524.1240 |
| Unmitigated |           |     |     | 524.1240 |

## CCMC- Cancer Center Construction - Fresno County, Annual

**8.2 Waste by Land Use****Unmitigated**

|              | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|-----------|-----|-----|-----------------|
| Land Use     | tons           | MT/yr     |     |     |                 |
| Hospital     | 1042.2         |           |     |     | 524.1240        |
| <b>Total</b> |                |           |     |     | <b>524.1240</b> |

**Mitigated**

|              | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|-----------|-----|-----|-----------------|
| Land Use     | tons           | MT/yr     |     |     |                 |
| Hospital     | 1042.2         |           |     |     | 524.1240        |
| <b>Total</b> |                |           |     |     | <b>524.1240</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

## CCMC- Cancer Center Construction - Fresno County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

**11.0 Vegetation**

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## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

## CCMC- Hotel & Shopping Center Construction

### Fresno County, Annual

## 1.0 Project Characteristics

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### 1.1 Land Usage

| Land Uses  | Size   | Metric   | Lot Acreage | Floor Surface Area | Population |
|------------|--------|----------|-------------|--------------------|------------|
| Hotel      | 150.00 | Room     | 5.00        | 217,800.00         | 0          |
| Strip Mall | 150.00 | 1000sqft | 3.44        | 150,000.00         | 0          |

### 1.2 Other Project Characteristics

|                                |                                |                                |       |                                  |       |
|--------------------------------|--------------------------------|--------------------------------|-------|----------------------------------|-------|
| <b>Urbanization</b>            | Urban                          | <b>Wind Speed (m/s)</b>        | 2.2   | <b>Precipitation Freq (Days)</b> | 45    |
| <b>Climate Zone</b>            | 3                              |                                |       | <b>Operational Year</b>          | 2020  |
| <b>Utility Company</b>         | Pacific Gas & Electric Company |                                |       |                                  |       |
| <b>CO2 Intensity (lb/MWhr)</b> | 641.35                         | <b>CH4 Intensity (lb/MWhr)</b> | 0.029 | <b>N2O Intensity (lb/MWhr)</b>   | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Const. Only

Land Use - 150 room hotel; 150,000sf shopping center

Construction Phase - Site Prep: 10 days; Grading: 20 days; Const: 330 days; Coating: 40 days.

Off-road Equipment - Equipment based on model defaults.

Trips and VMT - Const trips based on model defaults.

Vehicle Trips - Operational emissions not included.

Construction Off-road Equipment Mitigation - T3 offroad equipment & dust control

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

| Table Name                | Column Name                  | Default Value | New Value |
|---------------------------|------------------------------|---------------|-----------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15        |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 3.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 4.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 10.00     |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstructionPhase      | NumDays                      | 20.00         | 40.00     |
| tblConstructionPhase      | NumDays                      | 230.00        | 330.00    |
| tblConstructionPhase      | PhaseEndDate                 | 6/14/2019     | 7/12/2019 |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2020      |

## 2.0 Emissions Summary

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## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**2.1 Overall Construction****Unmitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2018    | 0.4812  | 4.2974 | 3.0637 | 6.9200e-003 | 0.3321        | 0.2106       | 0.5426     | 0.1312         | 0.1975        | 0.3287      |          |           |           |     |     | 631.9035 |
| 2019    | 2.7282  | 1.5048 | 1.1867 | 2.8300e-003 | 0.0792        | 0.0697       | 0.1489     | 0.0215         | 0.0658        | 0.0873      |          |           |           |     |     | 256.4243 |
| Maximum | 2.7282  | 4.2974 | 3.0637 | 6.9200e-003 | 0.3321        | 0.2106       | 0.5426     | 0.1312         | 0.1975        | 0.3287      |          |           |           |     |     | 631.9035 |

**Mitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2018    | 0.2109  | 2.9350 | 3.1241 | 6.9200e-003 | 0.2370        | 0.1256       | 0.3626     | 0.0804         | 0.1252        | 0.2056      |          |           |           |     |     | 631.9031 |
| 2019    | 2.6405  | 1.1560 | 1.2217 | 2.8300e-003 | 0.0792        | 0.0499       | 0.1291     | 0.0215         | 0.0498        | 0.0713      |          |           |           |     |     | 256.4242 |
| Maximum | 2.6405  | 2.9350 | 3.1241 | 6.9200e-003 | 0.2370        | 0.1256       | 0.3626     | 0.0804         | 0.1252        | 0.2056      |          |           |           |     |     | 631.9031 |

|                   | ROG   | NOx   | CO    | SO2  | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4  | N2O  | CO2e |
|-------------------|-------|-------|-------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|------|------|------|
| Percent Reduction | 11.15 | 29.49 | -2.24 | 0.00 | 23.12         | 37.38        | 28.90      | 33.28          | 33.54         | 33.45       | 0.00     | 0.00      | 0.00      | 0.00 | 0.00 | 0.00 |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

| Quarter | Start Date | End Date   | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|------------|--|--|
| 1       | 1-1-2018   | 3-31-2018  | 1.2103                                       | 0.6916                                     |
| 2       | 4-1-2018   | 6-30-2018  | 1.1731                                       | 0.8101                                     |
| 3       | 7-1-2018   | 9-30-2018  | 1.1860                                       | 0.8190                                     |
| 4       | 10-1-2018  | 12-31-2018 | 1.1915                                       | 0.8245                                     |
| 5       | 1-1-2019   | 3-31-2019  | 1.0604                                       | 0.7859                                     |
| 6       | 4-1-2019   | 6-30-2019  | 2.5972                                       | 2.4431                                     |
| 7       | 7-1-2019   | 9-30-2019  | 0.5580                                       | 0.5550                                     |
|         |            | Highest    | 2.5972                                       | 2.4431                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx            | CO             | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|----------------|----------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |                |                |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 1.6924        | 3.0000e-005    | 2.7700e-003    | 0.0000        |               | 1.0000e-005   | 1.0000e-005   |                | 1.0000e-005   | 1.0000e-005   |          |           |           |     |     | 5.7200e-003       |
| Energy       | 0.0383        | 0.3484         | 0.2927         | 2.0900e-003   |               | 0.0265        | 0.0265        |                | 0.0265        | 0.0265        |          |           |           |     |     | 1,267.6928        |
| Mobile       | 2.4836        | 28.4160        | 19.9277        | 0.0888        | 4.4521        | 0.1006        | 4.5528        | 1.2004         | 0.0954        | 1.2958        |          |           |           |     |     | 8,306.2064        |
| Waste        |               |                |                |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 120.5103          |
| Water        |               |                |                |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 51.2675           |
| <b>Total</b> | <b>4.2143</b> | <b>28.7644</b> | <b>20.2231</b> | <b>0.0909</b> | <b>4.4521</b> | <b>0.1271</b> | <b>4.5793</b> | <b>1.2004</b>  | <b>0.1219</b> | <b>1.3223</b> |          |           |           |     |     | <b>9,745.6826</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx            | CO             | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|----------------|----------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |                |                |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 1.6924        | 3.0000e-005    | 2.7700e-003    | 0.0000        |               | 1.0000e-005   | 1.0000e-005   |                | 1.0000e-005   | 1.0000e-005   |          |           |           |     |     | 5.7200e-003       |
| Energy       | 0.0383        | 0.3484         | 0.2927         | 2.0900e-003   |               | 0.0265        | 0.0265        |                | 0.0265        | 0.0265        |          |           |           |     |     | 1,267.6928        |
| Mobile       | 2.4836        | 28.4160        | 19.9277        | 0.0888        | 4.4521        | 0.1006        | 4.5528        | 1.2004         | 0.0954        | 1.2958        |          |           |           |     |     | 8,306.2064        |
| Waste        |               |                |                |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 120.5103          |
| Water        |               |                |                |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 51.2675           |
| <b>Total</b> | <b>4.2143</b> | <b>28.7644</b> | <b>20.2231</b> | <b>0.0909</b> | <b>4.4521</b> | <b>0.1271</b> | <b>4.5793</b> | <b>1.2004</b>  | <b>0.1219</b> | <b>1.3223</b> |          |           |           |     |     | <b>9,745.6826</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

**3.0 Construction Detail****Construction Phase**



## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

| Phase Number | Phase Name            | Phase Type            | Start Date | End Date  | Num Days Week | Num Days | Phase Description |
|--------------|-----------------------|-----------------------|------------|-----------|---------------|----------|-------------------|
| 1            | Site Preparation      | Site Preparation      | 1/1/2018   | 1/12/2018 | 5             | 10       |                   |
| 2            | Grading               | Grading               | 1/13/2018  | 2/9/2018  | 5             | 20       |                   |
| 3            | Building Construction | Building Construction | 2/10/2018  | 5/17/2019 | 5             | 330      |                   |
| 4            | Architectural Coating | Architectural Coating | 5/18/2019  | 7/12/2019 | 5             | 40       |                   |

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 551,700; Non-Residential Outdoor: 183,900; Striped Parking Area: 0  
(Architectural Coating – sqft)

#### OffRoad Equipment

| Phase Name            | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|-----------------------|---------------------------|--------|-------------|-------------|-------------|
| Site Preparation      | Rubber Tired Dozers       | 3      | 8.00        | 247         | 0.40        |
| Site Preparation      | Tractors/Loaders/Backhoes | 4      | 8.00        | 97          | 0.37        |
| Grading               | Excavators                | 1      | 8.00        | 158         | 0.38        |
| Grading               | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Grading               | Rubber Tired Dozers       | 1      | 8.00        | 247         | 0.40        |
| Grading               | Tractors/Loaders/Backhoes | 3      | 8.00        | 97          | 0.37        |
| Building Construction | Cranes                    | 1      | 7.00        | 231         | 0.29        |
| Building Construction | Forklifts                 | 3      | 8.00        | 89          | 0.20        |
| Building Construction | Generator Sets            | 1      | 8.00        | 84          | 0.74        |
| Building Construction | Tractors/Loaders/Backhoes | 3      | 7.00        | 97          | 0.37        |
| Building Construction | Welders                   | 1      | 8.00        | 46          | 0.45        |
| Architectural Coating | Air Compressors           | 1      | 6.00        | 78          | 0.48        |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**Trips and VMT**

| Phase Name            | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|-----------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation      | 7                       | 18.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Grading               | 6                       | 15.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Building Construction | 9                       | 139.00             | 60.00              | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Architectural Coating | 1                       | 28.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

**3.2 Site Preparation - 2018****Unmitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |               |               |               |                    | 0.0903        | 0.0000        | 0.0903        | 0.0497         | 0.0000        | 0.0497        |          |           |           |     |     | 0.0000         |
| Off-Road      | 0.0228        | 0.2410        | 0.1124        | 1.9000e-004        |               | 0.0129        | 0.0129        |                | 0.0119        | 0.0119        |          |           |           |     |     | 17.5152        |
| <b>Total</b>  | <b>0.0228</b> | <b>0.2410</b> | <b>0.1124</b> | <b>1.9000e-004</b> | <b>0.0903</b> | <b>0.0129</b> | <b>0.1032</b> | <b>0.0497</b>  | <b>0.0119</b> | <b>0.0615</b> |          |           |           |     |     | <b>17.5152</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.2 Site Preparation - 2018****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.7000e-004        | 3.2000e-004        | 3.1800e-003        | 1.0000e-005        | 7.2000e-004        | 0.0000        | 7.2000e-004        | 1.9000e-004        | 0.0000        | 2.0000e-004        |          |           |           |     |     | 0.6628        |
| <b>Total</b> | <b>4.7000e-004</b> | <b>3.2000e-004</b> | <b>3.1800e-003</b> | <b>1.0000e-005</b> | <b>7.2000e-004</b> | <b>0.0000</b> | <b>7.2000e-004</b> | <b>1.9000e-004</b> | <b>0.0000</b> | <b>2.0000e-004</b> |          |           |           |     |     | <b>0.6628</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 0.0352        | 0.0000             | 0.0352        | 0.0194         | 0.0000             | 0.0194        |          |           |           |     |     | 0.0000         |
| Off-Road      | 4.6600e-003        | 0.0953        | 0.1148        | 1.9000e-004        |               | 4.7300e-003        | 4.7300e-003   |                | 4.7300e-003        | 4.7300e-003   |          |           |           |     |     | 17.5152        |
| <b>Total</b>  | <b>4.6600e-003</b> | <b>0.0953</b> | <b>0.1148</b> | <b>1.9000e-004</b> | <b>0.0352</b> | <b>4.7300e-003</b> | <b>0.0400</b> | <b>0.0194</b>  | <b>4.7300e-003</b> | <b>0.0241</b> |          |           |           |     |     | <b>17.5152</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.2 Site Preparation - 2018****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.7000e-004        | 3.2000e-004        | 3.1800e-003        | 1.0000e-005        | 7.2000e-004        | 0.0000        | 7.2000e-004        | 1.9000e-004        | 0.0000        | 2.0000e-004        |          |           |           |     |     | 0.6628        |
| <b>Total</b> | <b>4.7000e-004</b> | <b>3.2000e-004</b> | <b>3.1800e-003</b> | <b>1.0000e-005</b> | <b>7.2000e-004</b> | <b>0.0000</b> | <b>7.2000e-004</b> | <b>1.9000e-004</b> | <b>0.0000</b> | <b>2.0000e-004</b> |          |           |           |     |     | <b>0.6628</b> |

**3.3 Grading - 2018****Unmitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |               |               |               |                    | 0.0655        | 0.0000        | 0.0655        | 0.0337         | 0.0000        | 0.0337        |          |           |           |     |     | 0.0000         |
| Off-Road      | 0.0277        | 0.3067        | 0.1658        | 3.0000e-004        |               | 0.0155        | 0.0155        |                | 0.0143        | 0.0143        |          |           |           |     |     | 27.3178        |
| <b>Total</b>  | <b>0.0277</b> | <b>0.3067</b> | <b>0.1658</b> | <b>3.0000e-004</b> | <b>0.0655</b> | <b>0.0155</b> | <b>0.0810</b> | <b>0.0337</b>  | <b>0.0143</b> | <b>0.0479</b> |          |           |           |     |     | <b>27.3178</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.3 Grading - 2018****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 7.9000e-004        | 5.3000e-004        | 5.3000e-003        | 1.0000e-005        | 1.2000e-003        | 1.0000e-005        | 1.2100e-003        | 3.2000e-004        | 1.0000e-005        | 3.3000e-004        |          |           |           |     |     | 1.1047        |
| <b>Total</b> | <b>7.9000e-004</b> | <b>5.3000e-004</b> | <b>5.3000e-003</b> | <b>1.0000e-005</b> | <b>1.2000e-003</b> | <b>1.0000e-005</b> | <b>1.2100e-003</b> | <b>3.2000e-004</b> | <b>1.0000e-005</b> | <b>3.3000e-004</b> |          |           |           |     |     | <b>1.1047</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 0.0256        | 0.0000             | 0.0256        | 0.0131         | 0.0000             | 0.0131        |          |           |           |     |     | 0.0000         |
| Off-Road      | 7.2600e-003        | 0.1484        | 0.1899        | 3.0000e-004        |               | 7.5600e-003        | 7.5600e-003   |                | 7.5600e-003        | 7.5600e-003   |          |           |           |     |     | 27.3178        |
| <b>Total</b>  | <b>7.2600e-003</b> | <b>0.1484</b> | <b>0.1899</b> | <b>3.0000e-004</b> | <b>0.0256</b> | <b>7.5600e-003</b> | <b>0.0331</b> | <b>0.0131</b>  | <b>7.5600e-003</b> | <b>0.0207</b> |          |           |           |     |     | <b>27.3178</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.3 Grading - 2018****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 7.9000e-004        | 5.3000e-004        | 5.3000e-003        | 1.0000e-005        | 1.2000e-003        | 1.0000e-005        | 1.2100e-003        | 3.2000e-004        | 1.0000e-005        | 3.3000e-004        |          |           |           |     |     | 1.1047        |
| <b>Total</b> | <b>7.9000e-004</b> | <b>5.3000e-004</b> | <b>5.3000e-003</b> | <b>1.0000e-005</b> | <b>1.2000e-003</b> | <b>1.0000e-005</b> | <b>1.2100e-003</b> | <b>3.2000e-004</b> | <b>1.0000e-005</b> | <b>3.3000e-004</b> |          |           |           |     |     | <b>1.1047</b> |

**3.4 Building Construction - 2018****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.3095        | 2.7016        | 2.0305        | 3.1100e-003        |               | 0.1732        | 0.1732        |                | 0.1629        | 0.1629        |          |           |           |     |     | 276.3032        |
| <b>Total</b> | <b>0.3095</b> | <b>2.7016</b> | <b>2.0305</b> | <b>3.1100e-003</b> |               | <b>0.1732</b> | <b>0.1732</b> |                | <b>0.1629</b> | <b>0.1629</b> |          |           |           |     |     | <b>276.3032</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.4 Building Construction - 2018****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0359        | 0.9901        | 0.1791        | 2.0000e-003        | 0.0459        | 8.0400e-003        | 0.0540        | 0.0133         | 7.6900e-003        | 0.0210        |          |           |           |     |     | 190.7592        |
| Worker       | 0.0841        | 0.0572        | 0.5674        | 1.3100e-003        | 0.1284        | 8.8000e-004        | 0.1292        | 0.0341         | 8.1000e-004        | 0.0349        |          |           |           |     |     | 118.2405        |
| <b>Total</b> | <b>0.1199</b> | <b>1.0473</b> | <b>0.7465</b> | <b>3.3100e-003</b> | <b>0.1743</b> | <b>8.9200e-003</b> | <b>0.1832</b> | <b>0.0474</b>  | <b>8.5000e-003</b> | <b>0.0559</b> |          |           |           |     |     | <b>308.9996</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0778        | 1.6431        | 2.0644        | 3.1100e-003        |               | 0.1044        | 0.1044        |                | 0.1044        | 0.1044        |          |           |           |     |     | 276.3029        |
| <b>Total</b> | <b>0.0778</b> | <b>1.6431</b> | <b>2.0644</b> | <b>3.1100e-003</b> |               | <b>0.1044</b> | <b>0.1044</b> |                | <b>0.1044</b> | <b>0.1044</b> |          |           |           |     |     | <b>276.3029</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.4 Building Construction - 2018****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0359        | 0.9901        | 0.1791        | 2.0000e-003        | 0.0459        | 8.0400e-003        | 0.0540        | 0.0133         | 7.6900e-003        | 0.0210        |          |           |           |     |     | 190.7592        |
| Worker       | 0.0841        | 0.0572        | 0.5674        | 1.3100e-003        | 0.1284        | 8.8000e-004        | 0.1292        | 0.0341         | 8.1000e-004        | 0.0349        |          |           |           |     |     | 118.2405        |
| <b>Total</b> | <b>0.1199</b> | <b>1.0473</b> | <b>0.7465</b> | <b>3.3100e-003</b> | <b>0.1743</b> | <b>8.9200e-003</b> | <b>0.1832</b> | <b>0.0474</b>  | <b>8.5000e-003</b> | <b>0.0559</b> |          |           |           |     |     | <b>308.9996</b> |

**3.4 Building Construction - 2019****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.1169        | 1.0434        | 0.8496        | 1.3300e-003        |               | 0.0639        | 0.0639        |                | 0.0600        | 0.0600        |          |           |           |     |     | 117.0853        |
| <b>Total</b> | <b>0.1169</b> | <b>1.0434</b> | <b>0.8496</b> | <b>1.3300e-003</b> |               | <b>0.0639</b> | <b>0.0639</b> |                | <b>0.0600</b> | <b>0.0600</b> |          |           |           |     |     | <b>117.0853</b> |



## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.4 Building Construction - 2019****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0137        | 0.4015        | 0.0685        | 8.5000e-004        | 0.0197        | 2.9100e-003        | 0.0226        | 5.6900e-003    | 2.7900e-003        | 8.4700e-003   |          |           |           |     |     | 81.0472         |
| Worker       | 0.0325        | 0.0214        | 0.2144        | 5.4000e-004        | 0.0550        | 3.6000e-004        | 0.0554        | 0.0146         | 3.4000e-004        | 0.0150        |          |           |           |     |     | 49.1724         |
| <b>Total</b> | <b>0.0462</b> | <b>0.4229</b> | <b>0.2828</b> | <b>1.3900e-003</b> | <b>0.0747</b> | <b>3.2700e-003</b> | <b>0.0780</b> | <b>0.0203</b>  | <b>3.1300e-003</b> | <b>0.0234</b> |          |           |           |     |     | <b>130.2196</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0334        | 0.7042        | 0.8848        | 1.3300e-003        |               | 0.0447        | 0.0447        |                | 0.0447        | 0.0447        |          |           |           |     |     | 117.0852        |
| <b>Total</b> | <b>0.0334</b> | <b>0.7042</b> | <b>0.8848</b> | <b>1.3300e-003</b> |               | <b>0.0447</b> | <b>0.0447</b> |                | <b>0.0447</b> | <b>0.0447</b> |          |           |           |     |     | <b>117.0852</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.4 Building Construction - 2019****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                 |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000          |
| Vendor       | 0.0137        | 0.4015        | 0.0685        | 8.5000e-004        | 0.0197        | 2.9100e-003        | 0.0226        | 5.6900e-003    | 2.7900e-003        | 8.4700e-003   |          |           |           |     |     | 81.0472         |
| Worker       | 0.0325        | 0.0214        | 0.2144        | 5.4000e-004        | 0.0550        | 3.6000e-004        | 0.0554        | 0.0146         | 3.4000e-004        | 0.0150        |          |           |           |     |     | 49.1724         |
| <b>Total</b> | <b>0.0462</b> | <b>0.4229</b> | <b>0.2828</b> | <b>1.3900e-003</b> | <b>0.0747</b> | <b>3.2700e-003</b> | <b>0.0780</b> | <b>0.0203</b>  | <b>3.1300e-003</b> | <b>0.0234</b> |          |           |           |     |     | <b>130.2196</b> |

**3.5 Architectural Coating - 2019****Unmitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 2.5571        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 5.3300e-003   | 0.0367        | 0.0368        | 6.0000e-005        |               | 2.5800e-003        | 2.5800e-003        |                | 2.5800e-003        | 2.5800e-003        |          |           |           |     |     | 5.1173        |
| <b>Total</b>    | <b>2.5625</b> | <b>0.0367</b> | <b>0.0368</b> | <b>6.0000e-005</b> |               | <b>2.5800e-003</b> | <b>2.5800e-003</b> |                | <b>2.5800e-003</b> | <b>2.5800e-003</b> |          |           |           |     |     | <b>5.1173</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.5 Architectural Coating - 2019****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.6500e-003        | 1.7400e-003        | 0.0175        | 4.0000e-005        | 4.4800e-003        | 3.0000e-005        | 4.5100e-003        | 1.1900e-003        | 3.0000e-005        | 1.2200e-003        |          |           |           |     |     | 4.0021        |
| <b>Total</b> | <b>2.6500e-003</b> | <b>1.7400e-003</b> | <b>0.0175</b> | <b>4.0000e-005</b> | <b>4.4800e-003</b> | <b>3.0000e-005</b> | <b>4.5100e-003</b> | <b>1.1900e-003</b> | <b>3.0000e-005</b> | <b>1.2200e-003</b> |          |           |           |     |     | <b>4.0021</b> |

**Mitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 2.5571        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 1.1900e-003   | 0.0271        | 0.0367        | 6.0000e-005        |               | 1.9000e-003        | 1.9000e-003        |                | 1.9000e-003        | 1.9000e-003        |          |           |           |     |     | 5.1173        |
| <b>Total</b>    | <b>2.5583</b> | <b>0.0271</b> | <b>0.0367</b> | <b>6.0000e-005</b> |               | <b>1.9000e-003</b> | <b>1.9000e-003</b> |                | <b>1.9000e-003</b> | <b>1.9000e-003</b> |          |           |           |     |     | <b>5.1173</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**3.5 Architectural Coating - 2019****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.6500e-003        | 1.7400e-003        | 0.0175        | 4.0000e-005        | 4.4800e-003        | 3.0000e-005        | 4.5100e-003        | 1.1900e-003        | 3.0000e-005        | 1.2200e-003        |          |           |           |     |     | 4.0021        |
| <b>Total</b> | <b>2.6500e-003</b> | <b>1.7400e-003</b> | <b>0.0175</b> | <b>4.0000e-005</b> | <b>4.4800e-003</b> | <b>3.0000e-005</b> | <b>4.5100e-003</b> | <b>1.1900e-003</b> | <b>3.0000e-005</b> | <b>1.2200e-003</b> |          |           |           |     |     | <b>4.0021</b> |

**4.0 Operational Detail - Mobile****4.1 Mitigation Measures Mobile**

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

|             | ROG     | NOx     | CO      | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------|---------|---------|---------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category    | tons/yr |         |         |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Mitigated   | 2.4836  | 28.4160 | 19.9277 | 0.0888 | 4.4521        | 0.1006       | 4.5528     | 1.2004         | 0.0954        | 1.2958      |          |           |           |     |     | 8,306.2064 |
| Unmitigated | 2.4836  | 28.4160 | 19.9277 | 0.0888 | 4.4521        | 0.1006       | 4.5528     | 1.2004         | 0.0954        | 1.2958      |          |           |           |     |     | 8,306.2064 |

## 4.2 Trip Summary Information

| Land Use   | Average Daily Trip Rate |          |          | Unmitigated | Mitigated  |
|------------|-------------------------|----------|----------|-------------|------------|
|            | Weekday                 | Saturday | Sunday   | Annual VMT  | Annual VMT |
| Hotel      | 1,225.50                | 1,228.50 | 892.50   | 2,238,797   | 2,238,797  |
| Strip Mall | 6,648.00                | 6,306.00 | 3064.50  | 9,374,511   | 9,374,511  |
| Total      | 7,873.50                | 7,534.50 | 3,957.00 | 11,613,308  | 11,613,308 |

## 4.3 Trip Type Information

| Land Use   | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|            | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Hotel      | 9.50       | 7.30       | 7.30        | 19.40      | 61.60      | 19.00       | 58             | 38       | 4       |
| Strip Mall | 9.50       | 7.30       | 7.30        | 16.60      | 64.40      | 19.00       | 45             | 40       | 15      |

## 4.4 Fleet Mix

| Land Use   | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hotel      | 0.481390 | 0.032808 | 0.168621 | 0.127212 | 0.018382 | 0.004997 | 0.032622 | 0.122881 | 0.002369 | 0.001675 | 0.005261 | 0.001115 | 0.000667 |
| Strip Mall | 0.481390 | 0.032808 | 0.168621 | 0.127212 | 0.018382 | 0.004997 | 0.032622 | 0.122881 | 0.002369 | 0.001675 | 0.005261 | 0.001115 | 0.000667 |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

|                         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|-------------------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Category                | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| Electricity Mitigated   |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 886.1142 |
| Electricity Unmitigated |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 886.1142 |
| NaturalGas Mitigated    | 0.0383  | 0.3484 | 0.2927 | 2.0900e-003 |               | 0.0265       | 0.0265     |                | 0.0265        | 0.0265      |          |           |           |     |     | 381.5786 |
| NaturalGas Unmitigated  | 0.0383  | 0.3484 | 0.2927 | 2.0900e-003 |               | 0.0265       | 0.0265     |                | 0.0265        | 0.0265      |          |           |           |     |     | 381.5786 |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|              | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use     | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Hotel        | 5.49727e+006   | 0.0296        | 0.2695        | 0.2264        | 1.6200e-003        |               | 0.0205        | 0.0205        |                | 0.0205        | 0.0205        |          |           |           |     |     | 295.0986        |
| Strip Mall   | 1.611e+006     | 8.6900e-003   | 0.0790        | 0.0663        | 4.7000e-004        |               | 6.0000e-003   | 6.0000e-003   |                | 6.0000e-003   | 6.0000e-003   |          |           |           |     |     | 86.4800         |
| <b>Total</b> |                | <b>0.0383</b> | <b>0.3484</b> | <b>0.2927</b> | <b>2.0900e-003</b> |               | <b>0.0265</b> | <b>0.0265</b> |                | <b>0.0265</b> | <b>0.0265</b> |          |           |           |     |     | <b>381.5786</b> |

**Mitigated**

|              | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use     | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Hotel        | 5.49727e+006   | 0.0296        | 0.2695        | 0.2264        | 1.6200e-003        |               | 0.0205        | 0.0205        |                | 0.0205        | 0.0205        |          |           |           |     |     | 295.0986        |
| Strip Mall   | 1.611e+006     | 8.6900e-003   | 0.0790        | 0.0663        | 4.7000e-004        |               | 6.0000e-003   | 6.0000e-003   |                | 6.0000e-003   | 6.0000e-003   |          |           |           |     |     | 86.4800         |
| <b>Total</b> |                | <b>0.0383</b> | <b>0.3484</b> | <b>0.2927</b> | <b>2.0900e-003</b> |               | <b>0.0265</b> | <b>0.0265</b> |                | <b>0.0265</b> | <b>0.0265</b> |          |           |           |     |     | <b>381.5786</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------|-----------------|-----------|-----|-----|-----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                 |
| Hotel        | 1.7816e+006     |           |     |     | 520.3198        |
| Strip Mall   | 1.2525e+006     |           |     |     | 365.7943        |
| <b>Total</b> |                 |           |     |     | <b>886.1142</b> |

**Mitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------|-----------------|-----------|-----|-----|-----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                 |
| Hotel        | 1.7816e+006     |           |     |     | 520.3198        |
| Strip Mall   | 1.2525e+006     |           |     |     | 365.7943        |
| <b>Total</b> |                 |           |     |     | <b>886.1142</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**



## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

|             | ROG     | NOx         | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|---------|-------------|-------------|--------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr |             |             |        |               |              |             |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 1.6924  | 3.0000e-005 | 2.7700e-003 | 0.0000 |               | 1.0000e-005  | 1.0000e-005 |                | 1.0000e-005   | 1.0000e-005 |          |           |           |     |     | 5.7200e-003 |
| Unmitigated | 1.6924  | 3.0000e-005 | 2.7700e-003 | 0.0000 |               | 1.0000e-005  | 1.0000e-005 |                | 1.0000e-005   | 1.0000e-005 |          |           |           |     |     | 5.7200e-003 |

## 6.2 Area by SubCategory

Unmitigated

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |                    |                    |               |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.2557        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000             |
| Consumer Products     | 1.4364        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000             |
| Landscaping           | 2.6000e-004   | 3.0000e-005        | 2.7700e-003        | 0.0000        |               | 1.0000e-005        | 1.0000e-005        |                | 1.0000e-005        | 1.0000e-005        |          |           |           |     |     | 5.7200e-003        |
| <b>Total</b>          | <b>1.6924</b> | <b>3.0000e-005</b> | <b>2.7700e-003</b> | <b>0.0000</b> |               | <b>1.0000e-005</b> | <b>1.0000e-005</b> |                | <b>1.0000e-005</b> | <b>1.0000e-005</b> |          |           |           |     |     | <b>5.7200e-003</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |                    |                    |               |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.2557        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000             |
| Consumer Products     | 1.4364        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000             |
| Landscaping           | 2.6000e-004   | 3.0000e-005        | 2.7700e-003        | 0.0000        |               | 1.0000e-005        | 1.0000e-005        |                | 1.0000e-005        | 1.0000e-005        |          |           |           |     |     | 5.7200e-003        |
| <b>Total</b>          | <b>1.6924</b> | <b>3.0000e-005</b> | <b>2.7700e-003</b> | <b>0.0000</b> |               | <b>1.0000e-005</b> | <b>1.0000e-005</b> |                | <b>1.0000e-005</b> | <b>1.0000e-005</b> |          |           |           |     |     | <b>5.7200e-003</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e    |
|-------------|-----------|-----|-----|---------|
| Category    | MT/yr     |     |     |         |
| Mitigated   |           |     |     | 51.2675 |
| Unmitigated |           |     |     | 51.2675 |

**7.2 Water by Land Use****Unmitigated**

|              | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|-----------|-----|-----|----------------|
| Land Use     | Mgal               | MT/yr     |     |     |                |
| Hotel        | 3.80502 / 0.422779 |           |     |     | 11.6244        |
| Strip Mall   | 11.1109 / 6.80989  |           |     |     | 39.6430        |
| <b>Total</b> |                    |           |     |     | <b>51.2675</b> |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|              | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|-----------|-----|-----|----------------|
| Land Use     | Mgal               | MT/yr     |     |     |                |
| Hotel        | 3.80502 / 0.422779 |           |     |     | 11.6244        |
| Strip Mall   | 11.1109 / 6.80989  |           |     |     | 39.6430        |
| <b>Total</b> |                    |           |     |     | <b>51.2675</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste****Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
|             | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 120.5103 |
| Unmitigated |           |     |     | 120.5103 |

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**8.2 Waste by Land Use****Unmitigated**

|              | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|-----------|-----|-----|-----------------|
| Land Use     | tons           | MT/yr     |     |     |                 |
| Hotel        | 82.13          |           |     |     | 41.3033         |
| Strip Mall   | 157.5          |           |     |     | 79.2070         |
| <b>Total</b> |                |           |     |     | <b>120.5103</b> |

**Mitigated**

|              | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|-----------|-----|-----|-----------------|
| Land Use     | tons           | MT/yr     |     |     |                 |
| Hotel        | 82.13          |           |     |     | 41.3033         |
| Strip Mall   | 157.5          |           |     |     | 79.2070         |
| <b>Total</b> |                |           |     |     | <b>120.5103</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

## CCMC- Hotel &amp; Shopping Center Construction - Fresno County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

**11.0 Vegetation**

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## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

## CCMC- Outpatient Comm. Ctr. Expansion

### Fresno County, Annual

## 1.0 Project Characteristics

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### 1.1 Land Usage

| Land Uses | Size  | Metric   | Lot Acreage | Floor Surface Area | Population |
|-----------|-------|----------|-------------|--------------------|------------|
| Hospital  | 40.00 | 1000sqft | 0.92        | 40,000.00          | 0          |

### 1.2 Other Project Characteristics

|                                |                                |                                |       |                                  |       |
|--------------------------------|--------------------------------|--------------------------------|-------|----------------------------------|-------|
| <b>Urbanization</b>            | Urban                          | <b>Wind Speed (m/s)</b>        | 2.2   | <b>Precipitation Freq (Days)</b> | 45    |
| <b>Climate Zone</b>            | 3                              |                                |       | <b>Operational Year</b>          | 2027  |
| <b>Utility Company</b>         | Pacific Gas & Electric Company |                                |       |                                  |       |
| <b>CO2 Intensity (lb/MWhr)</b> | 641.35                         | <b>CH4 Intensity (lb/MWhr)</b> | 0.029 | <b>N2O Intensity (lb/MWhr)</b>   | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Const. Only

Land Use - Hospital: 40,000SF

Construction Phase - Site Prep: 3 days; Grading: 20 days; Const: 330 days; Coating: 40 days.

Off-road Equipment - Equipment based on model defaults.

Trips and VMT - Const trips based on model defaults.

Vehicle Trips - Operational emissions not included.

Construction Off-road Equipment Mitigation - T3 offroad equipment & dust control

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

| Table Name                | Column Name                  | Default Value | New Value |
|---------------------------|------------------------------|---------------|-----------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15        |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 5.00      |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstructionPhase      | NumDays                      | 5.00          | 40.00     |
| tblConstructionPhase      | NumDays                      | 100.00        | 330.00    |
| tblConstructionPhase      | NumDays                      | 2.00          | 20.00     |
| tblConstructionPhase      | NumDays                      | 1.00          | 3.00      |
| tblConstructionPhase      | PhaseEndDate                 | 1/14/2025     | 1/3/2025  |
| tblGrading                | AcresOfGrading               | 1.50          | 0.50      |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2027      |

## 2.0 Emissions Summary

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## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

## 2.1 Overall Construction

### Unmitigated Construction

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2025    | 0.0764  | 0.7602 | 0.9293 | 1.7700e-003 | 0.0260        | 0.0304       | 0.0564     | 9.1300e-003    | 0.0280        | 0.0371      |          |           |           |     |     | 158.3590 |
| 2026    | 0.3114  | 0.3235 | 0.3997 | 7.6000e-004 | 7.9200e-003   | 0.0130       | 0.0210     | 2.1600e-003    | 0.0121        | 0.0142      |          |           |           |     |     | 67.8365  |
| Maximum | 0.3114  | 0.7602 | 0.9293 | 1.7700e-003 | 0.0260        | 0.0304       | 0.0564     | 9.1300e-003    | 0.0280        | 0.0371      |          |           |           |     |     | 158.3590 |

### Mitigated Construction

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2025    | 0.0416  | 0.8438 | 1.0460 | 1.7700e-003 | 0.0213        | 0.0490       | 0.0703     | 6.5900e-003    | 0.0490        | 0.0556      |          |           |           |     |     | 158.3588 |
| 2026    | 0.2958  | 0.3598 | 0.4464 | 7.6000e-004 | 7.9200e-003   | 0.0210       | 0.0290     | 2.1600e-003    | 0.0210        | 0.0232      |          |           |           |     |     | 67.8364  |
| Maximum | 0.2958  | 0.8438 | 1.0460 | 1.7700e-003 | 0.0213        | 0.0490       | 0.0703     | 6.5900e-003    | 0.0490        | 0.0556      |          |           |           |     |     | 158.3588 |

|                   | ROG   | NOx    | CO     | SO2  | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4  | N2O  | CO2e |
|-------------------|-------|--------|--------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|----------|-----------|------|------|------|
| Percent Reduction | 13.01 | -11.06 | -12.30 | 0.00 | 14.00         | -61.55       | -28.38     | 22.50          | -74.87        | -53.45      | 0.00     | 0.00     | 0.00      | 0.00 | 0.00 | 0.00 |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

| Quarter | Start Date | End Date   | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|------------|--|--|
| 1       | 1-1-2025   | 3-31-2025  | 0.1774                                       | 0.1893                                     |
| 2       | 4-1-2025   | 6-30-2025  | 0.2171                                       | 0.2293                                     |
| 3       | 7-1-2025   | 9-30-2025  | 0.2195                                       | 0.2318                                     |
| 4       | 10-1-2025  | 12-31-2025 | 0.2196                                       | 0.2319                                     |
| 5       | 1-1-2026   | 3-31-2026  | 0.2145                                       | 0.2266                                     |
| 6       | 4-1-2026   | 6-30-2026  | 0.3453                                       | 0.3533                                     |
| 7       | 7-1-2026   | 9-30-2026  | 0.0762                                       | 0.0767                                     |
|         |            | Highest    | 0.3453                                       | 0.3533                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |                    |               | MT/yr    |           |           |     |     |                   |
| Area         | 0.1841        | 0.0000        | 3.7000e-004   | 0.0000             |               | 0.0000        | 0.0000        |                | 0.0000             | 0.0000        |          |           |           |     |     | 7.6000e-004       |
| Energy       | 9.1900e-003   | 0.0835        | 0.0702        | 5.0000e-004        |               | 6.3500e-003   | 6.3500e-003   |                | 6.3500e-003        | 6.3500e-003   |          |           |           |     |     | 249.8595          |
| Mobile       | 0.1131        | 1.4550        | 1.0619        | 7.3000e-003        | 0.4696        | 3.6900e-003   | 0.4733        | 0.1265         | 3.4600e-003        | 0.1300        |          |           |           |     |     | 683.5745          |
| Waste        |               |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000             | 0.0000        |          |           |           |     |     | 217.2535          |
| Water        |               |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000             | 0.0000        |          |           |           |     |     | 15.7410           |
| <b>Total</b> | <b>0.3064</b> | <b>1.5386</b> | <b>1.1324</b> | <b>7.8000e-003</b> | <b>0.4696</b> | <b>0.0100</b> | <b>0.4797</b> | <b>0.1265</b>  | <b>9.8100e-003</b> | <b>0.1363</b> |          |           |           |     |     | <b>1,166.4293</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |                    |               | MT/yr    |           |           |     |     |                   |
| Area         | 0.1841        | 0.0000        | 3.7000e-004   | 0.0000             |               | 0.0000        | 0.0000        |                | 0.0000             | 0.0000        |          |           |           |     |     | 7.6000e-004       |
| Energy       | 9.1900e-003   | 0.0835        | 0.0702        | 5.0000e-004        |               | 6.3500e-003   | 6.3500e-003   |                | 6.3500e-003        | 6.3500e-003   |          |           |           |     |     | 249.8595          |
| Mobile       | 0.1131        | 1.4550        | 1.0619        | 7.3000e-003        | 0.4696        | 3.6900e-003   | 0.4733        | 0.1265         | 3.4600e-003        | 0.1300        |          |           |           |     |     | 683.5745          |
| Waste        |               |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000             | 0.0000        |          |           |           |     |     | 217.2535          |
| Water        |               |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000             | 0.0000        |          |           |           |     |     | 15.7410           |
| <b>Total</b> | <b>0.3064</b> | <b>1.5386</b> | <b>1.1324</b> | <b>7.8000e-003</b> | <b>0.4696</b> | <b>0.0100</b> | <b>0.4797</b> | <b>0.1265</b>  | <b>9.8100e-003</b> | <b>0.1363</b> |          |           |           |     |     | <b>1,166.4293</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

**3.0 Construction Detail****Construction Phase**

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

| Phase Number | Phase Name            | Phase Type            | Start Date | End Date  | Num Days Week | Num Days | Phase Description |
|--------------|-----------------------|-----------------------|------------|-----------|---------------|----------|-------------------|
| 1            | Site Preparation      | Site Preparation      | 1/1/2025   | 1/3/2025  | 5             | 3        |                   |
| 2            | Grading               | Grading               | 1/15/2025  | 2/11/2025 | 5             | 20       |                   |
| 3            | Building Construction | Building Construction | 2/12/2025  | 5/19/2026 | 5             | 330      |                   |
| 4            | Architectural Coating | Architectural Coating | 5/20/2026  | 7/14/2026 | 5             | 40       |                   |

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 60,000; Non-Residential Outdoor: 20,000; Striped Parking Area: 0 (Architectural Coating – sqft)

#### OffRoad Equipment

| Phase Name            | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|-----------------------|---------------------------|--------|-------------|-------------|-------------|
| Grading               | Concrete/Industrial Saws  | 1      | 8.00        | 81          | 0.73        |
| Site Preparation      | Tractors/Loaders/Backhoes | 1      | 8.00        | 97          | 0.37        |
| Site Preparation      | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Grading               | Rubber Tired Dozers       | 1      | 1.00        | 247         | 0.40        |
| Grading               | Tractors/Loaders/Backhoes | 2      | 6.00        | 97          | 0.37        |
| Building Construction | Cranes                    | 1      | 4.00        | 231         | 0.29        |
| Building Construction | Forklifts                 | 2      | 6.00        | 89          | 0.20        |
| Building Construction | Tractors/Loaders/Backhoes | 2      | 8.00        | 97          | 0.37        |
| Architectural Coating | Air Compressors           | 1      | 6.00        | 78          | 0.48        |

#### Trips and VMT

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

| Phase Name            | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|-----------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation      | 2                       | 5.00               | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Grading               | 4                       | 10.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Building Construction | 5                       | 13.00              | 7.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Architectural Coating | 1                       | 3.00               | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

**3.2 Site Preparation - 2025****Unmitigated Construction On-Site**

|               | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |                    |                    |                    | 2.7000e-004        | 0.0000             | 2.7000e-004        | 3.0000e-005        | 0.0000             | 3.0000e-005        |          |           |           |     |     | 0.0000        |
| Off-Road      | 6.6000e-004        | 7.1900e-003        | 5.7400e-003        | 1.0000e-005        |                    | 2.5000e-004        | 2.5000e-004        |                    | 2.3000e-004        | 2.3000e-004        |          |           |           |     |     | 1.2926        |
| <b>Total</b>  | <b>6.6000e-004</b> | <b>7.1900e-003</b> | <b>5.7400e-003</b> | <b>1.0000e-005</b> | <b>2.7000e-004</b> | <b>2.5000e-004</b> | <b>5.2000e-004</b> | <b>3.0000e-005</b> | <b>2.3000e-004</b> | <b>2.6000e-004</b> |          |           |           |     |     | <b>1.2926</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.2 Site Preparation - 2025****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.0000e-005        | 1.0000e-005        | 1.3000e-004        | 0.0000        | 6.0000e-005        | 0.0000        | 6.0000e-005        | 2.0000e-005        | 0.0000        | 2.0000e-005        |          |           |           |     |     | 0.0429        |
| <b>Total</b> | <b>2.0000e-005</b> | <b>1.0000e-005</b> | <b>1.3000e-004</b> | <b>0.0000</b> | <b>6.0000e-005</b> | <b>0.0000</b> | <b>6.0000e-005</b> | <b>2.0000e-005</b> | <b>0.0000</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0429</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |                    |                    |                    | 1.0000e-004        | 0.0000             | 1.0000e-004        | 1.0000e-005        | 0.0000             | 1.0000e-005        |          |           |           |     |     | 0.0000        |
| Off-Road      | 3.6000e-004        | 7.3100e-003        | 8.7900e-003        | 1.0000e-005        |                    | 3.6000e-004        | 3.6000e-004        |                    | 3.6000e-004        | 3.6000e-004        |          |           |           |     |     | 1.2926        |
| <b>Total</b>  | <b>3.6000e-004</b> | <b>7.3100e-003</b> | <b>8.7900e-003</b> | <b>1.0000e-005</b> | <b>1.0000e-004</b> | <b>3.6000e-004</b> | <b>4.6000e-004</b> | <b>1.0000e-005</b> | <b>3.6000e-004</b> | <b>3.7000e-004</b> |          |           |           |     |     | <b>1.2926</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.2 Site Preparation - 2025****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.0000e-005        | 1.0000e-005        | 1.3000e-004        | 0.0000        | 6.0000e-005        | 0.0000        | 6.0000e-005        | 2.0000e-005        | 0.0000        | 2.0000e-005        |          |           |           |     |     | 0.0429        |
| <b>Total</b> | <b>2.0000e-005</b> | <b>1.0000e-005</b> | <b>1.3000e-004</b> | <b>0.0000</b> | <b>6.0000e-005</b> | <b>0.0000</b> | <b>6.0000e-005</b> | <b>2.0000e-005</b> | <b>0.0000</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0429</b> |

**3.3 Grading - 2025****Unmitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 7.5300e-003        | 0.0000             | 7.5300e-003        | 4.1400e-003        | 0.0000             | 4.1400e-003        |          |           |           |     |     | 0.0000         |
| Off-Road      | 5.7400e-003        | 0.0510        | 0.0736        | 1.2000e-004        |                    | 2.1000e-003        | 2.1000e-003        |                    | 2.0100e-003        | 2.0100e-003        |          |           |           |     |     | 10.4714        |
| <b>Total</b>  | <b>5.7400e-003</b> | <b>0.0510</b> | <b>0.0736</b> | <b>1.2000e-004</b> | <b>7.5300e-003</b> | <b>2.1000e-003</b> | <b>9.6300e-003</b> | <b>4.1400e-003</b> | <b>2.0100e-003</b> | <b>6.1500e-003</b> |          |           |           |     |     | <b>10.4714</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.3 Grading - 2025****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 3.0000e-004        | 1.6000e-004        | 1.7800e-003        | 1.0000e-005        | 8.0000e-004        | 0.0000        | 8.0000e-004        | 2.1000e-004        | 0.0000        | 2.2000e-004        |          |           |           |     |     | 0.5724        |
| <b>Total</b> | <b>3.0000e-004</b> | <b>1.6000e-004</b> | <b>1.7800e-003</b> | <b>1.0000e-005</b> | <b>8.0000e-004</b> | <b>0.0000</b> | <b>8.0000e-004</b> | <b>2.1000e-004</b> | <b>0.0000</b> | <b>2.2000e-004</b> |          |           |           |     |     | <b>0.5724</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 2.9400e-003        | 0.0000             | 2.9400e-003        | 1.6100e-003        | 0.0000             | 1.6100e-003        |          |           |           |     |     | 0.0000         |
| Off-Road      | 2.6500e-003        | 0.0596        | 0.0794        | 1.2000e-004        |                    | 4.0200e-003        | 4.0200e-003        |                    | 4.0200e-003        | 4.0200e-003        |          |           |           |     |     | 10.4714        |
| <b>Total</b>  | <b>2.6500e-003</b> | <b>0.0596</b> | <b>0.0794</b> | <b>1.2000e-004</b> | <b>2.9400e-003</b> | <b>4.0200e-003</b> | <b>6.9600e-003</b> | <b>1.6100e-003</b> | <b>4.0200e-003</b> | <b>5.6300e-003</b> |          |           |           |     |     | <b>10.4714</b> |



## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.3 Grading - 2025****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 3.0000e-004        | 1.6000e-004        | 1.7800e-003        | 1.0000e-005        | 8.0000e-004        | 0.0000        | 8.0000e-004        | 2.1000e-004        | 0.0000        | 2.2000e-004        |          |           |           |     |     | 0.5724        |
| <b>Total</b> | <b>3.0000e-004</b> | <b>1.6000e-004</b> | <b>1.7800e-003</b> | <b>1.0000e-005</b> | <b>8.0000e-004</b> | <b>0.0000</b> | <b>8.0000e-004</b> | <b>2.1000e-004</b> | <b>0.0000</b> | <b>2.2000e-004</b> |          |           |           |     |     | <b>0.5724</b> |

**3.4 Building Construction - 2025****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0636        | 0.6332        | 0.8118        | 1.3200e-003        |               | 0.0279        | 0.0279        |                | 0.0256        | 0.0256        |          |           |           |     |     | 116.7782        |
| <b>Total</b> | <b>0.0636</b> | <b>0.6332</b> | <b>0.8118</b> | <b>1.3200e-003</b> |               | <b>0.0279</b> | <b>0.0279</b> |                | <b>0.0256</b> | <b>0.0256</b> |          |           |           |     |     | <b>116.7782</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.4 Building Construction - 2025****Unmitigated Construction Off-Site**

|              | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr            |               |               |                    |               |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000             | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000         |
| Vendor       | 1.4800e-003        | 0.0663        | 9.5200e-003   | 2.2000e-004        | 5.3600e-003   | 6.0000e-005        | 5.4200e-003   | 1.5500e-003        | 6.0000e-005        | 1.6100e-003        |          |           |           |     |     | 20.6070        |
| Worker       | 4.5500e-003        | 2.3700e-003   | 0.0267        | 9.0000e-005        | 0.0120        | 7.0000e-005        | 0.0121        | 3.1900e-003        | 6.0000e-005        | 3.2500e-003        |          |           |           |     |     | 8.5945         |
| <b>Total</b> | <b>6.0300e-003</b> | <b>0.0687</b> | <b>0.0362</b> | <b>3.1000e-004</b> | <b>0.0174</b> | <b>1.3000e-004</b> | <b>0.0175</b> | <b>4.7400e-003</b> | <b>1.2000e-004</b> | <b>4.8600e-003</b> |          |           |           |     |     | <b>29.2015</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0323        | 0.7080        | 0.9197        | 1.3200e-003        |               | 0.0445        | 0.0445        |                | 0.0445        | 0.0445        |          |           |           |     |     | 116.7781        |
| <b>Total</b> | <b>0.0323</b> | <b>0.7080</b> | <b>0.9197</b> | <b>1.3200e-003</b> |               | <b>0.0445</b> | <b>0.0445</b> |                | <b>0.0445</b> | <b>0.0445</b> |          |           |           |     |     | <b>116.7781</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.4 Building Construction - 2025****Mitigated Construction Off-Site**

|              | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr            |               |               |                    |               |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000             | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000         |
| Vendor       | 1.4800e-003        | 0.0663        | 9.5200e-003   | 2.2000e-004        | 5.3600e-003   | 6.0000e-005        | 5.4200e-003   | 1.5500e-003        | 6.0000e-005        | 1.6100e-003        |          |           |           |     |     | 20.6070        |
| Worker       | 4.5500e-003        | 2.3700e-003   | 0.0267        | 9.0000e-005        | 0.0120        | 7.0000e-005        | 0.0121        | 3.1900e-003        | 6.0000e-005        | 3.2500e-003        |          |           |           |     |     | 8.5945         |
| <b>Total</b> | <b>6.0300e-003</b> | <b>0.0687</b> | <b>0.0362</b> | <b>3.1000e-004</b> | <b>0.0174</b> | <b>1.3000e-004</b> | <b>0.0175</b> | <b>4.7400e-003</b> | <b>1.2000e-004</b> | <b>4.8600e-003</b> |          |           |           |     |     | <b>29.2015</b> |

**3.4 Building Construction - 2026****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Off-Road     | 0.0273        | 0.2714        | 0.3479        | 5.7000e-004        |               | 0.0119        | 0.0119        |                | 0.0110        | 0.0110        |          |           |           |     |     | 50.0478        |
| <b>Total</b> | <b>0.0273</b> | <b>0.2714</b> | <b>0.3479</b> | <b>5.7000e-004</b> |               | <b>0.0119</b> | <b>0.0119</b> |                | <b>0.0110</b> | <b>0.0110</b> |          |           |           |     |     | <b>50.0478</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.4 Building Construction - 2026****Unmitigated Construction Off-Site**

|              | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000             | 0.0000        | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000         |
| Vendor       | 6.2000e-004        | 0.0282        | 3.9500e-003   | 9.0000e-005        | 2.3000e-003        | 3.0000e-005        | 2.3200e-003        | 6.6000e-004        | 3.0000e-005        | 6.9000e-004        |          |           |           |     |     | 8.7747         |
| Worker       | 1.8500e-003        | 9.3000e-004   | 0.0107        | 4.0000e-005        | 5.1400e-003        | 3.0000e-005        | 5.1700e-003        | 1.3700e-003        | 3.0000e-005        | 1.3900e-003        |          |           |           |     |     | 3.5679         |
| <b>Total</b> | <b>2.4700e-003</b> | <b>0.0291</b> | <b>0.0147</b> | <b>1.3000e-004</b> | <b>7.4400e-003</b> | <b>6.0000e-005</b> | <b>7.4900e-003</b> | <b>2.0300e-003</b> | <b>6.0000e-005</b> | <b>2.0800e-003</b> |          |           |           |     |     | <b>12.3426</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Off-Road     | 0.0138        | 0.3034        | 0.3941        | 5.7000e-004        |               | 0.0191        | 0.0191        |                | 0.0191        | 0.0191        |          |           |           |     |     | 50.0477        |
| <b>Total</b> | <b>0.0138</b> | <b>0.3034</b> | <b>0.3941</b> | <b>5.7000e-004</b> |               | <b>0.0191</b> | <b>0.0191</b> |                | <b>0.0191</b> | <b>0.0191</b> |          |           |           |     |     | <b>50.0477</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.4 Building Construction - 2026****Mitigated Construction Off-Site**

|              | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000             | 0.0000        | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000         |
| Vendor       | 6.2000e-004        | 0.0282        | 3.9500e-003   | 9.0000e-005        | 2.3000e-003        | 3.0000e-005        | 2.3200e-003        | 6.6000e-004        | 3.0000e-005        | 6.9000e-004        |          |           |           |     |     | 8.7747         |
| Worker       | 1.8500e-003        | 9.3000e-004   | 0.0107        | 4.0000e-005        | 5.1400e-003        | 3.0000e-005        | 5.1700e-003        | 1.3700e-003        | 3.0000e-005        | 1.3900e-003        |          |           |           |     |     | 3.5679         |
| <b>Total</b> | <b>2.4700e-003</b> | <b>0.0291</b> | <b>0.0147</b> | <b>1.3000e-004</b> | <b>7.4400e-003</b> | <b>6.0000e-005</b> | <b>7.4900e-003</b> | <b>2.0300e-003</b> | <b>6.0000e-005</b> | <b>2.0800e-003</b> |          |           |           |     |     | <b>12.3426</b> |

**3.5 Architectural Coating - 2026****Unmitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 0.2781        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 3.4200e-003   | 0.0229        | 0.0362        | 6.0000e-005        |               | 1.0300e-003        | 1.0300e-003        |                | 1.0300e-003        | 1.0300e-003        |          |           |           |     |     | 5.1135        |
| <b>Total</b>    | <b>0.2815</b> | <b>0.0229</b> | <b>0.0362</b> | <b>6.0000e-005</b> |               | <b>1.0300e-003</b> | <b>1.0300e-003</b> |                | <b>1.0300e-003</b> | <b>1.0300e-003</b> |          |           |           |     |     | <b>5.1135</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.5 Architectural Coating - 2026****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.7000e-004        | 9.0000e-005        | 1.0000e-003        | 0.0000        | 4.8000e-004        | 0.0000        | 4.8000e-004        | 1.3000e-004        | 0.0000        | 1.3000e-004        |          |           |           |     |     | 0.3327        |
| <b>Total</b> | <b>1.7000e-004</b> | <b>9.0000e-005</b> | <b>1.0000e-003</b> | <b>0.0000</b> | <b>4.8000e-004</b> | <b>0.0000</b> | <b>4.8000e-004</b> | <b>1.3000e-004</b> | <b>0.0000</b> | <b>1.3000e-004</b> |          |           |           |     |     | <b>0.3327</b> |

**Mitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 0.2781        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 1.1900e-003   | 0.0271        | 0.0367        | 6.0000e-005        |               | 1.9000e-003        | 1.9000e-003        |                | 1.9000e-003        | 1.9000e-003        |          |           |           |     |     | 5.1135        |
| <b>Total</b>    | <b>0.2793</b> | <b>0.0271</b> | <b>0.0367</b> | <b>6.0000e-005</b> |               | <b>1.9000e-003</b> | <b>1.9000e-003</b> |                | <b>1.9000e-003</b> | <b>1.9000e-003</b> |          |           |           |     |     | <b>5.1135</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**3.5 Architectural Coating - 2026****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.7000e-004        | 9.0000e-005        | 1.0000e-003        | 0.0000        | 4.8000e-004        | 0.0000        | 4.8000e-004        | 1.3000e-004        | 0.0000        | 1.3000e-004        |          |           |           |     |     | 0.3327        |
| <b>Total</b> | <b>1.7000e-004</b> | <b>9.0000e-005</b> | <b>1.0000e-003</b> | <b>0.0000</b> | <b>4.8000e-004</b> | <b>0.0000</b> | <b>4.8000e-004</b> | <b>1.3000e-004</b> | <b>0.0000</b> | <b>1.3000e-004</b> |          |           |           |     |     | <b>0.3327</b> |

**4.0 Operational Detail - Mobile****4.1 Mitigation Measures Mobile**

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

|             | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|-------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Category    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| Mitigated   | 0.1131  | 1.4550 | 1.0619 | 7.3000e-003 | 0.4696        | 3.6900e-003  | 0.4733     | 0.1265         | 3.4600e-003   | 0.1300      |          |           |           |     |     | 683.5745 |
| Unmitigated | 0.1131  | 1.4550 | 1.0619 | 7.3000e-003 | 0.4696        | 3.6900e-003  | 0.4733     | 0.1265         | 3.4600e-003   | 0.1300      |          |           |           |     |     | 683.5745 |

## 4.2 Trip Summary Information

| Land Use | Average Daily Trip Rate |          |        | Unmitigated | Mitigated  |
|----------|-------------------------|----------|--------|-------------|------------|
|          | Weekday                 | Saturday | Sunday | Annual VMT  | Annual VMT |
| Hospital | 528.80                  | 407.20   | 356.40 | 1,225,975   | 1,225,975  |
| Total    | 528.80                  | 407.20   | 356.40 | 1,225,975   | 1,225,975  |

## 4.3 Trip Type Information

| Land Use | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|----------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|          | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Hospital | 9.50       | 7.30       | 7.30        | 64.90      | 16.10      | 19.00       | 73             | 25       | 2       |

## 4.4 Fleet Mix

| Land Use | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hospital | 0.511548 | 0.029012 | 0.173692 | 0.098673 | 0.011299 | 0.003668 | 0.033690 | 0.128623 | 0.002315 | 0.001283 | 0.004693 | 0.001028 | 0.000475 |

## 5.0 Energy Detail

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Historical Energy Use: N



## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

## 5.1 Mitigation Measures Energy

|                         | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|-------------------------|-------------|--------|--------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Category                | tons/yr     |        |        |             |               |              |             |                |               |             | MT/yr    |           |           |     |     |          |
| Electricity Mitigated   |             |        |        |             |               | 0.0000       | 0.0000      |                | 0.0000        | 0.0000      |          |           |           |     |     | 158.4087 |
| Electricity Unmitigated |             |        |        |             |               | 0.0000       | 0.0000      |                | 0.0000        | 0.0000      |          |           |           |     |     | 158.4087 |
| NaturalGas Mitigated    | 9.1900e-003 | 0.0835 | 0.0702 | 5.0000e-004 |               | 6.3500e-003  | 6.3500e-003 |                | 6.3500e-003   | 6.3500e-003 |          |           |           |     |     | 91.4508  |
| NaturalGas Unmitigated  | 9.1900e-003 | 0.0835 | 0.0702 | 5.0000e-004 |               | 6.3500e-003  | 6.3500e-003 |                | 6.3500e-003   | 6.3500e-003 |          |           |           |     |     | 91.4508  |

## 5.2 Energy by Land Use - NaturalGas

Unmitigated

|              | NaturalGas Use | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|----------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Land Use     | kBTU/yr        | tons/yr            |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                |
| Hospital     | 1.7036e+006    | 9.1900e-003        | 0.0835        | 0.0702        | 5.0000e-004        |               | 6.3500e-003        | 6.3500e-003        |                | 6.3500e-003        | 6.3500e-003        |          |           |           |     |     | 91.4508        |
| <b>Total</b> |                | <b>9.1900e-003</b> | <b>0.0835</b> | <b>0.0702</b> | <b>5.0000e-004</b> |               | <b>6.3500e-003</b> | <b>6.3500e-003</b> |                | <b>6.3500e-003</b> | <b>6.3500e-003</b> |          |           |           |     |     | <b>91.4508</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Mitigated**

|              | NaturalGas Use | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|----------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Land Use     | kBTU/yr        | tons/yr            |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                |
| Hospital     | 1.7036e+006    | 9.1900e-003        | 0.0835        | 0.0702        | 5.0000e-004        |               | 6.3500e-003        | 6.3500e-003        |                | 6.3500e-003        | 6.3500e-003        |          |           |           |     |     | 91.4508        |
| <b>Total</b> |                | <b>9.1900e-003</b> | <b>0.0835</b> | <b>0.0702</b> | <b>5.0000e-004</b> |               | <b>6.3500e-003</b> | <b>6.3500e-003</b> |                | <b>6.3500e-003</b> | <b>6.3500e-003</b> |          |           |           |     |     | <b>91.4508</b> |

**5.3 Energy by Land Use - Electricity****Unmitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------|-----------------|-----------|-----|-----|-----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                 |
| Hospital     | 542400          |           |     |     | 158.4087        |
| <b>Total</b> |                 |           |     |     | <b>158.4087</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Mitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------|-----------------|-----------|-----|-----|-----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                 |
| Hospital     | 542400          |           |     |     | 158.4087        |
| <b>Total</b> |                 |           |     |     | <b>158.4087</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

|             | ROG     | NOx    | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|---------|--------|-------------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr |        |             |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 0.1841  | 0.0000 | 3.7000e-004 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 7.6000e-004 |
| Unmitigated | 0.1841  | 0.0000 | 3.7000e-004 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 7.6000e-004 |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**6.2 Area by SubCategory****Unmitigated**

|                       | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.0278        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.1562        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 3.0000e-005   | 0.0000        | 3.7000e-004        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 7.6000e-004        |
| <b>Total</b>          | <b>0.1841</b> | <b>0.0000</b> | <b>3.7000e-004</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>7.6000e-004</b> |

**Mitigated**

|                       | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.0278        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.1562        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 3.0000e-005   | 0.0000        | 3.7000e-004        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 7.6000e-004        |
| <b>Total</b>          | <b>0.1841</b> | <b>0.0000</b> | <b>3.7000e-004</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>7.6000e-004</b> |

**7.0 Water Detail**

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**7.1 Mitigation Measures Water**

|             | Total CO2 | CH4 | N2O | CO2e    |
|-------------|-----------|-----|-----|---------|
| Category    | MT/yr     |     |     |         |
| Mitigated   |           |     |     | 15.7410 |
| Unmitigated |           |     |     | 15.7410 |

**7.2 Water by Land Use****Unmitigated**

|              | Indoor/Outdoor Use    | Total CO2 | CH4 | N2O | CO2e           |
|--------------|-----------------------|-----------|-----|-----|----------------|
| Land Use     | Mgal                  | MT/yr     |     |     |                |
| Hospital     | 5.01922 /<br>0.956042 |           |     |     | 15.7410        |
| <b>Total</b> |                       |           |     |     | <b>15.7410</b> |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|              | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|-----------|-----|-----|----------------|
| Land Use     | Mgal               | MT/yr     |     |     |                |
| Hospital     | 5.01922 / 0.956042 |           |     |     | 15.7410        |
| <b>Total</b> |                    |           |     |     | <b>15.7410</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste****Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
|             | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 217.2535 |
| Unmitigated |           |     |     | 217.2535 |

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**8.2 Waste by Land Use****Unmitigated**

|              | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|-----------|-----|-----|-----------------|
| Land Use     | tons           | MT/yr     |     |     |                 |
| Hospital     | 432            |           |     |     | 217.2535        |
| <b>Total</b> |                |           |     |     | <b>217.2535</b> |

**Mitigated**

|              | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|--------------|----------------|-----------|-----|-----|-----------------|
| Land Use     | tons           | MT/yr     |     |     |                 |
| Hospital     | 432            |           |     |     | 217.2535        |
| <b>Total</b> |                |           |     |     | <b>217.2535</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

## CCMC- Outpatient Comm. Ctr. Expansion - Fresno County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

**11.0 Vegetation**

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## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

## CCMC- Parking Lots and Asphalt Surfaces (Phase II)

### Fresno County, Annual

## 1.0 Project Characteristics

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### 1.1 Land Usage

| Land Uses   | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|-------------|------|--------|-------------|--------------------|------------|
| Parking Lot | 7.25 | Acre   | 7.25        | 315,810.00         | 0          |

### 1.2 Other Project Characteristics

|                                |                                |                                |       |                                  |       |
|--------------------------------|--------------------------------|--------------------------------|-------|----------------------------------|-------|
| <b>Urbanization</b>            | Urban                          | <b>Wind Speed (m/s)</b>        | 2.2   | <b>Precipitation Freq (Days)</b> | 45    |
| <b>Climate Zone</b>            | 3                              |                                |       | <b>Operational Year</b>          | 2031  |
| <b>Utility Company</b>         | Pacific Gas & Electric Company |                                |       |                                  |       |
| <b>CO2 Intensity (lb/MWhr)</b> | 641.35                         | <b>CH4 Intensity (lb/MWhr)</b> | 0.029 | <b>N2O Intensity (lb/MWhr)</b>   | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Construction only.

Land Use - Asphalt surface area: 7.25 acres

Construction Phase - Assumes an approximate 40-day overall construction schedule.

Off-road Equipment - Equipment based on model defaults.

Trips and VMT - Const trips based on model defaults.

Vehicle Trips - Operational emissions not included.

Off-road Equipment - Based on model defaults.

Energy Use -

Construction Off-road Equipment Mitigation - Includes use of T3 equipment and dust control

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

| Table Name                | Column Name                  | Default Value | New Value |
|---------------------------|------------------------------|---------------|-----------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15        |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstructionPhase      | NumDays                      | 20.00         | 40.00     |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2031      |

## 2.0 Emissions Summary

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## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**2.1 Overall Construction****Unmitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| 2029    | 0.0285  | 0.1720 | 0.2956 | 4.7000e-004 | 2.4000e-003   | 8.3800e-003  | 0.0108     | 6.4000e-004    | 7.7100e-003   | 8.3500e-003 |          |           |           |     |     | 41.8740 |
| Maximum | 0.0285  | 0.1720 | 0.2956 | 4.7000e-004 | 2.4000e-003   | 8.3800e-003  | 0.0108     | 6.4000e-004    | 7.7100e-003   | 8.3500e-003 |          |           |           |     |     | 41.8740 |

**Mitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| 2029    | 0.0214  | 0.2262 | 0.3500 | 4.7000e-004 | 2.4000e-003   | 0.0122       | 0.0146     | 6.4000e-004    | 0.0122        | 0.0128      |          |           |           |     |     | 41.8740 |
| Maximum | 0.0214  | 0.2262 | 0.3500 | 4.7000e-004 | 2.4000e-003   | 0.0122       | 0.0146     | 6.4000e-004    | 0.0122        | 0.0128      |          |           |           |     |     | 41.8740 |

|                   | ROG   | NOx    | CO     | SO2  | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4  | N2O  | CO2e |
|-------------------|-------|--------|--------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|------|------|------|
| Percent Reduction | 24.87 | -31.56 | -18.39 | 0.00 | 0.00          | -45.58       | -35.44     | 0.00           | -58.24        | -53.65      | 0.00     | 0.00      | 0.00      | 0.00 | 0.00 | 0.00 |

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

| Quarter | Start Date | End Date  | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|-----------|--|--|
| 1       | 1-1-2029   | 3-31-2029 | 0.1934                                       | 0.2389                                     |
|         |            | Highest   | 0.1934                                       | 0.2389                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Area         | 0.0270        | 0.0000        | 7.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.4000e-004    |
| Energy       | 0.0000        | 0.0000        | 0.0000             | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 81.1648        |
| Mobile       | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000         | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Waste        |               |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Water        |               |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| <b>Total</b> | <b>0.0270</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b>  | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>81.1650</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Area         | 0.0270        | 0.0000        | 7.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.4000e-004    |
| Energy       | 0.0000        | 0.0000        | 0.0000             | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 81.1648        |
| Mobile       | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000         | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Waste        |               |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Water        |               |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| <b>Total</b> | <b>0.0270</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b>  | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>81.1650</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

**3.0 Construction Detail****Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date  | Num Days Week | Num Days | Phase Description |
|--------------|------------|------------|------------|-----------|---------------|----------|-------------------|
| 1            | Paving     | Paving     | 1/1/2029   | 2/23/2029 | 5             | 40       |                   |

**Acres of Grading (Site Preparation Phase): 0**

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**Acres of Grading (Grading Phase): 0****Acres of Paving: 7.25****Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)****OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|------------|------------------------|--------|-------------|-------------|-------------|
| Paving     | Pavers                 | 2      | 8.00        | 130         | 0.42        |
| Paving     | Paving Equipment       | 2      | 8.00        | 132         | 0.36        |
| Paving     | Rollers                | 2      | 8.00        | 80          | 0.38        |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Paving     | 6                       | 15.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**3.2 Paving - 2029****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                |
| Off-Road     | 0.0183        | 0.1716        | 0.2916        | 4.6000e-004        |               | 8.3700e-003        | 8.3700e-003        |                | 7.7000e-003        | 7.7000e-003        |          |           |           |     |     | 40.3622        |
| Paving       | 9.5000e-003   |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000         |
| <b>Total</b> | <b>0.0278</b> | <b>0.1716</b> | <b>0.2916</b> | <b>4.6000e-004</b> |               | <b>8.3700e-003</b> | <b>8.3700e-003</b> |                | <b>7.7000e-003</b> | <b>7.7000e-003</b> |          |           |           |     |     | <b>40.3622</b> |

**Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 7.1000e-004        | 3.3000e-004        | 4.0500e-003        | 2.0000e-005        | 2.4000e-003        | 1.0000e-005        | 2.4100e-003        | 6.4000e-004        | 1.0000e-005        | 6.5000e-004        |          |           |           |     |     | 1.5118        |
| <b>Total</b> | <b>7.1000e-004</b> | <b>3.3000e-004</b> | <b>4.0500e-003</b> | <b>2.0000e-005</b> | <b>2.4000e-003</b> | <b>1.0000e-005</b> | <b>2.4100e-003</b> | <b>6.4000e-004</b> | <b>1.0000e-005</b> | <b>6.5000e-004</b> |          |           |           |     |     | <b>1.5118</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**3.2 Paving - 2029****Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Off-Road     | 0.0112        | 0.2259        | 0.3459        | 4.6000e-004        |               | 0.0122        | 0.0122        |                | 0.0122        | 0.0122        |          |           |           |     |     | 40.3622        |
| Paving       | 9.5000e-003   |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| <b>Total</b> | <b>0.0207</b> | <b>0.2259</b> | <b>0.3459</b> | <b>4.6000e-004</b> |               | <b>0.0122</b> | <b>0.0122</b> |                | <b>0.0122</b> | <b>0.0122</b> |          |           |           |     |     | <b>40.3622</b> |

**Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 7.1000e-004        | 3.3000e-004        | 4.0500e-003        | 2.0000e-005        | 2.4000e-003        | 1.0000e-005        | 2.4100e-003        | 6.4000e-004        | 1.0000e-005        | 6.5000e-004        |          |           |           |     |     | 1.5118        |
| <b>Total</b> | <b>7.1000e-004</b> | <b>3.3000e-004</b> | <b>4.0500e-003</b> | <b>2.0000e-005</b> | <b>2.4000e-003</b> | <b>1.0000e-005</b> | <b>2.4100e-003</b> | <b>6.4000e-004</b> | <b>1.0000e-005</b> | <b>6.5000e-004</b> |          |           |           |     |     | <b>1.5118</b> |

**4.0 Operational Detail - Mobile**



## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

## 4.1 Mitigation Measures Mobile

|             | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|-------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Category    | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |        |
| Mitigated   | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000        | 0.0000       | 0.0000     | 0.0000         | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000 |
| Unmitigated | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000        | 0.0000       | 0.0000     | 0.0000         | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000 |

## 4.2 Trip Summary Information

|             | Average Daily Trip Rate |          |        | Unmitigated | Mitigated  |
|-------------|-------------------------|----------|--------|-------------|------------|
| Land Use    | Weekday                 | Saturday | Sunday | Annual VMT  | Annual VMT |
| Parking Lot | 0.00                    | 0.00     | 0.00   |             |            |
| Total       | 0.00                    | 0.00     | 0.00   |             |            |

## 4.3 Trip Type Information

|             | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|-------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
| Land Use    | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Parking Lot | 9.50       | 7.30       | 7.30        | 0.00       | 0.00       | 0.00        | 0              | 0        | 0       |

## 4.4 Fleet Mix

| Land Use    | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Parking Lot | 0.518301 | 0.028358 | 0.175615 | 0.092490 | 0.009302 | 0.003346 | 0.033686 | 0.129485 | 0.002305 | 0.001165 | 0.004532 | 0.000989 | 0.000427 |

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

|                         | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|-------------------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Category                | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| Electricity Mitigated   |         |        |        |        |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 81.1648 |
| Electricity Unmitigated |         |        |        |        |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 81.1648 |
| NaturalGas Mitigated    | 0.0000  | 0.0000 | 0.0000 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000  |
| NaturalGas Unmitigated  | 0.0000  | 0.0000 | 0.0000 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000  |

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|              | NaturalGas Use | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|---------------|
| Land Use     | kBTU/yr        | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |               |
| Parking Lot  | 0              | 0.0000        | 0.0000        | 0.0000        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000        |
| <b>Total</b> |                | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>0.0000</b> |

**Mitigated**

|              | NaturalGas Use | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|---------------|
| Land Use     | kBTU/yr        | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |               |
| Parking Lot  | 0              | 0.0000        | 0.0000        | 0.0000        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000        |
| <b>Total</b> |                | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>0.0000</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------|-----------------|-----------|-----|-----|----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                |
| Parking Lot  | 277913          |           |     |     | 81.1648        |
| <b>Total</b> |                 |           |     |     | <b>81.1648</b> |

**Mitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------|-----------------|-----------|-----|-----|----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                |
| Parking Lot  | 277913          |           |     |     | 81.1648        |
| <b>Total</b> |                 |           |     |     | <b>81.1648</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

|             | ROG     | NOx    | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|---------|--------|-------------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr |        |             |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 0.0270  | 0.0000 | 7.0000e-005 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1.4000e-004 |
| Unmitigated | 0.0270  | 0.0000 | 7.0000e-005 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1.4000e-004 |

## 6.2 Area by SubCategory

Unmitigated

|                       | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 6.5900e-003   |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.0204        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 1.0000e-005   | 0.0000        | 7.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.4000e-004        |
| <b>Total</b>          | <b>0.0270</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>1.4000e-004</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 6.5900e-003   |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.0204        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 1.0000e-005   | 0.0000        | 7.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.4000e-004        |
| <b>Total</b>          | <b>0.0270</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>1.4000e-004</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e   |
|-------------|-----------|-----|-----|--------|
| Category    | MT/yr     |     |     |        |
| Mitigated   |           |     |     | 0.0000 |
| Unmitigated |           |     |     | 0.0000 |

**7.2 Water by Land Use****Unmitigated**

|              | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|-----------|-----|-----|---------------|
| Land Use     | Mgal               | MT/yr     |     |     |               |
| Parking Lot  | 0 / 0              |           |     |     | 0.0000        |
| <b>Total</b> |                    |           |     |     | <b>0.0000</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|              | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|-----------|-----|-----|---------------|
| Land Use     | Mgal               | MT/yr     |     |     |               |
| Parking Lot  | 0 / 0              |           |     |     | 0.0000        |
| <b>Total</b> |                    |           |     |     | <b>0.0000</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste****Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e   |
|-------------|-----------|-----|-----|--------|
|             | MT/yr     |     |     |        |
| Mitigated   |           |     |     | 0.0000 |
| Unmitigated |           |     |     | 0.0000 |



## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**8.2 Waste by Land Use****Unmitigated**

|              | Waste<br>Disposed | Total CO2 | CH4 | N2O | CO2e          |
|--------------|-------------------|-----------|-----|-----|---------------|
| Land Use     | tons              | MT/yr     |     |     |               |
| Parking Lot  | 0                 |           |     |     | 0.0000        |
| <b>Total</b> |                   |           |     |     | <b>0.0000</b> |

**Mitigated**

|              | Waste<br>Disposed | Total CO2 | CH4 | N2O | CO2e          |
|--------------|-------------------|-----------|-----|-----|---------------|
| Land Use     | tons              | MT/yr     |     |     |               |
| Parking Lot  | 0                 |           |     |     | 0.0000        |
| <b>Total</b> |                   |           |     |     | <b>0.0000</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

## CCMC- Parking Lots and Asphalt Surfaces (Phase II) - Fresno County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

**11.0 Vegetation**

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## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

## CCMC- Parking Lots and Asphalt Surfaces (Phase I)

### Fresno County, Annual

## 1.0 Project Characteristics

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### 1.1 Land Usage

| Land Uses   | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|-------------|------|--------|-------------|--------------------|------------|
| Parking Lot | 6.25 | Acre   | 6.25        | 272,250.00         | 0          |

### 1.2 Other Project Characteristics

|                                |                                |                                |       |                                  |       |
|--------------------------------|--------------------------------|--------------------------------|-------|----------------------------------|-------|
| <b>Urbanization</b>            | Urban                          | <b>Wind Speed (m/s)</b>        | 2.2   | <b>Precipitation Freq (Days)</b> | 45    |
| <b>Climate Zone</b>            | 3                              |                                |       | <b>Operational Year</b>          | 2017  |
| <b>Utility Company</b>         | Pacific Gas & Electric Company |                                |       |                                  |       |
| <b>CO2 Intensity (lb/MWhr)</b> | 641.35                         | <b>CH4 Intensity (lb/MWhr)</b> | 0.029 | <b>N2O Intensity (lb/MWhr)</b>   | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Construction only.

Land Use - Asphalt surface area: 6.25 acres

Construction Phase - Assumes an approximate 40-day overall construction schedule.

Off-road Equipment - Equipment based on model defaults.

Trips and VMT - Const trips based on model defaults.

Vehicle Trips - Operational emissions not included.

Off-road Equipment - Based on model defaults.

Energy Use -

Construction Off-road Equipment Mitigation - Includes use of T3 equipment and dust control

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

| Table Name                | Column Name                  | Default Value | New Value |
|---------------------------|------------------------------|---------------|-----------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15        |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation   | Tier                         | No Change     | Tier 3    |
| tblConstructionPhase      | NumDays                      | 20.00         | 40.00     |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2017      |

## 2.0 Emissions Summary

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## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**2.1 Overall Construction****Unmitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| 2017    | 0.0489  | 0.4156 | 0.3128 | 4.8000e-004 | 2.4000e-003   | 0.0232       | 0.0256     | 6.4000e-004    | 0.0214        | 0.0220      |          |           |           |     |     | 44.8753 |
| Maximum | 0.0489  | 0.4156 | 0.3128 | 4.8000e-004 | 2.4000e-003   | 0.0232       | 0.0256     | 6.4000e-004    | 0.0214        | 0.0220      |          |           |           |     |     | 44.8753 |

**Mitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| 2017    | 0.0212  | 0.2271 | 0.3581 | 4.8000e-004 | 2.4000e-003   | 0.0122       | 0.0146     | 6.4000e-004    | 0.0122        | 0.0128      |          |           |           |     |     | 44.8752 |
| Maximum | 0.0212  | 0.2271 | 0.3581 | 4.8000e-004 | 2.4000e-003   | 0.0122       | 0.0146     | 6.4000e-004    | 0.0122        | 0.0128      |          |           |           |     |     | 44.8752 |

|                   | ROG   | NOx   | CO     | SO2  | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4  | N2O  | CO2e |
|-------------------|-------|-------|--------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|------|------|------|
| Percent Reduction | 56.66 | 45.35 | -14.47 | 0.00 | 0.00          | 47.41        | 42.97      | 0.00           | 42.86         | 41.58       | 0.00     | 0.00      | 0.00      | 0.00 | 0.00 | 0.00 |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|----------|--|--|
|         |            | Highest  |  |  |

**2.2 Overall Operational****Unmitigated Operational**

|              | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Area         | 0.0233        | 0.0000        | 6.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.2000e-004    |
| Energy       | 0.0000        | 0.0000        | 0.0000             | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 69.9697        |
| Mobile       | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000         | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Waste        |               |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Water        |               |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| <b>Total</b> | <b>0.0233</b> | <b>0.0000</b> | <b>6.0000e-005</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b>  | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>69.9698</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Area         | 0.0233        | 0.0000        | 6.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.2000e-004    |
| Energy       | 0.0000        | 0.0000        | 0.0000             | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 69.9697        |
| Mobile       | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000         | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Waste        |               |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Water        |               |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| <b>Total</b> | <b>0.0233</b> | <b>0.0000</b> | <b>6.0000e-005</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b>  | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>69.9698</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

**3.0 Construction Detail****Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date  | Num Days Week | Num Days | Phase Description |
|--------------|------------|------------|------------|-----------|---------------|----------|-------------------|
| 1            | Paving     | Paving     | 8/1/2017   | 9/25/2017 | 5             | 40       |                   |

**Acres of Grading (Site Preparation Phase): 0**

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**Acres of Grading (Grading Phase): 0****Acres of Paving: 6.25****Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)****OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|------------|------------------------|--------|-------------|-------------|-------------|
| Paving     | Pavers                 | 2      | 8.00        | 130         | 0.42        |
| Paving     | Paving Equipment       | 2      | 8.00        | 132         | 0.36        |
| Paving     | Rollers                | 2      | 8.00        | 80          | 0.38        |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Paving     | 6                       | 15.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads



## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**3.2 Paving - 2017****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Off-Road     | 0.0389        | 0.4144        | 0.3006        | 4.6000e-004        |               | 0.0232        | 0.0232        |                | 0.0213        | 0.0213        |          |           |           |     |     | 42.6105        |
| Paving       | 8.1900e-003   |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| <b>Total</b> | <b>0.0471</b> | <b>0.4144</b> | <b>0.3006</b> | <b>4.6000e-004</b> |               | <b>0.0232</b> | <b>0.0232</b> |                | <b>0.0213</b> | <b>0.0213</b> |          |           |           |     |     | <b>42.6105</b> |

**Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.7700e-003        | 1.2300e-003        | 0.0122        | 3.0000e-005        | 2.4000e-003        | 2.0000e-005        | 2.4200e-003        | 6.4000e-004        | 2.0000e-005        | 6.5000e-004        |          |           |           |     |     | 2.2648        |
| <b>Total</b> | <b>1.7700e-003</b> | <b>1.2300e-003</b> | <b>0.0122</b> | <b>3.0000e-005</b> | <b>2.4000e-003</b> | <b>2.0000e-005</b> | <b>2.4200e-003</b> | <b>6.4000e-004</b> | <b>2.0000e-005</b> | <b>6.5000e-004</b> |          |           |           |     |     | <b>2.2648</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**3.2 Paving - 2017****Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Off-Road     | 0.0112        | 0.2259        | 0.3459        | 4.6000e-004        |               | 0.0122        | 0.0122        |                | 0.0122        | 0.0122        |          |           |           |     |     | 42.6104        |
| Paving       | 8.1900e-003   |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| <b>Total</b> | <b>0.0194</b> | <b>0.2259</b> | <b>0.3459</b> | <b>4.6000e-004</b> |               | <b>0.0122</b> | <b>0.0122</b> |                | <b>0.0122</b> | <b>0.0122</b> |          |           |           |     |     | <b>42.6104</b> |

**Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.7700e-003        | 1.2300e-003        | 0.0122        | 3.0000e-005        | 2.4000e-003        | 2.0000e-005        | 2.4200e-003        | 6.4000e-004        | 2.0000e-005        | 6.5000e-004        |          |           |           |     |     | 2.2648        |
| <b>Total</b> | <b>1.7700e-003</b> | <b>1.2300e-003</b> | <b>0.0122</b> | <b>3.0000e-005</b> | <b>2.4000e-003</b> | <b>2.0000e-005</b> | <b>2.4200e-003</b> | <b>6.4000e-004</b> | <b>2.0000e-005</b> | <b>6.5000e-004</b> |          |           |           |     |     | <b>2.2648</b> |

**4.0 Operational Detail - Mobile**

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

## 4.1 Mitigation Measures Mobile

|             | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|-------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Category    | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |        |
| Mitigated   | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000        | 0.0000       | 0.0000     | 0.0000         | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000 |
| Unmitigated | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000        | 0.0000       | 0.0000     | 0.0000         | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000 |

## 4.2 Trip Summary Information

| Land Use    | Average Daily Trip Rate |          |        | Unmitigated | Mitigated  |
|-------------|-------------------------|----------|--------|-------------|------------|
|             | Weekday                 | Saturday | Sunday | Annual VMT  | Annual VMT |
| Parking Lot | 0.00                    | 0.00     | 0.00   |             |            |
| Total       | 0.00                    | 0.00     | 0.00   |             |            |

## 4.3 Trip Type Information

| Land Use    | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|-------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|             | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Parking Lot | 9.50       | 7.30       | 7.30        | 0.00       | 0.00       | 0.00        | 0              | 0        | 0       |

## 4.4 Fleet Mix

| Land Use    | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Parking Lot | 0.460473 | 0.036633 | 0.167238 | 0.147836 | 0.023143 | 0.005958 | 0.030501 | 0.116272 | 0.002399 | 0.001935 | 0.005629 | 0.001175 | 0.000809 |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

|                         | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|-------------------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Category                | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| Electricity Mitigated   |         |        |        |        |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 69.9697 |
| Electricity Unmitigated |         |        |        |        |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 69.9697 |
| NaturalGas Mitigated    | 0.0000  | 0.0000 | 0.0000 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000  |
| NaturalGas Unmitigated  | 0.0000  | 0.0000 | 0.0000 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 0.0000  |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|              | NaturalGas Use | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|---------------|
| Land Use     | kBTU/yr        | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |               |
| Parking Lot  | 0              | 0.0000        | 0.0000        | 0.0000        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000        |
| <b>Total</b> |                | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>0.0000</b> |

**Mitigated**

|              | NaturalGas Use | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|---------------|
| Land Use     | kBTU/yr        | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |               |
| Parking Lot  | 0              | 0.0000        | 0.0000        | 0.0000        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000        |
| <b>Total</b> |                | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>0.0000</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------|-----------------|-----------|-----|-----|----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                |
| Parking Lot  | 239580          |           |     |     | 69.9697        |
| <b>Total</b> |                 |           |     |     | <b>69.9697</b> |

**Mitigated**

|              | Electricity Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------|-----------------|-----------|-----|-----|----------------|
| Land Use     | kWh/yr          | MT/yr     |     |     |                |
| Parking Lot  | 239580          |           |     |     | 69.9697        |
| <b>Total</b> |                 |           |     |     | <b>69.9697</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

|             | ROG     | NOx    | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|---------|--------|-------------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr |        |             |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 0.0233  | 0.0000 | 6.0000e-005 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1.2000e-004 |
| Unmitigated | 0.0233  | 0.0000 | 6.0000e-005 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1.2000e-004 |

## 6.2 Area by SubCategory

Unmitigated

|                       | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 5.6800e-003   |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.0176        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 1.0000e-005   | 0.0000        | 6.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.2000e-004        |
| <b>Total</b>          | <b>0.0233</b> | <b>0.0000</b> | <b>6.0000e-005</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>1.2000e-004</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG           | NOx           | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|---------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |               |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 5.6800e-003   |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.0176        |               |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 1.0000e-005   | 0.0000        | 6.0000e-005        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.2000e-004        |
| <b>Total</b>          | <b>0.0233</b> | <b>0.0000</b> | <b>6.0000e-005</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>1.2000e-004</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**



## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e   |
|-------------|-----------|-----|-----|--------|
| Category    | MT/yr     |     |     |        |
| Mitigated   |           |     |     | 0.0000 |
| Unmitigated |           |     |     | 0.0000 |

**7.2 Water by Land Use****Unmitigated**

|              | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|-----------|-----|-----|---------------|
| Land Use     | Mgal               | MT/yr     |     |     |               |
| Parking Lot  | 0 / 0              |           |     |     | 0.0000        |
| <b>Total</b> |                    |           |     |     | <b>0.0000</b> |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|              | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|-----------|-----|-----|---------------|
| Land Use     | Mgal               | MT/yr     |     |     |               |
| Parking Lot  | 0 / 0              |           |     |     | 0.0000        |
| <b>Total</b> |                    |           |     |     | <b>0.0000</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste****Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e   |
|-------------|-----------|-----|-----|--------|
|             | MT/yr     |     |     |        |
| Mitigated   |           |     |     | 0.0000 |
| Unmitigated |           |     |     | 0.0000 |

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**8.2 Waste by Land Use****Unmitigated**

|              | Waste<br>Disposed | Total CO2 | CH4 | N2O | CO2e          |
|--------------|-------------------|-----------|-----|-----|---------------|
| Land Use     | tons              | MT/yr     |     |     |               |
| Parking Lot  | 0                 |           |     |     | 0.0000        |
| <b>Total</b> |                   |           |     |     | <b>0.0000</b> |

**Mitigated**

|              | Waste<br>Disposed | Total CO2 | CH4 | N2O | CO2e          |
|--------------|-------------------|-----------|-----|-----|---------------|
| Land Use     | tons              | MT/yr     |     |     |               |
| Parking Lot  | 0                 |           |     |     | 0.0000        |
| <b>Total</b> |                   |           |     |     | <b>0.0000</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

## CCMC- Parking Lots and Asphalt Surfaces (Phase I) - Fresno County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

**11.0 Vegetation**

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## CCMC- Medical-Dental Office Building - Fresno County, Annual

## CCMC- Medical-Dental Office Building

### Fresno County, Annual

## 1.0 Project Characteristics

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### 1.1 Land Usage

| Land Uses               | Size  | Metric   | Lot Acreage | Floor Surface Area | Population |
|-------------------------|-------|----------|-------------|--------------------|------------|
| Medical Office Building | 94.39 | 1000sqft | 2.17        | 94,392.00          | 0          |

### 1.2 Other Project Characteristics

|                                 |                                |                                 |       |                                  |       |
|---------------------------------|--------------------------------|---------------------------------|-------|----------------------------------|-------|
| <b>Urbanization</b>             | Urban                          | <b>Wind Speed (m/s)</b>         | 2.2   | <b>Precipitation Freq (Days)</b> | 45    |
| <b>Climate Zone</b>             | 3                              |                                 |       | <b>Operational Year</b>          | 2024  |
| <b>Utility Company</b>          | Pacific Gas & Electric Company |                                 |       |                                  |       |
| <b>CO2 Intensity (lb/MW hr)</b> | 641.35                         | <b>CH4 Intensity (lb/MW hr)</b> | 0.029 | <b>N2O Intensity (lb/MW hr)</b>  | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Const. Only

Land Use - Med Office Bldg: 94392SF

Construction Phase - Demo: 10 days; Site Prep: 10 days; Grading: 20 days; Const: 330 days; Coating: 40 days.

Off-road Equipment - Equipment based on model defaults.

Trips and VMT - Const trips based on model defaults.

Vehicle Trips - Operational emissions not included.

Construction Off-road Equipment Mitigation - T3 offroad equipment & dust control

Demolition - Demo: 15608

## CCMC- Medical-Dental Office Building - Fresno County, Annual

| Table Name              | Column Name                  | Default Value | New Value |
|-------------------------|------------------------------|---------------|-----------|
| tblConstDustMitigation  | WaterUnpavedRoadVehicleSpeed | 40            | 15        |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 2.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 7.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 3.00      |
| tblConstEquipMitigation | NumberOfEquipmentMitigated   | 0.00          | 1.00      |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstEquipMitigation | Tier                         | No Change     | Tier 3    |
| tblConstructionPhase    | NumDays                      | 10.00         | 40.00     |
| tblConstructionPhase    | NumDays                      | 220.00        | 330.00    |
| tblConstructionPhase    | NumDays                      | 6.00          | 20.00     |
| tblConstructionPhase    | NumDays                      | 3.00          | 10.00     |
| tblConstructionPhase    | NumDays                      | 20.00         | 10.00     |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

|                           |                 |           |           |
|---------------------------|-----------------|-----------|-----------|
| tblConstructionPhase      | PhaseEndDate    | 7/5/2023  | 7/31/2023 |
| tblConstructionPhase      | PhaseEndDate    | 5/10/2023 | 6/5/2023  |
| tblConstructionPhase      | PhaseEndDate    | 2/2/2022  | 2/28/2022 |
| tblConstructionPhase      | PhaseEndDate    | 1/5/2022  | 1/28/2022 |
| tblConstructionPhase      | PhaseStartDate  | 5/11/2023 | 6/6/2023  |
| tblConstructionPhase      | PhaseStartDate  | 2/3/2022  | 3/1/2022  |
| tblConstructionPhase      | PhaseStartDate  | 1/6/2022  | 2/1/2022  |
| tblConstructionPhase      | PhaseStartDate  | 1/1/2022  | 1/15/2022 |
| tblGrading                | AcresOfGrading  | 10.00     | 3.00      |
| tblGrading                | AcresOfGrading  | 15.00     | 4.50      |
| tblProjectCharacteristics | OperationalYear | 2018      | 2024      |

## 2.0 Emissions Summary

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## CCMC- Medical-Dental Office Building - Fresno County, Annual

**2.1 Overall Construction****Unmitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2022    | 0.2517  | 2.1216 | 1.8915 | 3.9200e-003 | 0.1113        | 0.0921       | 0.2034     | 0.0454         | 0.0878        | 0.1332      |          |           |           |     |     | 336.9486 |
| 2023    | 0.7630  | 0.8550 | 0.8733 | 1.8000e-003 | 0.0198        | 0.0356       | 0.0554     | 5.3900e-003    | 0.0342        | 0.0396      |          |           |           |     |     | 153.5413 |
| Maximum | 0.7630  | 2.1216 | 1.8915 | 3.9200e-003 | 0.1113        | 0.0921       | 0.2034     | 0.0454         | 0.0878        | 0.1332      |          |           |           |     |     | 336.9486 |

**Mitigated Construction**

|         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|---------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Year    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |          |
| 2022    | 0.1068  | 1.9048 | 2.0615 | 3.9200e-003 | 0.0674        | 0.1011       | 0.1685     | 0.0243         | 0.1011        | 0.1253      |          |           |           |     |     | 336.9483 |
| 2023    | 0.7048  | 0.8560 | 0.9400 | 1.8000e-003 | 0.0198        | 0.0474       | 0.0672     | 5.3900e-003    | 0.0474        | 0.0528      |          |           |           |     |     | 153.5412 |
| Maximum | 0.7048  | 1.9048 | 2.0615 | 3.9200e-003 | 0.0674        | 0.1011       | 0.1685     | 0.0243         | 0.1011        | 0.1253      |          |           |           |     |     | 336.9483 |

|                   | ROG   | NOx  | CO    | SO2  | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4  | N2O  | CO2e |
|-------------------|-------|------|-------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|------|------|------|
| Percent Reduction | 20.01 | 7.25 | -8.56 | 0.00 | 33.45         | -16.30       | 8.90       | 41.65          | -21.76        | -3.11       | 0.00     | 0.00      | 0.00      | 0.00 | 0.00 | 0.00 |



## CCMC- Medical-Dental Office Building - Fresno County, Annual

| Quarter | Start Date | End Date   | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|------------|--|--|
| 1       | 1-1-2022   | 3-31-2022  | 0.5744                                       | 0.4217                                     |
| 2       | 4-1-2022   | 6-30-2022  | 0.5938                                       | 0.5248                                     |
| 3       | 7-1-2022   | 9-30-2022  | 0.6003                                       | 0.5306                                     |
| 4       | 10-1-2022  | 12-31-2022 | 0.6008                                       | 0.5311                                     |
| 5       | 1-1-2023   | 3-31-2023  | 0.5396                                       | 0.5074                                     |
| 6       | 4-1-2023   | 6-30-2023  | 0.7021                                       | 0.6778                                     |
| 7       | 7-1-2023   | 9-30-2023  | 0.3802                                       | 0.3793                                     |
|         |            | Highest    | 0.7021                                       | 0.6778                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 0.4344        | 1.0000e-005   | 8.7000e-004   | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.8000e-003       |
| Energy       | 6.6800e-003   | 0.0607        | 0.0510        | 3.6000e-004   |               | 4.6100e-003   | 4.6100e-003   |                | 4.6100e-003   | 4.6100e-003   |          |           |           |     |     | 323.4070          |
| Mobile       | 0.6383        | 7.5507        | 5.5833        | 0.0336        | 1.9337        | 0.0173        | 1.9510        | 0.5212         | 0.0162        | 0.5374        |          |           |           |     |     | 3,147.6070        |
| Waste        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 512.6628          |
| Water        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 37.1449           |
| <b>Total</b> | <b>1.0793</b> | <b>7.6114</b> | <b>5.6352</b> | <b>0.0340</b> | <b>1.9337</b> | <b>0.0219</b> | <b>1.9557</b> | <b>0.5212</b>  | <b>0.0208</b> | <b>0.5420</b> |          |           |           |     |     | <b>4,020.8236</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Category     | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Area         | 0.4344        | 1.0000e-005   | 8.7000e-004   | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.8000e-003       |
| Energy       | 6.6800e-003   | 0.0607        | 0.0510        | 3.6000e-004   |               | 4.6100e-003   | 4.6100e-003   |                | 4.6100e-003   | 4.6100e-003   |          |           |           |     |     | 323.4070          |
| Mobile       | 0.6383        | 7.5507        | 5.5833        | 0.0336        | 1.9337        | 0.0173        | 1.9510        | 0.5212         | 0.0162        | 0.5374        |          |           |           |     |     | 3,147.6070        |
| Waste        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 512.6628          |
| Water        |               |               |               |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 37.1449           |
| <b>Total</b> | <b>1.0793</b> | <b>7.6114</b> | <b>5.6352</b> | <b>0.0340</b> | <b>1.9337</b> | <b>0.0219</b> | <b>1.9557</b> | <b>0.5212</b>  | <b>0.0208</b> | <b>0.5420</b> |          |           |           |     |     | <b>4,020.8236</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

**3.0 Construction Detail****Construction Phase**

## CCMC- Medical-Dental Office Building - Fresno County, Annual

| Phase Number | Phase Name            | Phase Type            | Start Date | End Date  | Num Days Week | Num Days | Phase Description |
|--------------|-----------------------|-----------------------|------------|-----------|---------------|----------|-------------------|
| 1            | Site Preparation      | Site Preparation      | 1/15/2022  | 1/28/2022 | 5             | 10       |                   |
| 2            | Grading               | Grading               | 2/1/2022   | 2/28/2022 | 5             | 20       |                   |
| 3            | Building Construction | Building Construction | 3/1/2022   | 6/5/2023  | 5             | 330      |                   |
| 4            | Architectural Coating | Architectural Coating | 6/6/2023   | 7/31/2023 | 5             | 40       |                   |
| 5            | Demolition            | Demolition            | 1/1/2022   | 1/14/2022 | 5             | 10       |                   |

**Acres of Grading (Site Preparation Phase): 4.5**

**Acres of Grading (Grading Phase): 3**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 141,588; Non-Residential Outdoor: 47,196; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

## CCMC- Medical-Dental Office Building - Fresno County, Annual

| Phase Name            | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|-----------------------|---------------------------|--------|-------------|-------------|-------------|
| Building Construction | Generator Sets            | 1      | 8.00        | 84          | 0.74        |
| Site Preparation      | Tractors/Loaders/Backhoes | 1      | 7.00        | 97          | 0.37        |
| Site Preparation      | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Grading               | Graders                   | 1      | 8.00        | 187         | 0.41        |
| Grading               | Rubber Tired Dozers       | 1      | 8.00        | 247         | 0.40        |
| Grading               | Tractors/Loaders/Backhoes | 2      | 7.00        | 97          | 0.37        |
| Building Construction | Cranes                    | 1      | 8.00        | 231         | 0.29        |
| Building Construction | Forklifts                 | 2      | 7.00        | 89          | 0.20        |
| Site Preparation      | Scrapers                  | 1      | 8.00        | 367         | 0.48        |
| Building Construction | Tractors/Loaders/Backhoes | 1      | 6.00        | 97          | 0.37        |
| Building Construction | Welders                   | 3      | 8.00        | 46          | 0.45        |
| Architectural Coating | Air Compressors           | 1      | 6.00        | 78          | 0.48        |
| Demolition            | Concrete/Industrial Saws  | 1      | 8.00        | 81          | 0.73        |
| Demolition            | Rubber Tired Dozers       | 1      | 8.00        | 247         | 0.40        |
| Demolition            | Tractors/Loaders/Backhoes | 3      | 8.00        | 97          | 0.37        |

**Trips and VMT**

| Phase Name            | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|-----------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation      | 3                       | 8.00               | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Grading               | 4                       | 10.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Building Construction | 8                       | 30.00              | 15.00              | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Architectural Coating | 1                       | 6.00               | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |
| Demolition            | 5                       | 13.00              | 0.00               | 71.00               | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

## CCMC- Medical-Dental Office Building - Fresno County, Annual

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

**3.2 Site Preparation - 2022****Unmitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 2.3900e-003        | 0.0000             | 2.3900e-003        | 2.6000e-004        | 0.0000             | 2.6000e-004        |          |           |           |     |     | 0.0000         |
| Off-Road      | 6.8900e-003        | 0.0783        | 0.0503        | 1.2000e-004        |                    | 2.9800e-003        | 2.9800e-003        |                    | 2.7400e-003        | 2.7400e-003        |          |           |           |     |     | 10.8606        |
| <b>Total</b>  | <b>6.8900e-003</b> | <b>0.0783</b> | <b>0.0503</b> | <b>1.2000e-004</b> | <b>2.3900e-003</b> | <b>2.9800e-003</b> | <b>5.3700e-003</b> | <b>2.6000e-004</b> | <b>2.7400e-003</b> | <b>3.0000e-003</b> |          |           |           |     |     | <b>10.8606</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.2 Site Preparation - 2022****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.5000e-004        | 9.0000e-005        | 9.2000e-004        | 0.0000        | 3.2000e-004        | 0.0000        | 3.2000e-004        | 8.0000e-005        | 0.0000        | 9.0000e-005        |          |           |           |     |     | 0.2578        |
| <b>Total</b> | <b>1.5000e-004</b> | <b>9.0000e-005</b> | <b>9.2000e-004</b> | <b>0.0000</b> | <b>3.2000e-004</b> | <b>0.0000</b> | <b>3.2000e-004</b> | <b>8.0000e-005</b> | <b>0.0000</b> | <b>9.0000e-005</b> |          |           |           |     |     | <b>0.2578</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 9.3000e-004        | 0.0000             | 9.3000e-004        | 1.0000e-004        | 0.0000             | 1.0000e-004        |          |           |           |     |     | 0.0000         |
| Off-Road      | 3.0100e-003        | 0.0593        | 0.0682        | 1.2000e-004        |                    | 2.4900e-003        | 2.4900e-003        |                    | 2.4900e-003        | 2.4900e-003        |          |           |           |     |     | 10.8606        |
| <b>Total</b>  | <b>3.0100e-003</b> | <b>0.0593</b> | <b>0.0682</b> | <b>1.2000e-004</b> | <b>9.3000e-004</b> | <b>2.4900e-003</b> | <b>3.4200e-003</b> | <b>1.0000e-004</b> | <b>2.4900e-003</b> | <b>2.5900e-003</b> |          |           |           |     |     | <b>10.8606</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.2 Site Preparation - 2022****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 1.5000e-004        | 9.0000e-005        | 9.2000e-004        | 0.0000        | 3.2000e-004        | 0.0000        | 3.2000e-004        | 8.0000e-005        | 0.0000        | 9.0000e-005        |          |           |           |     |     | 0.2578        |
| <b>Total</b> | <b>1.5000e-004</b> | <b>9.0000e-005</b> | <b>9.2000e-004</b> | <b>0.0000</b> | <b>3.2000e-004</b> | <b>0.0000</b> | <b>3.2000e-004</b> | <b>8.0000e-005</b> | <b>0.0000</b> | <b>9.0000e-005</b> |          |           |           |     |     | <b>0.2578</b> |

**3.3 Grading - 2022****Unmitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |               |               |               |                    | 0.0618        | 0.0000             | 0.0618        | 0.0333         | 0.0000             | 0.0333        |          |           |           |     |     | 0.0000         |
| Off-Road      | 0.0154        | 0.1698        | 0.0922        | 2.1000e-004        |               | 7.4200e-003        | 7.4200e-003   |                | 6.8300e-003        | 6.8300e-003   |          |           |           |     |     | 18.2491        |
| <b>Total</b>  | <b>0.0154</b> | <b>0.1698</b> | <b>0.0922</b> | <b>2.1000e-004</b> | <b>0.0618</b> | <b>7.4200e-003</b> | <b>0.0692</b> | <b>0.0333</b>  | <b>6.8300e-003</b> | <b>0.0401</b> |          |           |           |     |     | <b>18.2491</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.3 Grading - 2022****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 3.7000e-004        | 2.2000e-004        | 2.3000e-003        | 1.0000e-005        | 8.0000e-004        | 0.0000        | 8.0000e-004        | 2.1000e-004        | 0.0000        | 2.2000e-004        |          |           |           |     |     | 0.6446        |
| <b>Total</b> | <b>3.7000e-004</b> | <b>2.2000e-004</b> | <b>2.3000e-003</b> | <b>1.0000e-005</b> | <b>8.0000e-004</b> | <b>0.0000</b> | <b>8.0000e-004</b> | <b>2.1000e-004</b> | <b>0.0000</b> | <b>2.2000e-004</b> |          |           |           |     |     | <b>0.6446</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 0.0241        | 0.0000             | 0.0241        | 0.0130         | 0.0000             | 0.0130        |          |           |           |     |     | 0.0000         |
| Off-Road      | 5.0400e-003        | 0.1022        | 0.1215        | 2.1000e-004        |               | 4.8500e-003        | 4.8500e-003   |                | 4.8500e-003        | 4.8500e-003   |          |           |           |     |     | 18.2491        |
| <b>Total</b>  | <b>5.0400e-003</b> | <b>0.1022</b> | <b>0.1215</b> | <b>2.1000e-004</b> | <b>0.0241</b> | <b>4.8500e-003</b> | <b>0.0290</b> | <b>0.0130</b>  | <b>4.8500e-003</b> | <b>0.0178</b> |          |           |           |     |     | <b>18.2491</b> |



## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.3 Grading - 2022****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 3.7000e-004        | 2.2000e-004        | 2.3000e-003        | 1.0000e-005        | 8.0000e-004        | 0.0000        | 8.0000e-004        | 2.1000e-004        | 0.0000        | 2.2000e-004        |          |           |           |     |     | 0.6446        |
| <b>Total</b> | <b>3.7000e-004</b> | <b>2.2000e-004</b> | <b>2.3000e-003</b> | <b>1.0000e-005</b> | <b>8.0000e-004</b> | <b>0.0000</b> | <b>8.0000e-004</b> | <b>2.1000e-004</b> | <b>0.0000</b> | <b>2.2000e-004</b> |          |           |           |     |     | <b>0.6446</b> |

**3.4 Building Construction - 2022****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.2032        | 1.5991        | 1.5717        | 2.7400e-003        |               | 0.0769        | 0.0769        |                | 0.0737        | 0.0737        |          |           |           |     |     | 228.5066        |
| <b>Total</b> | <b>0.2032</b> | <b>1.5991</b> | <b>1.5717</b> | <b>2.7400e-003</b> |               | <b>0.0769</b> | <b>0.0769</b> |                | <b>0.0737</b> | <b>0.0737</b> |          |           |           |     |     | <b>228.5066</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.4 Building Construction - 2022****Unmitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000         |
| Vendor       | 4.6200e-003   | 0.1752        | 0.0261        | 4.6000e-004        | 0.0109        | 4.3000e-004        | 0.0113        | 3.1400e-003    | 4.1000e-004        | 3.5500e-003   |          |           |           |     |     | 43.5883        |
| Worker       | 0.0122        | 7.1400e-003   | 0.0755        | 2.3000e-004        | 0.0263        | 1.6000e-004        | 0.0264        | 6.9800e-003    | 1.5000e-004        | 7.1300e-003   |          |           |           |     |     | 21.1749        |
| <b>Total</b> | <b>0.0168</b> | <b>0.1823</b> | <b>0.1016</b> | <b>6.9000e-004</b> | <b>0.0372</b> | <b>5.9000e-004</b> | <b>0.0377</b> | <b>0.0101</b>  | <b>5.6000e-004</b> | <b>0.0107</b> |          |           |           |     |     | <b>64.7632</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0782        | 1.4916        | 1.6872        | 2.7400e-003        |               | 0.0896        | 0.0896        |                | 0.0896        | 0.0896        |          |           |           |     |     | 228.5063        |
| <b>Total</b> | <b>0.0782</b> | <b>1.4916</b> | <b>1.6872</b> | <b>2.7400e-003</b> |               | <b>0.0896</b> | <b>0.0896</b> |                | <b>0.0896</b> | <b>0.0896</b> |          |           |           |     |     | <b>228.5063</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.4 Building Construction - 2022****Mitigated Construction Off-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr       |               |               |                    |               |                    |               |                |                    |               | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000        | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000         | 0.0000             | 0.0000        |          |           |           |     |     | 0.0000         |
| Vendor       | 4.6200e-003   | 0.1752        | 0.0261        | 4.6000e-004        | 0.0109        | 4.3000e-004        | 0.0113        | 3.1400e-003    | 4.1000e-004        | 3.5500e-003   |          |           |           |     |     | 43.5883        |
| Worker       | 0.0122        | 7.1400e-003   | 0.0755        | 2.3000e-004        | 0.0263        | 1.6000e-004        | 0.0264        | 6.9800e-003    | 1.5000e-004        | 7.1300e-003   |          |           |           |     |     | 21.1749        |
| <b>Total</b> | <b>0.0168</b> | <b>0.1823</b> | <b>0.1016</b> | <b>6.9000e-004</b> | <b>0.0372</b> | <b>5.9000e-004</b> | <b>0.0377</b> | <b>0.0101</b>  | <b>5.6000e-004</b> | <b>0.0107</b> |          |           |           |     |     | <b>64.7632</b> |

**3.4 Building Construction - 2023****Unmitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0951        | 0.7561        | 0.7889        | 1.3900e-003        |               | 0.0341        | 0.0341        |                | 0.0326        | 0.0326        |          |           |           |     |     | 115.8197        |
| <b>Total</b> | <b>0.0951</b> | <b>0.7561</b> | <b>0.7889</b> | <b>1.3900e-003</b> |               | <b>0.0341</b> | <b>0.0341</b> |                | <b>0.0326</b> | <b>0.0326</b> |          |           |           |     |     | <b>115.8197</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.4 Building Construction - 2023****Unmitigated Construction Off-Site**

|              | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr            |               |               |                    |               |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000             | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000         |
| Vendor       | 1.6000e-003        | 0.0694        | 0.0107        | 2.3000e-004        | 5.5200e-003   | 7.0000e-005        | 5.5800e-003   | 1.5900e-003        | 6.0000e-005        | 1.6600e-003        |          |           |           |     |     | 21.5335        |
| Worker       | 5.7400e-003        | 3.2400e-003   | 0.0350        | 1.1000e-004        | 0.0133        | 8.0000e-005        | 0.0134        | 3.5400e-003        | 7.0000e-005        | 3.6100e-003        |          |           |           |     |     | 10.3296        |
| <b>Total</b> | <b>7.3400e-003</b> | <b>0.0726</b> | <b>0.0457</b> | <b>3.4000e-004</b> | <b>0.0188</b> | <b>1.5000e-004</b> | <b>0.0190</b> | <b>5.1300e-003</b> | <b>1.3000e-004</b> | <b>5.2700e-003</b> |          |           |           |     |     | <b>31.8631</b> |

**Mitigated Construction On-Site**

|              | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Category     | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Off-Road     | 0.0396        | 0.7560        | 0.8552        | 1.3900e-003        |               | 0.0454        | 0.0454        |                | 0.0454        | 0.0454        |          |           |           |     |     | 115.8195        |
| <b>Total</b> | <b>0.0396</b> | <b>0.7560</b> | <b>0.8552</b> | <b>1.3900e-003</b> |               | <b>0.0454</b> | <b>0.0454</b> |                | <b>0.0454</b> | <b>0.0454</b> |          |           |           |     |     | <b>115.8195</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.4 Building Construction - 2023****Mitigated Construction Off-Site**

|              | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|--------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category     | tons/yr            |               |               |                    |               |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Hauling      | 0.0000             | 0.0000        | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000         |
| Vendor       | 1.6000e-003        | 0.0694        | 0.0107        | 2.3000e-004        | 5.5200e-003   | 7.0000e-005        | 5.5800e-003   | 1.5900e-003        | 6.0000e-005        | 1.6600e-003        |          |           |           |     |     | 21.5335        |
| Worker       | 5.7400e-003        | 3.2400e-003   | 0.0350        | 1.1000e-004        | 0.0133        | 8.0000e-005        | 0.0134        | 3.5400e-003        | 7.0000e-005        | 3.6100e-003        |          |           |           |     |     | 10.3296        |
| <b>Total</b> | <b>7.3400e-003</b> | <b>0.0726</b> | <b>0.0457</b> | <b>3.4000e-004</b> | <b>0.0188</b> | <b>1.5000e-004</b> | <b>0.0190</b> | <b>5.1300e-003</b> | <b>1.3000e-004</b> | <b>5.2700e-003</b> |          |           |           |     |     | <b>31.8631</b> |

**3.5 Architectural Coating - 2023****Unmitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 0.6563        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 3.8300e-003   | 0.0261        | 0.0362        | 6.0000e-005        |               | 1.4200e-003        | 1.4200e-003        |                | 1.4200e-003        | 1.4200e-003        |          |           |           |     |     | 5.1142        |
| <b>Total</b>    | <b>0.6601</b> | <b>0.0261</b> | <b>0.0362</b> | <b>6.0000e-005</b> |               | <b>1.4200e-003</b> | <b>1.4200e-003</b> |                | <b>1.4200e-003</b> | <b>1.4200e-003</b> |          |           |           |     |     | <b>5.1142</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.5 Architectural Coating - 2023****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.1000e-004        | 2.3000e-004        | 2.5200e-003        | 1.0000e-005        | 9.6000e-004        | 1.0000e-005        | 9.7000e-004        | 2.5000e-004        | 1.0000e-005        | 2.6000e-004        |          |           |           |     |     | 0.7445        |
| <b>Total</b> | <b>4.1000e-004</b> | <b>2.3000e-004</b> | <b>2.5200e-003</b> | <b>1.0000e-005</b> | <b>9.6000e-004</b> | <b>1.0000e-005</b> | <b>9.7000e-004</b> | <b>2.5000e-004</b> | <b>1.0000e-005</b> | <b>2.6000e-004</b> |          |           |           |     |     | <b>0.7445</b> |

**Mitigated Construction On-Site**

|                 | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category        | tons/yr       |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Archit. Coating | 0.6563        |               |               |                    |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Off-Road        | 1.1900e-003   | 0.0271        | 0.0367        | 6.0000e-005        |               | 1.9000e-003        | 1.9000e-003        |                | 1.9000e-003        | 1.9000e-003        |          |           |           |     |     | 5.1141        |
| <b>Total</b>    | <b>0.6575</b> | <b>0.0271</b> | <b>0.0367</b> | <b>6.0000e-005</b> |               | <b>1.9000e-003</b> | <b>1.9000e-003</b> |                | <b>1.9000e-003</b> | <b>1.9000e-003</b> |          |           |           |     |     | <b>5.1141</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.5 Architectural Coating - 2023****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.1000e-004        | 2.3000e-004        | 2.5200e-003        | 1.0000e-005        | 9.6000e-004        | 1.0000e-005        | 9.7000e-004        | 2.5000e-004        | 1.0000e-005        | 2.6000e-004        |          |           |           |     |     | 0.7445        |
| <b>Total</b> | <b>4.1000e-004</b> | <b>2.3000e-004</b> | <b>2.5200e-003</b> | <b>1.0000e-005</b> | <b>9.6000e-004</b> | <b>1.0000e-005</b> | <b>9.7000e-004</b> | <b>2.5000e-004</b> | <b>1.0000e-005</b> | <b>2.6000e-004</b> |          |           |           |     |     | <b>0.7445</b> |

**3.6 Demolition - 2022****Unmitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |                    |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 7.6800e-003        | 0.0000             | 7.6800e-003   | 1.1600e-003        | 0.0000             | 1.1600e-003        |          |           |           |     |     | 0.0000         |
| Off-Road      | 8.4400e-003        | 0.0831        | 0.0698        | 1.2000e-004        |                    | 4.1900e-003        | 4.1900e-003   |                    | 3.9100e-003        | 3.9100e-003        |          |           |           |     |     | 10.6060        |
| <b>Total</b>  | <b>8.4400e-003</b> | <b>0.0831</b> | <b>0.0698</b> | <b>1.2000e-004</b> | <b>7.6800e-003</b> | <b>4.1900e-003</b> | <b>0.0119</b> | <b>1.1600e-003</b> | <b>3.9100e-003</b> | <b>5.0700e-003</b> |          |           |           |     |     | <b>10.6060</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.6 Demolition - 2022****Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 2.5000e-004        | 8.3700e-003        | 1.2400e-003        | 3.0000e-005        | 6.1000e-004        | 3.0000e-005        | 6.3000e-004        | 1.7000e-004        | 2.0000e-005        | 1.9000e-004        |          |           |           |     |     | 2.6418        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.4000e-004        | 1.4000e-004        | 1.4900e-003        | 0.0000             | 5.2000e-004        | 0.0000             | 5.2000e-004        | 1.4000e-004        | 0.0000             | 1.4000e-004        |          |           |           |     |     | 0.4190        |
| <b>Total</b> | <b>4.9000e-004</b> | <b>8.5100e-003</b> | <b>2.7300e-003</b> | <b>3.0000e-005</b> | <b>1.1300e-003</b> | <b>3.0000e-005</b> | <b>1.1500e-003</b> | <b>3.1000e-004</b> | <b>2.0000e-005</b> | <b>3.3000e-004</b> |          |           |           |     |     | <b>3.0608</b> |

**Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Category      | tons/yr            |               |               |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |                |
| Fugitive Dust |                    |               |               |                    | 3.0000e-003        | 0.0000             | 3.0000e-003        | 4.5000e-004        | 0.0000             | 4.5000e-004        |          |           |           |     |     | 0.0000         |
| Off-Road      | 2.8100e-003        | 0.0605        | 0.0771        | 1.2000e-004        |                    | 3.5900e-003        | 3.5900e-003        |                    | 3.5900e-003        | 3.5900e-003        |          |           |           |     |     | 10.6060        |
| <b>Total</b>  | <b>2.8100e-003</b> | <b>0.0605</b> | <b>0.0771</b> | <b>1.2000e-004</b> | <b>3.0000e-003</b> | <b>3.5900e-003</b> | <b>6.5900e-003</b> | <b>4.5000e-004</b> | <b>3.5900e-003</b> | <b>4.0400e-003</b> |          |           |           |     |     | <b>10.6060</b> |



## CCMC- Medical-Dental Office Building - Fresno County, Annual

**3.6 Demolition - 2022****Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |                    |                    |                    |                    |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 2.5000e-004        | 8.3700e-003        | 1.2400e-003        | 3.0000e-005        | 6.1000e-004        | 3.0000e-005        | 6.3000e-004        | 1.7000e-004        | 2.0000e-005        | 1.9000e-004        |          |           |           |     |     | 2.6418        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 2.4000e-004        | 1.4000e-004        | 1.4900e-003        | 0.0000             | 5.2000e-004        | 0.0000             | 5.2000e-004        | 1.4000e-004        | 0.0000             | 1.4000e-004        |          |           |           |     |     | 0.4190        |
| <b>Total</b> | <b>4.9000e-004</b> | <b>8.5100e-003</b> | <b>2.7300e-003</b> | <b>3.0000e-005</b> | <b>1.1300e-003</b> | <b>3.0000e-005</b> | <b>1.1500e-003</b> | <b>3.1000e-004</b> | <b>2.0000e-005</b> | <b>3.3000e-004</b> |          |           |           |     |     | <b>3.0608</b> |

**4.0 Operational Detail - Mobile****4.1 Mitigation Measures Mobile**

## CCMC- Medical-Dental Office Building - Fresno County, Annual

|             | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category    | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Mitigated   | 0.6383  | 7.5507 | 5.5833 | 0.0336 | 1.9337        | 0.0173       | 1.9510     | 0.5212         | 0.0162        | 0.5374      |          |           |           |     |     | 3,147.6070 |
| Unmitigated | 0.6383  | 7.5507 | 5.5833 | 0.0336 | 1.9337        | 0.0173       | 1.9510     | 0.5212         | 0.0162        | 0.5374      |          |           |           |     |     | 3,147.6070 |

## 4.2 Trip Summary Information

| Land Use                | Average Daily Trip Rate |          |        | Unmitigated | Mitigated  |
|-------------------------|-------------------------|----------|--------|-------------|------------|
|                         | Weekday                 | Saturday | Sunday | Annual VMT  | Annual VMT |
| Medical Office Building | 3,410.38                | 845.75   | 146.31 | 5,045,224   | 5,045,224  |
| Total                   | 3,410.38                | 845.75   | 146.31 | 5,045,224   | 5,045,224  |

## 4.3 Trip Type Information

| Land Use                | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|-------------------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|                         | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Medical Office Building | 9.50       | 7.30       | 7.30        | 29.60      | 51.40      | 19.00       | 60             | 30       | 10      |

## 4.4 Fleet Mix

| Land Use                | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|-------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Medical Office Building | 0.501421 | 0.030018 | 0.171383 | 0.107490 | 0.013683 | 0.004097 | 0.033773 | 0.127911 | 0.002341 | 0.001406 | 0.004884 | 0.001058 | 0.000535 |

## 5.0 Energy Detail

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 Historical Energy Use: N

## CCMC- Medical-Dental Office Building - Fresno County, Annual

## 5.1 Mitigation Measures Energy

|                         | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e     |
|-------------------------|-------------|--------|--------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|----------|
| Category                | tons/yr     |        |        |             |               |              |             |                |               |             | MT/yr    |           |           |     |     |          |
| Electricity Mitigated   |             |        |        |             |               | 0.0000       | 0.0000      |                | 0.0000        | 0.0000      |          |           |           |     |     | 256.9273 |
| Electricity Unmitigated |             |        |        |             |               | 0.0000       | 0.0000      |                | 0.0000        | 0.0000      |          |           |           |     |     | 256.9273 |
| NaturalGas Mitigated    | 6.6800e-003 | 0.0607 | 0.0510 | 3.6000e-004 |               | 4.6100e-003  | 4.6100e-003 |                | 4.6100e-003   | 4.6100e-003 |          |           |           |     |     | 66.4797  |
| NaturalGas Unmitigated  | 6.6800e-003 | 0.0607 | 0.0510 | 3.6000e-004 |               | 4.6100e-003  | 4.6100e-003 |                | 4.6100e-003   | 4.6100e-003 |          |           |           |     |     | 66.4797  |

## 5.2 Energy by Land Use - NaturalGas

Unmitigated

|                         | NaturalGas Use | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|-------------------------|----------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Land Use                | kBTU/yr        | tons/yr            |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                |
| Medical Office Building | 1.23842e+006   | 6.6800e-003        | 0.0607        | 0.0510        | 3.6000e-004        |               | 4.6100e-003        | 4.6100e-003        |                | 4.6100e-003        | 4.6100e-003        |          |           |           |     |     | 66.4797        |
| <b>Total</b>            |                | <b>6.6800e-003</b> | <b>0.0607</b> | <b>0.0510</b> | <b>3.6000e-004</b> |               | <b>4.6100e-003</b> | <b>4.6100e-003</b> |                | <b>4.6100e-003</b> | <b>4.6100e-003</b> |          |           |           |     |     | <b>66.4797</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Mitigated**

|                         | NaturalGas Use | ROG                | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|-------------------------|----------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|----------------|
| Land Use                | kBTU/yr        | tons/yr            |               |               |                    |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                |
| Medical Office Building | 1.23842e+006   | 6.6800e-003        | 0.0607        | 0.0510        | 3.6000e-004        |               | 4.6100e-003        | 4.6100e-003        |                | 4.6100e-003        | 4.6100e-003        |          |           |           |     |     | 66.4797        |
| <b>Total</b>            |                | <b>6.6800e-003</b> | <b>0.0607</b> | <b>0.0510</b> | <b>3.6000e-004</b> |               | <b>4.6100e-003</b> | <b>4.6100e-003</b> |                | <b>4.6100e-003</b> | <b>4.6100e-003</b> |          |           |           |     |     | <b>66.4797</b> |

**5.3 Energy by Land Use - Electricity****Unmitigated**

|                         | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|-------------------------|-----------------|-----------|-----|-----|-----------------|
| Land Use                | kWh/yr          | MT/yr     |     |     |                 |
| Medical Office Building | 879733          |           |     |     | 256.9273        |
| <b>Total</b>            |                 |           |     |     | <b>256.9273</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Mitigated**

|                         | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|-------------------------|-----------------|-----------|-----|-----|-----------------|
| Land Use                | kWh/yr          | MT/yr     |     |     |                 |
| Medical Office Building | 879733          |           |     |     | 256.9273        |
| <b>Total</b>            |                 |           |     |     | <b>256.9273</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

|             | ROG     | NOx         | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|---------|-------------|-------------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr |             |             |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 0.4344  | 1.0000e-005 | 8.7000e-004 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1.8000e-003 |
| Unmitigated | 0.4344  | 1.0000e-005 | 8.7000e-004 | 0.0000 |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1.8000e-003 |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**6.2 Area by SubCategory****Unmitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |                    |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.0656        |                    |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.3687        |                    |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 8.0000e-005   | 1.0000e-005        | 8.7000e-004        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.8000e-003        |
| <b>Total</b>          | <b>0.4344</b> | <b>1.0000e-005</b> | <b>8.7000e-004</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>1.8000e-003</b> |

**Mitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |                    |                    |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.0656        |                    |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Consumer Products     | 0.3687        |                    |                    |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000             |
| Landscaping           | 8.0000e-005   | 1.0000e-005        | 8.7000e-004        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 1.8000e-003        |
| <b>Total</b>          | <b>0.4344</b> | <b>1.0000e-005</b> | <b>8.7000e-004</b> | <b>0.0000</b> |               | <b>0.0000</b> | <b>0.0000</b> |                | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>1.8000e-003</b> |

**7.0 Water Detail**

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**7.1 Mitigation Measures Water**

|             | Total CO2 | CH4 | N2O | CO2e    |
|-------------|-----------|-----|-----|---------|
| Category    | MT/yr     |     |     |         |
| Mitigated   |           |     |     | 37.1449 |
| Unmitigated |           |     |     | 37.1449 |

**7.2 Water by Land Use****Unmitigated**

|                         | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|-------------------------|--------------------|-----------|-----|-----|----------------|
| Land Use                | Mgal               | MT/yr     |     |     |                |
| Medical Office Building | 11.8441 / 2.25602  |           |     |     | 37.1449        |
| <b>Total</b>            |                    |           |     |     | <b>37.1449</b> |

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|                         | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|-------------------------|--------------------|-----------|-----|-----|----------------|
| Land Use                | Mgal               | MT/yr     |     |     |                |
| Medical Office Building | 11.8441 / 2.25602  |           |     |     | 37.1449        |
| <b>Total</b>            |                    |           |     |     | <b>37.1449</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste****Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
|             | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 512.6628 |
| Unmitigated |           |     |     | 512.6628 |



## CCMC- Medical-Dental Office Building - Fresno County, Annual

**8.2 Waste by Land Use****Unmitigated**

|                         | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|-------------------------|----------------|-----------|-----|-----|-----------------|
| Land Use                | tons           | MT/yr     |     |     |                 |
| Medical Office Building | 1019.41        |           |     |     | 512.6628        |
| <b>Total</b>            |                |           |     |     | <b>512.6628</b> |

**Mitigated**

|                         | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|-------------------------|----------------|-----------|-----|-----|-----------------|
| Land Use                | tons           | MT/yr     |     |     |                 |
| Medical Office Building | 1019.41        |           |     |     | 512.6628        |
| <b>Total</b>            |                |           |     |     | <b>512.6628</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

## CCMC- Medical-Dental Office Building - Fresno County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

**11.0 Vegetation**

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## CCMC- Operational Year 2020 - Fresno County, Annual

**CCMC- Operational Year 2020****Fresno County, Annual****1.0 Project Characteristics****1.1 Land Usage**

| Land Uses                | Size   | Metric   | Lot Acreage | Floor Surface Area | Population |
|--------------------------|--------|----------|-------------|--------------------|------------|
| Hospital                 | 96.50  | 1000sqft | 2.22        | 96,500.00          | 0          |
| Hotel                    | 150.00 | Room     | 5.00        | 217,800.00         | 0          |
| Regional Shopping Center | 150.00 | 1000sqft | 3.44        | 150,000.00         | 0          |

**1.2 Other Project Characteristics**

|                                 |                                |                                 |       |                                  |       |
|---------------------------------|--------------------------------|---------------------------------|-------|----------------------------------|-------|
| <b>Urbanization</b>             | Urban                          | <b>Wind Speed (m/s)</b>         | 2.2   | <b>Precipitation Freq (Days)</b> | 45    |
| <b>Climate Zone</b>             | 3                              |                                 |       | <b>Operational Year</b>          | 2020  |
| <b>Utility Company</b>          | Pacific Gas & Electric Company |                                 |       |                                  |       |
| <b>CO2 Intensity (lb/MW hr)</b> | 532.02                         | <b>CH4 Intensity (lb/MW hr)</b> | 0.024 | <b>N2O Intensity (lb/MW hr)</b>  | 0.005 |

**1.3 User Entered Comments & Non-Default Data**

## CCMC- Operational Year 2020 - Fresno County, Annual

Project Characteristics - Energy intensity factors include RPS adjustment.

Land Use - Hotel (150 room); Shopping Center (150KSF); Hospital-Cancer Center (96.5KSF),

Construction Phase - Construction emissions not included in this model run.

Off-road Equipment - Equipment based on model defaults.

Off-road Equipment - .

Trips and VMT - .

Demolition -

Vehicle Trips - Trip gen based on traffic analysis and model defaults. Vehicle trip lengths based on model defaults for Fresno County.

Energy Use - Includes RPS adjustment

Water And Wastewater - Water/wastewater based on model defaults.

Solid Waste - Solid waste based on model defaults.

Construction Off-road Equipment Mitigation - Const mitigation does not apply to this model run.

Energy Mitigation - Includes installation of energy-efficient lighting

Water Mitigation - Includes installation of low-flow water fixtures, water efficient irrigation systems

Waste Mitigation - Assumes minimum 50% diversion rate (current).

| Table Name                | Column Name                  | Default Value | New Value |
|---------------------------|------------------------------|---------------|-----------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15        |
| tblConstructionPhase      | NumDays                      | 10.00         | 1.00      |
| tblConstructionPhase      | PhaseEndDate                 | 1/14/2019     | 1/1/2019  |
| tblProjectCharacteristics | CH4IntensityFactor           | 0.029         | 0.024     |
| tblProjectCharacteristics | CO2IntensityFactor           | 641.35        | 532.02    |
| tblProjectCharacteristics | N2OIntensityFactor           | 0.006         | 0.005     |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2020      |
| tblVehicleTrips           | WD_TR                        | 8.17          | 8.92      |

## 2.0 Emissions Summary

## CCMC- Operational Year 2020 - Fresno County, Annual

## 2.1 Overall Construction

### Unmitigated Construction

|         | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|---------|-------------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Year    | tons/yr     |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |        |
| 2019    | 2.2100e-003 | 0.0228 | 0.0113 | 2.0000e-005 | 9.1100e-003   | 1.2000e-003  | 0.0103     | 4.9800e-003    | 1.1000e-003   | 6.0800e-003 |          |           |           |     |     | 1.7863 |
| Maximum | 2.2100e-003 | 0.0228 | 0.0113 | 2.0000e-005 | 9.1100e-003   | 1.2000e-003  | 0.0103     | 4.9800e-003    | 1.1000e-003   | 6.0800e-003 |          |           |           |     |     | 1.7863 |

### Mitigated Construction

|         | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|---------|-------------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Year    | tons/yr     |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |        |
| 2019    | 2.2100e-003 | 0.0228 | 0.0113 | 2.0000e-005 | 9.1100e-003   | 1.2000e-003  | 0.0103     | 4.9800e-003    | 1.1000e-003   | 6.0800e-003 |          |           |           |     |     | 1.7863 |
| Maximum | 2.2100e-003 | 0.0228 | 0.0113 | 2.0000e-005 | 9.1100e-003   | 1.2000e-003  | 0.0103     | 4.9800e-003    | 1.1000e-003   | 6.0800e-003 |          |           |           |     |     | 1.7863 |

[illegible]

## CCMC- Operational Year 2020 - Fresno County, Annual

| Quarter | Start Date | End Date  | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|-----------|--|--|
| 1       | 1-1-2019   | 3-31-2019 | 0.0179                                       | 0.0179                                     |
|         |            | Highest   | 0.0179                                       | 0.0179                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx            | CO             | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|--------------|---------------|----------------|----------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| Category     | tons/yr       |                |                |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Area         | 2.1365        | 3.0000e-005    | 3.6700e-003    | 0.0000        |               | 1.0000e-005   | 1.0000e-005   |                | 1.0000e-005   | 1.0000e-005   |          |           |           |     |     | 7.5600e-003        |
| Energy       | 0.0605        | 0.5499         | 0.4619         | 3.3000e-003   |               | 0.0418        | 0.0418        |                | 0.0418        | 0.0418        |          |           |           |     |     | 1,654.2883         |
| Mobile       | 3.0884        | 35.6935        | 26.2105        | 0.1192        | 6.2090        | 0.1368        | 6.3458        | 1.6740         | 0.1297        | 1.8038        |          |           |           |     |     | 11,139.5808        |
| Waste        |               |                |                |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 644.6343           |
| Water        |               |                |                |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 80.3008            |
| <b>Total</b> | <b>5.2854</b> | <b>36.2434</b> | <b>26.6761</b> | <b>0.1225</b> | <b>6.2090</b> | <b>0.1786</b> | <b>6.3876</b> | <b>1.6740</b>  | <b>0.1715</b> | <b>1.8456</b> |          |           |           |     |     | <b>13,518.8118</b> |

## CCMC- Operational Year 2020 - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx            | CO             | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|--------------|---------------|----------------|----------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| Category     | tons/yr       |                |                |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                    |
| Area         | 2.1365        | 3.0000e-005    | 3.6700e-003    | 0.0000        |               | 1.0000e-005   | 1.0000e-005   |                | 1.0000e-005   | 1.0000e-005   |          |           |           |     |     | 7.5600e-003        |
| Energy       | 0.0605        | 0.5499         | 0.4619         | 3.3000e-003   |               | 0.0418        | 0.0418        |                | 0.0418        | 0.0418        |          |           |           |     |     | 1,597.1445         |
| Mobile       | 3.0884        | 35.6935        | 26.2105        | 0.1192        | 6.2090        | 0.1368        | 6.3458        | 1.6740         | 0.1297        | 1.8038        |          |           |           |     |     | 11,139.5808        |
| Waste        |               |                |                |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 322.3171           |
| Water        |               |                |                |               |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 65.3649            |
| <b>Total</b> | <b>5.2854</b> | <b>36.2434</b> | <b>26.6761</b> | <b>0.1225</b> | <b>6.2090</b> | <b>0.1786</b> | <b>6.3876</b> | <b>1.6740</b>  | <b>0.1715</b> | <b>1.8456</b> |          |           |           |     |     | <b>13,124.4150</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>2.92</b> |

**3.0 Construction Detail****Construction Phase**

| Phase Number | Phase Name       | Phase Type       | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|--------------|------------------|------------------|------------|----------|---------------|----------|-------------------|
| 1            | Site Preparation | Site Preparation | 1/1/2019   | 1/1/2019 | 5             | 1        |                   |

**Acres of Grading (Site Preparation Phase): 0**

## CCMC- Operational Year 2020 - Fresno County, Annual

**Acres of Grading (Grading Phase): 0****Acres of Paving: 0****Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)****OffRoad Equipment**

| Phase Name       | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|------------------|---------------------------|--------|-------------|-------------|-------------|
| Site Preparation | Rubber Tired Dozers       | 3      | 8.00        | 247         | 0.40        |
| Site Preparation | Tractors/Loaders/Backhoes | 4      | 8.00        | 97          | 0.37        |

**Trips and VMT**

| Phase Name       | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation | 7                       | 18.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**



## CCMC- Operational Year 2020 - Fresno County, Annual

**3.2 Site Preparation - 2019****Unmitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |                    |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 9.0300e-003        | 0.0000             | 9.0300e-003   | 4.9700e-003        | 0.0000             | 4.9700e-003        |          |           |           |     |     | 0.0000        |
| Off-Road      | 2.1700e-003        | 0.0228        | 0.0110        | 2.0000e-005        |                    | 1.2000e-003        | 1.2000e-003   |                    | 1.1000e-003        | 1.1000e-003        |          |           |           |     |     | 1.7220        |
| <b>Total</b>  | <b>2.1700e-003</b> | <b>0.0228</b> | <b>0.0110</b> | <b>2.0000e-005</b> | <b>9.0300e-003</b> | <b>1.2000e-003</b> | <b>0.0102</b> | <b>4.9700e-003</b> | <b>1.1000e-003</b> | <b>6.0700e-003</b> |          |           |           |     |     | <b>1.7220</b> |

**Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.0000e-005        | 3.0000e-005        | 2.8000e-004        | 0.0000        | 7.0000e-005        | 0.0000        | 7.0000e-005        | 2.0000e-005        | 0.0000        | 2.0000e-005        |          |           |           |     |     | 0.0643        |
| <b>Total</b> | <b>4.0000e-005</b> | <b>3.0000e-005</b> | <b>2.8000e-004</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>2.0000e-005</b> | <b>0.0000</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0643</b> |

## CCMC- Operational Year 2020 - Fresno County, Annual

**3.2 Site Preparation - 2019****Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |                    |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 9.0300e-003        | 0.0000             | 9.0300e-003   | 4.9700e-003        | 0.0000             | 4.9700e-003        |          |           |           |     |     | 0.0000        |
| Off-Road      | 2.1700e-003        | 0.0228        | 0.0110        | 2.0000e-005        |                    | 1.2000e-003        | 1.2000e-003   |                    | 1.1000e-003        | 1.1000e-003        |          |           |           |     |     | 1.7220        |
| <b>Total</b>  | <b>2.1700e-003</b> | <b>0.0228</b> | <b>0.0110</b> | <b>2.0000e-005</b> | <b>9.0300e-003</b> | <b>1.2000e-003</b> | <b>0.0102</b> | <b>4.9700e-003</b> | <b>1.1000e-003</b> | <b>6.0700e-003</b> |          |           |           |     |     | <b>1.7220</b> |

**Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.0000e-005        | 3.0000e-005        | 2.8000e-004        | 0.0000        | 7.0000e-005        | 0.0000        | 7.0000e-005        | 2.0000e-005        | 0.0000        | 2.0000e-005        |          |           |           |     |     | 0.0643        |
| <b>Total</b> | <b>4.0000e-005</b> | <b>3.0000e-005</b> | <b>2.8000e-004</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>2.0000e-005</b> | <b>0.0000</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0643</b> |

**4.0 Operational Detail - Mobile**

## CCMC- Operational Year 2020 - Fresno County, Annual

## 4.1 Mitigation Measures Mobile

|             | ROG     | NOx     | CO      | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|---------|---------|---------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr |         |         |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 3.0884  | 35.6935 | 26.2105 | 0.1192 | 6.2090        | 0.1368       | 6.3458     | 1.6740         | 0.1297        | 1.8038      |          |           |           |     |     | 11,139.5808 |
| Unmitigated | 3.0884  | 35.6935 | 26.2105 | 0.1192 | 6.2090        | 0.1368       | 6.3458     | 1.6740         | 0.1297        | 1.8038      |          |           |           |     |     | 11,139.5808 |

## 4.2 Trip Summary Information

| Land Use                 | Average Daily Trip Rate |          |          | Unmitigated | Mitigated  |
|--------------------------|-------------------------|----------|----------|-------------|------------|
|                          | Weekday                 | Saturday | Sunday   | Annual VMT  | Annual VMT |
| Hospital                 | 1,275.73                | 982.37   | 859.82   | 2,957,664   | 2,957,664  |
| Hotel                    | 1,338.00                | 1,228.50 | 892.50   | 2,391,470   | 2,391,470  |
| Regional Shopping Center | 6,405.00                | 7,495.50 | 3786.00  | 10,847,071  | 10,847,071 |
| Total                    | 9,018.73                | 9,706.37 | 5,538.32 | 16,196,205  | 16,196,205 |

## 4.3 Trip Type Information

| Land Use                 | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|--------------------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
|                          | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Hospital                 | 9.50       | 7.30       | 7.30        | 64.90      | 16.10      | 19.00       | 73             | 25       | 2       |
| Hotel                    | 9.50       | 7.30       | 7.30        | 19.40      | 61.60      | 19.00       | 58             | 38       | 4       |
| Regional Shopping Center | 9.50       | 7.30       | 7.30        | 16.30      | 64.70      | 19.00       | 54             | 35       | 11      |

## CCMC- Operational Year 2020 - Fresno County, Annual

**4.4 Fleet Mix**

| Land Use                 | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|--------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hospital                 | 0.481390 | 0.032808 | 0.168621 | 0.127212 | 0.018382 | 0.004997 | 0.032622 | 0.122881 | 0.002369 | 0.001675 | 0.005261 | 0.001115 | 0.000667 |
| Hotel                    | 0.481390 | 0.032808 | 0.168621 | 0.127212 | 0.018382 | 0.004997 | 0.032622 | 0.122881 | 0.002369 | 0.001675 | 0.005261 | 0.001115 | 0.000667 |
| Regional Shopping Center | 0.481390 | 0.032808 | 0.168621 | 0.127212 | 0.018382 | 0.004997 | 0.032622 | 0.122881 | 0.002369 | 0.001675 | 0.005261 | 0.001115 | 0.000667 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

Install High Efficiency Lighting

Install Energy Efficient Appliances

|                         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category                | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Electricity Mitigated   |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 994.9408   |
| Electricity Unmitigated |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1,052.0846 |
| NaturalGas Mitigated    | 0.0605  | 0.5499 | 0.4619 | 3.3000e-003 |               | 0.0418       | 0.0418     |                | 0.0418        | 0.0418      |          |           |           |     |     | 602.2037   |
| NaturalGas Unmitigated  | 0.0605  | 0.5499 | 0.4619 | 3.3000e-003 |               | 0.0418       | 0.0418     |                | 0.0418        | 0.0418      |          |           |           |     |     | 602.2037   |

## CCMC- Operational Year 2020 - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|                          | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use                 | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Hospital                 | 4.10994e+006   | 0.0222        | 0.2015        | 0.1692        | 1.2100e-003        |               | 0.0153        | 0.0153        |                | 0.0153        | 0.0153        |          |           |           |     |     | 220.6251        |
| Hotel                    | 5.49727e+006   | 0.0296        | 0.2695        | 0.2264        | 1.6200e-003        |               | 0.0205        | 0.0205        |                | 0.0205        | 0.0205        |          |           |           |     |     | 295.0986        |
| Regional Shopping Center | 1.611e+006     | 8.6900e-003   | 0.0790        | 0.0663        | 4.7000e-004        |               | 6.0000e-003   | 6.0000e-003   |                | 6.0000e-003   | 6.0000e-003   |          |           |           |     |     | 86.4800         |
| <b>Total</b>             |                | <b>0.0605</b> | <b>0.5499</b> | <b>0.4619</b> | <b>3.3000e-003</b> |               | <b>0.0418</b> | <b>0.0418</b> |                | <b>0.0418</b> | <b>0.0418</b> |          |           |           |     |     | <b>602.2037</b> |

**Mitigated**

|                          | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|--------------------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-----------------|
| Land Use                 | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                 |
| Hospital                 | 4.10994e+006   | 0.0222        | 0.2015        | 0.1692        | 1.2100e-003        |               | 0.0153        | 0.0153        |                | 0.0153        | 0.0153        |          |           |           |     |     | 220.6251        |
| Hotel                    | 5.49727e+006   | 0.0296        | 0.2695        | 0.2264        | 1.6200e-003        |               | 0.0205        | 0.0205        |                | 0.0205        | 0.0205        |          |           |           |     |     | 295.0986        |
| Regional Shopping Center | 1.611e+006     | 8.6900e-003   | 0.0790        | 0.0663        | 4.7000e-004        |               | 6.0000e-003   | 6.0000e-003   |                | 6.0000e-003   | 6.0000e-003   |          |           |           |     |     | 86.4800         |
| <b>Total</b>             |                | <b>0.0605</b> | <b>0.5499</b> | <b>0.4619</b> | <b>3.3000e-003</b> |               | <b>0.0418</b> | <b>0.0418</b> |                | <b>0.0418</b> | <b>0.0418</b> |          |           |           |     |     | <b>602.2037</b> |

## CCMC- Operational Year 2020 - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|                          | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|--------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                 | kWh/yr          | MT/yr     |     |     |                   |
| Hospital                 | 1.30854e+006    |           |     |     | 317.0177          |
| Hotel                    | 1.7816e+006     |           |     |     | 431.6260          |
| Regional Shopping Center | 1.2525e+006     |           |     |     | 303.4410          |
| <b>Total</b>             |                 |           |     |     | <b>1,052.0846</b> |

**Mitigated**

|                          | Electricity Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------------------|-----------------|-----------|-----|-----|-----------------|
| Land Use                 | kWh/yr          | MT/yr     |     |     |                 |
| Hospital                 | 1.25079e+006    |           |     |     | 303.0277        |
| Hotel                    | 1.69492e+006    |           |     |     | 410.6252        |
| Regional Shopping Center | 1.16106e+006    |           |     |     | 281.2879        |
| <b>Total</b>             |                 |           |     |     | <b>994.9408</b> |

**6.0 Area Detail**

## CCMC- Operational Year 2020 - Fresno County, Annual

**6.1 Mitigation Measures Area**

|             | ROG     | NOx         | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e        |
|-------------|---------|-------------|-------------|--------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-------------|
| Category    | tons/yr |             |             |        |               |              |             |                |               |             | MT/yr    |           |           |     |     |             |
| Mitigated   | 2.1365  | 3.0000e-005 | 3.6700e-003 | 0.0000 |               | 1.0000e-005  | 1.0000e-005 |                | 1.0000e-005   | 1.0000e-005 |          |           |           |     |     | 7.5600e-003 |
| Unmitigated | 2.1365  | 3.0000e-005 | 3.6700e-003 | 0.0000 |               | 1.0000e-005  | 1.0000e-005 |                | 1.0000e-005   | 1.0000e-005 |          |           |           |     |     | 7.5600e-003 |

**6.2 Area by SubCategory****Unmitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |                    |                    |               |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.3228        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000             |
| Consumer Products     | 1.8133        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000             |
| Landscaping           | 3.4000e-004   | 3.0000e-005        | 3.6700e-003        | 0.0000        |               | 1.0000e-005        | 1.0000e-005        |                | 1.0000e-005        | 1.0000e-005        |          |           |           |     |     | 7.5600e-003        |
| <b>Total</b>          | <b>2.1365</b> | <b>3.0000e-005</b> | <b>3.6700e-003</b> | <b>0.0000</b> |               | <b>1.0000e-005</b> | <b>1.0000e-005</b> |                | <b>1.0000e-005</b> | <b>1.0000e-005</b> |          |           |           |     |     | <b>7.5600e-003</b> |

## CCMC- Operational Year 2020 - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|--------------------|
| SubCategory           | tons/yr       |                    |                    |               |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |                    |
| Architectural Coating | 0.3228        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000             |
| Consumer Products     | 1.8133        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000             |
| Landscaping           | 3.4000e-004   | 3.0000e-005        | 3.6700e-003        | 0.0000        |               | 1.0000e-005        | 1.0000e-005        |                | 1.0000e-005        | 1.0000e-005        |          |           |           |     |     | 7.5600e-003        |
| <b>Total</b>          | <b>2.1365</b> | <b>3.0000e-005</b> | <b>3.6700e-003</b> | <b>0.0000</b> |               | <b>1.0000e-005</b> | <b>1.0000e-005</b> |                | <b>1.0000e-005</b> | <b>1.0000e-005</b> |          |           |           |     |     | <b>7.5600e-003</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System



## CCMC- Operational Year 2020 - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e    |
|-------------|-----------|-----|-----|---------|
| Category    | MT/yr     |     |     |         |
| Mitigated   |           |     |     | 65.3649 |
| Unmitigated |           |     |     | 80.3008 |

## 7.2 Water by Land Use

Unmitigated

|                          | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------------------|--------------------|-----------|-----|-----|----------------|
| Land Use                 | Mgal               | MT/yr     |     |     |                |
| Hospital                 | 12.1089 / 2.30645  |           |     |     | 34.3115        |
| Hotel                    | 3.80502 / 0.422779 |           |     |     | 10.5258        |
| Regional Shopping Center | 11.1109 / 6.80989  |           |     |     | 35.4635        |
| <b>Total</b>             |                    |           |     |     | <b>80.3008</b> |

## CCMC- Operational Year 2020 - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|                          | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e           |
|--------------------------|--------------------|-----------|-----|-----|----------------|
| Land Use                 | Mgal               | MT/yr     |     |     |                |
| Hospital                 | 9.6871 / 2.16576   |           |     |     | 27.7211        |
| Hotel                    | 3.04401 / 0.39699  |           |     |     | 8.4705         |
| Regional Shopping Center | 8.8887 / 6.39449   |           |     |     | 29.1734        |
| <b>Total</b>             |                    |           |     |     | <b>65.3649</b> |

**8.0 Waste Detail**

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**8.1 Mitigation Measures Waste**

Institute Recycling and Composting Services

## CCMC- Operational Year 2020 - Fresno County, Annual

**Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
|             | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 322.3171 |
| Unmitigated |           |     |     | 644.6343 |

**8.2 Waste by Land Use****Unmitigated**

|                          | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|--------------------------|----------------|-----------|-----|-----|-----------------|
| Land Use                 | tons           | MT/yr     |     |     |                 |
| Hospital                 | 1042.2         |           |     |     | 524.1240        |
| Hotel                    | 82.13          |           |     |     | 41.3033         |
| Regional Shopping Center | 157.5          |           |     |     | 79.2070         |
| <b>Total</b>             |                |           |     |     | <b>644.6343</b> |

## CCMC- Operational Year 2020 - Fresno County, Annual

**8.2 Waste by Land Use****Mitigated**

|                          | Waste Disposed | Total CO2 | CH4 | N2O | CO2e            |
|--------------------------|----------------|-----------|-----|-----|-----------------|
| Land Use                 | tons           | MT/yr     |     |     |                 |
| Hospital                 | 521.1          |           |     |     | 262.0620        |
| Hotel                    | 41.065         |           |     |     | 20.6517         |
| Regional Shopping Center | 78.75          |           |     |     | 39.6035         |
| <b>Total</b>             |                |           |     |     | <b>322.3171</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

**10.0 Stationary Equipment****Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

CCMC- Operational Year 2020 - Fresno County, Annual

## 11.0 Vegetation

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## CCMC- Operational Year 2029 - Fresno County, Annual

**CCMC- Operational Year 2029****Fresno County, Annual****1.0 Project Characteristics****1.1 Land Usage**

| Land Uses                | Size   | Metric   | Lot Acreage | Floor Surface Area | Population |
|--------------------------|--------|----------|-------------|--------------------|------------|
| Hospital                 | 300.17 | 1000sqft | 6.89        | 300,172.00         | 0          |
| Hotel                    | 150.00 | Room     | 5.00        | 217,800.00         | 0          |
| Regional Shopping Center | 150.00 | 1000sqft | 3.44        | 150,000.00         | 0          |
| Medical Office Building  | 94.39  | 1000sqft | 2.17        | 94,392.00          | 0          |

**1.2 Other Project Characteristics**

|                                 |                                |                                 |       |                                  |       |
|---------------------------------|--------------------------------|---------------------------------|-------|----------------------------------|-------|
| <b>Urbanization</b>             | Urban                          | <b>Wind Speed (m/s)</b>         | 2.2   | <b>Precipitation Freq (Days)</b> | 45    |
| <b>Climate Zone</b>             | 3                              |                                 |       | <b>Operational Year</b>          | 2029  |
| <b>Utility Company</b>          | Pacific Gas & Electric Company |                                 |       |                                  |       |
| <b>CO2 Intensity (lb/MW hr)</b> | 532.02                         | <b>CH4 Intensity (lb/MW hr)</b> | 0.024 | <b>N2O Intensity (lb/MW hr)</b>  | 0.005 |

**1.3 User Entered Comments & Non-Default Data**

CCMC- Operational Year 2029 - Fresno County, Annual

Project Characteristics - Energy intensity factors include RPS adjustment.

Land Use - Hotel (150 room); Shopping Center (150KSF); Hospital (300.172KSF), Medical Office (94.392KSF)

Construction Phase - Construction emissions not included in this model run.

Off-road Equipment - Equipment based on model defaults.

Off-road Equipment - .

Trips and VMT - .

Demolition -

Vehicle Trips - Trip gen based on traffic analysis and model defaults. Vehicle trip lengths based on model defaults for Fresno County.

Energy Use - Includes RPS adjustment

Construction Off-road Equipment Mitigation - Const mitigation does not apply to this model run.

Water And Wastewater - Water/wastewater based on model defaults.

Solid Waste - Solid waste based on model defaults.

Water Mitigation - Includes installation of low-flow water fixtures, water efficient irrigation systems

Energy Mitigation - Includes installation of energy-efficient lighting

Waste Mitigation - Assumes minimum 50% diversion rate (current).

## CCMC- Operational Year 2029 - Fresno County, Annual

| Table Name                | Column Name                  | Default Value | New Value  |
|---------------------------|------------------------------|---------------|------------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15         |
| tblLandUse                | BuildingSpaceSquareFeet      | 300,170.00    | 300,172.00 |
| tblLandUse                | BuildingSpaceSquareFeet      | 94,390.00     | 94,392.00  |
| tblLandUse                | LandUseSquareFeet            | 300,170.00    | 300,172.00 |
| tblLandUse                | LandUseSquareFeet            | 94,390.00     | 94,392.00  |
| tblOffRoadEquipment       | OffRoadEquipmentUnitAmount   | 3.00          | 0.00       |
| tblOffRoadEquipment       | OffRoadEquipmentUnitAmount   | 4.00          | 0.00       |
| tblProjectCharacteristics | CH4IntensityFactor           | 0.029         | 0.024      |
| tblProjectCharacteristics | CO2IntensityFactor           | 641.35        | 532.02     |
| tblProjectCharacteristics | N2OIntensityFactor           | 0.006         | 0.005      |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2029       |
| tblTripsAndVMT            | WorkerTripNumber             | 0.00          | 18.00      |
| tblVehicleTrips           | WD_TR                        | 8.17          | 8.92       |

## 2.0 Emissions Summary

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## CCMC- Operational Year 2029 - Fresno County, Annual

## 2.1 Overall Construction

### Unmitigated Construction

|         | ROG         | NOx         | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|---------|-------------|-------------|-------------|--------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Year    | tons/yr     |             |             |        |               |              |             |                |               |             | MT/yr    |           |           |     |     |        |
| 2019    | 4.0000e-005 | 3.0000e-005 | 2.8000e-004 | 0.0000 | 7.0000e-005   | 0.0000       | 7.0000e-005 | 2.0000e-005    | 0.0000        | 2.0000e-005 |          |           |           |     |     | 0.0643 |
| Maximum | 4.0000e-005 | 3.0000e-005 | 2.8000e-004 | 0.0000 | 7.0000e-005   | 0.0000       | 7.0000e-005 | 2.0000e-005    | 0.0000        | 2.0000e-005 |          |           |           |     |     | 0.0643 |

### Mitigated Construction

|         | ROG         | NOx         | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|---------|-------------|-------------|-------------|--------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Year    | tons/yr     |             |             |        |               |              |             |                |               |             | MT/yr    |           |           |     |     |        |
| 2019    | 4.0000e-005 | 3.0000e-005 | 2.8000e-004 | 0.0000 | 7.0000e-005   | 0.0000       | 7.0000e-005 | 2.0000e-005    | 0.0000        | 2.0000e-005 |          |           |           |     |     | 0.0643 |
| Maximum | 4.0000e-005 | 3.0000e-005 | 2.8000e-004 | 0.0000 | 7.0000e-005   | 0.0000       | 7.0000e-005 | 2.0000e-005    | 0.0000        | 2.0000e-005 |          |           |           |     |     | 0.0643 |

[illegible]

## CCMC- Operational Year 2029 - Fresno County, Annual

| Quarter | Start Date | End Date  | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|-----------|--|--|
| 1       | 1-1-2019   | 3-31-2019 | 0.0001                                       | 0.0001                                     |
|         |            | Highest   | 0.0001                                       | 0.0001                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG           | NOx            | CO             | SO2           | Fugitive PM10  | Exhaust PM10  | PM10 Total     | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|--------------|---------------|----------------|----------------|---------------|----------------|---------------|----------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| Category     | tons/yr       |                |                |               |                |               |                |                |               |               | MT/yr    |           |           |     |     |                    |
| Area         | 3.5080        | 6.0000e-005    | 6.3700e-003    | 0.0000        |                | 2.0000e-005   | 2.0000e-005    |                | 2.0000e-005   | 2.0000e-005   |          |           |           |     |     | 0.0132             |
| Energy       | 0.1139        | 1.0358         | 0.8701         | 6.2200e-003   |                | 0.0787        | 0.0787         |                | 0.0787        | 0.0787        |          |           |           |     |     | 3,068.6433         |
| Mobile       | 2.6911        | 37.5655        | 22.9374        | 0.1662        | 10.5252        | 0.0767        | 10.6019        | 2.8351         | 0.0719        | 2.9070        |          |           |           |     |     | 15,584.8522        |
| Waste        |               |                |                |               |                | 0.0000        | 0.0000         |                | 0.0000        | 0.0000        |          |           |           |     |     | 2,263.4994         |
| Water        |               |                |                |               |                | 0.0000        | 0.0000         |                | 0.0000        | 0.0000        |          |           |           |     |     | 186.2790           |
| <b>Total</b> | <b>6.3131</b> | <b>38.6014</b> | <b>23.8138</b> | <b>0.1724</b> | <b>10.5252</b> | <b>0.1554</b> | <b>10.6807</b> | <b>2.8351</b>  | <b>0.1506</b> | <b>2.9857</b> |          |           |           |     |     | <b>21,103.2871</b> |

## CCMC- Operational Year 2029 - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG           | NOx            | CO             | SO2           | Fugitive PM10  | Exhaust PM10  | PM10 Total     | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|--------------|---------------|----------------|----------------|---------------|----------------|---------------|----------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| Category     | tons/yr       |                |                |               |                |               |                |                |               |               | MT/yr    |           |           |     |     |                    |
| Area         | 3.5080        | 6.0000e-005    | 6.3700e-003    | 0.0000        |                | 2.0000e-005   | 2.0000e-005    |                | 2.0000e-005   | 2.0000e-005   |          |           |           |     |     | 0.0132             |
| Energy       | 0.1139        | 1.0358         | 0.8701         | 6.2200e-003   |                | 0.0787        | 0.0787         |                | 0.0787        | 0.0787        |          |           |           |     |     | 2,978.9472         |
| Mobile       | 2.6911        | 37.5655        | 22.9374        | 0.1662        | 10.5252        | 0.0767        | 10.6019        | 2.8351         | 0.0719        | 2.9070        |          |           |           |     |     | 15,584.8522        |
| Waste        |               |                |                |               |                | 0.0000        | 0.0000         |                | 0.0000        | 0.0000        |          |           |           |     |     | 1,131.7497         |
| Water        |               |                |                |               |                | 0.0000        | 0.0000         |                | 0.0000        | 0.0000        |          |           |           |     |     | 150.9872           |
| <b>Total</b> | <b>6.3131</b> | <b>38.6014</b> | <b>23.8138</b> | <b>0.1724</b> | <b>10.5252</b> | <b>0.1554</b> | <b>10.6807</b> | <b>2.8351</b>  | <b>0.1506</b> | <b>2.9857</b> |          |           |           |     |     | <b>19,846.5495</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>5.96</b> |

**3.0 Construction Detail****Construction Phase**

| Phase Number | Phase Name       | Phase Type       | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|--------------|------------------|------------------|------------|----------|---------------|----------|-------------------|
| 1            | Site Preparation | Site Preparation | 1/1/2019   | 1/1/2019 | 5             | 10       |                   |

**Acres of Grading (Site Preparation Phase): 0**

## CCMC- Operational Year 2029 - Fresno County, Annual

**Acres of Grading (Grading Phase): 0****Acres of Paving: 0****Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)****OffRoad Equipment**

| Phase Name       | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|------------------|---------------------------|--------|-------------|-------------|-------------|
| Site Preparation | Rubber Tired Dozers       | 0      | 8.00        | 247         | 0.40        |
| Site Preparation | Tractors/Loaders/Backhoes | 0      | 8.00        | 97          | 0.37        |

**Trips and VMT**

| Phase Name       | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation | 0                       | 18.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Clean Paved Roads

## CCMC- Operational Year 2029 - Fresno County, Annual

**3.2 Site Preparation - 2019****Unmitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |               |
| Fugitive Dust |               |               |               |               | 0.0000        | 0.0000        | 0.0000        | 0.0000         | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000        |
| Off-Road      | 0.0000        | 0.0000        | 0.0000        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000        |
| <b>Total</b>  | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b>  | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>0.0000</b> |

**Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.0000e-005        | 3.0000e-005        | 2.8000e-004        | 0.0000        | 7.0000e-005        | 0.0000        | 7.0000e-005        | 2.0000e-005        | 0.0000        | 2.0000e-005        |          |           |           |     |     | 0.0643        |
| <b>Total</b> | <b>4.0000e-005</b> | <b>3.0000e-005</b> | <b>2.8000e-004</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>2.0000e-005</b> | <b>0.0000</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0643</b> |

## CCMC- Operational Year 2029 - Fresno County, Annual

**3.2 Site Preparation - 2019****Mitigated Construction On-Site**

|               | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |               |
| Fugitive Dust |               |               |               |               | 0.0000        | 0.0000        | 0.0000        | 0.0000         | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000        |
| Off-Road      | 0.0000        | 0.0000        | 0.0000        | 0.0000        |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000        |
| <b>Total</b>  | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b> | <b>0.0000</b>  | <b>0.0000</b> | <b>0.0000</b> |          |           |           |     |     | <b>0.0000</b> |

**Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.0000e-005        | 3.0000e-005        | 2.8000e-004        | 0.0000        | 7.0000e-005        | 0.0000        | 7.0000e-005        | 2.0000e-005        | 0.0000        | 2.0000e-005        |          |           |           |     |     | 0.0643        |
| <b>Total</b> | <b>4.0000e-005</b> | <b>3.0000e-005</b> | <b>2.8000e-004</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>2.0000e-005</b> | <b>0.0000</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0643</b> |

**4.0 Operational Detail - Mobile**

## CCMC- Operational Year 2029 - Fresno County, Annual

## 4.1 Mitigation Measures Mobile

|             | ROG     | NOx     | CO      | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|-------------|---------|---------|---------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-----------------|
| Category    | tons/yr |         |         |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |                 |
| Mitigated   | 2.6911  | 37.5655 | 22.9374 | 0.1662 | 10.5252       | 0.0767       | 10.6019    | 2.8351         | 0.0719        | 2.9070      |          |           |           |     |     | 15,584.85<br>22 |
| Unmitigated | 2.6911  | 37.5655 | 22.9374 | 0.1662 | 10.5252       | 0.0767       | 10.6019    | 2.8351         | 0.0719        | 2.9070      |          |           |           |     |     | 15,584.85<br>22 |

## 4.2 Trip Summary Information

| Land Use                 | Average Daily Trip Rate |           |          | Unmitigated | Mitigated  |
|--------------------------|-------------------------|-----------|----------|-------------|------------|
|                          | Weekday                 | Saturday  | Sunday   | Annual VMT  | Annual VMT |
| Hospital                 | 3,968.25                | 3,055.73  | 2674.51  | 9,200,022   | 9,200,022  |
| Hotel                    | 1,338.00                | 1,228.50  | 892.50   | 2,391,470   | 2,391,470  |
| Regional Shopping Center | 6,405.00                | 7,495.50  | 3786.00  | 10,847,071  | 10,847,071 |
| Medical Office Building  | 3,410.31                | 845.73    | 146.30   | 5,045,117   | 5,045,117  |
| Total                    | 15,121.56               | 12,625.47 | 7,499.32 | 27,483,680  | 27,483,680 |

## 4.3 Trip Type Information

## CCMC- Operational Year 2029 - Fresno County, Annual

|                          | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|--------------------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
| Land Use                 | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Hospital                 | 9.50       | 7.30       | 7.30        | 64.90      | 16.10      | 19.00       | 73             | 25       | 2       |
| Hotel                    | 9.50       | 7.30       | 7.30        | 19.40      | 61.60      | 19.00       | 58             | 38       | 4       |
| Regional Shopping Center | 9.50       | 7.30       | 7.30        | 16.30      | 64.70      | 19.00       | 54             | 35       | 11      |
| Medical Office Building  | 9.50       | 7.30       | 7.30        | 29.60      | 51.40      | 19.00       | 60             | 30       | 10      |

**4.4 Fleet Mix**

| Land Use                 | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|--------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hospital                 | 0.515717 | 0.028628 | 0.174827 | 0.094954 | 0.010157 | 0.003476 | 0.033656 | 0.129018 | 0.002306 | 0.001209 | 0.004599 | 0.001008 | 0.000446 |
| Hotel                    | 0.515717 | 0.028628 | 0.174827 | 0.094954 | 0.010157 | 0.003476 | 0.033656 | 0.129018 | 0.002306 | 0.001209 | 0.004599 | 0.001008 | 0.000446 |
| Regional Shopping Center | 0.515717 | 0.028628 | 0.174827 | 0.094954 | 0.010157 | 0.003476 | 0.033656 | 0.129018 | 0.002306 | 0.001209 | 0.004599 | 0.001008 | 0.000446 |
| Medical Office Building  | 0.515717 | 0.028628 | 0.174827 | 0.094954 | 0.010157 | 0.003476 | 0.033656 | 0.129018 | 0.002306 | 0.001209 | 0.004599 | 0.001008 | 0.000446 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

Install High Efficiency Lighting



## CCMC- Operational Year 2029 - Fresno County, Annual

|                         | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category                | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Electricity Mitigated   |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1,844.6146 |
| Electricity Unmitigated |         |        |        |             |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 1,934.3106 |
| NaturalGas Mitigated    | 0.1139  | 1.0358 | 0.8701 | 6.2200e-003 |               | 0.0787       | 0.0787     |                | 0.0787        | 0.0787      |          |           |           |     |     | 1,134.3327 |
| NaturalGas Unmitigated  | 0.1139  | 1.0358 | 0.8701 | 6.2200e-003 |               | 0.0787       | 0.0787     |                | 0.0787        | 0.0787      |          |           |           |     |     | 1,134.3327 |

## 5.2 Energy by Land Use - NaturalGas

Unmitigated

|                          | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Land Use                 | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Hospital                 | 1.27843e+007   | 0.0689        | 0.6267        | 0.5264        | 3.7600e-003        |               | 0.0476        | 0.0476        |                | 0.0476        | 0.0476        |          |           |           |     |     | 686.2744          |
| Hotel                    | 5.49727e+006   | 0.0296        | 0.2695        | 0.2264        | 1.6200e-003        |               | 0.0205        | 0.0205        |                | 0.0205        | 0.0205        |          |           |           |     |     | 295.0986          |
| Medical Office Building  | 1.23842e+006   | 6.6800e-003   | 0.0607        | 0.0510        | 3.6000e-004        |               | 4.6100e-003   | 4.6100e-003   |                | 4.6100e-003   | 4.6100e-003   |          |           |           |     |     | 66.4797           |
| Regional Shopping Center | 1.611e+006     | 8.6900e-003   | 0.0790        | 0.0663        | 4.7000e-004        |               | 6.0000e-003   | 6.0000e-003   |                | 6.0000e-003   | 6.0000e-003   |          |           |           |     |     | 86.4800           |
| <b>Total</b>             |                | <b>0.1140</b> | <b>1.0358</b> | <b>0.8701</b> | <b>6.2100e-003</b> |               | <b>0.0787</b> | <b>0.0787</b> |                | <b>0.0787</b> | <b>0.0787</b> |          |           |           |     |     | <b>1,134.3327</b> |

## CCMC- Operational Year 2029 - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Mitigated**

|                          | NaturalGas Use | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|--------------------------|----------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Land Use                 | kBTU/yr        | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Hospital                 | 1.27843e+007   | 0.0689        | 0.6267        | 0.5264        | 3.7600e-003        |               | 0.0476        | 0.0476        |                | 0.0476        | 0.0476        |          |           |           |     |     | 686.2744          |
| Hotel                    | 5.49727e+006   | 0.0296        | 0.2695        | 0.2264        | 1.6200e-003        |               | 0.0205        | 0.0205        |                | 0.0205        | 0.0205        |          |           |           |     |     | 295.0986          |
| Medical Office Building  | 1.23842e+006   | 6.6800e-003   | 0.0607        | 0.0510        | 3.6000e-004        |               | 4.6100e-003   | 4.6100e-003   |                | 4.6100e-003   | 4.6100e-003   |          |           |           |     |     | 66.4797           |
| Regional Shopping Center | 1.611e+006     | 8.6900e-003   | 0.0790        | 0.0663        | 4.7000e-004        |               | 6.0000e-003   | 6.0000e-003   |                | 6.0000e-003   | 6.0000e-003   |          |           |           |     |     | 86.4800           |
| <b>Total</b>             |                | <b>0.1140</b> | <b>1.0358</b> | <b>0.8701</b> | <b>6.2100e-003</b> |               | <b>0.0787</b> | <b>0.0787</b> |                | <b>0.0787</b> | <b>0.0787</b> |          |           |           |     |     | <b>1,134.3327</b> |

## CCMC- Operational Year 2029 - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|                          | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|--------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                 | kWh/yr          | MT/yr     |     |     |                   |
| Hospital                 | 4.07033e+006    |           |     |     | 986.1122          |
| Hotel                    | 1.7816e+006     |           |     |     | 431.6260          |
| Medical Office Building  | 879733          |           |     |     | 213.1315          |
| Regional Shopping Center | 1.2525e+006     |           |     |     | 303.4410          |
| <b>Total</b>             |                 |           |     |     | <b>1,934.3106</b> |

## CCMC- Operational Year 2029 - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Mitigated**

|                          | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|--------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                 | kWh/yr          | MT/yr     |     |     |                   |
| Hospital                 | 3.89071e+006    |           |     |     | 942.5952          |
| Hotel                    | 1.72759e+006    |           |     |     | 418.5401          |
| Medical Office Building  | 834576          |           |     |     | 202.1913          |
| Regional Shopping Center | 1.16106e+006    |           |     |     | 281.2879          |
| <b>Total</b>             |                 |           |     |     | <b>1,844.6146</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

## CCMC- Operational Year 2029 - Fresno County, Annual

|             | ROG     | NOx         | CO          | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|-------------|---------|-------------|-------------|--------|---------------|--------------|-------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Category    | tons/yr |             |             |        |               |              |             |                |               |             | MT/yr    |           |           |     |     |        |
| Mitigated   | 3.5080  | 6.0000e-005 | 6.3700e-003 | 0.0000 |               | 2.0000e-005  | 2.0000e-005 |                | 2.0000e-005   | 2.0000e-005 |          |           |           |     |     | 0.0132 |
| Unmitigated | 3.5080  | 6.0000e-005 | 6.3700e-003 | 0.0000 |               | 2.0000e-005  | 2.0000e-005 |                | 2.0000e-005   | 2.0000e-005 |          |           |           |     |     | 0.0132 |

## 6.2 Area by SubCategory

Unmitigated

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| SubCategory           | tons/yr       |                    |                    |               |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Architectural Coating | 0.5300        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Consumer Products     | 2.9774        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Landscaping           | 5.9000e-004   | 6.0000e-005        | 6.3700e-003        | 0.0000        |               | 2.0000e-005        | 2.0000e-005        |                | 2.0000e-005        | 2.0000e-005        |          |           |           |     |     | 0.0132        |
| <b>Total</b>          | <b>3.5080</b> | <b>6.0000e-005</b> | <b>6.3700e-003</b> | <b>0.0000</b> |               | <b>2.0000e-005</b> | <b>2.0000e-005</b> |                | <b>2.0000e-005</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0132</b> |

## CCMC- Operational Year 2029 - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG           | NOx                | CO                 | SO2           | Fugitive PM10 | Exhaust PM10       | PM10 Total         | Fugitive PM2.5 | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|-----------------------|---------------|--------------------|--------------------|---------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| SubCategory           | tons/yr       |                    |                    |               |               |                    |                    |                |                    |                    | MT/yr    |           |           |     |     |               |
| Architectural Coating | 0.5300        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Consumer Products     | 2.9774        |                    |                    |               |               | 0.0000             | 0.0000             |                | 0.0000             | 0.0000             |          |           |           |     |     | 0.0000        |
| Landscaping           | 5.9000e-004   | 6.0000e-005        | 6.3700e-003        | 0.0000        |               | 2.0000e-005        | 2.0000e-005        |                | 2.0000e-005        | 2.0000e-005        |          |           |           |     |     | 0.0132        |
| <b>Total</b>          | <b>3.5080</b> | <b>6.0000e-005</b> | <b>6.3700e-003</b> | <b>0.0000</b> |               | <b>2.0000e-005</b> | <b>2.0000e-005</b> |                | <b>2.0000e-005</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0132</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

## CCMC- Operational Year 2029 - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
| Category    | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 150.9872 |
| Unmitigated |           |     |     | 186.2790 |

**7.2 Water by Land Use****Unmitigated**

|                          | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------------------|--------------------|-----------|-----|-----|-----------------|
| Land Use                 | Mgal               | MT/yr     |     |     |                 |
| Hospital                 | 37.6655 / 7.17438  |           |     |     | 106.7284        |
| Hotel                    | 3.80502 / 0.422779 |           |     |     | 10.5258         |
| Medical Office Building  | 11.8441 / 2.25602  |           |     |     | 33.5613         |
| Regional Shopping Center | 11.1109 / 6.80989  |           |     |     | 35.4635         |
| <b>Total</b>             |                    |           |     |     | <b>186.2790</b> |

## CCMC- Operational Year 2029 - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|                          | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e            |
|--------------------------|--------------------|-----------|-----|-----|-----------------|
| Land Use                 | Mgal               | MT/yr     |     |     |                 |
| Hospital                 | 30.1324 / 6.73674  |           |     |     | 86.2284         |
| Hotel                    | 3.04401 / 0.39699  |           |     |     | 8.4705          |
| Medical Office Building  | 9.47529 / 2.1184   |           |     |     | 27.1150         |
| Regional Shopping Center | 8.8887 / 6.39449   |           |     |     | 29.1734         |
| <b>Total</b>             |                    |           |     |     | <b>150.9872</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste**

Institute Recycling and Composting Services



## CCMC- Operational Year 2029 - Fresno County, Annual

**Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e           |
|-------------|-----------|-----|-----|----------------|
|             | MT/yr     |     |     |                |
| Mitigated   |           |     |     | 1,131.749<br>7 |
| Unmitigated |           |     |     | 2,263.499<br>4 |

**8.2 Waste by Land Use****Unmitigated**

|                             | Waste<br>Disposed | Total CO2 | CH4 | N2O | CO2e                   |
|-----------------------------|-------------------|-----------|-----|-----|------------------------|
| Land Use                    | tons              | MT/yr     |     |     |                        |
| Hospital                    | 3241.84           |           |     |     | 1,630.326<br>3         |
| Hotel                       | 82.13             |           |     |     | 41.3033                |
| Medical Office<br>Building  | 1019.41           |           |     |     | 512.6628               |
| Regional<br>Shopping Center | 157.5             |           |     |     | 79.2070                |
| <b>Total</b>                |                   |           |     |     | <b>2,263.499<br/>4</b> |

## CCMC- Operational Year 2029 - Fresno County, Annual

**8.2 Waste by Land Use****Mitigated**

|                          | Waste Disposed | Total CO2 | CH4 | N2O | CO2e              |
|--------------------------|----------------|-----------|-----|-----|-------------------|
| Land Use                 | tons           | MT/yr     |     |     |                   |
| Hospital                 | 1620.92        |           |     |     | 815.1631          |
| Hotel                    | 41.065         |           |     |     | 20.6517           |
| Medical Office Building  | 509.705        |           |     |     | 256.3314          |
| Regional Shopping Center | 78.75          |           |     |     | 39.6035           |
| <b>Total</b>             |                |           |     |     | <b>1,131.7497</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

**10.0 Stationary Equipment****Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

**User Defined Equipment**

CCMC- Operational Year 2029 - Fresno County, Annual

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

## 11.0 Vegetation

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## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**CCMC- Phase I & II Operational Year 2030****Fresno County, Annual****1.0 Project Characteristics****1.1 Land Usage**

| Land Uses                         | Size   | Metric        | Lot Acreage | Floor Surface Area | Population |
|-----------------------------------|--------|---------------|-------------|--------------------|------------|
| Hospital                          | 468.84 | 1000sqft      | 10.76       | 468,844.00         | 0          |
| Hotel                             | 150.00 | Room          | 5.00        | 217,800.00         | 0          |
| Regional Shopping Center          | 220.00 | 1000sqft      | 5.05        | 220,000.00         | 0          |
| Medical Office Building           | 354.39 | 1000sqft      | 8.14        | 354,392.00         | 0          |
| Congregate Care (Assisted Living) | 100.00 | Dwelling Unit | 6.25        | 100,000.00         | 286        |

**1.2 Other Project Characteristics**

|                                 |                                |                                 |       |                                  |       |
|---------------------------------|--------------------------------|---------------------------------|-------|----------------------------------|-------|
| <b>Urbanization</b>             | Urban                          | <b>Wind Speed (m/s)</b>         | 2.2   | <b>Precipitation Freq (Days)</b> | 45    |
| <b>Climate Zone</b>             | 3                              |                                 |       | <b>Operational Year</b>          | 2030  |
| <b>Utility Company</b>          | Pacific Gas & Electric Company |                                 |       |                                  |       |
| <b>CO2 Intensity (lb/MW hr)</b> | 364.4                          | <b>CH4 Intensity (lb/MW hr)</b> | 0.016 | <b>N2O Intensity (lb/MW hr)</b>  | 0.004 |

**1.3 User Entered Comments & Non-Default Data**

CCMC- Phase I & II Operational Year 2030 - Fresno County, Annual

Project Characteristics - Energy intensity factors include RPS adjustment.

Land Use - Hotel (150 room); Shopping Center (220KSF); Hospital (468.844KSF), Medical Office (354.392KSF), Asst Living (100Units)

Construction Phase - Construction emissions not included in this model run.

Off-road Equipment - Equipment based on model defaults.

Off-road Equipment - .

Trips and VMT - .

Demolition -

Vehicle Trips - Trip gen based on traffic analysis and model defaults. Vehicle trip lengths based on model defaults for Fresno County.

Energy Use - Includes RPS adjustment

Construction Off-road Equipment Mitigation - Const mitigation does not apply to this model run.

Water And Wastewater - Water/wastewater based on model defaults.

Solid Waste - Solid waste based on model defaults.

Water Mitigation - Includes installation of low-flow water fixtures, water efficient irrigation systems

Energy Mitigation - Includes installation of energy-efficient lighting

Waste Mitigation - Assumes minimum 50% diversion rate (current).

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

| Table Name                | Column Name                  | Default Value | New Value  |
|---------------------------|------------------------------|---------------|------------|
| tblConstDustMitigation    | WaterUnpavedRoadVehicleSpeed | 40            | 15         |
| tblConstructionPhase      | NumDays                      | 30.00         | 1.00       |
| tblConstructionPhase      | PhaseEndDate                 | 1/14/2019     | 1/1/2019   |
| tblLandUse                | BuildingSpaceSquareFeet      | 468,840.00    | 468,844.00 |
| tblLandUse                | BuildingSpaceSquareFeet      | 354,390.00    | 354,392.00 |
| tblLandUse                | LandUseSquareFeet            | 468,840.00    | 468,844.00 |
| tblLandUse                | LandUseSquareFeet            | 354,390.00    | 354,392.00 |
| tblProjectCharacteristics | CH4IntensityFactor           | 0.029         | 0.016      |
| tblProjectCharacteristics | CO2IntensityFactor           | 641.35        | 364.4      |
| tblProjectCharacteristics | N2OIntensityFactor           | 0.006         | 0.004      |
| tblProjectCharacteristics | OperationalYear              | 2018          | 2030       |
| tblVehicleTrips           | WD_TR                        | 8.17          | 8.92       |

## 2.0 Emissions Summary

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## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

## 2.1 Overall Construction

### Unmitigated Construction

|         | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|---------|-------------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Year    | tons/yr     |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |        |
| 2019    | 2.2100e-003 | 0.0228 | 0.0113 | 2.0000e-005 | 9.1100e-003   | 1.2000e-003  | 0.0103     | 4.9800e-003    | 1.1000e-003   | 6.0800e-003 |          |           |           |     |     | 1.7863 |
| Maximum | 2.2100e-003 | 0.0228 | 0.0113 | 2.0000e-005 | 9.1100e-003   | 1.2000e-003  | 0.0103     | 4.9800e-003    | 1.1000e-003   | 6.0800e-003 |          |           |           |     |     | 1.7863 |

### Mitigated Construction

|         | ROG         | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e   |
|---------|-------------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|--------|
| Year    | tons/yr     |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |        |
| 2019    | 2.2100e-003 | 0.0228 | 0.0113 | 2.0000e-005 | 9.1100e-003   | 1.2000e-003  | 0.0103     | 4.9800e-003    | 1.1000e-003   | 6.0800e-003 |          |           |           |     |     | 1.7863 |
| Maximum | 2.2100e-003 | 0.0228 | 0.0113 | 2.0000e-005 | 9.1100e-003   | 1.2000e-003  | 0.0103     | 4.9800e-003    | 1.1000e-003   | 6.0800e-003 |          |           |           |     |     | 1.7863 |

[illegible]

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

| Quarter | Start Date | End Date  | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---------|------------|-----------|--|--|
| 1       | 1-1-2019   | 3-31-2019 | 0.0179                                       | 0.0179                                     |
|         |            | Highest   | 0.0179                                       | 0.0179                                     |

## 2.2 Overall Operational

Unmitigated Operational

|              | ROG            | NOx            | CO             | SO2           | Fugitive PM10  | Exhaust PM10  | PM10 Total     | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|--------------|----------------|----------------|----------------|---------------|----------------|---------------|----------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| Category     | tons/yr        |                |                |               |                |               |                |                |               |               | MT/yr    |           |           |     |     |                    |
| Area         | 6.4410         | 0.0649         | 1.9241         | 4.0500e-003   |                | 0.1959        | 0.1959         |                | 0.1959        | 0.1959        |          |           |           |     |     | 73.0626            |
| Energy       | 0.1837         | 1.6654         | 1.3685         | 0.0100        |                | 0.1269        | 0.1269         |                | 0.1269        | 0.1269        |          |           |           |     |     | 4,113.8162         |
| Mobile       | 4.9082         | 70.7701        | 41.7896        | 0.3126        | 20.0576        | 0.1390        | 20.1966        | 5.4024         | 0.1303        | 5.5327        |          |           |           |     |     | 29,321.8412        |
| Waste        |                |                |                |               |                | 0.0000        | 0.0000         |                | 0.0000        | 0.0000        |          |           |           |     |     | 4,674.6004         |
| Water        |                |                |                |               |                | 0.0000        | 0.0000         |                | 0.0000        | 0.0000        |          |           |           |     |     | 313.4060           |
| <b>Total</b> | <b>11.5330</b> | <b>72.5004</b> | <b>45.0823</b> | <b>0.3267</b> | <b>20.0576</b> | <b>0.4618</b> | <b>20.5194</b> | <b>5.4024</b>  | <b>0.4531</b> | <b>5.8555</b> |          |           |           |     |     | <b>38,496.7264</b> |



## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**2.2 Overall Operational****Mitigated Operational**

|              | ROG            | NOx            | CO             | SO2           | Fugitive PM10  | Exhaust PM10  | PM10 Total     | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e               |
|--------------|----------------|----------------|----------------|---------------|----------------|---------------|----------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|--------------------|
| Category     | tons/yr        |                |                |               |                |               |                |                |               |               | MT/yr    |           |           |     |     |                    |
| Area         | 6.4410         | 0.0649         | 1.9241         | 4.0500e-003   |                | 0.1959        | 0.1959         |                | 0.1959        | 0.1959        |          |           |           |     |     | 73.0626            |
| Energy       | 0.1837         | 1.6654         | 1.3685         | 0.0100        |                | 0.1269        | 0.1269         |                | 0.1269        | 0.1269        |          |           |           |     |     | 4,005.8945         |
| Mobile       | 4.9082         | 70.7701        | 41.7896        | 0.3126        | 20.0576        | 0.1390        | 20.1966        | 5.4024         | 0.1303        | 5.5327        |          |           |           |     |     | 29,321.8412        |
| Waste        |                |                |                |               |                | 0.0000        | 0.0000         |                | 0.0000        | 0.0000        |          |           |           |     |     | 2,337.3002         |
| Water        |                |                |                |               |                | 0.0000        | 0.0000         |                | 0.0000        | 0.0000        |          |           |           |     |     | 253.4864           |
| <b>Total</b> | <b>11.5330</b> | <b>72.5004</b> | <b>45.0823</b> | <b>0.3267</b> | <b>20.0576</b> | <b>0.4618</b> | <b>20.5194</b> | <b>5.4024</b>  | <b>0.4531</b> | <b>5.8555</b> |          |           |           |     |     | <b>35,991.5850</b> |

|                          | ROG         | NOx         | CO          | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total  | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2    | NBio-CO2    | Total CO2   | CH4         | N2O         | CO2e        |
|--------------------------|-------------|-------------|-------------|-------------|---------------|--------------|-------------|----------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Percent Reduction</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>    | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>6.51</b> |

**3.0 Construction Detail****Construction Phase**

| Phase Number | Phase Name       | Phase Type       | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|--------------|------------------|------------------|------------|----------|---------------|----------|-------------------|
| 1            | Site Preparation | Site Preparation | 1/1/2019   | 1/1/2019 | 5             | 1        |                   |

**Acres of Grading (Site Preparation Phase): 0**

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**Acres of Grading (Grading Phase): 0****Acres of Paving: 0****Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)****OffRoad Equipment**

| Phase Name       | Offroad Equipment Type    | Amount | Usage Hours | Horse Power | Load Factor |
|------------------|---------------------------|--------|-------------|-------------|-------------|
| Site Preparation | Rubber Tired Dozers       | 3      | 8.00        | 247         | 0.40        |
| Site Preparation | Tractors/Loaders/Backhoes | 4      | 8.00        | 97          | 0.37        |

**Trips and VMT**

| Phase Name       | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Site Preparation | 7                       | 18.00              | 0.00               | 0.00                | 10.80              | 7.30               | 20.00               | LD_Mix               | HDT_Mix              | HHDT                  |

**3.1 Mitigation Measures Construction**

Clean Paved Roads

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**3.2 Site Preparation - 2019****Unmitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |                    |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 9.0300e-003        | 0.0000             | 9.0300e-003   | 4.9700e-003        | 0.0000             | 4.9700e-003        |          |           |           |     |     | 0.0000        |
| Off-Road      | 2.1700e-003        | 0.0228        | 0.0110        | 2.0000e-005        |                    | 1.2000e-003        | 1.2000e-003   |                    | 1.1000e-003        | 1.1000e-003        |          |           |           |     |     | 1.7220        |
| <b>Total</b>  | <b>2.1700e-003</b> | <b>0.0228</b> | <b>0.0110</b> | <b>2.0000e-005</b> | <b>9.0300e-003</b> | <b>1.2000e-003</b> | <b>0.0102</b> | <b>4.9700e-003</b> | <b>1.1000e-003</b> | <b>6.0700e-003</b> |          |           |           |     |     | <b>1.7220</b> |

**Unmitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.0000e-005        | 3.0000e-005        | 2.8000e-004        | 0.0000        | 7.0000e-005        | 0.0000        | 7.0000e-005        | 2.0000e-005        | 0.0000        | 2.0000e-005        |          |           |           |     |     | 0.0643        |
| <b>Total</b> | <b>4.0000e-005</b> | <b>3.0000e-005</b> | <b>2.8000e-004</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>2.0000e-005</b> | <b>0.0000</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0643</b> |

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**3.2 Site Preparation - 2019****Mitigated Construction On-Site**

|               | ROG                | NOx           | CO            | SO2                | Fugitive PM10      | Exhaust PM10       | PM10 Total    | Fugitive PM2.5     | Exhaust PM2.5      | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category      | tons/yr            |               |               |                    |                    |                    |               |                    |                    |                    | MT/yr    |           |           |     |     |               |
| Fugitive Dust |                    |               |               |                    | 9.0300e-003        | 0.0000             | 9.0300e-003   | 4.9700e-003        | 0.0000             | 4.9700e-003        |          |           |           |     |     | 0.0000        |
| Off-Road      | 2.1700e-003        | 0.0228        | 0.0110        | 2.0000e-005        |                    | 1.2000e-003        | 1.2000e-003   |                    | 1.1000e-003        | 1.1000e-003        |          |           |           |     |     | 1.7220        |
| <b>Total</b>  | <b>2.1700e-003</b> | <b>0.0228</b> | <b>0.0110</b> | <b>2.0000e-005</b> | <b>9.0300e-003</b> | <b>1.2000e-003</b> | <b>0.0102</b> | <b>4.9700e-003</b> | <b>1.1000e-003</b> | <b>6.0700e-003</b> |          |           |           |     |     | <b>1.7220</b> |

**Mitigated Construction Off-Site**

|              | ROG                | NOx                | CO                 | SO2           | Fugitive PM10      | Exhaust PM10  | PM10 Total         | Fugitive PM2.5     | Exhaust PM2.5 | PM2.5 Total        | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e          |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|----------|-----------|-----------|-----|-----|---------------|
| Category     | tons/yr            |                    |                    |               |                    |               |                    |                    |               |                    | MT/yr    |           |           |     |     |               |
| Hauling      | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Vendor       | 0.0000             | 0.0000             | 0.0000             | 0.0000        | 0.0000             | 0.0000        | 0.0000             | 0.0000             | 0.0000        | 0.0000             |          |           |           |     |     | 0.0000        |
| Worker       | 4.0000e-005        | 3.0000e-005        | 2.8000e-004        | 0.0000        | 7.0000e-005        | 0.0000        | 7.0000e-005        | 2.0000e-005        | 0.0000        | 2.0000e-005        |          |           |           |     |     | 0.0643        |
| <b>Total</b> | <b>4.0000e-005</b> | <b>3.0000e-005</b> | <b>2.8000e-004</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>0.0000</b> | <b>7.0000e-005</b> | <b>2.0000e-005</b> | <b>0.0000</b> | <b>2.0000e-005</b> |          |           |           |     |     | <b>0.0643</b> |

**4.0 Operational Detail - Mobile**

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

## 4.1 Mitigation Measures Mobile

|             | ROG     | NOx     | CO      | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e            |
|-------------|---------|---------|---------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|-----------------|
| Category    | tons/yr |         |         |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |                 |
| Mitigated   | 4.9082  | 70.7701 | 41.7896 | 0.3126 | 20.0576       | 0.1390       | 20.1966    | 5.4024         | 0.1303        | 5.5327      |          |           |           |     |     | 29,321.84<br>12 |
| Unmitigated | 4.9082  | 70.7701 | 41.7896 | 0.3126 | 20.0576       | 0.1390       | 20.1966    | 5.4024         | 0.1303        | 5.5327      |          |           |           |     |     | 29,321.84<br>12 |

## 4.2 Trip Summary Information

| Land Use                          | Average Daily Trip Rate |           |           | Unmitigated | Mitigated  |
|-----------------------------------|-------------------------|-----------|-----------|-------------|------------|
|                                   | Weekday                 | Saturday  | Sunday    | Annual VMT  | Annual VMT |
| Hospital                          | 6,198.06                | 4,772.79  | 4177.36   | 14,369,651  | 14,369,651 |
| Hotel                             | 1,338.00                | 1,228.50  | 892.50    | 2,391,470   | 2,391,470  |
| Regional Shopping Center          | 9,394.00                | 10,993.40 | 5552.80   | 15,909,037  | 15,909,037 |
| Medical Office Building           | 12,804.11               | 3,175.33  | 549.30    | 18,942,038  | 18,942,038 |
| Congregate Care (Assisted Living) | 274.00                  | 220.00    | 244.00    | 767,573     | 767,573    |
| Total                             | 30,008.18               | 20,390.03 | 11,415.97 | 52,379,770  | 52,379,770 |

## 4.3 Trip Type Information

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

|                                   | Miles      |            |             | Trip %     |            |             | Trip Purpose % |          |         |
|-----------------------------------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
| Land Use                          | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary        | Diverted | Pass-by |
| Hospital                          | 9.50       | 7.30       | 7.30        | 64.90      | 16.10      | 19.00       | 73             | 25       | 2       |
| Hotel                             | 9.50       | 7.30       | 7.30        | 19.40      | 61.60      | 19.00       | 58             | 38       | 4       |
| Regional Shopping Center          | 9.50       | 7.30       | 7.30        | 16.30      | 64.70      | 19.00       | 54             | 35       | 11      |
| Medical Office Building           | 9.50       | 7.30       | 7.30        | 29.60      | 51.40      | 19.00       | 60             | 30       | 10      |
| Congregate Care (Assisted Living) | 10.80      | 7.30       | 7.50        | 48.40      | 15.90      | 35.70       | 86             | 11       | 3       |

**4.4 Fleet Mix**

| Land Use                          | LDA      | LDT1     | LDT2     | MDV      | LHD1     | LHD2     | MHD      | HHD      | OBUS     | UBUS     | MCY      | SBUS     | MH       |
|-----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Hospital                          | 0.517186 | 0.028486 | 0.175263 | 0.093589 | 0.009700 | 0.003404 | 0.033644 | 0.129242 | 0.002306 | 0.001185 | 0.004563 | 0.000998 | 0.000436 |
| Hotel                             | 0.517186 | 0.028486 | 0.175263 | 0.093589 | 0.009700 | 0.003404 | 0.033644 | 0.129242 | 0.002306 | 0.001185 | 0.004563 | 0.000998 | 0.000436 |
| Regional Shopping Center          | 0.517186 | 0.028486 | 0.175263 | 0.093589 | 0.009700 | 0.003404 | 0.033644 | 0.129242 | 0.002306 | 0.001185 | 0.004563 | 0.000998 | 0.000436 |
| Medical Office Building           | 0.517186 | 0.028486 | 0.175263 | 0.093589 | 0.009700 | 0.003404 | 0.033644 | 0.129242 | 0.002306 | 0.001185 | 0.004563 | 0.000998 | 0.000436 |
| Congregate Care (Assisted Living) | 0.517186 | 0.028486 | 0.175263 | 0.093589 | 0.009700 | 0.003404 | 0.033644 | 0.129242 | 0.002306 | 0.001185 | 0.004563 | 0.000998 | 0.000436 |

**5.0 Energy Detail**

Historical Energy Use: N

**5.1 Mitigation Measures Energy**

Install High Efficiency Lighting

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

|                         | ROG     | NOx    | CO     | SO2    | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e       |
|-------------------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|------------|
| Category                | tons/yr |        |        |        |               |              |            |                |               |             | MT/yr    |           |           |     |     |            |
| Electricity Mitigated   |         |        |        |        |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 2,176.9802 |
| Electricity Unmitigated |         |        |        |        |               | 0.0000       | 0.0000     |                | 0.0000        | 0.0000      |          |           |           |     |     | 2,284.9018 |
| NaturalGas Mitigated    | 0.1837  | 1.6654 | 1.3685 | 0.0100 |               | 0.1269       | 0.1269     |                | 0.1269        | 0.1269      |          |           |           |     |     | 1,828.9144 |
| NaturalGas Unmitigated  | 0.1837  | 1.6654 | 1.3685 | 0.0100 |               | 0.1269       | 0.1269     |                | 0.1269        | 0.1269      |          |           |           |     |     | 1,828.9144 |

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Unmitigated**

|                                   | NaturalGas Use | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Land Use                          | kBTU/yr        | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Congregate Care (Assisted Living) | 1.59234e+006   | 8.5900e-003   | 0.0734        | 0.0312        | 4.7000e-004   |               | 5.9300e-003   | 5.9300e-003   |                | 5.9300e-003   | 5.9300e-003   |          |           |           |     |     | 85.4782           |
| Hospital                          | 1.99681e+007   | 0.1077        | 0.9788        | 0.8222        | 5.8700e-003   |               | 0.0744        | 0.0744        |                | 0.0744        | 0.0744        |          |           |           |     |     | 1,071.9042        |
| Hotel                             | 5.49727e+006   | 0.0296        | 0.2695        | 0.2264        | 1.6200e-003   |               | 0.0205        | 0.0205        |                | 0.0205        | 0.0205        |          |           |           |     |     | 295.0986          |
| Medical Office Building           | 4.64962e+006   | 0.0251        | 0.2279        | 0.1915        | 1.3700e-003   |               | 0.0173        | 0.0173        |                | 0.0173        | 0.0173        |          |           |           |     |     | 249.5961          |
| Regional Shopping Center          | 2.3628e+006    | 0.0127        | 0.1158        | 0.0973        | 6.9000e-004   |               | 8.8000e-003   | 8.8000e-003   |                | 8.8000e-003   | 8.8000e-003   |          |           |           |     |     | 126.8373          |
| <b>Total</b>                      |                | <b>0.1837</b> | <b>1.6654</b> | <b>1.3685</b> | <b>0.0100</b> |               | <b>0.1269</b> | <b>0.1269</b> |                | <b>0.1269</b> | <b>0.1269</b> |          |           |           |     |     | <b>1,828.9143</b> |



## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**5.2 Energy by Land Use - NaturalGas****Mitigated**

|                                   | NaturalGas Use | ROG           | NOx           | CO            | SO2           | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|-------------------|
| Land Use                          | kBTU/yr        | tons/yr       |               |               |               |               |               |               |                |               |               | MT/yr    |           |           |     |     |                   |
| Congregate Care (Assisted Living) | 1.59234e+006   | 8.5900e-003   | 0.0734        | 0.0312        | 4.7000e-004   |               | 5.9300e-003   | 5.9300e-003   |                | 5.9300e-003   | 5.9300e-003   |          |           |           |     |     | 85.4782           |
| Hospital                          | 1.99681e+007   | 0.1077        | 0.9788        | 0.8222        | 5.8700e-003   |               | 0.0744        | 0.0744        |                | 0.0744        | 0.0744        |          |           |           |     |     | 1,071.9042        |
| Hotel                             | 5.49727e+006   | 0.0296        | 0.2695        | 0.2264        | 1.6200e-003   |               | 0.0205        | 0.0205        |                | 0.0205        | 0.0205        |          |           |           |     |     | 295.0986          |
| Medical Office Building           | 4.64962e+006   | 0.0251        | 0.2279        | 0.1915        | 1.3700e-003   |               | 0.0173        | 0.0173        |                | 0.0173        | 0.0173        |          |           |           |     |     | 249.5961          |
| Regional Shopping Center          | 2.3628e+006    | 0.0127        | 0.1158        | 0.0973        | 6.9000e-004   |               | 8.8000e-003   | 8.8000e-003   |                | 8.8000e-003   | 8.8000e-003   |          |           |           |     |     | 126.8373          |
| <b>Total</b>                      |                | <b>0.1837</b> | <b>1.6654</b> | <b>1.3685</b> | <b>0.0100</b> |               | <b>0.1269</b> | <b>0.1269</b> |                | <b>0.1269</b> | <b>0.1269</b> |          |           |           |     |     | <b>1,828.9143</b> |

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Unmitigated**

|                                   | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                          | kWh/yr          | MT/yr     |     |     |                   |
| Congregate Care (Assisted Living) | 484480          |           |     |     | 80.4291           |
| Hospital                          | 6.35752e+006    |           |     |     | 1,055.4202        |
| Hotel                             | 1.7816e+006     |           |     |     | 295.7662          |
| Medical Office Building           | 3.30293e+006    |           |     |     | 548.3239          |
| Regional Shopping Center          | 1.837e+006      |           |     |     | 304.9625          |
| <b>Total</b>                      |                 |           |     |     | <b>2,284.9019</b> |

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**5.3 Energy by Land Use - Electricity****Mitigated**

|                                   | Electricity Use | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|-----------------|-----------|-----|-----|-------------------|
| Land Use                          | kWh/yr          | MT/yr     |     |     |                   |
| Congregate Care (Assisted Living) | 472617          |           |     |     | 78.4597           |
| Hospital                          | 6.07697e+006    |           |     |     | 1,008.8447        |
| Hotel                             | 1.72759e+006    |           |     |     | 286.7992          |
| Medical Office Building           | 3.13339e+006    |           |     |     | 520.1782          |
| Regional Shopping Center          | 1.70289e+006    |           |     |     | 282.6984          |
| <b>Total</b>                      |                 |           |     |     | <b>2,176.9802</b> |

**6.0 Area Detail****6.1 Mitigation Measures Area**

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

|             | ROG     | NOx    | CO     | SO2         | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e    |
|-------------|---------|--------|--------|-------------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|-----|-----|---------|
| Category    | tons/yr |        |        |             |               |              |            |                |               |             | MT/yr    |           |           |     |     |         |
| Mitigated   | 6.4410  | 0.0649 | 1.9241 | 4.0500e-003 |               | 0.1959       | 0.1959     |                | 0.1959        | 0.1959      |          |           |           |     |     | 73.0626 |
| Unmitigated | 6.4410  | 0.0649 | 1.9241 | 4.0500e-003 |               | 0.1959       | 0.1959     |                | 0.1959        | 0.1959      |          |           |           |     |     | 73.0626 |

## 6.2 Area by SubCategory

Unmitigated

|                       | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|-----------------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| SubCategory           | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Architectural Coating | 0.9706        |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Consumer Products     | 5.3155        |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Hearth                | 0.1318        | 0.0563        | 1.1727        | 4.0100e-003        |               | 0.1917        | 0.1917        |                | 0.1917        | 0.1917        |          |           |           |     |     | 71.7982        |
| Landscaping           | 0.0232        | 8.6400e-003   | 0.7515        | 4.0000e-005        |               | 4.1600e-003   | 4.1600e-003   |                | 4.1600e-003   | 4.1600e-003   |          |           |           |     |     | 1.2645         |
| <b>Total</b>          | <b>6.4410</b> | <b>0.0649</b> | <b>1.9241</b> | <b>4.0500e-003</b> |               | <b>0.1959</b> | <b>0.1959</b> |                | <b>0.1959</b> | <b>0.1959</b> |          |           |           |     |     | <b>73.0626</b> |

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**6.2 Area by SubCategory****Mitigated**

|                       | ROG           | NOx           | CO            | SO2                | Fugitive PM10 | Exhaust PM10  | PM10 Total    | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total   | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e           |
|-----------------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------|-----------|-----|-----|----------------|
| SubCategory           | tons/yr       |               |               |                    |               |               |               |                |               |               | MT/yr    |           |           |     |     |                |
| Architectural Coating | 0.9706        |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Consumer Products     | 5.3155        |               |               |                    |               | 0.0000        | 0.0000        |                | 0.0000        | 0.0000        |          |           |           |     |     | 0.0000         |
| Hearth                | 0.1318        | 0.0563        | 1.1727        | 4.0100e-003        |               | 0.1917        | 0.1917        |                | 0.1917        | 0.1917        |          |           |           |     |     | 71.7982        |
| Landscaping           | 0.0232        | 8.6400e-003   | 0.7515        | 4.0000e-005        |               | 4.1600e-003   | 4.1600e-003   |                | 4.1600e-003   | 4.1600e-003   |          |           |           |     |     | 1.2645         |
| <b>Total</b>          | <b>6.4410</b> | <b>0.0649</b> | <b>1.9241</b> | <b>4.0500e-003</b> |               | <b>0.1959</b> | <b>0.1959</b> |                | <b>0.1959</b> | <b>0.1959</b> |          |           |           |     |     | <b>73.0626</b> |

**7.0 Water Detail****7.1 Mitigation Measures Water**

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

|             | Total CO2 | CH4 | N2O | CO2e     |
|-------------|-----------|-----|-----|----------|
| Category    | MT/yr     |     |     |          |
| Mitigated   |           |     |     | 253.4864 |
| Unmitigated |           |     |     | 313.4060 |

**7.2 Water by Land Use****Unmitigated**

|                                   | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e            |
|-----------------------------------|--------------------|-----------|-----|-----|-----------------|
| Land Use                          | Mgal               | MT/yr     |     |     |                 |
| Congregate Care (Assisted Living) | 6.5154 / 4.10754   |           |     |     | 17.1079         |
| Hospital                          | 58.8303 / 11.2058  |           |     |     | 139.4350        |
| Hotel                             | 3.80502 / 0.422779 |           |     |     | 8.8429          |
| Medical Office Building           | 44.469 / 8.47029   |           |     |     | 105.3971        |
| Regional Shopping Center          | 16.296 / 9.98784   |           |     |     | 42.6232         |
| <b>Total</b>                      |                    |           |     |     | <b>313.4060</b> |

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**7.2 Water by Land Use****Mitigated**

|                                   | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e            |
|-----------------------------------|--------------------|-----------|-----|-----|-----------------|
| Land Use                          | Mgal               | MT/yr     |     |     |                 |
| Congregate Care (Assisted Living) | 5.21232 / 3.85698  |           |     |     | 14.0180         |
| Hospital                          | 47.0642 / 10.5222  |           |     |     | 112.4530        |
| Hotel                             | 3.04401 / 0.39699  |           |     |     | 7.1085          |
| Medical Office Building           | 35.5752 / 7.95361  |           |     |     | 85.0018         |
| Regional Shopping Center          | 13.0368 / 9.37858  |           |     |     | 34.9052         |
| <b>Total</b>                      |                    |           |     |     | <b>253.4864</b> |

**8.0 Waste Detail****8.1 Mitigation Measures Waste**

Institute Recycling and Composting Services

## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**Category/Year**

|             | Total CO2 | CH4 | N2O | CO2e           |
|-------------|-----------|-----|-----|----------------|
|             | MT/yr     |     |     |                |
| Mitigated   |           |     |     | 2,337.300<br>2 |
| Unmitigated |           |     |     | 4,674.600<br>4 |

**8.2 Waste by Land Use****Unmitigated**

|                                   | Waste Disposed | Total CO2 | CH4 | N2O | CO2e                   |
|-----------------------------------|----------------|-----------|-----|-----|------------------------|
| Land Use                          | tons           | MT/yr     |     |     |                        |
| Congregate Care (Assisted Living) | 91.25          |           |     |     | 45.8898                |
| Hospital                          | 5063.47        |           |     |     | 2,546.426<br>8         |
| Hotel                             | 82.13          |           |     |     | 41.3033                |
| Medical Office Building           | 3827.41        |           |     |     | 1,924.810<br>3         |
| Regional Shopping Center          | 231            |           |     |     | 116.1703               |
| <b>Total</b>                      |                |           |     |     | <b>4,674.600<br/>4</b> |



## CCMC- Phase I &amp; II Operational Year 2030 - Fresno County, Annual

**8.2 Waste by Land Use****Mitigated**

|                                   | Waste Disposed | Total CO2 | CH4 | N2O | CO2e              |
|-----------------------------------|----------------|-----------|-----|-----|-------------------|
| Land Use                          | tons           | MT/yr     |     |     |                   |
| Congregate Care (Assisted Living) | 45.625         |           |     |     | 22.9449           |
| Hospital                          | 2531.74        |           |     |     | 1,273.2134        |
| Hotel                             | 41.065         |           |     |     | 20.6517           |
| Medical Office Building           | 1913.7         |           |     |     | 962.4052          |
| Regional Shopping Center          | 115.5          |           |     |     | 58.0851           |
| <b>Total</b>                      |                |           |     |     | <b>2,337.3002</b> |

**9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

**10.0 Stationary Equipment****Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

CCMC- Phase I & II Operational Year 2030 - Fresno County, Annual

**User Defined Equipment**

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

**11.0 Vegetation**

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# **Appendix 6A**

## **Biological Resources Assessment**

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**Biological Resources Assessment  
Herndon Avenue Widening Project  
City of Clovis**

**Prepared by**

**ODELL *Planning*  *Research, Inc.***

*Environmental Planning • School Facility Planning • Demographics*

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**Prepared for**

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1033 Fifth Street  
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**September 18, 2017**

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## Introduction

The purpose of this assessment is to determine if the project may have a significant impact on the biological resources in the vicinity and to identify design, operational, or other measures that may be available to reduce or avoid the impacts. The following biological resources report consists of a description of the results of the assessment, including habitat types present, species descriptions for special status species that have the potential to occur, potential significant impacts the project could have on these species and their habitats, recommendations for further focused species surveys, if necessary, and avoidance or minimization measures that would reduce or eliminate any project impacts on these species.

## Project Description and Background

The proposed Herndon Avenue widening would extend from Temperance Avenue on the west to the southern leg of DeWolf Avenue on the east, a distance of one mile (Figures 1 & 2). The project is partially within the City of Clovis and extends outside the city limits into Fresno County jurisdiction. The project ranges in elevation from 385 to 395 feet above mean sea level and is located in portions of Sections 34 & 35, Township 12 South, Range 21 East, and Section 2, Township 13 South, Range 21 East, M.D.B. & M., as shown on the Clovis, California Quadrangle 7.5 Minute Series USGS Map (Topographic).

Aside from the Clovis Community Medical Center (CCMC) campus on the north side of Herndon Avenue, east of Temperance Avenue, and an office building at the southwest corner of Herndon and Coventry Avenues, the existing land uses adjacent to Herndon Avenue in the project area consist of rural residences and vacant land. The Clovis General Plan designates the land north and south of Herndon Avenue between Temperance and Locan Avenues for Office use and the land on both sides of Herndon Avenue between Locan and DeWolf Avenues for Rural Residential use.

The project would widen the current five-lane Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the Enterprise Canal Bridge from two lanes to a four-lane divided roadway. At the Enterprise Canal Bridge the roadway will have tapered to two lanes and the widening between the bridge and the southern leg of DeWolf Avenue will be minor. The project includes the installation of sidewalks, curb and gutter, street lights, median improvements and striping overlay. Existing overhead utilities on the south side of Herndon Avenue between Temperance and Locan Avenues will be placed underground. East of Locan Avenue, the overhead utilities will be relocated outside the roadway. The project will include traffic signals at Locan Avenue and at DeWolf Avenue.

## Assessment Methods

A background search and literature review of all existing data pertaining to biological resources within the area was conducted. This included searching *California Natural Diversity Data Base* (CDFW 2017), the *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2017), the U.S. Fish and Wildlife Service *IPac Trust Resource List* (see Appendices), other available CEQA/NEPA documents, herbaria records, maps, and photographs. To ensure completeness of the search, a nine-quad radius was used for database queries, centered on the Clovis 7.5" USGS Quadrangle (Figure 3). From this review, a list of potentially occurring special status species was compiled for the project (see Appendices). Special status biological resources include special-status plant and wildlife species (including State or Federally designated, rare, threatened, endangered, Migratory Bird Treaty Act species, species of concern, or unique species); potential wetland/riparian habitats; sensitive plant communities; and other environmentally sensitive habitat areas.

On October 16, 2016, a reconnaissance-level site visit was conducted within the project footprint and a 100 foot radius buffer (study area), where accessible, to assess/map potential special status biological resources. The project site was surveyed on foot and evaluated to determine its ability to support the special status species under consideration. Wildlife observations, plant species, and habitat types encountered were documented. Focus was placed on searching for large burrows or burrow complexes and any potential wetland features, as well as potential wildlife corridors.

## **Environmental Setting**

### ***Existing Conditions***

The project site is within San Joaquin Valley subregion of the California Floristic Province (Baldwin et al. 2012). Topography of the vicinity is relatively flat, without large elevation changes. There are 5 soil types within the project area, however all soil map units are in the San Joaquin, Alamo, and Ramona Series (see Figure 3 in LOA 2017) (NRCS 2017). These soil series types are typically found on stream terraces, alluvial fans, or fan remnants on valleys. The alluvium is derived from granite and other rock sources, and range from poorly drained (Alamo Clay) to well drained soils, some of which have the potential to be hydric. None of the soils are strongly alkaline. Due to human land alteration within the project area and vicinity (road construction, residential/commercial development), the native soils have been altered resulting in the absence of typical characteristics of hydric soils (LOA 2017).

Located between the Coast Range and the Sierra Nevada, the San Joaquin Valley has dry, hot summers and cool winters. The Fresno/Clovis area has a mean annual rainfall of 11 inches and average temperatures of 63 °F (Average range: 50-76 °F) (Western Regional Climate Center 2015).

In general, this area of Clovis and Fresno County is developing to urban and residential uses, however residual agricultural and rural residential uses remain in the vicinity. With the development of the area, more urban influences also are prevalent, including frequent human disturbance, feral animals, rodent poisoning, and debris. Adjacent land uses include residential, offices, and an elementary school to the south, the Clovis Community Medical Center, Enterprise Canal and rural residential to the north, agricultural land and rural residential to the east, and residential and fallow agricultural land (future CCMC expansion area) to the west.

The approximately 11.8 acre project site consisted of paved Herndon Avenue, graveled road shoulder and sidewalks, ruderal/disturbed roadside areas, grazed rural residential land (horses and alpacas), and urban landscaped areas. Within this area was also a disturbed roadside depression and a seasonal wetland swale. A large man-made canal (Enterprise Canal) and access road is just north of Herndon Avenue. No other aquatic features were present. Habitat present within the project footprint was classified as developed/landscaped areas, ruderal/fallow agricultural land, and seasonal wetland swale.

Plant species observed within the study area were those typical of disturbed land and landscaped/developed land, such as non-native grasses (*Avena* spp., *Bromus* spp., *Cynodon dactylon*, *Hordeum* sp., in part), and weedy forbs (*Brassica nigra*, *Centaurea solstitialis*, *Croton setiger*, *Erodium* spp., *Helianthus annuus*, *Holocarpha* sp., *Malva parviflora*, *Plantago* sp., *Rumex crispus*, *Salsola tragus*, *Sonchus* sp., *Tribulus terrestris*, *Trichostema lanceolatum*, in part). There were several ornamental and non-native trees and shrubs associated with residences present such as coast redwood (*Sequoia sempervirens*), eucalyptus, weeping willow (*Salix × sepulcralis*), cactus, palm trees, fig (*Ficus carica*), English walnut (*Juglans regia*), oleander (*Nerium oleander*), lemon, orange, bamboo, Japanese maple, pines (*Pinus* spp.), and roses (*Rosa* spp.). Adjacent to the project area (north) along the canal are large mature eucalyptus trees.

A preliminary delineation of potential jurisdictional waters of the United States was completed by Live Oak Associates on August 8, 2017 (LOA 2017 – Appendix C). A total of approximately 8,900 square feet (0.204 acre) of potential waters of the U.S. has been identified within the project area, and includes a wetland swale (1,059 square feet)(0.024 acre) and an isolated roadside wetland depression (7,841 square feet)(0.18 acre) (LOA 2017 – see Figure 4 in Appendix C). No traditional vernal pool habitats were observed, however the roadside depression may provide habitat for large branchiopods (fairy shrimp). Artificial topographic features such as tire ruts, agricultural ditches, borrow pits, and roadside pools, can mimic the ephemeral aquatic habitat of natural vernal pools (USFWS 2015). In fact, the US Fish & Wildlife Service considers a seasonally inundated depression that holds water of sufficient depth and duration for a large branchiopod life cycle to be potential habitat for a species. Conversely, habitats with flowing water (e.g., creeks, streams, and ephemeral drainages) or those that are semi-to-permanently inundated and support perennial population of predators (e.g. bullfrogs, fish, and crayfish), generally are not considered suitable habitat for listed large branchiopods (USFWS 2015). Therefore, the seasonal wetland swale identified in the project area is not potential habitat for large branchiopods.

The immediate site vicinity is visited frequently by humans (vehicles, residents, farmers). Therefore, wildlife sensitive to human disturbance are less likely to use the project site. A few rodent burrows (none larger than 5 inches in diameter) were present within the study area, along the side of Herndon Avenue. No active rodent poisoning was evident. Rodent burrows provide habitat for several secondary inhabitant wildlife species, including snakes, lizards, and burrowing owls.

Busy roadways, landscaped areas, residential areas, and agricultural fields ordinarily provide low to marginal habitat for some terrestrial wildlife, primarily due to the amount of regular ground disturbance, pesticide/herbicide use, heavy foot and vehicle traffic, and feral or domestic animal presence. Wildlife species and sign (tracks and scat) observed on or near the project site during the visit included a species from various taxa (Table 1).

**Table 1.** Wildlife species observed during surveys conducted on October 16, 2016.

| SPECIES NAME   | COMMON NAME           |
|--|-----------------------|
| <b>BIRDS (ALL PROTECTED BY THE MIGRATORY BIRD TREATY ACT*)</b> |                       |
| <i>Anas platyrhynchos</i>                                      | Mallard               |
| <i>Aphelocoma californica</i>                                  | Western Scrub-jay     |
| <i>Branta canadensis</i>                                       | Canada goose          |
| <i>Calypte anna</i>  | Anna's hummingbird    |
| <i>Columba livia</i>   | Rock dove*            |
| <i>Larus californicus</i>                                      | California gull       |
| <b>MAMMALS</b>   |                       |
| <i>Canis familiaris</i>  | Domestic dog (scat)   |
| <i>Thomomys</i> sp.  | Gopher (mounds/holes) |

\*denotes a non-native species, not protected by MBTA

Wildlife species which may occur or use the project site for foraging or breeding include:

- bird species such as European starlings (*Sturnus vulgaris*), American crow (*Corvus brachyrhynchos*), black phoebe (*Sayornis nigricans*), mourning dove (*Zenaidura macroura*), northern mockingbird (*Mimus polyglottos*), killdeer (*Charadrius vociferus*), great blue heron (*Ardea herodias*), great horned owl (*Bubo virginianus*), mallard (*Anas platyrhynchos*) and various passerine species;

- small mammals such as California ground squirrel (*Spermophilus beecheyi*), desert cottontail (*Sylvilagus audubonii*), fox squirrel (*Sciurus niger*), Botta's pocket gopher (*Thomomys bottae*), broad-handed mole (*Scapanus latimanus*), deer mouse (*Peromyscus maniculatus*), California vole (*Microtus californicus*), old-world rats (*Rattus* sp.), and house mouse (*Mus musculus*).
- various bat species may forage on insects above the adjacent Enterprise Canal and landscaped areas, near street lights, and possibly roost in crevices of nearby overpasses and houses or in large trees at neighboring residences;
- medium-sized mammals accustomed to human disturbance which seek rodent prey such as raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), feral and domestic cats (*Felis domesticus*);
- and reptile and amphibian species Pacific gopher snake (*Pituophis catenifer catenifer*), western fence lizard (*Sceloporus occidentalis*), California toad (*Anaxyrus boreas halophilus*), and Sierran treefrog (*Pseudocris sierra*).

## Potential Direct and Indirect Project Impacts

*Would the project:*

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U. S. Fish and Wildlife Service? (Less than significant with Mitigation incorporation)*

The project site consisted of Herndon Avenue, graveled road shoulder and sidewalks, ruderal/disturbed roadside areas, grazed rural residential land (horses and alpacas), and urban landscaped areas. Also within the project are a roadside depression that holds water seasonally and an extremely ephemeral seasonal wetland swale. As such, the project site has been disturbed from its natural state for many years. Although loss of minimal rural residential agricultural land may result in decreased foraging area for some species, such land is of limited habitat value for sensitive plant and wildlife species, especially due to the amount of disturbance from humans, vehicles, and domestic animals on a regular basis. The direct impacts of the proposed road expansion will be a loss of marginal habitat and possible direct mortality for any animals in the path of construction equipment. Direct mortality could occur to common fossorial or slow-moving mammals and reptiles within the project area. Direct take could occur to large branchiopods such as vernal pool fairy shrimp (*Branchinecta lynchi*), if they occur in the marginally suitable roadside depression. Direct take could also occur for bird eggs and nestlings within the project area if vegetation removal or ground disturbance occur during the nesting season, generally February 1 through August 31. In addition to Migratory Bird Treaty Act (MBTA)-covered bird species, other special status bird species that could occur in the vicinity include Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), Loggerhead shrike (*Lanius ludovicianus*), fox sparrow (*Passerella iliaca*) (wintering), yellow-billed magpie (*Pica nuttalli*), Nuttall's woodpecker (*Picoides nuttallii*), oak titmouse (*Baeolophus inornatus*), and burrowing owl (*Athene cunicularia*) (Appendix A). The project is not expected to result in direct take of any special status plant species (Appendix B). Indirect impacts to species that may still use the area after construction could include decreased dispersal, increased mortality and injury, and increased debris that through ingestion or physical contact can be harmful to wildlife. All of these impacts are caused by the increase in human disturbance (vehicles, people, and pets). However, impacts to special status species can be minimized to a less than significant impact with the incorporation of avoidance and minimization measures.



## Special Status Species Impacts and Avoidance Measures

Database queries indicated 38 animals and 15 plant species with special status occur or have historically occurred within the 9-quad search area (Appendices A and B). Many of the species from the generated list either were historic, extirpated occurrences, or were species with very specialized habitat requirements that were not present on the site or within the vicinity. Therefore, the majority of the species were “ruled out”. Based on the habitat types present within the study area, 9 special status wildlife species have the potential to occur on the site.

### ***Vernal Pool Fairy Shrimp (Branchinecta lynchi; VPFS)***

Federal Status – Threatened

#### **Species Information and Impact**

VPFS are known from Alameda, Butte, Contra Costa, El Dorado, Fresno, Glenn, Kings, Lake, Los Angeles, Madera, Merced, Monterey, Napa, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Shasta, Solano, Stanislaus, Tehama, Tulare, Riverside, and Yuba counties in California and in southern Oregon. This species inhabits vernal pools ranging from 10-290 meters in elevation, primarily in the Central Valley and Coast Ranges of California. VPFS are commonly found in small swales, earth slumps, or basalt-flow depression basins with grassy or muddy bottoms in unplowed soils, and sometimes in very small depressions (< 1 meter diameter) in sandstone outcrops. Artificial topographic features such as tire ruts, agricultural ditches, borrow pits, and roadside pools, can mimic the ephemeral aquatic habitat of natural vernal pools, and can provide suitable habitat depending on inundation period and depth (USFWS 2015). Water temperatures between 4.5 and 23 C, with low to moderate total dissolved solids (48 to 481 parts per million (ppm)), and a pH between 6.3 and 8.5 are required by VPFS (Syrdahl, 1993; Eriksen and Belk, 1999). VPFS hatch from eggs (shell-covered dormant embryos) present in the soil from previous years of breeding, initiated when a pool fills with rainwater. They can reach maturity in approximately 18 days when temperatures are warmer (daytime temperatures of 20 C), but development can be delayed to 41 days when water is cooler (15 C) (Gallagher 1996, Helm 1998).

The project is not within USFWS designated critical habitat for VPFS (USFWS 2005). There are several CNDDDB records for VPFS within five miles of the study area. The nearest record is from 2006 and is mapped approximately ½ mile southeast of the project (CNDDDB occurrence number: 404). The record states that 3 adult VPFS were observed in a small murky puddle along the Enterprise Canal right-of-way.

The roadside wetland depression within the project area provides potential habitat for VPFS. Although VPFS have the potential to inhabit this feature, the roadside wetland depression in the project area provides only marginal habitat. No vernal pool branchiopod surveys have been conducted. This species has the potential to occur within the project area.

Therefore, in accordance with Section 7 of the FESA, a Biological Assessment will be prepared and will be submitted to the USFWS to initiate formal consultation for impacts to VPFS, a federally listed species. As described in detail below, any potential impacts to VPFS will be reduced to a ***less than significant*** level with the incorporation of **Mitigation Measures VPFS-1**.

Federally listed VPFS and other non-listed vernal pool branchiopods including midvalley fairy shrimp (*Branchinecta mesovallensis*) and California linderiella (*Linderiella occidentalis*) have the potential to occur within the proposed project area. Approximately 0.18 acres (7,841 square feet) of potential habitat would be directly impacted as a result of the road widening, this includes the entire pool, although it is not entirely within the project footprint (see Figure 4 in Appendix C). Therefore, this includes the portions of

the roadside depression in which work would occur within, but may not be destroyed, as a result of the Proposed Project. The implementation of the measures identified for this species in **Mitigation Measure VPFS-1**, including the purchase of preservation and/or creation credits required for impacts to federally listed VPFS, offset removal of marginal habitat and would enhance habitat for VPFS. **Therefore, impacts to VPFS would be reduced to less than significant.**

### **Avoidance and Minimization Measures**

The City may elect to conduct surveys for VPFS following USFWS survey guidelines (2015) to determine presence of the species within the project area. A complete survey includes at least one wet season survey and one dry season survey, completed within a 3 year period. If VPFS are not detected, and if approved by USFWS, the City may be exempt from further mitigation measures for VPFS. If VPFS are detected in the roadside depression, an Incidental Take Permit would be required, as detailed in VPFS-1. Alternatively, the City may elect to skip the surveys and immediately begin the consultation process for an Incidental Take Permit with USFWS and US Army Corps of Engineers (ACOE). A Biological Assessment to review the proposed action (the project) and its effects on the VPFS, in accordance with the legal requirements set forth in Section 7 of the Federal Endangered Species Act, would be required. Since impacts to jurisdictional wetlands will occur, it is anticipated that a federal nexus between the ACOE and USFWS would occur and a Biological Opinion/Incidental Take Permit would be issued.

**VPFS-1** An Incidental Take Permit for VPFS and shall be obtained from the USFWS prior to construction. All conditions of the permit required by USFWS shall be implemented. Appropriate mitigation credit ratios and other measures should be determined in consultation with USFWS and ACOE. At a minimum, the following conservation measures shall be implemented to minimize impacts to the federally listed VPFS and/or other non-listed vernal pool branchiopods including midvalley fairy shrimp and California linderiella:

- Effects of permanent losses and degradation of VPFS habitat shall be minimized and, to the greatest extent practicable, habitat restored. Before discharge of fill material, creation and/or preservation credits (amount TBD with consultation with USFWS) will be obtained from a USFWS-approved mitigation bank for every acre of habitat directly or indirectly impacted.
- Staging areas shall be located away from the seasonal wetlands and channels.
- Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be used onsite or disposed of at a regional landfill or other appropriate facility.
- A USFWS-approved biologist conduct habitat sensitivity training related to VPFS for all project contractors and personnel.

### ***Special Status Birds***

Ten special status avian species (Swainson's hawk, white-tailed kite, loggerhead shrike, fox sparrow (wintering), yellow-billed magpie, Nuttall's woodpecker, oak titmouse, and burrowing owl) have the potential to nest and/or forage within the study area. Greater detail regarding life history requirements of these birds is provided in Appendix A. Swainson's hawk, white-tailed kite, yellow-billed magpie, Nuttall's woodpecker, and oak titmouse could nest in the large trees within and adjacent to the study area. Loggerhead shrike could nest in shrubs or trees within and adjacent to the study area and forage in the open fields. Although none were detected during reconnaissance survey, burrowing owls could move into the area prior to construction, and occupy any large burrows during the nesting and wintering seasons. Fox sparrows may use the shrubs and landscaped areas of the project site and surrounding area for foraging habitat winter and/or migration.

## Impact

Since CDFW usually requires a various sized “no disturbance” buffers around nesting sites for these species, construction-related disturbance could be considered take under CESA and MBTA. Specific impacts to burrowing owl according to the *Staff Report on Burrowing Owl Mitigation* (CDFG 1995) include any “disturbance within 50 meters (approx. 160 ft) [75 m (250 ft) during breeding season] which may result in harassment of owls at occupied burrows; destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s)”.

In addition, other migratory birds will likely be nesting in the study area and vicinity, most of which are protected by the Migratory Bird Treaty Act (USCA 1918). Both construction related disturbance and the removal of vegetation within the project area could result in nest abandonment or direct mortality of eggs, chicks, and/or fledglings. This type of impact to migratory birds, including special status bird species, would be considered take under the MBTA and CESA, and therefore, is a potentially significant impact. In order to avoid impacts to avian species, nests and nesting habitat should not be disturbed or destroyed. The following measures will reduce potential impacts to a less than significant level.

## Avoidance and Minimization Measures

### AV-1

1. Avoidance. If feasible, any vegetation removal will take place between September 1 and February 1 to avoid impacts to nesting birds in compliance with the Migratory Bird Treaty Act. If vegetation removal must occur during the nesting season, project construction may be delayed due to actively nesting birds and their required protective buffers.
2. Pre-construction Surveys.
  - a. If vegetation removal or ground disturbance will commence between February 1 and August 31, a qualified biologist will conduct a pre-construction survey for nesting birds within 14 days of the initiation of disturbance activities. This survey will cover:
    - i. Potential nest sites in trees, bushes, or grass within species-specific buffers of the project area (Swainson’s hawk – 0.5 mile, other raptor species such as white-tailed kite – 500 ft, non-raptor species (loggerhead shrike, magpie etc. – 250 ft).
    - ii. Survey protocol developed by the Swainson’s Hawk Technical Advisory Committee (TAC) should be followed (CDFG 2000), which includes survey timing and requirements for repeated visits.
  - b. Surveys for burrowing owl will occur within 14 days prior to any ground disturbance, no matter the season. This survey will cover potential burrowing owl burrows in the project area and suitable habitat within 150 m (500 ft). Evaluation of use by owls shall be in accordance with California Department of Fish and Wildlife survey guidelines (CBOC 1993, CDFG 1995, CDFG 2012). Surveys will document if burrowing owls are nesting or using habitat in or directly adjacent to the project area. Survey results will be valid only for the season (breeding (Feb 1-Aug 31) or non-breeding (Sept 1-Jan 31) during which the survey is conducted.
  - c. If no active nests or burrows are detected during the pre-construction survey, then no further action is required. If an active nest or burrow is detected, then the following minimization measures will be implemented.
3. Minimization/Establish Buffers.

- a. Swainson's hawk, white-tailed kite, loggerhead shrike, yellow-billed magpie, Nuttall's woodpecker, oak titmouse, and MBTA-protected species: If any active nests are discovered (and if construction will occur during bird breeding season), the USFWS and/or CDFW will be contacted to determine protective measures required to avoid take. These measures could include fencing off an area where a nest occurs, or shifting construction work temporally or spatially away from the nesting birds. Biologists are required on site to monitor construction while protected migratory birds are nesting in the project area. If an active nest is found after the completion of the pre-construction surveys and after construction begins, all construction activities will stop until a qualified biologist has evaluated the nest and erected the appropriate buffer around the nest.

- b. Burrowing owl:

If burrowing owls are detected within the survey area, CDFW should be consulted to determine the suitable buffer. These buffers will take into account the level of disturbance of the project activity, existing disturbance of the site (vehicle traffic, humans, pets, etc.), and time of year (nesting vs. wintering). If avoidance is not feasible, the City will work with CDFW to determine appropriate mitigation, such as passive exclusion or translocation, and associated mitigation land offset (CDFG 2012).

4. If avoidance is not feasible, as per the General Plan Update PEIR (City of Clovis 2014), "A qualified biologist will develop appropriate mitigations that will reduce project impacts to sensitive or protected biological resources to a less than significant level. The type and amount of mitigation will depend on the resources impacted, the extent of the impacts, and the quality of habitats to be impacted. Mitigations may include, but are not limited to: 1) Compensation for lost habitat or waters in the form of preservation or creation of in-kind habitat or waters, either onsite or offsite, protected by conservation easement; 2) Purchase of appropriate credits from an approved mitigation bank servicing the Clovis General Plan Update Area; 3) Payment of in-lieu fees."

### ***Special Status Plants***

#### **Impact**

Of the 15 potentially occurring special status plant species, none were found within the project area. Although the site survey was not conducted at the peak blooming period for some potentially occurring special status plants, all plants could be ruled out because their elevation range, required habitat, and/or soil type differed from the site conditions. Therefore, the project will not impact any special status plant species.

- b. *Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U. S. Wildlife Service? (Less than significant with Mitigation incorporation)*

There is one seasonal wetland swale within the project area (see Figure 4 of Appendix C). This swale passes through the project area and crosses adjacent private land to the southwest. According to Live Oak Associates (2017), the swale is extremely ephemeral, only carrying water when provided from upstream sources. A review of the historic Google Earth imagery provided no evidence of inundation. The seasonal wetland swale may be considered a "tributary water", because as will be discussed in greater detail in the Wetland Delineation document (LOA 2017), it can be argued that at one time it connected to the San Joaquin River (a navigable water). There is a roadside depression that holds water seasonally, however this feature is not considered to be a sensitive natural community. Impacts to the seasonal wetland swale and associated mitigation measures are detailed in section c below.

- c. *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? (Less than significant with Mitigation incorporation)*

### **Impact**

Hydrologic features that may be considered waters of the United States were limited to a disturbed roadside depression and a seasonal wetland swale (approximately 0.204 acre of the 11.8 acre project site) (LOA 2017). A preliminary delineation was completed for the project (Appendix C). At the time of this report, it was not known at what date the delineation was submitted to the ACOE. The Proposed Project would impact approximately 0.204 acres of federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means. A Department of the Army Nationwide Permit Number (NWP) 14 application for linear transportation projects shall be required for the fill of the 0.204 acres of wetland features. With the incorporation of **Mitigation Measures W-1 and W-2**, including the purchase of creation and/or preservation credits for VPFS wetland habitat, to be determined in consultation with ACOE and USFWS, impacts to federally protected wetlands would be considered *less than significant*.

### **Mitigation Measures**

**W-1** The City shall obtain a Section 404 CWA Nationwide Permit (#14 for linear transportation projects) from the ACOE for impacts to wetlands and waters of the U.S. and comply with the mitigation measures identified in the permit to prevent discharge of pollutants to surface waters during construction. This shall include complying with the State's National Pollution Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit) issued by the Central Valley Regional Water Quality Control Board (CVRWQCB). A Section 401 Water Quality Certification must be obtained from the RWQCB for all proposed impacts to Waters of the State. A Section 1602 Lake and Streambed Alteration Agreement, if required by CDFW, must be obtained prior to the placement of any fill within the seasonal swale in the Project Area. Though the Nationwide Permit process, the ACOE will also submit a Biological Assessment to USFWS to initiate formal consultation under Section 7 of FESA to determine if the action could result in the incidental take of a federal listed species (in this case VPFS).

**W-2** To mitigate for impacts to waters and/or wetlands, credits will be purchased from an approved mitigation bank (typically at a 2:1 or 3:1 ratio – To be determined in consultation with ACOE and USFWS), a creation, restoration, or preservation project will be identified in the vicinity, or mitigation will be performed as otherwise directed by regulatory agencies during permit preparation. Mitigation will be implemented prior to or concurrent with filling jurisdictional waters and/or wetlands. Since the waters to be impacted by the road widening overlap with potential VPFS habitat, VPFS mitigation may incorporate a portion of the required wetland/waters mitigation acreage. The creation and preservation credits that would be purchased for the loss of VPFS, are expected to satisfy the USACE requirements for removal of seasonal wetlands.

- d. *Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites? (Less than Significant)*

The site does not appear to constitute a "movement corridor" for native wildlife (USFWS 1998) that would attract wildlife to move through the site any more than the surrounding developed and agricultural lands. The project site is bordered by residential and commercial development, and busy streets, which restricts access for wildlife. Smaller wildlife species and birds are not expected to be further inhibited by the project as compared with residential and agricultural uses. Therefore, the project will have a less than significant effect on regional wildlife movements (MO).

- e. *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?* **(No Impact)**

The project appears to be consistent with relevant biological resources policies of the City of Clovis and would not conflict with local policies or ordinances protecting biological resources (City of Clovis 2014, MO). Compliance with Mitigation Measures 4-1, 4-2, 4-3 and 4-4 of the City of Clovis General Plan Update Final EIR will be ensured by adhering to the previously mentioned avoidance, minimization, and mitigation measures.

- f. *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional or state habitat conservation plan?* **(No Impact)**

The City of Clovis and Fresno County are not part of any HCP or NCCP, so the project would not conflict any provisions of any local, regional or state habitat conservation plan (MO, USFWS 1998, 2005).

### **Cumulative Impact**

Expansion and improvements of Herndon Avenue resulting in the removal of adjacent agricultural land and minimal amount of very marginal waters of the US will not substantially contribute to the cumulative loss of habitat or the decline of special-status species. Therefore, implementation of the proposed project would not result in significant cumulative impacts to biological resources.

## SOURCES CONSULTED

- Baldwin, B.G., D.H. Goldman, D. J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson manual: vascular plants of California, second edition. University of California Press, Berkeley.
- California Burrowing Owl Consortium (CBOC). 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. Technical Report. Alviso, California, USA.
- California Department of Fish and Game (CDFG). 1995. Staff report on Burrowing Owl Mitigation. The Resources Agency, Sacramento, CA.
- California Department of Fish and Game. 2000. Recommended timing and methodology for Swainson's hawk nesting surveys in California's Central Valley. Swainson's Hawk Technical Advisory Committee, Sacramento, California, USA.
- California Department of Fish and Game. 2012. Staff report on burrowing owl mitigation. State of California Natural Resources Agency. March 7, 2012.
- California Department of Fish and Wildlife (CDFW). 2016. California Natural Diversity Database. The Resources Agency, Sacramento, CA Accessed August 2016.
- California Native Plant Society (CNPS). 2016. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society. Sacramento, CA. Accessed August 2016 from <http://www.cnps.org/inventory>
- City of Clovis. 2015. Final Program Environmental Impact Report. City of Clovis General Plan and Development Code Update. Prepared by PlaceWorks.
- Eriksen, C. and D. Belk. 1999. Fairy Shrimps of California's Puddles, Pools, and Playas. Mad River Press, Inc. Eureka, California.
- Gallagher, S. P. 1996. Seasonal Occurrence and Habitat Characteristics of Some Vernal Pool Branchiopoda in Northern California. Journal of Crustacean Biology 16.
- Helm, B.P. 1998. Biogeography of Eight Large Branchiopods Endemic to California. Pages 124-139 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren, Jr. and R. Ornduff (eds.) Ecology, Conservation, and Management of Vernal Pool Ecosystems- Proceedings from a 1996 Conference. California Native Plant society, Sacramento, California.
- H.T. Harvey & Associates. 2004. California bat mitigation, techniques, solutions, and effectiveness. Prepared for California Department of Transportation (Caltrans), Office of Biological Studies and Technical Assistance, Sacramento, CA. Project Number 2394-01. 163 pgs.
- H.T. Harvey & Associates. 2008. Clovis Healthcare Campus Expansion Biotic Study. Prepared for Paoli & Odell, Inc.
- Live Oak Associates, Inc. 2017. Potential Waters of the United States, Herndon Avenue Improvement Project, Fresno County, California. Prepared for the City of Clovis. August 8, 2017.
- Moyle, P.B. 2002. Inland Fishes of California. University of California Press. Berkeley, CA
- Odell, Melissa (MO), Senior Biologist/Planner. Odell Planning and Research, Inc. Project Site Biological Reconnaissance Survey. October 16, 2016.

- Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.
- Syrdahl, R.L. 1993. Distribution Patterns of Some Key Macroinvertebrates in a Series of Vernal Pools at Vina Plains Preserve, Tehama County, California. M.S. Thesis, California State University, Chico, California.
- USDA Natural Resources Conservation Service (NRCS). 2017. Web Soil Survey. Accessed August 2016 from <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>
- U. S. Code Annotated (USCA). 1918. Migratory bird treaty act of 1918. U.S. Code, Section Title 16, Parts 703-712.
- U.S. Fish and Wildlife Service (USFWS). 1998. Recovery plan for upland species of the San Joaquin Valley, California. Region 1, Portland, OR. 319 pp.
- U.S. Fish and Wildlife Service. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Portland, Oregon. xxvi + 606 pp.
- U.S. Fish and Wildlife Service. 2015. Survey Guidelines for the Listed Large Branchiopods. Sacramento, California. 24 pp.
- U.S. Fish and Wildlife Service. 2016. Information for Planning and Conservation (IPac) Trust Resource List. Accessed August 2016. <https://ecos.fws.gov/ipac/>
- Western Regional Climate Center. Historical Climate Center. [www.wrcc.dri.edu](http://www.wrcc.dri.edu). Accessed October 8, 2015.
- Zeiner, D. C., W. F. Laudenslayer, Jr., and K. E. Mayer, editors. 1988. California's Wildlife. Volume I: Amphibians and Reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, USA.
- Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer, and M. White, editors. 1990a. California's Wildlife. Volume II: Birds. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, USA.
- Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer, and M. White, editors. 1990b. California's Wildlife. Volume III: Mammals. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, USA



## Site Photos – October 23, 2016 and March 29, 2017



Project area along Herndon Avenue. Existing hospital campus on left side of photo. Looking west.  
October 2016.



Project area along Herndon Avenue. Existing Enterprise Canal and access road on left side of photo.  
Intersection with Locan Avenue in background. Looking west. October 2016.



Project area along Herndon Avenue. Dry seasonal wetland and culvert crossing in in center of photo. Adjacent property and associated large trees (potential bird nesting habitat) in background. Looking east. October 2016.



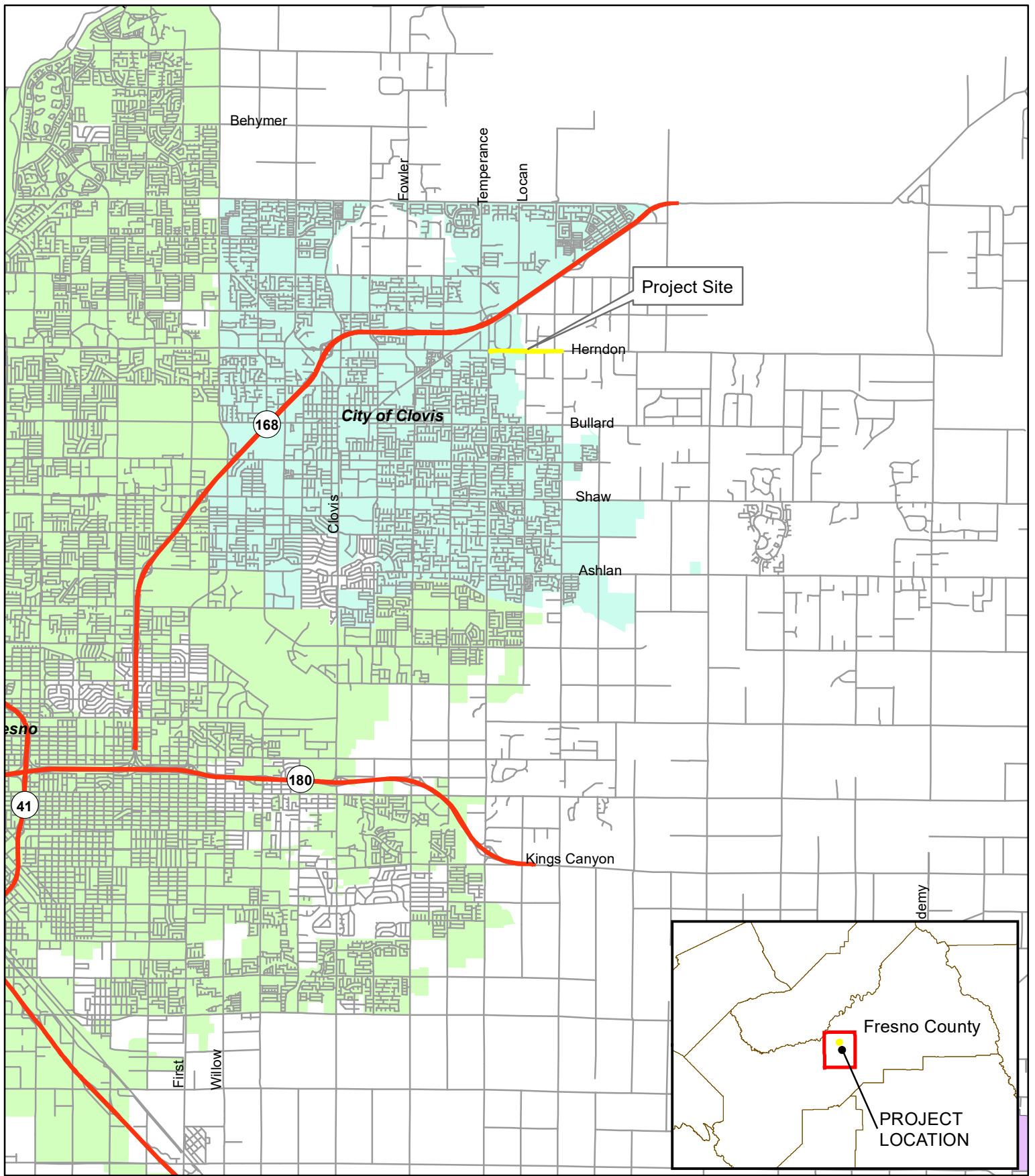
Roadside pool within project area at southeast corner of the intersection of Herndon and Locan Avenues. Looking northeast. March 2017.





Eastern end of Project Area looking east. Potential nesting bird habitat in residential trees and shrubs.  
Looking east. October 2016.

# Appendices and Maps



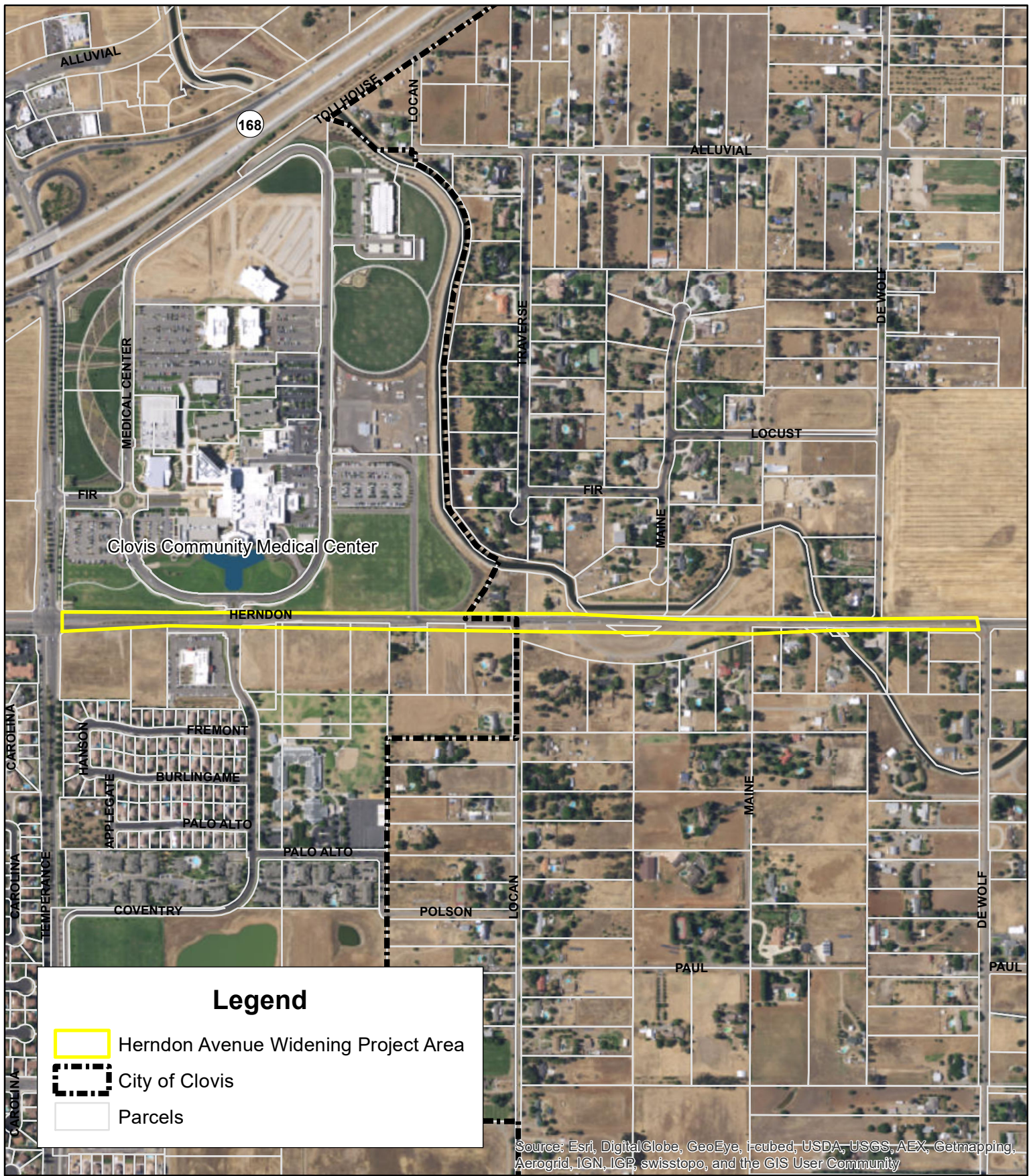
Source: County of Fresno, City of Clovis, ESRI

## Project Location

Herndon Avenue Widening Project  
City of Clovis

Figure 1





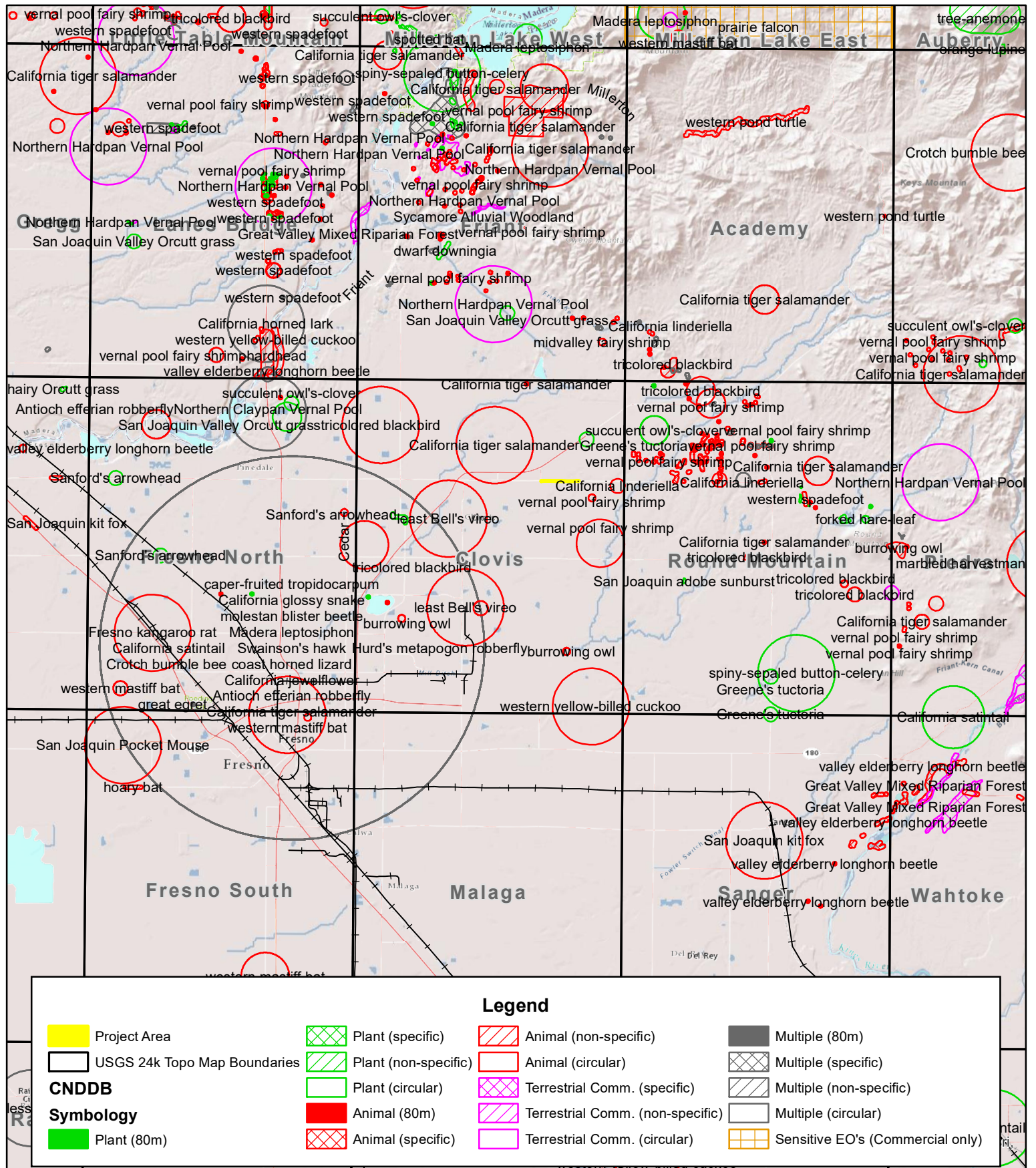
Source: County of Fresno, City of Clovis, ESRI

## Project Area

Herndon Avenue Widening Project  
City of Clovis

Figure 2





Source: CDFW, City of Clovis, ESRI

## California Natural Diversity Database (CNDDDB) Map

Figure 3

Herndon Avenue Widening Project  
City of Clovis



**Appendix A.** Special status animal species known from the vicinity of the CCMC Healthcare Campus Expansion Project.

| Status*   |       |         | Description of Habitat Required <sup>c, e, f</sup>   | Historic 9 Quad Presence <sup>a</sup> | Potential to Occur in Study Area <sup>a,b,d</sup>   |
|---|-------|---------|--|---------------------------------------|---|
| Name  | State | Federal |  |                                       |   |
| MAMMALS   |       |         |  |                                       |   |
| Pallid bat ( <i>Antrozous pallidus</i> )                    | SSC   | FSC     | Deserts, grasslands, scrublands, woodlands and open forests. Most common in open, dry habitats with rocky areas for roosting. Bridges, buildings, and exfoliating tree bark or hollows are frequently used for roost sites (H.T. Harvey 2004).   | Fresno South                          | Unlikely. Adjacent residences and associated large trees may provide roosting habitat. Canal and ponding basin nearby may provide water and foraging habitat. However, no suitable roosting habitat is within the study area.   |
| Fresno kangaroo rat ( <i>Dipodomys nitratoides exilis</i> ) | SE    | FE      | Alkali sink plant community to bare alkaline soils. Chenopod scrub and alkali grasslands in western Fresno County. Inhabits seasonally inundated bare alkaline soils. Associated with friable soil mounds.   | Fresno North                          | None. No habitat present.   |
| Spotted bat ( <i>Euderma maculatum</i> )                    | SSC   | None    | Occupies arid deserts, grasslands and mixed conifer forests. Feeds over water and along washes. May move from forests to lowlands in autumn. Roost in buildings, caves, crevices, and cliffs.  | Friant                                | Unlikely. Adjacent residences and associated large trees may provide roosting habitat. Canal and ponding basin nearby may provide water and foraging habitat. However, no suitable roosting habitat is within the study area.   |
| Western mastiff bat ( <i>Eumops perotis us</i> )            | SSC   | None    | Many open, semi-arid to arid habitats, including annual and perennial grasslands, among others. Usually present only where there are significant rock features offering suitable roosting habitat. Frequently roosts in crevices in cliff faces and rocks; high buildings are used rarely, and they are not known to use bridges or trees for roosts (H.T. Harvey 2004). | Fresno North, Fresno South            | Unlikely. There are no cliff faces or rock areas in the project vicinity; therefore, suitable roosting habitat is not present. Canal and ponding basin nearby may provide water and foraging habitat. However, no suitable roosting habitat is within the study area. |
| American badger ( <i>Taxidea taxus</i> )                    | SSC   | None    | Herbaceous, shrub, and open stages of most habitats with dry, friable soils.   | Clovis                                | Unlikely. Potential habitat present is frequently disturbed by plows (which destroy potential burrow sites), people and domestic animals. Also, access is restricted due to frequently travelled streets and residential development.                                 |
| San Joaquin kit fox ( <i>Vulpes macrotis mutica</i> )       | ST    | FE      | Large tracts of open, level, sandy ground preferred. Often associated with annual  | Friant, Sanger                        | Unlikely. Potential habitat present is frequently disturbed by plows (which destroy potential burrow sites and prey base), people and domestic animals.   |



**Status\***

| Name  | State      | Federal | Description of Habitat Required <sup>c, e, f</sup>  | Historic 9 Quad Presence <sup>a</sup> | Potential to Occur in Study Area <sup>a, b, d</sup>  |
|---|------------|---------|---|---------------------------------------|--|
|   |            |         | grasslands and small mammal burrow complexes.   |                                       | Also, access is restricted due to frequently travelled streets and residential development. Nearest locations are at least 10 miles away and were last detected in the 1980s. According to the City of Clovis EIR, the species appears to be absent from the City of Clovis Plan Area (City of Clovis 2014). |
| <b>BIRDS</b>  |            |         |   |                                       |  |
| Tricolored blackbird<br>( <i>Agelaius tricolor</i> )              | SSC<br>SCE | None    | Open grasslands and pasturelands associated with nesting cover (e.g., blackberry shrubs, wetland emergent vegetation, etc.).  | Fresno North, Round Mountain, Academy | Unlikely. Possible foraging habitat in open fields. Suitable aquatic nesting habitat is absent.  |
| Western grebe<br>( <i>Aechmophorus occidentalis</i> ) (wintering) |            | FSC     | Breed on freshwater lakes and marshes with extensive open water bordered by emergent vegetation. During winter they move to saltwater or brackish bays, estuaries, or sheltered sea coasts and are less frequently found on freshwater lakes or rivers.   | None                                  | None, no habitat present   |
| Short-eared owl ( <i>Asio flammeus</i> ) (wintering)              | SSC        | FSC     | Prefer large areas of open grassland, and are found in marshes, both fresh and salt, lowland meadows, irrigated alfalfa fields, and valley and foothill grassland. Tule patches or tall grass is needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation. | None                                  | Unlikely, suitably sized grassland habitat is not present. Winter foraging habitat and nesting habitat is marginal due to frequent disturbance.  |
| Burrowing owl ( <i>Athene cunicularia</i> )                       | SSC        | FSC     | Ground dweller of open country, golf courses, airports, etc. Often associated with California ground squirrel burrow complexes.   | Round Mountain, Piedra, Lanes Bridge  | Possible. Suitable breeding and foraging habitat present. Small mammal burrows observed in the study area.   |
| Oak Titmouse ( <i>Baeolophus inornatus</i> )                      |            | FSC     | Usually found in warm, open, dry oak or oak-pine woodlands. Will also use scrub oaks or other brush as long as woodlands are nearby. They live in a restricted range, from southwest Oregon to northwest Baja California, with  | Not followed in CNDDb                 | Possible. Project area and adjacent trees are suitable habitat for this species year-round.  |

**Status\***

| Name   | State        | Federal       | Description of Habitat Required <sup>c, e, f</sup>  | Historic 9 Quad Presence <sup>a</sup>                    | Potential to Occur in Study Area <sup>a,b,d</sup>  |
|--|--------------|---------------|---|--|--|
|  |              |               | another population in the Cape District of south Baja California.   |  |  |
| Swainson's hawk ( <i>Buteo swainsoni</i> )                               | ST           | FSC           | Open agricultural fields, grasslands, and low hills, with sparse trees. Nesting often associated with riparian areas.   | Malaga, Fresno North, Fresno South, Clovis, Lanes Bridge | Possible. Foraging habitat in open fields and nesting habitat in large trees.  |
| Snowy plover ( <i>Charadrius alexandrinus</i> )                          | SSC          | FSC           | Inhabits sandy beaches, salt pond levees, and shorelines of alkaline lakes. Requires friable soils for nesting.   | None   | Unlikely. Suitable wetland nesting habitat absent. Outside of current known range.   |
| Northern harrier ( <i>Circus cyaneus</i> )                               | SSC          | None          | Grasslands, open agricultural fields, and edges of wetlands. Typically nests on the ground among dense cover.   | None   | Unlikely. Nesting habitat is marginal due to frequent ground disturbance. Could forage over vacant lots/fields.                    |
| Western yellow-billed cuckoo ( <i>Coccyzus americanus occidentalis</i> ) | SE           | FT            | Occupies open woodlands and with shrubby vegetation. Nests in willow and cottonwood riparian forests with dense understory of shrubs and vines.   | Lanes Bridge, Clovis, Malaga, Round Mountain, Sanger     | None. No riparian habitat present.   |
| White-tailed kite (nesting) ( <i>Elanus leucurus</i> )                   | FP           | None          | Fairly common in grasslands, open agricultural fields and fallow highway median strips. Substantial groves of dense, broad-leaved deciduous trees used for nesting and roosting.  | None   | Possible. Could forage over vacant lots and open fields. Could nest in trees adjacent to the project area.                         |
| Peregrine falcon ( <i>Falco peregrinus</i> )                             | FP; delisted | FSC; delisted | Nests near wetlands, lakes, rivers, or other water, on cliffs, banks, dunes, or human-made structures. Nests consist of a depression or ledge in an open site. Riparian areas as well as coastal and inland wetlands are important habitats yearlong, especially in nonbreeding season. | None   | Unlikely. Suitable nesting habitat is not present. Winter foraging habitat is marginal due to lack of riparian or wetland habitat. |

**Status\***

| Name  | State  | Federal              | Description of Habitat Required <sup>c, e, f</sup>  | Historic 9 Quad Presence <sup>a</sup> | Potential to Occur in Study Area <sup>a,b,d</sup>  |
|---|--------|----------------------|---|---------------------------------------|--|
| Bald eagle ( <i>Haliaeetus leucocephalus</i> ) (wintering)    | SE; FP | BGEPA; FSC; delisted | Inhabits lower montane coniferous forests and areas with oldgrowth trees. Prefers ocean shore, lake margins, & rivers for both nesting & wintering. Most nests are found within 1 mi of water. Nests in large, old-growth, or dominant live tree w/open branches, especially ponderosa pine. Roosts communally in winter.                           | None                                  | Unlikely. Could forage in the canal and adjacent open fields, however, habitat type, frequent human disturbance and urban surrounding make nesting highly unlikely. Known to nest near Shaver Lake in Fresno County. |
| Loggerhead shrike ( <i>Lanius ludovicianus</i> )              | SSC    | FSC                  | Hunts in open or brushy areas, diving from low perch. Nests in dense shrubs or trees associated with foraging areas.  | None                                  | Possible. Could nest in trees within the study area and forage over open areas.  |
| Marbled godwit ( <i>Limosa fedoa</i> ) (wintering)            | None   | FSC                  | Occurs from mid-August to early May in estuarine habitats along coastal CA, and in the Grasslands Ecological Area in Merced County year-round. Foraging and roosting habitat include estuarine mudflats, sandy beaches, open shores, saline emergent wetlands, and adjacent wet upland fields. Nests in Canadian and extreme northern US, prairies. | Not followed in CNDDb                 | Unlikely. Not within known range, and no wetland habitat present. Could forage in fallow fields during migration.  |
| Lewis' woodpecker ( <i>Melanerpes lewis</i> ) (wintering)     | None   | FSC                  | Breeds in open forest and woodland with an open canopy and brushy understory. Requires dead trees for nest cavities. Winters and migrates through Sierra Nevada foothills and central valley.   | Not followed in CNDDb                 | Unlikely. Winter foraging/migration habitat is marginal due to frequent disturbance and lack of lark trees and shrubs. No nesting habitat present.   |
| Long-billed curlew ( <i>Numenius americanus</i> ) (wintering) | None   | FSC                  | Breeds in sparse, short grasses, including shortgrass and mixed-grass prairies as well as agricultural fields of western North America. In winter they migrate to the coasts and to interior Mexico, and use wetlands, tidal estuaries, mudflats, flooded fields, and occasionally beaches.   | Not followed in CNDDb                 | Unlikely. No wetland habitat present. Could forage in fallow fields during migration.  |
| Fox sparrow ( <i>Passerella iliaca</i> ) (wintering)          | None   | FSC                  | During the breeding season, occur in higher elevation Sierra foothills, where they nest in chaparral or montane coniferous forest under dense, shrubby vegetation. Winters throughout   | Not followed in CNDDb                 | Possible. Winter foraging/migration habitat is marginal due to lack of dense shrubs patches. Outside of nesting habitat range.   |

**Status\***

| Name   | State  | Federal | Description of Habitat Required <sup>c, e, f</sup>   | Historic 9 Quad Presence <sup>a</sup> | Potential to Occur in Study Area <sup>a,b,d</sup>   |
|--|--------|---------|--|---------------------------------------|---|
|  |        |         | California, in dense brushy patches and thickets within woodlands  |                                       |   |
| Yellow-bill magpie ( <i>Pica nuttalli</i> )  | None   | FSC     | California endemic species that occurs in the Central Valley and coastal mountain ranges from south of San Francisco to Santa Barbara County. Requires open oak & riparian woodland, farm & ranchland or urban areas with tall trees near grassland, pasture or cropland.                                    | Not followed in CNDDDB                | Possible. Could nest in trees within the study area and forage in open fields, agricultural land, or hospital landscaped areas. |
| Nuttall's woodpecker ( <i>Picoides nuttallii</i> )                                 | None   | FSC     | Oak forest and woodlands, including riparian zones. Requires standing snag or hollow tree for nest cavity.   | Not followed in CNDDDB                | Possible. Project area and adjacent trees are suitable habitat for this species year-round.                                     |
| Williamson's sapsucker ( <i>Sphyrapicus thyroideus</i> )                           | None   | FSC     | Occurs in high elevation conifer forests, where it breeds in lodgepole pines and aspens. Requires snags or live trees with rotted heartwood in which to excavate nesting and roosting cavities. In winter, individuals may remain on breeding habitat or descend to lower elevation ponderosa pine habitats. | Not followed in CNDDDB                | None. No habitat present.   |
| Least Bell's vireo ( <i>Vireo bellii pusillus</i> )                                | SE     | FE      | Occurs in riparian forest, scrub, and woodlands. Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis sp., and mesquite.                 | Clovis                                | None. No riparian habitat present.  |
| <b>REPTILES</b>  |        |         |  |                                       |   |
| Blunt-nosed leopard lizard ( <i>Gambelia</i> (= <i>Crotaphytus</i> ) <i>sila</i> ) | SE, FP | FE      | Occurs in semi-arid grasslands, washes and alkali flats, with sandy/gravelly/loamy soils. Occurs with plants such as annual and bunch grasses and <i>Atriplex</i> sp. Small mammal burrows provide cover for this species.   | None                                  | None. No habitat present.   |

**Status\***

| Name   | State   | Federal | Description of Habitat Required <sup>c, e, f</sup>   | Historic 9 Quad Presence <sup>a</sup>   | Potential to Occur in Study Area <sup>a,b,d</sup>   |
|--|---------|---------|--|---|---|
| Western pond turtle ( <i>Emys marmorata</i> aka <i>Actinemys marmorata</i> ) | SSC     | None    | Aquatic turtle of ponds, lakes, marshes, rivers, streams, and irrigation ditches that typically have rocky or muddy bottom, with aquatic vegetation. Nests in uplands associated with wetland habitat.   | Academy, Friant   | None. No habitat present.   |
| Giant garter snake ( <i>Thamnophis gigas</i> )                               | ST      | FT      | Marshes, sloughs, mud-bottom canals of rice farming areas, but occasionally slow streams. Bulrush and cattails typically present. Extremely aquatic. Found in areas with aquatic connectivity to San Joaquin River and Delta.                    | None  | None. No habitat present.   |
| <b>AMPHIBIANS</b>  |         |         |  |   |   |
| California tiger salamander ( <i>Ambystoma californiense</i> )               | ST, SSC | FT      | Quiet water of ponds, reservoirs, lakes, vernal pools, streams, and stock ponds within annual grasslands, oak savannah, oak woodland and open chaparral.   | Friant, Round Mountain, Lanes Bridge, Academy, Malaga, Fresno North, Fresno South, Clovis, Piedra | None. No habitat present in the project area due to frequent human disturbance and past agricultural operation. |
| California red-legged frog ( <i>Rana draytonii</i> )                         | SSC     | FT      | Chiefly lakes, ponds, and streams in coastal forest, inland woodlands, and valley grasslands where cattails, bulrush, or other plants provide dense cover. Aquatic sites need not be permanent.  | None  | None. No habitat present in the project area due to frequent human disturbance and past agricultural operation. |
| Western spadefoot ( <i>Spea hammondi</i> )                                   | SSC     | None    | Primarily a species of the lowlands, frequenting washes, river floodplains, alluvial fans, playas, alkali flats, but also foothills and mountains. Open vegetation and short grasses preferred, with sandy or gravelly soil. Valley and foothill | Friant, Fresno North, Lanes Bridge, Round   | None. No habitat present in the project area due to frequent human disturbance and past agricultural operation. |

| Name   | Status* |         | Description of Habitat Required <sup>c, e, f</sup>  | Historic 9 Quad Presence <sup>a</sup>                 | Potential to Occur in Study Area <sup>a,b,d</sup>  |
|--|---------|---------|---|---|--|
|  | State   | Federal |   |   |  |
|  |         |         | grasslands, open chaparral, pine-oak woodlands. Often associated with vernal pools.   | Mountain, Piedra                                      |  |
| <b>FISH</b>  |         |         |   |   |  |
| Delta smelt ( <i>Hypomesus tranpacificus</i> )                                 | SE      | FT      | Found only from the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano and Yolo counties. Typically found in estuarine waters-along the freshwater edge of the mixing zone (saltwater-freshwater interface), and upstream into river channels and tidally-influenced backwater sloughs. Most spawning happens in tidally-influenced backwater sloughs and channel edgewaters. | None  | None. No habitat present.  |
| Hardhead ( <i>Mylopharodon conocephalus</i> )                                  | SSC     | None    | Clear, deep pools with sand-gravel-boulder bottoms & slow water velocity. Not found where exotic centrarchids predominate.  | Lanes Bridge  | None. No habitat present.  |
| <b>INVERTEBRATES</b>   |         |         |   |   |  |
| Conservancy fairy shrimp ( <i>Branchinecta conservatio</i> )                   | None    | FE      | Rather large, cool-water vernal pools with moderately turbid water; the pools generally last until June.  | None  | None. Outside of known current range of species. No large vernal pools present.  |
| Vernal pool fairy shrimp ( <i>Branchinecta lynchi</i> )                        | None    | FT      | Vernal pool habitats from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. Tends to occur in smaller pools, most frequently pools measuring less than 0.05 acre often associated with mud bottomed swales, or basalt flow depression pools in unplowed grasslands.  | Friant, Lanes Bridge, Clovis, Round Mountain, Academy | Possible. No vernal pool habitat but a roadside depression that may mimic suitable inundation periods and depths required by the species is within the project footprint. Habitat extremely marginal |
| Valley elderberry longhorn beetle ( <i>Desmocerus californicus dimorphus</i> ) | None    | FT      | Nearly always found on or close to its host plant, elderberry ( <i>Sambucus</i> sp.). Inhabited shrubs typically have stems that are 1.0 inch or greater in diameter at ground level. Distribution is patchy throughout the remaining riparian forests of the Central Valley from Redding to Madera County.   | Lanes Bridge, Sanger                                  | None. Outside of updated species range. No habitat present or elderberry shrubs present.   |

\* None = no special status granted or recognized by named party

BGEPA = Bald and Golden Eagle Protection Act; USFWS prohibits the taking, possession and commerce of such birds.

FC = Federal Candidate; USFWS/NOAA FISHERIES has enough information on biological vulnerability and threats to support a proposal to list as endangered or threatened.

FE = Federally Endangered; listed by USFWS as in danger of extinction throughout all or a significant portion of its range.

FT = Federally Threatened; listed by USFWS as likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

FSC = Federal Species of Concern, including Birds of Conservation Concern; provides no protection, but allows for awareness and research efforts that may keep species from being listed.

SCE = California Candidate for Endangered Status under the CESA.

SCT = California Candidate for Threatened Status under the CESA.

SE = California Endangered under the CESA.

ST = California Threatened under the CESA.

FP = Fully Protected under California Fish and Game Code (Sections 3511, 4700, 5050, and 5515)

SSC = California Species of Special Concern.

a = Based upon quad lists from query of California Natural Diversity Database (CNDDB) search, accessed March 2017.

b = Based upon planning survey conducted by Odell P&R on project site during October 2016 and March 2017.

c = USFWS Sacramento Fish and Wildlife Office's Endangered Species Program; <http://www.fws.gov/sacramento/es/>

d= Moyle, P.B. 2002. Inland fishes of California. University of California Press. Berkeley, CA

e= Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Department of Fish and Game, Sacramento, California.

f = Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

**Appendix B.** Special status plant species known from the vicinity of the CCMC Healthcare Campus Expansion Project.

| Name  | Status <sup>a</sup> |         | Description of Habitat Required <sup>b</sup>   | Blooming Period | Historic 9 Quad Presence <sup>c</sup>               | Potential to Occur in Study Area <sup>d</sup>  |
|---|---------------------|---------|--|-----------------|---|--|
|   | State               | Federal |  |                 |   |  |
| Succulent owl's-clover<br>( <i>Castilleja campestris</i> ssp. <i>succulenta</i> ) | SE, 1B.2            | FT      | Occurs in vernal pools and valley and foothill grassland, often in acidic soils, between 50-750 meters of elevation.   | Apr-May         | Lanes Bridge, Round Mountain, Friant, Fresno North* | Not Expected. No acid soils, site disturbed, and no vernal pool habitat on site.   |
| California jewel-flower<br>( <i>Caulanthus californicus</i> )                     | SE, 1B.1            | FE      | Occurs in chenopod scrub, pinyon and juniper woodland, valley and foothill grassland often with sandy soil. 61-1000 meters elevation.                                | Feb-May         | Fresno North*, Fresno South*, Clovis*, Malaga*      | Not Expected. No grassland habitat present. Thought to be extirpated from Fresno area. (Closest CNDDDB occurrence does not have date- no habitat left within vicinity of Fresno-Extirpated from Fresno Area)                       |
| Dwarf downingia<br>( <i>Downingia pusilla</i> )                                   | 2B.2                | None    | Valley and foothill grassland (mesic sites), vernal pools. Vernal lake and pool margins with a variety of associates. In several types of vernal pools. 1-445 m.     | Mar-May         | Friant  | Not Expected. No vernal pool or grassland habitat present.   |
| Spiny-sepaed button-celery<br>( <i>Eryngium spinosepalum</i> )                    | 1B.2                | None    | Vernal pools, valley and foothill grassland. Some sites on clay soil of granitic origin; vernal pools, within grassland. 100-420 meters.                             | Apr-May         | Round Mountain*, Friant, Lanes Bridge               | Not Expected. No vernal pool or grassland habitat present.   |
| California satintail<br>( <i>Imperata brevifolia</i> )                            | 2.1                 | None    | Occurs on mesic sites, alkali seeps, and riparian areas in chaparral, coastal scrub, Mojavean desert scrub, and meadows and seeps between 0-500 meters in elevation. | Sep-May         | Malaga, Fresno North, Fresno South, Clovis          | Not Present. Habitat marginal. Not observed during any visit.  |
| Forked hare-leaf<br>( <i>Lagophylla dichotoma</i> )                               | 1B.1                | None    | Occurs in cismontane woodland, and valley and foothill grassland, sometimes in clay soils, between 45-335 meters in elevation.                                       | Apr-May         | Round Mountain                                      | Not Expected. No grassland or woodland habitat present. Site highly disturbed.   |
| Madera leptosiphon<br>( <i>Leptosiphon serrulatus</i> )                           | 1B.2                | None    | Often occurs on dry slopes and decomposed granite in cismontane woodland and lower montane coniferous forest between 300-1300 meters of elevation.                   | Apr-May         | Friant, Malaga, Fresno North, Fresno South, Clovis  | Not Present. Necessary soils and habitat absent, out of elevation range. The only source of information for the closest CNDDDB occurrence is a 1922 collection. Location was mapped from a best guess, but was in the "foothills". |



| Name   | Status <sup>a</sup> |         | Description of Habitat Required <sup>b</sup>  | Blooming Period | Historic 9 Quad Presence <sup>c</sup>      | Potential to Occur in Study Area <sup>d</sup>  |
|--|---------------------|---------|---|-----------------|--|--|
|  | State               | Federal |   |                 |  |  |
| San Joaquin Valley Orcutt grass ( <i>Orcuttia inaequalis</i> )   | SE, 1B.1            | FT      | Occurs in vernal pools, between 10-755 meters in elevation.   | Apr-Sep         | Lanes Bridge, Friant, Fresno North*        | Not Present. No vernal pool habitat present.   |
| Hairy Orcutt grass ( <i>Orcuttia pilosa</i> )                    | SE, 1B.1            | FE      | Occurs in vernal pools, between 45-200 meters in elevation.   | May-Sep         | Lanes Bridge                               | Not Present. No vernal pool habitat present.   |
| Hartweg's golden sunburst ( <i>Pseudobahia bahiifolia</i> )      | SE, 1B.1            | FE      | Valley and foothill grassland, cismontane woodland. Clay soils, often acidic. Predominantly on the northern slopes of knolls, but also along shady creeks or near vernal pools. 15-150 m. | Mar - Apr       | Friant                                     | Not present. None observed. No suitable habitat.   |
| San Joaquin adobe sunburst ( <i>Pseudobahia peirsonii</i> )      | SE, 1B.1            | FT      | Valley and foothill grassland, cismontane woodland. Grassy valley floors and rolling foothills in heavy clay soil. 90-800 m.  | Mar-Apr         | Round Mountain                             | Not Expected. Habitat extremely marginal and disturbed. None observed during any of the site visits.   |
| Sanford's arrowhead ( <i>Sagittaria sanfordii</i> )              | 1B.2                | None    | Occurs in standing or slow-moving freshwater ponds, marshes, swamps, ditches between 0-650 meters in elevation.   | May-Oct         | Clovis, Fresno North                       | Not Present. Suitable habitat not present.   |
| Caper-fruited tropidocarpum ( <i>Tropidocarpum capparideum</i> ) | 1B.1                | None    | Occurs in valley and foothill grassland, often alkaline hills, between 1-455 meters of elevation.   | Mar-Apr         | Malaga, Fresno South, Fresno North, Clovis | Not Expected. No grassland habitat or alkaline soils present. The only source of information for the one nearby CNDDB occurrence is from a 1930 collection. This plant is presumed extant in the area, but exact location of collection unknown (assumed centered on City of Fresno). Also, no plants have been documented in the vicinity since 1930. |
| Greene's tuctoria ( <i>Tuctoria greenei</i> )                    | Rare, 1B.1          | FE      | Occurs in dry bottoms of vernal pools in valley and foothill grasslands between 30-1070 meters in elevation.  | May-Jul         | Round Mountain*, Sanger*, Clovis*          | Not Expected. No vernal pool habitat present. All known occurrences have been extirpated.  |

<sup>a</sup> Status codes are as follows:

FC = Federal Candidate; USFWS/NOAA FISHERIES has enough information on biological vulnerability and threats to support a proposal to list as endangered or threatened.

FE = Federally Endangered; listed by USFWS as in danger of extinction throughout all or a significant portion of its range.

FT = Federally Threatened; listed by USFWS as likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

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SCE = California Candidate for Endangered Status under the CESA.

SCT = California Candidate for Threatened Status under the CESA.

ST = California Threatened under the CESA.

FP = Fully Protected under California Fish and Game Code (Sections 3511, 4700, 5050, and 5515)

SSC = California Species of Special Concern.

Rare = State listed as Rare

California Rare Plant Rank:

- 1A Presumed extinct in California
- 1B Rare or Endangered in California and elsewhere
- 2 Rare or Endangered in California, more common elsewhere
- 3 Plants for which we need more information - Review list
- 4 Plants of limited distribution - Watch list

California Native Plant Society Threat Codes:

- .1 Seriously Endangered in California (over 80% of occurrences Threatened / high degree and immediacy of threat)
- .2 Fairly Endangered in California (20-80% occurrences Threatened)
- .3 Not very Endangered in California (<20% of occurrences Threatened or no current threats known)

**b** Habitat information sources and blooming times - CNPS Inventory of Rare & Endangered Plants website (<http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi>) used for all plant species.

**c** Quad lists for plant species from March 2017 query of California Natural Diversity Database (CNDDB), supplemented for plants by the CNPS Inventory of Rare & Endangered Plants website, which notes quads species have been extirpated from (noted with an \* in this table).

**d** Site survey from work conducted by Odell P& R on project site during October 2016 and March 2017.



# **LIVE OAK ASSOCIATES, INC.**

an Ecological Consulting Firm

**POTENTIAL WATERS OF THE UNITED STATES  
HERNDON AVENUE IMPROVEMENT PROJECT  
FRESNO COUNTY, CALIFORNIA**



**Live Oak Associates, Inc.**

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August 8, 2017

File No. 2175-01

## EXECUTIVE SUMMARY

Live Oak Associates, Inc. (LOA) investigated potential waters of the United States associated with the Herndon Avenue Widening Project in the City of Clovis, California. This project will extend from Temperance Avenue to Dewolf Avenue, a distance of approximately one mile, and will affect areas to both the north and south of Herndon Avenue. Waters of the United States, also referred to as “jurisdictional waters,” are broadly defined as the territorial seas, rivers, their tributaries, impoundments of rivers and their tributaries, and wetlands adjacent to such waters. To be considered a water of the United States, a hydrologic feature must have a hydrologic connection to downstream waters of the United States. The discharge of fill into and the construction of structures within such waters are regulated by the U.S. Army Corps of Engineers under the supervision of the U.S. Environmental Protection Agency.

The Area of Potential effect (APE) as considered in this report includes all areas that may be temporarily or permanently disturbed by the future project footprint. Project elements potentially affecting jurisdictional waters that may be present include the widening of Herndon Avenue between Temperance and Coventry Avenues from five to six lanes, and the widening of the roadway between Coventry Avenue and the Enterprise Canal Bridge from two lanes to a four-lane divided roadway. At the Enterprise Canal Bridge, the roadway will taper to two lanes. Additional widening between the bridge and the southern leg of Dewolf Avenue will be minor. Other proposed improvements to Herndon Avenue within the APE would have no effect on any jurisdictional waters that may be present.

LOA plant/wetland ecologists Wendy Fisher and Anna Godinho examined the entire APE for possible waters of the United States, and gathered vegetation, soils and hydrology data at five sampling locations within and adjacent to hydrologic features that may be considered jurisdictional waters on July 20, 2017. Hydrologic features meeting the technical criteria of jurisdictional wetlands that were identified within the APE during the field visit include 1) a roadside depression (7,841 square feet) on the southern shoulder of Herndon Avenue; and 2) a seasonal wetland swale (1,059 square feet) where it passes beneath Herndon Avenue through a 2-foot culvert. The total area of these hydrologic features within the APE is approximately 8,900 square feet (0.2 acre).

The seasonal wetland swale within the APE indirectly connects to the San Joaquin River, a traditional navigable water of the United States that is within the jurisdiction of the U.S. Army Corp of Engineers. This hydrologic feature continues through the APE to the southwest and apparently spills into the storm water system maintained by the Fresno Metropolitan Flood Control District (FMFCD) and the Fresno Irrigation District (FID). This system uses Dry Creek to convey storm water into the Helm Canal and eventually the San Joaquin River via the Biola Spillway during major winter storm events. FID and the FMFCD together manage the diversion of flows based on frequency and amount of rainfall, and the capacity of water control structures upstream. The U.S. Army Corps of Engineers has asserted jurisdiction over Dry Creek and its tributaries in the past, presumably because the waters of Dry Creek can be considered tributary to the San Joaquin River when such waters are diverted into it.

Other hydrologic features that may be considered a Water of the United States were not observed in the APE.

## TABLE OF CONTENTS

|   |    |
|---|----|
| 1.0 INTRODUCTION .....  | 1  |
| 2.0 METHODS .....   | 8  |
| 2.1 SURVEY METHODS FOR AREAS MEETING THE TECHNICAL CRITERIA OF<br>JURISDICTIONAL WETLANDS ..... | 8  |
| 3.0 RESULTS .....   | 11 |
| 3.1 SETTING .....   | 11 |
| 3.2 POTENTIAL WATERS OF THE UNITED STATES .....   | 13 |
| 3.3 UPLAND AREAS .....  | 16 |
| 4.0 DISCUSSION .....  | 18 |
| LITERATURE CITED .....  | 20 |
| APPENDIX A: WETLAND DATA SHEETS .....   | 21 |
| 4a55aAPPENDIX B: SELECTED PHOTOGRAPHS OF THE PROJECT SITE .....                                 | 29 |
| APPENDIX C: VASCULAR PLANTS OF THE PROJECT SITE .....   | 36 |
| APPENDIX D: SOILS INFORMATION .....   | 39 |

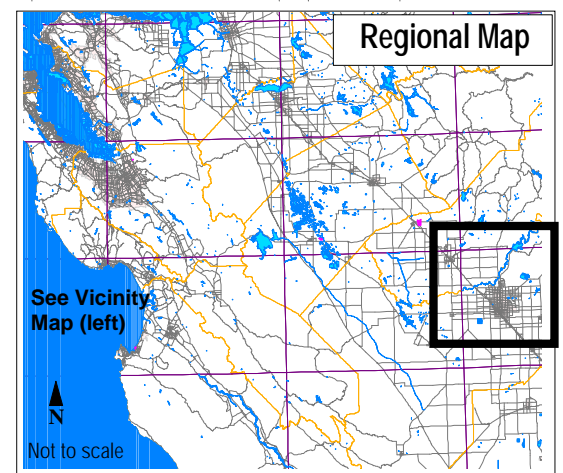
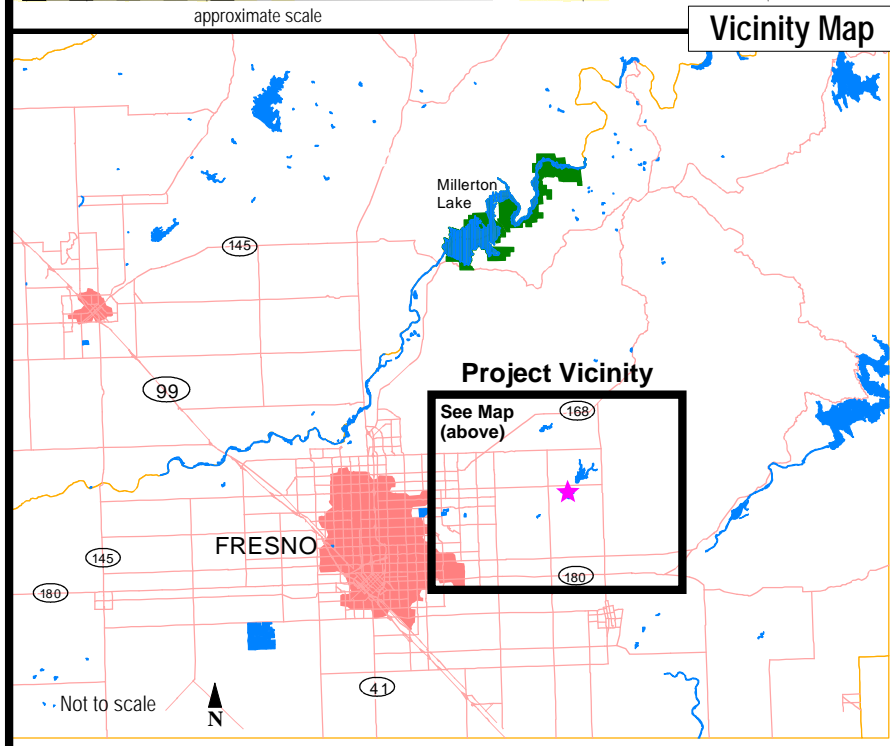
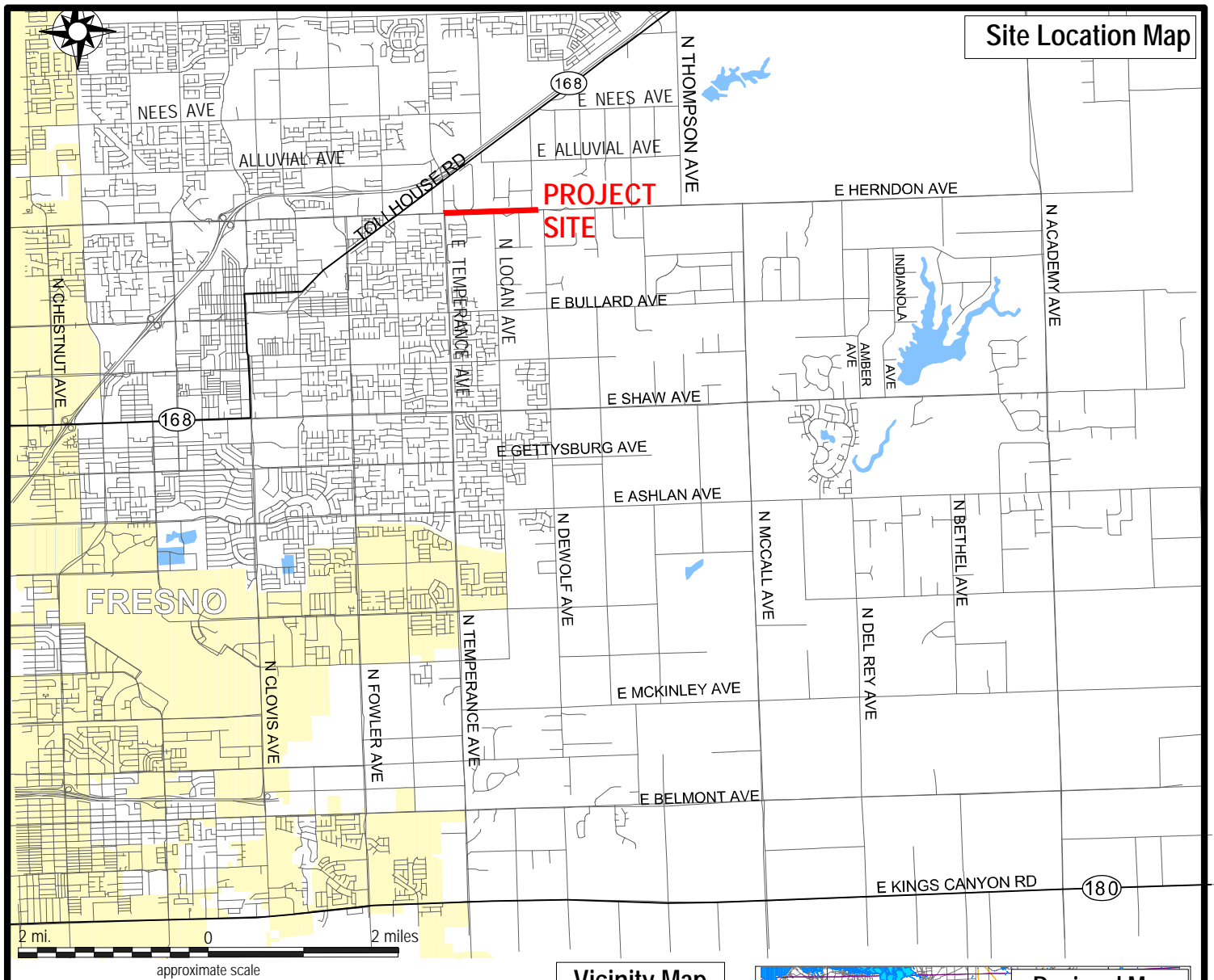
## **1.0 INTRODUCTION**


Live Oak Associates, Inc. (LOA) investigated the Herndon Avenue Widening study area (hereafter referred to as the project site) for possible Waters of the United States (also referred to as “jurisdictional waters”) in July of 2017. The Area of Potential Effect (APE) within the study area includes areas immediately north and south of the existing road alignment that extends from Temperance to DeWolf Avenues, a distance of approximately one mile (Figure 1). The project site can be found on the *Clovis* U.S. Geological Survey (USGS) 7.5 minute quadrangle, and is located within Sections 34 and 35 in Township 12 South, Range 21 East to the north and Section 2 in Township 13 South, Range 21 East to the south (Figure 2).

### **1.1 REGULATORY DEFINITION OF WATERS OF THE U.S.**

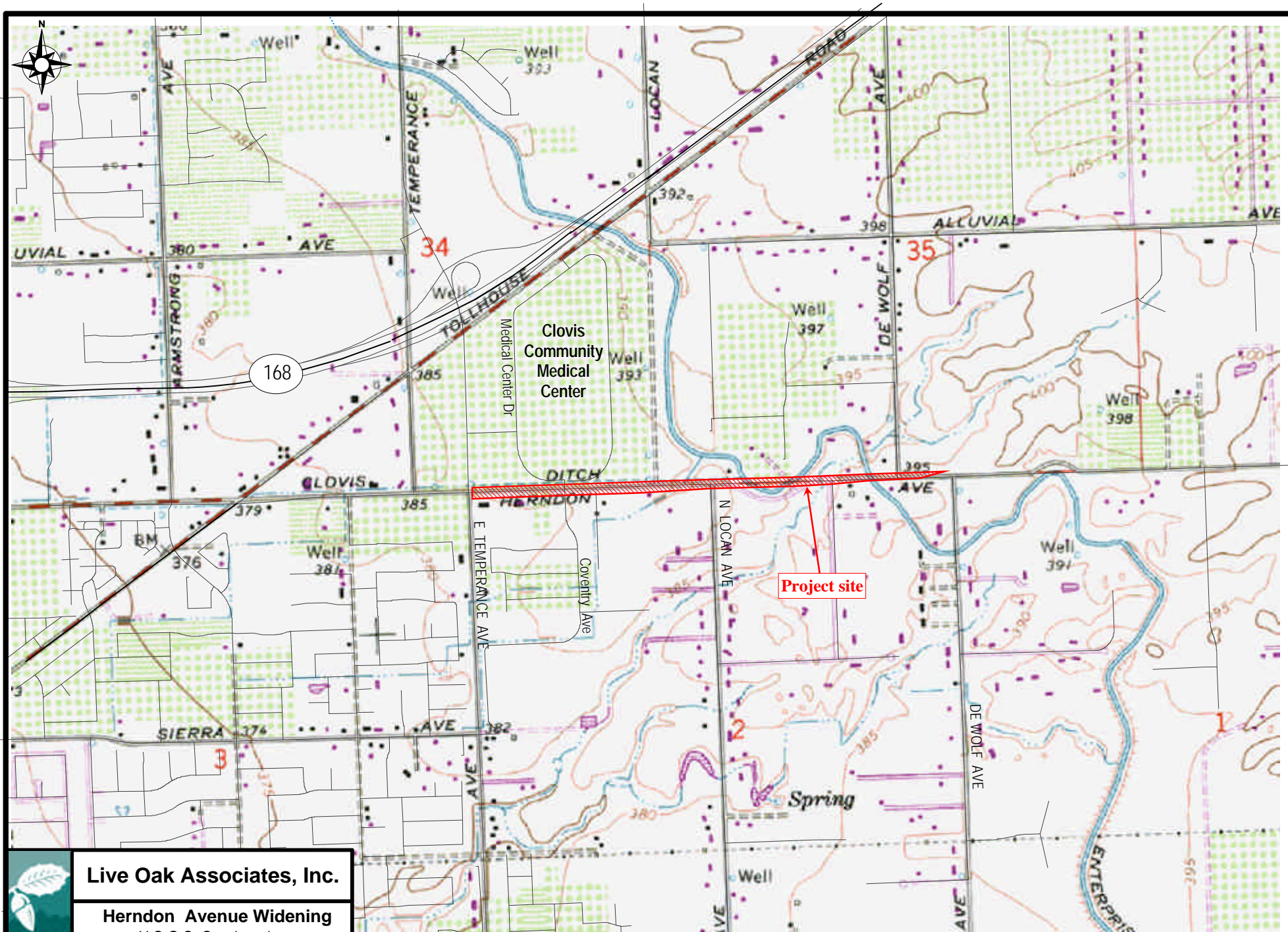
Section 404 of the federal Clean Water Act (CWA) regulates the discharge of dredged or fill material into “navigable waters” (33 U.S.C. §1344). The CWA defines “navigable waters” as “the waters of the United States, including the territorial seas” (33 U.S.C. §1362(7)). By regulation (33 CFR § 328.3(a) (3)), the U.S. Army Corps of Engineers (USACE) has defined “waters of the United States” to include some non-navigable waters as well, if they are hydrologically connected to navigable waters. Therefore, waters of the United States include the following:

- (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- (2) All interstate waters including interstate wetlands;
- (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:



|  |           |          |
|--|-----------|----------|
|  <b>Live Oak Associates, Inc.</b> |           |          |
| <b>Herndon Avenue Widening</b><br>Site / Vicinity Map  |           |          |
| Date   | Project # | Figure # |
| 7/20/2017  | 2175-01   | 1        |





**Live Oak Associates, Inc.**

**Herndon Avenue Widening**  
U.S.G.S. Quadrangle

|           |           |          |
|-----------|-----------|----------|
| Date      | Project # | Figure # |
| 7/20/2017 | 2175-01   | 2        |

From USGS  
Clovis 7.5' Quadrangle 1990

1/2 0 1/2 mile  
approximate scale



(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(iii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section (33 CFR § 328.3(a) (3)).

“Waters of the United States” are subject to the jurisdiction of the USACE and per provisions of Section 404 of the CWA the discharge of fill into such waters requires a federal permit issued by the USACE. Therefore, one objective of this report is to determine if possible waters of the United States are located within the project site such that the discharge of fill into them would necessitate a Department of the Army (DA) permit.

## **1.2 FEDERAL COURT DECISIONS AFFECTING THE DEFINITIONS OF WATERS OF THE UNITED STATES**

Waters of the U.S. are subject to the jurisdiction and permit requirements of the USACE under Section 404 of the Clean Water Act. Several federal court cases help define the extent of federal jurisdiction over rivers, their tributaries, their impoundments, and adjacent wetlands.

The court rulings and subsequent guidance provided by the EPA and USACE discussed above are germane to the delineation of jurisdictional waters summarized in this report. They are presently the basis for determining the jurisdictional status of drainage features and wetlands of the project site.

### **1.2.1 SWANCC Decision**

In January of 2001, the U.S. Supreme Court ruled in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (the SWANCC decision) that “non-navigable, isolated, intrastate” waters could not be claimed as jurisdictional by the USACE based on their use by migratory birds. Although the Court did not specifically address the meaning of the word “isolated”, it upheld the jurisdictional status of “adjacent” wetlands (and other waters), which are by definition wetlands that are “bordering, contiguous, or neighboring” other jurisdictional waters. Therefore, the term “isolated wetland” has implicitly been defined as ‘wetlands that are not bordering, contiguous, or neighboring’ other jurisdictional waters. This definition does not, however, address the degree of proximity necessary to establish that one wetland (or other water) is “adjacent” to a known jurisdictional water. As established by the Supreme Court in the *United States v. Riverside Bayview Homes, Inc.* in 1985, “wetlands separated from other waters by man-made dikes or barriers, natural river berms, beach dunes, and the like are ‘adjacent wetlands’”.

### **1.2.2 Consolidated Carabell/Rapanos Decision**

In June of 2006 the U.S. Supreme Court ruled in the consolidated cases of *June Carabell v. U.S. Army Corps of Engineers* and *John Rapanos v. United States* that wetlands are waters of the United States “if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as ‘navigable.’” When, in contrast, wetland’s effects on water quality are speculative or insubstantial, they fall outside the zone fairly encompassed by the statutory term ‘navigable waters.’

On June 5, 2007, the Environmental Protection Agency (EPA) and the USACE jointly issued guidance in interpreting the Carabell/Rapanos cases as they apply to the extent of federal jurisdiction covered by Section 404 of the Clean Water Act. The key points of this guidance are that the EPA and the USACE: 1) will assert jurisdiction over traditional navigable waters, wetlands adjacent to traditional navigable waters, relatively permanent non-navigable tributaries of traditional navigable waters, and wetlands that directly abut such tributaries; 2) will decide jurisdiction over relatively impermanent non-navigable tributaries of navigable waters, impermanent wetlands adjacent to such tributaries, and impermanent wetlands adjacent to but not directly abutting such tributaries, based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water; and 3) will not assert jurisdiction over swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow) or ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water. For relatively impermanent non-navigable waters tributary to navigable waters and relatively impermanent wetlands adjacent to such waters, the EPA and USACE will apply a significant nexus analysis that will “assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters.”

### **1.2.3 Headwaters, Inc. vs. Talent Irrigation District**

The Ninth Circuit Court of Appeals ruled that irrigation infrastructure (or, presumably, stormwater infrastructure) that discharges flow into downstream waters of the United States may itself be considered a water of the United States. The seasonal wetland swale, therefore, may be considered waters of the U.S. if those waters can be and from time to time are discharged into downstream waters of the U.S.

## **1.3 STATE OF CALIFORNIA JURISDICTION OVER AQUATIC FEATURES**

The State of California also asserts jurisdiction over drainages and wetlands of the project site. The limits of jurisdiction vary slightly from those of the USACE. The California

Department of Fish and Wildlife (CDFW) and the Regional Water Quality Control Board (RWQCB) are the two state regulatory agencies responsible for implementing state regulations that identify and protect waters of the state.

According to Section 1602 of the California Fish and Wildlife Code, public and private entities may not substantially divert or obstruct the natural flow of any river, stream, or lake within the state. This section of Fish and Wildlife Code establishes the State's interest in regulating construction activities in the "bed, channel, or bank" of a natural drainage or stream. A "stream" subject to the jurisdiction of the CDFG has been defined as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life" (California Code of Regulations, Title 14).

Since its inception, the RWQCB has had regulatory authority over activities affecting water quality in rivers, streams, lakes, and wetlands of the State. Shortly after the U.S. Supreme Court rendered its SWANCC Decision, the State Water Resources Control Board notified the Regional Boards that isolated waters, including wetlands, were subject to the jurisdiction of the State of California per provisions of the Porter-Cologne Water Quality Control Act. The Regional Boards, therefore, now assert jurisdiction over some isolated wetlands disclaimed as jurisdictional by the USACE.

## **1.2 PROJECT DESCRIPTION**

The Area of Potential effect (APE) as considered in this report includes all areas that may be temporarily or permanently disturbed by the future project footprint. Project elements potentially affecting jurisdictional waters that may be present include the widening of Herndon Avenue between Temperance and Coventry Avenues from five to six lanes, and the widening of the roadway between Coventry Avenue and the Enterprise Canal Bridge from two lanes to a four-lane divided roadway. At the Enterprise Canal Bridge, the roadway will taper to two lanes. Additional widening between the bridge and the southern leg of Dewolf Avenue will be minor. Other proposed improvements to Herndon Avenue within the APE would have no effect on any jurisdictional waters that may be present. Such improvements would include the sidewalks, curbs and gutters, street lights, median improvements, striping overlay, and underground utilities.

## 2.0 METHODS

LOA plant/wetland ecologists Wendy Fisher and Anna Godinho conducted a survey for hydrologic features within the project's APE that may be considered jurisdictional waters on July 20, 2017. This survey was conducted on foot in order to maximize visual coverage of the entire project site. The field investigators used aerial photography and a United States Geologic Survey (USGS) topographic map to guide the survey effort. The blue lines shown on the USGS maps reveal two channels passing through the study area in a southwesterly direction. Data points were selected within these historic blue line drainages. Additionally, inundation visible on aerial imagery within a roadside depression was cause for collecting data at this location. The boundaries of likely jurisdictional waters were delineated using some field measurements and a Trimble global positioning system (GPS) unit to 3-meter accuracy. LOA prepared the map depicting likely jurisdictional waters using data collected in the field and the best available aerial photography.

The surveys were consistent with guidelines found in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), *Minimum Standards for Acceptance of Preliminary Wetland Delineations* (USACE 2001), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). These surveys have been described in more detail below.

### 2.1 SURVEY METHODS FOR AREAS MEETING THE TECHNICAL CRITERIA OF JURISDICTIONAL WETLANDS

Wetlands are defined as “those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas” (Environmental Laboratory 1987). The diagnostic environmental characteristics of wetlands include hydrophytic vegetation, hydric soils and a hydrology characterized by an aquic or peraquic moisture regime. Accordingly, LOA surveyed the site for wetland indicator plants, positive indicators of hydric soils and wetland hydrology.

Five representative sampling locations were selected within the project site to assess and collect vegetation, hydrology and soils information. This information was entered onto standard data sheets patterned after those used by USACE for the Arid West Region. The data sheet for each numbered sampling location can be found in Appendix A. The numbered sampling locations were identified and mapped. Color photographs, presented in Appendix B, were taken at sampling locations of the project site.

Plants observed within a 5-10 foot radius of each sampling location were identified to species using *The Jepson Manual: Vascular Higher Plants of California, Second Edition* (Baldwin et al, 2012). The wetland indicator status of each species was obtained from the *1987 Wetland Plant List, California* (Reed 1988). A complete list of vascular plants identified on the project site during 2017 surveys can be found in Appendix C.

Wetland indicator species are so designated according to their frequency of occurrence in wetlands.

|                            |   |
|----------------------------|---|
| OBLIGATE (OBL)             | Probability to occur in wetland is >99%               |
| FACULTATIVE WETLAND (FACW) | Probability to occur in wetland is between 67-99%     |
| FACULTATIVE (FAC)          | Probability to occur in wetland is between 33 to 67%  |
| FACULTATIVE UPLAND (FACU)  | Probability to occur in wetland is between 1 to <33%. |
| UPLAND (UPL)               | Probability to occur in wetland is <1%                |

Hydrophytic vegetation is considered present when more than 50% of the dominant species at a given location are composed of obligate, facultative wetland and facultative plant species. However, the Arid West Supplemental Guidelines also incorporate an alternate prevalence index to be calculated in determining the presence of wetland vegetation if the dominance test is not met.

Each sampling location was also examined for positive indicators of wetland hydrology and hydric soils. Evidence of wetland hydrology may consist of primary indicators such as surface water, watermarks, drift lines, sediment deposits, etc. Secondary indicators of wetland hydrology include drainage patterns in wetlands, watermarks (Riverine), drift lines (Riverine), sediment deposits (Riverine), etc. In accordance with USACE

guidelines, a soil pit 10” to 12” in depth was dug at all sampling locations. The soils excavated from each pit were also examined for low chromas, gleying, mottling, concretions, sulfidic odors, etc.

## 3.0 RESULTS

### 3.1 SETTING

The project site consisted of paved City streets, road shoulders, ruderal (disturbed) gravel and dirt roadside areas, and ornamental landscaping associated with residences, businesses, and Clovis Community Medical Center. Although the Enterprise Canal passes beneath Herndon Avenue within the project alignment, and is a hydrologic feature that may be considered a water of the United States, it was not delineated as such, since no portion of the canal itself falls within the APE.

Climatic and topographic features of the project site are typical of those found in California's Central Valley. Except for the canals themselves, the project site is relatively flat. The elevation of the project site is approximately 250 feet National Geodetic Vertical Datum (NGVD) (see Figure 2). The project site, like most of California, has a Mediterranean climate with cool moist winters and hot dry summers. Precipitation falls in the form of rain between October and May, with the heaviest amounts in December, January, February, and March. Annual precipitation is approximately 11.32 inches (Western Regional Climate Center 2017). The Fresno area received 17.2 inches of rain between Oct 1, 2016 and July 30, 2017. The winter of 2016/2017 was 151% of average rainfall in the Fresno area (<http://www.cnrfc.noaa.gov/awipsProducts/RNOWRKCLI.php>).

To access the site from Highway 168 west, one would exit on Temperance Avenue and head south to Herndon Avenue. This is the western boundary of the project site.

Soils of the project site included five different soil mapping units from three soil series (see Table 1, Figure 3 and Appendix D). All the soils along the alignment are considered hydric by the NRCS (NRCS 2017). Human land alteration practices associated with grading, road construction and residential and commercial development adjacent to Herndon Avenue along this 1-mile stretch have altered the native soils so that most areas do not exhibit characteristics of hydric soils.

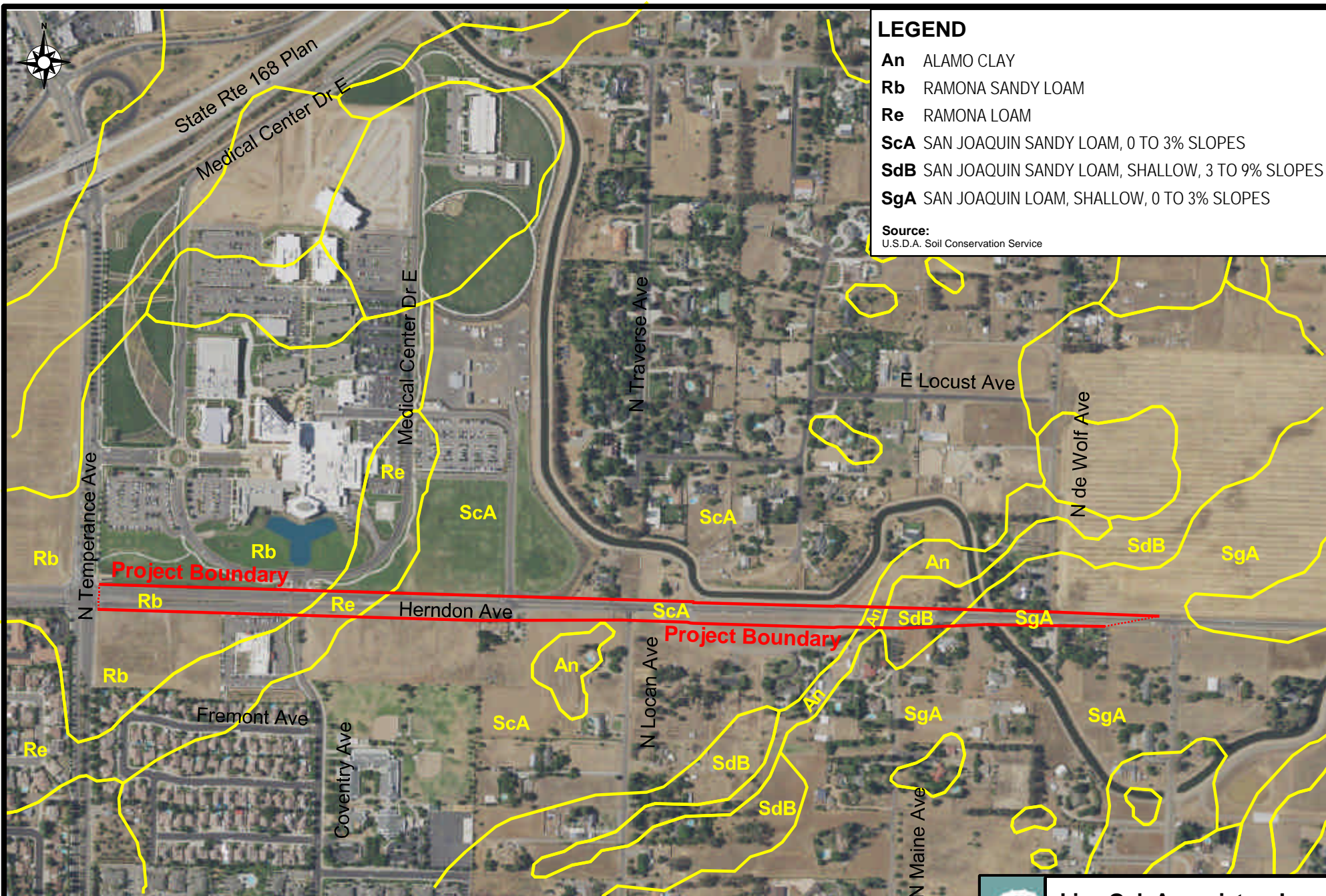




## LEGEND

- An** ALAMO CLAY
- Rb** RAMONA SANDY LOAM
- Re** RAMONA LOAM
- ScA** SAN JOAQUIN SANDY LOAM, 0 TO 3% SLOPES
- SdB** SAN JOAQUIN SANDY LOAM, SHALLOW, 3 TO 9% SLOPES
- SgA** SAN JOAQUIN LOAM, SHALLOW, 0 TO 3% SLOPES

**Source:**  
U.S.D.A. Soil Conservation Service



USDA FSA Aerial Photography Field Office 9/29/2016

1,000' 0 1,000 feet  
approximate scale



**Live Oak Associates, Inc.**

**Herndon Avenue Widening  
Soils**

| Date      | Project # | Figure # |
|-----------|-----------|----------|
| 7/20/2017 | 2175-01   | 3        |

| <b>TABLE 1. SOILS OF THE HERNDON AVENUE WIDENING PROJECT SITE (NRCS 2017).</b>   |                        |  |   |                     |
|--|------------------------|--|---|---------------------|
| <b>Soil Series/Soil</b>  | <b>Map Unit Symbol</b> | <b>Parent Material</b>   | <b>Drainage Class</b>                                 | <b>Hydric</b>       |
| Alamo Clay   | An                     | Formed in alluvium from mixed sources                                    | Poorly drained, Moderately Deep to hardpan            | Yes                 |
| Ramona Sandy Loam<br>Ramona Loam   | Rb<br>Re               | Formed in alluvium, derived mostly from granite and related rock sources | Well drained  | Yes                 |
| San Joaquin Sandy Loam, 0-3 % slopes<br>San Joaquin Sandy Loam, Shallow, 3-9% slopes<br>San Joaquin Loam, Shallow, 0-3% slopes | ScA<br>SdB<br>SgA      | Derived from mixed alluvium, but dominantly granitic rock sources        | Moderately deep to a duripan, moderately well drained | Yes, in depressions |

### 3.2 POTENTIAL WATERS OF THE UNITED STATES

Hydrologic features that may be considered waters of the United States were limited to a disturbed roadside depression and a seasonal wetland swale (approximately 0.204 acre of the 11.8 acre project site). Table 2 and Figure 4 show all potential jurisdictional waters identified during the field survey.

| <b>TABLE 2. POTENTIALLY JURISDICTIONAL WATERS OF THE HERNDON AVENUE IMPROVEMENT PROJECT SITE</b> |                               |                        |
|--|-------------------------------|------------------------|
| <b>Type of Water</b>   | <b>Approx. Square Footage</b> | <b>Approx. Acreage</b> |
| Seasonal Wetland Swale   | 1,059                         | 0.024                  |
| Roadside Depression  | 7,841                         | 0.18                   |
| <b>Total</b>   | 8,900                         | 0.204                  |

**3.2.1 Seasonal Wetland Swale.** A small portion of a seasonal wetland swale passes through the study area from north to south, just a few hundred feet west of Maine Avenue's intersection with Herndon Avenue. The seasonal wetland swale was dominated by a mix of upland and wetland vegetation, including creeping spikerush (*Eleocharis macrostachya*)(OBL), Hyssop's loosestrife (*Lythrum hyssopifolium*) (OBL), Bermuda grass (*Cynodon dactylon*)(FACU), Mediterranean barley (*Hordeum marinum* ssp. *gussonianum*)(FAC), toad rush (*Juncus bufonius*) (FACW), and blue panic grass (*Panicum capillare*) (FAC)(Sample Location #3). The vegetation met both the dominance test and the prevalence Index test indicating hydrophytic vegetation criteria was met. No sign of a defined bed and bank was observed. Therefore, the swale lacked evidence of ordinary high water (such as water marks, sediment deposits, drift deposits, drainage patterns). The Munsell color notation within the swale was 7.5YR 2/1 (low chroma) and redox features consisted of oxidized root channels and comprised approximately 2-3 percent of the top 6 inches of soil.

Review of historic Google Earth imagery revealed that the swale is extremely ephemeral in nature, carrying water only when upstream sources provide it. There was no evidence of inundation from review of the historic Google Earth imagery. The swale passed through the APE and traversed adjacent private lands to the southwest. Since access was





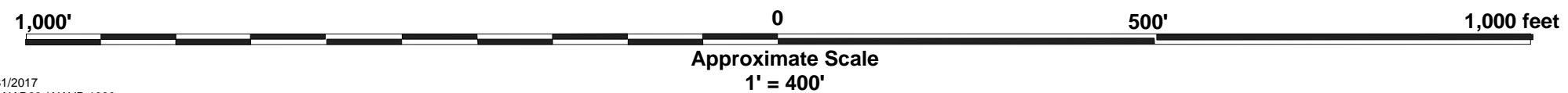
# LEGEND

Jurisdictional waters (Areas meeting the technical criteria for wetlands)

- Seasonal Wetland Swale (1,059 SF / 0.024 Ac., 98 LF)
- Roadside Depression (7,841 SF / 0.180 Ac)

Other Features

- Project A.P.E. (Approx. 11.789 Ac.)
- Sample Points
- Culvert



Source:  
Aerial Photograph Courtesy of Google Earth, Photo Date 3/31/2017  
Universal Transverse Mercator Coordinate System Zone 11, NAD83 / NAVD 1988

|           |   |          |  |
|-----------|---|----------|--|
|           | Live Oak Associates, Inc.                               |          |  |
|           | Herndon Avenue Widening<br>Potential Waters of the U.S. |          |  |
| Date      | Project #   | Figure # |  |
| 8/02/2017 | 2175-01   | 4        |  |

not granted on these lands, the connectivity was investigated using Google Earth imagery and USGS maps. The seasonal wetland swale may be considered a “tributary water”, because as will be discussed in greater detail below, it can be argued that at one time it connected to a navigable water, the San Joaquin River downstream.

**3.1.2 Roadside Depression.** Though sparse, vegetation observed in the seasonal roadside depression during the summer of 2017 was dominated by Bermuda grass (FACU), prostrate knotweed (*Polygonum aviculare*)(FACU) and swamp pricklegass (*Crypsis schoenoides*) (OBL)(Sample location #1). Great Valley coyote thistle (*Eryngium castrense*) (OBL) and creeping spikerush (OBL) were present in the deepest part of the depression. Both the dominance test and the prevalence index test were met, indicating the presence of hydrophytic vegetation.

The roadside depression located within the study area was not inundated during the site survey. Primary indicators of wetland hydrology included inundation visible on aerial imagery. FAC-Neutral test and saturation visible on aerial imagery were secondary indicators providing further evidence of wetland hydrology. No connection with any offsite tributary waters was evident. Though speculative, the depression could be a borrow pit dug for manmade purposes.

The soil pit dug within the loamy soils revealed prominent and distinct redoximorphic features (oxidized root channels), providing clear evidence of hydric soils. The Munsell color notation of the reduced matrix was 7.5YR 3/2 and the redox color was 7.5YR3/4.

### 3.3 UPLAND AREAS

Paved, gravel, and dirt road shoulders of the study area would be considered ruderal in nature. These areas were generally barren and devoid of vegetation. Residential/commercial areas and the medical center contained ornamental landscaping common to residential/commercial areas of the Central Valley, including mature ornamental trees including pines (*Pinus* sp.)(UPL), oaks (*Quercus* sp.)(UPL), coast redwood (*Sequoia*

*sempervirens*)(UPL), mulberry (*Morus* sp.)(UPL) and red gum (*Eucalyptus rostrata*)(UPL), to name a few.

Ruderal road shoulders were dominated by weedy alien plants including wild oats (*Avena fatua*) (UPL), prickly lettuce (*Lactuca serriola*) (FACU), barnyard barley (FACU), and Russian thistle (*Salsola tragus*)(UPL).

The vegetation was dominated by non-wetland species, and therefore the technical criterion for hydrophytic vegetation was not met. Soil pits that were dug in upland areas (Sampling Locations 2, 4 and 5) exhibited Munsell color notations of 10YR3/2 or 3/3. No redoximorphic features, such as mottles or oxidized root channels, were observed in these upland soils.

Although all the soils within the study area are considered hydric by the NRCS, decades of disturbance have altered the natural soils significantly, so that no signs of hydric soils were currently evident. Evidence of wetland hydrology, such as water-stained leaves, saturated or inundated soils, and a drainage pattern in wetlands, was lacking in upland areas of the site. These areas did not meet the technical criteria of jurisdictional wetlands.

## 4.0 DISCUSSION

The rationale for considering the wetland swale as waters of the U.S. is its apparent hydrologic connection to a traditional navigable water of the U.S. The headwaters of the swale are approximately 1.5 mile to the northeast. After passing through the APE, it travels southwest onto private lands and apparently goes underground approximately 0.5 miles from the APE. Review of USGS maps show this blue line stream flowing west to southwest through the center of the city of Clovis as Dry Creek and forms the Helm Canal on the south side of Clovis, which connects to Redbank Slough, and Redbank Slough to Mill Creek Ditch.

Mill Creek Ditch continues approximately 6 miles in a westerly direction through Clovis and Fresno to near the intersection of McKinley Avenue and Highway 41, after which the ditch is referred to as the Dry Creek Canal. This canal passes through Fresno into the agricultural lands to the southwest, ending approximately 5-10 miles southwest of the Fresno sewage treatment plant. A significant amount of water has been diverted from this canal to flow into irrigation ditches and agricultural fields along the way. Finally, the canal dissipates where it appears to flood irrigate a field approximately 3-air miles northeast of the Raisin City Oil Field. Thus, this seasonal swale does not appear to be isolated from other jurisdictional waters upstream. Although the swale could arguably be considered not connected downstream, there has been precedent previously set for waterways within the Fancher Creek watershed to be considered jurisdictional by the Corps.

Consistent with findings of the SWANCC Decision (see Section 1.2.1), it appears that the wetland depression is an isolated intrastate water with no apparent interstate or foreign commerce connection, and is a not water of the United States. The seasonal wetland depression located on the site does not appear to be “bordering, contiguous, or neighboring” other jurisdictional waters. Although this wetland may qualify as an “isolated wetland”, the degree of proximity necessary to establish that one wetland (or other water) is “adjacent” to a known jurisdictional water has not been established.



Even if this feature was not regulated by the Corps of Engineers because it is an intrastate isolated water with no apparent interstate or foreign commerce connection as defined under the Clean Water Act, it could be considered a water of the State. The statutory basis for determining what is and isn't a water of the state of California subject to the jurisdiction of the State and Regional Water Quality Control Boards (RWQCB) is somewhat unclear, although the RWQCB maintains that it has jurisdiction over all surface waters of the state.

The applicant is seeking a preliminary jurisdictional determination (JD), thereby bypassing any unnecessary effort associated with acquisition of an approved JD. A preliminary JD is "preliminary" in the sense that a recipient can later request and obtain an approved JD if that later becomes necessary or appropriate during the permit process or during the administrative appeal process (USACE 2008b). As such, a total of approximately 8,900 square feet (0.204 acre)) of potential waters of the U.S. has been identified within the study area, and includes a wetland swale (1,059 square feet)(0.024 acre) and an isolated roadside wetland depression (7,841 square feet)(0.18 acre) .

No other portion of the project site would be considered a Water of the United States.



## LITERATURE CITED

- Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D. G. Wilken, editors, 2012. *The Jepson Manual: Vascular Plants of California, second edition*. University of California Press, Berkeley.
- California Department of Fish and Game. 1995. California Fish and Game Code. Gould Publications. Binghamton, N.Y.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Department of the Army. Washington D.C. 100 pp.
- Guzy, Gary S. 2001. Memorandum. Supreme Court Ruling Concerning CWA Jurisdiction over Isolated Waters. U.S. Environmental Protection Agency.
- Holland, R.F. 1986. *Preliminary Description of the terrestrial natural communities of California*. Resources Agency, Sacramento, CA. 156 pp.
- Natural Resources Conservation Service (NRCS) internet website.  
<http://www2/ftw.usda.gov/osd/dat/C/DIBO.html> Site accessed May 2017.
- Sawyer, J.O. and T. Keeler-Wolf. 2001. A Manual of California Vegetation. California Native Plant Society. Sacramento, CA
- UC/Jepson Herbarium. Data provided by the participants of the Consortium of California Herbaria. Accessed May 2017 from  
<http://www.ucjeps.berkeley.edu/consortium/>.
- University of California Berkeley. 2017. Jepson Online Interchange for California floristics. <http://ucjeps.berkeley.edu/interchange.html>. Site accessed January 2013.
- USACE. 2001. Minimum Standards for Acceptance of Preliminary Wetland Delineations. Department of the Army.
- USACE. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. Department of the Army.
- Wetland Training Institute, Inc. 1990. Federal Wetland Regulation Reference Manual. B.N. Goode and R.J. Pierce (eds.) WTI 90-1. 281p.
- Wetland Training Institute, Inc. 1995. Field Guide for Wetland Delineation; 1987 Corps of Engineers Manual, Glenwood, NM. WTI 02-1 143pp.

## **APPENDIX A: WETLAND DATA SHEETS**

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Herndon Avenue Widening City/County: Clovis, Fresno Co Sampling Date: 7/20/17  
 Applicant/Owner: City of Clovis State: CA Sampling Point: 1  
 Investigator(s): Wendy Fisher, Anna Gohine Section, Township, Range: Sec 2, T13 S, R21 E  
 Landform (hillslope, terrace, etc.): Roadside pool Local relief (concave, convex, none): depression Slope (%): <1  
 Subregion (LRR): \_\_\_\_\_ Lat: 36°50'13.94"N Long: 119°39'17.01"W Datum: NAD 83  
 Soil Map Unit Name: San Joaquin sandy loam, 0-3% slopes NWI classification: none  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No ☒ (If no, explain in Remarks.)  
 Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No ☒  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|  |  |
|--|--|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ | Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ |
| Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____            |  |
| Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____      |  |
| Remarks: <u>Roadside Pool, greater than average precipitation this year</u>      |  |

## VEGETATION

| Tree Stratum (Use scientific names.)                                  | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet:  |
|---|------------------|-------------------|------------------|--|
| 1. _____  |                  |                   |                  | Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)                                |
| 2. _____  |                  |                   |                  | Total Number of Dominant Species Across All Strata: <u>3</u> (B)                                   |
| 3. _____  |                  |                   |                  | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66%</u> (A/B)                           |
| 4. _____  |                  |                   |                  |  |
| Total Cover: _____  |                  |                   |                  |  |
| Sapling/Shrub Stratum   |                  |                   |                  | Prevalence Index worksheet:  |
| 1. _____  |                  |                   |                  | Total % Cover of: _____ Multiply by: _____   |
| 2. _____  |                  |                   |                  | OBL species _____ x 1 = _____  |
| 3. _____  |                  |                   |                  | FACW species <u>30</u> x 2 = <u>60</u>   |
| 4. _____  |                  |                   |                  | FAC species <u>20</u> x 3 = <u>60</u>  |
| 5. _____  |                  |                   |                  | FACU species <u>50</u> x 4 = <u>200</u>  |
| Total Cover: _____  |                  |                   |                  | UPL species _____ x 5 = _____  |
| Herb Stratum  |                  |                   |                  | Column Totals: <u>160</u> (A) <u>320</u> (B)   |
| 1. <u>Cyperus schoenoides</u>   | <u>30</u>        | <u>y</u>          | <u>FACW</u>      | Prevalence Index = B/A = <u>3.2</u>  |
| 2. <u>Cynodon dactylon</u>  | <u>50</u>        | <u>y</u>          | <u>FACU</u>      |  |
| 3. <u>Polygonum aviculare</u>   | <u>20</u>        | <u>y</u>          | <u>FAC</u>       |  |
| 4. _____  |                  |                   |                  |  |
| 5. _____  |                  |                   |                  |  |
| 6. _____  |                  |                   |                  |  |
| 7. _____  |                  |                   |                  |  |
| 8. _____  |                  |                   |                  |  |
| Total Cover: <u>10</u>  |                  |                   |                  |  |
| Woody Vine Stratum  |                  |                   |                  | Hydrophytic Vegetation Indicators:   |
| 1. _____  |                  |                   |                  | <input checked="" type="checkbox"/> Dominance Test is >50%   |
| 2. _____  |                  |                   |                  | Prevalence Index is ≤3.0 <sup>1</sup>  |
|   |                  |                   |                  | Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |
|   |                  |                   |                  | Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  |
|   |                  |                   |                  | <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.                      |
| Total Cover: _____  |                  |                   |                  | Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____                   |
| % Bare Ground in Herb Stratum <u>90</u> % Cover of Biotic Crust _____ |                  |                   |                  |  |
| Remarks: <u>Only 10% of soil surface is vegetated</u>                 |                  |                   |                  |  |

Sampling Point: 1

[illegible]

### Indicators for Problematic Hydric Soils<sup>3</sup>:

- <sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present.

Hydric Soil Present? Yes ☒ No ☐

soil is compacted and very dry - cannot dig a deeper soil pit

**Secondary Indicators (2 or more required)**

|   |  |   |
|---|--|---|
| <input type="checkbox"/> Surface Water (A1)                                   | <input type="checkbox"/> Salt Crust (B11)                              | <input type="checkbox"/> Sediment Deposits (B2) (Riverine)                    |
| <input type="checkbox"/> High Water Table (A2)                                | <input type="checkbox"/> Biotic Crust (B12)                            | <input type="checkbox"/> Drift Deposits (B3) (Riverine)                       |
| <input type="checkbox"/> Saturation (A3)                                      | <input type="checkbox"/> Aquatic Invertebrates (B13)                   | <input type="checkbox"/> Drainage Patterns (B10)                              |
| <input type="checkbox"/> Water Marks (B1) (Nonriverine)                       | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                    | <input type="checkbox"/> Dry-Season Water Table (C2)                          |
| <input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)                 | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | <input type="checkbox"/> Thin Muck Surface (C7)                               |
| <input type="checkbox"/> Drift Deposits (B3) (Nonriverine)                    | <input type="checkbox"/> Presence of Reduced Iron (C4)                 | <input type="checkbox"/> Crayfish Burrows (C8)                                |
| <input type="checkbox"/> Surface Soil Cracks (B6)                             | <input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)    | <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks)                    | <input type="checkbox"/> Shallow Aquitard (D3)                                |
| <input type="checkbox"/> Water-Stained Leaves (B9)                            |  | <input checked="" type="checkbox"/> FAC-Neutral Test (D5)                     |

Wetland Hydrology Present? Yes ☒ No ☐

Remarks:

Pool is currently dry (as expected this time of year)

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Harndon Ave Widening Project City/County: Clovis, Fresno Co Sampling Date: 7/20/17  
 Applicant/Owner: City of Clovis State: CA Sampling Point: 2  
 Investigator(s): Wendy Fisher, Anna Codrino Section, Township, Range: Sec 2, T13S, R21E  
 Landform (hillslope, terrace, etc.): Road shoulder Local relief (concave, convex, none): none Slope (%): 0  
 Subregion (LRR): \_\_\_\_\_ Lat: 36°50'13.99"N Long: 119°39'16.20"W Datum: NAD 83  
 Soil Map Unit Name: San Joaquin sandy loam, 0-3 % slopes NWI classification: none  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No ☒  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|                                 |  |   |
|---------------------------------|--|---|
| Hydrophytic Vegetation Present? | Yes _____ No <input checked="" type="checkbox"/> | Is the Sampled Area<br>within a Wetland? Yes _____ No <input checked="" type="checkbox"/> |
| Hydric Soil Present?            | Yes _____ No <input checked="" type="checkbox"/> |   |
| Wetland Hydrology Present?      | Yes _____ No <input checked="" type="checkbox"/> |   |
| Remarks:                        |  |   |

## VEGETATION

| Tree Stratum (Use scientific names.)    | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet:  |                  |
|---|------------------|-------------------|------------------|--|------------------|
| 1. _____                                |                  |                   |                  | Number of Dominant Species That Are OBL, FACW, or FAC:   | <u>0</u> (A)     |
| 2. _____                                |                  |                   |                  | Total Number of Dominant Species Across All Strata:  | <u>1</u> (B)     |
| 3. _____                                |                  |                   |                  | Percent of Dominant Species That Are OBL, FACW, or FAC:  | <u>0</u> (A/B)   |
| 4. _____                                |                  |                   |                  |  |                  |
| Total Cover: _____                      |                  |                   |                  |  |                  |
| Sapling/Shrub Stratum                   |                  |                   |                  | Prevalence Index worksheet:  |                  |
| 1. _____                                |                  |                   |                  | Total % Cover of:  | Multiply by:     |
| 2. _____                                |                  |                   |                  | OBL species _____  | x 1 = _____      |
| 3. _____                                |                  |                   |                  | FACW species _____   | x 2 = _____      |
| 4. _____                                |                  |                   |                  | FAC species _____  | x 3 = _____      |
| 5. _____                                |                  |                   |                  | FACU species <u>30</u>   | x 4 = <u>120</u> |
| Total Cover: _____                      |                  |                   |                  | UPL species _____  | x 5 = _____      |
| Herb Stratum                            |                  |                   |                  | Column Totals: <u>30</u> (A)   | <u>120</u> (B)   |
| 1. <u>Cynodon dactylon</u>              | <u>30</u>        | <u>Y</u>          | <u>FACU</u>      | Prevalence Index = B/A = <u>4</u>  |                  |
| 2. _____                                |                  |                   |                  | Hydrophytic Vegetation Indicators:   |                  |
| 3. _____                                |                  |                   |                  | ___ Dominance Test is >50%   |                  |
| 4. _____                                |                  |                   |                  | ___ Prevalence Index is ≤3.0 <sup>1</sup>  |                  |
| 5. _____                                |                  |                   |                  | ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |                  |
| 6. _____                                |                  |                   |                  | ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  |                  |
| 7. _____                                |                  |                   |                  | ___  |                  |
| 8. _____                                |                  |                   |                  | ___  |                  |
| Total Cover: _____                      |                  |                   |                  | ___  |                  |
| Woody Vine Stratum                      |                  |                   |                  | ___  |                  |
| 1. _____                                |                  |                   |                  | ___  |                  |
| 2. _____                                |                  |                   |                  | ___  |                  |
| Total Cover: _____                      |                  |                   |                  | ___  |                  |
| % Bare Ground in Herb Stratum <u>70</u> |                  |                   |                  | Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>                       |                  |
| % Cover of Biotic Crust _____           |                  |                   |                  |  |                  |

Remarks:

## SOIL

Sampling Point: 2

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

| Depth<br>(inches) | Matrix        |     | Redox Features |   |                   |                  | Texture    | Remarks |
|-------------------|---------------|-----|----------------|---|-------------------|------------------|------------|---------|
|                   | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> | Loc <sup>2</sup> |            |         |
| 0-3               | 10YR 3/3      | 100 |                |   |                   |                  | Sandy loam |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |
|                   |               |     |                |   |                   |                  |            |         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix. <sup>2</sup>Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators:** (Applicable to all LRRs, unless otherwise noted.)

|  |   |   |
|--|---|---|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)           | <input type="checkbox"/> 1 cm Muck (A9) (LRR C)     |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)       | <input type="checkbox"/> 2 cm Muck (A10) (LRR B)    |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1)   | <input type="checkbox"/> Reduced Vertic (F18)       |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)   | <input type="checkbox"/> Red Parent Material (TF2)  |
| <input type="checkbox"/> Stratified Layers (A5) (LRR C)    | <input type="checkbox"/> Depleted Matrix (F3)       | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR D)            | <input type="checkbox"/> Redox Dark Surface (F6)    |   |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Dark Surface (F7) |   |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Depressions (F8)     |   |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Vernal Pools (F9)          |   |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          |   |   |

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No ☒

Remarks:

No indicators present

## HYDROLOGY

**Wetland Hydrology Indicators:**

**Primary Indicators (any one indicator is sufficient)**

|  |  |
|--|--|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Salt Crust (B11)                              |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Biotic Crust (B12)                            |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                   |
| <input type="checkbox"/> Water Marks (B1) (Nonriverine)            | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                    |
| <input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)      | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) (Nonriverine)         | <input type="checkbox"/> Presence of Reduced Iron (C4)                 |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)    |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks)                    |
| <input type="checkbox"/> Water-Stained Leaves (B9)                 |  |

**Secondary Indicators (2 or more required)**

|  |
|--|
| <input type="checkbox"/> Water Marks (B1) (Riverine)               |
| <input type="checkbox"/> Sediment Deposits (B2) (Riverine)         |
| <input type="checkbox"/> Drift Deposits (B3) (Riverine)            |
| <input type="checkbox"/> Drainage Patterns (B10)                   |
| <input type="checkbox"/> Dry-Season Water Table (C2)               |
| <input type="checkbox"/> Thin Muck Surface (C7)                    |
| <input type="checkbox"/> Crayfish Burrows (C8)                     |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Shallow Aquitard (D3)                     |
| <input type="checkbox"/> FAC-Neutral Test (D5)                     |

**Field Observations:**

Surface Water Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_

Water Table Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_

Saturation Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

Wetland Hydrology Present? Yes \_\_\_\_\_ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators present

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Harndon Ave Widening Project City/County: Clovis, Fresno Co Sampling Date: 7/20/17  
 Applicant/Owner: City of Clovis State: CA Sampling Point: 3  
 Investigator(s): Wendy Fisher, Anna Gethino Section, Township, Range: Sec 2, T13S, R21E  
 Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): <1  
 Subregion (LRR): \_\_\_\_\_ Lat: 36°50'14.35 N Long: 119°39'03.51 W Datum: NAD 83  
 Soil Map Unit Name: Alamo Clay NWI classification: none  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No ☒  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|  |  |
|--|--|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ | Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ |
| Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____            |  |
| Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____      |  |
| Remarks: <u>South of Culvert below Harndon</u>                                   |  |

## VEGETATION

| Tree Stratum (Use scientific names.)                                  | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet:  |
|---|------------------|-------------------|------------------|--|
| 1. _____  |                  |                   |                  | Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)                                  |
| 2. _____  |                  |                   |                  | Total Number of Dominant Species Across All Strata: <u>3</u> (B)                                     |
| 3. _____  |                  |                   |                  | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66</u> (A/B)                              |
| 4. _____  |                  |                   |                  |  |
| Total Cover: _____  |                  |                   |                  |  |
| Sapling/Shrub Stratum   |                  |                   |                  | Prevalence Index worksheet:  |
| 1. _____  |                  |                   |                  | Total % Cover of: <u>35</u> Multiply by: <u>35</u>   |
| 2. _____  |                  |                   |                  | OBL species <u>35</u> x 1 = <u>35</u>  |
| 3. _____  |                  |                   |                  | FACW species <u>1</u> x 2 = <u>2</u>   |
| 4. _____  |                  |                   |                  | FAC species <u>41</u> x 3 = <u>123</u>   |
| 5. _____  |                  |                   |                  | FACU species <u>20</u> x 4 = <u>80</u>   |
| Total Cover: _____  |                  |                   |                  | UPL species <u>3</u> x 5 = <u>15</u>   |
|   |                  |                   |                  | Column Totals: <u>100</u> (A) <u>235</u> (B)   |
|   |                  |                   |                  | Prevalence Index = B/A = <u>2.35</u>   |
| Herb Stratum  |                  |                   |                  | Hydrophytic Vegetation Indicators:   |
| 1. <u>Juncus bufonius</u>   | <u>1</u>         | <u>N</u>          | <u>FACW</u>      | <input checked="" type="checkbox"/> Dominance Test is $\geq 50\%$                                    |
| 2. <u>Eleocharis macrostachya</u>                                     | <u>15</u>        | <u>N</u>          | <u>OBL</u>       | <input checked="" type="checkbox"/> Prevalence Index is $\leq 3.0^1$                                 |
| 3. <u>Cynodon dactylon</u>  | <u>20</u>        | <u>Y</u>          | <u>FACW</u>      | — Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |
| 4. <u>Lythrum hyssopifolium</u>                                       | <u>20</u>        | <u>Y</u>          | <u>OBL</u>       | — Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  |
| 5. <u>Polygonum aviculare</u>   | <u>25</u>        | <u>Y</u>          | <u>FAC</u>       |  |
| 6. <u>Xanthium strumarium</u>   | <u>5</u>         | <u>N</u>          | <u>FAC</u>       |  |
| 7. <u>Hordeum murina gussonianum</u>                                  | <u>2</u>         | <u>N</u>          | <u>FAC</u>       |  |
| 8. <u>Echinochloa polystachya</u>                                     | <u>4</u>         | <u>N</u>          | <u>FAC</u>       |  |
| 9. <u>Rumex crispus</u>   | <u>1</u>         | <u>N</u>          | <u>FAC</u>       |  |
| 10. <u>Panicum capillare</u>  | <u>4</u>         | <u>N</u>          | <u>FAC</u>       |  |
| Total Cover: <u>100</u>   |                  |                   |                  |  |
| Woody Vine Stratum  |                  |                   |                  |  |
| 1. <u>Amsinckia sp</u>  | <u>3</u>         | <u>N</u>          | <u>VPL</u>       |  |
| 2. _____  |                  |                   |                  |  |
| Total Cover: _____  |                  |                   |                  |  |
| % Bare Ground in Herb Stratum <u>15</u> % Cover of Biotic Crust _____ |                  |                   |                  | Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____                     |

Remarks: \_\_\_\_\_

Sampling Point: 7

## HYDROLOGY

Arid West – Version 11-1-2006



# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Herndon Avenue Widening City/County: Clovis, Fresno Co Sampling Date: 7/20/17  
 Applicant/Owner: City of Clovis State: CA Sampling Point: 4  
 Investigator(s): Wendy Fisher, Anna Gohira Section, Township, Range: Sec 2, T13S, R21E  
 Landform (hillslope, terrace, etc.): road shoulder Local relief (concave, convex, none): none Slope (%): 0  
 Subregion (LRR): \_\_\_\_\_ Lat: 36° 50' 14.46" N Long: 119° 39' 03.22" W Datum: NAD 83  
 Soil Map Unit Name: Alamo clay NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No ☒  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

|                                 |  |   |
|---------------------------------|--|---|
| Hydrophytic Vegetation Present? | Yes _____ No <input checked="" type="checkbox"/> | Is the Sampled Area<br>within a Wetland? Yes _____ No <input checked="" type="checkbox"/> |
| Hydric Soil Present?            | Yes _____ No <input checked="" type="checkbox"/> |   |
| Wetland Hydrology Present?      | Yes _____ No <input checked="" type="checkbox"/> |   |
| Remarks:                        |  |   |

## VEGETATION

| Tree Stratum (Use scientific names.)                              | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet:  |
|---|------------------|-------------------|------------------|--|
| 1. _____  | _____            | _____             | _____            | Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)                                  |
| 2. _____  | _____            | _____             | _____            | Total Number of Dominant Species Across All Strata: <u>1</u> (B)                                     |
| 3. _____  | _____            | _____             | _____            | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)                               |
| 4. _____  | _____            | _____             | _____            |  |
| Total Cover: _____  |                  |                   |                  |  |
| Sapling/Shrub Stratum   |                  |                   |                  | Prevalence Index worksheet:  |
| 1. _____  | _____            | _____             | _____            | Total % Cover of: <u>0</u> Multiply by: _____  |
| 2. _____  | _____            | _____             | _____            | OBL species <u>0</u> x 1 = _____   |
| 3. _____  | _____            | _____             | _____            | FACW species <u>0</u> x 2 = _____  |
| 4. _____  | _____            | _____             | _____            | FAC species <u>20</u> x 3 = <u>60</u>  |
| 5. _____  | _____            | _____             | _____            | FACU species <u>57</u> x 4 = <u>228</u>  |
| Total Cover: _____  |                  |                   |                  | UPL species <u>23</u> x 5 = <u>115</u>   |
| Herb Stratum  |                  |                   |                  | Column Totals: <u>100</u> (A) <u>403</u> (B)   |
| 1. <u>Oenothera latifolia</u>                                     | <u>7</u>         | <u>no</u>         | <u>UPL</u>       | Prevalence Index = B/A = <u>4.03</u>   |
| 2. <u>Gnaphalium parryi</u>                                       | <u>50</u>        | <u>yes</u>        | <u>FACW</u>      |  |
| 3. <u>Eriogonum canadensis</u>                                    | <u>1</u>         | <u>n</u>          | <u>FACW</u>      |  |
| 4. <u>Sonchus oleraceus</u>                                       | <u>3</u>         | <u>n</u>          | <u>UPL</u>       |  |
| 5. <u>Festuca purpurea</u>  | <u>5</u>         | <u>n</u>          | <u>FAC</u>       |  |
| 6. <u>Malva parviflora</u>  | <u>3</u>         | <u>n</u>          | <u>UPL</u>       |  |
| 7. <u>Achillea - lotus scopulorum</u>                             | <u>5</u>         | <u>n</u>          | <u>UPL</u>       |  |
| 8. <u>Panicum capillare</u>                                       | <u>15</u>        | <u>n</u>          | <u>FAC</u>       |  |
| <u>Salsola tragus</u>   | <u>5</u>         | <u>n</u>          | <u>UPL</u>       |  |
| Total Cover: _____  |                  |                   |                  |  |
| Woody Vine Stratum  |                  |                   |                  | Hydrophytic Vegetation Indicators:   |
| 1. _____  | _____            | _____             | _____            | — Dominance Test is >50%   |
| 2. _____  | _____            | _____             | _____            | — Prevalence Index is ≤3.0 <sup>1</sup>  |
| Total Cover: _____  |                  |                   |                  | — Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |
| % Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____ |                  |                   |                  | — Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  |
| Remarks:  |                  |                   |                  | <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.                        |
|   |                  |                   |                  | Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>                     |



# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Harndon Ave Widening Project City/County: Clovis, Fresno Co Sampling Date: 7/20/17  
 Applicant/Owner: City of Clovis State: CA Sampling Point: 5  
 Investigator(s): Wendy Fisher, Anna Codrino Section, Township, Range: Sec 2, T13S, R21E  
 Landform (hillslope, terrace, etc.): Road shoulder Local relief (concave, convex, none): none Slope (%): 0  
 Subregion (LRR): \_\_\_\_\_ Lat: 35° 50' 14.46 N Long: 119° 39' 21.90 W Datum: NAD83  
 Soil Map Unit Name: San Joaquin Sandy loam, 0-3% slopes NWI classification: none  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No ☒ (If no, explain in Remarks.)  
 Are Vegetation ☒, Soil ☒, or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No ☒  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

|  |  |  |
|--|--|--|
| Hydrophytic Vegetation Present?                      | Yes _____ No <input checked="" type="checkbox"/> | Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> |
| Hydric Soil Present?                                 | Yes _____ No <input checked="" type="checkbox"/> |  |
| Wetland Hydrology Present?                           | Yes _____ No <input checked="" type="checkbox"/> |  |
| Remarks:<br><u>Disced field, Heavy rainfall year</u> |  |  |

## VEGETATION

| Tree Stratum (Use scientific names.)   | Absolute % Cover | Dominant Species? | Indicator Status | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)<br>Total Number of Dominant Species Across All Strata: <u>3</u> (B)<br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)  |
|--|------------------|-------------------|------------------|--|
| 1. _____   |                  |                   |                  |  |
| 2. _____   |                  |                   |                  |  |
| 3. _____   |                  |                   |                  |  |
| 4. _____   |                  |                   |                  |  |
| Total Cover: _____   |                  |                   |                  | <b>Prevalence Index worksheet:</b><br>Total % Cover of: _____ Multiply by: _____<br>OBL species _____ x 1 = _____<br>FACW species _____ x 2 = _____<br>FAC species _____ x 3 = _____<br>FACU species <u>30</u> x 4 = <u>120</u><br>UPL species <u>70</u> x 5 = <u>350</u><br>Column Totals: <u>100</u> (A) <u>470</u> (B)<br>Prevalence Index = B/A = <u>4.7</u> |
| <b>Sapling/Shrub Stratum</b><br>1. _____<br>2. _____<br>3. _____<br>4. _____<br>5. _____<br>Total Cover: _____   |                  |                   |                  |  |
| <b>Herb Stratum</b><br>1. <u>Avena fatua</u> <u>30</u> <u>Y</u> <u>UPL</u><br>2. <u>Trichostema lanceolatum</u> <u>5</u> <u>N</u> <u>UPL</u><br>3. <u>Bromus diandrus</u> <u>35</u> <u>Y</u> <u>UPL</u><br>4. <u>Bromus hordeaceus</u> <u>30</u> <u>Y</u> <u>FACU</u><br>5. _____<br>6. _____<br>7. _____<br>8. _____<br>Total Cover: <u>100</u> |                  |                   |                  |  |
| <b>Woody Vine Stratum</b><br>1. _____<br>2. _____<br>Total Cover: _____  |                  |                   |                  |  |
| % Bare Ground in Herb Stratum <u>50</u> % Cover of Biotic Crust _____  |                  |                   |                  |  |
| <b>Hydrophytic Vegetation Indicators:</b><br>_____ Dominance Test is >50%<br>_____ Prevalence Index is ≤3.0 <sup>1</sup><br>_____ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br>_____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  |                  |                   |                  |  |
| <b>Hydrophytic Vegetation Present?</b> Yes _____ No <input checked="" type="checkbox"/>  |                  |                   |                  |  |
| Remarks:   |                  |                   |                  |  |

Sampling Point: 5

## HYDROLOGY

Arid West – Version 11-1-2006

## **APPENDIX B: SELECTED PHOTOGRAPHS OF THE PROJECT SITE**



Photograph #1 (above). Ruderal road shoulder along the southwestern portion of the Herndon Avenue Improvement Project. Photograph #2 (below). Seasonal wetland swale at the location of Smaple location #3.







Photograph #3 (above). Looking north at the culvert passing beneath Herndon Avenue at the location of the seasonal wetland swale. Photograph #4 (below). Looking southeast across the roadside depression and Sample point #1.







Photographs #5 (above). Sample Point #2 was taken along the road shoulder outside of the wetland depression. Photograph #6 (below). Sample point #5 was taken in an area where a blue line was shown on the USGS map. No evidence of wetland hydrology, hydric soils, or hydrophytic vegetation was evident.





## **APPENDIX C: VASCULAR PLANTS OF THE PROJECT SITE**

## APPENDIX A: VASCULAR PLANTS OF THE PROJECT SITE

The vascular plant species listed below were observed on the project site during a site survey conducted by Live Oak Associates, Inc. along the Grant Canal and A Ditch "A" at the South Fowler Avenue crossing on July 20, 2017. The U.S. Fish and Wildlife Service wetland indicator status of each plant has been shown following its common name.

OBL - Obligate  
 FACW - Facultative Wetland  
 FAC - Facultative  
 FACU - Facultative Upland  
 UPL - Upland  
 NR - No review  
 NA - No agreement  
 NI - No investigation

### AGAVACEAE – Agave Family

|                  |                  |     |
|------------------|------------------|-----|
| <i>Agave</i> sp. | Cultivated Agave | UPL |
|------------------|------------------|-----|

### AMARATHACEAE- Amaranth Family

|                             |                    |      |
|-----------------------------|--------------------|------|
| <i>Amaranthus blitoides</i> | Prostrate Amaranth | FACU |
|-----------------------------|--------------------|------|

### APIACEAE – Carrot Family

|                           |                             |     |
|---------------------------|-----------------------------|-----|
| <i>Eryngium castrense</i> | Great Valley Coyote Thistle | OBL |
|---------------------------|-----------------------------|-----|

### APOCYNACEAE – Dogbane Family

|                        |          |     |
|------------------------|----------|-----|
| <i>Nerium oleander</i> | Oleander | UPL |
|------------------------|----------|-----|

### ARALIACEAE – Ginseng Family

|                     |             |     |
|---------------------|-------------|-----|
| <i>Hedera helix</i> | English Ivy | UPL |
|---------------------|-------------|-----|

### ASTERACEAE – Sunflower Family

|                             |         |     |
|-----------------------------|---------|-----|
| <i>Centrolmadia pungens</i> | Tarweed | UPL |
|-----------------------------|---------|-----|

|                            |                  |  |
|----------------------------|------------------|--|
| <i>Erigeron canadensis</i> | Canada Horseweed |  |
|----------------------------|------------------|--|

|                         |                 |      |
|-------------------------|-----------------|------|
| <i>Lactuca serriola</i> | Prickly Lettuce | FACU |
|-------------------------|-----------------|------|

|                          |                  |      |
|--------------------------|------------------|------|
| <i>Helianthus annuus</i> | Annual Sunflower | FACU |
|--------------------------|------------------|------|

|                           |                 |     |
|---------------------------|-----------------|-----|
| <i>Hypochaeris glabra</i> | Smooth Cats Ear | UPL |
|---------------------------|-----------------|-----|

|                          |             |     |
|--------------------------|-------------|-----|
| <i>Sonchus oleraceus</i> | Sow Thistle | UPL |
|--------------------------|-------------|-----|

|                            |                 |     |
|----------------------------|-----------------|-----|
| <i>Xanthium strumarium</i> | Rough Cocklebur | FAC |
|----------------------------|-----------------|-----|

### BIGNONACEAE – Bignonia Family

|                         |              |     |
|-------------------------|--------------|-----|
| <i>Campsis radicans</i> | Trumpet Vine | UPL |
|-------------------------|--------------|-----|

### BORAGINACEAE – Borage Family

|                      |            |     |
|----------------------|------------|-----|
| <i>Amsinckia</i> sp. | Fiddleneck | UPL |
|----------------------|------------|-----|

### BRASSICACEAE – Mustard Family

|                       |               |     |
|-----------------------|---------------|-----|
| <i>Brassica nigra</i> | Black Mustard | UPL |
|-----------------------|---------------|-----|

### CARYOPHYLLACEAE – Carnation Family

|                          |                  |     |
|--------------------------|------------------|-----|
| <i>Spergularia rubra</i> | Red Sand Spurrey | FAC |
|--------------------------|------------------|-----|

### CHENOPODIACEAE – Goosefoot Family

|                          |                  |     |
|--------------------------|------------------|-----|
| <i>Chenopodium album</i> | Common Goosefoot | UPL |
|--------------------------|------------------|-----|

### CONVOLVULACEAE – Morning Glory Family

|                             |                      |     |
|-----------------------------|----------------------|-----|
| <i>Convolvulus arvensis</i> | Common Morning Glory | UPL |
|-----------------------------|----------------------|-----|

|  |                          |      |
|--|--------------------------|------|
| <i>Convolvulus</i> sp.                       | Cultivated Morning Glory | UPL  |
| <i>Cuscuta</i> sp.                           | Dodder                   | UPL  |
| <b>CUPRESSACEAE – Cypress Family</b>         |                          |      |
| <i>Sequoia sempervirens</i>                  | Coast Redwood            | UPL  |
| <b>EUPHORBIACEAE – Spruge Family</b>         |                          |      |
| <i>Croton setiger</i>                        | Turkey Mullein           | UPL  |
| <b>FAGACEAE – Oak Family</b>                 |                          |      |
| <i>Quercus lobata</i>                        | Valley Oak               | FACU |
| <b>GERANIACEAE – Geranium Family</b>         |                          |      |
| <i>Acmispon glaber</i>                       | Spanish Clover           | UPL  |
| <i>Erodium botrys</i>                        | Red-stemmed Filaree      | FACU |
| <b>JUGLANDACEAE – Walnut Family</b>          |                          |      |
| <i>Juglans regia</i>                         | English Walnut           | UPL  |
| <b>JUNCACEAE- Rush Family</b>                |                          |      |
| <i>Eleocharis macrostachya</i>               | Creeping Spikerush       | FACW |
| <i>Juncus bufonius</i>                       | Toad Rush                | FACW |
| <b>LAMIACEAE – Mint Family</b>               |                          |      |
| <i>Trichostema lanceolatum</i>               | Vinegar Weed             | FACU |
| <b>LYTHRACEAE – Loosestrife Family</b>       |                          |      |
| <i>Lythrum hyssopifolium</i>                 | Hyssop’s Loosestrife     | OBL  |
| <b>MALVACEAE – Mallow Family</b>             |                          |      |
| <i>Malva parviflora</i>                      | Mallow                   | UPL  |
| <b>MORACEAE – Mulberry Family</b>            |                          |      |
| <i>Morus</i> sp.                             | Mulberry                 | UPL  |
| <b>MYRTACEAE – Eucalyptus Family</b>         |                          |      |
| <i>Eucalyptus rostrata</i>                   | Red Gum                  | UPL  |
| <b>PINACEAE – Pine Family</b>                |                          |      |
| <i>Pinus</i> sp.                             | Ornamental Pine          | UPL  |
| <b>POACEAE – Grass Family</b>                |                          |      |
| <i>Avena fatua</i>                           | Wild Oats                | UPL  |
| <i>Bromus diandrus</i>                       | Ripgut Brome             | UPL  |
| <i>Bromus hordeaceus</i>                     | Soft Chess               | FACU |
| <i>Crypsis schoenoides</i>                   | Swamp Timothy Grass      | FACW |
| <i>Cynodon dactylon</i>                      | Bermuda Grass            | FACU |
| <i>Distichlis spicata</i>                    | Inland Saltgrass         | FAC  |
| <i>Hordeum marinum gussonianum</i>           | Mediterranean Barley     | FACU |
| <i>Hordeum murinum</i> ssp. <i>leporinum</i> | Foxtail Barley           | FACU |
| <i>Festuca perennis</i>                      | Ryegrass                 | FAC  |
| <i>Panicum capillare</i>                     | Blue Panic Grass         | FACW |
| <b>POLYGONACEAE – Smartweed Family</b>       |                          |      |
| <i>Polygonum aviculare</i>                   | Prostrate Knotweed       | FAC  |
| <i>Rumex crispus</i>                         | Curly Dock               | FAC  |
| <b>SALICACEAE – Willow Family</b>            |                          |      |
| <i>Salix × sepulcralis</i>                   | Weeping Willow           | -    |
| <b>ZYGOPHYLLACEAE – Puncture Vine Family</b> |                          |      |
| <i>Tribulus terrestris</i>                   | Puncture Vine            | UPL  |

## **APPENDIX D: SOILS INFORMATION**

LOCATION ALAMO

CA

Established Series

Rev. JHR-GMK-MAM-WBS-AJT

05/2006

## ALAMO SERIES

The Alamo series consists of moderately deep to hardpan, poorly drained soils that formed in alluvium from mixed sources. Alamo soils are in basins and drainageways on floodplains and fan remnants. Slope ranges from 0 to 2 percent. The annual precipitation is about 16 inches and the annual air temperature is 61 degrees F.

**TAXONOMIC CLASS:** Fine, smectitic, thermic Typic Duraquolls

**TYPICAL PEDON:** Alamo clay on a West facing slope of less than 1 percent under cultivation at 80 feet elevation. (Colors are for dry soil unless otherwise noted.)

**Ap**--0 to 9 inches; dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) moist; common fine and medium strong brown (7.5YR 5/8) mottles; moderate medium angular blocky structure; hard, firm, sticky and very plastic; common very fine and fine roots; few very fine and fine tubular and interstitial pores; slightly acid (pH 6.1); abrupt smooth boundary. (6 to 11 inches thick)

**Bw1**--9 to 27 inches; dark gray (10YR 4/1) clay, very dark grayish brown (2.5Y 3/2) moist; very hard, firm, sticky and very plastic; few very fine roots; moderate coarse subangular blocky structure; few very fine tubular pores; neutral (pH 7.0); gradual smooth boundary. (10 to 20 inches thick)

**Bw2**--27 to 37; dark grayish brown (10YR 4/2) clay, dark grayish brown (10YR 4/2) moist; very hard, firm, sticky and very plastic; few very fine roots; moderate coarse subangular blocky structure; few fine and very fine tubular pores; slightly alkaline (pH 7.8); abrupt smooth boundary. (4 to 10 inches thick)

**Bkqm**--37 to 40 inches; light yellowish brown (10YR 6/4) indurated duripan; extremely hard, brittle; few discontinuous 2 to 5 mm. lime coatings; moderately alkaline (pH 8.0).

**TYPE LOCATION:** Placer County, California; 7 miles southwest of Lincoln; 50 feet north of Pleasant Grove Road; 1,320 feet west and 60 feet north of the east 1/4 corner of section 34, T. 12 N., R. 5 E. Pleasant Grove Quad.

**RANGE IN CHARACTERISTICS:** Depth to the duripan is 20 to 40 inches. The profile cracks on summer drying. The mean annual soil temperature is about 60 degrees to 65 degrees F. A water table occurs near the surface from winter to early spring. The soil is moist in some part most of the remaining time. Some pedons have sandy loam overburden due to land leveling.

The A horizon has dry color of N4/0; 2.5Y 4/1, 10YR 4/1, 4/2, 5/1, or 5/2. Moist colors are N3/0; 10YR 3/1, 3/2; 2.5Y 3/2. It has distinct or prominent mottles in most pedons. It has granular to blocky structure. It is slightly acid to slightly alkaline.

The Bw horizon has dry color of N5/0; 2.5Y 6/2, 5/2; 10YR 5/1, 4/1, 4/2, 3/2; or 7.5YR 3/2. Moist colors are N4/0; 2.5Y 4/2; 10YR 4/2, 4/1 or 3/1. Mottles are present in most pedons. This horizon is blocky when dry and generally becomes massive on wetting. It is slightly acid to moderately alkaline and becomes more alkaline as depth increases.

A Bk horizon is in the lower part of some pedons. Color is similar to the Bw horizons. Reaction is neutral to moderately alkaline. Lime occurs in seams or nodules.

The Bkqm horizon has dry color of 10YR 6/3, 6/4 or 5/3. Moist color is 10YR 4/3, 4/4. The duripan is strongly cemented to indurated.

**COMPETING SERIES:** There are no other soils in this family.

**GEOGRAPHIC SETTING:** Alamo soils are in nearly level basins and drainageways on fan remnants and floodplains at elevations of 50 to 500 feet. They formed in fine textured alluvium mixed rock sources. The climate is dry subhumid with hot dry summers and cool moist winters. Mean annual precipitation is 10 to 22 inches. Average January temperature is 45 degrees F.; average July temperature is 80 degrees F.; mean annual temperature is 61 degrees F. The frost-free period is 250 to 275 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the [Cometa](#), [Fiddymment](#), [Kaseberg](#), [Madera](#), [San Joaquin](#) and [Yokohl](#) soils. Cometa soils have an argillic horizon. Fiddymment soils have a fine-loamy textural control section and a clay increase of 15 to 25 percent within or at the upper boundary of the argillic horizon. Kaseberg soils are well drained and loamy. Madera, San Joaquin and Yokohl soils have an argillic horizon.

**DRAINAGE AND PERMEABILITY:** Poorly drained; ponded or very slow runoff, where ponded it occurs from December to April; very slow permeability. A water table is near the surface from winter to early spring.

**USE AND VEGETATION:** Used mainly for pasture. Some areas are used for dry-farmed grains, rice and irrigated pasture. Vegetation consists of annual grasses, forbs and weeds.

**DISTRIBUTION AND EXTENT:** East side of Sacramento and San Joaquin Valleys, California. The soils are of moderate extent in MLRA-17.

**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California

**SERIES ESTABLISHED:** Marysville Area, California. 1909.

**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Mollic epipedon - the zone from the surface to 9 inches (Ap)

**Duripan-** the zone from 37 to 40 inches (Bkqm)

The typical pedon has been revised to reflect structure in the dry condition. Soils mapped at the low end of the precipitation range need to be evaluated. Those soils that do not have a Bw horizon and that have accumulations of lime throughout the B horizon are to be excluded from this series concept.

---

National Cooperative Soil Survey  
U.S.A.

LOCATION RAMONA  
Established Series  
Rev. GB/LAB/LCL  
01/2003

CA

## RAMONA SERIES

The Ramona series is a member of the fine-loamy, mixed, thermic family of Typic Haploxeralfs. Typically, Ramona soils have brown, slightly and medium acid, sandy loam and fine sandy loam A horizons, reddish brown and yellowish red, slightly acid, sandy clay loam B2t horizons, and strong brown, neutral, fine sandy loam C horizons.

**TAXONOMIC CLASS:** Fine-loamy, mixed, superactive, thermic Typic Haploxeralfs

**TYPICAL PEDON:** Ramona fine sandy loam - cultivated (Colors are for dry soil unless otherwise noted.)

**Ap**--0 to 14 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; hard, very friable, nonsticky, nonplastic; few fine roots; many very fine interstitial and tubular pores; moderately acid (pH 6.0); clear smooth boundary. (8 to 15 inches thick)

**A12**--14 to 23 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; hard, very friable, slightly sticky, slightly plastic; few fine roots; common fine tubular pores; slightly acid (pH 6.5); clear smooth boundary. (5 to 10 inches thick)

**B1**--23 to 29 inches; brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; moderate coarse angular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine roots; many fine tubular pores; few thin clay films on faces of peds and lining pores; slightly acid (pH 6.5); clear smooth boundary. (3 to 8 inches thick)

**B21t**--29 to 37 inches; reddish brown (5YR 4/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; moderate coarse prismatic structure; very hard, firm, sticky, plastic; few fine roots; common fine tubular pores; common thin clay films on faces of peds and lining pores; slightly acid (pH 6.5); gradual smooth boundary. (6 to 10 inches thick)

**B22t**--37 to 46 inches; yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; moderate coarse prismatic structure; very hard, firm, sticky, plastic; very few fine roots; few fine tubular pores; many moderately thick clay films on faces of peds and lining pores; slightly acid (pH 6.5); gradual smooth boundary. (6 to 12 inches thick)

**B23t**--46 to 58 inches; yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; moderate coarse prismatic structure; very hard, firm, sticky, plastic; few fine tubular pores; many moderately thick clay films on faces of peds and lining pores; slightly acid (pH 6.5); gradual smooth boundary. (8 to 14 inches thick)



**B3**--58 to 68 inches; yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; moderate coarse angular blocky structure; very hard, firm, sticky, plastic; few fine tubular pores; many moderately thick clay films on faces of peds and lining pores; neutral (pH 6.8); clear irregular boundary. (6 to 12 inches thick)

**C**--68 to 74 inches; strong brown (7.5YR 5/6) fine sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, firm, slightly sticky, slightly plastic; few fine pores; neutral (pH 7.0).

**TYPE LOCATION:** Riverside County, California; about 3 miles northwest of Beaumont, California; approximately 1,100 feet north and 500 feet west of the S1/4 corner of sec. 31, T.2S., R.1W.

**RANGE IN CHARACTERISTICS:** The mean annual soil temperature at a depth of 20 inches is 59 degrees to 65 degrees F. and the soil temperature usually is not below 47 degrees F. or is below 47 degrees F. for only a few days in January. Soil between the depth of about 5 and 15 inches usually is moist in some or all parts from November or early December until late April or May and is dry all the rest of the year. The A and B horizons have more than 15 percent combined coarse and very coarse sand and 5 to 35 percent fine rock fragments of 2 to 5mm size. Rock fragments larger than 5mm are less than 5 percent. The C horizons are variable as to coarse sand, fine gravel, and rock fragments larger than 5mm but in general are more coarse than the A and B horizons.

The A horizon is light brownish gray to dark grayish brown or yellowish brown (10YR 6/2, 5/2, 4/2, 6/3, 5/3, 4/3, 5/4; 7.5YR 5/2, 5/4) when dry. It is coarse sandy loam, sandy loam, fine sandy loam or light loam and has less than 1 percent organic matter. After considerable cultivation or cattle trampling some or all of the A horizon is hard or very hard and massive when dry. It is neutral to moderately acid. The lower boundary is gradual or there is an A3 horizon or a B1 horizon or both horizons are present.

The B2t horizon is dark brown, strong brown, brown or light brown in 7.5YR hue or reddish brown or yellowish red in 5YR hue in yellowish in 10YR hue in the lower part. It is heavy sandy loam, sandy clay loam or loam with 18 to 27 percent clay. Total clay content is 3 to 12 percent more in the B2t horizon than in the A horizon. The B2t horizon is slightly acid or neutral in all parts or in some pedons it is slightly alkaline in the lower part. It has weak or moderate angular blocky or prismatic structure. In pedons having a B3 or B3t horizon, color of the transitional horizon is similar to the B2t horizon or it has a hue 1/4 letter interval less red. It is slightly acid to moderately alkaline.

The C horizon is coarse sandy loam, fine sandy loam or loam and is neutral to moderately alkaline. In some pedons it is calcareous in some part with a small amount of segregated or disseminated lime.

**COMPETING SERIES:** These are the [Arbuckle](#), [Blasingame](#), [Borden](#), [Esparto](#), [Fallbrook](#), [Montpellier](#), [Sesame](#), Snalling, [Tivy](#), [Wasioja](#), and [Wyman](#) series. Arbuckle soils are gravelly with more than 15 percent gravel larger than 5mm in the argillic horizon. Blasingame and Tivy soils have a paralithic contact less than 40 inches below the surface. Borden soils have an argillic

horizon that is moderately alkaline and is calcareous in some or all parts. Esparto soils are marginal to the silty family with less than 20 percent fine gravel, coarse and very coarse sand. Fallbrook soils have 27 to 35 percent clay in the argillic horizon. The difference in total clay content between A and B2t horizon is more than 10 percent absolute. Sesame soils have a lithic contact between A and B2t horizon is more than 10 percent absolute. Sesame soils have a lithic contact at a depth of 20 to 40 inches. Snalling soils are medium acid in the B2t horizon. (See Remarks). Wasioja soils have an aridic moisture regime marginal to xeric. Wyman soils have less than 15 percent coarse and very coarse sand, less than 10 percent absolute clay difference between A and B horizon and about 27 to 35 percent clay in the B2t horizon.

**GEOGRAPHIC SETTING:** The Ramona soils are nearly level to moderately steep. They are on terraces and fans at elevations of 250 to 3,500 feet. They formed in alluvium derived mostly from granitic and related rock sources. The climate is dry subhumid mesothermal with warm dry summers and cool moist winters. Mean annual precipitation is 10 to 20 inches. Average January temperature is 50 degrees F., average July temperature is about 70 degrees F., average annual temperature is 60 degrees to 66 degrees F. The frost-free season is 230 to 320 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing [Fallbrook](#) and [Montpellier](#) soils and the [Arlingtonk](#), [Greenfield](#), [Hanford](#), and [Placentia](#) soils. Arlington soils have a duripan. Greenfield soils have less than 18 percent clay in the argillic horizon. Hanford soils lack an argillic horizon. Placentia soils have a natric horizon with more than 35 percent clay.

**DRAINAGE AND PERMEABILITY:** Well-drained; slow to rapid runoff; moderately slow permeability.

**USE AND VEGETATION:** Used mostly for production of grain, grain-hay, pasture, irrigated citrus, olives, truck crops, and deciduous fruits. Uncultivated areas have a cover of annual grasses, forbs, chamise or chaparral.

**DISTRIBUTION AND EXTENT:** The Ramona soils are in the interior valleys of central and the western part of southern California. The soils are extensive.

**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California

**SERIES ESTABLISHED:** Los Angeles County (Pasadena Area), California, 1915.

**REMARKS:** The Ramona soils are formerly classified as Noncalcic Brown soils. The Snalling soils are differentiated from Ramona soils on soil reaction in the B2t horizon. Some differentiae used to separate series within this family are difficult to apply consistently.

The activity class was added to the classification in January of 2003. Competing series were not checked at that time. - ET

OSD scanned by SSQA. Last revised by state on 10/72.

LOCATION SAN JOAQUIN

CA

Established Series

Rev. MAM-JHR-DJE-CEJ-CAF

09/1999

## SAN JOAQUIN SERIES

The San Joaquin series consists of moderately deep to a duripan, well and moderately well drained soils that formed in alluvium derived from mixed but dominantly granitic rock sources. They are on undulating low terraces with slopes of 0 to 9 percent. The mean annual precipitation is about 15 inches and the mean annual temperature is about 61 degrees F.

**TAXONOMIC CLASS:** Fine, mixed, active, thermic Abruptic Durixeralfs

**TYPICAL PEDON:** San Joaquin loam - on east facing complex slope of 1 percent in a vineyard at elevation of 40 feet. (Colors are for dry soil unless otherwise stated. When described on May 3, 1983, the soil was moist throughout).

**Ap**--0 to 6 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; moderate medium and fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular and interstitial and few fine tubular pores; few fine very dark gray (10YR 3/1) Fe-Mn concretions and stains; neutral (pH 7.3); clear wavy boundary. (5 to 15 inches thick)

**Bt1**--6 to 10 inches; brown (7.5YR 5/4) loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular and common very fine interstitial pores; few thin clay films on ped faces and bridging mineral grains; few fine very dark gray (10YR 3/1) Fe-Mn concretions and stains; moderately acid (pH 5.7); clear wavy boundary. (0 to 8 inches thick)

**Bt2**--10 to 16 inches; brown (7.5YR 5/4) loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; many very fine and few fine tubular and common very fine interstitial pores; few thin clay films on ped faces, common thin clay film bridging mineral grains; common light gray (10YR 7/2) fine sand or silt grains on ped faces and lining pores; few fine very dark gray (10YR 3/1) Fe-Mn concretions; moderately acid (pH 5.9); abrupt wavy boundary. (0 to 12 inches thick)

**2Bt3**--16 to 21 inches; brown (7.5YR 5/4) clay; strong brown (7.5YR 4/6) moist; moderate medium prismatic structure; extremely hard, firm, sticky and very plastic; few very fine, fine and medium roots; common very fine tubular and few very fine interstitial pores; common moderately thick clay films on ped faces, many thin clay films bridging mineral grains; common slickensides that do not intersect; about 3 percent fine very dark gray diameter Fe-Mn concretions; neutral (pH 7.0); gradual wavy boundary. (4 to 10 inches thick)

**2Bt4**--21 to 26 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; moderate medium prismatic structure; extremely hard, firm, sticky and plastic; few very fine, fine and medium roots; common very fine tubular and few very fine interstitial pores; common moderately thick clay films on ped faces and common thin clay films as bridges between mineral grains; about 3 percent very dark gray (10YR 3/1) Fe-Mn concretions and stains; neutral (pH 7.3); abrupt wavy boundary. (3 to 5 inches thick)

**2Bqm1**--26 to 29 inches; variegated brown (7.5YR 5/4) and light brown (7.5YR 6/4) indurated duripan, brown (7.5YR 4/4) moist; extremely hard and brittle; silica and sesquioxide cementation in more than 90 percent of the matrix; few fine Fe-Mn concretions; strongly effervescent with secondary lime in fractures; common very fine close tubular pores; moderately alkaline (pH 8.0); gradual smooth boundary. (1 to 10 inches thick)

**2Bqm2**--29 to 48 inches; variegated brown (7.5YR 5/4) and strong brown (7.5YR 4/6) duripan, dark brown (7.5YR 3/4) moist; extremely hard and brittle; silica and sesquioxide cementation in more than 90 percent of the matrix; common fine Fe-Mn concretions and stains; strongly effervescent with segregated lime in fractures; common very fine closed tubular pores; moderately alkaline (pH 8.0); clear wavy boundary. (1 to 25 inches thick)

**2Bq**--48 to 60 inches; brown (7.5YR 5/4) duripan, dark brown (7.5YR 3/4) moist; extremely hard and brittle; silica and sesquioxide cementation in 70 to 90 percent of matrix; common fine Fe-Mn concretions; many very fine interstitial pores; moderately alkaline (pH 8.0).

**TYPE LOCATION:** San Joaquin County, California; about 5 miles northeast of Lodi, 3,700 feet west of intersection of Southern Pacific Railroad and Forest Lake Road; 1,100 feet south of Forest Lake Road and about 100 feet west into vineyard; 1,700 feet north and 2,600 feet east of the southwest corner of sec. 3, T. 4 N., R. 6 E., MDB&M.; Lodi North quadrangle.

**RANGE IN CHARACTERISTICS:** Depth to the duripan ranges from 20 to 40 inches. The mean annual soil temperature varies from 60 degrees to 64 degrees F and the soil temperature is not below 47 degrees F at any time. The soil, at depths of about 7 to 24 inches or directly above the duripan, is dry in all parts from June to November and is moist in some or all parts the rest of the year. Clay increases by more than 15 percent absolute.

The Ap or A horizon has colors of 7.5YR 4/4, 5/2, 5/4, 5/6, 6/2, 6/4, 6/6, 7/6, 7/8; 5YR 4/3, 4/4, 4/6, 5/3, 5/4, 5/6, 5/8; 10YR 4/3, 5/3, 5/4, 6/3 or 6/4. Moist colors are 1 or 2 units darker in value. It is sandy loam, silt loam, fine sandy loam or loam. Reaction is moderately acid or slightly acid, but may be neutral where liming has taken place. Base saturation is greater than 75 percent.

The Bt horizon when present has colors of 7.5YR 5/4, 5/6, 6/6 and 5YR 5/6. Moist colors are 7.5YR 4/4; 5YR 4/4. Textures are sandy clay loam, loam or silt loam. It is moderately acid to neutral.

The 2Bt horizon has colors of 7.5YR 6/6, 6/4, 5/6, 5/4, 5/2, 4/6, 4/4; 5YR 5/8, 5/6, 4/6, 5/4, 4/4, 3/4, 4/3, 3/3; 2.5YR 5/4, 4/8, 4/6, 4/4 or 3/4. Moist colors are 1 or 2 units of value darker. It is

clay loam or clay but average clay content is 35 to 50 percent. It is slightly acid to slightly alkaline.

There is an abrupt boundary at or within the upper part of the argillic horizon with an absolute clay increase of at least 15 percent.

The duripan has colors of 10YR 7/3, 6/4, 5/6, 5/4; 7.5YR 7/2, 6/4, 5/6, 5/4, 5/2, 4/6, 4/4, 4/2; 5YR 3/3, 4/3, 4/4, 5/6 or 5/8 and is usually variegated. It is cemented with iron and or silica becoming less indurated with depth. Segregated carbonates do not line fractures in some pedons.

**COMPETING SERIES:** These are the [Yuvas](#) and [Redding](#) series. Redding soils have base saturation of 35 to 75 percent in the A and Bt horizon and are gravelly or cobbly in the control section. Yuvas soils have a paralithic contact at 21 to 40 inches.

**GEOGRAPHIC SETTING:** San Joaquin soils are on hummocky, nearly level to undulating terraces at elevations of about 20 to 500 feet. Some areas have been leveled. Slopes range from 0 to 9 percent. They formed in alluvium from mixed but mainly granitic rock sources. The climate is dry with hot dry summers and cool moist and foggy winters. Mean annual precipitation varies from 10 to 22 inches. Average January temperature is 45 degrees F; average July temperature is 80 degrees F; mean annual temperature is 60 to 63 degrees F. Frost-free period is 250 to 300 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the [Exeter](#), [Fiddymont](#), [Madera](#), [Alamo](#) and [Cometa](#) soils. Alamo soils are clayey throughout. Cometa soils lack a duripan. Exeter soils lack an abrupt boundary with at least 15 percent clay increase within the argillic horizon. Fiddymont soils average less than 35 percent within the control section. Madera soils have montmorillonitic mineralogy.

**DRAINAGE AND PERMEABILITY:** Well and moderately well drained; medium to very high runoff; very slow permeability. Some areas are subject to rare or occasional flooding.

**USE AND VEGETATION:** Cropland and livestock grazing; crops are small grains, irrigated pasture and rice; vineyards, fruit and nut crops.

**DISTRIBUTION AND EXTENT:** Eastern side of the Sacramento and San Joaquin Valleys. The soils are extensive in MLRA-17.

**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California

**SERIES ESTABLISHED:** Fresno County, California, 1900.

**REMARKS:** This soil series is bordering on the Typic Durixeralf subgroup. The type location of this series has been moved to better reflect the central concept as historically mapped. (Textures from lab data reflect slightly different values than field estimates. NSSL S83CA-077-042.)

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface to a depth of 6 inches (Ap)

Argillic horizon - the zone from 16 to 26 inches (2Bt3, 2Bt4)

Duripan - the zone from 26 to 60 inches (2Bqm1, 2Bqm2, 2Bq)

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National Cooperative Soil Survey  
U.S.A.

## **Appendix 6B**

### **Clovis Healthcare Campus Expansion Biotic Study (2008)**

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**CLOVIS HEALTHCARE CAMPUS EXPANSION  
BIOTIC STUDY**

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16 September 2008

File No. 2975-01



## TABLE OF CONTENTS

|  |    |
|--|----|
| ENVIRONMENTAL SETTING .....  | 1  |
| PROJECT DESCRIPTION.....   | 1  |
| PROJECT AREA DESCRIPTION.....  | 2  |
| BIOTIC SURVEYS .....   | 5  |
| BIOTIC HABITATS .....  | 5  |
| SPECIAL-STATUS PLANT AND WILDLIFE SPECIES .....  | 7  |
| SPECIAL-STATUS SPECIES REGULATIONS OVERVIEW .....  | 7  |
| SPECIAL-STATUS PLANT SPECIES .....   | 8  |
| SPECIAL-STATUS WILDLIFE SPECIES .....  | 9  |
| REGULATED HABITATS.....  | 10 |
| UNITED STATES ARMY CORPS OF ENGINEERS JURISDICTION.....  | 10 |
| CALIFORNIA DEPARTMENT OF FISH AND GAME JURISDICTION .....  | 10 |
| ENVIRONMENTAL IMPACTS.....   | 12 |
| SIGNIFICANCE CRITERIA .....  | 12 |
| IMPACTS FOUND TO BE LESS THAN SIGNIFICANT .....  | 13 |
| CUMULATIVE IMPACTS.....  | 13 |
| INDIRECT IMPACTS .....   | 13 |
| UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS .....  | 13 |
| LITERATURE CITED .....   | 14 |
| APPENDIX A. CDFG Staff Report on Burrowing Owl Mitigation .....  | 15 |
| APPENDIX B. Plant Species Observed on the Project Site.....  | 25 |
| APPENDIX C. Special-Status Plant Species Considered but Rejected for Occurrence on the<br>Project Site.....    | 26 |
| APPENDIX D. Special-Status Wildlife Species Considered but Rejected for Occurrence on the<br>Project Site..... | 27 |

## FIGURES

|   |   |
|---|---|
| Figure 1. Project and Site Vicinity Map. .... | 3 |
|---|---|

## TABLES

|   |   |
|---|---|
| Table 1. Summary of Soil Types at the Clovis Healthcare Campus Project Site. .... | 4 |
|---|---|

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## ENVIRONMENTAL SETTING

### PROJECT DESCRIPTION

Clovis Community Medical Center is planning an expansion of its Healthcare Campus at the intersection of Herndon and Temperance avenues in Clovis, Fresno County, California. The need for the expansion is due to an accelerating bed demand in Clovis as a result of the high rate of human population growth in the area. The expansion is divided into 2 major phases: (1) a 10-year expansion plan for the additional facilities and improvements that will be constructed by 2018 and (2) a conceptual 25-year long-range site development master plan.

The 10-year plan includes a new 5-story bed tower, a 169,000 square ft expansion of the existing hospital, expansion of the existing central plant, a new 4-story parking structure, 3 new professional healthcare buildings, relocation of the existing helistop, and a trail that will parallel the Enterprise Canal on the east side of the campus then extend west through the northern portion of the hospital property to the intersection of Temperance Avenue and Highway 168. The 25-year plan includes a new 5-story bed tower, an approximately 100,000 square ft expansion of the hospital, expansion of the central plant, a new parking structure with a rooftop helistop, and 4 new professional healthcare buildings. This report analyzes the potential effects of implementing the 10- and 25-year expansion plans on biological resources at and in the vicinity of the project site.

### Conservation Measures (CM)

As part of the proposed project, the following conservation measures shall be implemented to avoid or minimize impacts to nesting birds and special-status species.

*CM 1. Avoidance of Nesting Birds.* Native birds are known or expected to nest on or in the vicinity of the project site. Construction disturbance during the bird nesting season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. To the extent practicable, construction shall be scheduled to avoid the bird nesting season, which extends from January through August.

If it is not possible to schedule construction between August and January, a pre-construction survey for nesting birds shall be conducted by a qualified wildlife biologist to ensure that no nests of rare or protected species will be disturbed during project implementation. A pre-construction survey shall be conducted no more than 14 days prior to the initiation of construction activities during the early part of the breeding season (January through April) and no more than 30 days prior to the initiation of these activities during the late part of the breeding season (May through August). During this survey, the qualified person shall inspect all potential nest substrates in and immediately adjacent to the impact areas for nests. If an active nest is found close enough to the construction area to be disturbed by these activities, the biologist, in consultation with the California Department of Fish and Game (CDFG), shall determine the extent of a construction-free buffer zone to be established around the nest. See Special-Status Species Regulations Overview (page 7).

*CM 2. Habitat Assessment Survey for Burrowing Owl.* A habitat assessment survey for burrowing owl (*Athene cunicularia*), a California Bird Species of Special Concern, shall be conducted no more than 30 days prior to ground-disturbing activities. Burrowing owls require ground squirrel burrows or similar subterranean structures as refuge. Although ground squirrels are not currently present on the project site, squirrels may move into the area prior to construction and provide suitable habitat for burrowing owls. If suitable habitat is not observed during the pre-construction survey, no further action is warranted. However, if ground squirrel burrow complexes are discovered during the habitat assessment survey, further surveys shall be conducted as described in the CDFG *Staff Report on Burrowing Owl Mitigation* (CDFG 1995; Appendix A).

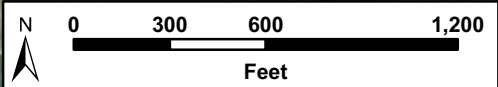
## **PROJECT AREA DESCRIPTION**

The project site is in the San Joaquin Valley, approximately 2 mi northeast of downtown Clovis in Fresno County, California (Figure 1). The site is on the Clovis U.S. Geological Survey (USGS) 7.5-minute quadrangle in Township 12S, Range 21E, Section 34 at an elevation of approximately 360 ft. The surrounding land uses are predominantly commercial and residential mixed with areas of active and inactive agriculture. Ruderal fields occur immediately north and southeast of the project site; residential areas occur immediately west and east. The ruderal field north of Highway 168, east of Temperance Avenue, and west of the Enterprise Canal is currently being developed as a commercial park.

The climate of the San Joaquin Valley is characterized by hot, dry summers and cool, moist winters with frequent heavy fog. Weather patterns in the valley result from the presence of the Coast Range to the west and the Sierra Nevada to the east. Overall, the Coast Range produces a rain shadow effect, with the majority of moisture falling on the coastal side of the mountains. During winter months, the offshore high-pressure areas move farther south along the coast, allowing the San Joaquin Valley to receive the majority (90%) of its annual precipitation. The annual precipitation in Clovis averages 10.14 inches (National Oceanic and Atmospheric Administration; NOAA 2008). Temperatures range from an average high of 53.6°F and low of 37°F in December to an average high of 98.6°F and low of 64.9°F in July (NOAA 2008).

The Natural Resource Conservation Service (NRCS 2008) has classified the soils underlying the project site. Each of the 8 soil types present (Table 1) are formed from alluvium derived from granitic rock sources, and each has a drainage classification ranging from moderately well drained to well drained. None of the soil types are subject to ponding, and none are strongly alkaline.

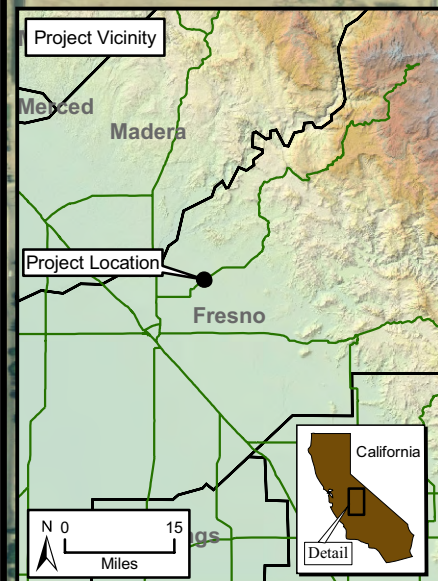
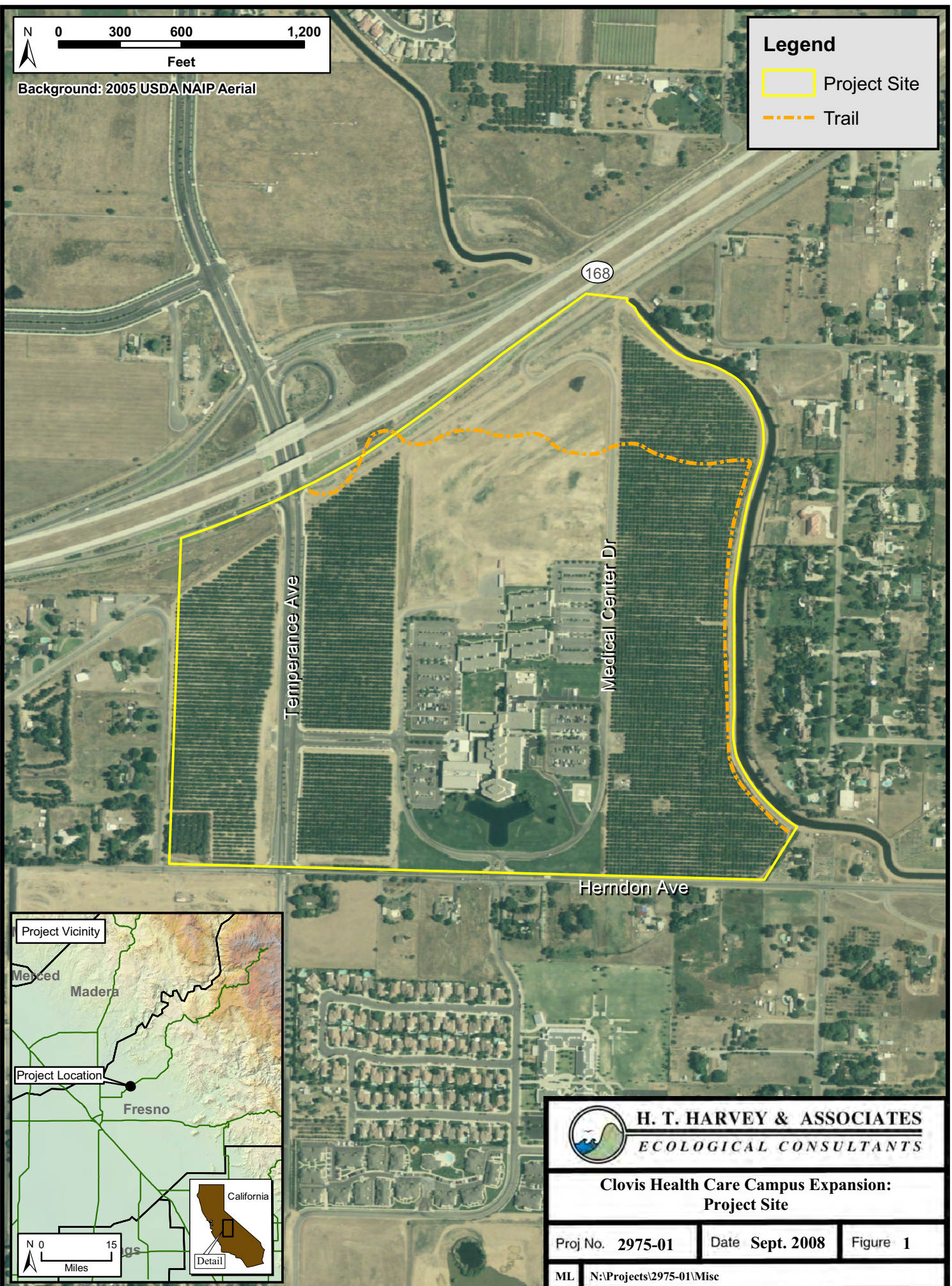




Background: 2005 USDA NAIP Aerial

### Legend

- Project Site
- Trail



**H. T. HARVEY & ASSOCIATES**  
*ECOLOGICAL CONSULTANTS*

### Clovis Health Care Campus Expansion: Project Site

Proj No. 2975-01

Date Sept. 2008

Figure 1

ML N:\Projects\2975-01\Misc

**Table 1. Summary of Soil Types at the Clovis Healthcare Campus Project Site.**

| <b>Soil type</b>                   | <b>Slope percentage</b> | <b>Soil Coverage in acres</b> |
|------------------------------------|-------------------------|-------------------------------|
| Atwater sandy loam                 | 0-3%                    | 20.0                          |
| Atwater sandy loam                 | 3-9%                    | 7.7                           |
| Greenfield sandy loam              | 0-3%                    | 18.1                          |
| Ramona sandy loam                  | 0-2%                    | 3.3                           |
| Ramona sandy loam, hard substratum | 0-2%                    | 47.9                          |
| Ramona loam, hard substratum       | 0-2%                    | 5.8                           |
| San Joaquin sandy loam             | 0-3%                    | 22.3                          |
| San Joaquin loam                   | 0-3%                    | 11.9                          |



## BIOTIC SURVEYS

A reconnaissance field survey of the project site was conducted on 27 August 2008. The purpose of the survey was to document biotic resources associated with the site that may pose constraints to the proposed development. Specifically, surveys were conducted to: 1) describe existing biotic habitats; 2) assess the site for its potential to support special-status species and their habitats; and 3) identify potential jurisdictional habitats, including those regulated by the United States Army Corps of Engineers (USACE) and the CDFG.

### BIOTIC HABITATS

A survey for botanically sensitive habitats was conducted concurrently with a reconnaissance-level special-status plant survey. Agricultural, ruderal, and developed areas represent the only habitat types occurring on the project site (Figure 1). These biotic habitats and associated vegetation and wildlife are described in more detail below.

#### Agricultural Habitat

##### *Vegetation*

Citrus orchards occur on the west and east edges of the project site (Figure 1). Although vegetation is controlled within the orchards by chemical and mechanical means, some weedy species were observed on the margins and between the rows. These were Bermuda grass (*Cynodon dactylon*), dallisgrass (*Paspalum dilatatum*), telegraph weed (*Heterotheca grandiflora*), and puncture vine (*Tribulus terrestris*). See Appendix B for a list of all plant species observed on the project site.



##### *Wildlife*

Orchards typically provide limited habitats for wildlife, as frequent disturbances associated with crop production (e.g., pruning, spraying, harvesting, and watering) limit the potential for most wildlife species to persist in these habitats. Common amphibians such as the western toad (*Bufo boreas*) are known to persist under these conditions. Common bird species observed in the citrus orchards included mourning dove (*Zenaida macroura*) and house finch (*Carpodacus mexicanus*). Burrowing animals, such as California ground squirrels (*Spermophilus beecheyi*) and gophers (*Thomomys bottae*), are typically discouraged in orchards due to damage they cause to crops and irrigation systems.

## Ruderal Habitat

### Vegetation

Ruderal habitat, including a disked field north of the current healthcare campus facilities and the edges of the citrus orchards, covers much of the project site. The ruderal habitat on the site is routinely disked for weed control and therefore contains scant vegetation. Several weedy species do persist, however. The predominant species observed in the ruderal portions of the site were annual bur-sage (*Ambrosia acanthicarpa*), horseweed (*Conyza canadensis*), prickly sow thistle (*Sonchus asper* ssp. *asper*), spotted spurge (*Chamaesyce maculata*), broadleaf filaree (*Erodium botrys*), wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*), jimson weed (*Datura wrightii*), and puncture vine.



### Wildlife

Species that occur in ruderal habitats are generally accustomed to frequent disturbances. Birds observed in the vicinity of the project site within ruderal habitat included red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), mourning dove, northern mockingbird (*Mimus polyglottos*), and house finch. Weed control activities have prevented California ground squirrels from becoming established on the project site and likely exclude most other mammals with the possible exception of gophers and house mice (*Mus musculus*).

## Developed Habitat

### Vegetation

Ornamental trees and flowers and a lawn occur among the existing buildings, parking areas, access roads, and concrete walkways.

### Wildlife

Although not considered native habitat, developed habitat is used by common wildlife species accustomed to frequent disturbance. Birds observed on and in the vicinity of the project site included killdeer (*Chadrius vociferous*; photo at right, above), mourning dove, American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), house finch, and house sparrow (*Passer domesticus*).



## SPECIAL-STATUS PLANT AND WILDLIFE SPECIES

### SPECIAL-STATUS SPECIES REGULATIONS OVERVIEW

Federal and state endangered species legislation gives special status to several plant and animal species known to occur in the vicinity of the project site. In addition, state resource agencies and professional organizations, whose lists are recognized by agencies when reviewing environmental documents, have identified as sensitive some species occurring in the vicinity of the project site. Such species are referred to collectively as special-status species and include the following: plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA); animals listed as “fully protected” under the California Fish and Game Code; animals designated as “Species of Special Concern” by the CDFG; and plants listed as rare or endangered by the California Native Plant Society (CNPS) in the *Inventory of Rare and Endangered Plants of California* (2008).

ESA provisions protect federally listed threatened and endangered species and their habitats from unlawful take. Under the ESA, “take” is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of the specifically enumerated conduct.” The U.S. Fish & Wildlife Service’s (Service) regulations define harm to mean “an act which actually kills or injures wildlife.” Such an act “may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering” (50 CFR § 17.3). Activities that may result in “take” of individuals are regulated by the Service. The Service produced an updated list of candidate species 11 May 2005 (50 CFR Part 17). Candidate species are not afforded legal protection under the ESA but do receive special attention from federal and state agencies during the environmental review process.

Provisions of CESA protect state-listed threatened and endangered species. CDFG regulates activities that may result in “take” of listed individuals (i.e., “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill”). Habitat degradation or modification is not expressly included in the definition of “take” under the California Fish and Game Code. Additionally, the California Fish and Game Code contains lists of vertebrate species designated as “fully protected” (California Fish & Game Code §§ 3511 [birds], 4700 [mammals], 5050 [reptiles and amphibians], 5515 [fish]). Such species may not be taken or possessed.

In addition to federal and state-listed species, the CDFG also has produced a list of Species of Special Concern to serve as a “watch list.” Species on this list are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Species of Special Concern may receive special attention during environmental review, but they do not have statutory protection. The Service also uses the label, Species of Concern, as an informal term that refers to those species that might be in need of concentrated conservation actions. Species of Concern receive no legal protection as a result of the designation, and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species. However, most, if not all, of these species are currently protected by state and federal laws.



Raptors (e.g., eagles, hawks, and owls) and their nests are protected under both federal and state regulations. The federal Migratory Bird Treaty Act<sup>1</sup> (MBTA) prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. Birds of prey are protected in California under the State Fish and Game Code.<sup>2</sup> Section 3503.5 states it is “unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this Code or any regulation adopted pursuant thereto.” Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “take” by the CDFG.

Vascular plants listed as rare or endangered by the CNPS, but which might not have designated status under state endangered species legislation, are defined as follows:

- List 1A Plants considered by the CNPS to be extinct in California
- List 1B Plants rare, threatened, or endangered in California and elsewhere
- List 2 Plants rare, threatened, or endangered in California, but more numerous elsewhere
- List 3 Plants about which we need more information – a review list
- List 4 Plants of limited distribution – a watch list

## **SPECIAL-STATUS PLANT SPECIES**

A reconnaissance survey was conducted on 27 August 2008 for habitats capable of supporting special-status plant species. Prior to the site survey, information concerning the known distribution of threatened, endangered, or other special-status plant species with the potential to occur in the area was collected from several sources and reviewed. Sources included the CDFG’s Natural Diversity Database (CNDDDB; CNDDDB 2008) and information available through the Service, CDFG, and technical publications. The CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2008) and *The Jepson Manual* (Hickman 1993) supplied information regarding the distribution and habitats of vascular plants in the vicinity.

A query of special-status plants listed in the CNDDDB was performed for the USGS Clovis topographical quadrangle in which the project site occurs and for the 8 surrounding quadrangles. The habitat requirements of each special-status plant species were compared to the existing habitat conditions at the project site to determine the likelihood of occurrence for each species at the site. CNDDDB (2008) lists just one record of a special-status plant species occurring within 2.5 mi of the project site. There is a 1937 record of Greene’s tuctoria (*Tuctoria greenii*), a vernal pool obligate, near the intersection of Nees Avenue and Tollhouse Road, approximately 0.8 mi

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<sup>1</sup> 16 U.S.C., Sec. 703, Supp. I, 1989.

<sup>2</sup> Section 3503.5, 1992.

northeast of the project site. After negative surveys in 1981 and 1987 the population was presumed to be extirpated (CNDDDB 2008).

Special-status plant species in Fresno County (CNDDDB 2008) are associated with habitat types that do not occur on the project site, such as valley and foothill grassland, chenopod scrub, or vernal pool habitat. Suburban development and years of intensive agriculture in the undeveloped areas have altered the area's hydrology and eliminated native habitats capable of supporting rare plant populations. All special-status plant species identified as occurring in the project vicinity by the CNDDDB were determined to be absent from the project site due to lack of suitable habitat (Appendix C).

## **SPECIAL-STATUS WILDLIFE SPECIES**

A survey of the project site was conducted on 27 August 2008 for habitats capable of supporting special-status wildlife species. Prior to the site survey, information concerning the known distribution of threatened, endangered, or other special-status wildlife species with potential to occur in the area was collected from several sources and reviewed. These sources included the CNDDDB (2008) and information available through the Service, CDFG, Museum of Vertebrate Zoology, and California Academy of Sciences.

A CNDDDB query for occurrences of special-status wildlife species within the USGS Clovis topographical quadrangle in which the project site occurs and the 8 surrounding quadrangles identified 18 special-status wildlife species as currently or historically occurring in the project vicinity. Seventeen species were rejected for occurrence on the project site due to lack of suitable aquatic or terrestrial habitat (Appendix D). The remaining species, the burrowing owl, is addressed below.

**Burrowing Owl. Federal Status: None; State Status: Species of Special Concern.** The burrowing owl is a small, terrestrial owl of open country. Burrowing owls favor flat, open grassland on gentle slopes and sparse shrubland ecosystems. These owls prefer annual and perennial grasslands, typically with sparse or nonexistent tree or shrub canopies. In California, burrowing owls occur in close association with California ground squirrels, as they use the abandoned burrows of ground squirrels for shelter and nesting.

No burrowing owls or signs of their presence, such as feathers, droppings, pellets, or prey remains, were observed on the project site during the reconnaissance survey. California ground squirrel burrows were not present on the site during the reconnaissance survey. The surrounding residential neighborhoods reduce the likelihood of California ground squirrels becoming established on the site. Ground squirrel burrows were also absent from most of the surrounding properties including the ruderal fields west, east, and southwest of the project site. The only ground squirrel burrows observed were immediately north of the project site on the slopes of the right-of-way for Highway 168. However, even with limited burrow availability, the species could occupy the site in the future.

## **REGULATED HABITATS**

### **UNITED STATES ARMY CORPS OF ENGINEERS JURISDICTION**

#### **Regulatory Overview**

Areas meeting the regulatory definition of “Waters of the U.S.” (jurisdictional waters) are subject to the jurisdiction of the USACE under provisions of Section 404 of the Clean Water Act (1972) and Section 10 of the Rivers and Harbors Act (1899). These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as “Waters of the U.S.,” tributaries of waters otherwise defined as “Waters of the U.S.,” the territorial seas, and wetlands (termed Special Aquatic Sites) adjacent to “Waters of the U.S.” (33 CFR, Part 328, Section 328.3). Wetlands on non-agricultural lands are identified using the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

Construction activities within jurisdictional waters are regulated by the USACE. The placement of fill into such waters must comply with permit requirements of the USACE. No USACE permit will be effective in the absence of state water quality certification pursuant to Section 401 of the Clean Water Act. The State Water Resources Control Board is the state agency (together with the Regional Water Quality Control Boards) charged with implementing water quality certification in California.

#### **Survey Results**

A field survey for potential jurisdictional waters on the project site was conducted on 27 August 2008. No jurisdictional waters were found to be present on the project site. The Enterprise Canal borders the project site on the east. Water from this canal originates from the Kings River, 0.5 mi downstream of Avocado Lake. From the river, this canal meanders northwestward for approximately 30 mi, where it drains into numerous small irrigation ditches in an agricultural matrix of upland habitat northwest of Fresno. While the Enterprise Canal shares connectivity with the Kings River, it drains into upland agriculture that lacks connectivity to waters regulated by the USACE. Therefore, areas of the Enterprise Canal that border the project site are not likely to fall under USACE jurisdiction.

### **CALIFORNIA DEPARTMENT OF FISH AND GAME JURISDICTION**

#### **Regulatory Overview**

The CDFG potentially extends the definition of stream to include “intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams (USGS), and watercourses with subsurface flows. Canals, aqueducts, irrigation ditches, and other means of water conveyance can also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife” (CDFG 1994). Such areas on the site were determined using

methods described in *A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607* (CDFG 1994).

Activities that result in the diversion or obstruction of the natural flow of a stream; substantially change its bed, channel, or bank; or use any materials (including vegetation) from the streambed, may require that the project applicant enter into a Streambed Alteration Agreement with the CDFG.

## **Survey Results**

A field survey was conducted within the project area on 27 August 2008 for streams and other waterways potentially under the regulatory jurisdiction of the CDFG. No area observed on the project site would fall under CDFG jurisdiction, per Sections 1600–1607 of the California Fish and Game Code. The Enterprise Canal, just east of the project site, may fall under CDFG jurisdiction, although it supports no riparian or emergent vegetation.

## ENVIRONMENTAL IMPACTS

### SIGNIFICANCE CRITERIA

The California Environmental Quality Act (CEQA) defines “significant effect on the environment” as “a substantial, or potentially substantial, adverse change in the environment” (Pub. Res. Code, §21068). Under CEQA Guidelines Section 15065, a project's effects on biotic resources are deemed significant where the project would:

- substantially reduce the habitat of a fish or wildlife species,
- cause a fish or wildlife population to drop below self-sustaining levels,
- threaten to eliminate a plant or animal community, and/or
- substantially reduce the number or restrict the range of a rare or endangered plant or animal.

In addition to the Section 15065 criteria, Appendix G within the CEQA Guidelines lists other potential impacts to consider when analyzing the effects of a project. The following are applicable to the assessment of impacts stemming from the proposed project:

- Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or the Service?
- Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?
- Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preserve policy or ordinance?
- Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

## **IMPACTS FOUND TO BE LESS THAN SIGNIFICANT**

### **Loss of Habitat for Most Special-Status Plant and Wildlife Species**

The agricultural, ruderal, and developed habitats on the project site are unsuitable for special-status plant and wildlife species. Therefore, project implementation will not substantially reduce the habitat available for these species, restrict their range, or cause their regional populations to drop below self-sustaining levels. Furthermore, the proposed project would not interfere substantially with the movement of any native fish or wildlife species or with an established wildlife corridor. Implementation of the project also would not impede the use of native wildlife nursery sites or conflict with any local policy or ordinance protecting biological resources or with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Impacts to special-status species stemming from a loss of habitat would therefore be less than significant.

### **Loss of Agricultural, Ruderal, and Developed Habitats**

Agricultural, ruderal, and developed habitats predominately support common plant and wildlife species. These habitats are locally common and support regionally common and mostly non-native plant species, and the majority of biotic resources associated with these habitats will continue to be abundant following the 10-year and 25-year build-out of the project area. Loss of these habitats therefore would not result in significant impacts to biological resources.

## **CUMULATIVE IMPACTS**

Expansion and improvements within the existing Clovis Health Care Campus will not substantially contribute to the cumulative loss of habitat, the primary reason for the decline of special-status species. Therefore, no significant cumulative impacts to biological resources would occur from implementing the proposed project.

## **INDIRECT IMPACTS**

With implementation of the conservation measures incorporated into the project description, significant indirect impacts to nesting birds, including burrowing owl, in the vicinity of the project site would be avoided. The proposed project site and vicinity comprise a matrix of developed and agricultural habitats, which are regionally common and unsuitable for the occurrence of special-status species. Therefore, no significant indirect impacts to biological resources would occur from implementing the proposed project.

## **UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS**

No unavoidable significant adverse impacts to biological resources would occur from implementing the proposed project.

## LITERATURE CITED

- [CDFG] California Department of Fish and Game. 1994. A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607. Environmental Services Division.
- [CNPS] California Native Plant Society. 2008. Inventory of Rare and Endangered Vascular Plant of California. Available online at <http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi>, accessed 26 August 2008.
- [CNDDB] California Natural Diversity Data Base. 2008. Rarefind. California Department of Fish and Game.
- Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1. Prepared for the U.S. Army Corps of Engineers.
- Hickman, J. C. 1993. The Jepson Manual: Higher Plants of California. University of California Press.
- [NOAA] National Oceanic and Atmospheric Administration. 2008. Climate Summary for Fresno Area Available online at <http://www.wrh.noaa.gov/hnx/fatmain.php>, accessed 4 September 2008.
- [NRCS] Natural Resources Conservation Service. 2008. United States Department of Agriculture. Web Soil Survey. Soil Survey of Eastern Fresno County. Available online at <http://websoilsurvey.nrcs.usda.gov/>, accessed 4 September 2008.

**APPENDIX A.**  
**CDFG STAFF REPORT ON BURROWING OWL MITIGATION**



## Memorandum

: "Div. Chiefs - IFD, BDD, NED, & WMD  
Reg. Mgrs. - Regions 1, 2, 3, 4, & 5

Date : October 17, 1995

From : Department of Fish and Game

Subject :  
Staff Report on Burrowing Owl Mitigation

I am hereby transmitting the Staff Report on Burrowing Owl Mitigation for your use in reviewing projects (California Environmental Quality Act [CEQA] and others) which may affect burrowing owl habitat. The Staff Report has been developed during the last several months by the Environmental Services Division (ESD) in cooperation with the Wildlife Management Division (WMD) and regions 1, 2, and 4. It has been sent out for public review and redrafted as appropriate.

Either the mitigation measures in the staff report may be used or project specific measures may be developed. Alternative project specific measures proposed by the Department divisions/regions or by project sponsors will also be considered. However, such mitigation measures must be submitted to ESD for review. The review process will focus on the consistency of the proposed measure with Department, Fish and Game Commission, and legislative policy and with laws regarding raptor species. ESD will coordinate project specific mitigation measure review with WMD.

If you have any questions regarding the report, please contact Mr. Ron Rempel, Supervising Biologist, Environmental Services Division, telephone (916) 654-9980.

**COPY** Original signed by  
C.F. Raysbrook

C. F. Raysbrook  
Interim Director

Attachment

cc: Mr. Ron Rempel  
Department of Fish and Game  
Sacramento

# STAFF REPORT ON BURROWING OWL MITIGATION

## Introduction

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates to protect native species of fish and wildlife. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to burrowing owls (*Speotyto cunicularia*; A.O.U. 1991) staff (WMD, ESD, and Regions) has prepared this report. To ensure compliance with legislative and commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); and (2) other authorizations the Department gives to project proponents for projects impacting burrowing owls.

This report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes preapproved mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature, the Fish and Game Commission and the Department's public trust responsibilities. Implementation of mitigation measures consistent with this report are intended to help achieve the conservation of burrowing owls and should compliment multi-species habitat conservation planning efforts currently underway. The *Burrowing Owl Survey Protocol and Mitigation Guidelines* developed by The California Burrowing Owl Consortium (CBOC 1993) were taken into consideration in the preparation of this staff report as were comments from other interested parties.

A range-wide conservation strategy for this species is needed. Any range-wide conservation strategy should establish criteria for avoiding the need to list the species pursuant to either the California or federal Endangered Species Acts through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific efforts.

California's burrowing owl population is clearly declining and, if declines continue, the species may qualify for listing. Because of the intense pressure for urban development within suitable burrowing owl nesting and foraging habitat (open, flat and gently rolling grasslands and grass/shrub lands) in California, conflicts between owls and development projects often occur. Owl survival can be adversely affected by disturbance and foraging habitat loss even when impacts to individual birds and nests/burrows are avoided. Adequate information about the presence of owls is often unavailable prior to project approval. Following project approval there is no legal mechanism through which to seek mitigation other than avoidance of occupied burrows or nests. The absence of standardized survey methods often impedes consistent impact assessment.

## **Burrowing Owl Habitat Description**

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and arid scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

## **Occupied Burrowing Owl Habitat**

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by detecting a burrowing owl, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

## **CEQA Project Review**

The measures included in this report are intended to provide a decision-making process that should be implemented whenever there is potential for an action or project to adversely affect burrowing owls. For projects subject to the California Environmental Quality Act (CEQA), the process begins by conducting surveys to determine if burrowing owls are foraging or nesting on or adjacent to the project site. If surveys confirm that the site is occupied habitat, mitigation measures to minimize impacts to burrowing owls, their burrows and foraging habitat should be incorporated into the CEQA document as enforceable conditions. The measures in this document are intended to conserve the species by protecting and maintaining viable populations of the species throughout their range in California. This may often result in protecting and managing habitat for the species at sites away from rapidly urbanizing/developing areas. Projects and situations vary and mitigation measures should be adapted to fit specific circumstances.

Projects not subject to CEQA review may have to be handled separately since the legal authority the Department has with respect to burrowing owls in this type of situation is often limited. The burrowing owl is protected from "take" (Section 3503.5 of the Fish and Game Code) but unoccupied habitat is likely to be lost for activities not subject to CEQA.

## **Legal Status**

The burrowing owl is a migratory species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. To avoid violation of the take provisions of these laws generally requires that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle (February 1 to August 31). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered “take” and is potentially punishable by fines and/or imprisonment.

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or “rare” regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001 (c), 2103; Guidelines 15380, 15064, 15065). To be legally adequate, mitigation measures must be capable of “avoiding the impact altogether by not taking a certain action or parts of an action”; “minimizing impacts by limiting the degree or magnitude of the action and its implementation”; “rectifying the impact by repairing, rehabilitating or restoring the impacted environment”; “or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action” (Guidelines, Section 15370). Avoidance or mitigation to reduce impacts to less than significant levels must be included in a project or the CEQA lead agency must make and justify findings of overriding considerations.

## **Impact Assessment**

### **Habitat Assessment**

The project site and a 150 meter (approximately 500 ft.) buffer (where possible and appropriate based on habitat) should be surveyed to assess the presence of burrowing owls and their habitat (Thomsen 1971, Martin 1973). If occupied habitat is detected on or adjacent to the site, measures to avoid, minimize, or mitigate the project’s impacts to the species should be incorporated into the project, including burrow preconstruction surveys to ensure avoidance of direct take. It is also recommended that preconstruction surveys be conducted if the species was not detected but is likely to occur on the project site.

## **Burrowing Owl and Burrow Surveys**

Burrowing owl and burrow surveys should be conducted during both the wintering and nesting seasons, unless the species is detected on the first survey. If possible, the winter survey should be conducted between December 1 and January 31 (when wintering owls are most likely to be present) and the nesting season survey should be conducted between April 15 and July 15 (the peak of the breeding season). Surveys conducted from two hours before sunset to one hour after, or from one hour before to two hours after sunrise, are also preferable.

Surveys should be conducted by walking suitable habitat on the entire project site and (where possible) in areas within 150 meters (approx. 500 ft.) of the project impact zone. The 150-meter buffer zone is surveyed to identify burrows and owls outside of the project area which may be impacted by factors -such as noise and vibration (heavy equipment, etc.) during project construction. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To effectively survey large projects (100 acres or larger), two or more surveyors should be used to walk adjacent transects. To avoid impacts to owls from surveyors, owls and/or occupied burrows should be avoided by a minimum of 50 meters (approx. 160 ft.) wherever practical. Disturbance to occupied burrows should be avoided during all seasons.

## **Definition of Impacts**

The following should be considered impacts to the species:

- Disturbance within 50 meters (approx. 160 ft.) Which may result in harassment of owls at occupied burrows;
- Destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and
- Destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s).

## **Written Report**

A report for the project should be prepared for the Department and copies should be submitted to the Regional contact and to the Wildlife Management Division Bird and Mammal Conservation Program. The report should include the following information:

- Date and time of visit(s) including name of the qualified biologist conducting surveys, weather and visibility conditions, and survey methodology;
- Description of the site including location, size, topography, vegetation communities, and animals observed during visit(s);
- Assessment of habitat suitability for burrowing owls;
- Map and photographs of the site;
- Results of transect surveys including a map showing the location of all burrow(s) (natural or artificial) and owl(s), including the numbers at each burrow if present and tracks, feathers, pellets, or other items (prey remains, animal scat);
- Behavior of owls during the surveys;
- Summary of both winter and nesting season surveys including any productivity information and a map showing territorial boundaries and home ranges; and
- Any historical information (Natural Diversity Database, Department regional files? Breeding Bird Survey data, American Birds records, Audubon Society, local bird club, other biologists, etc.) regarding the presence of burrowing owls on the site.

## Mitigation

The objective of these measures is to avoid and minimize impacts to burrowing owls at a project site and preserve habitat that will support viable owls populations. If burrowing owls are detected using the project area, mitigation measures to minimize and offset the potential impacts should be included as enforceable measures during the CEQA process.

Mitigation actions should be carried out from September 1 to January 31 which is prior to the nesting season (Thomsen 1971, Zam 1974). Since the timing of nesting activity may vary with latitude and climatic conditions, this time frame should be adjusted accordingly. Preconstruction surveys of suitable habitat at the project site(s) and buffer zone(s) should be conducted within the 30 days prior to construction to ensure no additional, burrowing owls have established territories since the initial surveys. If ground disturbing activities are delayed or suspended for more than 30 days after the preconstruction survey, the site should be resurveyed.

Although the mitigation measures may be included as enforceable project conditions in the CEQA process, it may also be desirable to formalize them in a Memorandum of Understanding (MOU) between the Department and the project sponsor. An MOU is needed when lands (fee title or conservation easement) are being transferred to the Department.

### Specific Mitigation Measures

1. Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by the Department verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.
2. To offset the loss of foraging and burrow habitat on the project site, a minimum of 6.5 acres of foraging habitat (calculated on a 100 m {approx. 300 ft.} foraging radius around the burrow) per pair or unpaired resident bird, should be acquired and permanently protected. The protected lands should be adjacent to occupied burrowing owl habitat and at a location acceptable to the Department. *Protection of additional habitat acreage per pair or unpaired resident bird may be applicable in some instances.* The CBOC has also developed mitigation guidelines (CBOC 1993) that can be incorporated by CEQA lead agencies and which are consistent with this staff report.
3. When destruction of occupied burrows is unavoidable, existing unsuitable burrows should be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on the protected lands site. One example of an artificial burrow design is provided in Attachment A.
4. If owls must be moved away from the disturbance area, passive relocation techniques (as described below) should be used rather than trapping. At least one or more weeks will be necessary to accomplish this and allow the owls to acclimate to alternate burrows.
5. The project sponsor should provide funding for long-term management and monitoring of the protected lands. The monitoring plan should include success criteria, remedial measures, and an annual report to the Department.

### Impact Avoidance

If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approx. 160 ft.) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approx. 250 ft.) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be *permanently* preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department.

### **Passive Relocation - With One-Way Doors**

Owls should be excluded from burrows in the immediate impact zone and within a 50 meter (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances. One-way doors (e.g., modified dryer vents) should be left in place 48 hours to insure owls have left the burrow before excavation. Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily for one week* to confirm owl use of burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.

### **Passive Relocation - Without One-Way Doors**

Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily until the owls have relocated to the new burrows*. The formerly occupied burrows may then be excavated. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

## **Projects Not Subject to CEQA**

The Department is often contacted regarding the presence of burrowing owls on construction sites, parking lots and other areas for which there is no CEQA action or for which the CEQA process has been completed. In these situations, the Department should seek to reach agreement with the project sponsor to implement the specific mitigation measures described above. If they are unwilling to do so, passive relocation without the aid of one-way doors is their only option based upon Fish and Game Code 3503.5.



## Literature Cited

- American Ornithologists Union (AOU). 1991. Thirty-eighth supplement to the AOU checklist of North American birds. *Auk* 108:750-754.
- Feeney, L. 1992. Site fidelity in burrowing owls. Unpublished paper presented to Raptor Research Annual Meeting, November 1992. Seattle, Washington.
- Haug, E. A. and L. W. Oliphant. 1990. Movements, activity patterns, and habitat use of burrowing owls in Saskatchewan. *J. Wildlife Management* 54:27-35.
- Henny, C. J. and L. J. Blus. 1981. Artificial burrows provide new insight into burrowing owl nesting biology. *Raptor Research* 15:82-85.
- Martin, D. J. 1973. Selected aspects of burrowing owl ecology and behavior. *Condor* 75:446-456.
- Rich, T. 1984. Monitoring burrowing owl populations: Implications of burrow re-use. *Wildlife Society Bulletin* 12:178-180.
- The California Burrowing Owl Consortium (CBOC). 1993. Burrowing owl survey protocol and mitigation guidelines. Tech. Rep. Burrowing Owl Consortium, Alviso, California.
- Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. *Condor* 73:177-192.
- Zarn, M. 1974. Burrowing owl. U. S. Department of Interior, Bureau of Land Management. Technical Note T-N 250. Denver, Colorado. 25 pp.

**APPENDIX B.**  
**PLANT SPECIES OBSERVED ON THE PROJECT SITE**

| PLANT SPECIES OBSERVED ON THE PROJECT SITE |  |                        |
|--|--|------------------------|
| FAMILY NAME                                | SCIENTIFIC NAME                        | COMMON NAME            |
| Amaranthaceae                              | <i>Amaranthus albus</i>                | pigweed                |
| Asteraceae                                 | <i>Ambrosia acanthicarpa</i>           | annual bur-sage        |
| Asteraceae                                 | <i>Anaphalis margaritacea</i>          | pearly everlasting     |
| Asteraceae                                 | <i>Conyza canadensis</i>               | horseweed              |
| Asteraceae                                 | <i>Heterotheca grandiflora</i>         | telegraph weed         |
| Asteraceae                                 | <i>Lactuca serriola</i>                | prickly lettuce        |
| Asteraceae                                 | <i>Sonchus asper</i> ssp. <i>asper</i> | prickly sow thistle    |
| Brassicaceae                               | <i>Brassica nigra</i>                  | black mustard          |
| Euphorbiaceae                              | <i>Chamaesyce maculata</i>             | spotted spurge         |
| Euphorbiaceae                              | <i>Eremocarpus setigerus</i>           | turkey mullein         |
| Geraniaceae                                | <i>Erodium botrys</i>                  | broadleaf filaree      |
| Molluginaceae                              | <i>Mollugo verticillata</i>            | carpet weed            |
| Poaceae                                    | <i>Avena fatua</i>                     | wild oats              |
| Poaceae                                    | <i>Bromus diandrus</i>                 | ripgut brome           |
| Poaceae                                    | <i>Cynodon dactylon</i>                | Bermuda grass          |
| Poaceae                                    | <i>Distichlis spicata</i>              | salt grass             |
| Poaceae                                    | <i>Paspalum dilatatum</i>              | dallisgrass            |
| Poaceae                                    | <i>Phalaris minor</i>                  | littleseed canarygrass |
| Polygonaceae                               | <i>Polygonum</i> sp.                   | knotweed               |
| Solanaceae                                 | <i>Datura wrightii</i>                 | Jimson weed            |
| Zygophyllaceae                             | <i>Tribulus terrestris</i>             | puncture vine          |

**APPENDIX C.**  
**SPECIAL-STATUS PLANT SPECIES**  
**CONSIDERED BUT REJECTED FOR OCCURRENCE ON THE PROJECT SITE**

| SPECIAL-STATUS PLANT SPECIES CONSIDERED BUT REJECTED<br>FOR OCCURRENCE ON THE PROJECT SITE |                                 |                        |                           |                           |   |                             |                                 |
|--|---------------------------------|------------------------|---------------------------|---------------------------|---|-----------------------------|---------------------------------|
| Scientific name  | Common name                     | Lack of alkaline soils | Lack of adobe/ clay soils | Lack of grassland habitat | Lack of decomposed granite soils in cismontane woodland | Lack of vernal pool habitat | Highly degraded site conditions |
| <i>Castilleja campestris</i> ssp. <i>succulenta</i>  | Succulent owl's-clover          |                        |                           |                           |   | X                           | X                               |
| <i>Caulanthus californicus</i>   | California jewel-flower         |                        |                           | X                         |   |                             | X                               |
| <i>Downingia pusilla</i>   | Dwarf downingia                 |                        |                           | X                         |   | X                           | X                               |
| <i>Eryngium spinosepalum</i>   | Spiny-sepaled button-celery     |                        |                           | X                         |   | X                           | X                               |
| <i>Leptosiphon serrulatus</i>  | Madera leptosiphon              |                        |                           |                           | X   |                             | X                               |
| <i>Orcuttia inaequalis</i>   | San Joaquin Valley orcutt grass |                        |                           |                           |   | X                           | X                               |
| <i>Orcuttia pilosa</i>   | Hairy orcutt grass              |                        |                           |                           |   | X                           | X                               |
| <i>Pseudobahia bahiifolia</i>  | Hartweg's golden sunburst       |                        | X                         | X                         |   |                             | X                               |
| <i>Pseudobahia peirsonii</i>   | San Joaquin adobe sunburst      |                        | X                         | X                         |   |                             | X                               |
| <i>Sagittaria sanfordii</i>  | Sanford's arrowhead             |                        |                           |                           |   |                             | X                               |
| <i>Tropidocarpum capparideum</i>   | Caper-fruited tropidocarpum     | X                      | X                         |                           |   |                             | X                               |
| <i>Tuctoria greenei</i>  | Greene's tuctoria               |                        |                           |                           |   | X                           | X                               |

**APPENDIX D.**  
**SPECIAL-STATUS WILDLIFE SPECIES**  
**CONSIDERED BUT REJECTED FOR OCCURRENCE ON THE PROJECT SITE**

| <b>SPECIAL-STATUS WILDLIFE SPECIES CONSIDERED BUT REJECTED FOR OCCURRENCE ON THE PROJECT SITE</b> |                                   |                                       |   |   |
|---|-----------------------------------|---------------------------------------|---|---|
| <b>Scientific Name</b>  | <b>Common Name</b>                | <b>Outside of known current range</b> | <b>Lack of suitable aquatic habitat</b> | <b>Lack of suitable terrestrial habitat</b> |
| <i>Branchinecta lynchi</i>  | Vernal pool fairy shrimp          |                                       | X                                       |   |
| <i>Branchinecta mesoamericana</i>   | Midvalley fairy shrimp            |                                       | X                                       |   |
| <i>Lepidurus packardii</i>  | Vernal pool tadpole shrimp        |                                       | X                                       |   |
| <i>Desmocerus californicus dimorphus</i>  | Valley elderberry longhorn beetle |                                       | X                                       | X   |
| <i>Mylopharodon conocephalus</i>  | Hardhead                          |                                       | X                                       |   |
| <i>Ambystoma californiense</i>  | California tiger salamander       |                                       | X                                       | X   |
| <i>Spea hammondi</i>  | Western spadefoot                 |                                       | X                                       | X   |
| <i>Actinemys marmorata</i>  | Western pond turtle               |                                       | X                                       | X   |
| <i>Coccyzus americanus occidentalis</i>   | Western yellow-billed cuckoo      | X                                     |   | X   |
| <i>Agelaius tricolor</i>  | Tricolored blackbird              |                                       | X                                       | X   |
| <i>Antrozous pallidus</i>   | Pallid bat                        |                                       |   | X   |
| <i>Eudera maculatum</i>   | Spotted bat                       |                                       |   | X   |
| <i>Eumops perotis californicus</i>  | Western mastiff bat               |                                       |   | X   |
| <i>Lasiurus cinereus</i>  | Hoary bat                         |                                       |   | X   |
| <i>Dipodomys nitratoides exilis</i>   | Fresno kangaroo rat               | X                                     |   | X   |
| <i>Taxidea taxus</i>  | American badger                   |                                       |   | X   |
| <i>Vulpes macrotis mutica</i>   | San Joaquin kit fox               | X                                     |   | X   |

## **Appendix 7**

### **Cultural Resources Assessment**

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**A CULTURAL RESOURCES ASSESSMENT FOR THE PROPOSED  
CLOVIS COMMUNITY MEDICAL CENTER EXPANSION  
AND HERNDON AVENUE WIDENING PROJECT,  
HERNDON AND TEMPERANCE AVENUES,  
CITY OF CLOVIS, FRESNO COUNTY, CALIFORNIA**

Prepared by:

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Submitted to:

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49370 Road 426, Suite C  
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26 January 2017

USGS Topographic Quadrangle: Clovis, Calif., 7.5' (1978/1981)

Area: 13 acres / 5.2 hectares  
(Keywords: *Pitkachi/Gashowu Yokuts, Enterprise Canal,  
Township 12S/13S, Range 21E*)

## TABLE OF CONTENTS

|  | <i>Page</i> |
|--|-------------|
| <b>SUMMARY OF FINDINGS.....</b>              | <b>3</b>    |
| <b>INTRODUCTION .....</b>                    | <b>3</b>    |
| <b>PROJECT LOCATION AND DESCRIPTION.....</b> | <b>4</b>    |
| <b>REGULATORY FRAMEWORK .....</b>            | <b>8</b>    |
| California Environmental Quality Act .....   | 8           |
| <b>SOURCES CONSULTED .....</b>               | <b>8</b>    |
| <b>BACKGROUND.....</b>                       | <b>9</b>    |
| Prehistoric Period Summary .....             | 9           |
| Ethnographic Summary .....                   | 13          |
| Historic Period Summary .....                | 13          |
| <b>METHODS AND FINDINGS .....</b>            | <b>15</b>   |
| Summary of Findings.....                     | 16          |
| <b>REFERENCES CITED.....</b>                 | <b>17</b>   |
| <b>PREPARER'S QUALIFICATIONS.....</b>        | <b>19</b>   |

Attachment A: Records Search

## **SUMMARY OF FINDINGS**

Clovis Community Medical Center is proposing to expand its healthcare facilities on its campus located east of Temperance Avenue between Herndon Avenue and State Route 168, at the eastern edge of the City of Clovis. The proposed project also includes widening of Herndon Avenue between Temperance and DeWolf avenues. The project study area lies within Township 12S, Range 21E, Section 32, and Township 13S, Range 21E, Section 2, MDB&M (see Maps 1-2).

This cultural resources assessment was performed at the request of Mr. Scott B. Odell of Odell Planning & Research, Inc. Mr. Odell's firm is assisting the City of Clovis with the preparation of environmental documents necessary under the California Environmental Quality Act (CEQA). Provisions and implementing guidelines of the CEQA, as amended March 18, 2010, state that identification and evaluation of historical resources is required for any action that may result in a potential adverse effect on the significance of such resources, which include archaeological resources.

On November 15, 2016, Sierra Valley Cultural Planning (SVCP) archaeologist Douglas S. McIntosh completed a systematic archaeological pedestrian survey of the project Area of Potential Effect (APE; see Map 3). The field survey sought to identify archaeological sites, features or artifacts which might be present on the ground surface. Items such as chipped stone tools, grinding implements, and midden soils are indicators of prehistoric activities. The survey also sought to identify any historic artifacts, features, and structures over 50 years old.

One historic feature was identified adjacent to the project study area. The Enterprise Canal, built in the 1870s and now part of the Fresno Irrigation District, bounds the project area on the east. It is unlikely that expansion of the medical center will have an effect on the canal. No further management actions to protect this potentially significant feature are recommended at this time.

Other than the Enterprise Canal, no archaeological or other cultural resources were identified as a result of this cultural resources assessment. It is unlikely, therefore, that the proposed action will have an effect on important archaeological, historical, or other cultural resources. No further cultural resources investigation is therefore recommended. In the unlikely event that buried archaeological deposits are encountered within the project area, the finds must be evaluated by a qualified archaeologist. Should human remains be encountered, the County Coroner must be contacted immediately; if the remains are determined to be Native American, then the Native American Heritage Commission must be contacted as well.

## **INTRODUCTION**

In 2008, SVCP completed a cultural resources assessment of ~135 acres of the proposed 148-acre Clovis Community Medical Center located north of Herndon Avenue between Temperance and the Enterprise Canal (Roper 2008). Other than the Enterprise Canal, no cultural resources requiring consideration of effects were identified. This report presents the findings of a pedestrian archaeological survey of two vacant parcels located south of the Clovis Community Medical Center included in the current expansion project, along the south side of Herndon Avenue, east of Temperance Avenue. These two parcels have a total area of approximately +/-5



acres. In addition, this study also examined a one mile stretch of Herndon Avenue, from Temperance to N. DeWolf avenues. The project study area lies within Township 12S, Range 21E, Sections 34 and 35, and Township 13S, Range 21E, Section 2, MDB&M (see Maps 1-2).

Odell Planning & Research, Inc., is assisting the City of Clovis with the preparation of environmental documents necessary under the CEQA. Provisions and implementing guidelines of the CEQA, as amended March 18, 2010, state that identification and evaluation of historical resources is required for any action that may result in a potential adverse effect on the significance of such resources, which include archaeological resources.

SVCP archaeologist Douglas S. McIntosh completed an archaeological survey of the project APE. This report was completed by SVCP Principal Investigator C. Kristina Roper.

## **PROJECT LOCATION AND DESCRIPTION**

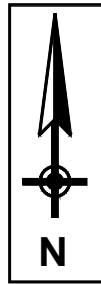
The Project APE is located at the eastern edge of the City of Clovis, south of State Route 168 and west of the Enterprise Canal. This area is developing to urban and residential uses; however, residual rural residential uses and vacant parcels remain in the vicinity. Adjacent land uses include urban residential development and an elementary school to the south; the Enterprise Canal and rural residential use to the east; State Route 168, agricultural land and commercial development to the north; and rural residential development to the west. Elevation is 391 feet above mean sea level.

Clovis Community Medical Center (CCMC) is proposing to expand its healthcare facilities on its campus located east of Temperance Avenue between Herndon Avenue and State Route 168. In addition, commercial uses and a hotel are proposed on land owned by CCMC west of Temperance Avenue and commercial uses and an assisted living facility are proposed on land south of Herndon Avenue. Approximately 135 acres of the project area was previously surveyed in 2008 (Roper 2008). The present study includes two parcels south of Herndon Avenue as well as Herndon Avenue between Temperance and E. DeWolf avenues (see Map 3).

The existing medical center comprises 719,548 square feet of building area, including the main hospital building (223,521 square feet), a bed tower (138,726 square feet), the outpatient care center (70,300 square feet), a conference center (21,814 square feet), a central plant (17,354 square feet), a parking garage (659 spaces), and administrative, corporate, and medical office buildings (247,833 square feet total). The existing medical center includes 208 licensed beds.

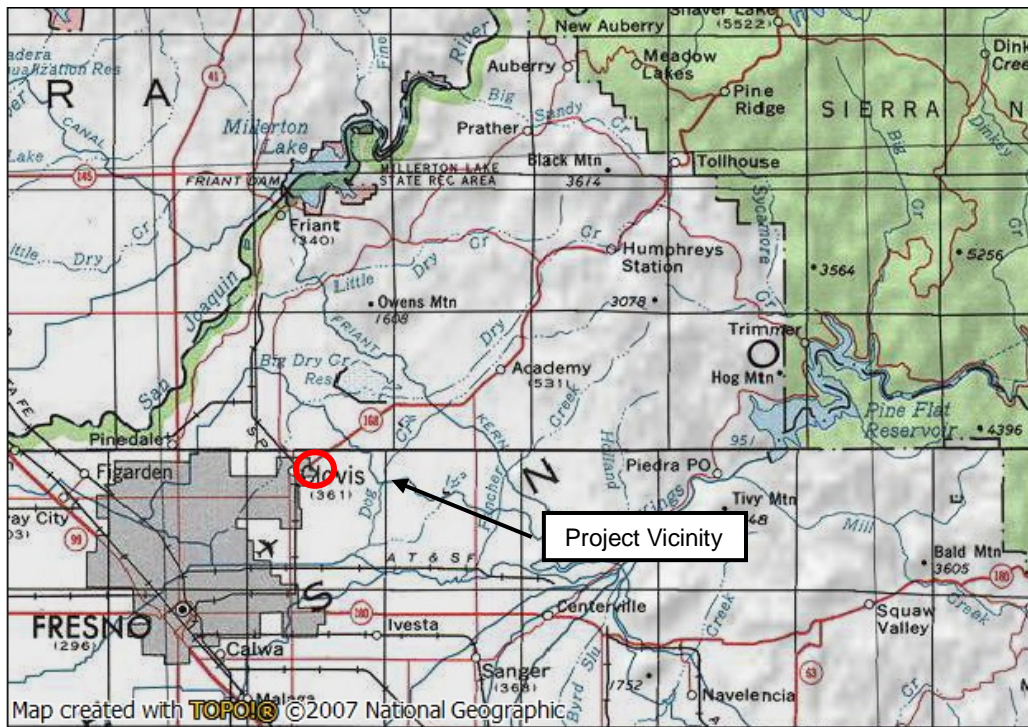
The proposed expansion is divided into two major phases: a 2-10 year expansion plan and a 20 year expansion plan. The initial expansion will increase the building square footage of the medical center by a net increase of 394,564 square feet to a total of 1,114,112 square feet, taking into account that two of the existing medical office buildings (totaling 15,608 square feet) will be removed due to future construction. The number of licensed beds will increase from 208 to 358. The 2-10 year expansion plan also includes the addition of up to 150,000 square feet of commercial space west of Temperance Avenue, as well as a 150 room hotel.

Implementation of the 20 year plan will result in an increase of 428,672 square feet of medical center building area. The total square footage of the medical center upon implementation of the long range plan will be 1,542,784 square feet. The number of licensed beds will increase

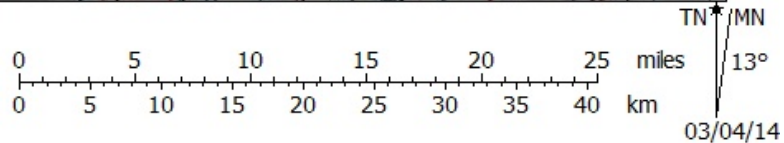


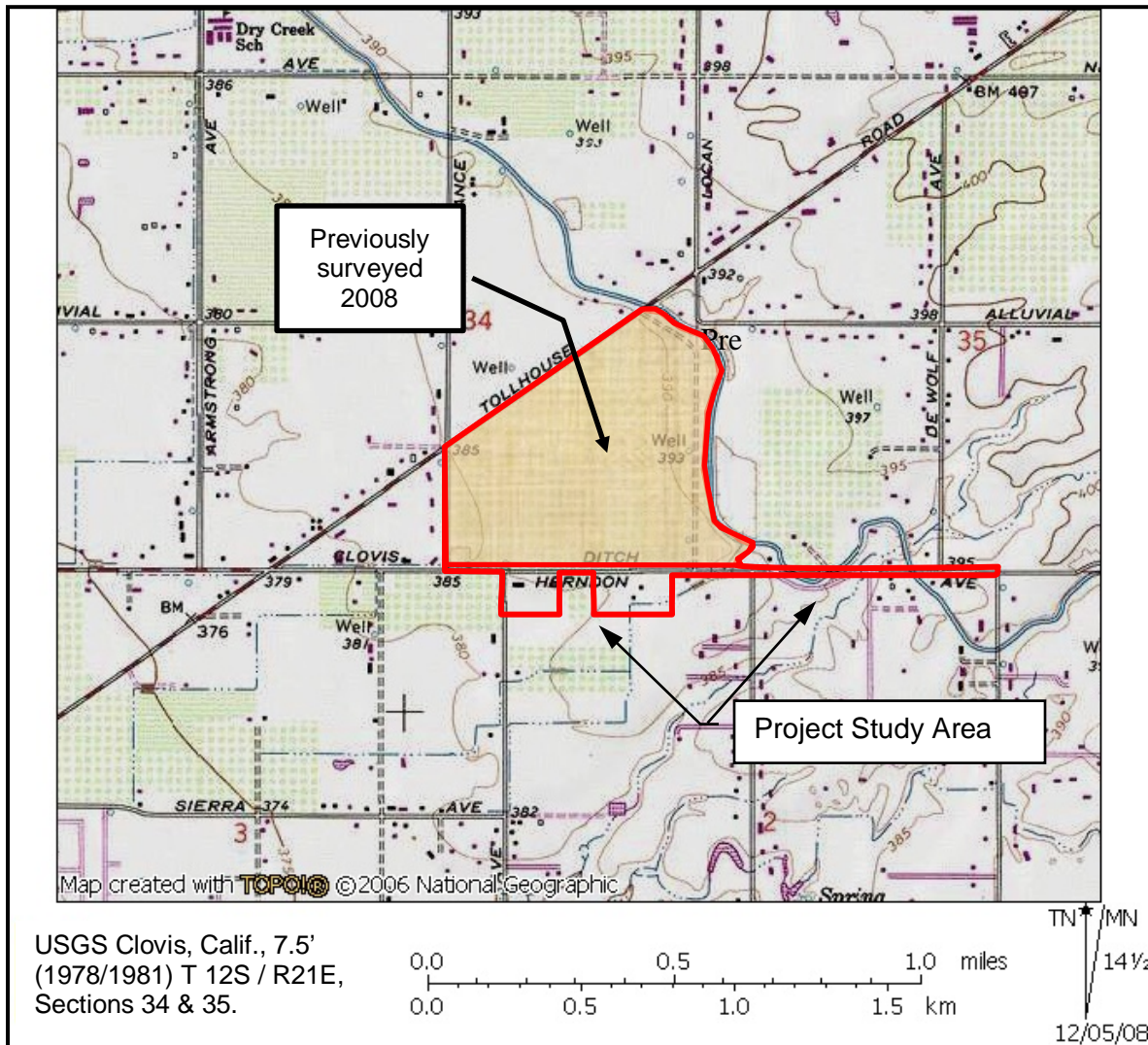
## MAP 1. PROJECT VICINITY

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project City of Clovis, Fresno County



Map created with **TOPOIG** ©2007 National Geographic



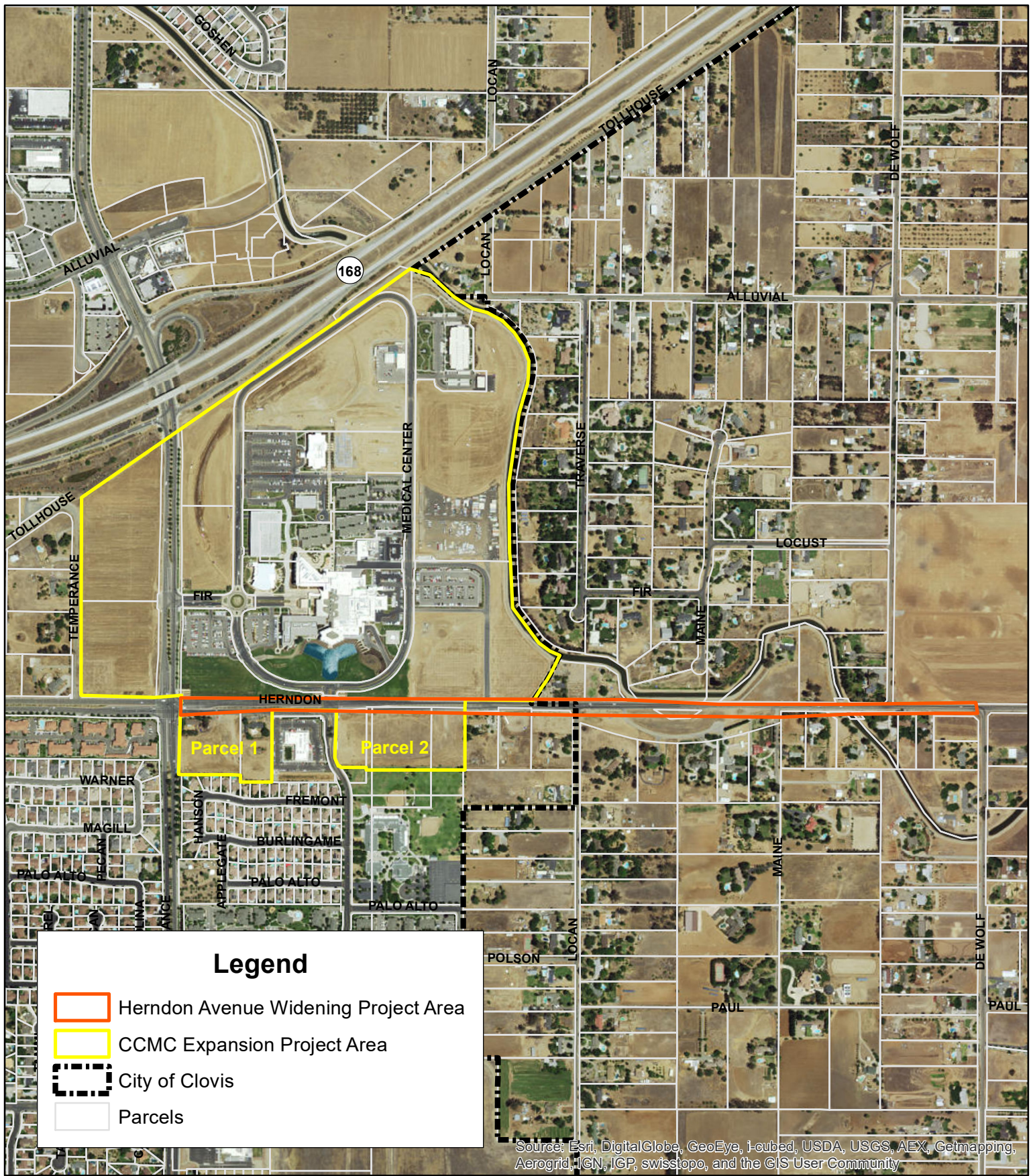


**Map 2.** Project Study Area, Clovis Community Medical Center, Healthcare Campus Expansion Project, City of Clovis, Fresno County, California.

to a total of 508. The 20 year plan also includes up to 70,000 square feet of retail and/or office development and a 100-unit Assisted Living or Memory Care facility south of Herndon Avenue.

As presently conceived, the additional medical buildings would be located throughout the campus property, primarily on the outside of the Medical Center Drive loop road. The retail buildings would be located west of Temperance Avenue and south of Herndon Avenue. Parking lot revisions will be made to accommodate new ambulance drop-off, expanded loading dock circulation, and fire truck access throughout the campus. Parking facilities and walking paths may be lighted. The helicopter landing pad location will remain the same.





Source: County of Fresno, City of Clovis, ESRI

### Map 3. Project Area of Potential Effects (includes Parcels 1-2 and Herndon Avenue Widening)

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis



The Area of Potential Effects (APE) for the present survey includes the project footprint depicted on Map 3.

## **REGULATORY FRAMEWORK**

### **California Environmental Quality Act**

CEQA requires consideration of project impacts on archaeological or historical sites deemed to be "historical resources." Under CEQA, a substantial adverse change in the significant qualities of a historical resource is considered a significant effect on the environment. For the purposes of CEQA, a "historical resource" is a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CR) (Title 14 CCR §15064.5(a)(1)-(3)). Historical resources may include, but are not limited to, "any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (PRC §5020.1(j)).

The eligibility criteria for the CR are the definitive criteria for assessing the significance of historical resources for the purposes of CEQA (Office of Historic Preservation n.d.). Generally, a resource is considered "historically significant" if it meets one or more of the following criteria for listing on the CR:

- 1) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; or
- 2) is associated with the lives of persons important in our past; or
- 3) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- 4) has yielded, or may be likely to yield, information important in prehistory or history (PRC §5024.1[c]).

## **SOURCES CONSULTED**

Prior to field inspection, a records search was completed on 26 May 2016 by the Southern San Joaquin Valley Information Center (SSJV) of the California Historical Resources Information System staff to identify areas previously investigated and to identify known cultural resources present within or in close proximity to the Project APE. According to the Information Center records, there are no prehistoric or historic-period sites or structures identified within the project APE. There are three recorded resources within the ½-mile radius; these resources consist of an historic-era structure foundation, the Enterprise Canal, and the Truman Kahler Complex. Truman Kahler Complex, located at 2599 E. Tollhouse Street, has a National Register status code of 252, indicating that this property has been determined eligible for listing in the National Register of Historic Places by a consensus through the Section 106 process. It is also listed in the California Register of Historical Resources. This resource, a wooden tank house and the last structural remnant of the Fresno Flume and Lumber Company, is no longer present at the above address.

There have been three previous investigations within the APE; 16 investigations have been completed within ½-mile of the APE. No cultural resource sites listed on the National Register of Historic Places, the California Register of Historic Resources, California Points of

Historical Interest, State Historic Landmarks, or the California Inventory of Historic Resources have been documented within or immediately adjacent to the project APE.

The Native American Heritage Commission (NAHC) was contacted on 20 November 2016 in order to determine whether Native American sacred sites have been identified either within or in close proximity to the project APE. No response was received from the NAHC as of 27 January 2017.

## **BACKGROUND**

The project area is located at the eastern edge of the City of Clovis, in north-central Fresno County, California. The APE is situated on a flat, fairly level parcel immediately west of the Enterprise Canal at an elevation of 391 feet above sea level. Figures 1 through 4 provide a pictorial overview of the project APE.

Prior to EuroAmerican exploration and settlement in the region, the central San Joaquin Valley was extensive grassland covered with spring-flowering herbs. Stands of trees -- sycamore, cottonwoods, box elders and willows -- lined the stream and river courses with groves of valley oaks in well-watered localities with rich soil. Rivers yielded fish, mussels, and pond turtles; migratory waterfowl nested in the dense tules along the river sloughs downstream. When the Spanish first set foot in the area, they found the deer and tule elk trails to be so broad and extensive that they first supposed that the area was occupied by cattle. Grizzly bears occupied the open grassland and riparian corridors on the valley floor and adjacent foothills. Smaller mammals and birds, including jackrabbits, ground squirrels, and quail were abundant. Native Americans occupants of the region describe abundant sedge beds, along with rich areas of deer grass, plants that figure prominently in the construction of Native American basketry items.

### **Prehistoric Period Summary**

The San Joaquin Valley and adjacent Sierran foothills and Coast Range have a long and complex cultural history with distinct regional patterns that extend back more than 11,000 years (McGuire 1995). The first generally agreed-upon evidence for the presence of prehistoric peoples in the region is represented by the distinctive basally-thinned and fluted projectile points, found on the margins of extinct lakes in the San Joaquin Valley. These projectiles, often compared to Clovis points, have been found at three localities in the San Joaquin Valley including along the Pleistocene shorelines of former Tulare Lake. Based on evidence from these sites and other well-dated contexts elsewhere, these Paleo-Indian hunters who used these spear points existed during a narrow time range of 11550 cal B.C. to 8550 cal B.C. (Rosenthal et al. 2007).

As a result of climate change at the end of the Pleistocene, a period of extensive deposition occurred throughout the lowlands of central California, burying many older landforms and providing a distinct break between Pleistocene and subsequent occupations during the Holocene. Another period of deposition, also a product of climate change, had similar results around 7550 cal B.C., burying some of the oldest archaeological deposits discovered in California (Rosenthal and Meyer 2004).



**Figure 1.** View east along Herndon Avenue at Temperance Avenue.



**Figure 2.** View west along Herndon Avenue from E. DeWolf Avenue.



**Figure 3.** View southwest from the northeast corner of Parcel 1.



**Figure 4.** View northwest from the southeast corner of Parcel 2.



The Lower Archaic (8550-5550 cal B.C.) is characterized by an apparent contrast in economies, although it is possible they may be seasonal expressions of the same economy. Archaeological deposits which date to this period on the valley floor frequently include only large stemmed spear points, suggesting an emphasis on large game such as artiodactyls (Wallace 1991). Recent discoveries in the adjacent Sierra Nevada have yielded distinct milling assemblages which clearly indicate a reliance on plant foods. Investigations at Copperopolis (LaJeunesse and Pryor 1996) argue that nut crops were the primary target of seasonal plant exploitation. Assemblages at these foothill sites include dense accumulations of handstones, millingslabs, and various cobble-core tools, representing “frequently visited camps in a seasonally structured settlement system” (Rosenthal et al. 2007:152). During the Lower Archaic, regional interaction spheres were well established. Marine shell from the central California coast has been found in early Holocene contexts in the Great Basin east of the Sierra Nevada, and eastern Sierra obsidian comprises a large percentage of flaked stone debitage and tools recovered from sites on both sides of the Sierra (Rosenthal et al. 2007:152).

About 8,000 years ago, many California cultures shifted the main focus of their subsistence strategies from hunting to nut and seed gathering, as evidenced by the increase in food-grinding implements found in archeological sites dating to this period. This cultural pattern is best known for southern California, where it has been termed the Milling Stone Horizon (Wallace 1954, 1978a), but recent studies suggest that the horizon may be more widespread than originally described and is found throughout the central region during the Middle Archaic Period. Dates associated with this period vary between 9,000 and 2,000 cal BP, although most cluster in the 6,800 to 4,500 cal BP range (Basgall and True 1985).

On the valley floor, early Middle Archaic sites are relatively rare; this changes significantly toward the end of the Middle Archaic. In central California late Middle Archaic settlement focused on river courses on the valley floor. “Extended residential settlement at these sites is indicated by refined and specialized tool assemblages and features, a wide range of nonutilitarian artifacts, abundant trade objects, and plant and animal remains indicative of year-round occupation” (Rosenthal et al. 2007:154). Again, climate change apparently influence this shift, with warmer, drier conditions prevailing throughout California. The shorelines of many lakes, including Tulare Lake, contracted substantially, while at the same time rising sea levels favored the expansion of the San Joaquin/Sacramento Delta region, with newly formed wetlands extending eastward from the San Francisco Bay.

In contrast with rare early Middle Archaic sites on the valley floor, early Middle Archaic sites are relatively common in the Sierran foothills, and their recovered, mainly utilitarian assemblages show relatively little change from the preceding period with a continued emphasis on acorns and pine nuts. Few bone or shell artifacts, beads, or ornaments have been recovered from these localities. Projectile points from this period reflect a high degree of regional morphological variability, with an emphasis on local toolstone material supplemented with a small amount of obsidian from eastern sources. In contrast with the more elaborate mortuary assemblages and extended burial mode documented at Valley sites, burials sites documented at some foothill sites such as CA-FRE-61 on Wahtoke Creek are reminiscent of “re-burial” features reported from Milling Stone Horizon sites in southern California. These re-burials are characterized by re-interment of incomplete skeletons often capped with inverted millingslabs (McGuire 1995:57).

A return to colder and wetter conditions marked the Upper Archaic in Central California (550 cal B.C. to cal A.D. 1100). Previously desiccated lakes returned to spill levels and increased freshwater flowed in the San Joaquin and Sacramento watershed. Cultural patterns as reflected in the archeological record, particularly specialized subsistence practices, emerged during this period. The archeological record becomes more complex, as specialized adaptations to locally available resources were developed and valley populations expanded into the lower Sierran foothills. New and specialized technologies expanded and distinct shell bead types occurred across the region. The range of subsistence resources utilized and exchange systems expanded significantly from the previous period. In the Central Valley, archaeological evidence of social stratification and craft specialization is indicated by well-made artifacts such as charmstones and beads, often found as mortuary items.

The period between approximately cal A.D. 1000 and Euro-American contact is referred to as the Emergent Period. The Emergent Period is marked by the introduction of bow and arrow technology which replaced the dart and atlatl at about cal A.D. 1000 and 1300. In the San Joaquin region, villages and small residential sites developed along the many stream courses in the lower foothills and along the river channels and sloughs of the valley floor. A local form of pottery was developed in the southern Sierran foothills along the Kaweah River. Archaeological excavations at habitation sites in Merced and Fresno counties have revealed an artifact assemblage belonging to the Yokuts groups who inhabited the valley floor and adjacent foothills into historic times (Olsen and Payen 1968, 1969; Pritchard 1970).

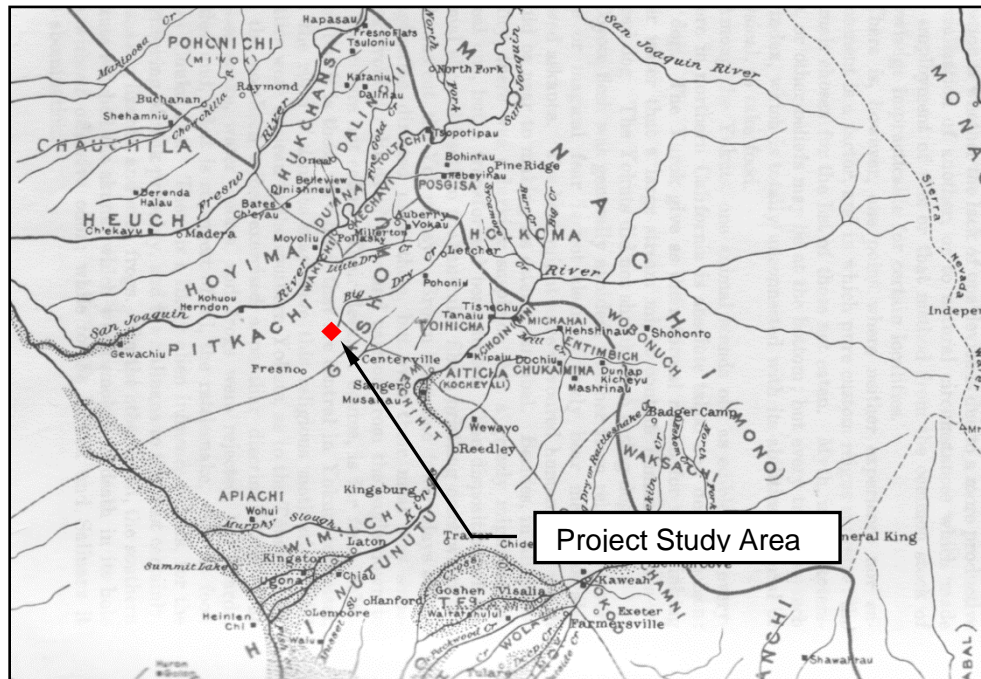
### **Ethnographic Summary**

Prior to EuroAmerican settlement, most of the San Joaquin Valley and the bordering foothills of the Sierra Nevada and Coastal Range were inhabited by speakers of Yokutsan languages. The southern San Joaquin Valley was home of speakers of Yokutsan languages. The bulk of the Valley Yokuts people lived on the eastern side of the San Joaquin Valley. The project APE falls within the territory of the *Gashowu* Yokuts (Figure 5). The *Gashowu* occupied the area centering on Big Dry Creek. The *Pitkachi*, a Northern Valley Yokuts tribelet, occupied the southern side of the San Joaquin River extending up and down river from the town of Herndon (Latta 1999:161). Population densities were highest in the eastern valley and adjacent Sierra Nevada foothills, with as many as 10+ people per square mile living along a narrow strip bordering the San Joaquin and its tributaries (Baumhoff 1963: map 7). No village or other named sites are identified within one mile radius of the Project APE.

Numerous accounts of Valley Yokuts lifeways offer details of pre-European land use in the San Joaquin Valley. The reader is referred to Gayton (1948), Kroeber (1925), Latta (1999), and Wallace (1978b) for additional information on pre-contact Yokuts subsistence and culture.

### **Historic Period Summary**

The San Joaquin Valley was visited in the early 1800s by Spanish expeditions exploring the interior in search of potential mission sites. The Moraga (1806) expedition may have passed through *Pitkachi* territory (Cook 1960). In 1832-33 Colonel Jose J. Warner, a member of the Ewing-Young trapping expedition, passed through the San Joaquin Valley. Warner described Native villages densely packed along the valley waterways, from the foothills down into the slough area. The next year he revisited the area following a devastating malaria epidemic. Whereas the previous year the region had been densely occupied by Native peoples, during this trip not more than five Indians were observed between the head of the Sacramento Valley and the Kings River (Cook 1955).



**Figure 5.** Northern Valley Yokuts Village Locations (from Kroeber 1925: Plate 47).

EuroAmerican settlement of the region began in 1851 with the establishment of Fort Miller on the San Joaquin River. Hostilities between Native inhabitants and American settlers initially prevented widespread settlement of the region; however, by 1860 such threats had been reduced and settlers began taking up large tracts in the region.

The earliest economic development of the area focused on cattle. Miller and Lux, the cattle kings, claimed ownership to extensive holdings in Fresno and adjacent counties. Agriculture, particularly dry-land winter wheat cultivation, gained importance following passage of the “No Fence” law of 1874 (Clough 1996:29). Expansion of agriculture as an economic focus did not occur until after introduction of irrigation into the region.

The community of Clovis began in the 1870s when the pioneer Stephen H. Cole homesteaded 320 acres of government land in the valley. In 1874 he gave his 16-year-old son, Clovis M. Cole, four horses. Clovis became a teamster, hauling lumber from the mountains and purchasing land to raise grain for feed and seed. He eventually farmed 50,000 acres and was known as the “Wheat King of the United States.” He donated land from his holdings for the railroad and the present site of the city of Clovis (Rehart 1997:81). After the drought and depression of 1893, Cole scaled down his wheat ranching operations and built a house in Fresno, where his father was then serving as mayor.

The success of irrigation projects along the Kings River to the south spurred development of irrigation projects to the north and northeast of Fresno.

*The Kings River and Fresno Canal system was begun in 1872, shortly after the first leg of the Fresno Canal was completed. Investors in this system sought to irrigate land north of the Fresno Canal system, diverting through the Gould and Enterprise Canals. During the mid-1870s, this company fell under the ownership of Dr. E. B. Perrin, a major figure in land development in nineteenth century Fresno County. By the late 1870s, however, the company lost access to much of its water in an adverse court battle with the Fresno Canal and Irrigation Company (the Fresno Canal) which then bought Perrin's company. These canals are now part of the Fresno Irrigation District and Consolidated Irrigation District. Conveyance systems like these were incredibly costly, and only a few early investor-speculators had the capital to fund them [JRP Historical Consulting Services and California Department of Transportation 2000:20].*

An 1896 report of the State Mineralogist describes the Enterprise Canal as 30 miles in length, with a width of 25 ft at the top elevation and 15 ft at the bottom, with a depth of 2.5 ft. It diverts water from the Kings River with a capacity of 100 cubic ft per second (Crawford 1896).

## **METHODS AND FINDINGS**

On November 15, 2016, SVCP archaeologist Douglas S. McIntosh, under the direction of C. Kristina Roper, conducted a systematic archaeological pedestrian survey of the ~13-acre project APE. The project APE extends for one mile along Herndon Avenue, between Temperance and E. DeWolf avenues, within the City of Clovis and in unincorporated portions of Fresno County, California. The APE also includes of two vacant parcels, located south of the Clovis Community Medical Center, along the south side of Herndon Avenue, east of Temperance Avenue (Map 3).

The field survey sought to identify any archaeological sites, features or artifacts which might be present on the ground surface. Items such chipped stone tools, grinding implements, and midden soils are indicators of prehistoric activities. In addition the survey also sought to identify any historic artifacts, features, and structures over fifty years old.

Survey methods involved walking systematic east to west transects across the two vacant parcels. These transects were spaced approximately seven to ten meters apart. Along Herndon Avenue, an area of fifteen meters wide was surveyed along both the north and south sides of the road. The survey did not involve walking through fenced properties or within private residential yards. All of the residential structures along the Herndon Avenue survey corridor were photographed. A Panasonic Lumix DMC-TS20 digital camera was used to photo document the project setting and any cultural resources. All photo information was recorded in the field on a photo-log.

The project is located in an area with a mixture of medical offices, new housing tract developments, homes on small acreage with pastures and open agricultural and fallow farm fields. Within the two vacant parcels, ground visibility ranged from 50 to 80 percent. Low non-native grasses and dry vegetation limited a full inspection of ground surfaces. Imported gravels and demolition debris including fragments of concrete, asphalt, stucco and imported rocks were noted at both parcels. Modern trash including an assortment of plastics, papers and beverage containers were present along road edges. Both of these parcels have been mechanically disturbed by either bulldozing or disking activities.

Along the Herndon Avenue survey corridor, ground visibility was generally very good, 75 to 100 percent. Open parcels were generally free of vegetation as a result of mechanical disking activities. A limited amount of road side trash was observed along this corridor.

Native soils within two parcels and along Herndon Avenue are a silty sandy clay loam with granitic gravels. Small rounded granitic cobbles were observed throughout the project area. Soils have generally Munsell color value of 10YR 4/4, dark yellowish brown (wet).

### **Summary of Findings**

Within the two vacant parcels modern water pressure tanks and well features are present. A concrete well pad at the east side of the eastern parcels has an inscribed date of "12-27-72". A light scatter of modern household refuse and sections of steel water pipes are present within the southern central portion of the eastern parcel. A moderate scatter of structural demolition debris is also present at both of these parcels.

Along the north side of Herndon Avenue, near the southeast corner of the Clovis Community Medical Center property is an unlined earthen irrigation ditch feature with a concrete stand pipe. This feature is bounded to the east by a private residence at 7490 Herndon Avenue. The feature appears to be a feeder ditch which connects to the Enterprise Canal. The interior of the ditch feature measures five feet wide at the base. The banks of the ditch measure approximately 3 ½ feet to 4 feet tall. Water from this ditch appears to have flowed into a concrete standpipe, which is located along the north edge of Herndon Avenue. UTM coordinates at the concrete standpipe and Herndon Avenue were recorded as 11 263157E / 4080136N (NAD 83).

Along the Herndon Avenue survey corridor, all of the residential structures appear to be modern, with the possible exception of the homes at 7500 and 7788 Herndon Avenue.

A modern section of the Enterprise Canal, along the north side of Herndon Avenue between Locan and Maine Roads, was photographed. In addition, aspects of the canal and associated bridge over Herndon Avenue, just west of E DeWolf Avenue, were photo documented. No dates were observed on the bridge or on the concrete canal banks.

No archaeological or other cultural resources were identified as a result of this cultural resources assessment. It is unlikely, therefore, that the proposed action will have an effect on important archaeological, historical, or other cultural resources. No further cultural resources investigation is therefore recommended. In the unlikely event that buried archaeological deposits are encountered within the project area, the finds must be evaluated by a qualified archaeologist. Should human remains be encountered, the County Coroner must be contacted immediately; if the remains are determined to be Native American, then the Native American Heritage Commission must be contacted as well.

## REFERENCES CITED

Basgall, M. E. and D. L. True.

- 1985 Archaeological Investigations in Crowder Canyon, 1973-1984: Excavations at Sites SBR-421B, SBR-421C, SBR-421D, and SBR-713. Report on file, Caltrans, Sacramento, CA.

Baumhoff, M. A.

- 1963 *Ecological Determinants of Aboriginal California Populations*. University of California Publications in American Archaeology and Ethnology 49(2). Berkeley, CA.

Clough, Charles W.

- 1996 Madera. Madera County Historical Society, Panama West Books, Fresno, CA. On file, Fresno County History Room, Fresno County Library, Fresno, CA.

Cook, Sherburne F.

- 1955 *The Aboriginal Population of the San Joaquin Valley, California*. *University of California Anthropological Records* 16(2):31-80. Berkeley, CA.
- 1960 *Colonial Expeditions to the Interior of California: Central Valley, 1800-1820*. *University of California Anthropological Records* 16(6):239-292. Berkeley, CA.

Crawford, J. J.

- 1896 Thirteenth Report (Third Biennial) of the State Mineralogist for the Two Years Ending September 15, 1896. California State Mining Bureau, Sacramento, CA.

Gayton, A. H.

- 1948 *Yokuts and Western Mono Ethnography I: Tulare Lake, Southern Valley, and Central Foothill Yokuts*. *University of California Anthropological Records* 10(1). Berkeley, CA.

JRP Historical Consulting Services and the California Department of Transportation

- 2000 *Water Conveyance Systems in California*. California Department of Transportation, Environmental Program/Cultural Studies Office, Sacramento, CA.

Kroeber, A. L.

- 1925 *Handbook of the Indians of California* (1976 Dover Edition). Bureau of American Ethnology Bulletin 76, Smithsonian Institution, Washington D.C.

LaJeunesse, Roger M., and John M. Pryor

- 1996 *Skyrocket Appendices*. Report on file, Department of Anthropology, California State University, Fresno, CA..

Latta, Frank F.

- 1999 *Handbook of Yokuts Indians*. Brewer's Historical Press, Exeter, CA / Coyote Press, Salinas, CA.

McGuire, Kelly R.

- 1995 Test Excavations at CA-FRE-61, Fresno County, California. Occasional Papers in Anthropology 5. Museum of Anthropology, California State University Bakersfield, CA.

Olsen, William H., and Louis A. Payen

1968 *Archaeology of the Little Panoche Reservoir, Fresno County, California*. California State Department of Parks and Recreation, Archaeological Resources Section Report 11. Sacramento, CA..

1969 *Archaeology of the Grayson Site, Merced County, California*. California State Department of Parks and Recreation, Archaeological Resources Section Report 12. Sacramento, CA.

Phillips, G. H.

1993 *Indians and Intruders in Central California, 1769-1849*. University of Oklahoma Press, Norman, OK..

Pritchard, William E.

1970 *Archeology of the Menjoulet Site, Merced County, California*. California State Department of Parks and Recreation, Archaeological Resources Section Report 13. Sacramento, CA..

Rehart, Katherine Morrison

1997 *The Valley's Legends and Legacies II*. Word Dancer Press, Clovis, CA.

Roper, C. Kristina

2008 Phase 1 Cultural Resources Study, Clovis Community Medical Center, Healthcare Campus Expansion, Herndon and Temperance Avenues, City of Clovis, Fresno County, California. Sierra Valley Cultural Planning, Three Rivers, CA. Submitted to Paoli & Odell, Inc., Fresno, CA.

Rosenthal, Jeffrey S., and Jack Meyer

2004 *Landscape Evolution and the Archaeological Record: A Geoarchaeological Study of the Southern Santa Clara Valley and Surrounding Region*. Center for Archaeological Research at Davis, Publication No. 14, University of California, Davis, CA.

Rosenthal, Jeffrey S., Gregory G. White and Mark Q. Sutton

2007 The Central Valley: A View from the Catbird's Seat. In *California Prehistory: Colonization, Culture, and Complexity*, pp. 147-164, edited by Terry L. Jones and Kathryn A. Klar. Alta Mira Press, New York, NY..

Thompson, Thomas H.

1891 *Official Historical Atlas Map of Fresno County*. Tulare, CA.

Wallace, William J.

1954 The Little Sycamore Site and the Early Milling Stone Cultures of Southern California. *American Antiquity* 20(2):112-123.

1978a Post-Pleistocene Archeology, 9000 to 2000 B.C. In *Handbook of North American Indians*, vol. 8, *California*, edited by R. F. Heizer, pp. 25-36. Smithsonian Institution, Washington, D.C.

- 1978b Northern Valley Yokuts. In *Handbook of North American Indians*, vol. 8, *California*, edited by R. F. Heizer, pp. 448-461. Smithsonian Institution, Washington, D.C.
- 1991 Tulare Lake's Archaeological Past. In *Background to a Study of Tulare Lake's Archaeological Past*, pp. 23-33. Contributions to Tulare Lake Archaeology 1.

## PREPARER'S QUALIFICATIONS

**Douglas S. McIntosh** completed the archaeological survey of the Project APE. Mr. McIntosh has over 25 years of experience in California archaeology and has served as field crew chief and lead field assistant for both historical and prehistoric resource investigations, including tasks of surveying, field mapping, excavation, field graphics, soils descriptions, photography, and general site documentation. He has served as an archaeological monitor for various aspects of earthmoving and grading activities for cultural resources, and as Laboratory assistant for both historical and prehistoric resources which includes processing soil samples, cleaning and cataloging historical and prehistoric artifacts and collections, and artifact illustration. Mr. McIntosh has conducted historical research which involves records, maps and archival searches, oral interviews, and documentation of historical photographic collections.

**C. Kristina Roper** meets the Secretary of the Interior's Guidelines for archaeology. Ms. Roper has a B.A. in Anthropology from the University of California, Berkeley, and a M.A. in Cultural Resources Management from Sonoma State University. She has over 34 years of archaeological survey and excavation experience, including both prehistoric and historic sites, in California, Nevada, Oregon, and Idaho, and has produced over 250 professional reports. For the past 16 years Ms. Roper has served as a Lecturer in Anthropology at California State University, Fresno. Courses taught include World Prehistory, Introduction to Archaeology, Bio-Behavioral Evolution of the Human Species, Historical Archaeology, Critical Thinking, Food and Culture, Applied Anthropology, and Cultural Resources Management. Ms. Roper is a Registered Professional Archaeologist in good standing. As sole proprietor of a cultural resources management firm established in 1995, her responsibilities include all aspects of project management, from marketing and development, to project completion, and include NEPA, CEQA, and NHPA (Section 106) compliance.



## **Attachment A: Records Search**



**To:** Melissa Odell  
Odell Planning & Research, Inc.  
49370 Road 426, Suite C  
Oakhurst, CA 93644

**Record Search 16-210**

**Date:** May 26, 2016

**Re:** Clovis Community Medical Center Master Plan Expansion and Herndon Avenue Widening Project

**County:** Fresno

**Map(s):** Clovis 7.5'

### **CULTURAL RESOURCES RECORDS SEARCH**

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

The following are the results of a search of the cultural resource files at the Southern San Joaquin Valley Information Center. These files include known and recorded cultural resources sites, inventory and excavation reports filed with this office, and resources listed on the National Register of Historic Places, Historic Property Directory (3/18/13), California State Historical Landmarks, California Register of Historical Resources, California Inventory of Historic Resources, and California Points of Historical Interest. Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area.

### **PRIOR CULTURAL RESOURCE STUDIES CONDUCTED WITHIN THE PROJECT AREA AND THE ONE-HALF MILE RADIUS**

According to the information in our files, there have been three previous cultural resource studies conducted within the project area, FR-01130, 02323, 02658. There have been 16 additional studies conducted within the one-half mile radius, FR-00196, 00298, 00303, 00340, 00438, 00548, 01588, 01590, 01724, 02216, 02234, 02235, 02269, 02301, 02474, and 02727.

## KNOWN/RECORDED CULTURAL RESOURCES WITHIN THE PROJECT AREA AND THE ONE-HALF MILE RADIUS

There are no recorded cultural resources within the project area. There are three recorded resources within the one-half mile radius, P-10-005820, 005934, and 006110. These resources consist of an historic era structure foundation, the Enterprise Canal, and the Truman Kahler Complex.

Resources P-10-006110, the Truman Kahler Complex, located at 2599 E. Tollhouse Street, has a National Register status code of 2S2, indicating that this property has been determined eligible for listing in the National Register of Historic Places by a consensus through the Section 106 process. It is also listed in the California Register of Historical Resources. There are no other recorded cultural resources within the project area or radius that are listed in the National Register of Historic Places, the California Register of Historical Resources, the California Points of Historical Interest, California Inventory of Historic Resources, or the California State Historic Landmarks.

## COMMENTS AND RECOMMENDATIONS

We understand this project consists of the expansion and improvement of an existing hospital campus, originally built in 1988, and the widening of Herndon Avenue from Temperance Avenue to DeWolf Avenue. Further, we understand the proposed expansion area has been used for existing hospital purposes and for agriculture. Please note that farming does not constitute previously development, as it does not destroy cultural resources, but merely moves them around within the plow zone. The most recent of the previous studies completed on the property was done in 2008. Due to changes in field methods and technology, the Information Center routinely recommends a new study be completed with a previous study is more than five years old. Therefore, prior to any ground disturbance activities, we recommend a qualified, professional archaeologist conduct a field survey of all vacant lands to determine if cultural resources are present. Additionally, if cultural resources are unearthed during ground disturbance activities, all work must halt in the area of the find and a qualified, professional archaeologist should be called out to assess the findings and make the appropriate mitigation recommendations. A list of qualified consultants is available at [www.chrisinfo.org](http://www.chrisinfo.org).

We also recommend that you contact the Native American Heritage Commission in Sacramento. They will provide you with a current list of Native American individuals/organizations that can assist you with information regarding cultural resources that may not be included in the CHRIS Inventory and that may be of concern to the Native groups in the area. The Commission will consult their "Sacred Lands Inventory" file in order to determine what sacred resources, if any, exist within this project area and the way in which these resources might be managed. Finally, please consult with the lead agency on this project to determine if any other cultural resource investigation is required. If you need any additional information or have any questions or concerns, please contact our office at (661) 654-2289.

By:



Celeste M. Thomson, Coordinator

Date: May 26, 2016

Please note that invoices for Information Center services will be sent under separate cover from the California State University, Bakersfield Accounting Office.

## **Appendix 15**

### **Noise Impact Assessment**

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# **NOISE IMPACT ASSESSMENT**

**FOR**

## **MASTER PLAN EXPANSION OF THE CLOVIS COMMUNITY MEDICAL CENTER PROJECT CLOVIS, CA**

**JULY 2017**

**PREPARED FOR:**

ODELL PLANNING & RESEARCH, INC.  
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## TABLE OF CONTENTS

|  |    |
|--|----|
| Introduction .....                         | 1  |
| Proposed Project Summary .....             | 1  |
| Acoustic Fundamentals .....                | 1  |
| Amplitude .....                            | 1  |
| Frequency.....                             | 1  |
| Addition of Decibels .....                 | 1  |
| Sound Propagation & Attenuation .....      | 3  |
| Noise Descriptors .....                    | 3  |
| Human Response to Noise.....               | 4  |
| Effects of Noise on Human Activities ..... | 5  |
| Regulatory Framework.....                  | 7  |
| Noise .....                                | 7  |
| Groundborne Vibration.....                 | 8  |
| Affected Environment .....                 | 9  |
| Sensitive Land Uses.....                   | 9  |
| Ambient Noise Levels .....                 | 11 |
| Groundborne Vibration.....                 | 11 |
| Impact Analysis .....                      | 12 |
| Standards of Significance.....             | 12 |
| Methodology .....                          | 14 |
| Impacts and Mitigation Measures.....       | 14 |

## LIST OF TABLES

|          |   |    |
|----------|---|----|
| Table 1  | Common Acoustical Descriptors .....   | 4  |
| Table 2  | Federal Interagency Committee on Noise Recommended Criteria for Evaluation of Increases in Ambient Noise Levels ..... | 5  |
| Table 3  | City of Clovis Interior and Exterior Noise Standards .....  | 9  |
| Table 4  | City of Clovis Land Use Noise Combability Matrix.....   | 10 |
| Table 5  | Damage Potential to Buildings at Various Groundborne Vibration Levels.....  | 10 |
| Table 6  | Annoyance Potential to People at Various Groundborne Vibration Levels .....   | 11 |
| Table 7  | Ambient Daytime Noise Levels .....  | 12 |
| Table 8  | Existing Traffic Noise Levels .....   | 12 |
| Table 9  | Typical Construction Equipment Noise Levels .....   | 15 |
| Table 10 | Predicted Increases in Traffic Noise Levels Existing Conditions .....   | 17 |
| Table 11 | Predicted Increases in Traffic Noise Levels Future Cumulative Year 2035 Conditions.....                               | 18 |
| Table 12 | Representative Vibration Source Levels for Construction Equipment .....   | 21 |

## LIST OF FIGURES

|          |                           |   |
|----------|---------------------------|---|
| Figure 1 | Common Noise Levels ..... | 2 |
|----------|---------------------------|---|

## INTRODUCTION

This report describes the existing noise environment in the project vicinity and identifies potential noise impacts associated with the proposed project. Project impacts are evaluated relative to applicable noise level criteria and to the existing ambient noise environment. Mitigation measures have been identified for significant noise-related impacts.

## PROPOSED PROJECT SUMMARY

Clovis Community Medical Center is proposing to expand its healthcare facilities on its campus located east of Temperance Avenue between Herndon Avenue and State Route 168. In addition, commercial uses and a hotel are proposed on land owned by CCMC west of Temperance Avenue and commercial uses and an assisted living facility are proposed on land south of Herndon Avenue. The proposed improvements would be developed in two phases. The project would also widen the current five-lane Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the southern leg of DeWolf Avenue from two lanes to a four-lane divided roadway.

## ACOUSTIC FUNDAMENTALS

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency.

### AMPLITUDE

Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

### FREQUENCY

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA (U.S. EPA 1971). Common community noise sources and associated noise levels, in dBA, are depicted in Figure 1.

### ADDITION OF DECIBELS

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

**Figure 1  
Common Noise Levels**

| Common Outdoor Activities                          | Noise Level (dBA) | Common Indoor Activities                       |
|--|-------------------|--|
|  | <b>110</b>        | Rock Band                                      |
| Jet Fly-over at 300m (1000 ft)                     |                   |  |
|  | <b>100</b>        |  |
| Gas Lawn Mower at 1 m (3 ft)                       |                   |  |
|  | <b>90</b>         |  |
| Diesel Truck at 15 m (50 ft),<br>at 80 km (50 mph) |                   | Food Blender at 1 m (3 ft)                     |
| Noisy Urban Area, Daytime                          | <b>80</b>         | Garbage Disposal at 1 m (3 ft)                 |
| Gas Lawn Mower, 30 m (100 ft)                      |                   |  |
| Commercial Area                                    | <b>70</b>         | Vacuum Cleaner at 3 m (10 ft)                  |
| Heavy Traffic at 90 m (300 ft)                     |                   | Normal Speech at 1 m (3 ft)                    |
|  | <b>60</b>         |  |
| Quiet Urban Daytime                                |                   | Large Business Office                          |
|  | <b>50</b>         | Dishwasher Next Room                           |
| Quiet Urban Nighttime                              |                   |  |
| Quiet Suburban Nighttime                           | <b>40</b>         | Theater, Large Conference<br>Room (Background) |
|  |                   | Library  |
| Quiet Rural Nighttime                              | <b>30</b>         | Bedroom at Night,<br>Concert Hall (Background) |
|  | <b>20</b>         | Broadcast/Recording Studio                     |
|  | <b>10</b>         |  |
| Lowest Threshold of Human<br>Hearing               | <b>0</b>          | Lowest Threshold of Human<br>Hearing           |

Source: Caltrans 2016



## **SOUND PROPAGATION & ATTENUATION**

### **GEOMETRIC SPREADING**

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level decreases (attenuates) at a rate of approximately 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 decibels for each doubling of distance from a line source, depending on ground surface characteristics. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water,), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation for soft surfaces results in an overall attenuation rate of 4.5 decibels per doubling of distance from the source.

### **ATMOSPHERIC EFFECTS**

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

### **SHIELDING BY NATURAL OR HUMAN-MADE FEATURES**

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in minimum 5 dB of noise reduction. Taller barriers provide increased noise reduction.

### **NOISE DESCRIPTORS**

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the sound-pressure level in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies, which is referred to as the “A-weighted” sound level (expressed in units of dBA). The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with environmental noise.

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are typically used. For the evaluation of environmental noise, the most commonly used descriptors are  $L_{eq}$ ,  $L_{dn}$ , CNEL and SEL. The energy-equivalent noise level,  $L_{eq}$ , is a measure of the average energy content (intensity) of noise over any given period. Many communities use 24-hour descriptors of noise levels to regulate noise. The day-night average noise level,  $L_{dn}$ , is the 24-hour average of the noise intensity, with a 10-dBA "penalty" added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to  $L_{dn}$  but adds an additional 5-dBA penalty for evening noise (7 p.m. to 10 p.m.) Another descriptor that is commonly discussed is the single-event noise exposure level, also referred to as the sound-exposure level, expressed as SEL. The SEL describes a receiver's cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 second), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle. Common noise level descriptors are summarized in Table 1.

**Table 1**  
**Common Acoustical Descriptors**

| Descriptor                                       | Definition   |
|--|--|
| Energy Equivalent Noise Level ( $L_{eq}$ )       | The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.   |
| Minimum Noise Level ( $L_{min}$ )                | The minimum instantaneous noise level during a specific period of time.  |
| Maximum Noise Level ( $L_{max}$ )                | The maximum instantaneous noise level during a specific period of time.  |
| Day-Night Average Noise Level (DNL or $L_{dn}$ ) | The DNL was first recommended by the U.S. EPA in 1974 as a "simple, uniform and appropriate way" of measuring long term environmental noise. DNL takes into account both the frequency of occurrence and duration of all noise events during a 24-hour period with a 10 dBA "penalty" for noise events that occur between the more noise-sensitive hours of 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours. |
| Community Noise Equivalent Level (CNEL)          | The CNEL is similar to the $L_{dn}$ described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated $L_{dn}$ .   |
| Single Event Level (SEL)                         | The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.   |

## HUMAN RESPONSE TO NOISE

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with

noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans;
- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial;
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

A limitation of using a single noise-level increase value to evaluate noise impacts, as discussed above, is that it fails to account for pre-project noise conditions. With this in mind, the Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of project-generated increases in noise levels that take into account the ambient noise level. The FICON recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (i.e., CNEL,  $L_{dn}$ ). FICON-recommended noise evaluation criteria are summarized in Table 2 (FICON 2000).

**Table 2**  
**Federal Interagency Committee on Noise**  
**Recommended Criteria for Evaluation of Increases in Ambient Noise Levels**

| Ambient Noise Level Without Project | Increase Required for Significant Impact |
|-------------------------------------|--|
| < 60 dB                             | 5.0 dB, or greater                       |
| 60-65 dB                            | 3.0 dB, or greater                       |
| > 65 dB                             | 1.5 dB, or greater                       |

*Source: FICON 2000*

As depicted in **Table 2**, an increase in the traffic noise level of 5.0, or greater, would typically be considered to result in increased levels of annoyance where existing ambient noise levels are less than 60 dB. Within areas where the ambient noise level ranges from 60 to 65 dB, increased levels of annoyance would be anticipated at increases of 3 dB, or greater. Increases of 1.5 dB, or greater, could result in increased levels of annoyance in areas where the ambient noise level exceeds 65 dB. The rationale for the FICON-recommended criteria is that as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause significant increases in annoyance (FICON 2000).

## EFFECTS OF NOISE ON HUMAN ACTIVITIES

The extent to which environmental noise is deemed to result in increased levels of annoyance, activity interference, and sleep disruption varies greatly from individual to individual depending on various factors, including the loudness or suddenness of the noise, the information value of the noise (e.g., aircraft overflights, child crying, fire alarm), and an individual's sleep state and sleep habits. Over time, adaptation to noise events and increased levels of noise may also occur. In terms of land use compatibility, environmental noise is often evaluated in terms of the potential for noise events to result in increased levels of annoyance, sleep disruption, or interference with speech communication, activities, and learning.

## SPEECH COMMUNICATION

For most noise-sensitive land uses, an interior noise level of 45 dB  $L_{eq}$  is typically identified for the protection of speech communication in order to provide for 100-percent intelligibility of speech sounds. Assuming an average 20-dB reduction in sound level between outdoors and indoors (which is an average amount of sound attenuation that assumes windows are closed), this interior noise level would equate to an exterior noise level of 65 dBA  $L_{eq}$ . For outdoor voice communication, an exterior noise level of 60 dBA  $L_{eq}$  allows normal conversation at distances up to 2 meters with 95 percent sentence intelligibility (U.S. EPA 1974.) Based on this information, speech interference begins to become a problem when steady noise levels reach approximately 60 to 65 dBA.

## LEARNING

Closely related to speech interference are the effects of noise on learning and, more broadly, on cognitive tasks. Recent studies have shown a strong relationship between noise and children's reading ability. Children's attention spans also appear to be adversely affected by noise. Adults are affected as well. Some studies indicate that, in a noisy environment, adults have increased difficulty accomplishing complex tasks. One of the issues associated with assessment of these effects is which noise metric correlates most closely with the impacts. For example, DNL, with its nighttime weighting, may not be the best measure of noise impacts on schools given that operational activities are often limited to the daytime hours.

Various standards and recommended criteria have been developed to specifically address classroom noise. For instance, with regard to transportation sources, the California Department of Transportation has adopted abatement criteria that limit the maximum interior average-hourly noise level within classrooms, as well as other noise-sensitive interior uses, to 52 dBA  $L_{eq}$ . In June 2002, the American National Standards Institute, Inc. (ANSI) released a new classroom acoustics standard entitled *Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools*" (ANSI S12.60-2002). For schools exposed to intermittent noise sources, such as airport and other transportation noise, the ANSI standards recommend that interior noise levels not exceed 40 dBA  $L_{eq}$  during the noisiest hour of the day. At present complying with the ANSI-recommended standard is voluntary in most locations.

## ANNOYANCE & SLEEP DISRUPTION

With regard to potential increases in annoyance, activity interference, and sleep disruption, land use compatibility determinations are typically based on the use of the cumulative noise exposure metrics (i.e., CNEL or  $L_{dn}$ ). Perhaps the most comprehensive and widely accepted evaluation of the relationship between noise exposure and the extent of annoyance was one originally developed by Theodore J. Schultz in 1978. In 1978 the research findings of Theodore J. Schultz provided support for  $L_{dn}$  as the descriptor for environmental noise. Research conducted by Schultz identified a correlation between the cumulative noise exposure metric and individuals who were highly annoyed by transportation noise. The Schultz curve, expressing this correlation, became a basis for noise standards. When expressed graphically, this relationship is typically referred to as the Schultz curve. The Schultz curve indicates that approximately 13 percent of the population is highly annoyed at a noise level of 65 dBA  $L_{dn}$ . It also indicates that the percent of people describing themselves as being highly annoyed accelerates smoothly between 55 and 70 dBA  $L_{dn}$ . A noise level of 65 dBA  $L_{dn}$  is a commonly referenced dividing point between lower and higher rates of people describing themselves as being highly annoyed.

The Schultz curve and associated research became the basis for many of the noise criteria subsequently established for federal, state, and local entities. Most federal and state of California regulations and policies related to transportation noise sources establish a noise level of 65 dBA CNEL/ $L_{dn}$  as the basic limit of acceptable noise exposure for residential and other noise-sensitive land uses. For instance, with respect to aircraft noise, both the Federal Aviation Administration (FAA) and the State of California have identified a noise level of 65 dBA  $L_{dn}$  as the dividing point between normally compatible and normally incompatible residential land use generally applied for determination of land use compatibility. For noise-sensitive land uses exposed to aircraft noise, noise levels in excess of 65 dBA CNEL/ $L_{dn}$  are typically considered to result in a potentially significant increase in levels of annoyance.

Allowing for an average exterior-to-interior noise reduction of 20 dB, an exterior noise level of 65 dBA CNEL/L<sub>dn</sub> would equate to an interior noise level of 45 dBA CNEL/L<sub>dn</sub>. An interior noise level of 45 dB CNEL/L<sub>dn</sub> is generally considered sufficient to protect against activity interference at most noise-sensitive land uses, including residential dwellings, and would also be sufficient to protect against sleep interference (U.S. EPA, 1974.) Within California, the California Building Code establishes a noise level of 45 dBA CNEL as the maximum acceptable interior noise level for residential uses (other than detached single-family dwellings). Use of the 45 dBA CNEL/L<sub>dn</sub> threshold is further supported by recommendations provided in the State of California Office of Planning and Research's *General Plan Guidelines* (2002), which recommend an interior noise level of 45 dB CNEL/L<sub>dn</sub> as the maximum allowable interior noise level sufficient to permit "normal residential activity".

The cumulative noise exposure metric is currently the only noise metric for which there is a substantial body of research data and regulatory guidance defining the relationship between noise exposure, people's reactions, and land use compatibility. However, when evaluating environmental noise impacts involving intermittent noise events, such as aircraft overflights and train passbys, the use of cumulative noise metrics may not provide a thorough understanding of the resultant impact. The general public often finds it difficult to understand the relationship between intermittent noise events and cumulative noise exposure metrics. In such instances, supplemental use of single-event noise metrics, such as the SEL descriptor, may be helpful as a means of increasing public understanding regarding the relationship between these metrics and the extent of the resultant noise impact.

Although the use of supplemental noise descriptors can provide increased understanding of intermittent noise events and relationship to the cumulative noise metrics, current environmental regulations do not identify quantitative criteria, metrics, or computation methods pertaining to single-event noise exposure for determination of land use compatibility. However, with regard to aircraft noise exposure, FICAN has provided non-regulatory guidance for estimating the expected percent of awakenings that may result from single aircraft noise events. For example, at an indoor sound exposure of SEL 80 dBA, the FICAN data indicates that approximately 10 percent of exposed individuals would be awakened. Although some estimates of the percentage of people expected to be awakened when exposed to specific single-event noise levels inside a home have been provided, no quantitative determination as to what frequency of awakening would be acceptable has been made by Federal, State or local entities. Although no quantitative thresholds have yet been identified with regard to single-event noise exposure, the indication from several studies is that the noise threshold for significant occurrence of sleep disruption is higher than for speech interference.

## **REGULATORY FRAMEWORK**

### **NOISE**

#### **FEDERAL**

##### *Federal Aviation Administration*

As a means of implementing the Aviation Safety and Noise Abatement Act of 1979, the Federal Aviation Administration (FAA) adopted regulations that established a voluntary program which airports can utilize to conduct airport noise compatibility planning. These compatibility planning studies are often referred to as "Part 150" studies. Part 150 includes a system for measuring airport noise impacts and presents guidelines for identifying incompatible land uses. Airports which choose to undertake a Part 150 study are eligible for federal funding both for the study itself and for implementation of approved components of the local program.

The noise exposure maps included in Part 150 studies are depicted in terms of average-daily noise contours (i.e., L<sub>dn</sub> or CNEL) around an airport. For the purposes of federal regulations, all land uses are considered compatible with noise levels of less than DNL 65 dB. At higher noise exposures, selected land uses are also deemed acceptable, depending upon the nature of the use and the degree of structural noise attenuation provided. FAA determinations under Part 150 are not intended to substitute federally

determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses (Caltrans, 2002).

## STATE OF CALIFORNIA

### *State of California Public Utilities Code*

Section 21669, Article 3, Chapter 4, Part 1, Division 9 of the California Public Utilities Code (PUC) (Aeronautics Law) provides the legislative authority to adopt noise standards governing the operation of aircraft and aircraft engines for airports. Caltrans Division of Aeronautics is the agency responsible for compliance with this PUC section. Section 21662.4 (a), Article 3, Chapter 4, Part 1, Division 9 of the PUC exempts emergency service helicopters from local ordinances.

## CITY OF CLOVIS

### *City of Clovis General Plan*

The Noise Element of the City of Clovis General Plan contains policies designed to protect the community from the harmful and annoying effects of exposure to excessive noise. The City's General Plan identifies maximum allowable noise standards for noise sources, as well as, land use compatibility noise standards for newly proposed land uses. The City's noise standards for various land uses are summarized in Table 3. The City's noise standards for land use compatibility are summarized in Table 4.

As depicted in Table 3, the City's maximum acceptable exterior and interior noise standards for residential and school land uses is 65 and 45 dBA CNEL respectively. For newly proposed land uses, hospitals are considered "normally compatible" within noise environments up to 65 dBA CNEL, offices are considered normally compatible up to 75 dBA CNEL, and residential land uses and hotels are considered normally compatible up to 70 dBA CNEL.

### *City of Clovis Municipal Code*

The City of Clovis Municipal Code includes restrictions related to noise-generating construction activities. Accordingly, construction activities that occur between the hours of 9:00 p.m. and 7:00 a.m. on weekdays (Monday through Saturday) or at any time on Sundays or holidays and result in sound that creates a noise disturbance at residential land uses would be deemed to be in violation of the Municipal Code. In addition, per the Municipal Code, stationary equipment (e.g., generators) shall not be located adjacent to any existing residences unless it is enclosed in a noise-attenuating structure, subject to the approval of the City Public Works Director.

## **GROUNDBORNE VIBRATION**

There are no federal, state, or local regulatory standards for groundborne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance. Caltrans-recommended criteria for the evaluation of groundborne vibration levels, with regard to structural damage and human annoyance, are summarized in Table 5 and Table 6, respectively. The criteria differentiate between transient and continuous/frequent sources. Transient sources of groundborne vibration include intermittent events, such as blasting; whereas, continuous and frequent events would include the operations of equipment, including construction equipment, and vehicle traffic on roadways (Caltrans 2013).

**Table 3**  
**City of Clovis Interior and Exterior Noise Standards**

| Land Use Categories  | Additional Uses Allowed                                      | Noise Level (dBA, CNEL)          |                 |
|--|--|----------------------------------|-----------------|
|  |  | Interior1                        | Exterior2       |
| Residential  | Single Family, Multifamily                                   | 45 <sup>3</sup> /55 <sup>4</sup> | 65 <sup>7</sup> |
|  | Mobile Home  | --                               | 65 <sup>5</sup> |
| Commercial/Industrial  | Hotel, Motel, Transient Lodging                              | 45                               | 65 <sup>6</sup> |
|  | Commercial, Retail, Bank, Restaurant                         | 55                               | --              |
|  | Office Building, Professional Office, Research & Development | 50                               | --              |
|  | Gymnasium (Multipurpose)                                     | 50                               | --              |
|  | Health Clubs   | 55                               | --              |
| Institutional  | Manufacturing, Warehousing, Wholesale, Utilities             | 65                               | --              |
|  | Hospital, School Classroom                                   | 45                               | 65              |
| Open Space   | Church, Library  | 45                               | --              |
|  | Parks  | --                               | 65              |
| <b>Notes:</b><br>1. Interior environment excludes bathrooms, toilets, closets, and corridors.<br>2. Outdoor environment limited to private yard of single family or multifamily residences private patio which is accessed by a means of exit from inside the unit; mobile home park; hospital patio; park picnic area; school playground; and hotel and motel recreation area.<br>3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided pursuant to Appendix Chapter 12, Section 1208 of UBC.<br>4. Noise level requirement with open windows, if they are used to meet natural ventilation requirement.<br>5. Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.<br>6. Exterior noise level shall be such that interior noise level will not exceed 45 CNEL.<br>7. Except those areas affected by aircraft noise. |  |                                  |                 |

The groundborne vibration criteria recommended by Caltrans for evaluation of potential structural damage is based on building classifications, which take into account the age and condition of the building. For residential structures and newer buildings, Caltrans considers a minimum peak-particle velocity (ppv) threshold of 0.25 inches per second (in/sec) for transient sources and 0.04 in/sec for continuous/frequent sources to be sufficient to protect against building damage. Continuous groundborne vibration levels below approximately 0.02 in/sec ppv are unlikely to cause damage to any structure. In terms of human annoyance, continuous vibrations in excess of 0.04 in/sec ppv and transient sources in excess of 0.25 in/sec ppv are identified by Caltrans as the minimum perceptible level for ground vibration. Short periods of ground vibration in excess of 2.0 in/sec ppv can be expected to result in severe annoyance to people. Short periods of ground vibration in excess of 0.1 in/sec ppv (0.2 in/sec ppv within buildings) can be expected to result in increased levels of annoyance (Caltrans 2013).

## AFFECTED ENVIRONMENT

### SENSITIVE LAND USES

Noise-sensitive land uses generally include those uses where exposure to noise would result in adverse effects, as well as uses where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other noise-sensitive land uses include hospitals, convalescent facilities, parks, hotels, churches, libraries, and other uses where low interior noise levels are essential.

Noise-sensitive land uses located near the project site consist predominantly of residential land uses. The nearest existing residential uses are located approximately 650 feet east of the Clovis Community Medical Center (CCMC) and to the south, across Herndon Avenue. The Cedarwood Elementary School is located along Coventry Avenue, approximately 700 feet south of Herndon Avenue.

**Table 4**  
**City of Clovis Land Use Noise Combability Matrix**

| Land Uses   | Noise Level (dBA CNEL) |    |    |    |    |    |     |
|---|------------------------|----|----|----|----|----|-----|
|   | <50                    | 55 | 60 | 65 | 70 | 75 | 80> |
| Amphitheater, concert hall, auditorium, meeting hall  | B                      | B  | C  | C  | D  | D  | D   |
| Mobile home   | A                      | A  | B  | C  | C  | D  | D   |
| Hospital, library, school, faith/religious uses   | A                      | A  | B  | C  | C  | D  | D   |
| Hotel, motel, transient lodging   | A                      | A  | B  | B  | C  | C  | D   |
| Single family, multifamily, faith/religious uses  | A                      | A  | B  | B  | C  | D  | D   |
| Parks   | A                      | A  | A  | B  | C  | D  | D   |
| Office building, research & development, professional office, city office building, and hotel   | A                      | A  | A  | B  | B  | C  | D   |
| Amusement park, miniature golf, go-cart track, health club, equestrian center   | A                      | A  | A  | B  | B  | D  | D   |
| Golf courses, nature centers, cemeteries, wildlife reserves, wildlife habitat   | A                      | A  | A  | A  | B  | C  | C   |
| Commercial retail, bank, restaurant, movie theater  | A                      | A  | A  | A  | B  | B  | C   |
| Automobile service station, auto dealer, manufacturing, warehousing, wholesale, utilities   | A                      | A  | A  | A  | B  | B  | B   |
| Agriculture   | A                      | A  | A  | A  | A  | A  | A   |
| <b>Notes:</b><br><i>Compatibility zones indicate the degree to which the land uses listed are compatible with the noise levels (CNEL) shown in the table.</i><br><i>Zone A. Clearly Compatible. Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.</i><br><i>Zone B. Normally Compatible. New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.</i><br><i>Zone C. Normally Incompatible. New construction or development should normally be discouraged. If new construction or development does proceed, a detailed analysis or noise reduction requirements must be made and needed noise insulation features must be included in the design.</i><br><i>Zone D. Clearly Incompatible. New construction or development should generally not be undertaken.</i> |                        |    |    |    |    |    |     |

**Table 5**  
**Damage Potential to Buildings at Various Groundborne Vibration Levels**

| Structure and Condition   | Vibration Level<br>(in/sec ppv) |  |
|---|---------------------------------|--|
|   | Transient Sources               | Continuous/Frequent Intermittent Sources |
| Extremely Fragile Historic Buildings, Ruins, Ancient Monuments  | 0.12                            | 0.08                                     |
| Fragile Buildings   | 0.2                             | 0.1                                      |
| Historic and Some Old Buildings   | 0.5                             | 0.25                                     |
| Older Residential Structures  | 0.5                             | 0.3                                      |
| New Residential Structures  | 1.0                             | 0.5                                      |
| Modern Industrial/Commercial Buildings  | 2.0                             | 0.5                                      |
| <i>Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.</i><br><i>Source: Caltrans 2013</i> |                                 |  |



**Table 6**  
**Annoyance Potential to People at Various Groundborne Vibration Levels**

| Human Response  | Vibration Level<br>(in/sec ppv) |  |
|---|---------------------------------|--|
|   | Transient Sources               | Continuous/Frequent Intermittent Sources |
| Barely Perceptible  | 0.04                            | 0.01                                     |
| Distinctly Perceptible  | 0.25                            | 0.04                                     |
| Strongly Perceptible  | 0.9                             | 0.10                                     |
| Severe  | 2.0                             | 0.4                                      |
| <i>Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.</i><br><i>Source: Caltrans 2013</i> |                                 |  |

## AMBIENT NOISE LEVELS

To document the existing noise environment, ambient noise surveys were conducted by AMBIENT Air Quality & Noise Consulting at various locations in the project area. Short-term (10-minute) noise measurements were conducted on May 16, 2017 using a Larson Davis model 820 sound-level meter placed at a height of approximately 5 feet above the ground surface. Based on the measurements conducted, ambient noise levels are predominantly influenced by vehicle traffic on area roadways. Measured average daytime noise levels (in dBA  $L_{eq}$ ) in the project area generally range from the mid to upper 60s, dependent primarily on distance from area roadways. Average nighttime noise levels are generally approximately 5 to 10 dBA less than daytime noise levels. Intermittent noise levels in the project area associated with vehicle traffic on area roadways and can reach levels of approximately 80 dBA  $L_{max}$  along area roadway corridors. To a lesser extent, occasional aircraft overflights also contribute on an intermittent basis to the ambient noise environment. Measurement survey results are summarized in Table 7.

### Existing Traffic Noise

The dominant noise source in the project area is vehicular traffic on area roadways. Table 7 summarizes the existing traffic noise levels (in dBA  $L_{dn}$ /CNEL) for existing roadways located in the project area. Existing roadway traffic noise levels were calculated using the Federal Highway Administration (FHWA) roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. As depicted in Table 8, predicted noise levels (in dBA CNEL/ $L_{dn}$ ) at approximately 50 feet from area roadways range from the mid to upper 60's.

## GROUNDBORNE VIBRATION

No major existing sources of groundborne vibration were identified in the project area. Vehicle traffic on area roadways, particularly heavy-duty trucks, can result in increased groundborne vibration. However, groundborne vibration levels associated with vehicle traffic is typically considered minor and would not exceed applicable criteria at the project site boundaries.

**Table 7  
Ambient Daytime Noise Levels**

|  | Monitoring Location  | Monitoring Period | Measured Noise Level (dBA) |      |      |
|--|--|-------------------|----------------------------|------|------|
|  |  |                   | Leq                        | Lmax | Lmin |
| 3  | N. Temperance Avenue, North of Herndon Avenue, Approximately 62 feet from the roadway centerline | 07:20-07:30       | 66.3                       | 74.6 | 54.2 |
| 4  | Herndon Avenue west of N. Temperance Avenue, Approximately 57 feet from the roadway centerline   | 07:50-08:00       | 67.4                       | 76.1 | 55.6 |
| 5  | Herndon Avenue at Locan Avenue, Approximately 30 feet from the roadway centerline                | 08:15-08:25       | 72.1                       | 78.8 | 56.4 |
| <i>Noise measurements were conducted on May 16, 2017 using a Larson Davis Laboratories Model 820 Type I integrating sound meter positioned at a height of approximately 5 feet above ground surface.</i> |  |                   |                            |      |      |

**Table 8  
Existing Traffic Noise Levels**

| Roadway Segment   | Predicted Noise Level (dBA CNEL/Ldn)      |
|---|---|
|   | 50 ft from Centerline of Near Travel Lane |
| Herndon Avenue, Armstrong Avenue to Tollhouse Road  | 67.8                                      |
| Herndon Avenue, Tollhouse Road to Temperance Avenue   | 68.0                                      |
| Herndon Avenue, Temperance Avenue to Coventry Avenue  | 67.9                                      |
| Herndon Avenue, Coventry Avenue to CCMC Access Road   | 67.3                                      |
| Herndon Avenue, CCMC Access Road to Locan Avenue  | 67.3                                      |
| Herndon Avenue, Locan Avenue to De Wolf Avenue  | 68.2                                      |
| Herndon Avenue, De Wolf Avenue (DL) to De Wolf Avenue (SL)  | 67.5                                      |
| Herndon Avenue, De Wolf Avenue (SL) to Leonard Avenue   | 67.9                                      |
| Locan Avenue, Herndon Avenue to Bullard Avenue  | 61.8                                      |
| <i>Traffic noise levels were predicted using the FHWA roadway noise prediction model based on traffic information obtained from the traffic analysis prepared for this project. Modeled traffic noise levels assume no natural or man-made shielding (e.g., vegetation, berms, walls, buildings).</i> |   |

## IMPACT ANALYSIS

### STANDARDS OF SIGNIFICANCE

Criteria for determining the significance of noise impacts were developed based on information contained in the California Environmental Quality Act Guidelines (CEQA Guidelines, Appendix G). According to those guidelines, a project may have a significant effect on the environment if it would result in the following conditions:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies.
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

- e) For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels.
- f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

The nearest airport/airstrip is the Fresno-Yosemite International Airport, which is located approximately 3.2 miles southwest of the project site. Implementation of the proposed project would not affect airport operations, nor would implementation of the proposed project result in the development or relocation of any noise-sensitive land uses in proximity to any airport or airstrip. As a result, implementation of the proposed project would not result in increased exposure of individuals to excessive aircraft noise levels associated with the existing airport. There are no existing private airstrips within the vicinity of the project area. For these reasons, noise impacts associated with exposure to aircraft noise levels were identified as being less than significant or having no impact and will not be further discussed in this report.

Temporary noise impacts associated with the proposed project would be associated with short-term construction-related activities. Long-term permanent increases in noise levels would occur associated with onsite operational activities, as well as, potential increases in traffic noise levels along area roadways. Potential increases in groundborne vibration levels would be primarily associated with short-term construction-related activities. For purposes of this analysis and where applicable, the City of Clovis noise standards were used for evaluation of project-related noise impacts. Significance thresholds used in this analysis are discussed in greater detail, as follows:

- Short-term Exposure to Construction-Generated Noise — No standardized criteria have been developed by the State of California or the City of Clovis for assessing construction noise impacts. However, the Federal Transit Administration (FTA) has identified criteria for the assessment of construction-generated noise levels. For noise-sensitive land uses, such as residential land uses, the FTA criteria identify daytime and nighttime average-hourly noise limits of 90 and 80 dBA  $L_{eq}^{(8)}$ , respectively. Project-generated average-hourly construction noise levels that would exceed these limits at nearby noise-sensitive land uses would be considered to have a potentially significant impact. In addition, construction-generated noise levels that would exceed a commonly applied interior noise standard of 45 dBA  $L_{eq}$  within nearby classrooms would be considered to have a potentially significant impact.
- Long-term Exposure to Project-Generated Noise — Long-term operational noise impacts would be considered significant if the proposed project would result in a noticeable increase in ambient noise levels that would exceed applicable City of Clovis' noise standards (Table 3). Accordingly, predicted noise levels that would exceed the City's exterior and interior noise standards of 65 and 45 dBA CNEL, respectively, at nearby residential land uses and Cedarwood Elementary School would be considered to have a potentially significant impact.
- Groundborne Vibration — Groundborne vibration levels would be considered significant if predicted short-term construction or long-term operational groundborne vibration levels attributable to the proposed project would exceed recommended criteria (Tables 5 and 6) at nearby existing or proposed onsite structures.
- Increases in Ambient Noise Levels — For purposes of this analysis, significant increases in the ambient noise levels were based on FICON-recommended criterion (Table 2). Accordingly, significant increases in ambient noise levels would be defined as an increase of 5 dBA, or greater, where the ambient noise environment is less than 60 dBA; 3.0 dBA, or greater, where the ambient noise environment is between 60 and 65 dBA; and an increase of 1.5 dBA, or greater, where the ambient noise environment exceeds 65 dBA. The rationale for these criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause significant annoyance (FICON 2000).

## METHODOLOGY

### *Short-Term Construction Noise*

Short-term noise impacts associated with construction activities were analyzed based on typical construction equipment noise levels and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on an average noise-attenuation rate of 6 dB per doubling of distance from the source.

### *Long-term Traffic Noise*

Traffic noise levels were calculated using the Federal Highway Administration (FHWA) roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. Future cumulative traffic noise levels, with project implementation, were calculated to include the planned widening of Herndon Avenue. The project's contribution to traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic.

Noise levels associated with parking lots and the proposed parking structure were calculated in accordance with Federal Transit Administration's (FHWA) *Transit Noise and Vibration Impact Assessment Guidelines* (2006) assuming a reference noise level of 92 dBA SEL. Average-hourly noise levels associated with vehicle parking-related activities were calculated based on the capacity of the parking facility and traffic volumes derived from the traffic analysis prepared for this project.

### *Non-Transportation Noise*

Non-transportation noise source noise levels were calculated based on representative noise levels obtained from existing environmental documentation and distances to the nearest noise-sensitive land uses. Noise levels were predicted based on an average noise-attenuation rate of 6 dB per doubling of distance from the source.

### *Groundborne Vibration*

Groundborne vibration levels were assessed based on representative equipment vibration levels derived from existing environmental documentation and distances to nearby existing structures. Construction-related vibration levels were evaluated in comparison to Caltrans-recommended criteria for structural damage and human annoyance.

## IMPACTS AND MITIGATION MEASURES

### ***Impact Noise-1***

***Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?***

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading and excavation, erection) of construction. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Although noise ranges were found to be similar for all construction phases, the initial site preparation phase tended to involve the most equipment. As noted in Table 9, noise levels generated by individual pieces of construction equipment typically range from approximately 74 dBA to 89 dBA  $L_{max}$  at 50 feet (FTA 2006). Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Average-hourly noise levels at construction sites and road improvement projects typically range from approximately 65 to 87 dBA  $L_{eq}$  at 50 feet, depending on the activities performed.

**Table 9**  
**Typical Construction Equipment Noise Levels**

| Equipment                | Typical Noise Level (dBA Lmax)<br>50 feet from Source |
|--------------------------|---|
| Air Compressor           | 81  |
| Backhoe                  | 80  |
| Compactor                | 82  |
| Concrete Mixer           | 85  |
| Concrete Vibrator        | 76  |
| Crane, Mobile            | 83  |
| Dozer                    | 85  |
| Generator                | 81  |
| Grader                   | 85  |
| Impact Wrench            | 85  |
| Jack Hammer              | 88  |
| Loader                   | 85  |
| Truck                    | 88  |
| Paver                    | 89  |
| Pneumatic Tool           | 85  |
| Roller                   | 74  |
| Saw                      | 76  |
| <i>Sources: FTA 2006</i> |   |

Noise from localized point sources, such as construction sites, typically decreases by approximately 6 dBA with each doubling of distance from source to receptor. Given this noise attenuation rate and based on the noise levels presented in Table 9, predicted noise levels at residential land uses located adjacent to and within approximately 50 feet of proposed road improvements and development sites, such as the proposed commercial development located to the south and west of the existing medical center, could reach levels of up to approximately 89 dBA  $L_{eq}$ . Predicted construction noise levels at residential land uses located within approximately 50 feet of the construction site would not exceed the commonly applied daytime noise standard of 90 dBA  $L_{eq}$  but would exceed the nighttime noise standard of 80 dBA  $L_{eq}$ .

Based on the same assumptions identified above, predicted exterior noise levels at Cedarwood Elementary School would be approximately 70 dBA  $L_{eq}$ . Assuming a minimum exterior-to-interior noise reduction of 20 dBA, predicted interior classroom noise levels could reach levels of approximately 50 dBA  $L_{eq}$ . Predicted interior classroom noise levels would exceed normally recommended noise standards (i.e., 40 dBA  $L_{eq}$ ) and, therefore, could result in speech interference with normal classroom instructional activities.

With regard to residential land uses, noise levels associated with construction activities occurring during the more noise-sensitive nighttime hours (i.e., 10 p.m. to 7 a.m.) are also of increased concern. Because exterior ambient noise levels typically decrease during the nighttime hours as community activities (e.g., commercial activities, vehicle traffic) decrease, construction activities performed during these more noise-sensitive periods of the day can result in increased annoyance and potential sleep disruption for occupants of nearby residential dwellings. The proposed project does not include restrictions on the hours during which construction activities would occur. As a result, construction activities occurring during the more noise-sensitive nighttime hours could result in increased levels of annoyance and potential sleep disruption for occupants of nearby residential land uses. Because predicted construction noise levels would exceed applicable noise standards at nearby residential land uses, as well as, at Cedarwood Elementary School, this impact would be considered potentially significant.

## **Mitigation Measures**

### **Mitigation Measure Noise-2: Implement Noise Control Measures to Reduce Short-term Noise Impacts.**

- a. Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7 a.m. and 7 p.m., Monday through Friday, and between the hours of 7 a.m. and 7 p.m. on Saturday and Sunday.
- b. Construction equipment shall be properly maintained and equipped with exhaust mufflers and engine shrouds in accordance with manufacturers' recommendations.
- c. Construction equipment staging areas shall be located at the furthest distance possible from nearby noise-sensitive land uses.

### **Level of Significance after Mitigation**

Implementation of the above mitigation measures would limit construction activities to the less noise-sensitive periods of the day. Predicted construction noise levels at nearby residential land uses would not exceed the commonly applied daytime noise standard of 90 dBA  $L_{eq}$ . Use of mufflers and engine shrouds would reduce equipment noise levels by approximately 10 dBA. With mitigation, predicted noise levels within the interior of the nearest classroom would be reduced to approximately 40 dBA  $L_{eq}$ , or less. With implementation of the above mitigation measures, this impact would be considered less than significant.

**Impact Noise-2**      ***Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?***

Long-term increases in ambient noise levels associated with the proposed project would be associated with increases in vehicle traffic along area roadways. Onsite non-transportation noise sources would also contribute to potential increases in ambient noise levels. Noise levels associated with project-generated traffic and non-transportation sources are discussed below.

### **Traffic Noise**

Implementation of the proposed project would result in increased traffic volumes on some area roadways. The increase in traffic volumes resulting from implementation of the proposed project would, therefore, contribute to predicted increases in traffic noise levels. The FHWA roadway noise prediction model was used to predict traffic noise levels along primarily affected roadway segments, with and without implementation of the proposed project. Modeling was conducted based on predicted traffic volumes obtained from the traffic analysis prepared for this project. Accordingly, traffic noise levels were evaluated for existing conditions, with and without implementation of Phase I land uses; as well as, future cumulative year 2035 conditions, with and without project buildout. The project's contribution to traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic. Predicted traffic noise levels for existing and future cumulative conditions are discussed separately, as follows:

#### ***Existing Conditions***

Predicted existing traffic noise levels and increases associated with Phase I implementation of the proposed project are summarized in Table 10. As depicted, implementation of the proposed project would result in predicted increases in traffic noise levels of approximately 1.0 dBA, or less, along primarily affected area roadway segments. As noted earlier in this report, perceptible changes in ambient noise levels do not typically occur at levels below 3 dBA. Based on the modeling conducted, implementation of the proposed project would not result in a significant increase in traffic noise levels at nearby noise-sensitive land uses. As a result, predicted increases in traffic noise levels associated with implementation of the proposed project would be considered less than significant.

**Table 10**  
**Predicted Increases in Traffic Noise Levels**  
**Existing Conditions**

| Roadway  | Predicted CNEL, 50 Feet from Near-Travel Lane Centerline |                      | Predicted Increase | Significant Increase? |
|--|--|----------------------|--------------------|-----------------------|
|  | Without Project  | With Project Phase I |                    |                       |
| Herndon Avenue, Armstrong Avenue to Tollhouse Road   | 67.8   | 68.4                 | 0.6                | No                    |
| Herndon Avenue, Tollhouse Road to Temperance Avenue  | 68.0   | 68.8                 | 0.8                | No                    |
| Herndon Avenue, Temperance Avenue to Coventry Avenue   | 67.9   | 68.2                 | 0.3                | No                    |
| Herndon Avenue, Coventry Avenue to CCMC Access Road  | 67.3   | 67.5                 | 0.2                | No                    |
| Herndon Avenue, CCMC Access Road to Locan Avenue   | 67.3   | 67.6                 | 0.3                | No                    |
| Herndon Avenue, Locan Avenue to De Wolf Avenue   | 68.2   | 68.5                 | 0.3                | No                    |
| Herndon Avenue, De Wolf Avenue (DL) to De Wolf Avenue (SL)   | 67.5   | 68.0                 | 0.5                | No                    |
| Herndon Avenue, De Wolf Avenue (SL) to Leonard Avenue  | 67.9   | 68.1                 | 0.2                | No                    |
| Locan Avenue, Herndon Avenue to Bullard Avenue   | 61.8   | 62.8                 | 1.0                | No                    |
| <i>Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on data obtained from the traffic analysis prepared for this project.</i> |  |                      |                    |                       |

#### *Future Cumulative Year 2035*

Predicted future cumulative traffic noise levels and increases attributable to buildout of the proposed Master Plan are summarized in Table 11. Based on the traffic noise modeling conducted, implementation of the proposed Master Plan would result in predicted increases in traffic noise levels of approximately 0.7 dBA, or less, along primarily affected area roadway segments. As noted earlier in this report, perceptible changes in ambient noise levels do not typically occur at levels below 3 dBA. Based on the modeling conducted, implementation of the proposed project would not result in a significant increase in traffic noise levels at nearby noise-sensitive land uses. As a result, predicted increases in future cumulative traffic noise levels associated with buildout of the proposed project would be considered less than significant.

#### Non-Transportation Noise Sources

Noise sources commonly associated with medical facilities can include occasional parking lot activities (e.g., opening and closing of vehicle doors, people talking), and use of onsite building equipment, such as HVAC systems, boilers, and power generators. Building equipment is typically located within a central plant or located on rooftops. Noise levels associated with these noise sources for both the proposed 10-year expansion plan and the 25-year Master Plan are discussed separately, as follows:

#### Parking Structure

The proposed project would include construction of an approximate 677-space multi-story parking structure. The parking structure would be located northeast of the existing medical center, approximately 1,000 feet north of Herndon Avenue. The nearest residential dwellings are located approximately 725 feet to the east. As previously discussed, noise levels commonly associated with vehicle parking areas are often associated with the starting of vehicles, the opening and closing of vehicle doors, playing of amplified music, and the occasional sound of vehicle alarms and horns. Noise levels associated with large parking structures can reach levels of approximately 92 dBA SEL at 50 feet (FTA 2006.)

**Table 11**  
**Predicted Increases in Traffic Noise Levels**  
**Future Cumulative Year 2035 Conditions**

| Roadway  | Predicted CNEL, 50 Feet from Near-Travel Lane Centerline |                       | Predicted Increase | Significant Increase? |
|--|--|-----------------------|--------------------|-----------------------|
|  | Without Project  | With Project Buildout |                    |                       |
| Herndon Avenue, Armstrong Avenue to Tollhouse Road   | 69.5   | 69.8                  | 0.3                | No                    |
| Herndon Avenue, Tollhouse Road to Temperance Avenue  | 70.0   | 70.3                  | 0.3                | No                    |
| Herndon Avenue, Temperance Avenue to Coventry Avenue   | 70.2   | 70.9                  | 0.7                | No                    |
| Herndon Avenue, Coventry Avenue to CCMC Access Road  | 70.8   | 71.1                  | 0.3                | No                    |
| Herndon Avenue, CCMC Access Road to Locan Avenue   | 70.8   | 71.1                  | 0.3                | No                    |
| Herndon Avenue, Locan Avenue to De Wolf Avenue   | 71.8   | 71.9                  | 0.1                | No                    |
| Herndon Avenue, De Wolf Avenue (DL) to De Wolf Avenue (SL)   | 71.6   | 71.7                  | 0.1                | No                    |
| Herndon Avenue, De Wolf Avenue (SL) to Leonard Avenue  | 71.0   | 71.1                  | 0.1                | No                    |
| Locan Avenue, Herndon Avenue to Bullard Avenue   | 70.8   | 71.2                  | 0.4                | No                    |
| <i>Traffic noise levels were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on data obtained from the traffic analysis prepared for this project.</i> |  |                       |                    |                       |

Parking structure noise levels were calculated assuming that all vehicles parking spaces would be accessed within a one-hour period. Based on this assumption, peak-hour noise levels associated with the proposed parking structure would be 59 dBA  $L_{eq}$  at 50 feet. Predicted peak-hour noise levels at the nearest residential land use located to the east of the proposed parking structure would be approximately 30 dBA  $L_{eq}$ . Predicted average-daily noise levels at this nearest residence would be approximately 37 dBA CNEL, or less. Predicted noise levels at other offsite noise sensitive receptors located south of Herndon Avenue would be less than 25 dBA CNEL. Predicted noise levels at nearby land uses would not exceed the City's exterior or interior noise standards of 65 and 45 dBA CNEL, respectively, and would be largely masked by ambient noise levels. This impact is considered less than significant.

#### Parking Lots

The proposed project would include construction of surface parking lots to serve proposed development, including the proposed hotel, shopping centers, medical-office buildings, and assisted living facility. Based on the traffic analysis prepared for this project, these proposed land uses would generate a maximum of approximately 100 vehicle trips during the peak-hour. Based on this traffic volume, parking lots associated with the proposed land uses would generate peak-hour noise levels of approximately 25 dBA  $L_{eq}$ , or less. Proposed parking lots would be largely shielded from direct exposure of nearby sensitive land uses and resultant noise levels would be largely masked by ambient traffic noise levels. Furthermore, operational noise levels would typically be limited to the daytime hours. Predicted operational noise levels at nearby sensitive land uses would not exceed the City's exterior or interior noise standards of 65 and 45 dBA CNEL, respectively. This impact is considered less than significant.

#### Central Plant Expansion

Phase II of the proposed project would include expansion of the central plant. As part of the expansion, a new central plant would be constructed and centrally located within the eastern portion of the site. Building and equipment specifications for the future plant expansion have not yet been identified. However, potential noise-generating equipment associated with central plant would be anticipated to include chillers, boilers, and emergency-use power generators. Up to three emergency generators would likely be installed. Noise levels associated with chillers and boilers can reach levels of approximately 85 dBA



$L_{eq}$  at 3 feet. Based on manufacturer's technical data, noise levels associated with the generators would be approximately 89 dBA  $L_{eq}$  at 50 feet (Caterpillar 2008.)

The nearest residential land uses are located approximately 375 feet east of the proposed central plant. Based on the operational noise levels discussed above, and assuming a minimum noise reduction of 15 dB for the building enclosure, predicted operational noise levels at the property line of the nearest residential land uses would be approximately 35 dBA  $L_{eq}$  during normal plant operations. During periods when operation of the emergency generators would be required, predicted noise levels at the nearest residential land uses would be approximately 61 dBA  $L_{eq}$ . Assuming that all equipment were to operate continuously over a 24-hour period, predicted maximum exterior noise levels at the nearest residential land uses would be approximately 72 dBA CNEL. Based on this noise level and assuming an average exterior-to-interior noise reduction of 20 dBA, predicted interior noise levels at the nearest residential dwellings would be approximately 52 dBA CNEL.

Predicted operational noise levels at the nearest residential land uses located east of the medical center could potentially exceed the City's exterior or interior noise standards of 65 dBA and 45 dBA CNEL, respectively. Given increased distance from the source and shielding provided by intervening structures, predicted noise levels at noise-sensitive receptors located south of Herndon Avenue, including Cedarwood Elementary School, would not exceed applicable noise standards. This impact would be considered potentially significant.

#### Building Mechanical Equipment

The proposed project includes construction of commercial buildings generally located along Herndon Avenue, to the west and south of the existing medical center and adjacent to existing residential land uses. In addition to adjacent residential land uses, nearby noise-sensitive land uses also includes Cedarwood Elementary School, which is located south of Herndon Avenue, approximately 230 feet south of proposed assisted living facility.

Noise-generating building mechanical equipment associated with commercial-use buildings would be primarily associated with the operation of exterior air conditioning units, which are generally limited to the daytime hours of operation. Noise levels associated with larger commercial-use air conditioning systems can reach levels of up to approximately 78 dBA at 3 feet (Lennox 2017). Assuming that HVAC units were to be located at ground level and within approximately 30 feet of nearby residential land uses, operational noise levels at the nearest residential land uses would be approximately 58 dBA  $L_{eq}$ . Assuming that the air conditioning units were to run continuously over a 24-hour period, predicted average-daily noise levels at the residential land uses located within approximately 30 feet could potentially exceed the City's exterior noise standard of 65 dBA CNEL. Based on these same assumptions, predicted operational noise levels at Cedarwood Elementary School would be approximately 46 dBA CNEL, would not exceed the City's noise standards, and would be largely masked by ambient noise levels. Because predicted operational noise levels at residential land uses located within 30 feet of proposed commercial development could potentially exceed the City's noise standards, this impact would be considered potentially significant.

#### Herndon Avenue Widening

The proposed project would also include the widening of the current five-lane Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the southern leg of DeWolf Avenue from two lanes to a four-lane divided roadway. Site plans and alignments for the proposed widened segments of Herndon Avenue have not yet been developed. Based on traffic noise modeling conducted for similar projects and depending on the final alignment and distances to nearby noise sensitive receptors, predicted traffic noise levels could potentially exceed the City's noise standards. Depending on changes in distance from roadway travel lanes to receptors, significant increases in traffic noise levels may also occur. As a result, exposure to traffic noise levels associated with the future widening of Herndon Avenue would be considered to have a potentially significant impact.

## **Mitigation Measures**

### **Mitigation Measure Noise-2: Implement Noise Control Measures to Reduce Long-term Noise Impacts.**

- a. An acoustical analysis shall be prepared for the proposed central plant prior to final design. The acoustical analysis shall identify building/equipment noise-reduction measures to be incorporated sufficient to achieve an exterior average-hourly noise-level of 50 dBA  $L_{eq}$ , or less, at the property line of the nearest noise-sensitive land use. This average-hourly noise levels performance standard would equate to an average-daily noise level of approximately 58 dBA CNEL, which would ensure compliance with the City of Clovis exterior and interior noise level standards of 65 and 45 dBA CNEL, respectively. Noise-reduction measures to be incorporated may include, but are not limited to, the selection of alternative or quieter equipment, use of sound enclosures, and shielding building intake and exhaust vents from direct line of sight of nearby noise-sensitive land uses. The acoustical analysis shall be submitted to the City of Clovis Planning Department for review and approval prior to issuance of construction/grading permits for the construction of the central plant.
- b. Emergency generators shall be enclosed and fitted with exhaust silencers.
- c. Building air conditioning units for proposed structures shall be located on building rooftops and shielded from direct line-of-sight of adjacent noise-sensitive land uses. Building parapets shall be constructed, when necessary, to shield nearby land uses from direct line-of-site of air conditioning units.
- d. An acoustical analysis shall be prepared for the planned future widening of Herndon Avenue. The acoustical analysis shall evaluate changes in traffic noise levels that would result from the proposed widening in comparison to the City of Clovis General Plan noise standards (refer to Table 3). Noise-reduction measures (e.g., sound walls) shall be evaluated, where practical, to reduce traffic noise levels to below applicable noise standards. The acoustical analysis shall be submitted to the City of Clovis Planning Department for review and approval prior to issuance of construction/grading permits.

### **Level of Significance after Mitigation**

Implementation of Mitigation Measure Noise-2,a would require that acoustical assessments be prepared for the proposed future central plant expansion and future widening of Herndon Road, once more detailed information becomes available and prior to construction. The assessments would be required to meet the City of Clovis noise performance standards and, where necessary, incorporate noise-reduction measures to achieve these standards. Mitigation Measure Noise-2,b would require the installation of exhaust silencers for newly installed emergency generators, which would reduce exhaust noise by a minimum of approximately 15 dB. Mitigation Measure Noise-2,c would require building air conditioning units to be located on rooftop areas and shielded from direct line-of-sight of nearby noise-sensitive land uses. The shielding of building air conditioning units from direct line of sight would reduce operational noise levels at nearby land uses by approximately 5 to 10 dBA. With mitigation, non-transportation noise levels would not exceed City of Clovis noise standards.

Mitigation Measure Noise-2,d would require the preparation of an acoustical analysis for the planned future widening of Herndon Avenue, once more detailed site plans become available. The acoustical analysis would be required to evaluate changes in traffic noise levels in comparison to the City of Clovis General Plan noise standards and, where practical, noise-reduction measures (e.g., sound walls). However, in some instances, the feasibility of noise-reduction measures, such as sound walls, may not be practical. As a result, increases in traffic noise associated with the future widening of Herndon Avenue would be considered significant and unavoidable.

**Impact Noise-3**

**Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?**

No major stationary sources of groundborne vibration were identified in the project area that would result in the long-term exposure of proposed onsite land uses to unacceptable levels of ground vibration. In addition, the proposed project would not involve the use of any major equipment or processes that would result in potentially significant levels of ground vibration that would exceed these standards at nearby existing land uses. However, construction activities associated with the proposed project would require the use of various tractors, trucks, and jackhammers that could result in intermittent increases in groundborne vibration levels. The use of major groundborne vibration-generating construction equipment/processes (i.e., blasting, pile driving) is not anticipated to be required for construction of future onsite land uses.

Groundborne vibration levels commonly associated with construction equipment are summarized in Table 12. As identified, groundborne vibration levels generated by construction equipment would be approximately 0.09 in/sec ppv, or less, at 25 feet. Predicted groundborne vibration levels would not be anticipated to exceed recommended criteria for structural damage and human annoyance (0.2 and 0.1 in/sec ppv, respectively) at nearby land uses. As a result, short-term groundborne vibration impacts would be considered less than significant.

**Table 12**  
**Representative Vibration Source Levels for Construction Equipment**

| Equipment                              | Peak Particle Velocity at 25 Feet (In/Sec) |
|--|--|
| Large Bulldozers                       | 0.089                                      |
| Loaded Trucks                          | 0.076                                      |
| Jackhammer                             | 0.035                                      |
| Small Bulldozers                       | 0.003                                      |
| <i>Source: FTA 2006, Caltrans 2013</i> |  |

**Impact Noise-4:**

**Would the project result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?**

Non-Transportation Noise

As discussed in Impact Noise-3, the proposed project would result in increased non-transportation noise levels at nearby noise-sensitive land uses that would exceed the City of Clovis General Plan noise standards. Short-term construction related activities would also be projected to exceed commonly applied noise criteria. As a result, exposure to non-transportation noise levels generated by the proposed project would be considered to have a *potentially significant impact*. (Refer to Impact Noise-2 and Noise-3 for additional discussion of short-term and long-term noise impacts associated with the proposed project.)

Transportation Noise

The City of Clovis General Plan includes land use compatibility noise standards for newly proposed land uses. As depicted in Table 3, the City's "normally compatible" exterior and interior noise standards for residential and school land uses is 65 and 45 dBA CNEL respectively. For newly proposed land uses, hospitals are considered "normally compatible" within exterior noise environments up to 65 dBA CNEL, offices are considered "normally compatible" up to 75 dBA CNEL, commercial uses are considered "normally compatible" up to 80 dBA CNEL, and residential land uses and hotels are considered "normally compatible" up to 70 dBA CNEL.

### *Roadway Traffic*

Based on the traffic noise modeling conducted for future cumulative year 2035 conditions, predicted exterior traffic noise levels along the adjacent segments of Herndon Avenue, in the vicinity of the proposed land uses, would range from approximately 70 to 71 dBA CNEL at 50 feet from the roadway centerline. Assuming a minimum setback distance of approximately 75 feet from the centerline of adjacent roadway segments, predicted exterior traffic noise levels would be approximately 68 dBA CNEL, or less, at the nearest proposed commercial, medical-dental office buildings. Predicted exterior traffic noise levels at the proposed assisted living facility would be approximately 66 dBA CNEL. Existing average-daily volumes along Highway 168 currently average approximately 16,000/day with trucks constituting roughly eight percent of the roadway volume (Caltrans 2017). By year 2035, traffic volumes along Highway 168 are projected to increase to roughly 44,000 vehicles/day (Caltrans 2015). Based on this estimate, predicted future average-daily noise level for Highway 168 would be approximately 76 dBA CNEL at 50 feet from the near-travel-lane centerline. Predicted future traffic noise levels at the proposed cancer center and commercial land uses located near the northern boundary of the project site would be approximately 65 and 67 dBA CNEL, respectively. Predicted future traffic noise levels at these land uses would not exceed the City's respective "normally compatible" noise standards of 75 dBA CNEL for offices, or 80 dBA CNEL for commercial uses. Predicted traffic noise levels at other proposed onsite land uses would be approximately 60 dBA CNEL, or less.

Predicted future cumulative traffic noise levels at proposed land uses would not exceed the City of Clovis "normally compatible" noise standards. As a result, the compatibility of proposed land uses in comparison to future traffic noise levels would be considered to have a less-than-significant impact.

As noted in Impact Noise-2, the project would also widen the current five-lane Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the southern leg of DeWolf Avenue from two lanes to a four-lane divided roadway. Site plans and alignments for the proposed widened segments of Herndon Avenue have not yet been developed. Based on traffic noise modeling conducted for similar projects and depending on the final alignment and distances to nearby noise sensitive receptors, predicted traffic noise levels could potentially exceed the City's noise standards. Depending on changes in distance from roadway travel lanes to receptors, significant increases in traffic noise levels may also occur. As a result, exposure to traffic noise levels associated with the future widening of Herndon Avenue would be considered to have a potentially significant impact.

### *On-Site Helistop Noise*

The proposed project would not include changes that would affect onsite helistop operations or require the relocation of the existing helistop. Helistop noise levels were evaluated in the previously prepared Clovis Community Medical Center Master Plan. Based on the analysis previously prepared, the projected 60 dBA and 65 dBA CNEL operational noise contours for the helistop would extend approximately 550 and 260 feet from the center of the landing pad, respectively. Proposed new land uses located within the projected 60 dBA CNEL contour would include the proposed central plant, general services building, and future expansion of the acute care unit, located along the eastern side of the existing medical center. Predicted helistop noise levels at the central plant and general services buildings would not exceed the City's exterior noise standard of 80 dBA CNEL for similar land uses (e.g., maintenance, manufacturing, utility uses). Predicted exterior noise levels at the proposed acute care unit would be approximately 67 dBA. The acute care unit would be a transient use and would not include long-term care of patients, similar to that of a medical office. In accordance with the City's noise standards, offices are considered "normally compatible" up to 75 dBA CNEL. Predicted helistop noise levels at other proposed land uses would be less than 60 dBA CNEL and would not exceed the City's noise standards. For these reasons, exposure to helistop noise levels would be considered less than significant.

### **Mitigation Measures**

Implement Mitigation Measures Noise-2,a – 2,d.

### **Level of Significance after Mitigation**

Implementation of Mitigation Measure Noise-2,a would require that acoustical assessments be prepared for the proposed future central plant expansion and future widening of Herndon Road, once more detailed information becomes available and prior to construction. The assessments would be required to meet the City of Clovis noise performance standards and, where necessary, incorporate noise-reduction measures to achieve these standards. Mitigation Measure Noise-2,b would require the installation of exhaust silencers for newly installed emergency generators, which would reduce exhaust noise by a minimum of approximately 15 dB. Mitigation Measure Noise-2,c would require building air conditioning units to be located on rooftop areas and shielded from direct line-of-sight of nearby noise-sensitive land uses. The shielding of building air conditioning units from direct line of sight would reduce operational noise levels at nearby land uses by approximately 5 to 10 dBA. With mitigation, non-transportation noise levels would not exceed City of Clovis noise standards and would be considered to have a less-than-significant impact.

Mitigation Measure Noise-2,d would require the preparation of an acoustical analysis for the planned future widening of Herndon Avenue, once more detailed site plans become available. The acoustical analysis would be required to evaluate changes in traffic noise levels in comparison to the City of Clovis General Plan noise standards and, where practical, noise-reduction measures (e.g., sound walls). However, in some instances, the feasibility of noise-reduction measures, such as sound walls, may not be practical. As a result, increases in traffic noise associated with the future widening of Herndon Avenue would be considered significant and unavoidable.

## **CUMULATIVE SETTING AND IMPACTS**

### **CUMULATIVE SETTING**

The geographic extent of the cumulative setting for noise consists of the project area and the surrounding areas within the City. Cumulative development conditions would result in increased cumulative roadway noise levels, and would also result in increased noise associated with future development. As noted earlier in this report, ambient noise levels in the project area are influenced primarily by traffic noise emanating from area roadways. No major stationary sources of noise have been identified in the project area. The primary factor for cumulative noise impact analysis is the consideration of future traffic noise levels.

### **CUMULATIVE IMPACTS**

#### **Contribution to Cumulative Noise Levels**

**Impact Noise-5:     *Would the project result in a significant contribution to cumulative noise levels at nearby land uses?***

Future cumulative traffic noise levels, with and without implementation of the proposed project, were calculated using the FHWA roadway noise prediction model (FHWA-RD-77-108) based on California vehicle reference noise levels and traffic data obtained from the traffic analysis prepared for this project. The project's contribution to the cumulative traffic noise levels along area roadways was determined by comparing the predicted noise levels with and without project-generated traffic under cumulative conditions. Based on the modeling conducted, predicted increases in traffic noise levels under future cumulative conditions, with construction of the proposed land uses, would be approximately 0.7 dBA CNEL, or less (refer to Table 11). Development of the proposed land uses would not contribute to significant increases in traffic noise levels at sensitive land uses located along primarily affected area roadways. However, as noted in Impact Noise-4, the widening of Herndon Avenue may result in significant increases in traffic noise levels at some nearby existing noise-sensitive land uses depending on final design. As a result, this impact would be considered potentially significant.

**Mitigation Measures**

Implement Mitigation Measure Noise-2.d.

**Level of Significance after Mitigation**

Mitigation Measure Noise-2,d would require the preparation of an acoustical analysis for the planned future widening of Herndon Avenue, once more detailed site plans become available. The acoustical analysis would be required to evaluate changes in traffic noise levels in comparison to the City of Clovis General Plan noise standards and, where practical, noise-reduction measures (e.g., sound walls). However, in some instances, the feasibility of noise-reduction measures, such as sound walls, may not be practical. As a result, increases in traffic noise associated with the future widening of Herndon Avenue would be considered significant and unavoidable.

## REFERENCES

- American National Standards Institute, Inc. (ANSI). 2002. ANSI S12.60-2002: Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools.
- California Department of Transportation (Caltrans). 1998. California Department of Transportation (Caltrans). Technical Noise Supplement.
- California Department of Transportation (Caltrans). September 2013. Transportation and Construction Vibration Guidance Manual.
- California Department of Transportation (Caltrans). May 2016. EIR/EA Annotated Outline.
- California Department of Transportation (Caltrans). April 2015. Transportation Concept Report, State Route 168.
- California Department of Transportation (Caltrans). Accessed: June 29, 2017. Traffic Census Program, Traffic Counts. Website url: <http://www.dot.ca.gov/trafficops/census/>.
- Caterpillar. Manufacturer Specifications and Technical Data: Diesel Generator Set: 2,000 kW. LEHE8746-00. Accessed: December 12, 2008. Website url: <http://www.cat.com/cda/components/securedFile/displaySecuredFileServletJSP?fileId=98752&languageId=7>.
- City of Clovis. 2014. *City of Clovis General Plan*.
- Federal Interagency Committee on Noise (FICON). October 22, 2000. Discussion of Methodologies of Measuring Noise Impact.
- JLB Traffic Engineering, Inc. 2017. *Draft Traffic Impact Analysis: Master Plan Expansion of the Clovis Community Medical Center*.
- United States Department of Transportation, Federal Transit Administration (FTA). April 2006. Transit Noise and Vibration Impact Assessment.
- United States Environmental Protection Agency (EPA). December 31, 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.
- United States Environmental Protection Agency (EPA). May 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.

## **APPENDIX A**

### **Noise Modeling & Documentation**



## **TRAFFIC NOISE MODELING**

### **MODEL CALIBRATION**

SEGMENT: HERNDON, EAST OF LOCAN

LDA: 97%

MDV: 2%

HDV: 1%

MEASURED: 72.1

MODELED: 71.6

DIFFERENCE: 0.5

ACCEPTABLE ( $\pm 2.0$ dB)? : YES

### **EXISTING**

HERNDON AVE, ARMSTRONG AVE TO TOLLHOUSE RD

LANES: 5

SPEED: 45

ADT: 14684

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 67.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 424

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 136

HERNDON AVE, TOLLHOUSE RD TO TEMPERANCE AVE

LANES: 5

SPEED: 45

ADT: 15142

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 68.0

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 140

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 437

HERNDON AVE, TEMPERANCE AVE TO COVENTRY AVE

LANES: 5

SPEED: 45

ADT: 14937

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 67.9

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 431

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 138

HERNDON AVE, COVENTRY AVE TO CCMC ACCESS RD

LANES: 2

SPEED: 45

ADT: 12714

EL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 67.3

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 367

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 116

HERNDON AVE, CCMC ACCESS RD TO LOCAN AVE

LANES: 2

SPEED: 45

ADT: 12878

NEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 67.3

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 372

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 118

**EXISTING (CONTINUED)**

HERNDON AVE, LOCAN AVE TO DE WOLF AVE

LANES: 2

SPEED: 55

ADT: 9654

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 68.2

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 463

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 147

HERNDON AVE, DE WOLF AVE (DL) TO DE WOLF AVE (SL)

LANES: 2

SPEED: 55

ADT: 8637

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 67.5

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 204

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 95

HERNDON AVE, DE WOLF AVE (SL) TO LEONARD AVE

LANES: 2

SPEED: 55

ADT: 7611

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 67.9

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 187

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 87

LOCAN AVE, HERNDON AVE TO BULLARD AVE

LANES: 2

SPEED: 55

ADT: 1886

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 61.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 74

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): WR

**EXISTING PLUS PROJECT PHASE I**

HERNDON AVE, ARMSTRONG AVE TO TOLLHOUSE RD

LANES: 5

SPEED: 45

ADT: 16631

NEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 68.4

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 480

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 153

HERNDON AVE, TOLLHOUSE RD TO TEMPERANCE AVE

LANES: 5

SPEED: 45

ADT: 18003

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 68.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 238

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 112

HERNDON AVE, TEMPERANCE AVE TO COVENTRY AVE

LANES: 6

SPEED: 45

ADT: 15597

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 68.2

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 217

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 104

**EXISTING PLUS PROJECT PHASE I (CONTINUED)**

HERNDON AVE, COVENTRY AVE TO CCMC ACCESS RD

LANES: 4

SPEED: 45

ADT: 13358

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 67.5

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 195

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 92

HERNDON AVE, CCMC ACCESS RD TO LOCAN AVE

LANES: 4

SPEED: 45

ADT: 13744

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 67.6

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 199

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 94

HERNDON AVE, LOCAN AVE TO DE WOLF AVE

LANES: 4

SPEED: 55

ADT: 10077

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 68.5

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 226

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 106

HERNDON AVE, DE WOLF AVE (DL) TO DE WOLF AVE (SL)

LANES: 4

SPEED: 55

ADT: 9048

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 68.0

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 211

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 99

HERNDON AVE, DE WOLF AVE (SL) TO LEONARD AVE

LANES: 2

SPEED: 55

ADT: 7975

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 68.1

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 193

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 90

LOCAN AVE, HERNDON AVE TO BULLARD AVE

LANES: 2

SPEED: 55

ADT: 2329

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 62.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 85

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): WR

**CUMULATIVE YEAR 2035**

HERNDON AVE, ARMSTRONG AVE TO TOLLHOUSE RD

LANES: 5

SPEED: 45

ADT: 25960

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 69.5

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 303

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 142

**CUMULATIVE YEAR 2035 (CONTINUED)**

HERNDON AVE, TOLLHOUSE RD TO TEMPERANCE AVE

LANES: 5

SPEED: 45

ADT: 29140

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 70.0

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 327

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 153

HERNDON AVE, TEMPERANCE AVE TO COVENTRY AVE

LANES: 6

SPEED: 45

ADT: 33330

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 70.2

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 358

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 168

HERNDON AVE, COVENTRY AVE TO CCMC ACCESS RD

LANES: 4

SPEED: 45

ADT: 31400

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 70.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 343

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 160

HERNDON AVE, CCMC ACCESS RD TO LOCAN AVE

LANES: 4

SPEED: 45

ADT: 31870

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 70.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 347

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 162

HERNDON AVE, LOCAN AVE TO DE WOLF AVE

LANES: 4

SPEED: 55

ADT: 23840

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 400

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 187

HERNDON AVE, DE WOLF AVE (DL) TO DE WOLF AVE (SL)

LANES: 4

SPEED: 55

ADT: 22870

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.6

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 390

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 182

HERNDON AVE, DE WOLF AVE (SL) TO LEONARD AVE

LANES: 2

SPEED: 55

ADT: 15580

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.0

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 302

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 140

LOCAN AVE, HERNDON AVE TO BULLARD AVE

LANES: 2

SPEED: 55

ADT: 14970

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 70.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 294

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 137

**CUMULATIVE YEAR 2035 PLUS PROJECT**

HERNDON AVE, ARMSTRONG AVE TO TOLLHOUSE RD

LANES: 5

SPEED: 45

ADT: 27614

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 69.8

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 315

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 148

HERNDON AVE, TOLLHOUSE RD TO TEMPERANCE AVE

LANES: 5

SPEED: 45

ADT: 31255

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 70.3

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 342

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 160

HERNDON AVE, TEMPERANCE AVE TO COVENTRY AVE

LANES: 6

SPEED: 45

ADT: 38950

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 70.9

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 397

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 186

HERNDON AVE, COVENTRY AVE TO CCMC ACCESS RD

LANES: 4

SPEED: 45

ADT: 34080

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.1

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 363

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 169

HERNDON AVE, CCMC ACCESS RD TO LOCAN AVE

LANES: 4

SPEED: 45

ADT: 33691

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.1

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 360

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 168

HERNDON AVE, LOCAN AVE TO DE WOLF AVE

LANES: 4

SPEED: 55

ADT: 24366

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.9

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 406

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 189

**CUMULATIVE YEAR 2035 PLUS PROJECT (CONTINUED)**

HERNDON AVE, DE WOLF AVE (DL) TO DE WOLF AVE (SL)

LANES: 4

SPEED: 55

ADT: 23380

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.7

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 395

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 184

HERNDON AVE, DE WOLF AVE (SL) TO LEONARD AVE

LANES: 2

SPEED: 55

ADT: 15931

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.11

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 386

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 142

LOCAN AVE, HERNDON AVE TO BULLARD AVE

LANES: 2

SPEED: 55

ADT: 16265

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE: 71.2

DISTANCE FROM ROADWAY CENTERLINE TO 60 CNEL CONTOUR (FEET): 311

DISTANCE FROM ROADWAY CENTERLINE TO 65 CNEL CONTOUR (FEET): 144

## **Appendix 19**

### **Traffic Impact Analysis**

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# Draft Traffic Impact Analysis

## Master Plan Expansion of the Clovis Community Medical Center

At Herndon Avenue and Temperance Avenue

In the City of Clovis, California

***Prepared for:***

City of Clovis  
1033 Fifth Street  
Clovis, CA 93612

November 8, 2017

Project No. 006-009



**Traffic Engineering, Inc.**

***Traffic Engineering, Transportation Planning, & Parking Solutions***

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*Traffic Engineering, Transportation Planning, & Parking Solutions*

## Draft Traffic Impact Analysis

### Master Plan Expansion of the Clovis Community Medical Center at Herndon Avenue and Temperance Avenue

In the City of Clovis, CA

November 8, 2017

This Traffic Impact Analysis Report has been prepared under the direction of a licensed Traffic Engineer. The licensed Traffic Engineer attests to the technical information contained therein, and has judged the qualifications of any technical specialists providing engineering data from which recommendations, conclusions, and decisions are based.

Prepared by:

---

Jose Luis Benavides, PE, TE

President



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## Table of Contents

|  |           |
|--|-----------|
| <b>Introduction and Summary.....</b>                         | <b>1</b>  |
| Introduction .....   | 1         |
| Summary .....  | 1         |
| Existing Traffic Conditions.....                             | 1         |
| Existing plus Project Phase 1 Traffic Conditions .....       | 2         |
| Near Term plus Project Phase 1 Traffic Conditions .....      | 2         |
| Cumulative Year 2035 No Project Traffic Conditions.....      | 3         |
| Cumulative Year 2035 plus Project Traffic Conditions.....    | 3         |
| Queuing Analysis.....  | 4         |
| Project Equitable Fair Share Impact Analysis.....            | 4         |
| <b>TIA Scope of Work .....</b>                               | <b>4</b>  |
| Study Facilities .....                                       | 4         |
| Intersections .....  | 5         |
| Segments.....  | 5         |
| Study Scenarios .....  | 6         |
| Existing Traffic Conditions.....                             | 6         |
| Existing plus Project Phase 1 Traffic Conditions .....       | 6         |
| Near Term plus Project Phase 1 Traffic Conditions .....      | 6         |
| Cumulative Year 2035 No Project Traffic Conditions.....      | 6         |
| Cumulative Year 2035 plus Project Traffic Conditions.....    | 6         |
| <b>Level of Service Analysis Methodology .....</b>           | <b>6</b>  |
| <b>Criteria of Significance .....</b>                        | <b>7</b>  |
| <b>Operational Analysis Assumptions and Defaults .....</b>   | <b>8</b>  |
| <b>Existing Traffic Conditions .....</b>                     | <b>8</b>  |
| Roadway Network .....  | 8         |
| Results of Existing Level of Service Analysis .....          | 11        |
| Traffic Signal Warrants.....                                 | 12        |
| <b>Existing plus Project Phase 1 Traffic Conditions.....</b> | <b>15</b> |
| Project Description .....                                    | 15        |
| Transit .....  | 16        |



Master Plan Expansion of the Clovis Community Medical Center  
Draft Traffic Impact Analysis  
November 8, 2017

|   |           |
|---|-----------|
| Bikeways.....   | 16        |
| Travel Demand Analysis.....   | 16        |
| Travel Demand Modeling Approach .....   | 16        |
| Trip Generation.....  | 16        |
| Trip Distribution .....   | 17        |
| Results of Existing plus Project Phase 1 Level of Service Analysis .....        | 17        |
| Traffic Signal Warrants.....  | 19        |
| <b>Near Term plus Project Phase 1 Traffic Conditions .....</b>                  | <b>23</b> |
| Description of Approved and Pipeline Projects .....                             | 23        |
| Results of Near Term plus Project Phase 1 Level of Service Analysis .....       | 24        |
| Traffic Signal Warrants.....  | 26        |
| <b>Cumulative Year 2035 No Project Traffic Conditions.....</b>                  | <b>29</b> |
| Results of Cumulative Year 2035 No Project Level of Service Analysis.....       | 29        |
| Traffic Signal Warrants.....  | 32        |
| <b>Cumulative Year 2035 plus Project Traffic Conditions .....</b>               | <b>35</b> |
| Results of Cumulative Year 2035 plus Project Level of Service Analysis.....     | 35        |
| Traffic Signal Warrants.....  | 37        |
| <b>Queuing Analysis .....</b>   | <b>41</b> |
| <b>Project's Pro-Rata Fair Share of Future Transportation Improvements.....</b> | <b>46</b> |
| <b>Conclusions and Recommendations.....</b>                                     | <b>47</b> |
| Existing Traffic Conditions.....  | 47        |
| Existing plus Project Phase 1 Traffic Conditions .....                          | 47        |
| Near Term plus Project Phase 1 Traffic Conditions .....                         | 47        |
| Cumulative Year 2035 No Project Traffic Conditions.....                         | 48        |
| Cumulative Year 2035 plus Project Traffic Conditions.....                       | 50        |
| Queuing Analysis.....   | 50        |
| Project Equitable Fair Share Impact Analysis.....                               | 50        |
| <b>Study Participants.....</b>  | <b>51</b> |
| <b>References.....</b>  | <b>51</b> |



## List of Figures

|   |    |
|---|----|
| Figure 1: Vicinity Map .....  | 13 |
| Figure 2: Existing - Traffic Volumes, Geometrics and Controls.....                            | 14 |
| Figure 3: Site Plan .....   | 20 |
| Figure 4: Phase 1 (2026) - Project Only Trip Assignment .....                                 | 21 |
| Figure 5: Existing plus Project Phase 1 - Traffic Volumes, Geometrics and Controls .....      | 22 |
| Figure 6: Near Term Projects' Trip Assignment .....   | 27 |
| Figure 7: Near Term plus Project Phase 1 - Traffic Volumes, Geometrics and Controls.....      | 28 |
| Figure 8: Cumulative Year 2035 No Project - Traffic Volumes, Geometrics and Controls.....     | 33 |
| Figure 9: Cumulative Year 2035 No Project - Mitigated Geometrics and Controls .....           | 34 |
| Figure 10: Phase 2 (2035) - Project Only Trips .....  | 38 |
| Figure 11: Cumulative Year 2035 plus Project - Traffic Volumes, Geometrics and Controls ..... | 39 |
| Figure 12: Cumulative Year 2035 plus Project - Mitigated Geometrics and Controls .....        | 40 |

## List of Tables

|  |    |
|--|----|
| Table I: Existing Intersection LOS Results .....                             | 11 |
| Table II: Existing Segment LOS Results .....                                 | 12 |
| Table III: Phase 1 (2026) Project Only Trip Generation .....                 | 17 |
| Table IV: Year 2035 Additional Project Only Trip Generation .....            | 17 |
| Table V: Year 2035 Total Project Only Trip Generation .....                  | 17 |
| Table VI: Existing plus Project Phase 1 Intersection LOS Results .....       | 18 |
| Table VII: Existing plus Project Phase 1 Segment LOS Results .....           | 19 |
| Table VIII: Near Term plus Project Phase 1 Trip Generation .....             | 23 |
| Table IX: Near Term plus Project Phase 1 Intersection LOS Results .....      | 25 |
| Table X: Near Term plus Project Phase 1 Segment LOS Results .....            | 25 |
| Table XI: Cumulative Year 2035 No Project Intersection LOS Results .....     | 31 |
| Table XII: Cumulative Year 2035 No Project Segment LOS Results .....         | 32 |
| Table XIII: Cumulative Year 2035 plus Project Intersection LOS Results ..... | 36 |
| Table XIV: Cumulative Year 2035 plus Project Segment LOS Results .....       | 37 |
| Table XV: Queuing Analysis .....   | 43 |
| Table XV: Queuing Analysis (Continued).....                                  | 44 |
| Table XVI: Project's Fair Share of the Future Improvements.....              | 46 |

## List of Appendices

|   |
|---|
| Appendix A: Methodology                                       |
| Appendix B: Draft Scope of Work                               |
| Appendix C: Traffic Counts                                    |
| Appendix D: Traffic Modeling                                  |
| Appendix E: LOS Worksheets, Existing                          |
| Appendix F: LOS Worksheets, Existing plus Project Phase 1     |
| Appendix G: LOS Worksheets, Near Term plus Project Phase 1    |
| Appendix H: LOS Worksheets, Cumulative Year 2035 No Project   |
| Appendix I: LOS Worksheets, Cumulative Year 2035 plus Project |
| Appendix J: Signal Warrants                                   |



## Introduction and Summary

### Introduction

This report describes a Traffic Impact Analysis (TIA) prepared by JLB Traffic Engineering, Inc. (JLB) for the proposed Master Plan Expansion of the Clovis Community Medical Center located at Herndon Avenue and Temperance Avenue in the City of Clovis. The proposed Project to be evaluated includes two components. Per information provided to JLB, both of the Project components are consistent with the City of Clovis General Plan. Figure 1 shows the location of the proposed Project site relative to the surrounding roadway network.

The first component is the proposed expansion plan of the Clovis Community Medical Center (CCMC), which is a phased project over the next 20 years. The CCMC Project includes the construction of new inpatient bed towers, medical office buildings, a general support building, a cancer center, a central plant, and a parking garage along with the expansion of the emergency department, surgical facilities, materials management and outpatient community center. In addition, the CCMC Project includes the potential development of areas adjacent to the main campus, primarily with retail commercial buildings as well as a hotel and an assisted living center.

The second component, the Herndon Avenue Project, is the proposed widening of Herndon Avenue from Temperance Avenue to De Wolf Avenue (south leg). Herndon Avenue will be widened to six lanes between Temperance Avenue and Coventry Avenue and four lanes between Coventry Avenue and the south leg of De Wolf Avenue. As needed, existing traffic signals within the Herndon Avenue Project will be modified to accommodate the proposed lane geometrics.

The purpose of this TIA is to evaluate the potential traffic impacts, identify short-term and long-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process as required by CEQA. The study primarily focused on evaluating traffic conditions at study intersections, segments, and interchanges that may be impacted by the proposed Project. The scope of work was prepared via consultation with the City of Clovis, City of Fresno, County of Fresno, and Caltrans staff.

### Summary

The potential traffic impacts of the proposed project were evaluated in accordance with the standards set forth by the level of service (LOS) policies of the owner agency of the study facility.

#### *Existing Traffic Conditions*

- Except for the intersection of SR 168 EB Ramps at Temperance Avenue, all study intersections operate at an acceptable LOS during both the AM and PM peak hours. To improve the LOS at this intersection, it is recommended that a second eastbound left-turn lane be added and that the existing traffic signal be modified to accommodate the added lane.
- Under this scenario, all study segments operate at an acceptable LOS.



### *Existing plus Project Phase 1 Traffic Conditions*

- By this scenario, it is assumed that widening of Herndon Avenue between Temperance Avenue and the south leg of De Wolf Avenue has been completed.
- The Phase 1 of the CCMC (Year 2026) consists of adding a 300,172 square-foot expansion of the existing hospital, 94,392 square feet of Medical Dental Office Building, 150,000 square feet of Shopping Center, and a 150 room Hotel.
- Phase 1 of the CCMC is estimated to generate a maximum of 15,121 daily trips, 756 AM peak hour trips and 1,278 PM peak hour trips.
- Similar to the previous scenario, except for the intersection of SR 168 EB Ramps at Temperance Avenue, all study intersections are projected to operate at an acceptable LOS during both the AM and PM peak hours. To improve the LOS at this intersection, it is recommended that a second eastbound right-turn lane and third northbound thru lane be added and that the existing traffic signal be modified to accommodate the added lane geometrics.
- Under this scenario, all study segments are projected to operate at an acceptable LOS.

### *Near Term plus Project Phase 1 Traffic Conditions*

- The near term projects are estimated to generate 45,938 daily trips, 4,655 AM peak hour trips and 5,267 PM peak hour trips.
- Under this scenario, except for the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Temperance Avenue, and Herndon Avenue at De Wolf Avenue (south leg), all intersections are projected to operate at acceptable LOS during both the AM and PM peak hours. To improve the LOS at each one of the intersections projected to exceed its LOS threshold, it is recommended that the improvement measures recommended under the Existing plus Project Phase 1 Traffic Conditions scenario be implemented along with the following.
  - Herndon Avenue at Temperance Avenue
    - Implement overlap phasing of the westbound right-turn with the southbound left-turn phase
    - Prohibit southbound to northbound U-turns
  - Herndon Avenue at De Wolf Avenue (south leg)
    - Implement All-Way STOP traffic controls
- Of the near term projects, the CCMC Phase 1 Project accounts for only 24.8, 14.0, and 19.5 percent of the total near term project traffic for the daily, AM and PM peak hours, respectively. Therefore, it can be deduced that the mitigation measures presented under this scenario may not be necessary immediately upon completion of the proposed Project.
- Under this scenario, all study segments are projected to operate at an acceptable LOS.



### *Cumulative Year 2035 No Project Traffic Conditions*

- Under this scenario, several of the study intersections are expected to exceed their respective LOS thresholds. These include the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (north leg), Herndon Avenue at De Wolf Avenue (south leg), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue. To improve the LOS at each one of the intersections, various mitigation measures are recommended including but not limited to signalization, addition of lanes, All-Way STOP controls, signalization and coordination, and signal phasing setups. Specific recommendations are explained in detail under the Cumulative Year 2035 No Project Traffic Conditions scenario and are further illustrated in Figure 9.
- Under this scenario, all study segments are projected to operate at an acceptable LOS.

### *Cumulative Year 2035 plus Project Traffic Conditions*

- Phase 2 of the CCMC is estimated to generate a maximum of 14,887 daily trips, 866 AM peak hour trips and 1,374 PM peak hour trips. Therefore Phase 1 and Phase 2 of the CCMC Project are estimated to generate a combined maximum of 30,008 daily trips, 1,622 AM peak hour trips and 2,652 PM peak hour trips.
- Similar to the Cumulative Year 2035 No Project, under this scenario, the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (NL), Herndon Avenue at De Wolf Avenue (SL), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue are projected to exceed their respective LOS threshold. For these intersections, it is recommended that the same improvements presented in the Cumulative 2035 No Project Scenario be implemented.
- Further, the intersections of Fir Avenue at Temperance Avenue and Herndon Avenue at Tollhouse Road are also projected to exceed their respective LOS threshold. To improve the LOS at these intersections, various mitigation measures are recommended. These recommendations include but are not limited to All-Way STOP controls, signalization, addition of lanes, signal coordination, specialized signal operations, and phasing setups. Specific mitigation measures are explained in detail in the Cumulative Year 2035 plus Project Traffic Conditions scenario and are further illustrated in Figure 12.
- Finally, the intersection of the New Temperance Access Road at Temperance Avenue is projected to exceed its LOS threshold. However, since this intersection is not projected to meet All-Way STOP or traffic signal warrants, the deficient LOS would be considered adverse but not significant and therefore mitigation measures are not recommended.
- Under this scenario, all study segments are projected to operate at an acceptable LOS.





### *Queuing Analysis*

- It is recommended that the City consider left- and right-turn lane storage lengths as indicated in Table XV.

### *Project Equitable Fair Share Impact Analysis*

- It is recommended that the Project contribute its equitable fair share towards future transportation improvements as presented in Table XVI.

## TIA Scope of Work

The study focused on evaluating traffic conditions at the existing and proposed study intersections and segments that may potentially be impacted by the proposed Project. On September 20, 2016, a draft scope of work for the preparation of a traffic impact analysis for this Project was provided to the City of Clovis, City of Fresno, County of Fresno, and Caltrans staff. On September 30, 2016, the City of Clovis approved the scope of work subject to the inclusion of the proposed right-in right-out access to Temperance Avenue. On October 11, 2016, the County of Fresno requested a trip distribution assignment for their final review of the TIA scope of work. On December 19, 2016, JLB provided the Project's trip distribution assignment to the City of Clovis, City of Fresno, County of Fresno, and Caltrans staff. Based on the Project's trip distribution assignment, the County of Fresno approved the scope of work subject to the inclusion of the intersections of Bullard Avenue at Locan Avenue and Bullard Avenue at De Wolf Avenue and the segment of Locan Avenue between Herndon Avenue and Bullard Avenue. On October 12, 2016, Caltrans approved the TIA scope of work as presented. On January 9, 2017, the City of Fresno approved the TIA scope of work as presented. Based on the comments received, this study includes in the analysis the additional intersections and segment requested by the City of Clovis and County of Fresno.

## Study Facilities

The study focused on evaluating traffic conditions at the existing study intersections and segments that may potentially be impacted by the proposed Project. The existing AM and PM peak hour turning movement counts were conducted at the study intersections in December of 2015 and throughout 2016. With the exception of the intersections of Bullard Avenue at Locan Avenue and Bullard Avenue at De Wolf Avenue and the segment of Locan Avenue between Herndon Avenue and Bullard Avenue, new traffic counts were collected in December 2015 or in 2016. The exceptions were a result of existing roadways being under construction. For those, existing traffic counts from 2009 were expanded by an annual growth rate of 4.3 percent to derive at the Base Year 2016 volumes. The 4.3 percent annual growth rate was determined between the Base Year 2016 and Cumulative Year 2035 No Project Model runs for the roadway network in the vicinity of Bullard Avenue and Locan Avenue. New existing traffic counts for the existing study intersections and segments are contained in Appendix C. The existing turning movement volumes, intersection geometrics, and traffic controls are illustrated in Figure 2. Traffic volumes were adjusted upward to balance the difference between study intersections along Temperance Avenue and Medical Center Drive.



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Page | 4



### *Intersections*

1. Nees Avenue / Temperance Avenue
2. Alluvial Avenue / Temperance Avenue
3. SR 168 WB Ramps / Temperance Avenue
4. SR 168 EB Ramps / Temperance Avenue
5. Fir Avenue / Temperance Avenue
6. Fir Avenue / Medical Center Drive
7. Herndon Avenue / Armstrong Avenue
8. Herndon Avenue / Tollhouse Road
9. Herndon Avenue / Temperance Avenue
10. Herndon Avenue / Coventry Avenue
11. Medical Center Drive / Coventry Avenue
12. Herndon Avenue / CCMC Access Road
13. Herndon Avenue / Locan Avenue
14. Herndon Avenue / De Wolf Avenue (NL)
15. Herndon Avenue / De Wolf Avenue (SL)
16. Herndon Avenue / Leonard Avenue
17. Herndon Avenue / McCall Avenue
18. Herndon Avenue / Academy Avenue
19. New Access Road / Temperance Avenue
20. Bullard Avenue / Locan Avenue
21. Bullard Avenue / De Wolf Avenue

### *Segments*

Herndon Avenue between:

1. Armstrong Avenue and Tollhouse Road
2. Tollhouse Road and Temperance Avenue
3. Temperance Avenue and Coventry Avenue
4. Coventry Avenue and CCMC Access Road
5. CCMC Access Road and Locan Avenue
6. Locan Avenue and De Wolf Avenue (NL)
7. De Wolf Avenue (NL) and De Wolf Avenue (SL)
8. De Wolf Avenue (SL) and Leonard Avenue

Locan Avenue between:

1. Herndon Avenue and Bullard Avenue



**Traffic Engineering, Inc.**

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Page | 5

## Study Scenarios

### *Existing Traffic Conditions*

This scenario evaluates existing traffic volumes and roadway conditions based on year 2016 traffic volumes.

### *Existing plus Project Phase 1 Traffic Conditions*

This scenario evaluates total traffic volumes and roadway conditions based on the addition of the Ten-Year Expansion Plan (Phase 1) traffic to the previous scenario. The Project Phase 1 trips to the study intersections were based on JLB's knowledge of the existing roadway network, engineering judgement, residential and commercial densities, and the City of Clovis Circulation Element in the vicinity of the Project.

### *Near Term plus Project Phase 1 Traffic Conditions*

This scenario evaluates total traffic volumes and roadway conditions based on the addition of the Near Term traffic to the previous scenario. To derive at the Near Term plus Project Phase 1 traffic volumes, this scenario expands the traffic volumes in the Existing plus Project Phase 1 scenario by adding the Near Term related trips.

### *Cumulative Year 2035 No Project Traffic Conditions*

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2035 without the proposed Project. The Cumulative Year 2035 No Project traffic volumes were obtained by subtracting the Project build-out trips from the Cumulative Year 2035 plus Project scenario.

### *Cumulative Year 2035 plus Project Traffic Conditions*

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2035 with the proposed Project. The Cumulative Year 2035 plus Project traffic volumes were obtained from the Fresno COG traffic model runs (Base Year 2016 and the Cumulative Year 2035 plus Project) and existing traffic counts. Under this scenario, the increment method as recommended by the Model Steering Committee was utilized to determine the Cumulative Year 2035 plus Project traffic volumes. The Fresno COG Traffic Model runs are contained in Appendix D.

## Level of Service Analysis Methodology

Level of Service (LOS) is a qualitative index of the performance of an element of the transportation system. LOS is a rating scale running from "A" to "F", with "A" indicating no congestion of any kind and "F" indicating unacceptable congestion and delays. LOS in this study describes the operating conditions for signalized and unsignalized intersections.

The 2010 *Highway Capacity Manual* (HCM) is the standard reference published by the Transportation Research Board and contains the specific criteria and methods to be used in assessing LOS. U-turn movements were analyzed using HCM 2000 methodologies and would yield more accurate results for the reason that HCM 2010 methodologies do not allow the analysis of U-turns. Synchro software was used to define LOS in this study. Details regarding these calculations are included in Appendix A.



A traffic impact is considered significant if it renders an unacceptable LOS on an intersection or street segment, or if it worsens an already unacceptable LOS condition on an intersection or street segment. At unsignalized intersections, a traffic impact would be considered “adverse but not significant” if the LOS standard is exceeded but the projected traffic does not satisfy traffic signal warrants. Under these conditions, the typical means to completely alleviate delays to stop controlled vehicles would be to install a traffic signal. However, the unmet signal warrants would imply that the reduction in delay for the stop-controlled vehicles may not justify new delays that would be incurred by the major street traffic (which is currently not stopped). Under these circumstances, the installation of a traffic signal would not be recommended and the substandard LOS for stop-controlled vehicles would be considered “adverse but not significant” impact.

## Criteria of Significance

The 2035 Clovis General Plan has established LOS D as the acceptable LOS threshold on its major streets. Therefore, LOS D threshold was utilized to evaluate the potential significance of LOS impacts to City of Clovis roadway facilities.

The County of Fresno has established LOS C as the acceptable level of traffic congestion on county roads and streets that fall entirely outside the Sphere of Influence (SOI) of a City. For those areas that fall within the SOI of a City, the LOS criteria of the City are the criteria of significance used in this report. LOS C is used to evaluate the potential significance of LOS impacts to Fresno County intersections and segments that fall outside the City of Clovis SOI. With a few exceptions, most the study intersections and segments are within the City of Clovis SOI, and therefore the City of Clovis LOS threshold was utilized. The exceptions are the intersections of Herndon Avenue at De Wolf Avenue (south leg), Herndon Avenue at Leonard Avenue, and Herndon Avenue at Academy Avenue and the segments of Herndon Avenue between the De Wolf Avenue (north leg) and De Wolf Avenue (south leg) and Herndon Avenue between De Wolf Avenue (south leg) and Leonard Avenue. For these exceptions, the County of Fresno LOS C threshold was utilized.

Caltrans endeavors to maintain a target LOS at the transition between LOS C and D on State highway facilities consistent with the *Caltrans Guide for the Preparation of Traffic Impact Studies* dated December 2002. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. In this TIA, all study intersections and segments operated by Caltrans utilized LOS C threshold to evaluate the potential significance of impacts to the roadway facilities.



## Operational Analysis Assumptions and Defaults

The following operational analysis values, assumptions and defaults were used in this study to ensure a consistent analysis of LOS among the various scenarios.

- Yellow time consistent with the California Manual of Uniform Traffic Control Devices (CA MUTCD) based on approach speeds
- All-red clearance intervals of 1.0 second for all phases
- Walk intervals of 7.0 seconds
- Flashing Don't Walk based on 3.5 feet/second walking speed with yellow plus all-red clearance subtracted
- All new or modified signals utilize protected left-turn phasing
- At existing intersections, the observed Peak Hour Factor (PHF) is utilized in the Existing, Existing plus Project Phase 1 and Near Term plus Project build-out scenarios
- A PHF of 0.92 (or the Existing PHF if higher) is utilized in the Cumulative 2035 No Project and Cumulative 2035 plus Project scenarios
- New proposed study facilities utilize a PHF of 0.92 as recommended by the Highway Capacity Manual
- A 3 percent heavy vehicle factor
- An average of 3 pedestrian calls per hour at signalized intersections

## Existing Traffic Conditions

### Roadway Network

The Project site and surrounding study area are illustrated in Figure 1. Important roadways serving the Project site are discussed below.

**State Route (SR) 168** is an existing four-lane freeway in the vicinity of the proposed Project site. For regional travel, the City of Clovis relies primarily on SR 168 as it connects the City of Clovis to the City of Fresno on the south. SR 168 continues onto SR 180 south of its interchange with McKinley Avenue and later connects to SR 41.

**Nees Avenue** is an existing east-west two- to four-lane roadway in the vicinity of the proposed Project site. Nees Avenue is a four-lane divided arterial from the western Clovis city limits at Willow Avenue to its intersection with Temperance Avenue and a two-lane collector that extends approximately one and a half miles east of Temperance Avenue. The 2035 Clovis General Plan Circulation Element designates Nees Avenue as an arterial west of Locan Avenue and a rural collector between Tollhouse Road and Thompson Avenue within the City of Clovis.



**Alluvial Avenue** is an existing east-west collector in the vicinity of the proposed Project site. Alluvial Avenue extends westerly from its intersection with Temperance Avenue through the City of Clovis and into the City of Fresno. East of Temperance Avenue, Alluvial Avenue turns into Owens Mountain Parkway. Alluvial Avenue is a four-lane divided collector west of Temperance Avenue and a two-lane undivided roadway east of Temperance Avenue. Based on information provided by the City of Clovis engineering staff, the easterly extension of Alluvial Avenue (Owens Mountain Parkway) will terminate at the interchange of Nees Avenue and SR 168.

**New Temperance Access Road** is a previously approved right-in right-out local access road to Temperance Avenue.

**Fir Avenue** is an existing divided local roadway adjacent to the proposed Project site. Fir Avenue connects Temperance Avenue and Medical Center Drive West and serves as the main access to the Clovis Community Medical Center from SR 168. The 2035 Clovis General Plan Circulation Element designates Fir Avenue as a local street within the City of Clovis.

**Herndon Avenue** is an existing arterial in the vicinity of the proposed Project site. Herndon Avenue is an east-west major street that extends through the City of Clovis, City of Fresno and beyond for just over twenty miles. It is also the most northerly continuous route on the Fresno County side of the San Joaquin River. Near the Project site, Herndon Avenue is a four-lane divided arterial west of Temperance Avenue and a two-lane undivided arterial east of Temperance Avenue. The 2035 Clovis General Plan Circulation Element designates Herndon Avenue as a six-lane divided expressway between Willow Avenue and SR 168, a six-lane divided arterial between SR 168 and Coventry Avenue, and a four-lane divided arterial east of Coventry Avenue within the City of Clovis.

**Bullard Avenue** is an existing east-west two- to four-lane divided roadway in the vicinity of the proposed Project site. In this area, Bullard Avenue is a four-lane undivided arterial between Locan Avenue and De Wolf Avenue. The 2035 Clovis General Plan Circulation Element designates Bullard Avenue as a four-lane divided arterial between Willow Avenue and Harvard Avenue and between Purdue Avenue and McCall Avenue in the City of Clovis.

**Armstrong Avenue** is an existing north-south undivided roadway in the vicinity of the proposed Project site. Armstrong Avenue is a two- to four-lane undivided collector from the southern Clovis city limits just south of Ashlan Avenue to its northern terminus at Nees Avenue. The 2035 Clovis General Plan Circulation Element designates Armstrong Avenue between Nees Avenue and the southern City limits as an undivided collector within the City of Clovis.

**Tollhouse Road** is an existing two-lane collector in the vicinity of the proposed Project site and traverses the City of Clovis in a northeast-southwest direction. Tollhouse Road exists from Sunnyside Avenue to its intersection with the old Temperance Avenue south of SR 168 and between Medical Center Drive East and Thompson Avenue. The 2035 Clovis General Plan Circulation Element designates Tollhouse Road as a collector between Sunnyside Avenue and Herndon Avenue and a rural collector between Clovis Community Medical Center Drive and Cole Avenue within the City of Clovis.



**Temperance Avenue** is an existing north-south four-lane divided limited access expressway in the vicinity of the proposed Project site. It connects to Shepherd Avenue on the north and continues over 16 miles to Golden State Boulevard on the south. The 2035 Clovis General Plan Circulation Element designates Temperance Avenue as an arterial north of SR 168 and an expressway south of SR 168 within the City of Clovis.

**Medical Center Drive** is an existing two-lane undivided collector adjacent to the proposed Project site. Medical Center Drive runs on all sides of the Clovis Community Medical Center, encircling the Medical Center. The 2035 Clovis General Plan Circulation Element designates Medical Center Drive as a private local street within the City of Clovis.

**Coventry Avenue** is an existing street adjacent to the proposed Project site. North of Herndon Avenue, Coventry Avenue is a four-lane divided collector connecting Herndon Avenue and Medical Center Drive South and serves as the main access to the Clovis Community Medical Center from Herndon Avenue. South of Herndon Avenue, Coventry Avenue is a two-lane undivided local street.

**CCMC Access Road** is an existing two-lane undivided local roadway in the vicinity of the proposed Project site. CCMC Access Road runs north-south in its connection to Herndon Avenue and east-west in its connection to Medical Center Drive.

**Locan Avenue** is an existing north-south two-lane undivided collector in the vicinity of the proposed Project site. In this area, Locan Avenue extends south of Herndon Avenue. The 2035 Clovis General Plan Circulation Element designates Locan Avenue as an undivided collector between Shepherd Avenue and Nees Avenue and south of Herndon Avenue within the City of Clovis.

**De Wolf Avenue** is an existing north-south two-lane collector in the vicinity of the proposed Project site. In this area, De Wolf Avenue connects Tollhouse Road and Herndon Avenue and continues south of Herndon Avenue approximately five miles to Olive Avenue in the City of Fresno. The 2035 Clovis General Plan Circulation Element designates De Wolf Avenue as an arterial between Shepherd Avenue and Owens Mountain Parkway and a collector between Tollhouse Road and the southern Clovis city limits.

**Leonard Avenue** is an existing north-south two-lane local roadway in the vicinity of the proposed Project site. In this area, Leonard Avenue extends southerly from Herndon Avenue approximately one half mile. The Clovis 2035 General Plan Circulation Element designates Leonard Avenue as a local roadway between Herndon Avenue and Bullard Avenue and a divided arterial between Bullard Avenue and Ashlan Avenue.

**McCall Avenue** is an existing north-south two-lane major roadway in the vicinity of the proposed Project site. McCall Avenue extends southerly from Herndon Avenue through the City of Clovis sphere of influence and continues onto the City of Selma beyond SR 99. McCall Avenue is planned to extend northwesterly to the existing intersection of SR 168 and Shepherd Avenue north of Herndon Avenue. The Clovis 2035 General Plan Circulation Element designates McCall Avenue as an arterial within the City of Clovis. Economic and market analysis performed in 2001 for the Southeast Urban Center Specific Plan identified the critical role that the improvement of McCall Avenue will play in the development of commercial properties in the area.





**Academy Avenue** is an existing north-south two-lane major roadway in the vicinity of the proposed Project site. Academy Avenue extends southerly from SR 168 through the Cities of Sanger, Parlier, and Kingsburg at the southern edge of Fresno County. The Fresno County General Plan Circulation Element designates Academy Avenue as a rural arterial within the County of Fresno.

## Results of Existing Level of Service Analysis

Table I presents a summary of the existing peak hour LOS at the study intersections, while Table II presents a summary of the existing LOS for the study segments. Figure 2 illustrates the existing traffic volumes, intersection geometrics, and controls. LOS worksheets for the Existing Traffic Conditions scenario are provided in Appendix E. Except for the intersection of SR 168 EB Ramps at Temperance Avenue, all study intersections are projected to operate at an acceptable LOS during both the AM and PM peak hours.

To improve the LOS at this intersection, it is recommended that a second eastbound left-turn lane be added and that the existing traffic signal be modified to accommodate the added lane geometrics.

Under this scenario, all study segments operate at an acceptable LOS.

**Table I: Existing Intersection LOS Results**

|    | Intersection                           | Intersection Control   | (7-9) AM Peak Hour         |          | (4-6) PM Peak Hour         |     |
|----|--|------------------------|----------------------------|----------|----------------------------|-----|
|    |  |                        | Average Delay<br>(sec/veh) | LOS      | Average Delay<br>(sec/veh) | LOS |
| 1  | Nees Avenue / Temperance Avenue        | Signalized             | 18.0                       | B        | 31.2                       | C   |
| 2  | Alluvial Avenue / Temperance Avenue    | Signalized             | 44.6                       | D        | 16.0                       | B   |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized             | 4.9                        | A        | 2.9                        | A   |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized             | <b>37.6</b>                | <b>D</b> | 32.3                       | C   |
|    |  | Signalized (Mitigated) | 27.7                       | C        | 14.2                       | B   |
| 5  | Fir Avenue / Temperance Avenue         | Signalized             | 14.7                       | B        | 9.7                        | A   |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout             | 6.1                        | A        | 5.6                        | A   |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized             | 17.8                       | B        | 15.2                       | B   |
| 8  | Herndon Avenue / Tollhouse Road        | Two-Way STOP           | 11.2                       | B        | 13.8                       | B   |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized             | 33.2                       | C        | 17.0                       | B   |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized             | 12.8                       | B        | 11.7                       | B   |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP           | 10.3                       | B        | 9.4                        | A   |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP           | 16.5                       | C        | 16.2                       | C   |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP           | 26.7                       | D        | 19.5                       | C   |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP           | 17.2                       | C        | 14.5                       | B   |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP           | 24.1                       | C        | 21.2                       | C   |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP           | 14.1                       | B        | 14.0                       | B   |
| 17 | Herndon Avenue / McCall Avenue         | One-Way STOP           | 15.0                       | C        | 14.3                       | B   |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP           | 13.3                       | B        | 14.3                       | B   |
| 19 | New Access Road / Temperance Avenue    | Does Not Exist         | N/A                        | N/A      | N/A                        | N/A |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP           | 12.9                       | B        | 10.5                       | B   |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP           | 14.3                       | B        | 11.0                       | B   |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
LOS for Two-Way and One-Way STOP controlled intersections are based on the worst approach/movement of the minor street.



**Table II: Existing Segment LOS Results**

| <i>Study Segment</i> | <i>Limits</i>                               | <i>Lanes</i> | <i>24-hour Volume</i> | <i>LOS</i> |
|----------------------|---|--------------|-----------------------|------------|
| Herndon Avenue       | Armstrong Avenue and Tollhouse Road         | 5            | 14,684                | C          |
| Herndon Avenue       | Tollhouse Road and Temperance Avenue        | 5            | 15,142                | C          |
| Herndon Avenue       | Temperance Avenue and Coventry Avenue       | 5            | 14,937                | C          |
| Herndon Avenue       | Coventry Avenue and CCMC Access Road        | 2            | 12,714                | C          |
| Herndon Avenue       | CCMC Access Road and Locan Avenue           | 2            | 12,878                | C          |
| Herndon Avenue       | Locan Avenue and De Wolf Avenue (NL)        | 2            | 9,654                 | C          |
| Herndon Avenue       | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 2            | 8,637                 | C          |
| Herndon Avenue       | De Wolf Avenue (SL) and Leonard Avenue      | 2            | 7,611                 | C          |
| Locan Avenue         | Herndon Avenue and Bullard Avenue           | 2            | 1,886                 | B          |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

### *Traffic Signal Warrants*

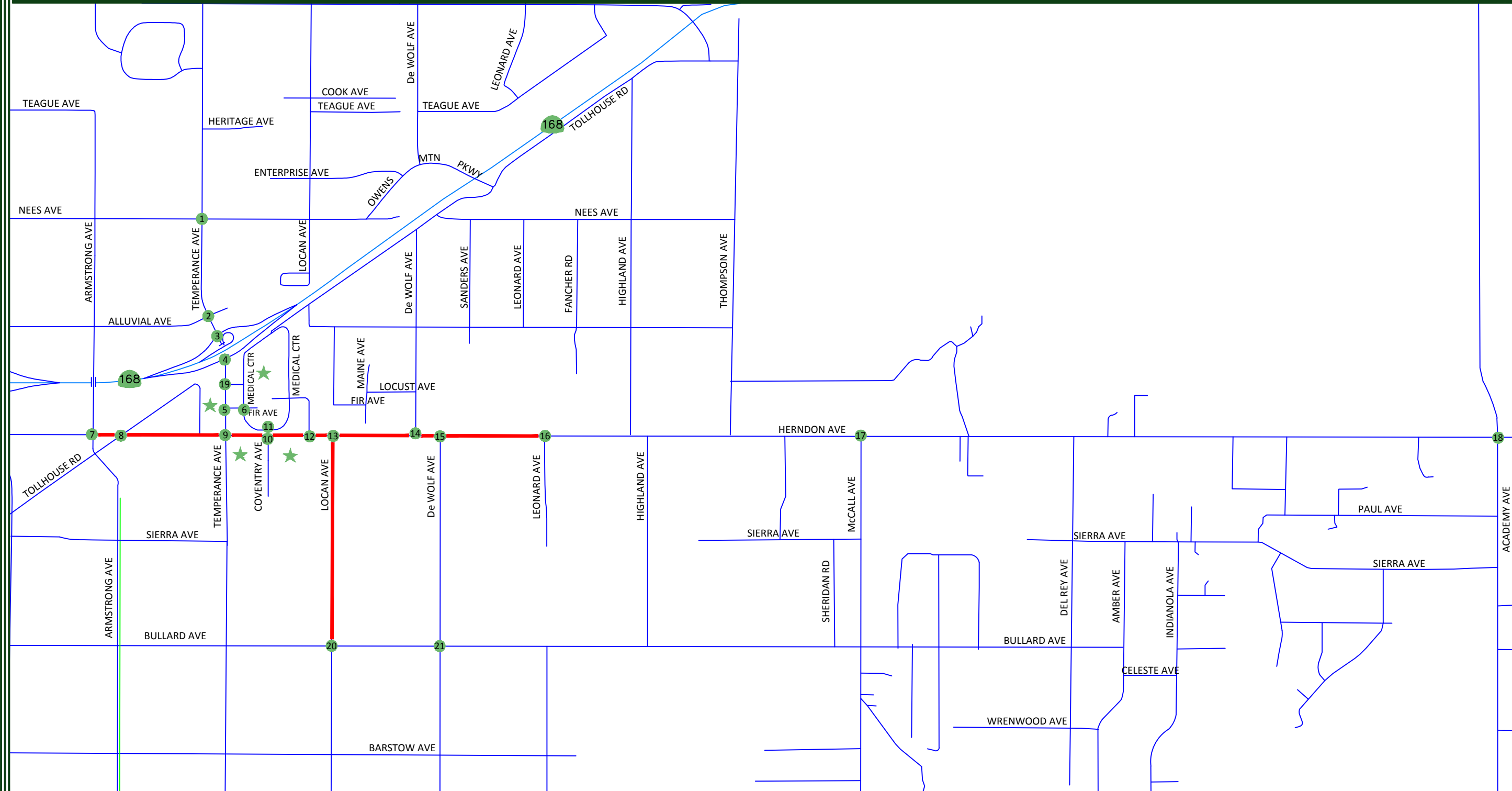
Peak hour traffic signal warrants were prepared for the unsignalized study intersections for the Existing scenario. These warrants are found in Appendix J. Under this scenario, the intersections of Herndon Avenue at Locan Avenue and Herndon Avenue at De Wolf Avenue (south leg) satisfy peak hour signal warrants during both peaks, while the intersection of Bullard Avenue at De Wolf Avenue satisfies peak hour signal warrants during the AM peak only. Based on the signal warrants, the intersection operational analysis and traffic engineering judgment, signalization of these intersections is not recommended. It is worth noting that CA MUTCD states “satisfaction of a signal warrant or warrants shall not in itself require the installation of a traffic signal.” Therefore, it is recommended that prior to the installation of a traffic signal, investigation of CA MUTCD warrants 1, 4, and 7, as applicable, be conducted for these intersections.





City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Vicinity Map

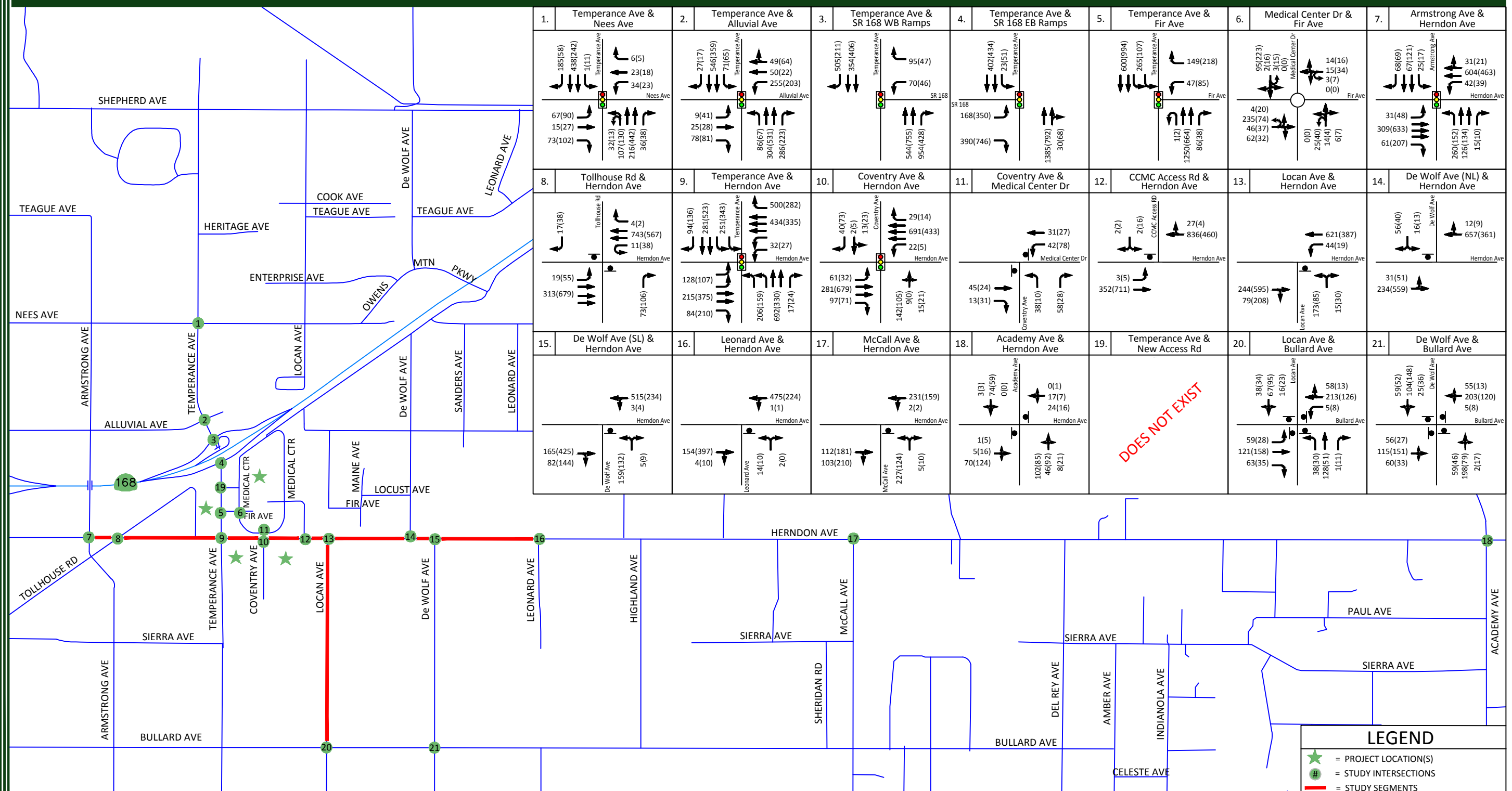
Figure  
1



(006-009) 03/03/2017 - SM

City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Existing - Traffic Volumes, Geometrics and Controls

Figure  
2



## Existing plus Project Phase 1 Traffic Conditions

### Project Description

The Project evaluated in this TIA includes two components. The first component is the proposed Clovis Community Medical Center (CCMC) Expansion Project, which is a phased project over the next 20 years. The CCMC expansion plan includes construction of new inpatient bed towers, medical office buildings, a general support building, a cancer center, a central plant, and a parking garage along with the expansion of the emergency department, surgical facilities, materials management and the outpatient community center. In addition, the CCMC project includes the potential development of areas adjacent to the main campus, primarily with retail commercial buildings, as well as a hotel and an assisted living center. The Clovis Community Medical Center Expansion Project will be completed in two phases.

The second component, the Herndon Avenue Project, is the proposed widening of Herndon Avenue from Temperance Avenue to De Wolf Avenue (south leg). Herndon Avenue will be widened to six lanes between Temperance Avenue and Coventry Avenue and four lanes from Coventry Avenue to the south leg of De Wolf Avenue. As needed, existing traffic signals within the Herndon Widening Project will be modified to accommodate the proposed lane geometrics. The Herndon Avenue Widening Project is anticipated to be completed by the City of Clovis in 2019 and thus from the Existing plus Project scenario forward, the widening of Herndon Avenue between Temperance Avenue and the south leg of De Wolf Avenue is part of the baseline lane geometrics.

Clovis Community Medical Center is planning a major expansion to its Healthcare Campus at Herndon Avenue and Temperance Avenue. The need for the expansion is due to the accelerating bed demand in Clovis resulting from the high population growth rate in the area. The expansion is divided into two major phases: (a) Phase 1: includes the anticipated Ten-Year Expansion Plan for the additional facilities and improvements that will be constructed by 2026, and (b) Phase 2: the Long-Range Development Site Plan that will be constructed by 2035. Figure 3 illustrates the Ten-Year Expansion Plan (Year 2026) along with the Long-Range Development Site Plan (Year 2035).

The Phase 1 Expansion Plan (Year 2026) consists of adding a 300,172 square-foot expansion of the existing hospital, 94,392 square feet of Medical Dental Office Building, 150,000 square feet of Shopping Center, and a 150 room Hotel.

The Phase 2 Long-Range Master Plan (Year 2035) expansion includes another 168,672 square-foot expansion of the existing hospital, 260,000 square feet of Medical Dental Office Building, 70,000 square feet of Shopping Center, and a 100 bed Assisted Living Facility.



## Transit

Clovis Transit is the transit operator in the City of Clovis. Currently, the nearest transit stop to the Project site is the Clovis Stageline Transit Route 50. Route 50 runs in the vicinity of the proposed Project via Temperance Avenue. This route provides a direct connection to Cal Skate, Kaiser Medical Center, Sierra Vista Mall, Clovis High School, CART (Center for Applied Research and Technology), Mickey Cox Elementary School, Clovis Community Medical Center, Clovis Civic Center, and Clark Junior High School. Route 50 operates at one-hour intervals Monday through Saturday. Its stop nearest to the project site is located on Temperance Avenue north of the intersection at Temperance Avenue and Fir Avenue.

## Bikeways

Currently, bike lanes exist in the vicinity of the project on its frontages to Herndon Avenue and Temperance Avenue. The 2035 Clovis General Plan Circulation Element designates Herndon Avenue and Temperance Avenue as Class II bike lanes.

## Travel Demand Analysis

### *Travel Demand Modeling Approach*

The Council of Fresno County Governments (Fresno COG) countywide gravity based model was used in the study. The current Fresno COG model is an AM and PM peak model. The model estimates peak hour trips using a trip generation equation for each land use type. After trip generation, the model distributes all the trips between their origins and destinations onto the roadway network in the model and assigns trips to individual streets.

JLB submitted a traffic modeling request to Fresno COG staff to update the major street network and add the existing and proposed Project land uses. The detailed network and corresponding land use data were provided by JLB to Fresno COG staff. Fresno COG completed all model runs. The electronic files of the model runs were then provided to JLB for post processing. The Furness Method, which modifies model-estimated turning volumes based upon observed turning volume counts, was utilized. Additionally, as recommended by the Model Steering Committee, the increment method was utilized to determine traffic volumes for the both Cumulative Year 2035 scenarios. Traffic models are contained in Appendix D.

### *Trip Generation*

Trip generation for the proposed Project is based on information provided by the Clovis Community Medical Center and the City of Clovis and trip rates are obtained from the standard reference Trip Generation, 9th Edition, published by the Institute of Transportation Engineers (ITE). Table III summarizes the trip generation for the proposed Phase 1 Expansion Plan (Year 2026), while Table IV summarizes the additional trip generation of the Phase 2 Long-Range Master Plan (Year 2035). Phase 1 of the CCMC is estimated to generate a maximum of 15,121 daily trips, 756 AM peak hour trips and 1,278 PM peak hour trips while Phase 2 of the CCMC is estimated to generate a maximum of 14,887 daily trips, 866 AM peak hour trips and 1,374 PM peak hour trips. Table V summarizes the cumulative trip generation of the CCMC Phase 1 (Year 2026) and Phase 2 Long-Range (Year 2035) Plans at build-out. At build-out, the CCMC Project is estimated to generate a maximum of 30,008 daily trips, 1,622 AM peak hour trips and 2,652 PM peak hour trips.



**Table III: Phase 1 (2026) Project Only Trip Generation**

| Land Use (ITE Code)                  | Size    | Unit          | Daily |        | AM Peak Hour |    |     |     |     |       | PM Peak Hour |    |     |     |     |       |
|--------------------------------------|---------|---------------|-------|--------|--------------|----|-----|-----|-----|-------|--------------|----|-----|-----|-----|-------|
|                                      |         |               | Rate  | Total  | Trip Rate    | In | Out | In  | Out | Total | Trip Rate    | In | Out | In  | Out | Total |
|                                      |         |               |       |        |              | %  |     |     |     |       |              | %  |     |     |     |       |
| Hotel (310)                          | 150     | Occupied Beds | 8.92  | 1,338  | 0.67         | 58 | 42  | 59  | 42  | 101   | 0.70         | 49 | 51  | 51  | 54  | 105   |
| Shopping Center (820)                | 150.000 | k.s.f.        | 42.70 | 6,405  | 0.96         | 62 | 38  | 89  | 55  | 144   | 3.71         | 48 | 52  | 267 | 290 | 557   |
| Hospital (610)                       | 300.172 | k.s.f         | 13.22 | 3,968  | 0.95         | 63 | 37  | 180 | 105 | 285   | 0.93         | 38 | 62  | 106 | 173 | 279   |
| Medical-Dental Office Building (710) | 94.392  | k.s.f         | 36.13 | 3,410  | 2.39         | 79 | 21  | 179 | 47  | 226   | 3.57         | 28 | 72  | 94  | 243 | 337   |
| Total Project Trips                  |         |               |       | 15,121 |              |    |     | 507 | 249 | 756   |              |    |     | 518 | 760 | 1,278 |

Notes: k.s.f. = Thousand Square Feet

**Table IV: Year 2035 Additional Project Only Trip Generation**

| Land Use (ITE Code)                  | Size    | Unit          | Daily |        | AM Peak Hour |    |     |     |     |       | PM Peak Hour |    |     |     |     |       |
|--------------------------------------|---------|---------------|-------|--------|--------------|----|-----|-----|-----|-------|--------------|----|-----|-----|-----|-------|
|                                      |         |               | Rate  | Total  | Trip Rate    | In | Out | In  | Out | Total | Trip Rate    | In | Out | In  | Out | Total |
|                                      |         |               |       |        |              | %  |     |     |     |       |              | %  |     |     |     |       |
| Assisted Living (254)                | 100     | Occupied Beds | 2.74  | 274    | 0.18         | 68 | 32  | 12  | 6   | 18    | 0.29         | 50 | 50  | 15  | 14  | 29    |
| Shopping Center (820)                | 70.000  | k.s.f.        | 42.70 | 2,989  | 0.96         | 62 | 38  | 42  | 25  | 67    | 3.71         | 48 | 52  | 125 | 135 | 260   |
| Hospital (610)                       | 168.672 | k.s.f         | 13.22 | 2,230  | 0.95         | 63 | 37  | 101 | 59  | 160   | 0.93         | 38 | 62  | 60  | 97  | 157   |
| Medical-Dental Office Building (710) | 260.000 | k.s.f         | 36.13 | 9,394  | 2.39         | 79 | 21  | 491 | 130 | 621   | 3.57         | 28 | 72  | 260 | 668 | 928   |
| Total Project Trips                  |         |               |       | 14,887 |              |    |     | 646 | 220 | 866   |              |    |     | 460 | 914 | 1,374 |

Notes: k.s.f. = Thousand Square Feet

**Table V: Year 2035 Total Project Only Trip Generation**

| Land Use                   | Daily         | AM Peak Hour |            |              | PM Peak Hour |              |              |
|----------------------------|---------------|--------------|------------|--------------|--------------|--------------|--------------|
|                            |               | In           | Out        | Total        | In           | Out          | Total        |
| <b>Total Project Trips</b> | <b>30,008</b> | <b>1,153</b> | <b>469</b> | <b>1,622</b> | <b>978</b>   | <b>1,674</b> | <b>2,652</b> |

Notes: k.s.f. = Thousand Square Feet

R = Rates developed from ITE regression equations

### Trip Distribution

Project trips were assigned to the study intersections based on existing travel patterns, the Fresno COG traffic model runs, communication with City of Clovis staff, knowledge of the study area, traffic engineering judgement, and the Clovis General Plan Circulation Element. Figure 4 illustrates the Phase 1 Project Only trip assignment to the study intersections and segments under the Existing plus Project Phase 1 scenario.

### Results of Existing plus Project Phase 1 Level of Service Analysis

The Existing plus Project Phase 1 scenario represents the anticipated operations of the study intersections and segments under the assumption of an immediate build-out of the Phase 1 Plan. It is unlikely that these conditions will occur since build-out of the Phase 1 Plans expected to occur over the next ten years.

Therefore, the analyses presented herein should be considered a worst-case scenario.

The Existing plus Project Phase 1 turning movement volumes, intersection geometrics, and controls are illustrated in Figure 5. By this scenario, it is assumed that the Herndon Avenue Project, the expansion of Herndon Avenue between Temperance Avenue and the south leg of De Wolf Avenue, has been



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Page | 17

completed. Therefore, this scenario takes into account the added lane geometric as illustrated in Figure 5 for this section of Herndon Avenue and the intersections of Herndon Avenue at Coventry Avenue, Herndon Avenue at CCMC Access Road, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (north leg), and Herndon Avenue at De Wolf Avenue (south leg). For all other study intersections and segments, this scenario assumes that the existing roadway geometrics and traffic controls will remain in place. The study intersection LOS calculation results are contained in Appendix F. Tables VI and VII summarize the LOS at the study intersections and segments, respectively, under the Existing plus Project Phase 1 scenario. Similar to the previous scenario, except for the intersection of SR 168 EB Ramps at Temperance Avenue, all study intersections are projected to operate at an acceptable LOS during both the AM and PM peak hours.

To improve the LOS at this intersection, it is recommended that a second eastbound right-turn lane and third northbound through lane be added and that the existing traffic signal be modified to accommodate the added lane geometrics.

Under this scenario, all study segments are projected to operate at an acceptable LOS.

**Table VI: Existing plus Project Phase 1 Intersection LOS Results**

|    | <i>Intersection</i>                    | <i>Intersection Control</i> | <i>(7-9) AM Peak Hour</i>          |            | <i>(4-6) PM Peak Hour</i>          |            |
|----|--|-----------------------------|------------------------------------|------------|------------------------------------|------------|
|    |  |                             | <i>Average Delay<br/>(sec/veh)</i> | <i>LOS</i> | <i>Average Delay<br/>(sec/veh)</i> | <i>LOS</i> |
| 1  | Nees Avenue / Temperance Avenue        | Signalized                  | 24.2                               | C          | 21.2                               | C          |
| 2  | Alluvial Avenue / Temperance Avenue    | Signalized                  | 37.7                               | D          | 24.8                               | C          |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized                  | 6.4                                | A          | 1.7                                | A          |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized                  | <b>65.0</b>                        | <b>E</b>   | <b>77.6</b>                        | <b>E</b>   |
|    |  | Signalized (Mitigated)      | 17.8                               | B          | 22.6                               | C          |
| 5  | Fir Avenue / Temperance Avenue         | Signalized                  | 33.6                               | C          | 31.1                               | C          |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout                  | 9.2                                | A          | 8.8                                | A          |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized                  | 37.8                               | D          | 46.1                               | D          |
| 8  | Herndon Avenue / Tollhouse Road        | Two-Way STOP                | 11.4                               | B          | 15.3                               | C          |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized                  | 52.4                               | D          | 31.2                               | C          |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized                  | 38.8                               | D          | 22.8                               | C          |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP                | 13.6                               | B          | 10.8                               | B          |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP                | 11.9                               | B          | 9.9                                | A          |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP                | 28.9                               | D          | 22.9                               | C          |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP                | 13.2                               | B          | 11.7                               | B          |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP                | 23.7                               | C          | 19.9                               | C          |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP                | 14.4                               | B          | 14.6                               | B          |
| 17 | Herndon Avenue / McCall Avenue         | One-Way STOP                | 15.5                               | C          | 15.0                               | C          |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP                | 13.5                               | B          | 14.8                               | B          |
| 19 | New Access Road / Temperance Avenue    | One-Way STOP                | 21.0                               | C          | 19.5                               | C          |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP                | 13.7                               | B          | 11.4                               | B          |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP                | 15.1                               | C          | 11.7                               | B          |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
LOS for Two-Way and One-Way STOP controlled intersections are based on the worst approach/movement of the minor street.





**Table VII: Existing plus Project Phase 1 Segment LOS Results**

| <i>Study Segment</i> | <i>Limits</i>                               | <i>Lanes</i> | <i>24-hour Volume</i> | <i>LOS</i> |
|----------------------|---|--------------|-----------------------|------------|
| Herndon Avenue       | Armstrong Avenue and Tollhouse Road         | 5            | 16,631                | C          |
| Herndon Avenue       | Tollhouse Road and Temperance Avenue        | 5            | 18,003                | C          |
| Herndon Avenue       | Temperance Avenue and Coventry Avenue       | 6            | 15,597                | C          |
| Herndon Avenue       | Coventry Avenue and CCMC Access Road        | 4            | 13,358                | C          |
| Herndon Avenue       | CCMC Access Road and Locan Avenue           | 4            | 13,744                | C          |
| Herndon Avenue       | Locan Avenue and De Wolf Avenue (NL)        | 4            | 10,077                | C          |
| Herndon Avenue       | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 4            | 9,048                 | B          |
| Herndon Avenue       | De Wolf Avenue (SL) and Leonard Avenue      | 2            | 7,975                 | C          |
| Locan Avenue         | Herndon Avenue and Bullard Avenue           | 2            | 2,329                 | B          |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

### *Traffic Signal Warrants*

Peak hour traffic signal warrants were prepared for the unsignalized study intersections for the Existing plus Project Phase 1 Traffic Conditions scenario. These warrants are found in Appendix J. Under this scenario, the intersection of Herndon Avenue at Locan Avenue satisfies peak hour signal warrants during both peaks, while the intersection of Bullard Avenue at De Wolf Avenue and Herndon Avenue at De Wolf Avenue satisfy peak hour signal warrants during the AM peak only and the intersection of Herndon Avenue at Tollhouse Road satisfies peak hour signal warrants during the PM peak only. Based on the signal warrants, the intersection operational analysis and traffic engineering judgment, signalization of these intersections is not recommended. It is worth noting that CA MUTCD states “satisfaction of a signal warrant or warrants shall not in itself require the installation of a traffic signal.” Therefore, it is recommended that prior to the installation of a traffic signal, investigation of CA MUTCD warrants 1, 4, and 7, as applicable, be conducted for these intersections.



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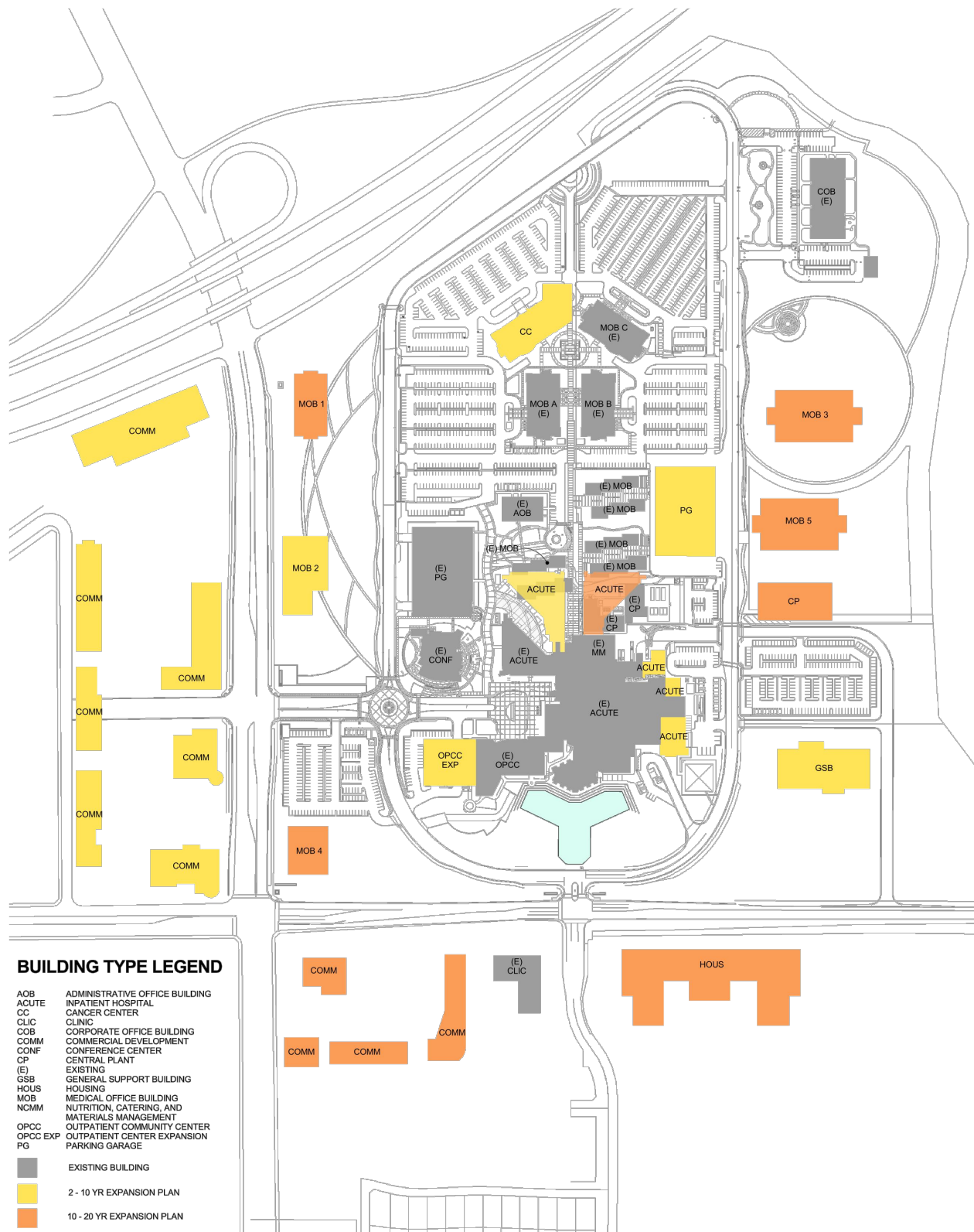
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Page | 19



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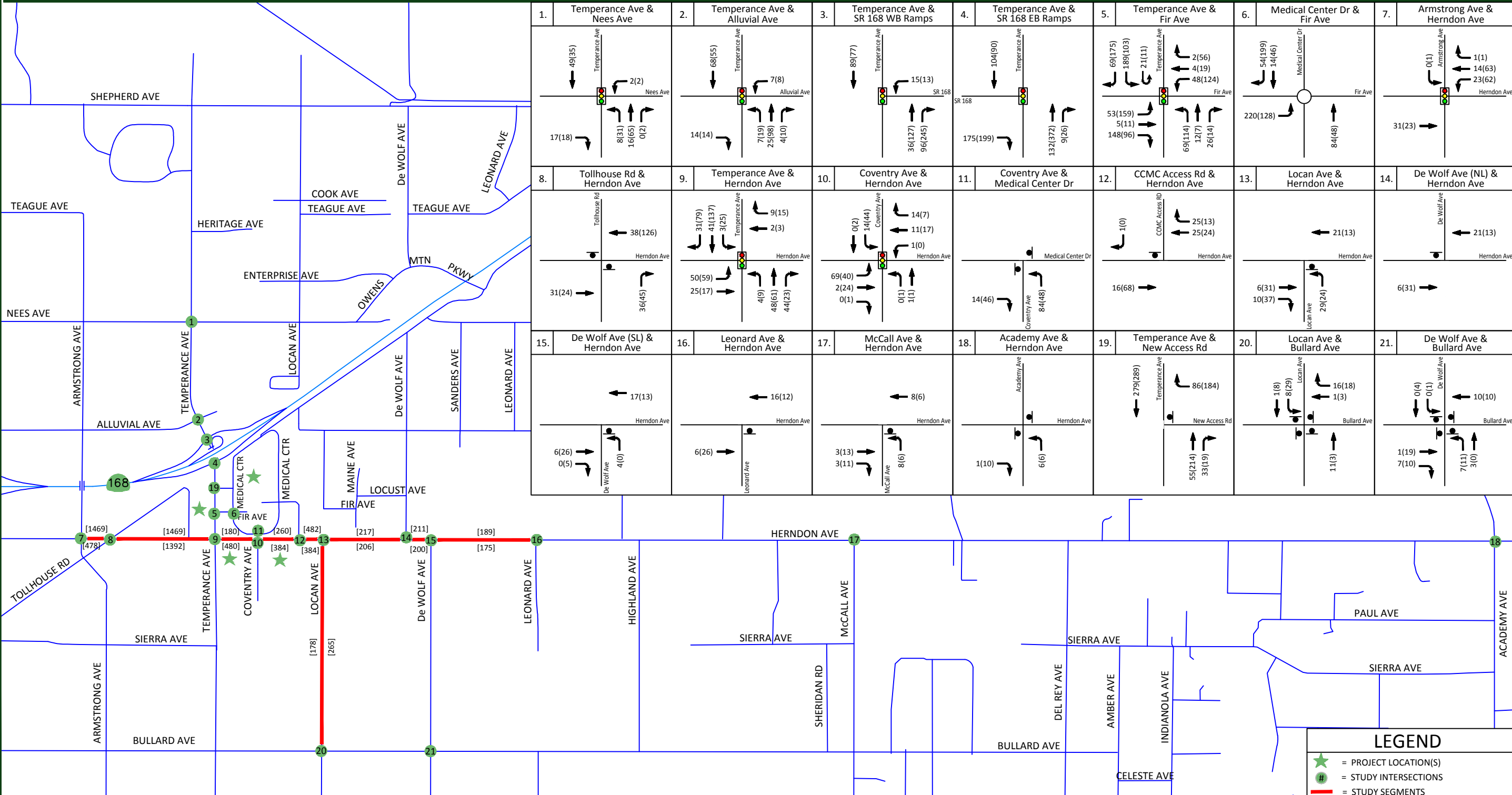


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City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Phase 1 (2026) - Project Only Trip Assignment

Figure  
4



**LEGEND**

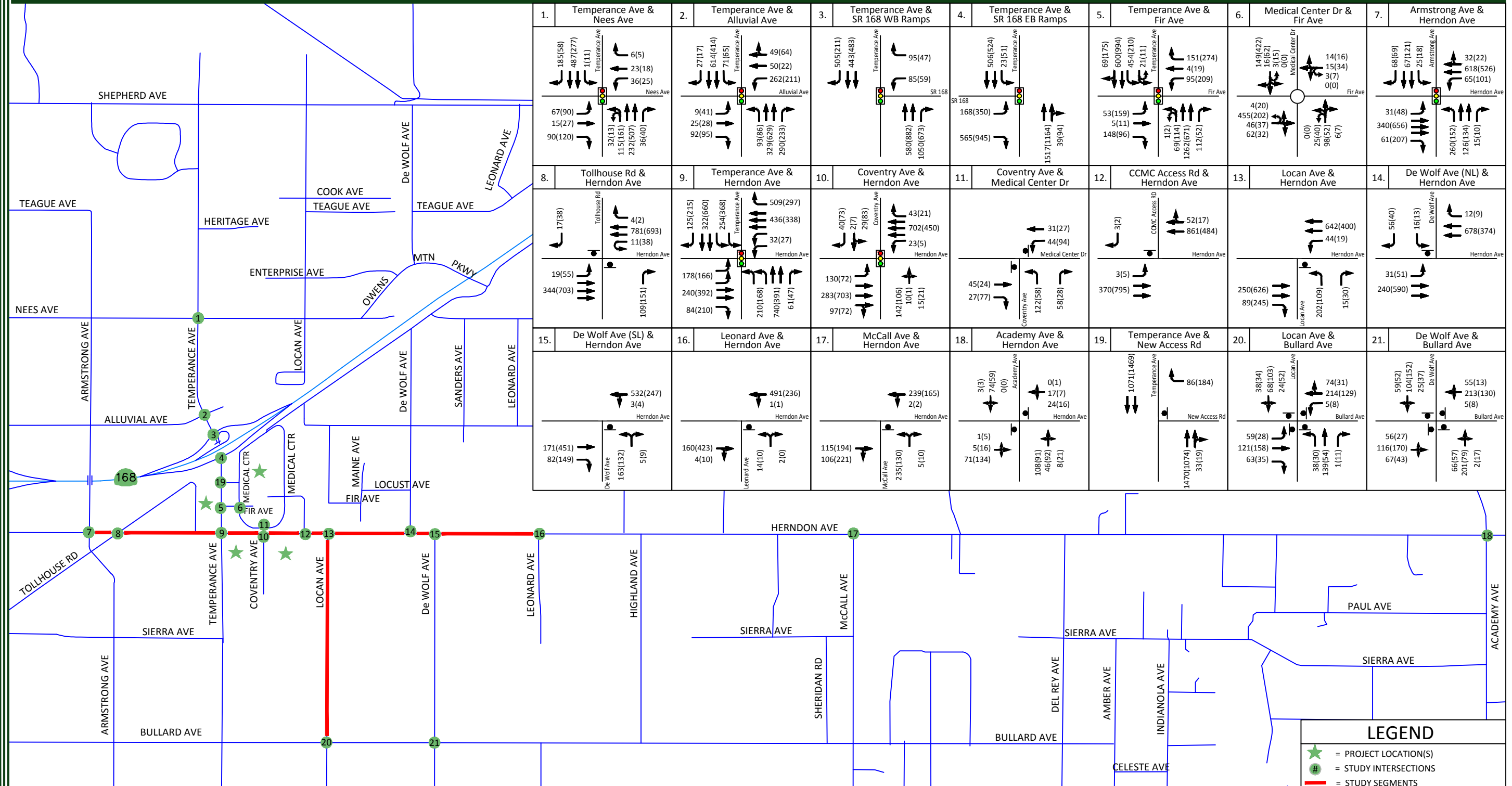
- ★ = PROJECT LOCATION(S)
- # = STUDY INTERSECTIONS
- = STUDY SEGMENTS
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- [XX] = DAILY TRIPS
- = STOP SIGN
- 🚦 = SIGNALIZED INTERSECTION
- = ROUNDABOUT

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City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Existing plus Project Phase 1 - Traffic Volumes, Geometrics and Controls

Figure  
5



**LEGEND**

- ★ = PROJECT LOCATION(S)
- # = STUDY INTERSECTIONS
- = STUDY SEGMENTS
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- [XX] = DAILY TRIPS
- ◫ = STOP SIGN
- ◫◫ = SIGNALIZED INTERSECTION
- = ROUNDABOUT

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## Near Term plus Project Phase 1 Traffic Conditions

### Description of Approved and Pipeline Projects

Approved and Pipeline Projects consist of developments that are either under construction, built but not fully occupied, are not built but have final site development review (SDR) approval, or for which the lead agency or responsible agencies have knowledge of. On September 13, 2016, JLB staff conducted a reconnaissance of the surrounding area to confirm the near term projects. Subsequently, it was agreed that the projects listed in Table VIII were approved, near approval, or in the pipeline within the proximity of the Project site.

The trip generation listed in Table VIII is that which is anticipated to be added to the streets and highways by these projects between the time of the preparation of this report and five years after build-out of Phase 1. Near term projects are estimated to generate 45,938 daily trips, 4,655 AM peak hour trips and 5,267 PM peak hour trips. Figure 6 illustrates the location of the approved, near approval, or pipeline projects and their combined trip assignment to the study intersections and segments under this scenario.

**Table VIII: Near Term plus Project Phase 1 Trip Generation**

| <i>Approved Project Location</i>                 | <i>Approved or Pipeline Project Name</i>                    | <i>Daily Trips</i> | <i>AM Peak Hour Trips</i> | <i>PM Peak Hour Trips</i> |
|--|---|--------------------|---------------------------|---------------------------|
| A  | TT 5427 Single Family Subdivision <sup>1</sup>              | 3,265              | 257                       | 343                       |
| B  | TT 5461 <sup>1</sup>  | 457                | 36                        | 48                        |
| C  | TT 5472 Single Family Subdivision (portion of) <sup>1</sup> | 1,457              | 115                       | 153                       |
| D  | TT 5546 <sup>2</sup>  | 314                | 25                        | 33                        |
| E  | TT 5550 Single Family Subdivision <sup>2</sup>              | 295                | 23                        | 31                        |
| F  | TT 5605 <sup>2</sup>  | 3,084              | 243                       | 324                       |
| G  | TT 5701 <sup>2</sup>  | 1,152              | 91                        | 121                       |
| H  | TT 5717 Various Land Uses (portion of) <sup>3</sup>         | 4,823              | 595                       | 622                       |
| I  | TT 5720A <sup>2</sup>                                       | 219                | 17                        | 23                        |
| J  | TT 5836 <sup>1</sup>  | 381                | 30                        | 40                        |
| K  | TT 6049 <sup>2</sup>  | 238                | 19                        | 25                        |
| L  | TT 6067 <sup>3</sup>  | 942                | 74                        | 99                        |
| M  | TT 6072 Single Family Subdivision (portion of) <sup>1</sup> | 809                | 64                        | 85                        |
| N  | TT 6109 Single Family Subdivision <sup>4</sup>              | 2,742              | 216                       | 288                       |
| O  | TT 6112 Single Family Subdivision (portion of) <sup>2</sup> | 724                | 57                        | 76                        |
| P  | TT 6128 <sup>4</sup>  | 419                | 33                        | 44                        |
| Q  | TT 6145 <sup>4</sup>  | 657                | 52                        | 69                        |
| R  | 20,000 square-foot Office Building <sup>2</sup>             | 221                | 31                        | 30                        |
| S  | C-09-106 <sup>3</sup>                                       | 2,065              | 148                       | 159                       |
| T  | Harbor House Apartments <sup>4</sup>                        | 313                | 24                        | 29                        |
| U  | Harlan Ranch Commercial <sup>2</sup>                        | 4,687              | 105                       | 407                       |
| V  | RT Park <sup>1</sup>  | 16,055             | 2,351                     | 2,153                     |
| W  | Subdivision at NWQ of Ashlan and De Wolf <sup>2</sup>       | 619                | 49                        | 65                        |
| <b>Total Approved and Pipeline Project Trips</b> |   | <b>45,938</b>      | <b>4,655</b>              | <b>5,267</b>              |

Notes: 1 = Trip Generation based on Peters Engineering Traffic Impact Study Report  
2 = Trip Generation Prepared by JLB based Readily Available Land Development Data  
3 = Trip Generation based on TJKM Traffic Impact Analysis Report  
4 = Trip Generation based on JLB Traffic Engineering, Inc. Traffic Impact Analysis Report

## Results of Near Term plus Project Phase 1 Level of Service Analysis

This scenario assumes that the baseline lane geometrics and traffic controls for the Existing plus Project Phase 1 Traffic Conditions scenario will remain in place with one exception. The exception is that the intersection of Alluvial Avenue at Temperance Avenue will transition from a signalized intersection to a two-lane roundabout. At present, the City of Clovis is finalizing the construction documents for the roundabout and construction is projected to be completed by the year 2020. Therefore, this scenario analyzes the intersection of Alluvial Avenue at Temperance Avenue as a two-lane roundabout.

The Near Term Project Only trips are illustrated in Figure 6, while the Near Term plus Project Phase 1 total turning movement volumes, intersection geometrics, and traffic controls are illustrated in Figure 7. The study intersection's LOS calculation results are contained in Appendix G. Tables IX and X summarize the LOS at the study intersections and segments, respectively, under this scenario. Under this scenario, except for the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Temperance Avenue, and Herndon Avenue at De Wolf Avenue (south leg), all intersections are projected to operate at acceptable LOS during both the AM and PM peak hours.

To improve the LOS at each one of the intersections projected to exceed its LOS threshold, it is recommended that the improvement measures recommended under the Existing plus Project Phase 1 Traffic Conditions scenario be implemented along with the following.

- Herndon Avenue at Temperance Avenue
  - Implement overlap phasing of the westbound right-turn with the southbound left-turn phase
  - Prohibit southbound to northbound U-turns
- Herndon Avenue at De Wolf Avenue (south leg)
  - Add All-Way STOP traffic controls

It should be noted that of the near term projects, the Project being analyzed accounts for 24.8, 14.0 and 19.5 percent of the total near term project traffic for the daily, AM and PM peak hours, respectively. Therefore, it can be deduced that the mitigation measures presented under this scenario may not be necessary immediately upon completion of the proposed Phase 1 Project. However, assuming that all of the near term projects are developed close to the completion date of the Phase 1 Project being analyzed, the detailed mitigation measures presented in the Near Term plus Project Phase 1 scenario will be necessary in order to improve the LOS to an acceptable threshold.

Under this scenario, all study segments are projected to operate at an acceptable LOS.

**Table IX: Near Term plus Project Phase 1 Intersection LOS Results**

|    | <i>Intersection</i>                    | <i>Intersection Control</i> | <i>(7-9) AM Peak Hour</i>          |            | <i>(4-6) PM Peak Hour</i>          |            |
|----|--|-----------------------------|------------------------------------|------------|------------------------------------|------------|
|    |  |                             | <i>Average Delay<br/>(sec/veh)</i> | <i>LOS</i> | <i>Average Delay<br/>(sec/veh)</i> | <i>LOS</i> |
| 1  | Nees Avenue / Temperance Avenue        | Signalized                  | 33.2                               | C          | 29.9                               | C          |
| 2  | Alluvial Avenue / Temperance Avenue    | Roundabout                  | 9.2                                | A          | 9.8                                | A          |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized                  | 4.3                                | A          | 2.5                                | A          |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized                  | <b>81.9</b>                        | <b>F</b>   | <b>87.0</b>                        | <b>F</b>   |
|    |  | Signalized (Mitigated)      | 33.1                               | C          | 20.9                               | C          |
| 5  | Fir Avenue / Temperance Avenue         | Signalized                  | 54.3                               | D          | 40.0                               | D          |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout                  | 9.2                                | A          | 8.8                                | A          |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized                  | 38.4                               | D          | 51.3                               | D          |
| 8  | Herndon Avenue / Tollhouse Rodd        | Two-Way STOP                | 11.7                               | B          | 16.0                               | C          |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized                  | <b>58.3</b>                        | <b>E</b>   | 37.2                               | D          |
|    |  | Signalized (Mitigated)      | 39.9                               | D          | 27.0                               | C          |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized                  | 40.3                               | D          | 48.5                               | D          |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP                | 13.6                               | B          | 10.8                               | B          |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP                | 12.1                               | B          | 10.0                               | B          |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP                | 32.2                               | D          | 25.6                               | D          |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP                | 13.4                               | B          | 12.4                               | B          |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP                | <b>25.7</b>                        | <b>D</b>   | 21.5                               | C          |
|    |  | All-Way STOP (Mitigated)    | 20.5                               | C          | 15.3                               | C          |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP                | 14.9                               | B          | 14.9                               | B          |
| 17 | Herndon Avenue / McCall Avenue         | One-Way STOP                | 15.7                               | C          | 15.3                               | C          |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP                | 13.6                               | B          | 14.9                               | B          |
| 19 | New Access Road / Temperance Avenue    | One-Way STOP                | 30.6                               | D          | 24.3                               | C          |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP                | 15.0                               | B          | 12.2                               | B          |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP                | 16.1                               | C          | 12.4                               | B          |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
LOS for Two-Way and One-Way STOP controlled intersections are based on the worst approach/movement of the minor street.

**Table X: Near Term plus Project Phase 1 Segment LOS Results**

| <i>Study Segment</i> | <i>Limits</i>                               | <i>Lanes</i> | <i>24-hour Volume</i> | <i>LOS</i> |
|----------------------|---|--------------|-----------------------|------------|
| Herndon Avenue       | Armstrong Avenue and Tollhouse Road         | 5            | 23,111                | C          |
| Herndon Avenue       | Tollhouse Road and Temperance Avenue        | 5            | 24,603                | C          |
| Herndon Avenue       | Temperance Avenue and Coventry Avenue       | 6            | 16,337                | C          |
| Herndon Avenue       | Coventry Avenue and CCMC Access Road        | 4            | 14,048                | C          |
| Herndon Avenue       | CCMC Access Road and Locan Avenue           | 4            | 14,434                | C          |
| Herndon Avenue       | Locan Avenue and De Wolf Avenue (NL)        | 4            | 10,617                | C          |
| Herndon Avenue       | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 4            | 9,528                 | B          |
| Herndon Avenue       | De Wolf Avenue (SL) and Leonard Avenue      | 2            | 8,355                 | C          |
| Locan Avenue         | Herndon Avenue and Bullard Avenue           | 2            | 2,519                 | B          |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables



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Page | 25

### *Traffic Signal Warrants*

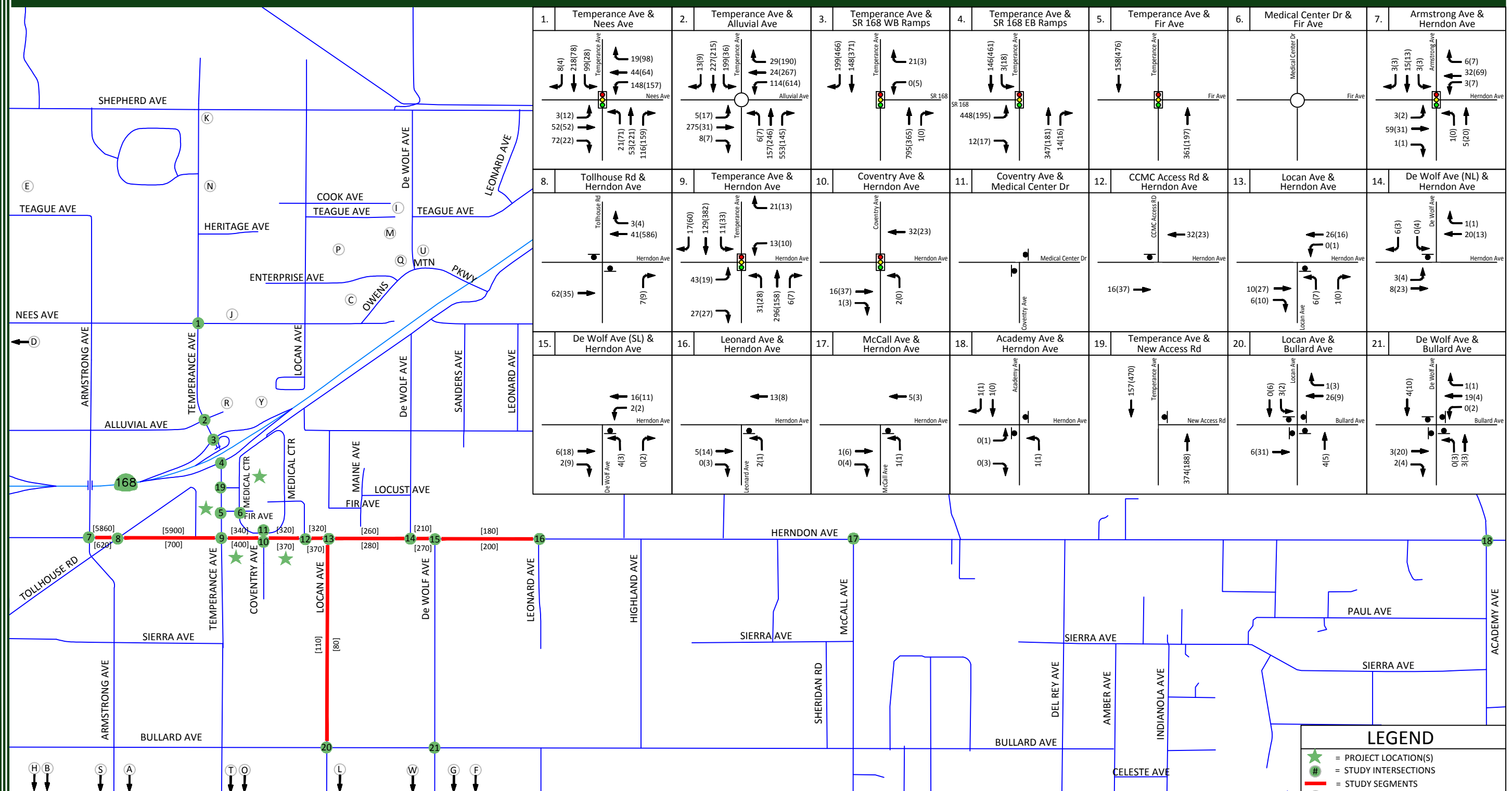
Peak hour traffic signal warrants were prepared for the unsignalized study intersections for the Near Term plus Project Phase 1 Traffic Conditions scenario. These warrants are found in Appendix J. Under this scenario, the intersection of Herndon Avenue at Locan Avenue satisfies peak hour signal warrants during both peaks, while the intersections of Herndon Avenue at De Wolf Avenue (south leg), Herndon Avenue at McCall Avenue and Bullard Avenue at De Wolf Avenue satisfy peak hour signal warrants during the AM peak only and Herndon Avenue at Tollhouse Road satisfies peak hour signal warrants during the PM peak only. Based on the signal warrants, the intersection operational analysis and traffic engineering judgment, signalization of these intersections is not recommended. It is worth noting that CA MUTCD states “satisfaction of a signal warrant or warrants shall not in itself require the installation of a traffic signal.” Therefore, it is recommended that prior to the installation of a traffic signal, investigation of CA MUTCD warrants 1, 4, and 7, as applicable, be conducted for these intersections.





City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Near Term Project's - Trip Assignment

Figure  
6



|                                    |                                  |                                     |                                      |                                    |                                |                                    |
|------------------------------------|----------------------------------|-------------------------------------|--------------------------------------|------------------------------------|--------------------------------|------------------------------------|
| 1. Temperance Ave & Nees Ave       | 2. Temperance Ave & Alluvial Ave | 3. Temperance Ave & SR 168 WB Ramps | 4. Temperance Ave & SR 168 EB Ramps  | 5. Temperance Ave & Fir Ave        | 6. Medical Center Dr & Fir Ave | 7. Armstrong Ave & Herndon Ave     |
| 8. Tollhouse Rd & Herndon Ave      | 9. Temperance Ave & Herndon Ave  | 10. Coventry Ave & Herndon Ave      | 11. Coventry Ave & Medical Center Dr | 12. CCMC Access Rd & Herndon Ave   | 13. Locan Ave & Herndon Ave    | 14. De Wolf Ave (NL) & Herndon Ave |
| 15. De Wolf Ave (SL) & Herndon Ave | 16. Leonard Ave & Herndon Ave    | 17. McCall Ave & Herndon Ave        | 18. Academy Ave & Herndon Ave        | 19. Temperance Ave & New Access Rd | 20. Locan Ave & Bullard Ave    | 21. De Wolf Ave & Bullard Ave      |

LEGEND

= PROJECT LOCATION(S)

= STUDY INTERSECTIONS

= STUDY SEGMENTS

= NEAR TERM PROJECT LOCATION

= AM PEAK HOUR TRIPS

= PM PEAK HOUR TRIPS

= DAILY TRIPS

= STOP SIGN

= SIGNALIZED INTERSECTION

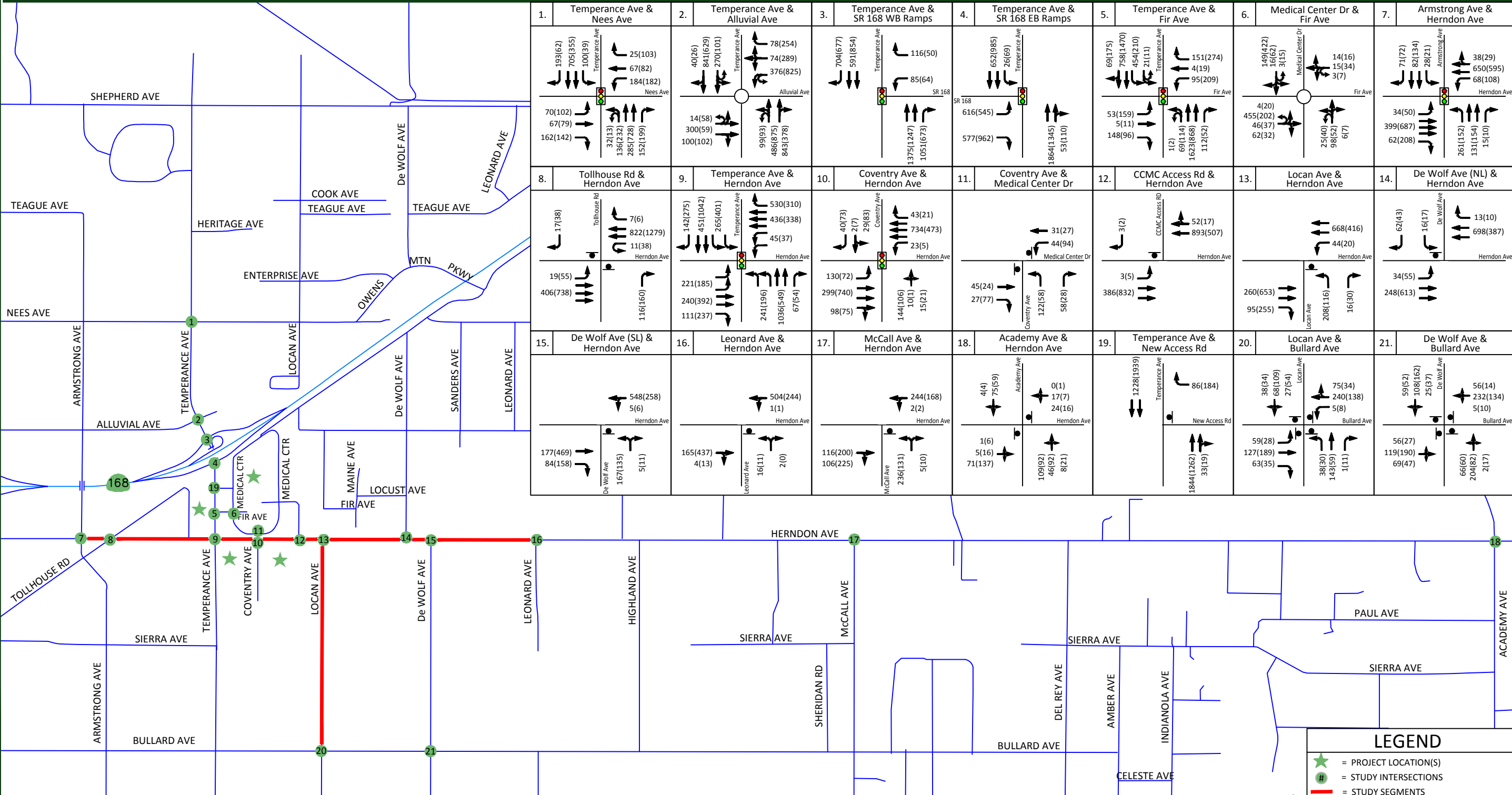
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City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Near Term plus Project Phase 1 - Traffic Volumes, Geometrics and Controls

Figure  
7



**LEGEND**

- ★ = PROJECT LOCATION(S)
- # = STUDY INTERSECTIONS
- = STUDY SEGMENTS
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- [XX] = DAILY TRIPS
- = STOP SIGN
- 🚦 = SIGNALIZED INTERSECTION
- = ROUNDABOUT

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## Cumulative Year 2035 No Project Traffic Conditions

Per information obtained from the City of Clovis and the Fresno COG model, it is projected that McCall Avenue will be constructed between Herndon Avenue and SR 168 by the year 2035. As a result, this scenario assumes the presence of McCall Avenue north of Herndon Avenue. This scenario assumes that the lane geometrics and traffic controls presented for the Near Term plus Project Phase 1 Traffic Conditions scenario will remain in place.

## Results of Cumulative Year 2035 No Project Level of Service Analysis

The study intersection LOS calculation results are contained in Appendix H. Tables XI and XII summarize the LOS at the study intersections and segments, respectively, under all study scenarios. The Cumulative Year 2035 No Project total turning movement volumes, intersection geometrics, and traffic controls are illustrated in Figure 8.

Under this scenario, several of the study intersections are expected to exceed their respective LOS thresholds. These include the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (north leg), Herndon Avenue at De Wolf Avenue (south leg), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue. To improve the LOS at each one of the intersections projected to exceed its LOS threshold, it is recommended that the following improvement measures as presented below and illustrated in Figure 9 be implemented.

- SR 168 EB Ramps at Temperance Avenue
  - Add a second eastbound left-turn lane
  - Add a second eastbound right-turn lane
  - Add a third northbound thru lane
  - Modify the traffic signal to accommodate the added lane geometrics
- Herndon Avenue at Armstrong Avenue
  - Add a third westbound thru lane
  - Modify the traffic signal to accommodate the added lane
- Herndon Avenue at Temperance Avenue
  - Implement overlap phasing of the westbound right-turn with the southbound left-turn phase
  - Prohibit southbound to northbound U-turns
- Herndon Avenue at Locan Avenue
  - Signalize the intersection
  - Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue
- Herndon Avenue at De Wolf Avenue (NL)
  - Signalize the intersection
  - Limit pedestrian crosswalks across Herndon Avenue to the west leg of Herndon Avenue



- Herndon Avenue at De Wolf Avenue (SL)
  - Convert the westbound left-thru lane to a thru lane
  - Add a westbound left-turn lane
  - Signalize the intersection
  - Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue
- Herndon Avenue at Leonard Avenue
  - Convert the westbound left-thru lane to a thru lane
  - Add a westbound left-turn lane
  - Signalize the intersection
  - Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue
- Herndon Avenue at McCall Avenue
  - Convert the eastbound left-thru-right lane to a thru-right lane
  - Convert the westbound left-thru-right lane to a thru-right lane
  - Convert the northbound left-thru-right lane to a thru-right lane
  - Convert the southbound left-thru-right lane to a thru-right lane
  - Add left-turn lanes to all approaches
  - Signalize the intersection
- Herndon Avenue at Academy Avenue
  - Convert the eastbound left-thru-right lane to a left-thru lane
  - Add an eastbound right-turn lane
  - Convert the northbound left-thru-right lane to a thru-right lane
  - Add a northbound left-turn lane
  - Implement All-Way STOP controls
- Bullard Avenue at Locan Avenue
  - Add a second eastbound thru lane
  - Add a second westbound thru lane
  - Convert the southbound left-thru-right lane to a thru-right lane
  - Add a southbound left-turn lane
  - Signalize the intersection
- Bullard Avenue at De Wolf Avenue
  - Add an eastbound left-turn lane
  - Convert the eastbound left-thru-right lane to a thru lane
  - Add an eastbound right-turn lane
  - Convert the westbound left-thru-right lane to a thru-right lane
  - Add a westbound left-turn lane
  - Convert the northbound left-thru-right lane to a thru-right lane
  - Add a northbound left-turn lane
  - Convert the southbound left-thru-right lane to a thru-right lane
  - Add a southbound left-turn lane
  - Signalize the intersection

Under this scenario, all study segments are projected to operate at an acceptable LOS.



**Table XI: Cumulative Year 2035 No Project Intersection LOS Results**

|    | Intersection                           | Intersection Control     | (7-9) AM Peak Hour         |          | (4-6) PM Peak Hour         |          |
|----|--|--------------------------|----------------------------|----------|----------------------------|----------|
|    |  |                          | Average Delay<br>(sec/veh) | LOS      | Average Delay<br>(sec/veh) | LOS      |
| 1  | Nees Avenue / Temperance Avenue        | Signalized               | 36.1                       | D        | 27.7                       | C        |
| 2  | Alluvial Avenue / Temperance Avenue    | Roundabout               | 10.1                       | B        | 10.0                       | B        |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized               | 6.7                        | A        | 4.5                        | A        |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized               | <b>46.1</b>                | <b>D</b> | <b>50.8</b>                | <b>D</b> |
|    |  | Signalized (Mitigated)   | 23.5                       | C        | 30.2                       | C        |
| 5  | Fir Avenue / Temperance Avenue         | Signalized               | 14.3                       | B        | 10.1                       | B        |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout               | 6.1                        | A        | 5.6                        | A        |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized               | <b>64.1</b>                | <b>E</b> | 28.9                       | C        |
|    |  | Signalized (Mitigated)   | 48.5                       | D        | 42.6                       | D        |
| 8  | Herndon Avenue / Tollhouse Road        | Two-Way STOP             | 15.4                       | C        | 21.9                       | C        |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized               | <b>65.4</b>                | <b>E</b> | 31.7                       | D        |
|    |  | Signalized (Mitigated)   | 49.9                       | D        | 45.8                       | D        |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized               | 26.8                       | C        | 12.1                       | B        |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP             | 9.8                        | A        | 9.4                        | A        |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP             | 17.3                       | C        | 13.4                       | B        |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP             | <b>&gt;120</b>             | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)   | 21.0                       | C        | 18.5                       | B        |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP             | 19.3                       | C        | <b>37.4</b>                | <b>E</b> |
|    |  | Signalized (Mitigated)   | 3.8                        | A        | 3.1                        | A        |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP             | <b>&gt;120</b>             | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)   | 22.0                       | C        | 22.3                       | C        |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP             | <b>69.5</b>                | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)   | 16.9                       | B        | 22.7                       | C        |
| 17 | Herndon Avenue / McCall Avenue         | Two-Way STOP             | <b>&gt;120</b>             | <b>F</b> | <b>&gt;120</b>             | <b>F</b> |
|    |  | Signalized (Mitigated)   | 40.3                       | D        | 39.5                       | D        |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP             | <b>26.3</b>                | <b>D</b> | <b>93.3</b>                | <b>F</b> |
|    |  | All-Way STOP (Mitigated) | 10.9                       | B        | 16.6                       | C        |
| 19 | New Access Road / Temperance Avenue    | Does Not Exist           | N/A                        | N/A      | N/A                        | N/A      |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP             | <b>64.1</b>                | <b>F</b> | <b>67.4</b>                | <b>F</b> |
|    |  | Signalized (Mitigated)   | 48.5                       | D        | 42.5                       | D        |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP             | <b>68.7</b>                | <b>F</b> | <b>78.1</b>                | <b>F</b> |
|    |  | Signalized (Mitigated)   | 49.2                       | D        | 40.6                       | D        |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.



**Table XII: Cumulative Year 2035 No Project Segment LOS Results**

| <i>Study Segment</i> | <i>Limits</i>                               | <i>Lanes</i> | <i>24-hour Volume</i> | <i>LOS</i> |
|----------------------|---|--------------|-----------------------|------------|
| Herndon Avenue       | Armstrong Avenue and Tollhouse Road         | 5            | 25,960                | C          |
| Herndon Avenue       | Tollhouse Road and Temperance Avenue        | 5            | 29,140                | C          |
| Herndon Avenue       | Temperance Avenue and Coventry Avenue       | 6            | 33,330                | C          |
| Herndon Avenue       | Coventry Avenue and CCMC Access Road        | 4            | 31,400                | C          |
| Herndon Avenue       | CCMC Access Road and Locan Avenue           | 4            | 31,870                | C          |
| Herndon Avenue       | Locan Avenue and De Wolf Avenue (NL)        | 4            | 23,840                | C          |
| Herndon Avenue       | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 4            | 22,870                | C          |
| Herndon Avenue       | De Wolf Avenue (SL) and Leonard Avenue      | 2            | 15,580                | C          |
| Locan Avenue         | Herndon Avenue and Bullard Avenue           | 2            | 14,970                | C          |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

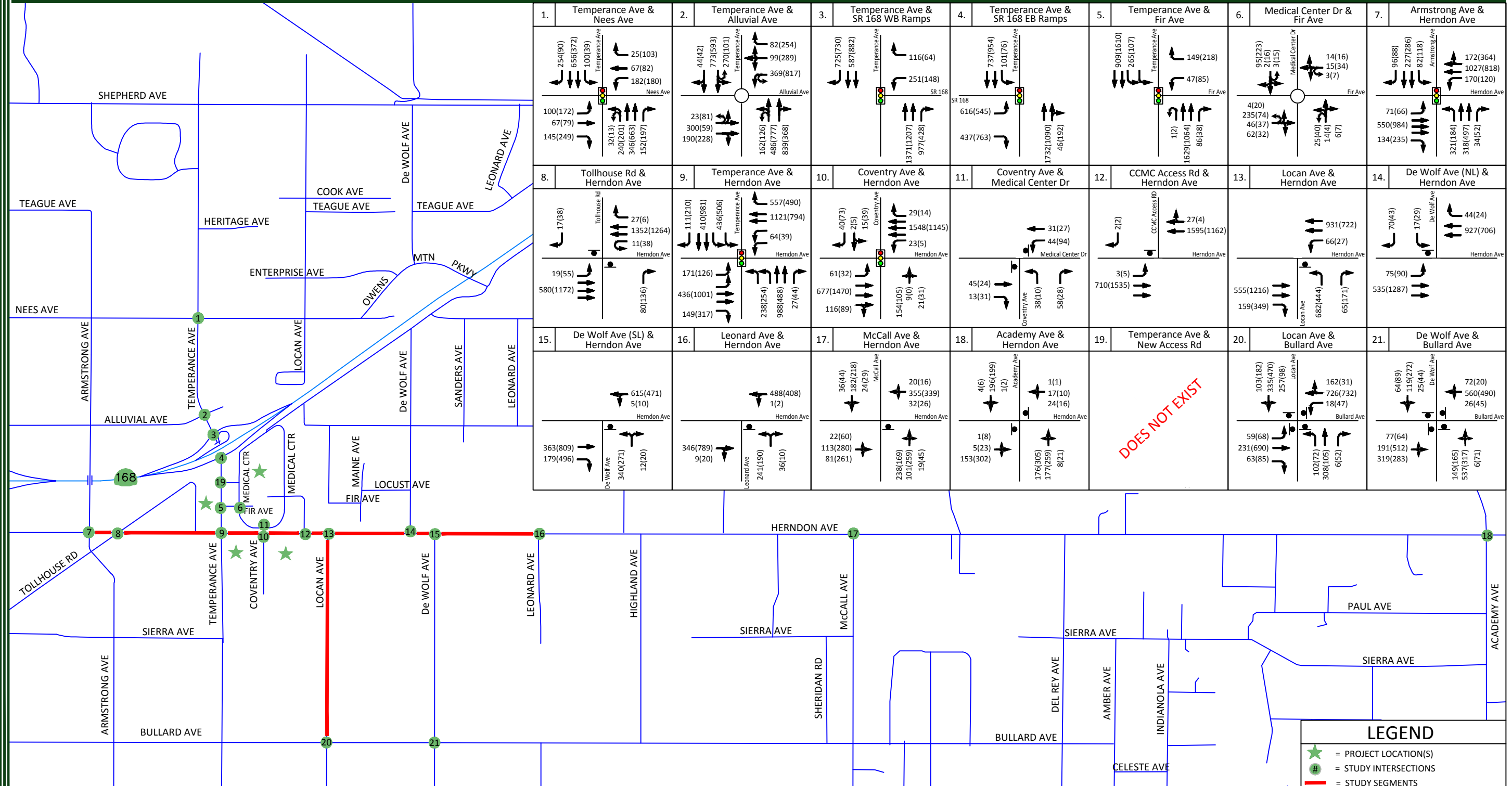
### *Traffic Signal Warrants*

Peak hour traffic signal warrants were prepared for the unsignalized study intersections for the Cumulative Year 2035 No Project Traffic Conditions scenario. These warrants are found in Appendix J. Under this scenario, the intersections of Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (SL), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue satisfy peak hour signal warrants during both peaks, while the intersection of Herndon Avenue at Academy Avenue satisfies peak hour signal warrants during the PM peak only. Except for the intersection of Herndon Avenue at Academy Avenue, based on the signal warrants, the intersection operational analysis and traffic engineering judgment, signalization of these intersections is recommended. The intersection of Herndon Avenue at Academy Avenue is projected to function at an acceptable LOS without the need for a traffic signal. It is worth noting that CA MUTCD states “satisfaction of a signal warrant or warrants shall not in itself require the installation of a traffic signal.” Therefore, it is recommended that prior to the installation of a traffic signal at the intersection of Herndon Avenue at Academy Avenue, investigation of CA MUTCD warrants 1, 4, and 7, as applicable, be conducted. On the other hand, the intersection of Herndon Avenue at De Wolf Avenue (north leg) is projected to operate at an unacceptable LOS threshold and implementation of All-STOP controls and the addition of lanes is not projected to improve its LOS to an acceptable level. Therefore, it is recommended that the intersection of Herndon Avenue at De Wolf Avenue (north leg) be signalized.



City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Cumulative Year 2035 No Project - Traffic Volumes, Geometrics and Controls

Figure  
8



**LEGEND**

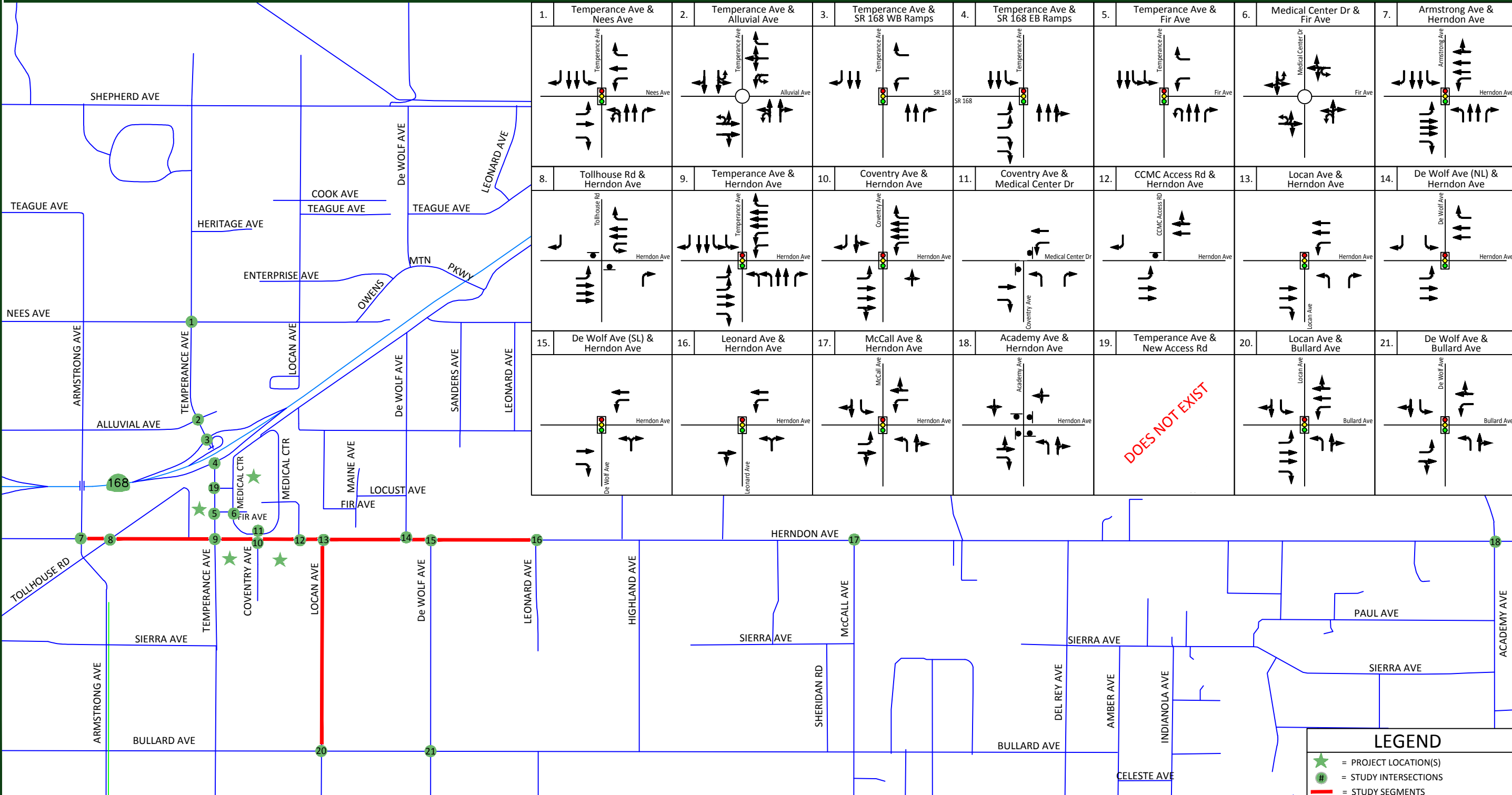
- ★ = PROJECT LOCATION(S)
- # = STUDY INTERSECTIONS
- = STUDY SEGMENTS
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- [XX] = DAILY TRIPS
- = STOP SIGN
- 🚦 = SIGNALIZED INTERSECTION
- = ROUNDABOUT

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City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Cumulative Year 2035 No Project - Mitigated Geometrics and Controls

Figure  
9



DOES NOT EXIST

**LEGEND**

- ★ = PROJECT LOCATION(S)
- # = STUDY INTERSECTIONS
- = STUDY SEGMENTS
- ◫ = STOP SIGN
- ◫ = SIGNALIZED INTERSECTION
- = ROUNDABOUT

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## Cumulative Year 2035 plus Project Traffic Conditions

Similar to the Cumulative Year 2035 No Project scenario, this scenario assumes that McCall Avenue will be constructed between Herndon Avenue and SR 168. This scenario assumes that the lane geometrics and traffic controls presented for the Near Term plus Project Phase 1 Traffic Conditions scenario will remain in place.

## Results of Cumulative Year 2035 plus Project Level of Service Analysis

The study intersection LOS calculation results are contained in Appendix I. Tables XIII and XIV summarize the LOS at the study intersections and segments, respectively, under all study scenarios. By this scenario, it is assumed that both Phase 1 and Phase 2 of the CCMC Project components would be built out. Figure 4 illustrates the Phase 1 Project Only trips while figure 10 illustrates the Phase 2 Project Only trips. The Cumulative Year 2035 plus Project total turning movement volumes, intersection geometrics, and traffic controls are illustrated in Figure 11. Under this scenario, several of the study intersections are expected to exceed their respective LOS thresholds. These include the intersections of Fir Avenue at Temperance Avenue, Herndon Avenue at Tollhouse Road, and all the intersections presented in the Cumulative Year 2035 No Project scenario. To improve the LOS at each one of the intersections projected to exceed its LOS threshold, it is recommended that the improvement measures presented below and illustrated in Figure 12 be implemented.

- For the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (NL), Herndon Avenue at De Wolf Avenue (SL), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue, it is recommended that the same improvements presented in the Cumulative 2035 No Project Scenario be implemented.
- Fir Avenue at Temperance Avenue
  - Add a northbound thru lane
  - Modify the traffic signal to accommodate the added lane
- Herndon Avenue at Tollhouse Road
  - The worst movement is the northbound right. JLB anticipates that as the volume of this movement increases, it will experience a higher peak hour factor in the future, which in turn will improve its LOS to D. Should a higher peak hour factor not materialize, then it is recommended that all truck traffic be prohibited from using Tollhouse Road between Armstrong Avenue and Herndon Avenue.
- New Temperance Access Road at Temperance Avenue
  - By the year 2035 it is projected that the LOS for this intersection will drop below LOS D. As this intersection is limited to right-in and right-out access, the additions of lanes is not projected to improve its LOS and implementation of a traffic signal or All-Way STOPs are not projected to be warranted. As a result, the projected LOS at this intersection would be considered adverse but not significant and therefore mitigation measures are not recommended.

Under this scenario, all study segments are projected to operate at an acceptable LOS.



**Table XIII: Cumulative Year 2035 plus Project Intersection LOS Results**

|    | Intersection                           | Intersection Control     | (7-9) AM Peak Hour         |     | (4-6) PM Peak Hour         |     |
|----|--|--------------------------|----------------------------|-----|----------------------------|-----|
|    |  |                          | Average Delay<br>(sec/veh) | LOS | Average Delay<br>(sec/veh) | LOS |
| 1  | Nees Avenue / Temperance Avenue        | Signalized               | 37.2                       | D   | 29.9                       | C   |
| 2  | Alluvial Avenue / Temperance Avenue    | Roundabout               | 11.6                       | B   | 16.7                       | C   |
| 3  | SR 168 WB Ramps / Temperance Avenue    | Signalized               | 6.4                        | A   | 5.4                        | A   |
| 4  | SR 168 EB Ramps / Temperance Avenue    | Signalized               | >120                       | F   | >120                       | F   |
|    |  | Signalized (Mitigated)   | 34.8                       | C   | 32.2                       | C   |
| 5  | Fir Avenue / Temperance Avenue         | Signalized               | 104.8                      | F   | >120                       | F   |
|    |  | Signalized (Mitigated)   | 40.6                       | D   | 44.7                       | D   |
| 6  | Fir Avenue / Medical Center Drive      | Roundabout               | 21.9                       | C   | 12.3                       | B   |
| 7  | Herndon Avenue / Armstrong Avenue      | Signalized               | 67.5                       | E   | 50.5                       | D   |
|    |  | Signalized (Mitigated)   | 48.5                       | D   | 43.2                       | D   |
| 8  | Herndon Avenue / Tollhouse Road        | Two-Way STOP             | 16.1                       | C   | 36.7                       | E   |
|    |  | Two-Way STOP (Mitigated) | 16.1                       | C   | 34.5                       | D   |
| 9  | Herndon Avenue / Temperance Avenue     | Signalized               | 66.8                       | E   | 44.7                       | D   |
|    |  | Signalized (Mitigated)   | 41.1                       | D   | 36.9                       | D   |
| 10 | Herndon Avenue / Coventry Avenue       | Signalized               | 29.1                       | C   | 26.2                       | C   |
| 11 | Medical Center Drive / Coventry Avenue | Two-Way STOP             | 12.2                       | B   | 17.6                       | C   |
| 12 | Herndon Avenue / CCMC Access Road      | One-Way STOP             | 18.9                       | C   | 16.8                       | C   |
| 13 | Herndon Avenue / Locan Avenue          | One-Way STOP             | >120                       | F   | >120                       | F   |
|    |  | Signalized (Mitigated)   | 23.2                       | C   | 21.5                       | C   |
| 14 | Herndon Avenue / De Wolf Avenue (NL)   | One-Way STOP             | 21.0                       | C   | 44.9                       | E   |
|    |  | Signalized (Mitigated)   | 3.8                        | A   | 3.1                        | A   |
| 15 | Herndon Avenue / De Wolf Avenue (SL)   | One-Way STOP             | >120                       | F   | >120                       | F   |
|    |  | Signalized (Mitigated)   | 22.4                       | C   | 31.4                       | C   |
| 16 | Herndon Avenue / Leonard Avenue        | One-Way STOP             | 95.6                       | F   | >120                       | F   |
|    |  | Signalized (Mitigated)   | 17.6                       | B   | 24.7                       | C   |
| 17 | Herndon Avenue / McCall Avenue         | Two-Way STOP             | >120                       | F   | >120                       | F   |
|    |  | Signalized (Mitigated)   | 40.6                       | D   | 41.4                       | D   |
| 18 | Herndon Avenue / Academy Avenue        | Two-Way STOP             | 28.4                       | D   | 112.6                      | F   |
|    |  | All-Way STOP (Mitigated) | 11.1                       | B   | 17.8                       | C   |
| 19 | New Access Road / Temperance Avenue    | One-Way STOP             | 84.2                       | F   | >120                       | F   |
| 20 | Bullard Avenue / Locan Avenue          | All-Way STOP             | 67.3                       | F   | 68.0                       | F   |
|    |  | Signalized (Mitigated)   | 51.1                       | D   | 43.7                       | D   |
| 21 | Bullard Avenue / De Wolf Avenue        | All-Way STOP             | 69.0                       | F   | 78.1                       | F   |
|    |  | Signalized (Mitigated)   | 52.8                       | D   | 45.1                       | D   |

Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls  
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.





**Table XIV: Cumulative Year 2035 plus Project Segment LOS Results**

| <i>Study Segment</i> | <i>Limits</i>                               | <i>Lanes</i> | <i>24-hour Volume</i> | <i>LOS</i> |
|----------------------|---|--------------|-----------------------|------------|
| Herndon Avenue       | Armstrong Avenue and Tollhouse Road         | 5            | 27,614                | C          |
| Herndon Avenue       | Tollhouse Road and Temperance Avenue        | 5            | 31,255                | C          |
| Herndon Avenue       | Temperance Avenue and Coventry Avenue       | 6            | 38,950                | C          |
| Herndon Avenue       | Coventry Avenue and CCMC Access Road        | 4            | 34,080                | C          |
| Herndon Avenue       | CCMC Access Road and Locan Avenue           | 4            | 33,691                | C          |
| Herndon Avenue       | Locan Avenue and De Wolf Avenue (NL)        | 4            | 24,366                | C          |
| Herndon Avenue       | De Wolf Avenue (NL) and De Wolf Avenue (SL) | 4            | 23,380                | C          |
| Herndon Avenue       | De Wolf Avenue (SL) and Leonard Avenue      | 2            | 15,931                | C          |
| Locan Avenue         | Herndon Avenue and Bullard Avenue           | 2            | 16,265                | C          |

Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

### *Traffic Signal Warrants*

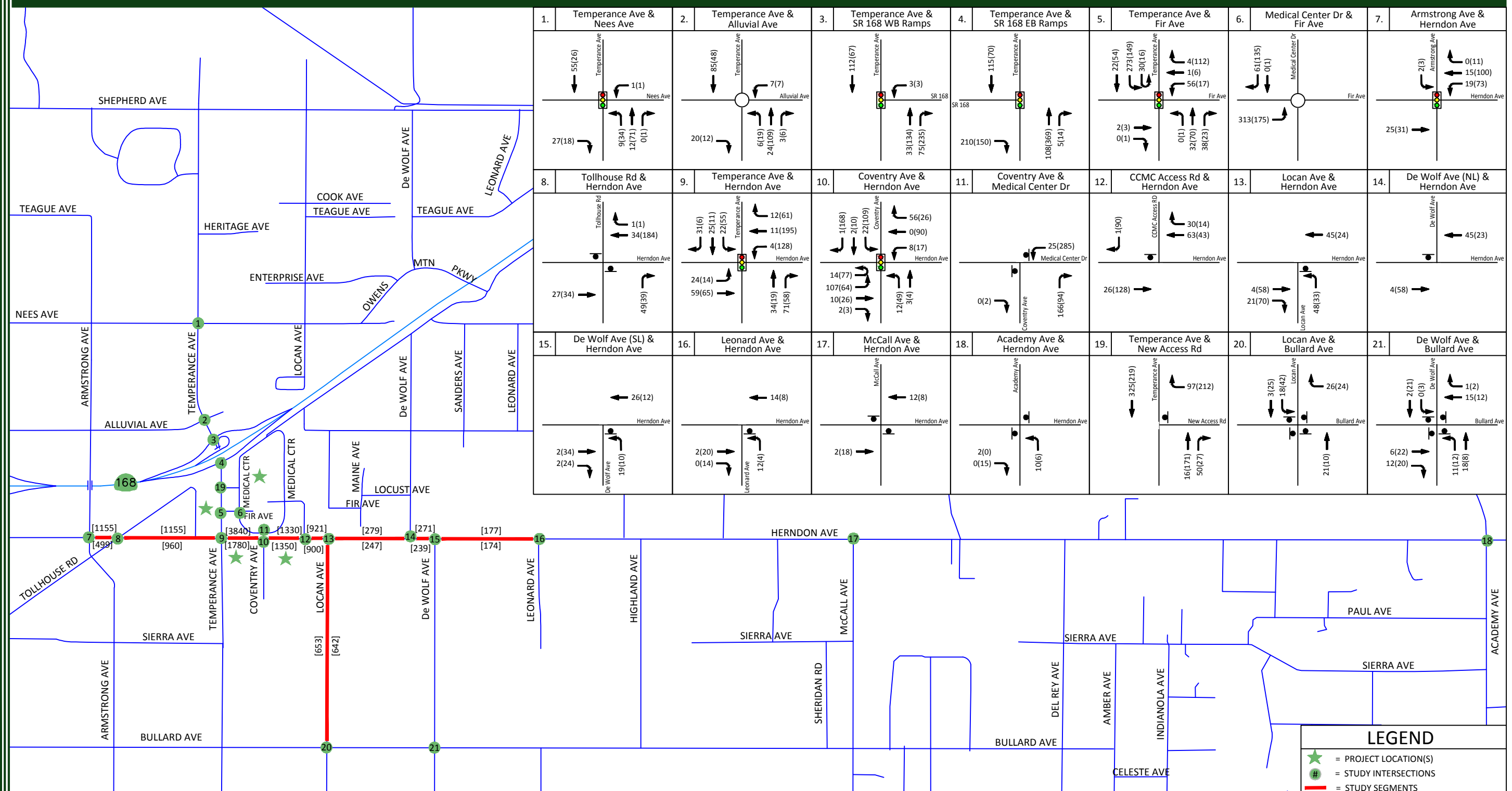
Peak hour traffic signal warrants were prepared for the unsignalized study intersections for the Cumulative Year 2035 plus Project Traffic Conditions scenario. These warrants are found in Appendix J. Under this scenario, the intersections of Herndon Avenue at Tollhouse Road, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (SL), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue satisfy peak hour signal warrants during both peaks, while the intersection of Herndon Avenue at Academy Avenue satisfies peak hour signal warrants during the PM peak only.

Except for the intersections of Herndon Avenue at Tollhouse Road and Herndon Avenue at Academy Avenue, based on the signal warrants, the intersection operational analysis and traffic engineering judgment, signalization of these intersections is recommended. The intersections of Herndon Avenue at Tollhouse Road and Herndon Avenue at Academy Avenue are projected to function at an acceptable LOS without the need for a traffic signal. It is worth noting that CA MUTCD states “satisfaction of a signal warrant or warrants shall not in itself require the installation of a traffic signal.” Therefore, it is recommended that prior to the installation of a traffic signal at the intersections of Herndon Avenue at Tollhouse Road or Herndon Avenue at Academy Avenue, investigation of CA MUTCD warrants 1, 4, and 7, as applicable, be conducted. On the other hand, the intersection of Herndon Avenue at De Wolf Avenue (north leg) is projected to operate at an unacceptable LOS threshold and implementation of All-STOP controls and the addition of lanes is not projected to improve its LOS to an acceptable level. Therefore, it is recommended that the intersection of Herndon Avenue at De Wolf Avenue (north leg) be signalized.



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Phase 2 (2035) - Project Only Trip Assignment

Figure  
10



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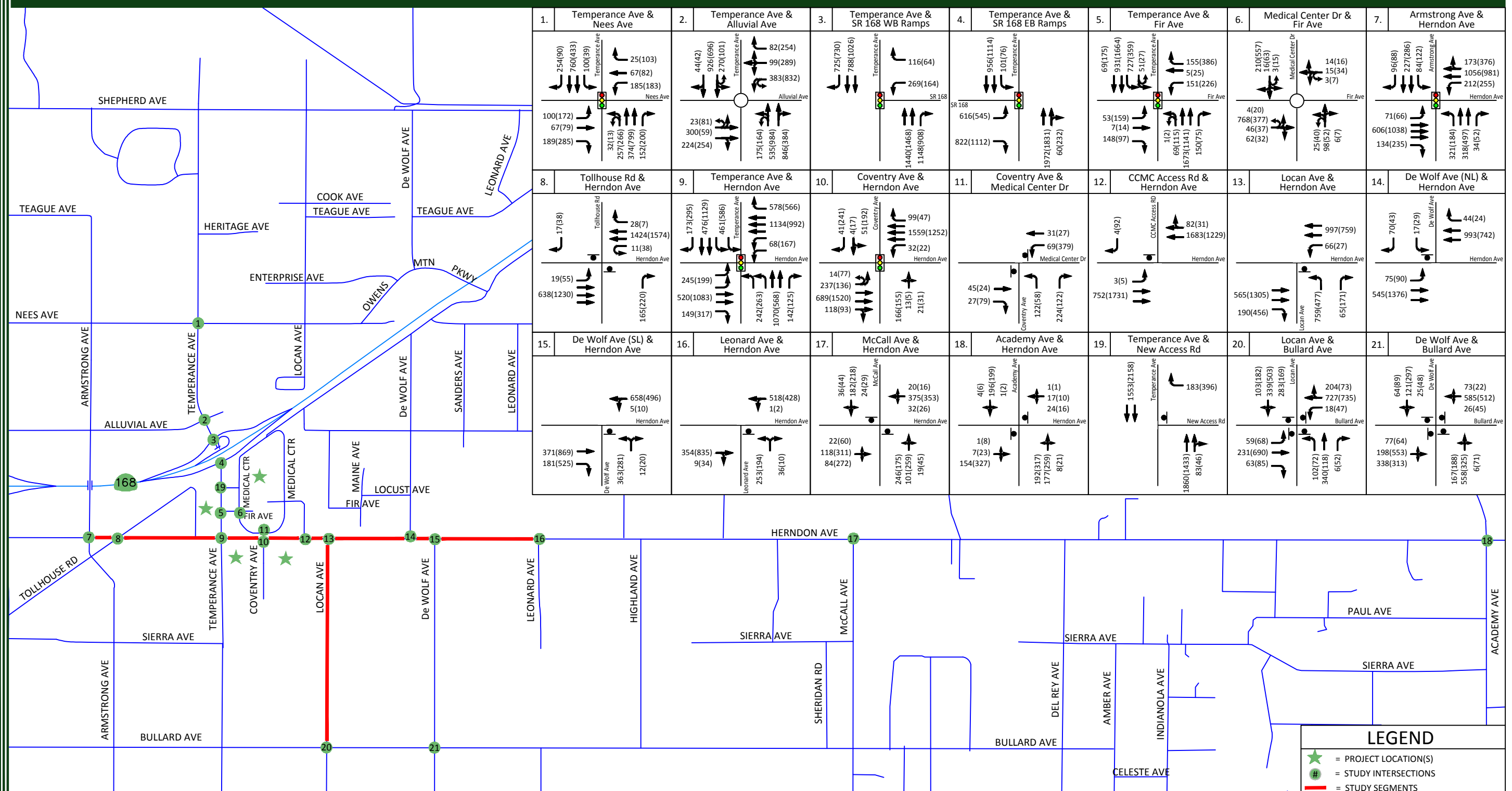
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- # = STUDY INTERSECTIONS
- = STUDY SEGMENTS
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- [XX] = DAILY TRIPS
- = STOP SIGN
- 🚦 = SIGNALIZED INTERSECTION
- ⊙ = ROUNDABOUT

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Cumulative Year 2035 plus Project - Traffic Volumes, Geometrics and Controls

Figure  
11



**LEGEND**

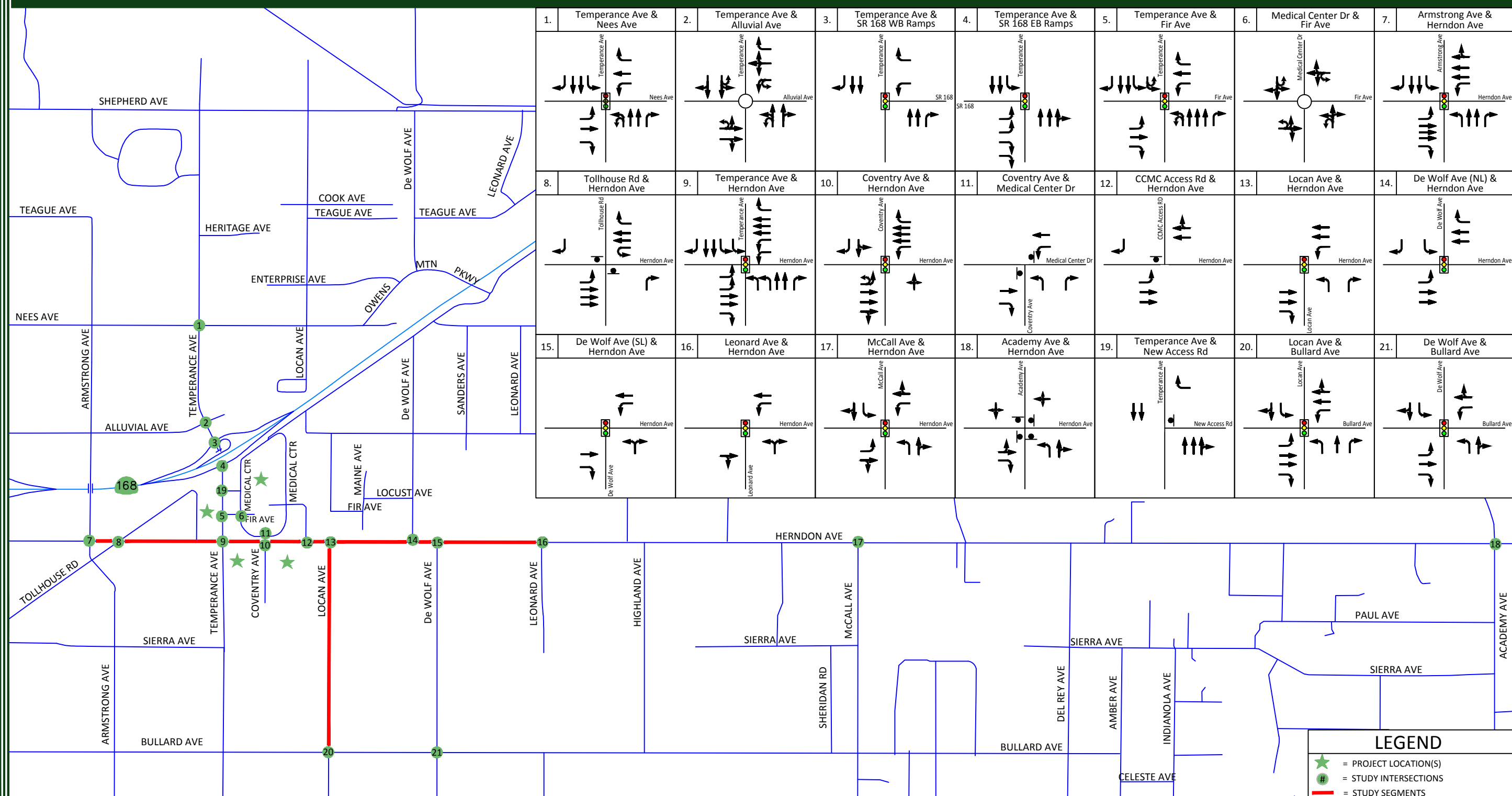
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- # = STUDY INTERSECTIONS
- = STUDY SEGMENTS
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- (XX) = PM PEAK HOUR TRIPS
- [XX] = DAILY TRIPS
- = STOP SIGN
- 🚦 = SIGNALIZED INTERSECTION
- = ROUNDABOUT

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City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA  
Cumulative Year 2035 plus Project - Mitigated Geometrics and Controls

Figure  
12



**LEGEND**

- ★ = PROJECT LOCATION(S)
- = STUDY INTERSECTIONS
- = STUDY SEGMENTS
- ⬇ = STOP SIGN
- 🚦 = SIGNALIZED INTERSECTION
- ⊙ = ROUNDABOUT

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## Queuing Analysis

Table XV (located in the Cumulative Year 2035 plus Project Scenario) provides a queue length summary for left- and right-turn lanes at the study intersections under all study scenarios. The queuing analyses for the study intersections are contained in the LOS worksheets for the respective scenarios. Appendix A contains the methodologies used to evaluate these intersections.

Queuing analyses were completed using Sim Traffic output information. Synchro provides both 50th and 95th percentile maximum queue lengths in feet. According to the Synchro manual, “the 50th percentile maximum queue is the maximum back of queue on a typical cycle and the 95th percentile queue is the maximum back of queue with 95th percentile volumes.” The queues shown on Table XV are the 95th percentile queue lengths for the respective lane movements.

The Highway Design Manual (HDM) provides guidance for determining deceleration lengths for the left- and right-turn lanes based on design speeds. Per the HDM criteria, “tapers for right-turn lanes are usually unnecessary since the main line traffic need not be shifted laterally to provide space for the right-turn lane. If, in some rare instances, a lateral shift were needed, the approach taper would use the same formula as for a left-turn lane.” Therefore, a bay taper length pursuant to the Caltrans HDM would need to be added as necessary to the recommended storage lengths presented below.

Based on the SimTraffic output files, it is recommended that the storage capacity for the following be considered for the Cumulative Year 2035 plus Project Conditions.

- Nees Avenue at Temperance Avenue
  - Consider increasing the storage capacity of the eastbound right-turn lane to 150 feet
  - Consider increasing the storage capacity of the westbound left-turn lane to 175 feet
  - Consider increasing the storage capacity of the westbound right-turn lane to 100 feet
  - Consider increasing the storage capacity of the northbound left-turn lane to 300 feet
  - Consider increasing the storage capacity of the southbound left-turn lane to 300 feet
  - Consider increasing the storage capacity of the southbound right-turn lane to 200 feet
- SR 168 EB Ramps at Temperance Avenue
  - Consider setting the storage capacity of the eastbound dual left-turn lanes to 475 feet
  - Consider setting the storage capacity of the eastbound dual right-turn lanes to 575 feet
  - Consider increasing the storage capacity of the southbound left-turn lane to 375 feet
- Fir Avenue at Temperance Avenue
  - Consider setting the storage capacity of the eastbound left-turn lane to 200 feet
  - Consider setting the storage capacity of the eastbound right-turn lane to 125 feet
  - Consider increasing the storage capacity of the westbound left-turn lane to 175 feet
  - Consider increasing the storage capacity of the northbound left-turn lane to 175 feet
  - Consider increasing the storage capacity of the northbound right-turn lane to 250 feet
  - Consider increasing the storage capacity of the southbound dual left-turn lanes to 350 feet
  - Consider setting the storage capacity of the southbound right-turn lane to 75 feet





- Herndon Avenue at Armstrong Avenue
  - Consider increasing the storage capacity of the eastbound right-turn lane to 150 feet
  - Consider increasing the storage capacity of the westbound left-turn lane to 200 feet
  - Consider increasing the storage capacity of the northbound left-turn lane to 175 feet
  - Consider increasing the storage capacity of the southbound left-turn lane to 175 feet
  - Consider setting the storage capacity of the southbound right-turn lane to 125 feet
- Herndon Avenue at Temperance Avenue
  - Consider increasing the storage capacity of the eastbound dual left-turn lanes to 300 feet
  - Consider increasing the storage capacity of the eastbound right-turn lane to 275 feet
  - Consider increasing the storage capacity of the westbound right-turn lane to 500 feet
  - Consider increasing the storage capacity of the northbound dual left-turn lanes to 275 feet
  - Consider increasing the storage capacity of the northbound right-turn lane to 250 feet
  - Consider increasing the storage capacity of the southbound dual left-turn lanes to 300 feet
  - Consider setting the storage capacity of the southbound right-turn lane to 275 feet
- Herndon Avenue at Coventry Avenue
  - Consider increasing the storage capacity of the eastbound left-turn lane to 250 feet
  - Consider increasing the storage capacity of the westbound right-turn lane to 225 feet
- Herndon Avenue at Locan Avenue
  - Consider setting the storage capacity of the eastbound right-turn lane to 150 feet
  - Consider setting the storage capacity of the westbound left-turn lane to 200 feet
  - Consider setting the storage capacity of the northbound right-turn lane to 275 feet
- Herndon Avenue at De Wolf Avenue (NL)
  - Consider setting the storage capacity of the eastbound left-turn lane to 125 feet
  - Consider setting the storage capacity of the westbound right-turn lane to 75 feet
  - Consider setting the storage capacity of the southbound right-turn lane to 75 feet
- Herndon Avenue at De Wolf Avenue (SL)
  - Consider setting the storage capacity of the eastbound right-turn lane to 150 feet
  - Consider setting the storage capacity of the westbound left-turn lane to 75 feet
- Herndon Avenue at Leonard Avenue
  - Consider setting the storage capacity of the westbound left-turn lane to 75 feet
- Herndon Avenue at McCall Avenue
  - Consider setting the storage capacity of the eastbound left-turn lane to 175 feet
  - Consider setting the storage capacity of the westbound left-turn lane to 75 feet
  - Consider setting the storage capacity of the northbound left-turn lane to 275 feet
  - Consider setting the storage capacity of the southbound left-turn lane to 75 feet
- Herndon Avenue at Academy Avenue
  - Consider setting the storage capacity of the eastbound right-turn lane to 175 feet
  - Consider setting the storage capacity of the northbound left-turn lane to 100 feet
- New Access Road at Temperance Avenue
  - Utilize a street type approach to minimize impacts to Temperance Avenue
  - Internal driveways to the new access road should not be installed within the first 125 feet measured from the Temperance Avenue right-of-way



Master Plan Expansion of the Clovis Community Medical Center  
Draft Traffic Impact Analysis  
November 8, 2017

- Bullard Avenue at Locan Avenue
  - Consider setting the storage capacity of the eastbound right-turn lane to 100 feet
  - Consider increasing the storage capacity of the northbound left-turn lane to 175 feet
  - Consider setting the storage capacity of the southbound left-turn lane to 300 feet
- Bullard Avenue at De Wolf Avenue
  - Consider setting the storage capacity of the eastbound left-turn lane to 150 feet
  - Consider setting the storage capacity of the eastbound right-turn lane to 150 feet
  - Consider setting the storage capacity of the westbound left-turn lane to 275 feet
  - Consider setting the storage capacity of the northbound left-turn lane to 300 feet
  - Consider setting the storage capacity of the southbound left-turn lane to 175 feet

**Table XV: Queuing Analysis**

| ID | Intersection                        | Existing Queue<br>Storage Length (ft.) |      | Existing |     | Existing +<br>Project |     | Near Term +<br>Project |     | 2035 No<br>Project |     | 2035 +<br>Project |     |
|----|-------------------------------------|--|------|----------|-----|-----------------------|-----|------------------------|-----|--------------------|-----|-------------------|-----|
|    |                                     |  |      | AM       | PM  | AM                    | PM  | AM                     | PM  | AM                 | PM  | AM                | PM  |
| 1  | Nees Ave / Temperance Avenue        | EB Left                                | 240  | 68       | 75  | 105                   | 106 | 148                    | 126 | 147                | 199 | 113               | 222 |
|    |                                     | EB Right                               | 80   | 51       | 56  | 50                    | 83  | 95                     | 94  | 83                 | 104 | 132               | 114 |
|    |                                     | WB Left                                | 100  | 52       | 46  | 66                    | 48  | 169                    | 169 | 169                | 162 | 169               | 170 |
|    |                                     | WB Right                               | 25   | 17       | 12  | 14                    | 15  | 55                     | 99  | 30                 | 25  | 25                | 86  |
|    |                                     | NB Left                                | 240  | 118      | 115 | 190                   | 234 | 221                    | 295 | 308                | 253 | 259               | 264 |
|    |                                     | NB Right                               | 120  | 19       | 25  | 18                    | 25  | 84                     | 127 | 43                 | 50  | 28                | 119 |
|    |                                     | SB Left                                | 250  | 9        | 39  | 10                    | 45  | 147                    | 72  | 136                | 70  | 307               | 78  |
|    |                                     | SB Right                               | 95   | 66       | 51  | 92                    | 39  | 185                    | 31  | 185                | 53  | 185               | 139 |
| 2  | Alluvial Avenue / Temperance Avenue | EB Left                                | 250  | 39       | 61  | 39                    | 77  | *                      | *   | *                  | *   | *                 | *   |
|    |                                     | EB Right                               | >500 | 62       | 49  | 61                    | 66  | *                      | *   | *                  | *   | *                 | *   |
|    |                                     | WB Left                                | 85   | 219      | 167 | 204                   | 192 | *                      | *   | *                  | *   | *                 | *   |
|    |                                     | NB Left                                | 225  | 96       | 69  | 116                   | 117 | *                      | *   | *                  | *   | *                 | *   |
|    |                                     | NB Right                               | 125  | 91       | 62  | 94                    | 118 | *                      | *   | *                  | *   | *                 | *   |
|    |                                     | SB Left                                | 275  | 110      | 68  | 127                   | 112 | *                      | *   | *                  | *   | *                 | *   |
|    |                                     | SB Right                               | 275  | 29       | 26  | 25                    | 25  | *                      | *   | *                  | *   | *                 | *   |
|    |                                     | EB Approach                            | *    | *        | *   | *                     | *   | 60                     | 265 | 70                 | 249 | 92                | 646 |
|    |                                     | WB Approach                            | *    | *        | *   | *                     | *   | 55                     | 35  | 69                 | 80  | 99                | 108 |
|    |                                     | NB Approach                            | *    | *        | *   | *                     | *   | 96                     | 136 | 91                 | 128 | 130               | 199 |
|    |                                     | SB Approach                            | *    | *        | *   | *                     | *   | 330                    | 85  | 364                | 85  | 410               | 141 |
| 3  | SR 168 WB Ramps / Temperance Avenue | WB Left                                | >500 | 78       | 54  | 120                   | 65  | 284                    | 96  | 329                | 152 | 480               | 223 |
|    |                                     | WB Right                               | 385  | 53       | 44  | 58                    | 44  | 110                    | 53  | 130                | 61  | 316               | 62  |
|    |                                     | SB Right                               | >500 | 78       | 64  | 94                    | 56  | 284                    | 118 | 184                | 90  | 70                | 124 |
| 4  | SR 168 EB Ramps / Temperance Avenue | EB Left                                | >500 | 152      | 194 | 105                   | 191 | 643                    | 408 | *                  | *   | *                 | *   |
|    |                                     | EB Dual Lefts                          | *    | *        | *   | *                     | *   | *                      | *   | 394                | 317 | 465               | 449 |
|    |                                     | EB Dual Rights                         | *    | 82       | 183 | 179                   | 249 | 587                    | 317 | 179                | 311 | 572               | 563 |
|    |                                     | SB Left                                | 250  | 64       | 47  | 40                    | 54  | 226                    | 76  | 231                | 108 | 370               | 188 |

Notes: \* = Does not exist or is not projected to exist



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Page | 43

**Table XVI: Queuing Analysis (Continued)**

| ID | Intersection                           | Existing Queue<br>Storage Length (ft.) |      | Existing |     | Existing +<br>Project |     | Near Term +<br>Project |     | 2035 No<br>Project |     | 2035 +<br>Project |     |
|----|--|--|------|----------|-----|-----------------------|-----|------------------------|-----|--------------------|-----|-------------------|-----|
|    |  |  |      | AM       | PM  | AM                    | PM  | AM                     | PM  | AM                 | PM  | AM                | PM  |
| 5  | Fir Avenue / Temperance Avenue         | EB Left                                | *    | *        | *   | 73                    | 183 | 100                    | 184 | *                  | *   | 80                | 200 |
|    |  | EB Right                               | *    | *        | *   | 79                    | 88  | 91                     | 91  | *                  | *   | 65                | 105 |
|    |  | WB Left                                | 130  | 83       | 89  | 151                   | 174 | 110                    | 174 | 77                 | 131 | 173               | 174 |
|    |  | WB Right                               | >500 | 152      | 100 | 124                   | 180 | 198                    | 228 | 97                 | 147 | 109               | 285 |
|    |  | NB Left                                | 100  | *        | *   | 111                   | 172 | 167                    | 100 | *                  | 22  | 171               | 167 |
|    |  | NB Right                               | 105  | 181      | 95  | 255                   | 105 | 255                    | 223 | 255                | 35  | 255               | 240 |
|    |  | SB Dual Lefts                          | 225  | 146      | 75  | 333                   | 237 | 353                    | 282 | 198                | 134 | 353               | 313 |
|    |  | SB Right                               | *    | *        | *   | *                     | *   | *                      | *   | *                  | *   | 44                | 66  |
| 6  | Fir Avenue / Medical Center Drive      | EB ULTR                                | 300  | 94       | 41  | 162                   | 98  | 103                    | 99  | 86                 | 37  | 161               | 132 |
|    |  | WB ULTR                                | 270  | 18       | 10  | 33                    | 37  | 31                     | 16  | 21                 | 10  | 27                | 44  |
|    |  | NB ULTR                                | 225  | 24       | 24  | 65                    | 24  | 31                     | 66  | 21                 | 21  | 45                | 39  |
|    |  | SB ULTR                                | 255  | 21       | 38  | 10                    | 78  | 18                     | 58  | 15                 | 52  | 10                | 102 |
| 7  | Herndon Avenue / Armstrong Avenue      | EB Left                                | 400  | 59       | 74  | 53                    | 64  | 61                     | 78  | 160                | 100 | 116               | 111 |
|    |  | EB Right                               | 100  | 20       | 54  | 25                    | 62  | 30                     | 71  | 53                 | 84  | 56                | 138 |
|    |  | WB Left                                | 105  | 53       | 46  | 137                   | 119 | 112                    | 130 | 200                | 132 | 200               | 200 |
|    |  | NB Left                                | 105  | 158      | 113 | 164                   | 141 | 165                    | 164 | 164                | 197 | 164               | 165 |
|    |  | NB Right                               | 130  | 14       | 11  | 15                    | 12  | 20                     | 15  | 31                 | 38  | 28                | 39  |
|    |  | SB Left                                | 100  | 47       | 27  | 53                    | 47  | 57                     | 50  | 146                | 152 | 135               | 163 |
|    |  | SB Right                               | 80   | 51       | 48  | 64                    | 67  | 55                     | 75  | 103                | 123 | 97                | 111 |
| 8  | Herndon Avenue / Tollhouse Road        | EB Left                                | 400  | 5        | 27  | 7                     | 26  | 14                     | 55  | 11                 | 55  | 7                 | 56  |
|    |  | WB Left                                | 120  | *        | 7   | *                     | 4   | *                      | 7   | 3                  | 5   | *                 | 21  |
|    |  | WB Right                               | 85   | 11       | *   | *                     | 7   | *                      | *   | *                  | *   | *                 | *   |
|    |  | NB Right                               | >500 | 34       | 43  | 41                    | 85  | 41                     | 126 | 37                 | 117 | 56                | 155 |
|    |  | SB Right                               | >500 | 16       | 4   | 7                     | 10  | 13                     | 32  | 10                 | 23  | *                 | 29  |
| 9  | Herndon Avenue / Temperance Avenue     | EB Dual Lefts                          | 150  | 99       | 131 | 278                   | 209 | 251                    | 109 | 138                | 83  | 305               | 209 |
|    |  | EB Right                               | 160  | 44       | 96  | 47                    | 77  | 70                     | 156 | 55                 | 280 | 125               | 280 |
|    |  | WB Dual Lefts                          | 150  | 27       | 30  | 36                    | 30  | 40                     | 42  | 144                | 44  | 149               | 126 |
|    |  | WB Right                               | 400  | 248      | 85  | 453                   | 145 | 570                    | 170 | 490                | 259 | 519               | 308 |
|    |  | NB Dual Lefts                          | 230  | 90       | 75  | 269                   | 98  | 280                    | 138 | 277                | 140 | 281               | 192 |
|    |  | NB Right                               | 100  | 21       | 29  | 240                   | 98  | 240                    | 159 | 239                | 128 | 240               | 240 |
|    |  | SB Dual Lefts                          | 175  | 146      | 160 | 186                   | 191 | 136                    | 182 | 262                | 216 | 251               | 288 |
|    |  | SB Right                               | 150  | 48       | 49  | 106                   | 67  | 110                    | 184 | 52                 | 223 | 57                | 270 |
| 10 | Herndon Avenue / Coventry Avenue       | EB Left                                | 145  | 59       | 35  | 123                   | 89  | 143                    | 98  | 125                | 53  | 223               | 230 |
|    |  | EB Right                               | 75   | 28       | 21  | *                     | *   | *                      | *   | *                  | *   | *                 | *   |
|    |  | WB Left                                | 190  | 47       | 12  | 61                    | 16  | 47                     | 13  | 56                 | 8   | 116               | 147 |
|    |  | WB Right                               | 120  | 37       | 27  | 41                    | 35  | 204                    | 28  | 80                 | 20  | 147               | 220 |
|    |  | SB Right                               | 25   | 54       | 75  | 74                    | 64  | 73                     | 45  | 80                 | 56  | 54                | 66  |
| 11 | Medical Center Drive / Coventry Avenue | EB Right                               | 100  | 32       | 66  | 55                    | 60  | 41                     | 82  | 31                 | 55  | 59                | 126 |
|    |  | WB Left                                | 100  | 46       | 52  | 56                    | 77  | 52                     | 91  | 52                 | 87  | 59                | 145 |
|    |  | NB Left                                | 25   | 10       | 17  | 35                    | 51  | 0                      | 47  | 10                 | 0   | 68                | 66  |
|    |  | NB Right                               | 25   | 0        | 38  | 0                     | 22  | 0                      | 21  | 0                  | 0   | 66                | 45  |
| 12 | Herndon Avenue / CCMC Access Rd        | EB Left                                | 100  | 9        | 9   | 20                    | 0   | 19                     | 13  | 12                 | 0   | 15                | 9   |
|    |  | SB Right                               | >500 | *        | *   | 0                     | 9   | 20                     | 17  | 15                 | 18  | 24                | 86  |
| 13 | Herndon Avenue / Locan Avenue          | EB Right                               | *    | *        | *   | 0                     | 7   | 13                     | 0   | 87                 | 79  | 86                | 146 |
|    |  | WB Left                                | 75   | 31       | 26  | 35                    | 27  | 38                     | 21  | 170                | 48  | 177               | 77  |
|    |  | NB Left                                | *    | *        | *   | 161                   | 68  | 166                    | 122 | 518                | 411 | 726               | 470 |
|    |  | NB Right                               | *    | *        | *   | 19                    | 250 | 21                     | 41  | 263                | 275 | 263               | 276 |

Notes: \* = Does not exist or is not projected to exist



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Page | 44



**Table XV: Queuing Analysis (Continued)**

| ID | Intersection                         | Existing Queue<br>Storage Length (ft.) |      | Existing |    | Existing +<br>Project |     | Near Term +<br>Project |     | 2035 No<br>Project |     | 2035 +<br>Project |     |
|----|--------------------------------------|--|------|----------|----|-----------------------|-----|------------------------|-----|--------------------|-----|-------------------|-----|
|    |                                      |  |      | AM       | PM | AM                    | PM  | AM                     | PM  | AM                 | PM  | AM                | PM  |
| 14 | Herndon Avenue / De Wolf Avenue (NL) | EB Left                                | *    | *        | *  | 35                    | 45  | 35                     | 27  | 110                | 96  | 100               | 89  |
|    |                                      | WB Right                               | *    | *        | *  | *                     | *   | *                      | *   | 22                 | 12  | 24                | 20  |
|    |                                      | SB Left                                | *    | *        | *  | 29                    | 18  | 30                     | 32  | 33                 | 26  | 51                | 56  |
|    |                                      | SB Right                               | *    | *        | *  | 31                    | 40  | 50                     | 22  | 56                 | 54  | 62                | 38  |
| 15 | Herndon Avenue / De Wolf Avenue (SL) | EB Right                               | *    | *        | *  | *                     | *   | 46                     | 54  | 67                 | 104 | 59                | 131 |
|    |                                      | WB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 25                 | 34  | 22                | 24  |
| 16 | Herndon Avenue / Leonard Avenue      | WB Left                                | *    | *        | *  | *                     | *   | *                      | *   | *                  | 13  | 10                | 15  |
| 17 | Herndon Avenue / McCall Avenue       | EB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 59                 | 97  | 63                | 160 |
|    |                                      | WB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 64                 | 45  | 72                | 55  |
|    |                                      | NB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 266                | 231 | 240               | 249 |
|    |                                      | SB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 50                 | 58  | 69                | 75  |
| 18 | Herndon Avenue / Academy Avenue      | EB Right                               | *    | *        | *  | *                     | *   | *                      | *   | 64                 | 100 | 73                | 154 |
|    |                                      | NB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 79                 | 91  | 67                | 95  |
| 19 | New Access Road / Temperance Avenue  | WB Right                               | *    | *        | *  | 124                   | 122 | 152                    | 123 | *                  | *   | 508               | 556 |
| 20 | Bullard Avenue / Locan Avenue        | EB Left                                | 270  | 39       | 27 | 42                    | 44  | 42                     | 41  | 101                | 92  | 73                | 143 |
|    |                                      | EB Right                               | >500 | 54       | 38 | 44                    | 41  | 40                     | 40  | 46                 | 60  | 64                | 78  |
|    |                                      | WB Left                                | 260  | 16       | 18 | 16                    | 17  | 18                     | 11  | 46                 | 73  | 44                | 49  |
|    |                                      | NB Left                                | 125  | 43       | 36 | 40                    | 43  | 39                     | 38  | 178                | 127 | 180               | 136 |
|    |                                      | NB Right                               | 50   | 6        | 9  | 7                     | 25  | *                      | 21  | 13                 | 36  | 14                | 36  |
|    |                                      | SB Left                                | 250  | *        | *  | *                     | *   | *                      | *   | 274                | 280 | 257               | 497 |
| 21 | Bullard Avenue / De Wolf Avenue      | EB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 131                | 96  | 118               | 102 |
|    |                                      | EB Right                               | *    | *        | *  | *                     | *   | *                      | *   | 150                | 121 | 119               | 140 |
|    |                                      | WB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 267                | 87  | 264               | 70  |
|    |                                      | NB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 300                | 199 | 370               | 163 |
|    |                                      | SB Left                                | *    | *        | *  | *                     | *   | *                      | *   | 63                 | 73  | 56                | 151 |

Notes: \* = Does not exist or is not projected to exist



## Project's Pro-Rata Fair Share of Future Transportation Improvements

The project's equitable fair share impact to all study intersections that are projected to fall below their respective LOS threshold is provided in Table XVI. The project's fair share percentage impacts were calculated pursuant to the Caltrans Guide for the Preparation of Traffic Impact Studies. The Project's pro-rata fair shares were calculated utilizing the Existing, Phase 1 Project Only trip assignment, Phase 2 Project Only trip assignment, and the Cumulative 2035 plus Project volumes. Figure 2 illustrates the Existing traffic volumes. Figures 4 and 10 illustrate the Project only trip assignment to the respective study intersections for Phase 1 and Phase 2 respectively. Figure 11 illustrates the total traffic volumes during the Cumulative Year 2035 plus Project scenario. The critical peak period for the study facilities was determined to be during the PM peak and therefore the PM peak volumes are utilized to determine the Project's pro-rata fair share.

It is recommended that the Project contribute its equitable fair share as listed in Table XVI for the future improvements necessary to maintain an acceptable LOS. However, fair share contributions should only be made for those facilities or portion thereof currently not funded by the responsible agencies roadway impact fee program(s) (as appropriate). For those improvements not presently covered by local and regional roadway impact fee programs, it is recommended that the Project contribute its equitable fair share. Payment of the Project's equitable fair share in addition to the local and regional impact fee programs would satisfy the Project's traffic mitigation measures.

This study does not provide construction costs for the recommended mitigation measures; therefore, if the recommended mitigation measures are implemented, it is recommended that the CCMC work with City of Clovis, County of Fresno and Caltrans staff as appropriate to develop the estimated construction costs.

**Table XVII: Project's Fair Share of the Future Improvements**

| ID | Intersection                         | Existing 2016<br>Traffic Volumes<br>(PM Peak) | Year 2035 + Project<br>Traffic Volumes<br>(PM Peak) | Project PM<br>Peak Hour Trips | Project Fair<br>Share (%) |
|----|--------------------------------------|---|---|-------------------------------|---------------------------|
| 4  | SR 168 EB Ramps / Temperance Avenue  | 2,441   | 4,910   | 1,290                         | 52.25%                    |
| 5  | Fir Avenue / Temperance Avenue       | 2,108   | 4,465   | 1,341                         | 56.89%                    |
| 7  | Herndon Avenue / Armstrong Avenue    | 1,914   | 4,180   | 368                           | 16.24%                    |
| 8  | Herndon Avenue / Tollhouse Road      | 1,485   | 3,162   | 453                           | 27.01%                    |
| 9  | Herndon Avenue / Temperance Avenue   | 2,851   | 6,290   | 1,040                         | 30.24%                    |
| 13 | Herndon Avenue / Locan Avenue        | 1,324   | 3,219   | 290                           | 15.30%                    |
| 14 | Herndon Avenue / De Wolf Avenue (NL) | 1,033   | 2,304   | 125                           | 9.83%                     |
| 15 | Herndon Avenue / De Wolf Avenue (SL) | 948   | 2,201   | 124                           | 9.90%                     |
| 16 | Herndon Avenue / Leonard Avenue      | 642   | 1,503   | 84                            | 9.76%                     |
| 17 | Herndon Avenue / McCall Avenue       | 686   | 1,808   | 62                            | 5.53%                     |
| 18 | Herndon Avenue / Academy Avenue      | 429   | 1,189   | 37                            | 4.87%                     |
| 20 | Bullard Avenue / Locan Avenue        | 612   | 2,794   | 162                           | 7.42%                     |
| 21 | Bullard Avenue / De Wolf Avenue      | 729   | 2,526   | 155                           | 8.63%                     |

Notes: Project Fair Share = ((Project Traffic) / (Year 2035 plus Project Traffic Volumes - Existing Traffic Volumes)) X 100



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Page | 46

## Conclusions and Recommendations

Conclusions and recommendations regarding the proposed Project components are presented below.

### *Existing Traffic Conditions*

- Except for the intersection of SR 168 EB Ramps at Temperance Avenue, all study intersections operate at an acceptable LOS during both the AM and PM peak hours. To improve the LOS at this intersection, it is recommended that a second eastbound left-turn lane be added and that the existing traffic signal be modified to accommodate the added lane.
- Under this scenario, all study segments operate at an acceptable LOS.

### *Existing plus Project Phase 1 Traffic Conditions*

- By this scenario, it is assumed that widening of Herndon Avenue between Temperance Avenue and the south leg of De Wolf Avenue has been completed.
- The Phase 1 of the CCMC (Year 2026) consists of adding a 300,172 square-foot expansion of the existing hospital, 94,392 square feet of Medical Dental Office Building, 150,000 square feet of Shopping Center, and a 150 room Hotel.
- Phase 1 of the CCMC is estimated to generate a maximum of 15,121 daily trips, 756 AM peak hour trips and 1,278 PM peak hour trips.
- Similar to the previous scenario, except for the intersection of SR 168 EB Ramps at Temperance Avenue, all study intersections are projected to operate at an acceptable LOS during both the AM and PM peak hours. To improve the LOS at this intersection, it is recommended that a second eastbound right-turn lane and third northbound thru lane be added and that the existing traffic signal be modified to accommodate the added lane geometrics.
- Under this scenario, all study segments are projected to operate at an acceptable LOS.

### *Near Term plus Project Phase 1 Traffic Conditions*

- The near term projects are estimated to generate 45,938 daily trips, 4,655 AM peak hour trips and 5,267 PM peak hour trips.
- Under this scenario, except for the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Temperance Avenue, and Herndon Avenue at De Wolf Avenue (south leg), all intersections are projected to operate at acceptable LOS during both the AM and PM peak hours. To improve the LOS at each one of the intersections projected to exceed its LOS threshold, it is recommended that the improvement measures recommended under the Existing plus Project Phase 1 Traffic Conditions scenario be implemented along with the following.
  - Herndon Avenue at Temperance Avenue
    - Implement overlap phasing of the westbound right-turn with the southbound left-turn phase
    - Prohibit southbound to northbound U-turns
  - Herndon Avenue at De Wolf Avenue (south leg)
    - Implement All-Way STOP traffic controls



- Of the near term projects, the CCMC Phase 1 Project accounts for only 24.8, 14.0, and 19.5 percent of the total near term project traffic for the daily, AM and PM peak hours, respectively. Therefore, it can be deduced that the mitigation measures presented under this scenario may not be necessary immediately upon completion of the proposed Project.
- Under this scenario, all study segments are projected to operate at an acceptable LOS.

#### *Cumulative Year 2035 No Project Traffic Conditions*

- Under this scenario, several of the study intersections are expected to exceed their respective LOS thresholds. These include the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (north leg), Herndon Avenue at De Wolf Avenue (south leg), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue. To improve the LOS at each one of the intersections projected to exceed its LOS threshold, it is recommended that the following improvement measures as presented below and illustrated in Figure 9 be implemented.
  - SR 168 EB Ramps at Temperance Avenue
    - Add a second eastbound left-turn lane
    - Add a second eastbound right-turn lane
    - Add a third northbound thru lane
    - Modify the traffic signal to accommodate the added lane geometrics
  - Herndon Avenue at Armstrong Avenue
    - Add a third westbound thru lane
    - Modify the traffic signal to accommodate the added lane
  - Herndon Avenue at Temperance Avenue
    - Implement overlap phasing of the westbound right-turn with the southbound left-turn phase
    - Prohibit southbound to northbound U-turns
  - Herndon Avenue at Locan Avenue
    - Signalize the intersection
    - Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue
  - Herndon Avenue at De Wolf Avenue (NL)
    - Signalize the intersection
    - Limit pedestrian crosswalks across Herndon Avenue to the west leg of Herndon Avenue
  - Herndon Avenue at De Wolf Avenue (SL)
    - Convert the westbound left-thru lane to a thru lane
    - Add a westbound left-turn lane
    - Signalize the intersection
    - Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue



- Herndon Avenue at Leonard Avenue
  - Convert the westbound left-thru lane to a thru lane
  - Add a westbound left-turn lane
  - Signalize the intersection
  - Limit pedestrian crosswalks across Herndon Avenue to the east leg of Herndon Avenue
- Herndon Avenue at McCall Avenue
  - Convert the eastbound left-thru-right lane to a thru-right lane
  - Convert the westbound left-thru-right lane to a thru-right lane
  - Convert the northbound left-thru-right lane to a thru-right lane
  - Convert the southbound left-thru-right lane to a thru-right lane
  - Add left-turn lanes to all approaches
  - Signalize the intersection
- Herndon Avenue at Academy Avenue
  - Convert the eastbound left-thru-right lane to a left-thru lane
  - Add an eastbound right-turn lane
  - Convert the northbound left-thru-right lane to a thru-right lane
  - Add a northbound left-turn lane
  - Implement All-Way STOP controls
- Bullard Avenue at Locan Avenue
  - Add a second eastbound thru lane
  - Add a second westbound thru lane
  - Convert the southbound left-thru-right lane to a thru-right lane
  - Add a southbound left-turn lane
  - Signalize the intersection
- Bullard Avenue at De Wolf Avenue
  - Add an eastbound left-turn lane
  - Convert the eastbound left-thru-right lane to a thru lane
  - Add an eastbound right-turn lane
  - Convert the westbound left-thru-right lane to a thru-right lane
  - Add a westbound left-turn lane
  - Convert the northbound left-thru-right lane to a thru-right lane
  - Add a northbound left-turn lane
  - Convert the southbound left-thru-right lane to a thru-right lane
  - Add a southbound left-turn lane
  - Signalize the intersection
- Under this scenario, all study segments are projected to operate at an acceptable LOS.



### *Cumulative Year 2035 plus Project Traffic Conditions*

- Phase 2 of the CCMC is estimated to generate a maximum of 14,887 daily trips, 866 AM peak hour trips and 1,374 PM peak hour trips. Therefore Phase 1 and Phase 2 of the CCMC Project are estimated to generate a combined maximum of 30,008 daily trips, 1,622 AM peak hour trips and 2,652 PM peak hour trips.
- Similar to the Cumulative Year 2035 No Project, under this scenario, the intersections of SR 168 EB Ramps at Temperance Avenue, Herndon Avenue at Armstrong Avenue, Herndon Avenue at Temperance Avenue, Herndon Avenue at Locan Avenue, Herndon Avenue at De Wolf Avenue (NL), Herndon Avenue at De Wolf Avenue (SL), Herndon Avenue at Leonard Avenue, Herndon Avenue at McCall Avenue, Herndon Avenue at Academy Avenue, Bullard Avenue at Locan Avenue, and Bullard Avenue at De Wolf Avenue are projected to exceed their respective LOS threshold. For these intersections, it is recommended that the same improvements presented in the Cumulative 2035 No Project Scenario be implemented.
- Further, the intersections of Fir Avenue at Temperance Avenue and Herndon Avenue at Tollhouse Road are also projected to exceed their respective LOS threshold. Specific mitigation measures are further illustrated in Figure 12.
  - Fir Avenue at Temperance Avenue
    - Add a northbound thru lane
    - Modify the traffic signal to accommodate the added lane
  - Herndon Avenue at Tollhouse Road
    - The worst movement is the northbound right. JLB anticipates that as the volume of this movement increases, it will experience a higher peak hour factor in the future, which in turn will improve its LOS to D. Should a higher peak hour factor not materialize, then it is recommended that all truck traffic be prohibited from using Tollhouse Road between Armstrong Avenue and Herndon Avenue.
- Finally, the intersection of the New Access Road at Temperance Avenue is projected to exceed its LOS threshold. However, since this intersection is not projected to meet All-Way STOP or traffic signal warrants, the deficient LOS would be considered adverse but not significant and therefore mitigation measures are not recommended.
- Under this scenario, all study segments are projected to operate at an acceptable LOS.

### *Queuing Analysis*

- It is recommended that the City consider left- and right-turn lane storage lengths as indicated in Table XV.

### *Project Equitable Fair Share Impact Analysis*

- It is recommended that the Project contribute its equitable fair share towards future transportation improvements as presented in Table XVI.

## Study Participants

### JLB Traffic Engineering, Inc. Personnel:

|                             |                 |
|-----------------------------|-----------------|
| Jose Luis Benavides, PE, TE | Project Manager |
| Susana Maciel, EIT          | Engineer I/II   |
| Javier Rios                 | Engineer I/II   |
| Jove Alcazar                | Engineer I/II   |
| Alan Miao, EIT              | Engineer I/II   |
| Veronica Benavides          | Clerical        |

### Persons Consulted:

|                      |                                 |
|----------------------|---------------------------------|
| Bryan Araki          | City of Clovis                  |
| Mike Harrison, PE    | City of Clovis                  |
| Sean Smith, PE       | City of Clovis                  |
| David Padilla        | Caltrans                        |
| Jill Gormley, TE     | City of Fresno                  |
| Harpreet Kooner      | County of Fresno                |
| Tong Xiong           | County of Fresno                |
| Scott B. Odell, AICP | Odell Planning & Research, Inc. |

## References

1. *Trip Generation*, 9th Edition, Washington D.C., Institute of Transportation Engineers, 2012
2. *Guide for the Preparation of Traffic Impact Studies*, Caltrans, dated December 2002.
3. City of Clovis, *2035 General Plan*
4. *2014 California Manual on Uniform Traffic Control Devices*, Caltrans, November 7, 2014
5. Final Report, *Traffic Impact Analysis for the Proposed Master Plan Expansion of the Clovis Community Medical Center*, TJKM Transportation Consultants, May 22, 2009



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Page | 51

## Appendix A: Methodology



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Page / A



## APPENDIX A

### Levels of Service Methodology

The description and procedures for calculating capacity and level of service (LOS) are found in the Transportation Research Board, Highway Capacity Manual (HCM). The HCM 2010 represents the research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level of service (LOS), from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish a LOS.

### Urban Streets (Automobile Mode)

The term "urban streets" refers to urban arterials and collectors, including those in downtown areas. Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials. Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals. Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing taxicabs, buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

### Flow Characteristics

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control.

The street environment includes the geometric characteristics of the facility, the character of roadside activity, and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway/access point density, spacing between signalized intersections, existence of parking, level of pedestrian and bicyclist activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic controls (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds; however, such controls are needed to establish right-of-way.



## Levels of Service (automobile Mode)

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service (LOS). The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

**LOS A** describes primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal. Travel speeds exceed 85 of the base free flow speed (FFS).

**LOS B** describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67 and 85 percent of the base FFS.

**LOS C** describes stable operations. The ability to maneuver and change lanes in midblock location may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50 and 67 percent of the base FFS.

**LOS D** indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volumes, inappropriate signal timing, at the boundary intersections. The travel speed is between 40 and 50 percent of the base FFS.

**LOS E** is characterized unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30 and 40 percent of the base FFS.

**LOS F** is characterized by street flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30 percent or less of the base FFS.

**Table A-1: Urban Street Levels of Service (Automobile Mode)**

| Travel Speed as a Percentage of Base Free-Flow Speed (%) | LOS by Critical Volume-to-Capacity Ratio <sup>a</sup> |      |
|--|---|------|
|  | ≤1.0  | >1.0 |
| >85  | A   | F    |
| >67 to 85  | B   | F    |
| >50 to 67  | C   | F    |
| >40 to 50  | D   | F    |
| >30 to 40  | E   | F    |
| ≤30  | F   | F    |

<sup>a</sup> = The Critical volume-to-capacity ratio is based on consideration of the through movement-to-capacity ratio at each boundary intersection in the subject direction of travel. The critical volume-to-capacity ratio is the largest ratio of those considered.

Source: Highway Capacity Manual 2010, Exhibit 16-4. Urban Street LOS Criteria (Automobile Mode)



## Intersection Levels of Service

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs.

### Signalized Intersections – Performance Measures

For signalized intersections, the performance measures include automobile volume-to-capacity ratio, automobile delay, queue storage length, ratio of pedestrian delay, pedestrian circulation area, pedestrian perception score, bicycle delay, and bicycle perception score. LOS is also considered a performance measure. For the automobile mode average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A LOS designation is given to the weighted average control delay to better describe the level of operation. A description of LOS for signalized intersections is found in Table A-2.

**Table A-2: Signalized Intersection Level of Service Description (Automobile Mode)**

| Level of Service | Description  | Average Control Delay (seconds per vehicle) |
|------------------|--|---|
| A                | Operations with a control delay of 10 seconds/vehicle or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when volume-to-capacity ratio is and either progression is exceptionally favorable or the cycle length is very short. If it's due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.  | ≤10   |
| B                | Operations with control delay between 10.1 to 20.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.  | >10.0 to 20.0                               |
| C                | Operations with average control delays between 20.1 to 35.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping. | >20 to 35                                   |
| D                | Operations with control delay between 35.1 to 55.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop, and individual cycle failures are noticeable.   | >35 to 55                                   |
| E                | Operations with control delay between 55.1 to 80.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.   | >55 to 80                                   |
| F                | Operations with unacceptable control delay exceeding 80.0 seconds/vehicle and a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.   | >80   |

Source: Highway Capacity Manual 2010



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Page | A-3

## Unsignalized Intersections

The HCM 2010 procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, i. e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

### All-Way Stop Controlled Intersections

All-way stop controlled intersections is a form of traffic controls in which all approaches to an intersection are required to stop. Similar to signalized intersections, at all-way stop controlled intersections the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection as a whole. In other words the delay measured for all-way stop controlled intersections is a measure of the average delay for all vehicles passing through the intersection during the peak hour. A LOS designation is given to the weighted average control delay to better describe the level of operation.

### Two-Way Stop Controlled Intersections

Two-way stop controlled (TWSC) intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At TWSC intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay are determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A LOS for TWSC intersection is determined by the computed or measured control delay for each minor movement. LOS is not defined for the intersection as a whole for three main reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at the typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay from all vehicles; and (c) the resulting low delay can mask important LOS deficiencies for minor movements. Table A-3 provides a description of LOS at unsignalized intersections.

**Table A-3: Unsignalized Intersection Level of Service Description (Automobile Mode)**

| Control Delay (seconds per vehicle) | LOS by Volume-to-Capacity Ratio |             |
|-------------------------------------|---------------------------------|-------------|
|                                     | $v/c \leq 1.0$                  | $v/c > 1.0$ |
| $\leq 10$                           | A                               | F           |
| >10 to 15                           | B                               | F           |
| >15 to 25                           | C                               | F           |
| >25 to 35                           | D                               | F           |
| >35 to 50                           | E                               | F           |
| >50                                 | F                               | F           |

Source: HCM 2010 Exhibit 19-1



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Page | A-4

## Appendix B: Draft Scope of Work



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*Page | B*

September 20, 2016

Mike Harrison, P.E.  
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City of Clovis  
1033 Fifth Street  
Clovis, CA 93612

Via Email Only: [mikeh@ci.clovis.ca.us](mailto:mikeh@ci.clovis.ca.us)

**Subject: Proposed Draft Scope of Work for the Preparation of a Traffic Impact Analysis for the Proposed Clovis Community Medical Center Master Plan Expansion and Herndon Avenue Widening Project in the City of Clovis (JLB Project 006-009)**

Dear Mr. Harrison,

JLB Traffic Engineering, Inc. (JLB) hereby submits this Draft Scope of Work for the preparation of a Traffic Impact Analysis (TIA) for Clovis Community Medical Center Master Plan Expansion. The proposed Project to be evaluated includes two components. The first component is the proposed Clovis Community Medical Center (CCMC) Expansion Project, which is a phased project over the next 20 years. The CCMC expansion plan includes construction of new inpatient bed towers, medical office buildings, a general support building, a cancer center, a central plant and a parking garage, as well as expansion of the emergency department, surgical facilities, materials management and the outpatient community center. In addition, the CCMC project includes the potential development of areas adjacent to the main campus, primarily with retail commercial buildings, as well as a hotel and an assisted living center.

The second Project component is the proposed widening of Herndon Avenue from Temperance Avenue to De Wolf Avenue (South Leg). Herndon Avenue will be widened to six lanes between Temperance Avenue and Coventry Avenue and to four lanes from Coventry Avenue to the south leg of De Wolf Avenue. The widening of Herndon Avenue between Temperance Avenue and the south leg of De Wolf Avenue will include the signalization of Locan Avenue and both intersections of De Wolf Avenue. As needed existing traffic signals within the Herndon Widening Project will be modified to accommodate the proposed lane geometrics. Per information provided to JLB, the Project is consistent with the City of Clovis General Plan. An aerial of the Project vicinity and the conceptual site plan are shown in Exhibits A and B respectively. The purpose of this TIA is to evaluate the potential on and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process. In order to evaluate the on and off-site traffic impacts of the proposed project, JLB proposes the following draft scope of work.

#### **Scope of Work**

- Request a Fresno Council of Governments (Fresno COG) traffic forecast model run for the Project (Select Zone Analysis) which will include the Project and the streets to be analyzed. The Fresno COG



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*Page | 1*

traffic forecasting model will be used to forecast traffic volumes for the Base Year, Mid Term Year 2026 and Cumulative Year 2035 scenarios.

- JLB will evaluate existing and forecast levels of service (LOS) at the study intersection(s). JLB will use HCM 2010 methodologies within Synchro to perform this analysis for the a.m. and p.m. peak hours. JLB will identify the causes of poor LOS.
- Evaluate onsite circulation and provide recommendations as necessary to improve circulation to the site and within the project site.
- As necessary obtain recent or schedule and conduct new traffic counts at the study facility (ies).
- Perform a site visit to observe existing traffic conditions, especially during the a.m. and p.m. peak hours. Existing roadway conditions, including geometrics and traffic controls, will be verified.
- Forecast trip distribution based on turn count information, input from Fresno COG, and knowledge of the existing and planned circulation network in the vicinity of the project.
- Prepare California Manual on Uniform Traffic Control Devices (CA MUTCD) peak hour signal warrants for un-signalized study intersections.
- JLB will qualitatively analyze existing and planned transit routes in the project's vicinity.
- JLB will qualitatively analyze existing and planned bikeways in the project's vicinity.

#### **Study Scenarios:**

1. Existing traffic conditions;
2. Existing plus Project Phase 1 (2 to 10 Year Plan) traffic conditions with proposed mitigation measures (if any);
3. Near Term (2026) plus Project Phase 1 (2 to 10 Year Plan) traffic conditions with needed improvements (if any);
4. Cumulative Year 2035 No Project traffic conditions with needed improvements (if any); and
5. Cumulative Year 2035 plus Project Phases I and 2 traffic conditions with proposed mitigation measures (if any).

#### **Weekday peak hours to be analyzed:**

1. 7-9 a.m. peak hour
2. 4-6 p.m. peak hour

#### **Study Intersections:**

1. Nees Avenue / Temperance Avenue
2. Alluvial Avenue / Temperance Avenue
3. SR 168 WB Ramps / Temperance Avenue
4. SR 168 EB Ramps / Temperance Avenue
5. Fir Avenue / Temperance Avenue
6. Fir Avenue / Medical Center Drive
7. Herndon Avenue / Armstrong Avenue
8. Herndon Avenue / Tollhouse Road
9. Herndon Avenue / Temperance Avenue
10. Herndon Avenue / Coventry Avenue
11. Medical Center Drive / Coventry Avenue
12. Herndon Avenue / CCMC Access Road (Approximately 570 west of Locan Avenue)
13. Herndon Avenue / Locan Avenue
14. Herndon Avenue / De Wolf Avenue (north leg)





15. Herndon Avenue / De Wolf Avenue (south leg)
16. Hendon Avenue / Leonard Avenue
17. Herndon Avenue / McCall Avenue
18. Herndon Avenue / Academy Avenue

Queuing analysis is included in the proposed scope of work for the study intersection(s) listed above under all study scenarios. This analysis will be utilized to recommend minimum storage lengths for left and right turn lanes at all study intersections.

#### **Study Segments:**

1. Herndon Avenue between Armstrong Avenue and Tollhouse Road
2. Herndon Avenue between Tollhouse Road and Temperance Avenue
3. Herndon Avenue between Temperance Avenue and Coventry Avenue
4. Herndon Avenue between Coventry Avenue and CCMC Access Road
5. Herndon Avenue between CCMC Access Road and Locan Avenue
6. Herndon Avenue between Locan Avenue and De Wolf Avenue (north leg)
7. Herndon Avenue between De Wolf Avenue (north leg) and De Wolf (south Leg)
8. Herndon Avenue between De Wolf (south leg) and Leonard Avenue

#### **Project Only Trip Assignment to the Following State Facilities:**

1. SR 168 at Herndon Avenue
2. SR 168 at Fowler Avenue
3. SR 168 at Temperance Avenue

#### **Access to the Project**

As the overall Project is located at different locations relative to the major street network, access to the Project will differ by general location. The west portion of the Project, located at the northwest corner of Herndon Avenue and Temperance Avenue, is proposed to have access points to Temperance Avenue and Old Temperance Road. Another portion of the Project bounded by Herndon Avenue to the north and Coventry Avenue to the east proposes to have access to Herndon Avenue and Coventry Avenue. A third component of the Project bounded by Herndon Avenue to the north and Coventry Avenue to the west proposes to have access to Herndon Avenue and Coventry Avenue. Finally, the main component of the Clovis Community Medical Center proposes to have two access points to Herndon Avenue and two access points to Temperance Avenue. Of the access points to Herndon Avenue, one is via Coventry Avenue and the second is via CCMC Access Road. Of these the CCMC Access Road to Herndon Avenue is proposed as a right in, right out and left in access. The access points to Temperance Avenue are via Fir Avenue and via a previously approved right-in right-out access point north of Fir Avenue.

#### **Trip Generation**

Trip generation for the proposed Project is based on information provided by the City and the Institute of Transportation Engineers (ITE) reference, *Trip Generation, 9th Edition*. Table I provides the existing trip generation for Clovis Community Medical Center, While Table II provides the Project's trip generation under the Two to Ten Year Plan (Short Term), while Table III provides the trip generation of the Project under the Twenty Year Plan (Long Term Plan), while Table IV provides the combined trip generation of both the short term and long term plans.





**Table I: Existing Land Use Trip Generation**

| Land Use (ITE CODE)                  | TAZ  | Size    | Unit   | Daily |               | A.M. Peak Hour |            |            |            |              | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|------|---------|--------|-------|---------------|----------------|------------|------------|------------|--------------|----------------|------------|------------|------------|--------------|
|                                      |      |         |        | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total        | Trip Rate      | In : Out % | In         | Out        | Total        |
| Hospital (610)                       | 670B | 471.715 | k.s.f. | 13.22 | 6,236         | 0.95           | 63 : 37    | 282        | 166        | 448          | 0.93           | 38 : 62    | 167        | 272        | 439          |
| Medical-Dental Office Building (710) | 670B | 247.833 | k.s.f. | 36.13 | 8,954         | 2.39           | 79 : 21    | 468        | 124        | 592          | 3.57           | 28 : 72    | 248        | 637        | 885          |
| <b>Total Project Trips</b>           |      |         |        |       | <b>15,190</b> |                |            | <b>750</b> | <b>290</b> | <b>1,040</b> |                |            | <b>415</b> | <b>909</b> | <b>1,324</b> |

**Table II: Year 2026 Project Only Trip Generation (Phase I: 2 to 10 Year Plan)**

| Land Use (ITE CODE)                  | TAZ  | Size    | Unit          | Daily |               | A.M. Peak Hour |            |            |            |            | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|------|---------|---------------|-------|---------------|----------------|------------|------------|------------|------------|----------------|------------|------------|------------|--------------|
|                                      |      |         |               | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total      | Trip Rate      | In : Out % | In         | Out        | Total        |
| Hotel (310)                          | 670A | 150     | Occupied Beds | 8.92  | 1,338         | 0.67           | 58 : 42    | 59         | 42         | 101        | 0.70           | 49 : 51    | 51         | 54         | 105          |
| Shopping Center (820)                | 670A | 150.000 | k.s.f.        | 42.70 | 6,405         | 0.96           | 62 : 38    | 89         | 55         | 144        | 3.71           | 48 : 52    | 267        | 290        | 557          |
| Hospital (610)                       | 670B | 300.172 | k.s.f.        | 13.22 | 3,968         | 0.95           | 63 : 37    | 180        | 105        | 285        | 0.93           | 38 : 62    | 106        | 173        | 279          |
| Medical-Dental Office Building (710) | 670B | 161.500 | k.s.f.        | 36.13 | 5,835         | 2.39           | 79 : 21    | 305        | 81         | 386        | 3.57           | 28 : 72    | 162        | 415        | 577          |
| <b>Total Project Trips</b>           |      |         |               |       | <b>17,546</b> |                |            | <b>633</b> | <b>283</b> | <b>916</b> |                |            | <b>586</b> | <b>932</b> | <b>1,518</b> |

Notes: ksf = Thousand Square Feet

**Table III: Year 2035 Additional Project Only Trip Generation (Phase 2: 20 Year Plan)**

| Land Use (ITE CODE)                  | TAZ  | Size    | Unit          | Daily |               | A.M. Peak Hour |            |            |            |            | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|------|---------|---------------|-------|---------------|----------------|------------|------------|------------|------------|----------------|------------|------------|------------|--------------|
|                                      |      |         |               | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total      | Trip Rate      | In : Out % | In         | Out        | Total        |
| Assisted Living (254)                | 732D | 100     | Occupied Beds | 2.74  | 274           | 0.18           | 68 : 32    | 12         | 6          | 18         | 0.29           | 50 : 50    | 15         | 14         | 29           |
| Hospital (610)                       | 670B | 168.672 | k.s.f.        | 13.22 | 2,230         | 0.95           | 63 : 37    | 101        | 59         | 160        | 0.93           | 38 : 62    | 60         | 97         | 157          |
| Medical-Dental Office Building (710) | 670B | 260.000 | k.s.f.        | 36.13 | 9,394         | 2.39           | 79 : 21    | 491        | 130        | 621        | 3.57           | 28 : 72    | 260        | 668        | 928          |
| Shopping Center (820)                | 732B | 70.000  | k.s.f.        | 42.70 | 2,989         | 0.96           | 62 : 38    | 42         | 25         | 67         | 3.71           | 48 : 52    | 125        | 135        | 260          |
| <b>Total Project Trips</b>           |      |         |               |       | <b>14,887</b> |                |            | <b>646</b> | <b>220</b> | <b>866</b> |                |            | <b>460</b> | <b>914</b> | <b>1,374</b> |

Notes: ksf = Thousand Square Feet



**Table IV: Year 2035 Total Project Only Trip Generation**

|                            | Daily         | A.M. Peak Hour |            |              | P.M. Peak Hour |              |              |
|----------------------------|---------------|----------------|------------|--------------|----------------|--------------|--------------|
|                            | Total         | In             | Out        | Total        | In             | Out          | Total        |
| <b>Total Project Trips</b> | <b>32,433</b> | <b>1,279</b>   | <b>503</b> | <b>1,782</b> | <b>1,046</b>   | <b>1,846</b> | <b>2,892</b> |

### Near Term Projects to be Included

We are working with City of Clovis Engineering and Planning staff to identify near term projects in the vicinity of the proposed Project. The near term projects would then be included under the Near Term plus Project Analysis. At this point, the proposed projects to be included in the Near Term analysis are:

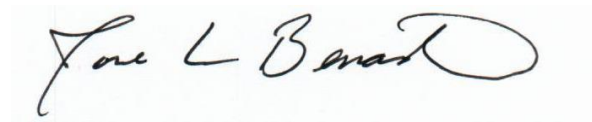
- |   |  |
|---|--|
| 1. Harbor House Apartments  | NEC of Ashlan and Temperance Avenues                       |
| 2. TT 5427 (portion of)   | NWC of Shields and Temperance Avenues                      |
| 3. TT 5447 (portion of)   | NEC of Shields and Temperance Avenues                      |
| 4. TT 5461 (portion of)   | NEC of Dakota and Temperance Avenues                       |
| 5. TT 5472  | NEC of Nees and Locan Avenues                              |
| 6. TT 5550  | SWC of Teague and Armstrong Avenues                        |
| 7. Tract 5592   | SWC of Shields and Locan Avenues                           |
| 8. TT 5717 (portion of)   | SEC of Shields and Shields Avenues                         |
| 9. TT 5836  | NEC of Temperance and Nees Avenues                         |
| 10. TT 6067   | NEC of Shields and Locan Avenues                           |
| 11. TT 6049 (portion of)  | SEC of Temperance and Shepherd Avenues                     |
| 12. TT 6072   | SWC of Teague and DeWolf Avenues                           |
| 13. Larsen Single Family Subdivision  | NWC of Teague and Locan Avenues                            |
| 14. Single Family Subdivision   | NEC of De Wolf Avenue and the Gould Canal                  |
| 15. Single Family Subdivision   | NWQ of Ashlan and De Wolf Avenues                          |
| 16. C-09-106 (portion of)   | SWC of Shields and Armstrong Avenues                       |
| 17. Harlan Ranch Commercial   | NEC of DeWolf and Owens Mountain Parkway                   |
| 18. RT Park, Office and Light Industrial  | Along SR 168 between Temperance and Owens Mountain Parkway |
| 19. Other Near Term Projects the City of Clovis, City of Fresno, County of Fresno or Caltrans has knowledge of and for which it is anticipated that said project(s) is/are projected to be whole or partially built by the Year 2026. The respective City, County and Caltrans as appropriate provides JLB with project details such as a project description, location, proposed land uses with breakdowns and type of residential units and amount of square footages for non-residential uses. |  |



Mr. Harrison  
CCMC Master Plan Expansion TIA Draft Scope of Work  
September 20, 2016

The above scope of work is based on our understanding of this project and our experience with similar Traffic Impact Analysis projects. In the absence of comments by October 12, 2016, we will assume that the above scope of work is acceptable to the agency (ies) that have not submitted any comments to the proposed TIA scope of work. If you have any questions or require additional information, please contact me at (559) 570-8991 or by email at [jbenavides@JLBtraffic.com](mailto:jbenavides@JLBtraffic.com).

Sincerely,



Jose Luis Benavides, P.E., T.E.  
President

CC: Jill Gormley, P.E., City of Fresno  
Harpreet Kooner, County of Fresno  
David Padilla, Caltrans

Z:\01 Projects\006 Clovis\006-009 CCMC Phase 2 TIA\Draft Scope of Work\L09202016 Draft Scope of Work.docx



TRAFFIC ENGINEERING, INC.

Traffic Engineering, Transportation Planning & Parking Solutions

[www.JLBtraffic.com](http://www.JLBtraffic.com)

[info@JLBtraffic.com](mailto:info@JLBtraffic.com)

1300 E Shaw Ave. Ste. 103

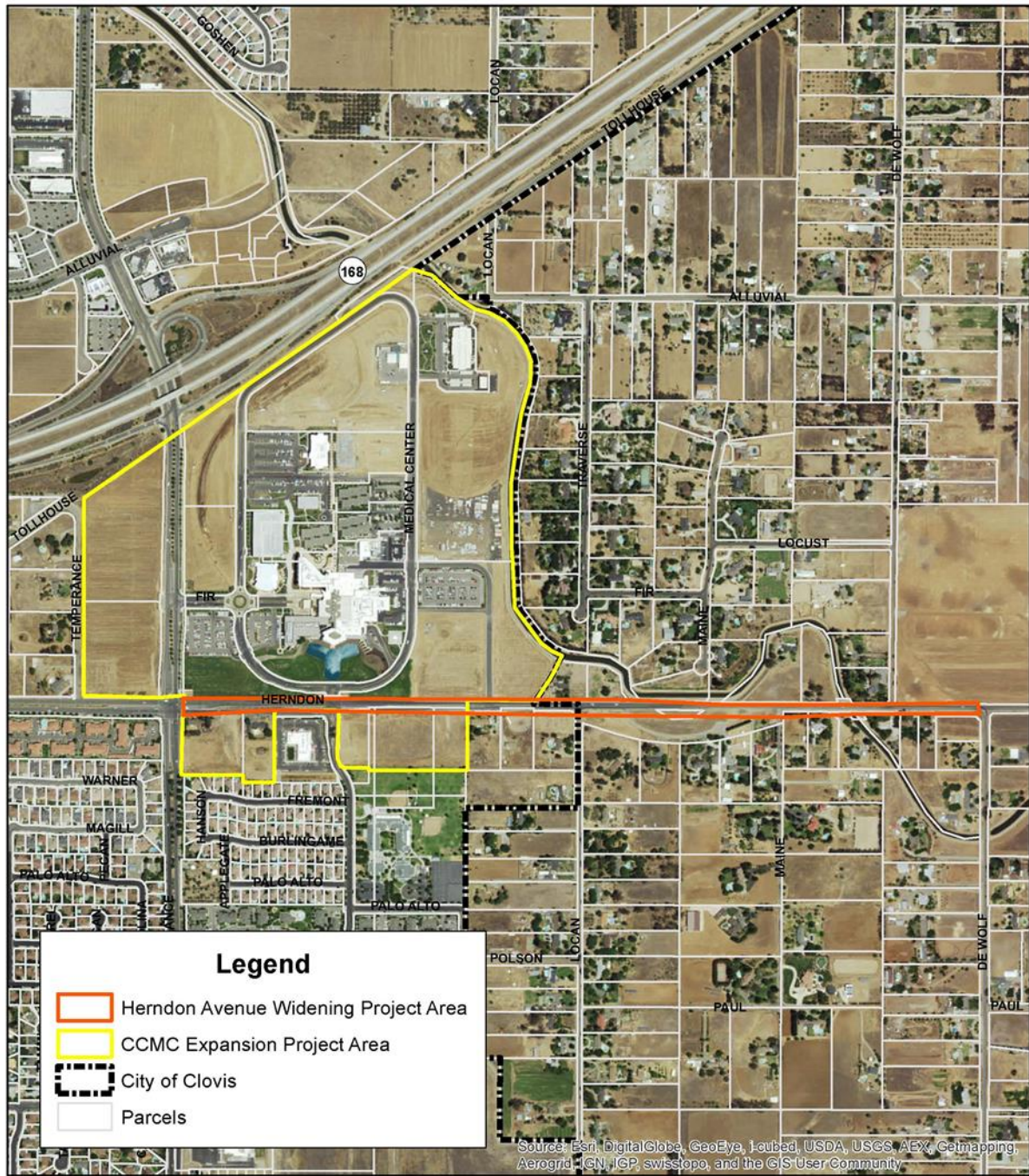
Fresno, CA 93710

(559) 570-8991

Page | 6



## Exhibit A – Aerial



Source: County of Fresno, City of Clovis, ESRI

### Project Area

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis

Figure 2

ODELL Planning & Research, Inc.



## Exhibit B – Site Plan

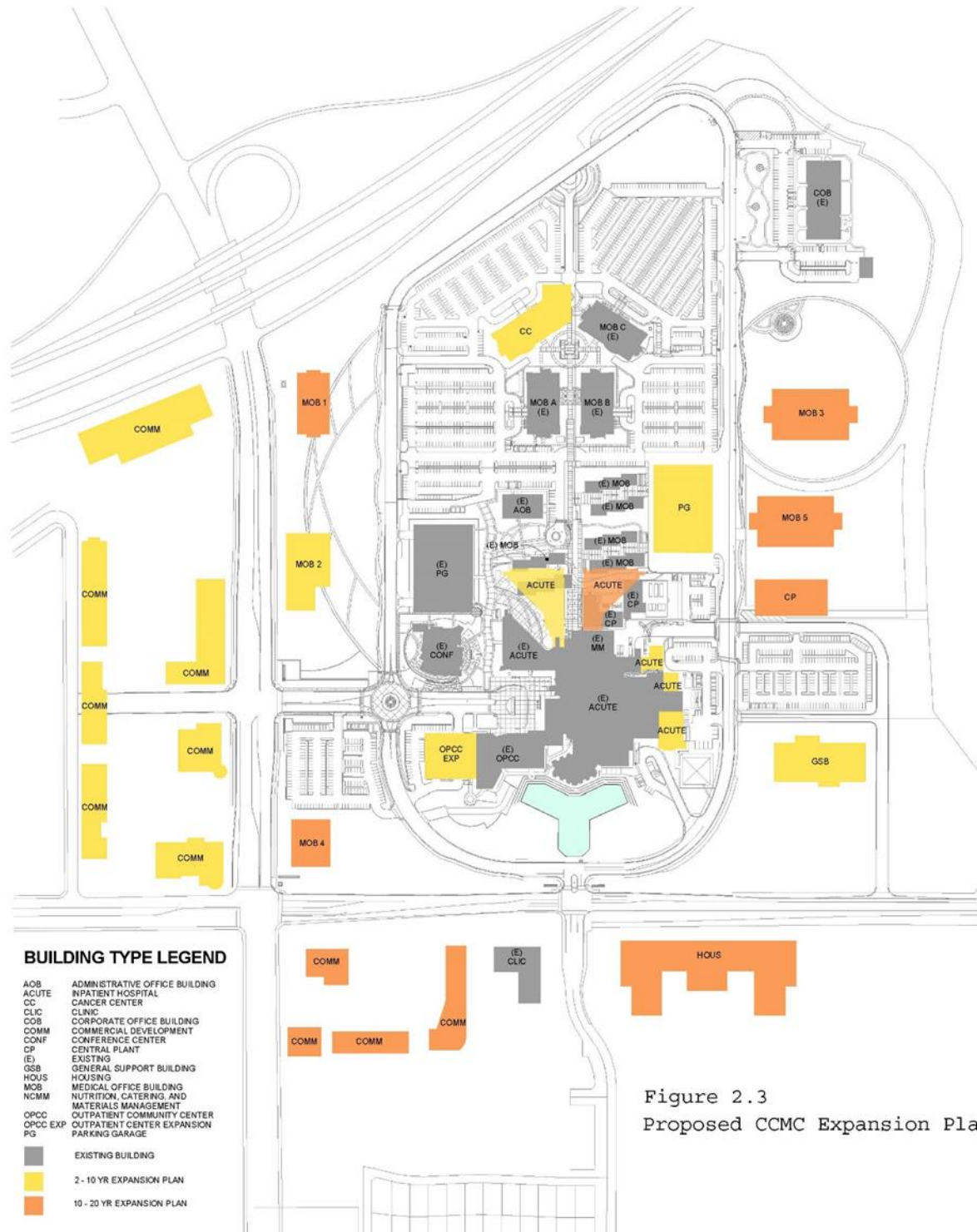


Figure 2.3  
Proposed CCMC Expansion Plan



## Jose Benavides

---

**From:** Padilla, Dave@DOT <dave.padilla@dot.ca.gov>  
**Sent:** Wednesday, October 12, 2016 2:07 PM  
**To:** Jose Benavides  
**Subject:** RE: Clovis Community Medical Center TIA Draft Scope of Work

Jose, I am not sure if I have commented on this scope , however, the SOW is acceptable as presented. Please route the TIA for our review once completed.

Sincerely,

David Padilla

Office: (559) 444-2493, Fax: (559) 445-5875



---

**From:** Jose Benavides [mailto:jbenavides@jlbtraffic.com]  
**Sent:** Tuesday, September 20, 2016 4:43 PM  
**To:** Mike Harrison (mikeh@ci.clovis.ca.us) <mikeh@ci.clovis.ca.us>  
**Cc:** Padilla, Dave@DOT <dave.padilla@dot.ca.gov>; Harpreet Kooner (HKooner@co.fresno.ca.us) <HKooner@co.fresno.ca.us>; Jill Gormley (Jill.Gormley@fresno.gov) <Jill.Gormley@fresno.gov>  
**Subject:** Clovis Community Medical Center TIA Draft Scope of Work

Good afternoon,

Attached you will find a Draft Scope of Work of the preparation of a Traffic Impact Analysis for the Clovis Community Medical Center Master Plan Expansion and Herndon Avenue widening project for review and comment. We look forward to working with you and other responsible agencies to finalize the draft scope of work for the TIA.

Sincerely,

Jose Luis Benavides, P.E., T.E.  
President



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Fresno, CA 93710

Office: (559) 570-8991

Cell: (559) 694-6000

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## Jose Benavides

---

**From:** Sean Smith <SeanS@ci.clovis.ca.us>  
**Sent:** Friday, September 30, 2016 12:04 PM  
**To:** Jose Benavides  
**Cc:** Mike Harrison; Mel Gonzalez Sanchez; dave\_padilla@dot.ca.gov; HKooner@co.fresno.ca.us; Jill. Gormley (Jill.Gormley@fresno.gov)  
**Subject:** FW: Clovis Community Medical Center TIA Draft Scope of Work  
**Attachments:** L09202016 Draft Scope of Work.pdf

Jose,

Thanks for letting us look at the scope of work for this project. The City of Clovis is agreeable to the scope provided that one additional intersection is studied: the proposed right-in right-out access point to Temperance north of Fir. If you have any questions, please feel free to contact me or other Engineering staff.

*Please note that our counter is open from 8am – 3pm; staff is available for appointments only after 3 pm.*

**Sean Smith**, RCE, QSD  
Interim DRU Manager  
City of Clovis  
[www.cityofclovis.com](http://www.cityofclovis.com)  
1033 Fifth Street ■ Clovis, CA 93612  
T 559.324.2363 ■ C 559.765.7505  
email [seans@cityofclovis.com](mailto:seans@cityofclovis.com)

cc: project file

---

**From:** Mike Harrison  
**Sent:** Tuesday, September 20, 2016 4:56 PM  
**To:** Sean Smith  
**Subject:** Fwd: Clovis Community Medical Center TIA Draft Scope of Work

Sent from my Verizon Wireless 4G LTE smartphone

----- Original message -----

From: Jose Benavides <jbenavides@jlbtraffic.com>  
Date: 09/20/2016 4:43 PM (GMT-08:00)  
To: Mike Harrison <mikeh@ci.clovis.ca.us>  
Cc: "David Padilla (dave\_padilla@dot.ca.gov)" <dave\_padilla@dot.ca.gov>, "Harpreet Kooner (HKooner@co.fresno.ca.us)" <HKooner@co.fresno.ca.us>, "Jill Gormley (Jill.Gormley@fresno.gov)" <Jill.Gormley@fresno.gov>  
Subject: Clovis Community Medical Center TIA Draft Scope of Work

Good afternoon,

Attached you will find a Draft Scope of Work of the preparation of a Traffic Impact Analysis for the Clovis Community Medical Center Master Plan Expansion and Herndon Avenue widening project for review and comment. We look forward to working with you and other responsible agencies to finalize the draft scope of work for the TIA.

Sincerely,

Jose Luis Benavides, P.E., T.E.

President



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Fresno, CA 93710

Office: (559) 570-8991

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## Jose Benavides

---

**From:** Jill Gormley <Jill.Gormley@fresno.gov>  
**Sent:** Monday, January 9, 2017 1:45 PM  
**To:** Jose Benavides; Harpreet Kooner (HKooner@co.fresno.ca.us)  
**Subject:** RE: Clovis Community Medical Center Trip Assignment

I have no additional comments.

jmg

---

**From:** Jose Benavides [mailto:jbenavides@jlbtraffic.com]  
**Sent:** Monday, December 19, 2016 4:38 PM  
**To:** Harpreet Kooner (HKooner@co.fresno.ca.us)  
**Cc:** Jill Gormley  
**Subject:** Clovis Community Medical Center Trip Assignment

Good afternoon,

As was previously requested the attached two figures represent the trip assignment of the Project Only trips for the Clovis Community Medical Center Ten-Year and Long Term Plans. Figure 4 illustrates the Ten-Year (2026) Project Only Trip Assignment while Figure 10 illustrates the Long-Term (2035) Project Only Trip Assignment.

The Project Only Trip Assignments on these two figures have been prepared based on the Fresno COG Select Zone Analysis, Engineering judgement, the City's circulation element and our knowledge of the roadways in the vicinity of the Project. Based on these figures we plan to add to the TIA the analysis of the following intersections and segments.

Intersections:

1. New CCMC Access Road to Temperance
2. Bullard at Locan
3. Bullard at De Wolf

Segments:

1. Locan between Herndon and Bullard

Let us know if you have any further questions or comments to the proposed scope of work. In the absence of comments by December 30<sup>th</sup> it will be assumed that there are no further comments to the scope of work.

Sincerely,

Jose Luis Benavides, P.E., T.E.  
President



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Cell: (559) 694-6000  
[www.JLBtraffic.com](http://www.JLBtraffic.com)

## Jose Benavides

---

**From:** Kooner, Harpreet <HKooner@co.fresno.ca.us>  
**Sent:** Thursday, January 12, 2017 1:30 PM  
**To:** Jose Benavides  
**Cc:** Jill Gormley (Jill.Gormley@fresno.gov)  
**Subject:** RE: Clovis Community Medical Center Trip Assignment

Jose,

We have no additional comments.

---

### *Harpreet Kooner*

**From:** Jose Benavides [mailto:jbenavides@jlbtraffic.com]  
**Sent:** Monday, December 19, 2016 4:38 PM  
**To:** Kooner, Harpreet  
**Cc:** Jill Gormley (Jill.Gormley@fresno.gov)  
**Subject:** Clovis Community Medical Center Trip Assignment

Good afternoon,

As was previously requested the attached two figures represent the trip assignment of the Project Only trips for the Clovis Community Medical Center Ten-Year and Long Term Plans. Figure 4 illustrates the Ten-Year (2026) Project Only Trip Assignment while Figure 10 illustrates the Long-Term (2035) Project Only Trip Assignment.

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Let us know if you have any further questions or comments to the proposed scope of work. In the absence of comments by December 30<sup>th</sup> it will be assumed that there are no further comments to the scope of work.

Sincerely,

Jose Luis Benavides, P.E., T.E.  
President



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Cell: (559) 694-6000  
[www.JLBtraffic.com](http://www.JLBtraffic.com)

## Jose Benavides

---

**From:** Kooner, Harpreet <HKooner@co.fresno.ca.us>  
**Sent:** Tuesday, October 11, 2016 7:59 AM  
**To:** Jose Benavides; Mike Harrison (mikeh@ci.clovis.ca.us)  
**Cc:** David Padilla (dave\_padilla@dot.ca.gov); Jill Gormley (Jill.Gormley@fresno.gov); Daniele, Frank; Xiong, Tong (PWP)  
**Subject:** RE: Clovis Community Medical Center TIA Draft Scope of Work

Jose,

Thank you for reaching out to the County. County has requested trip distribution for this project. Looking at overall County traffic circulation, County is requesting the following intersections and roadway segments to be included in your analysis: Bullard/DeWolf and Bullard/Locan; roadway segments DeWolf between Herndon and Bullard and Locan between Herndon and Bullard.

If needed, we can revisit this request after the trip distribution is determined for this project.

*Harpreet Kooner*

---

**From:** Jose Benavides [mailto:jbenavides@jlbtraffic.com]  
**Sent:** Tuesday, September 20, 2016 4:43 PM  
**To:** Mike Harrison (mikeh@ci.clovis.ca.us)  
**Cc:** David Padilla (dave\_padilla@dot.ca.gov); Kooner, Harpreet; Jill Gormley (Jill.Gormley@fresno.gov)  
**Subject:** Clovis Community Medical Center TIA Draft Scope of Work

Good afternoon,

Attached you will find a Draft Scope of Work of the preparation of a Traffic Impact Analysis for the Clovis Community Medical Center Master Plan Expansion and Herndon Avenue widening project for review and comment. We look forward to working with you and other responsible agencies to finalize the draft scope of work for the TIA.

Sincerely,

Jose Luis Benavides, P.E., T.E.  
President



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## Appendix C: Traffic Counts



**Traffic Engineering, Inc.**

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*Fresno, CA 93710*

*(559) 570-8991*

*Page | C*

# JLB Traffic Engineering, Inc.

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Fresno, CA 93710

(559) 570-8991

Traffic Engineering, Transportation Planning & Parking Solutions

[www.JLBtraffic.com](http://www.JLBtraffic.com)

File Name : 01 Nees at Temperance (091316)

Site Code : 00000000

Start Date : 9/13/2016

Page No : 1

## Groups Printed- Unshifted - Bank 1

|             | TEMPERANCE<br>Southbound |      |       |      |            | NEES<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | NEES<br>Eastbound |      |       |      |            |            |
|-------------|--------------------------|------|-------|------|------------|-------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|-------------------|------|-------|------|------------|------------|
| Start Time  | Left                     | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 1                        | 116  | 11    | 2    | 130        | 13                | 4    | 2     | 0    | 19         | 23                       | 58   | 4     | 0    | 85         | 6                 | 3    | 15    | 0    | 24         | 258        |
| 07:15 AM    | 2                        | 137  | 17    | 0    | 156        | 6                 | 5    | 3     | 0    | 14         | 32                       | 41   | 6     | 0    | 79         | 4                 | 5    | 9     | 0    | 18         | 267        |
| 07:30 AM    | 0                        | 127  | 24    | 1    | 152        | 9                 | 6    | 2     | 0    | 17         | 40                       | 49   | 12    | 0    | 101        | 9                 | 3    | 16    | 0    | 28         | 298        |
| 07:45 AM    | 0                        | 132  | 18    | 0    | 150        | 6                 | 6    | 1     | 5    | 18         | 28                       | 47   | 4     | 2    | 81         | 5                 | 2    | 8     | 0    | 15         | 264        |
| Total       | 3                        | 512  | 70    | 3    | 588        | 34                | 21   | 8     | 5    | 68         | 123                      | 195  | 26    | 2    | 346        | 24                | 13   | 48    | 0    | 85         | 1087       |
| 08:00 AM    | 1                        | 92   | 87    | 0    | 180        | 5                 | 9    | 1     | 4    | 19         | 34                       | 58   | 11    | 1    | 104        | 21                | 2    | 22    | 0    | 45         | 348        |
| 08:15 AM    | 0                        | 87   | 56    | 0    | 143        | 14                | 2    | 2     | 0    | 18         | 37                       | 62   | 9     | 0    | 108        | 32                | 8    | 27    | 1    | 68         | 337        |
| 08:30 AM    | 1                        | 65   | 13    | 0    | 79         | 4                 | 6    | 1     | 1    | 12         | 26                       | 64   | 5     | 1    | 96         | 19                | 3    | 12    | 0    | 34         | 221        |
| 08:45 AM    | 1                        | 71   | 8     | 2    | 82         | 5                 | 3    | 1     | 0    | 9          | 29                       | 46   | 2     | 0    | 77         | 6                 | 2    | 11    | 0    | 19         | 187        |
| Total       | 3                        | 315  | 164   | 2    | 484        | 28                | 20   | 5     | 5    | 58         | 126                      | 230  | 27    | 2    | 385        | 78                | 15   | 72    | 1    | 166        | 1093       |
| *****       |                          |      |       |      |            |                   |      |       |      |            |                          |      |       |      |            |                   |      |       |      |            |            |
| 04:00 PM    | 0                        | 62   | 10    | 0    | 72         | 7                 | 7    | 2     | 2    | 18         | 19                       | 72   | 11    | 2    | 104        | 15                | 7    | 18    | 0    | 40         | 234        |
| 04:15 PM    | 1                        | 49   | 22    | 1    | 73         | 6                 | 4    | 3     | 0    | 13         | 26                       | 97   | 4     | 1    | 128        | 12                | 4    | 18    | 0    | 34         | 248        |
| 04:30 PM    | 1                        | 51   | 12    | 0    | 64         | 3                 | 3    | 4     | 0    | 10         | 25                       | 82   | 12    | 0    | 119        | 40                | 6    | 27    | 0    | 73         | 266        |
| 04:45 PM    | 1                        | 64   | 7     | 0    | 72         | 12                | 0    | 1     | 0    | 13         | 42                       | 95   | 9     | 0    | 146        | 14                | 5    | 27    | 1    | 47         | 278        |
| Total       | 3                        | 226  | 51    | 1    | 281        | 28                | 14   | 10    | 2    | 54         | 112                      | 346  | 36    | 3    | 497        | 81                | 22   | 90    | 1    | 194        | 1026       |
| 05:00 PM    | 3                        | 47   | 9     | 0    | 59         | 8                 | 3    | 1     | 0    | 12         | 38                       | 88   | 5     | 0    | 131        | 17                | 7    | 28    | 0    | 52         | 254        |
| 05:15 PM    | 2                        | 61   | 14    | 0    | 77         | 7                 | 4    | 1     | 0    | 12         | 29                       | 124  | 12    | 1    | 166        | 25                | 6    | 25    | 0    | 56         | 311        |
| 05:30 PM    | 4                        | 70   | 16    | 0    | 90         | 4                 | 8    | 1     | 2    | 15         | 41                       | 116  | 5     | 0    | 162        | 25                | 4    | 27    | 0    | 56         | 323        |
| 05:45 PM    | 2                        | 64   | 19    | 0    | 85         | 4                 | 3    | 2     | 0    | 9          | 35                       | 114  | 16    | 0    | 165        | 23                | 10   | 22    | 0    | 55         | 314        |
| Total       | 11                       | 242  | 58    | 0    | 311        | 23                | 18   | 5     | 2    | 48         | 143                      | 442  | 38    | 1    | 624        | 90                | 27   | 102   | 0    | 219        | 1202       |
| Grand Total | 20                       | 1295 | 343   | 6    | 1664       | 113               | 73   | 28    | 14   | 228        | 504                      | 1213 | 127   | 8    | 1852       | 273               | 77   | 312   | 2    | 664        | 4408       |
| Apprch %    | 1.2                      | 77.8 | 20.6  | 0.4  |            | 49.6              | 32   | 12.3  | 6.1  |            | 27.2                     | 65.5 | 6.9   | 0.4  |            | 41.1              | 11.6 | 47    | 0.3  |            |            |
| Total %     | 0.5                      | 29.4 | 7.8   | 0.1  | 37.7       | 2.6               | 1.7  | 0.6   | 0.3  | 5.2        | 11.4                     | 27.5 | 2.9   | 0.2  | 42         | 6.2               | 1.7  | 7.1   | 0    | 15.1       |            |
| Unshifted   | 17                       | 1295 |       |      |            |                   |      |       |      |            |                          | 1213 |       |      |            |                   |      |       |      |            |            |
| % Unshifted | 85                       | 100  | 100   | 100  | 99.8       | 100               | 100  | 100   | 100  | 100        | 81.3                     | 100  | 100   | 100  | 94.9       | 86.4              | 100  | 100   | 100  | 94.4       | 97         |
| Bank 1      | 3                        | 0    | 0     | 0    | 3          | 0                 | 0    | 0     | 0    | 0          | 94                       | 0    | 0     | 0    | 94         | 37                | 0    | 0     | 0    | 37         | 134        |
| % Bank 1    | 15                       | 0    | 0     | 0    | 0.2        | 0                 | 0    | 0     | 0    | 0          | 18.7                     | 0    | 0     | 0    | 5.1        | 13.6              | 0    | 0     | 0    | 5.6        | 3          |

# JLB Traffic Engineering, Inc.

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Fresno, CA 93710

(559) 570-8991

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[www.JLBtraffic.com](http://www.JLBtraffic.com)

File Name : 01 Nees at Temperance (091316)

Site Code : 00000000

Start Date : 9/13/2016

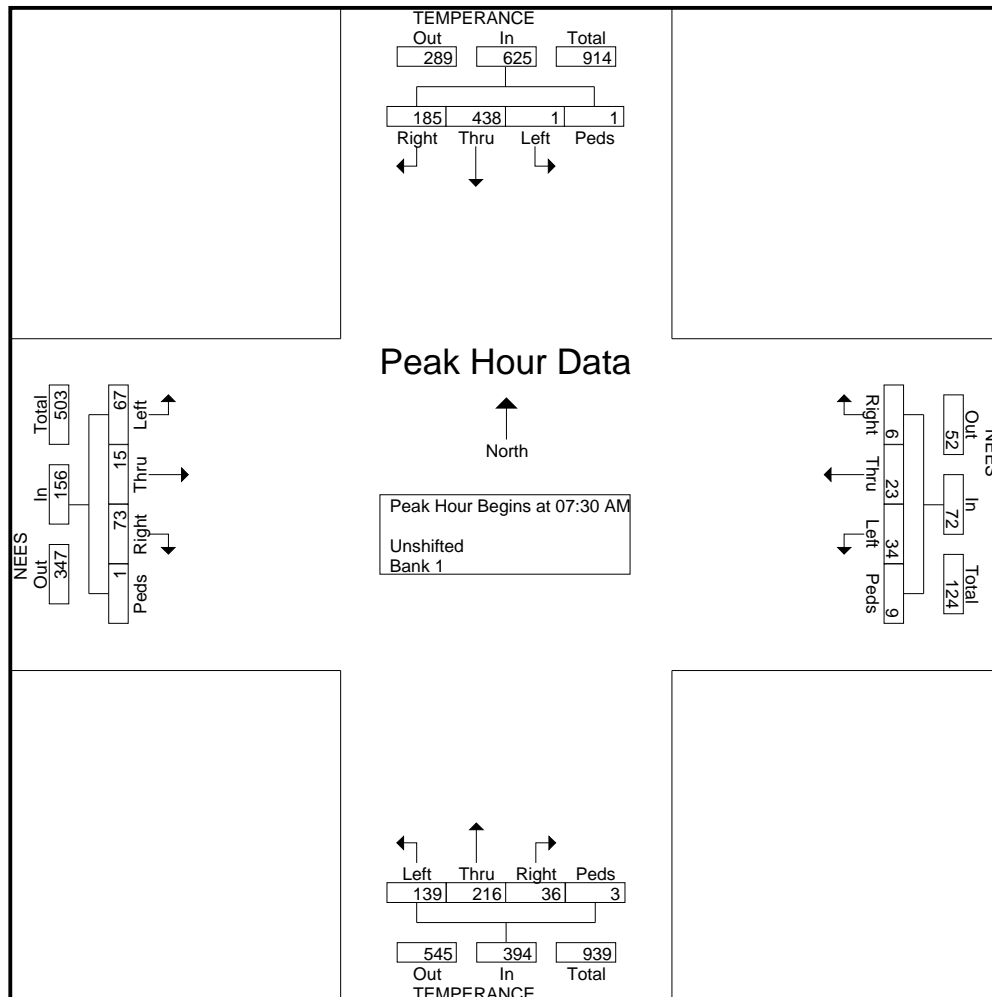
Page No : 2

|            | TEMPERANCE<br>Southbound |      |       |      |            | NEES<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | NEES<br>Eastbound |      |       |      |            |            |
|------------|--------------------------|------|-------|------|------------|-------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|-------------------|------|-------|------|------------|------------|
| Start Time | Left                     | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:30 AM     | 0    | 127  | 24   | 1    | 152  | 9    | 6    | 2    | 0    | 17   | 40   | 49   | 12   | 0    | 101  | 9    | 3    | 16   | 0    | 28   | 298  |
| 07:45 AM     | 0    | 132  | 18   | 0    | 150  | 6    | 6    | 1    | 5    | 18   | 28   | 47   | 4    | 2    | 81   | 5    | 2    | 8    | 0    | 15   | 264  |
| 08:00 AM     | 1    | 92   | 87   | 0    | 180  | 5    | 9    | 1    | 4    | 19   | 34   | 58   | 11   | 1    | 104  | 21   | 2    | 22   | 0    | 45   | 348  |
| 08:15 AM     | 0    | 87   | 56   | 0    | 143  | 14   | 2    | 2    | 0    | 18   | 37   | 62   | 9    | 0    | 108  | 32   | 8    | 27   | 1    | 68   | 337  |
| Total Volume | 1    | 438  | 185  | 1    | 625  | 34   | 23   | 6    | 9    | 72   | 139  | 216  | 36   | 3    | 394  | 67   | 15   | 73   | 1    | 156  | 1247 |
| % App. Total | 0.2  | 70.1 | 29.6 | 0.2  |      | 47.2 | 31.9 | 8.3  | 12.5 |      | 35.3 | 54.8 | 9.1  | 0.8  |      | 42.9 | 9.6  | 46.8 | 0.6  |      |      |
| PHF          | .250 | .830 | .532 | .250 | .868 | .607 | .639 | .750 | .450 | .947 | .869 | .871 | .750 | .375 | .912 | .523 | .469 | .676 | .250 | .574 | .896 |





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Traffic Engineering, Transportation Planning & Parking Solutions

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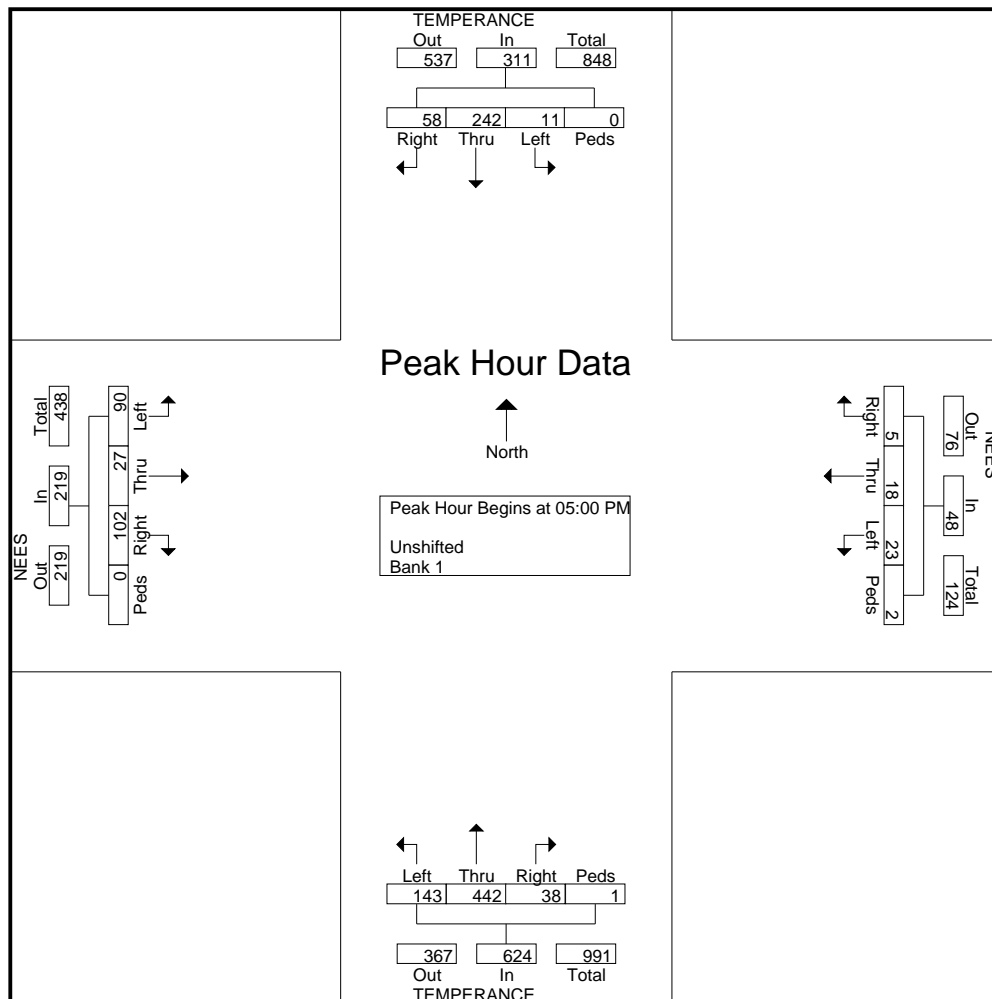
File Name : 01 Nees at Temperance (091316)

Site Code : 00000000

Start Date : 9/13/2016

Page No : 3

|  | TEMPERANCE<br>Southbound |      |       |      |            | NEES<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | NEES<br>Eastbound |      |       |      |            |            |
|--|--------------------------|------|-------|------|------------|-------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|-------------------|------|-------|------|------------|------------|
| Start<br>Time  | Left                     | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                          |      |       |      |            |                   |      |       |      |            |                          |      |       |      |            |                   |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                          |      |       |      |            |                   |      |       |      |            |                          |      |       |      |            |                   |      |       |      |            |            |
| 05:00 PM   | 3                        | 47   | 9     | 0    | 59         | 8                 | 3    | 1     | 0    | 12         | 38                       | 88   | 5     | 0    | 131        | 17                | 7    | 28    | 0    | 52         | 254        |
| 05:15 PM   | 2                        | 61   | 14    | 0    | 77         | 7                 | 4    | 1     | 0    | 12         | 29                       | 124  | 12    | 1    | 166        | 25                | 6    | 25    | 0    | 56         | 311        |
| 05:30 PM   | 4                        | 70   | 16    | 0    | 90         | 4                 | 8    | 1     | 2    | 15         | 41                       | 116  | 5     | 0    | 162        | 25                | 4    | 27    | 0    | 56         | 323        |
| 05:45 PM   | 2                        | 64   | 19    | 0    | 85         | 4                 | 3    | 2     | 0    | 9          | 35                       | 114  | 16    | 0    | 165        | 23                | 10   | 22    | 0    | 55         | 314        |
| Total Volume   | 11                       | 242  | 58    | 0    | 311        | 23                | 18   | 5     | 2    | 48         | 143                      | 442  | 38    | 1    | 624        | 90                | 27   | 102   | 0    | 219        | 1202       |
| % App. Total   | 3.5                      | 77.8 | 18.6  | 0    |            | 47.9              | 37.5 | 10.4  | 4.2  |            | 22.9                     | 70.8 | 6.1   | 0.2  |            | 41.1              | 12.3 | 46.6  | 0    |            |            |
| PHF  | .688                     | .864 | .763  | .000 | .864       | .719              | .563 | .625  | .250 | .800       | .872                     | .891 | .594  | .250 | .940       | .900              | .675 | .911  | .000 | .978       | .930       |



# JLB Traffic Engineering, Inc.

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Traffic Engineering, Transportation Planning & Parking Solutions

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File Name : 01 Nees at Temperance (091316)

Site Code : 00000000

Start Date : 9/13/2016

Page No : 1

## Groups Printed- Bank 1

|             | TEMPERANCE<br>Southbound |      |       |      |            | NEES<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | NEES<br>Eastbound |      |       |      |            |            |
|-------------|--------------------------|------|-------|------|------------|-------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|-------------------|------|-------|------|------------|------------|
| Start Time  | Left                     | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 9                        | 0    | 0     | 0    | 9          | 1                 | 0    | 0     | 0    | 1          | 10         |
| 07:15 AM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 11                       | 0    | 0     | 0    | 11         | 1                 | 0    | 0     | 0    | 1          | 12         |
| 07:30 AM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 19                       | 0    | 0     | 0    | 19         | 1                 | 0    | 0     | 0    | 1          | 20         |
| 07:45 AM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 5                        | 0    | 0     | 0    | 5          | 0                 | 0    | 0     | 0    | 0          | 5          |
| Total       | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 44                       | 0    | 0     | 0    | 44         | 3                 | 0    | 0     | 0    | 3          | 47         |
| 08:00 AM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 3                        | 0    | 0     | 0    | 3          | 1                 | 0    | 0     | 0    | 1          | 4          |
| 08:15 AM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 5                        | 0    | 0     | 0    | 5          | 1                 | 0    | 0     | 0    | 1          | 6          |
| 08:30 AM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 5                        | 0    | 0     | 0    | 5          | 2                 | 0    | 0     | 0    | 2          | 7          |
| 08:45 AM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 7                        | 0    | 0     | 0    | 7          | 0                 | 0    | 0     | 0    | 0          | 7          |
| Total       | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 20                       | 0    | 0     | 0    | 20         | 4                 | 0    | 0     | 0    | 4          | 24         |
| *****       |                          |      |       |      |            |                   |      |       |      |            |                          |      |       |      |            |                   |      |       |      |            |            |
| 04:00 PM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 4                        | 0    | 0     | 0    | 4          | 3                 | 0    | 0     | 0    | 3          | 7          |
| 04:15 PM    | 1                        | 0    | 0     | 0    | 1          | 0                 | 0    | 0     | 0    | 0          | 5                        | 0    | 0     | 0    | 5          | 3                 | 0    | 0     | 0    | 3          | 9          |
| 04:30 PM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 4                        | 0    | 0     | 0    | 4          | 6                 | 0    | 0     | 0    | 6          | 10         |
| 04:45 PM    | 1                        | 0    | 0     | 0    | 1          | 0                 | 0    | 0     | 0    | 0          | 4                        | 0    | 0     | 0    | 4          | 3                 | 0    | 0     | 0    | 3          | 8          |
| Total       | 2                        | 0    | 0     | 0    | 2          | 0                 | 0    | 0     | 0    | 0          | 17                       | 0    | 0     | 0    | 17         | 15                | 0    | 0     | 0    | 15         | 34         |
| 05:00 PM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 2                        | 0    | 0     | 0    | 2          | 1                 | 0    | 0     | 0    | 1          | 3          |
| 05:15 PM    | 1                        | 0    | 0     | 0    | 1          | 0                 | 0    | 0     | 0    | 0          | 2                        | 0    | 0     | 0    | 2          | 5                 | 0    | 0     | 0    | 5          | 8          |
| 05:30 PM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 6                        | 0    | 0     | 0    | 6          | 5                 | 0    | 0     | 0    | 5          | 11         |
| 05:45 PM    | 0                        | 0    | 0     | 0    | 0          | 0                 | 0    | 0     | 0    | 0          | 3                        | 0    | 0     | 0    | 3          | 4                 | 0    | 0     | 0    | 4          | 7          |
| Total       | 1                        | 0    | 0     | 0    | 1          | 0                 | 0    | 0     | 0    | 0          | 13                       | 0    | 0     | 0    | 13         | 15                | 0    | 0     | 0    | 15         | 29         |
| Grand Total | 3                        | 0    | 0     | 0    | 3          | 0                 | 0    | 0     | 0    | 0          | 94                       | 0    | 0     | 0    | 94         | 37                | 0    | 0     | 0    | 37         | 134        |
| Apprch %    | 100                      | 0    | 0     | 0    |            | 0                 | 0    | 0     | 0    |            | 100                      | 0    | 0     | 0    |            | 100               | 0    | 0     | 0    |            |            |
| Total %     | 2.2                      | 0    | 0     | 0    | 2.2        | 0                 | 0    | 0     | 0    | 0          | 70.1                     | 0    | 0     | 0    | 70.1       | 27.6              | 0    | 0     | 0    | 27.6       |            |

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File Name : 02 Alluvial at Temperance

Site Code : 00000000

Start Date : 2/2/2016

Page No : 1

## Groups Printed- Unshifted

|             | TEMPERANCE<br>Southbound |      |       |      |            | ALLUVIAL<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | ALLUVIAL<br>Eastbound |      |       |      |            |            |
|-------------|--------------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|------------|
| Start Time  | Left                     | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 23                       | 111  | 1     | 0    | 135        | 72                    | 10   | 16    | 1    | 99         | 13                       | 63   | 69    | 0    | 145        | 4                     | 10   | 13    | 0    | 27         | 406        |
| 07:15 AM    | 12                       | 161  | 2     | 0    | 175        | 73                    | 10   | 10    | 0    | 93         | 13                       | 81   | 69    | 0    | 163        | 1                     | 9    | 15    | 0    | 25         | 456        |
| 07:30 AM    | 14                       | 150  | 10    | 0    | 174        | 61                    | 10   | 13    | 0    | 84         | 18                       | 61   | 78    | 0    | 157        | 2                     | 4    | 23    | 0    | 29         | 444        |
| 07:45 AM    | 24                       | 129  | 10    | 0    | 163        | 55                    | 21   | 10    | 0    | 86         | 35                       | 68   | 70    | 0    | 173        | 2                     | 8    | 21    | 0    | 31         | 453        |
| Total       | 73                       | 551  | 23    | 0    | 647        | 261                   | 51   | 49    | 1    | 362        | 79                       | 273  | 286   | 0    | 638        | 9                     | 31   | 72    | 0    | 112        | 1759       |
| 08:00 AM    | 21                       | 106  | 5     | 1    | 133        | 66                    | 9    | 16    | 1    | 92         | 20                       | 94   | 69    | 1    | 184        | 4                     | 4    | 19    | 0    | 27         | 436        |
| 08:15 AM    | 13                       | 93   | 5     | 0    | 111        | 64                    | 5    | 10    | 1    | 80         | 18                       | 79   | 80    | 1    | 178        | 5                     | 10   | 10    | 0    | 25         | 394        |
| 08:30 AM    | 12                       | 88   | 6     | 0    | 106        | 67                    | 9    | 13    | 0    | 89         | 14                       | 65   | 64    | 0    | 143        | 0                     | 3    | 15    | 0    | 18         | 356        |
| 08:45 AM    | 13                       | 86   | 9     | 0    | 108        | 61                    | 5    | 16    | 2    | 84         | 15                       | 60   | 53    | 0    | 128        | 5                     | 4    | 9     | 0    | 18         | 338        |
| Total       | 59                       | 373  | 25    | 1    | 458        | 258                   | 28   | 55    | 4    | 345        | 67                       | 298  | 266   | 2    | 633        | 14                    | 21   | 53    | 0    | 88         | 1524       |
| *****       |                          |      |       |      |            |                       |      |       |      |            |                          |      |       |      |            |                       |      |       |      |            |            |
| 04:00 PM    | 9                        | 74   | 4     | 1    | 88         | 39                    | 4    | 7     | 4    | 54         | 15                       | 84   | 35    | 4    | 138        | 8                     | 2    | 22    | 0    | 32         | 312        |
| 04:15 PM    | 12                       | 96   | 4     | 0    | 112        | 30                    | 2    | 15    | 1    | 48         | 17                       | 78   | 49    | 2    | 146        | 4                     | 5    | 22    | 0    | 31         | 337        |
| 04:30 PM    | 12                       | 74   | 6     | 0    | 92         | 31                    | 3    | 15    | 4    | 53         | 22                       | 126  | 41    | 4    | 193        | 8                     | 6    | 28    | 0    | 42         | 380        |
| 04:45 PM    | 18                       | 86   | 2     | 0    | 106        | 43                    | 10   | 18    | 0    | 71         | 28                       | 103  | 41    | 1    | 173        | 7                     | 10   | 26    | 0    | 43         | 393        |
| Total       | 51                       | 330  | 16    | 1    | 398        | 143                   | 19   | 55    | 9    | 226        | 82                       | 391  | 166   | 11   | 650        | 27                    | 23   | 98    | 0    | 148        | 1422       |
| 05:00 PM    | 22                       | 100  | 2     | 0    | 124        | 48                    | 4    | 18    | 0    | 70         | 28                       | 130  | 46    | 0    | 204        | 7                     | 4    | 26    | 0    | 37         | 435        |
| 05:15 PM    | 16                       | 93   | 0     | 0    | 109        | 47                    | 11   | 14    | 2    | 74         | 15                       | 137  | 59    | 0    | 211        | 12                    | 9    | 17    | 0    | 38         | 432        |
| 05:30 PM    | 18                       | 88   | 5     | 0    | 111        | 58                    | 4    | 13    | 0    | 75         | 10                       | 133  | 53    | 0    | 196        | 11                    | 8    | 17    | 1    | 37         | 419        |
| 05:45 PM    | 9                        | 78   | 10    | 0    | 97         | 50                    | 3    | 19    | 1    | 73         | 14                       | 131  | 65    | 0    | 210        | 11                    | 7    | 21    | 0    | 39         | 419        |
| Total       | 65                       | 359  | 17    | 0    | 441        | 203                   | 22   | 64    | 3    | 292        | 67                       | 531  | 223   | 0    | 821        | 41                    | 28   | 81    | 1    | 151        | 1705       |
| Grand Total | 248                      | 1613 | 81    | 2    | 1944       | 865                   | 120  | 223   | 17   | 1225       | 295                      | 1493 | 941   | 13   | 2742       | 91                    | 103  | 304   | 1    | 499        | 6410       |
| Apprch %    | 12.8                     | 83   | 4.2   | 0.1  |            | 70.6                  | 9.8  | 18.2  | 1.4  |            | 10.8                     | 54.4 | 34.3  | 0.5  |            | 18.2                  | 20.6 | 60.9  | 0.2  |            |            |
| Total %     | 3.9                      | 25.2 | 1.3   | 0    | 30.3       | 13.5                  | 1.9  | 3.5   | 0.3  | 19.1       | 4.6                      | 23.3 | 14.7  | 0.2  | 42.8       | 1.4                   | 1.6  | 4.7   | 0    | 7.8        |            |

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File Name : 02 Alluvial at Temperance

Site Code : 00000000

Start Date : 2/2/2016

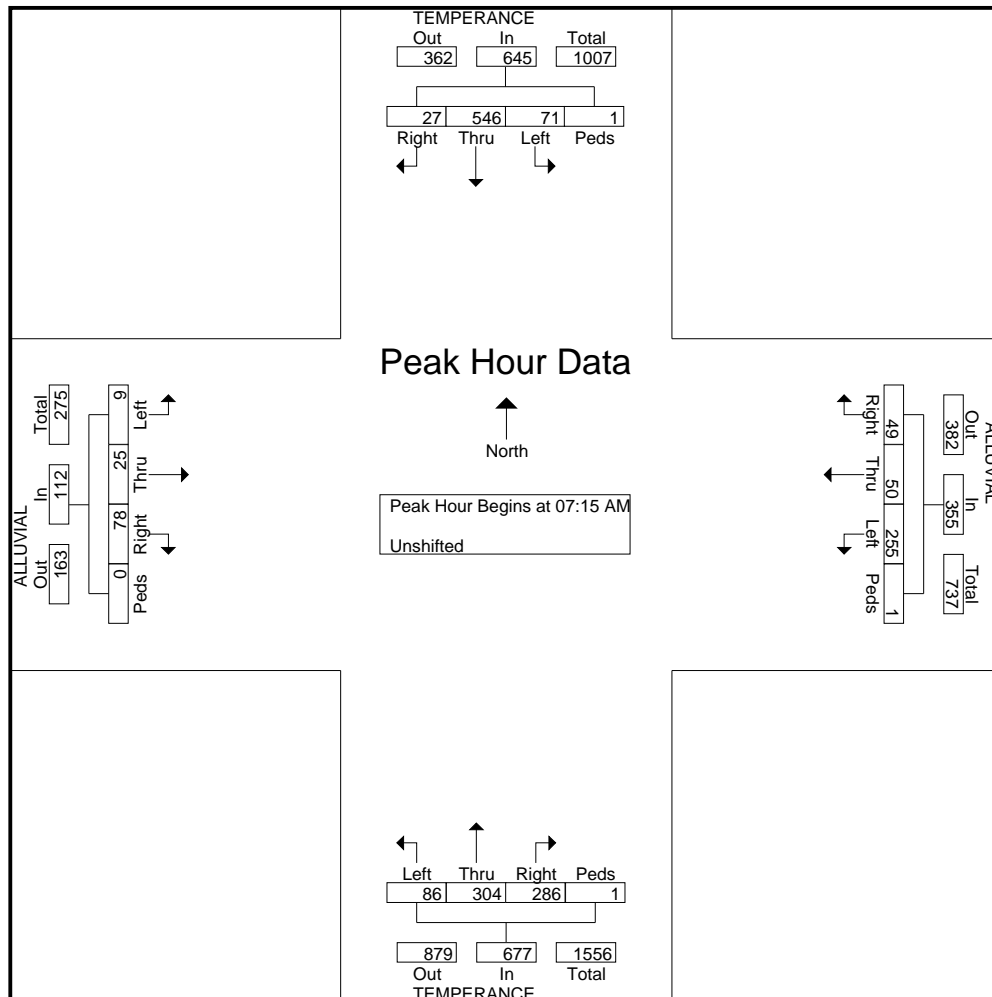
Page No : 2

|            | TEMPERANCE<br>Southbound |      |       |      |            | ALLUVIAL<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | ALLUVIAL<br>Eastbound |      |       |      |            |            |
|------------|--------------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|------------|
| Start Time | Left                     | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:15 AM

|              |           |            |           |          |            |           |           |           |          |           |           |           |           |          |            |          |          |           |      |           |            |
|--------------|-----------|------------|-----------|----------|------------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|----------|------------|----------|----------|-----------|------|-----------|------------|
| 07:15 AM     | 12        | <b>161</b> | 2         | 0        | <b>175</b> | <b>73</b> | 10        | 10        | 0        | <b>93</b> | 13        | 81        | 69        | 0        | 163        | 1        | <b>9</b> | 15        | 0    | 25        | <b>456</b> |
| 07:30 AM     | 14        | 150        | <b>10</b> | 0        | 174        | 61        | 10        | 13        | 0        | 84        | 18        | 61        | <b>78</b> | 0        | 157        | 2        | 4        | <b>23</b> | 0    | 29        | 444        |
| 07:45 AM     | <b>24</b> | 129        | 10        | 0        | 163        | 55        | <b>21</b> | 10        | 0        | 86        | <b>35</b> | 68        | 70        | 0        | 173        | 2        | 8        | 21        | 0    | <b>31</b> | 453        |
| 08:00 AM     | 21        | 106        | 5         | <b>1</b> | 133        | 66        | 9         | <b>16</b> | <b>1</b> | 92        | 20        | <b>94</b> | 69        | <b>1</b> | <b>184</b> | <b>4</b> | 4        | 19        | 0    | 27        | 436        |
| Total Volume | 71        | 546        | 27        | 1        | 645        | 255       | 50        | 49        | 1        | 355       | 86        | 304       | 286       | 1        | 677        | 9        | 25       | 78        | 0    | 112       | 1789       |
| % App. Total | 11        | 84.7       | 4.2       | 0.2      |            | 71.8      | 14.1      | 13.8      | 0.3      |           | 12.7      | 44.9      | 42.2      | 0.1      |            | 8        | 22.3     | 69.6      | 0    |           |            |
| PHF          | .740      | .848       | .675      | .250     | .921       | .873      | .595      | .766      | .250     | .954      | .614      | .809      | .917      | .250     | .920       | .563     | .694     | .848      | .000 | .903      | .981       |



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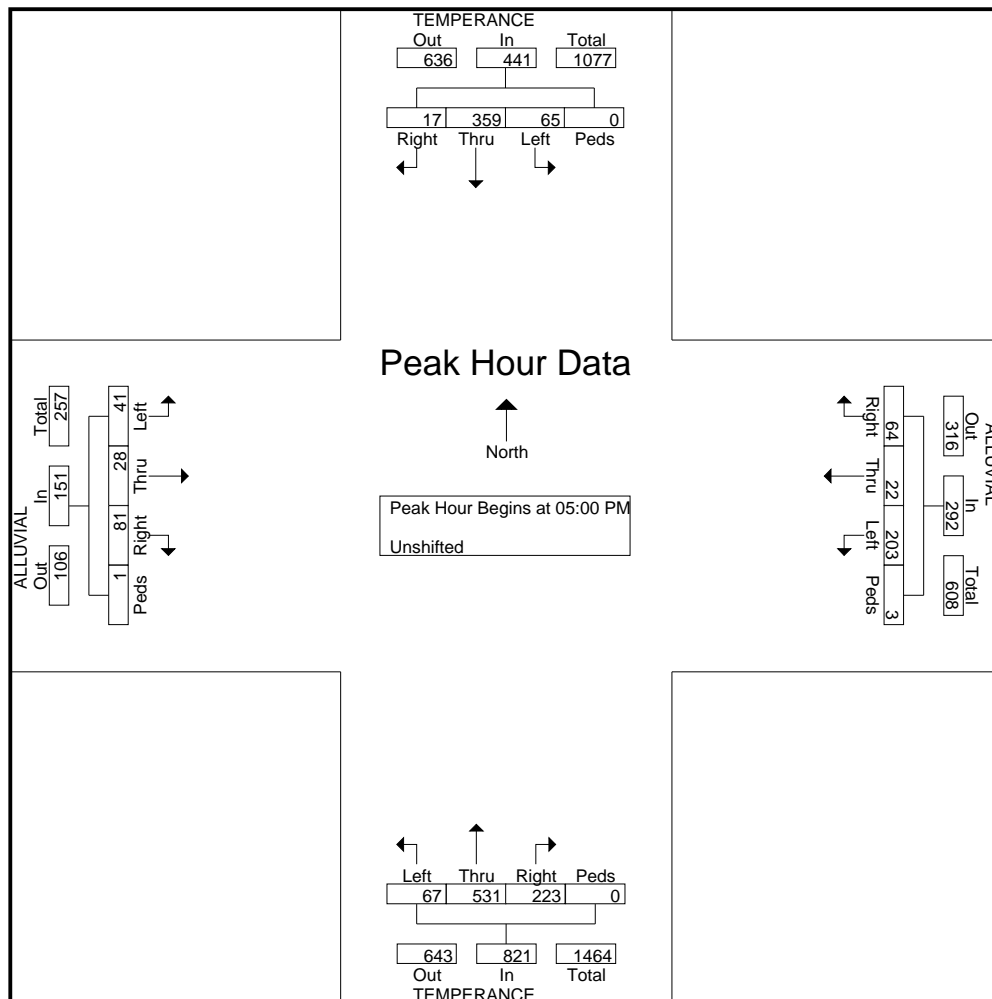
File Name : 02 Alluvial at Temperance

Site Code : 00000000

Start Date : 2/2/2016

Page No : 3

|  | TEMPERANCE<br>Southbound |      |       |      |            | ALLUVIAL<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | ALLUVIAL<br>Eastbound |      |       |      |            |            |
|--|--------------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|------------|
| Start Time   | Left                     | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                          |      |       |      |            |                       |      |       |      |            |                          |      |       |      |            |                       |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                          |      |       |      |            |                       |      |       |      |            |                          |      |       |      |            |                       |      |       |      |            |            |
| 05:00 PM   | 22                       | 100  | 2     | 0    | 124        | 48                    | 4    | 18    | 0    | 70         | 28                       | 130  | 46    | 0    | 204        | 7                     | 4    | 26    | 0    | 37         | 435        |
| 05:15 PM   | 16                       | 93   | 0     | 0    | 109        | 47                    | 11   | 14    | 2    | 74         | 15                       | 137  | 59    | 0    | 211        | 12                    | 9    | 17    | 0    | 38         | 432        |
| 05:30 PM   | 18                       | 88   | 5     | 0    | 111        | 58                    | 4    | 13    | 0    | 75         | 10                       | 133  | 53    | 0    | 196        | 11                    | 8    | 17    | 1    | 37         | 419        |
| 05:45 PM   | 9                        | 78   | 10    | 0    | 97         | 50                    | 3    | 19    | 1    | 73         | 14                       | 131  | 65    | 0    | 210        | 11                    | 7    | 21    | 0    | 39         | 419        |
| Total Volume   | 65                       | 359  | 17    | 0    | 441        | 203                   | 22   | 64    | 3    | 292        | 67                       | 531  | 223   | 0    | 821        | 41                    | 28   | 81    | 1    | 151        | 1705       |
| % App. Total   | 14.7                     | 81.4 | 3.9   | 0    |            | 69.5                  | 7.5  | 21.9  | 1    |            | 8.2                      | 64.7 | 27.2  | 0    |            | 27.2                  | 18.5 | 53.6  | 0.7  |            |            |
| PHF  | .739                     | .898 | .425  | .000 | .889       | .875                  | .500 | .842  | .375 | .973       | .598                     | .969 | .858  | .000 | .973       | .854                  | .778 | .779  | .250 | .968       | .980       |



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File Name : 03 sr 168 wb ramps to temperence

Site Code : 00000000

Start Date : 2/3/2016

Page No : 1

## Groups Printed- Unshifted

| Start Time  | TEMPERANCE<br>Southbound |       |      |            | 168 WB<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |       |      |            | Int. Total |
|-------------|--------------------------|-------|------|------------|---------------------|------|-------|------|------------|--------------------------|-------|------|------------|------------|
|             | Thru                     | Right | Peds | App. Total | Left                | Thru | Right | Peds | App. Total | Thru                     | Right | Peds | App. Total |            |
| 07:00 AM    | 67                       | 97    | 1    | 165        | 17                  | 0    | 28    | 1    | 46         | 122                      | 165   | 0    | 287        | 498        |
| 07:15 AM    | 86                       | 120   | 0    | 206        | 19                  | 0    | 30    | 0    | 49         | 95                       | 235   | 0    | 330        | 585        |
| 07:30 AM    | 66                       | 142   | 0    | 208        | 16                  | 0    | 28    | 0    | 44         | 135                      | 284   | 0    | 419        | 671        |
| 07:45 AM    | 101                      | 156   | 0    | 257        | 21                  | 0    | 19    | 0    | 40         | 144                      | 247   | 0    | 391        | 688        |
| Total       | 320                      | 515   | 1    | 836        | 73                  | 0    | 105   | 1    | 179        | 496                      | 931   | 0    | 1427       | 2442       |
| 08:00 AM    | 101                      | 87    | 0    | 188        | 14                  | 1    | 18    | 0    | 33         | 170                      | 188   | 0    | 358        | 579        |
| 08:15 AM    | 88                       | 74    | 0    | 162        | 15                  | 0    | 22    | 0    | 37         | 148                      | 180   | 0    | 328        | 527        |
| 08:30 AM    | 80                       | 83    | 0    | 163        | 14                  | 0    | 27    | 0    | 41         | 138                      | 195   | 1    | 334        | 538        |
| 08:45 AM    | 76                       | 82    | 0    | 158        | 12                  | 0    | 16    | 0    | 28         | 120                      | 137   | 0    | 257        | 443        |
| Total       | 345                      | 326   | 0    | 671        | 55                  | 1    | 83    | 0    | 139        | 576                      | 700   | 1    | 1277       | 2087       |
| *****       |                          |       |      |            |                     |      |       |      |            |                          |       |      |            |            |
| 04:00 PM    | 88                       | 60    | 0    | 148        | 10                  | 0    | 10    | 0    | 20         | 144                      | 105   | 0    | 249        | 417        |
| 04:15 PM    | 83                       | 49    | 0    | 132        | 2                   | 0    | 9     | 0    | 11         | 130                      | 86    | 2    | 218        | 361        |
| 04:30 PM    | 89                       | 60    | 0    | 149        | 13                  | 1    | 10    | 0    | 24         | 149                      | 113   | 0    | 262        | 435        |
| 04:45 PM    | 95                       | 45    | 0    | 140        | 11                  | 0    | 12    | 0    | 23         | 182                      | 114   | 1    | 297        | 460        |
| Total       | 355                      | 214   | 0    | 569        | 36                  | 1    | 41    | 0    | 78         | 605                      | 418   | 3    | 1026       | 1673       |
| 05:00 PM    | 88                       | 69    | 1    | 158        | 9                   | 0    | 6     | 0    | 15         | 203                      | 127   | 5    | 335        | 508        |
| 05:15 PM    | 110                      | 47    | 0    | 157        | 13                  | 1    | 13    | 0    | 27         | 213                      | 88    | 0    | 301        | 485        |
| 05:30 PM    | 113                      | 50    | 0    | 163        | 13                  | 0    | 16    | 0    | 29         | 157                      | 99    | 0    | 256        | 448        |
| 05:45 PM    | 103                      | 52    | 0    | 155        | 5                   | 0    | 6     | 0    | 11         | 150                      | 91    | 0    | 241        | 407        |
| Total       | 414                      | 218   | 1    | 633        | 40                  | 1    | 41    | 0    | 82         | 723                      | 405   | 5    | 1133       | 1848       |
| Grand Total | 1434                     | 1273  | 2    | 2709       | 204                 | 3    | 270   | 1    | 478        | 2400                     | 2454  | 9    | 4863       | 8050       |
| Apprch %    | 52.9                     | 47    | 0.1  |            | 42.7                | 0.6  | 56.5  | 0.2  |            | 49.4                     | 50.5  | 0.2  |            |            |
| Total %     | 17.8                     | 15.8  | 0    | 33.7       | 2.5                 | 0    | 3.4   | 0    | 5.9        | 29.8                     | 30.5  | 0.1  | 60.4       |            |

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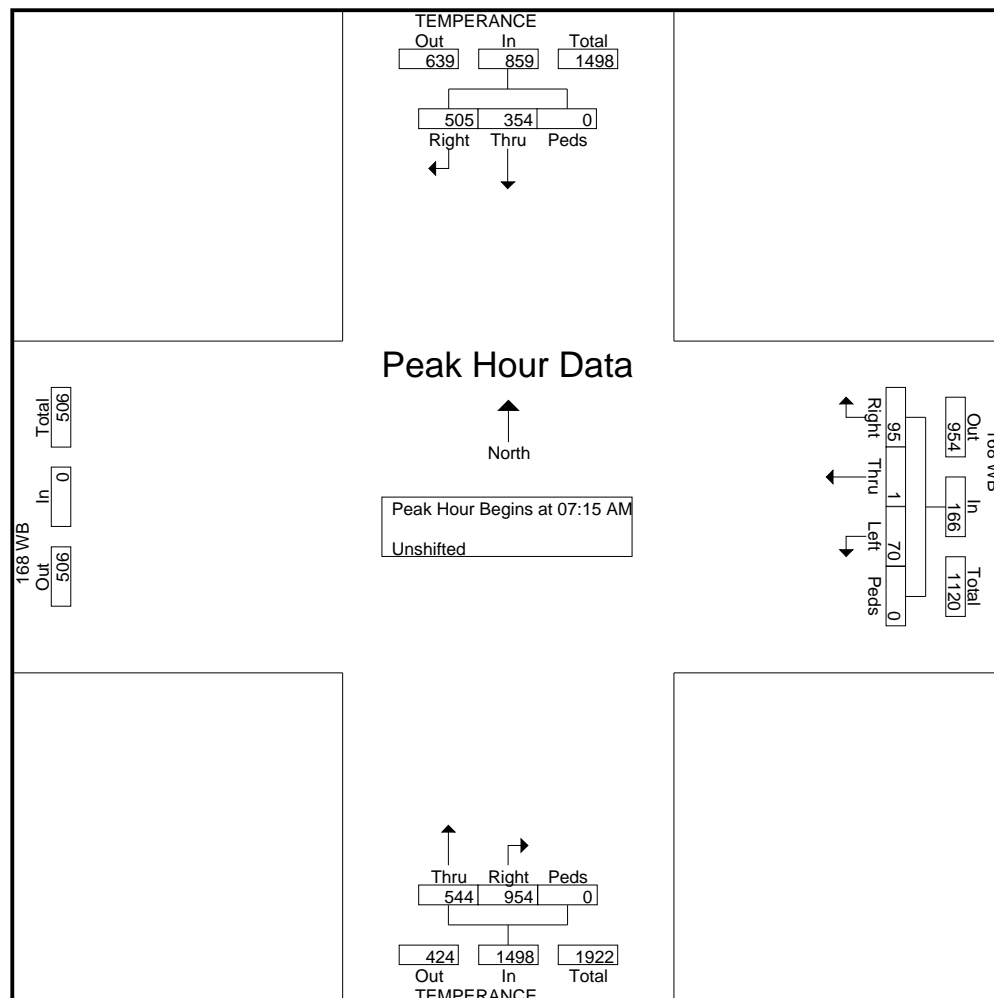
File Name : 03 sr 168 wb ramps to temperence

Site Code : 00000000

Start Date : 2/3/2016

Page No : 2

|  | TEMPERANCE<br>Southbound |       |      |            | 168 WB<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |       |      |            |            |
|--|--------------------------|-------|------|------------|---------------------|------|-------|------|------------|--------------------------|-------|------|------------|------------|
| Start Time   | Thru                     | Right | Peds | App. Total | Left                | Thru | Right | Peds | App. Total | Thru                     | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                          |       |      |            |                     |      |       |      |            |                          |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                          |       |      |            |                     |      |       |      |            |                          |       |      |            |            |
| 07:15 AM   | 86                       | 120   | 0    | 206        | 19                  | 0    | 30    | 0    | 49         | 95                       | 235   | 0    | 330        | 585        |
| 07:30 AM   | 66                       | 142   | 0    | 208        | 16                  | 0    | 28    | 0    | 44         | 135                      | 284   | 0    | 419        | 671        |
| 07:45 AM   | 101                      | 156   | 0    | 257        | 21                  | 0    | 19    | 0    | 40         | 144                      | 247   | 0    | 391        | 688        |
| 08:00 AM   | 101                      | 87    | 0    | 188        | 14                  | 1    | 18    | 0    | 33         | 170                      | 188   | 0    | 358        | 579        |
| Total Volume   | 354                      | 505   | 0    | 859        | 70                  | 1    | 95    | 0    | 166        | 544                      | 954   | 0    | 1498       | 2523       |
| % App. Total   | 41.2                     | 58.8  | 0    |            | 42.2                | 0.6  | 57.2  | 0    |            | 36.3                     | 63.7  | 0    |            |            |
| PHF  | .876                     | .809  | .000 | .836       | .833                | .250 | .792  | .000 | .847       | .800                     | .840  | .000 | .894       | .917       |



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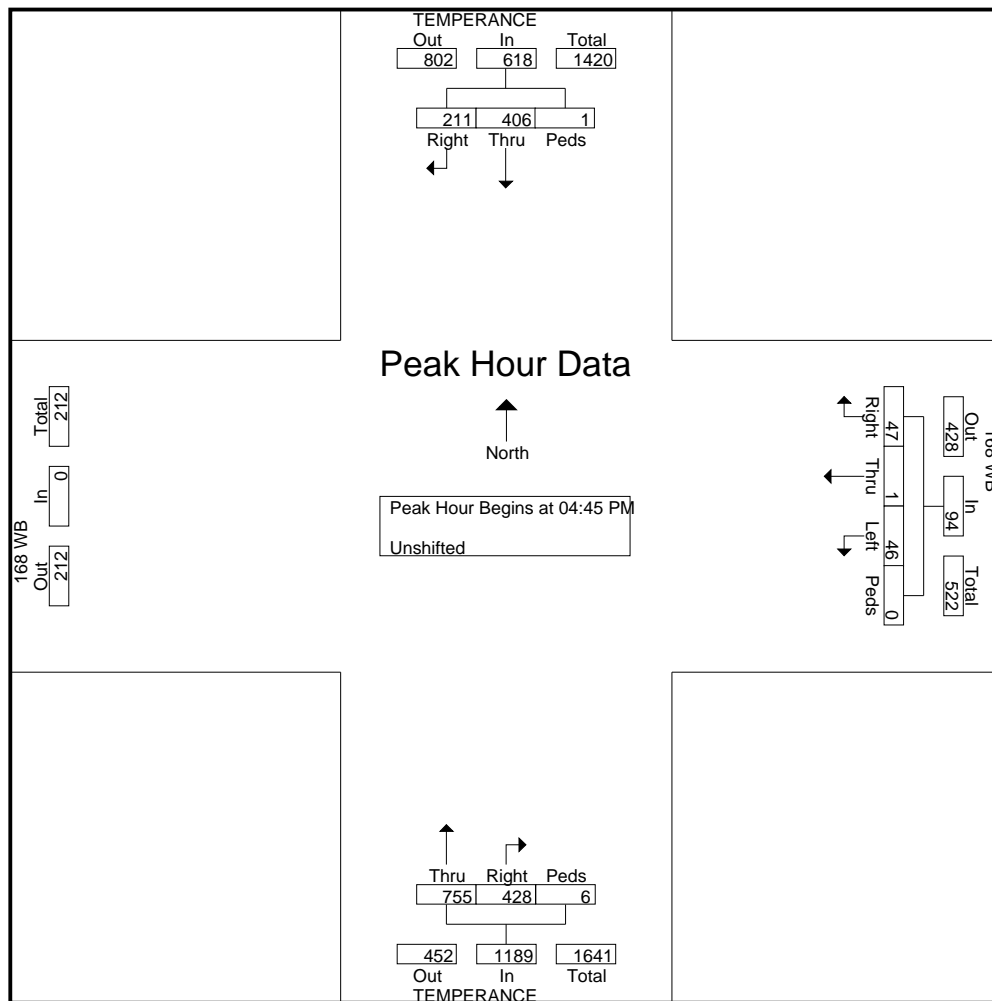
File Name : 03 sr 168 wb ramps to temperence

Site Code : 00000000

Start Date : 2/3/2016

Page No : 3

|  | TEMPERANCE<br>Southbound |           |          |            | 168 WB<br>Westbound |          |           |      |            | TEMPERANCE<br>Northbound |            |          |            |            |
|--|--------------------------|-----------|----------|------------|---------------------|----------|-----------|------|------------|--------------------------|------------|----------|------------|------------|
| Start Time   | Thru                     | Right     | Peds     | App. Total | Left                | Thru     | Right     | Peds | App. Total | Thru                     | Right      | Peds     | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                          |           |          |            |                     |          |           |      |            |                          |            |          |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                          |           |          |            |                     |          |           |      |            |                          |            |          |            |            |
| 04:45 PM   | 95                       | 45        | 0        | 140        | 11                  | 0        | 12        | 0    | 23         | 182                      | 114        | 1        | 297        | 460        |
| 05:00 PM   | 88                       | <b>69</b> | <b>1</b> | 158        | 9                   | 0        | 6         | 0    | 15         | 203                      | <b>127</b> | <b>5</b> | <b>335</b> | <b>508</b> |
| 05:15 PM   | 110                      | 47        | 0        | 157        | <b>13</b>           | <b>1</b> | 13        | 0    | 27         | <b>213</b>               | 88         | 0        | 301        | 485        |
| 05:30 PM   | <b>113</b>               | 50        | 0        | <b>163</b> | 13                  | 0        | <b>16</b> | 0    | <b>29</b>  | 157                      | 99         | 0        | 256        | 448        |
| Total Volume   | 406                      | 211       | 1        | 618        | 46                  | 1        | 47        | 0    | 94         | 755                      | 428        | 6        | 1189       | 1901       |
| % App. Total   | 65.7                     | 34.1      | 0.2      |            | 48.9                | 1.1      | 50        | 0    |            | 63.5                     | 36         | 0.5      |            |            |
| PHF  | .898                     | .764      | .250     | .948       | .885                | .250     | .734      | .000 | .810       | .886                     | .843       | .300     | .887       | .936       |





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File Name : 04 SR 168 EB Ramps to Temperence

Site Code : 00000000

Start Date : 2/4/2016

Page No : 1

## Groups Printed- Unshifted

| Start Time  | TEMPERANCE<br>Southbound |      |      |            | TEMPERANCE<br>Northbound |       |      |            | 168 EB<br>Eastbound |      |       |      |            | Int. Total |
|-------------|--------------------------|------|------|------------|--------------------------|-------|------|------------|---------------------|------|-------|------|------------|------------|
|             | Left                     | Thru | Peds | App. Total | Thru                     | Right | Peds | App. Total | Left                | Thru | Right | Peds | App. Total |            |
| 07:00 AM    | 8                        | 81   | 0    | 89         | 239                      | 3     | 0    | 242        | 48                  | 0    | 52    | 0    | 100        | 431        |
| 07:15 AM    | 3                        | 104  | 0    | 107        | 354                      | 3     | 0    | 357        | 28                  | 0    | 71    | 0    | 99         | 563        |
| 07:30 AM    | 4                        | 90   | 0    | 94         | 410                      | 4     | 0    | 414        | 38                  | 0    | 83    | 0    | 121        | 629        |
| 07:45 AM    | 7                        | 108  | 0    | 115        | 331                      | 9     | 0    | 340        | 51                  | 0    | 140   | 0    | 191        | 646        |
| Total       | 22                       | 383  | 0    | 405        | 1334                     | 19    | 0    | 1353       | 165                 | 0    | 346   | 0    | 511        | 2269       |
| 08:00 AM    | 9                        | 100  | 0    | 109        | 290                      | 14    | 0    | 304        | 51                  | 0    | 96    | 0    | 147        | 560        |
| 08:15 AM    | 6                        | 94   | 0    | 100        | 259                      | 9     | 1    | 269        | 43                  | 0    | 119   | 0    | 162        | 531        |
| 08:30 AM    | 13                       | 94   | 0    | 107        | 248                      | 6     | 1    | 255        | 34                  | 0    | 94    | 0    | 128        | 490        |
| 08:45 AM    | 10                       | 71   | 0    | 81         | 209                      | 3     | 1    | 213        | 24                  | 0    | 93    | 0    | 117        | 411        |
| Total       | 38                       | 359  | 0    | 397        | 1006                     | 32    | 3    | 1041       | 152                 | 0    | 402   | 0    | 554        | 1992       |
| *****       |                          |      |      |            |                          |       |      |            |                     |      |       |      |            |            |
| 04:00 PM    | 11                       | 97   | 0    | 108        | 183                      | 16    | 0    | 199        | 56                  | 0    | 132   | 0    | 188        | 495        |
| 04:15 PM    | 20                       | 85   | 0    | 105        | 175                      | 9     | 0    | 184        | 53                  | 0    | 125   | 0    | 178        | 467        |
| 04:30 PM    | 12                       | 95   | 0    | 107        | 197                      | 18    | 0    | 215        | 84                  | 0    | 144   | 1    | 229        | 551        |
| 04:45 PM    | 18                       | 103  | 0    | 121        | 193                      | 16    | 0    | 209        | 88                  | 0    | 175   | 0    | 263        | 593        |
| Total       | 61                       | 380  | 0    | 441        | 748                      | 59    | 0    | 807        | 281                 | 0    | 576   | 1    | 858        | 2106       |
| 05:00 PM    | 18                       | 98   | 0    | 116        | 219                      | 15    | 2    | 236        | 90                  | 0    | 180   | 0    | 270        | 622        |
| 05:15 PM    | 5                        | 120  | 0    | 125        | 205                      | 22    | 0    | 227        | 79                  | 2    | 189   | 0    | 270        | 622        |
| 05:30 PM    | 10                       | 113  | 0    | 123        | 175                      | 15    | 1    | 191        | 93                  | 0    | 202   | 0    | 295        | 609        |
| 05:45 PM    | 8                        | 119  | 0    | 127        | 184                      | 13    | 0    | 197        | 98                  | 0    | 168   | 0    | 266        | 590        |
| Total       | 41                       | 450  | 0    | 491        | 783                      | 65    | 3    | 851        | 360                 | 2    | 739   | 0    | 1101       | 2443       |
| Grand Total | 162                      | 1572 | 0    | 1734       | 3871                     | 175   | 6    | 4052       | 958                 | 2    | 2063  | 1    | 3024       | 8810       |
| Apprch %    | 9.3                      | 90.7 | 0    |            | 95.5                     | 4.3   | 0.1  |            | 31.7                | 0.1  | 68.2  | 0    |            |            |
| Total %     | 1.8                      | 17.8 | 0    | 19.7       | 43.9                     | 2     | 0.1  | 46         | 10.9                | 0    | 23.4  | 0    | 34.3       |            |

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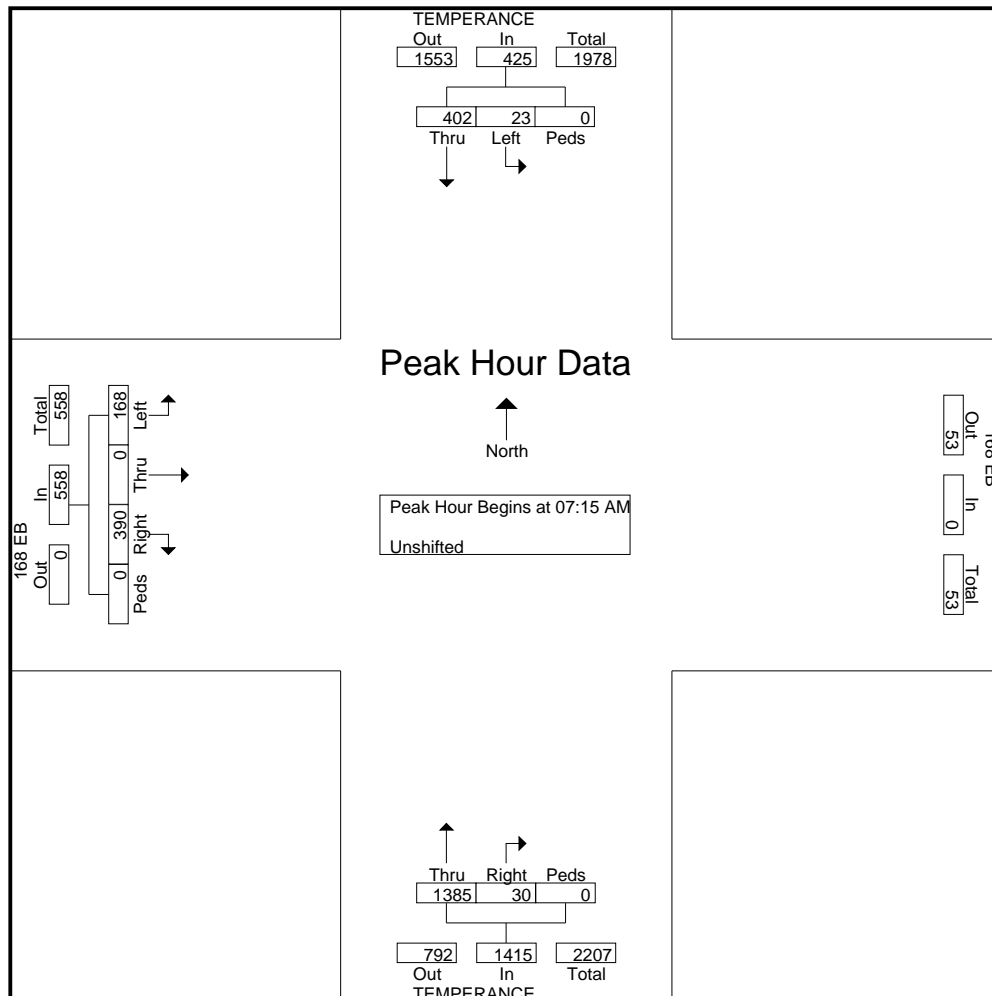
File Name : 04 SR 168 EB Ramps to Temperence

Site Code : 00000000

Start Date : 2/4/2016

Page No : 2

|  | TEMPERANCE<br>Southbound |      |      |            | TEMPERANCE<br>Northbound |       |      |            | 168 EB<br>Eastbound |      |       |      |            |            |
|--|--------------------------|------|------|------------|--------------------------|-------|------|------------|---------------------|------|-------|------|------------|------------|
| Start Time   | Left                     | Thru | Peds | App. Total | Thru                     | Right | Peds | App. Total | Left                | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                          |      |      |            |                          |       |      |            |                     |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                          |      |      |            |                          |       |      |            |                     |      |       |      |            |            |
| 07:15 AM   | 3                        | 104  | 0    | 107        | 354                      | 3     | 0    | 357        | 28                  | 0    | 71    | 0    | 99         | 563        |
| 07:30 AM   | 4                        | 90   | 0    | 94         | 410                      | 4     | 0    | 414        | 38                  | 0    | 83    | 0    | 121        | 629        |
| 07:45 AM   | 7                        | 108  | 0    | 115        | 331                      | 9     | 0    | 340        | 51                  | 0    | 140   | 0    | 191        | 646        |
| 08:00 AM   | 9                        | 100  | 0    | 109        | 290                      | 14    | 0    | 304        | 51                  | 0    | 96    | 0    | 147        | 560        |
| Total Volume   | 23                       | 402  | 0    | 425        | 1385                     | 30    | 0    | 1415       | 168                 | 0    | 390   | 0    | 558        | 2398       |
| % App. Total   | 5.4                      | 94.6 | 0    |            | 97.9                     | 2.1   | 0    |            | 30.1                | 0    | 69.9  | 0    |            |            |
| PHF  | .639                     | .931 | .000 | .924       | .845                     | .536  | .000 | .854       | .824                | .000 | .696  | .000 | .730       | .928       |



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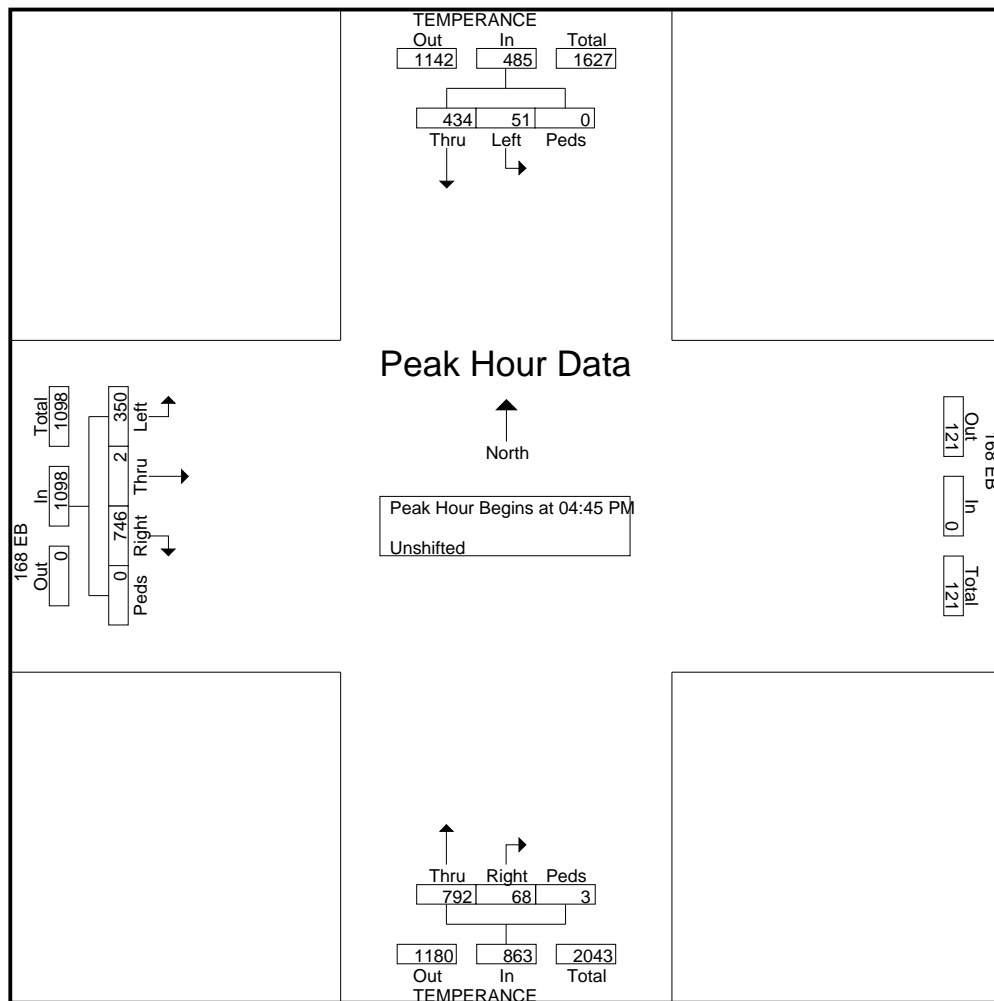
File Name : 04 SR 168 EB Ramps to Temperence

Site Code : 00000000

Start Date : 2/4/2016

Page No : 3

|  | TEMPERANCE<br>Southbound |      |      |            | TEMPERANCE<br>Northbound |       |      |            | 168 EB<br>Eastbound |      |       |      |            |            |
|--|--------------------------|------|------|------------|--------------------------|-------|------|------------|---------------------|------|-------|------|------------|------------|
| Start Time   | Left                     | Thru | Peds | App. Total | Thru                     | Right | Peds | App. Total | Left                | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                          |      |      |            |                          |       |      |            |                     |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                          |      |      |            |                          |       |      |            |                     |      |       |      |            |            |
| 04:45 PM   | 18                       | 103  | 0    | 121        | 193                      | 16    | 0    | 209        | 88                  | 0    | 175   | 0    | 263        | 593        |
| 05:00 PM   | 18                       | 98   | 0    | 116        | 219                      | 15    | 2    | 236        | 90                  | 0    | 180   | 0    | 270        | 622        |
| 05:15 PM   | 5                        | 120  | 0    | 125        | 205                      | 22    | 0    | 227        | 79                  | 2    | 189   | 0    | 270        | 622        |
| 05:30 PM   | 10                       | 113  | 0    | 123        | 175                      | 15    | 1    | 191        | 93                  | 0    | 202   | 0    | 295        | 609        |
| Total Volume   | 51                       | 434  | 0    | 485        | 792                      | 68    | 3    | 863        | 350                 | 2    | 746   | 0    | 1098       | 2446       |
| % App. Total   | 10.5                     | 89.5 | 0    |            | 91.8                     | 7.9   | 0.3  |            | 31.9                | 0.2  | 67.9  | 0    |            |            |
| PHF  | .708                     | .904 | .000 | .970       | .904                     | .773  | .375 | .914       | .941                | .250 | .923  | .000 | .931       | .983       |



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File Name : 05 Fir at Temperence

Site Code : 00000000

Start Date : 2/24/2016

Page No : 1

## Groups Printed- Unshifted

|             | TEMPERANCE<br>Southbound |      |      |            | FIR<br>Westbound |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            |            |
|-------------|--------------------------|------|------|------------|------------------|-------|------|------------|--------------------------|------|-------|------|------------|------------|
| Start Time  | Left                     | Thru | Peds | App. Total | Left             | Right | Peds | App. Total | U-turn                   | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 78                       | 96   | 0    | 174        | 2                | 20    | 0    | 22         | 0                        | 210  | 18    | 0    | 228        | 424        |
| 07:15 AM    | 46                       | 133  | 0    | 179        | 6                | 22    | 0    | 28         | 0                        | 315  | 16    | 0    | 331        | 538        |
| 07:30 AM    | 48                       | 166  | 0    | 214        | 10               | 54    | 0    | 64         | 0                        | 351  | 19    | 0    | 370        | 648        |
| 07:45 AM    | 84                       | 164  | 0    | 248        | 17               | 40    | 0    | 57         | 1                        | 319  | 27    | 0    | 347        | 652        |
| Total       | 256                      | 559  | 0    | 815        | 35               | 136   | 0    | 171        | 1                        | 1195 | 80    | 0    | 1276       | 2262       |
| 08:00 AM    | 87                       | 137  | 0    | 224        | 14               | 33    | 0    | 47         | 0                        | 265  | 24    | 1    | 290        | 561        |
| 08:15 AM    | 73                       | 138  | 0    | 211        | 6                | 24    | 0    | 30         | 0                        | 276  | 18    | 2    | 296        | 537        |
| 08:30 AM    | 68                       | 111  | 0    | 179        | 14               | 17    | 0    | 31         | 0                        | 250  | 28    | 1    | 279        | 489        |
| 08:45 AM    | 88                       | 84   | 0    | 172        | 13               | 36    | 0    | 49         | 0                        | 227  | 19    | 0    | 246        | 467        |
| Total       | 316                      | 470  | 0    | 786        | 47               | 110   | 0    | 157        | 0                        | 1018 | 89    | 4    | 1111       | 2054       |
| *****       |                          |      |      |            |                  |       |      |            |                          |      |       |      |            |            |
| 04:00 PM    | 33                       | 153  | 0    | 186        | 30               | 64    | 0    | 94         | 0                        | 136  | 15    | 0    | 151        | 431        |
| 04:15 PM    | 18                       | 196  | 0    | 214        | 28               | 57    | 0    | 85         | 0                        | 130  | 13    | 0    | 143        | 442        |
| 04:30 PM    | 32                       | 212  | 0    | 244        | 34               | 57    | 0    | 91         | 3                        | 146  | 14    | 0    | 163        | 498        |
| 04:45 PM    | 21                       | 211  | 0    | 232        | 31               | 62    | 0    | 93         | 0                        | 151  | 11    | 0    | 162        | 487        |
| Total       | 104                      | 772  | 0    | 876        | 123              | 240   | 0    | 363        | 3                        | 563  | 53    | 0    | 619        | 1858       |
| 05:00 PM    | 29                       | 219  | 0    | 248        | 28               | 66    | 0    | 94         | 0                        | 166  | 7     | 0    | 173        | 515        |
| 05:15 PM    | 20                       | 241  | 0    | 261        | 17               | 41    | 0    | 58         | 0                        | 167  | 9     | 1    | 177        | 496        |
| 05:30 PM    | 29                       | 264  | 0    | 293        | 20               | 60    | 0    | 80         | 2                        | 167  | 9     | 0    | 178        | 551        |
| 05:45 PM    | 29                       | 270  | 0    | 299        | 20               | 51    | 0    | 71         | 0                        | 164  | 13    | 0    | 177        | 547        |
| Total       | 107                      | 994  | 0    | 1101       | 85               | 218   | 0    | 303        | 2                        | 664  | 38    | 1    | 705        | 2109       |
| Grand Total | 783                      | 2795 | 0    | 3578       | 290              | 704   | 0    | 994        | 6                        | 3440 | 260   | 5    | 3711       | 8283       |
| Apprch %    | 21.9                     | 78.1 | 0    |            | 29.2             | 70.8  | 0    |            | 0.2                      | 92.7 | 7     | 0.1  |            |            |
| Total %     | 9.5                      | 33.7 | 0    | 43.2       | 3.5              | 8.5   | 0    | 12         | 0.1                      | 41.5 | 3.1   | 0.1  | 44.8       |            |

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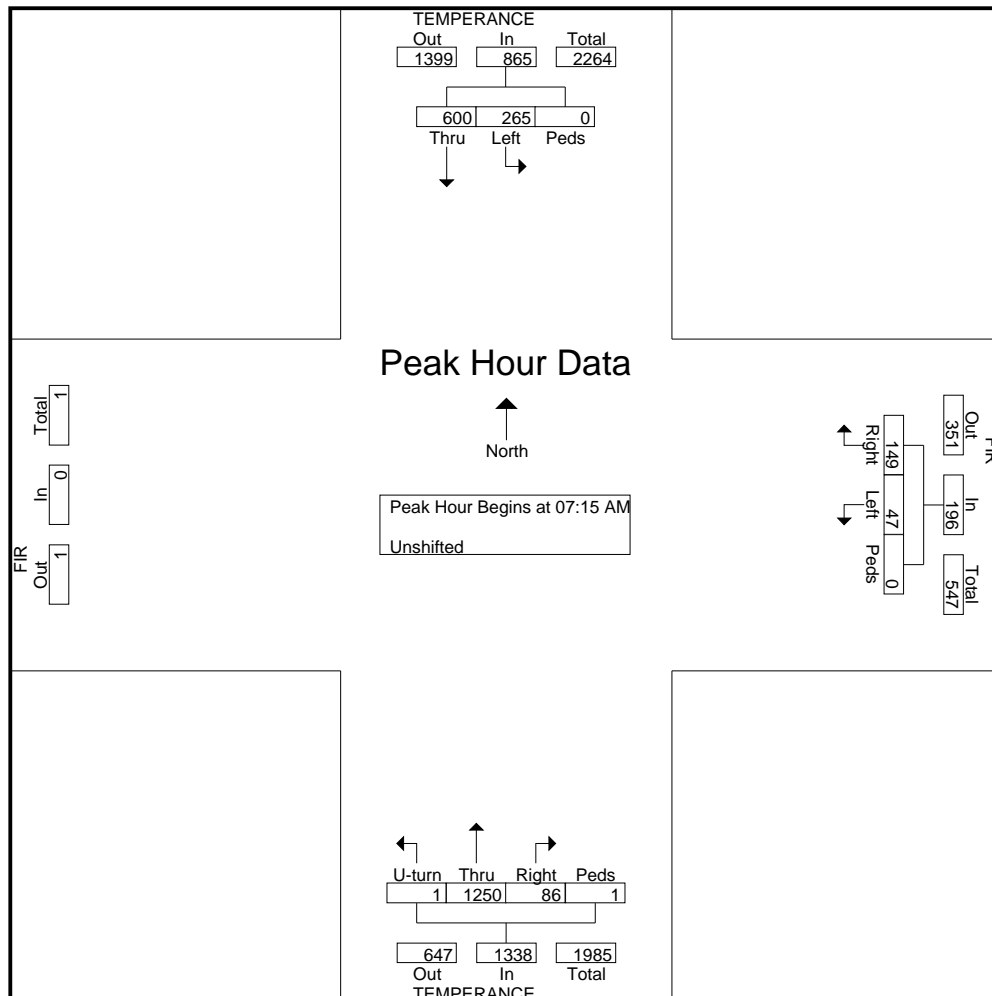
File Name : 05 Fir at Temperance

Site Code : 00000000

Start Date : 2/24/2016

Page No : 2

|  | TEMPERANCE<br>Southbound |      |      |            | FIR<br>Westbound |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            |            |
|--|--------------------------|------|------|------------|------------------|-------|------|------------|--------------------------|------|-------|------|------------|------------|
| Start Time   | Left                     | Thru | Peds | App. Total | Left             | Right | Peds | App. Total | U-turn                   | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                          |      |      |            |                  |       |      |            |                          |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:15 AM       |                          |      |      |            |                  |       |      |            |                          |      |       |      |            |            |
| 07:15 AM   | 46                       | 133  | 0    | 179        | 6                | 22    | 0    | 28         | 0                        | 315  | 16    | 0    | 331        | 538        |
| 07:30 AM   | 48                       | 166  | 0    | 214        | 10               | 54    | 0    | 64         | 0                        | 351  | 19    | 0    | 370        | 648        |
| 07:45 AM   | 84                       | 164  | 0    | 248        | 17               | 40    | 0    | 57         | 1                        | 319  | 27    | 0    | 347        | 652        |
| 08:00 AM   | 87                       | 137  | 0    | 224        | 14               | 33    | 0    | 47         | 0                        | 265  | 24    | 1    | 290        | 561        |
| Total Volume   | 265                      | 600  | 0    | 865        | 47               | 149   | 0    | 196        | 1                        | 1250 | 86    | 1    | 1338       | 2399       |
| % App. Total   | 30.6                     | 69.4 | 0    |            | 24               | 76    | 0    |            | 0.1                      | 93.4 | 6.4   | 0.1  |            |            |
| PHF  | .761                     | .904 | .000 | .872       | .691             | .690  | .000 | .766       | .250                     | .890 | .796  | .250 | .904       | .920       |



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File Name : 05 Fir at Temperence

Site Code : 00000000

Start Date : 2/24/2016

Page No : 3

|  | TEMPERANCE<br>Southbound |      |      |            | FIR<br>Westbound |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            |            |
|--|--------------------------|------|------|------------|------------------|-------|------|------------|--------------------------|------|-------|------|------------|------------|
| Start Time   | Left                     | Thru | Peds | App. Total | Left             | Right | Peds | App. Total | U-turn                   | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                          |      |      |            |                  |       |      |            |                          |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                          |      |      |            |                  |       |      |            |                          |      |       |      |            |            |
| 05:00 PM   | 29                       | 219  | 0    | 248        | 28               | 66    | 0    | 94         | 0                        | 166  | 7     | 0    | 173        | 515        |
| 05:15 PM   | 20                       | 241  | 0    | 261        | 17               | 41    | 0    | 58         | 0                        | 167  | 9     | 1    | 177        | 496        |
| 05:30 PM   | 29                       | 264  | 0    | 293        | 20               | 60    | 0    | 80         | 2                        | 167  | 9     | 0    | 178        | 551        |
| 05:45 PM   | 29                       | 270  | 0    | 299        | 20               | 51    | 0    | 71         | 0                        | 164  | 13    | 0    | 177        | 547        |
| Total Volume   | 107                      | 994  | 0    | 1101       | 85               | 218   | 0    | 303        | 2                        | 664  | 38    | 1    | 705        | 2109       |
| % App. Total   | 9.7                      | 90.3 | 0    |            | 28.1             | 71.9  | 0    |            | 0.3                      | 94.2 | 5.4   | 0.1  |            |            |
| PHF  | .922                     | .920 | .000 | .921       | .759             | .826  | .000 | .806       | .250                     | .994 | .731  | .250 | .990       | .957       |

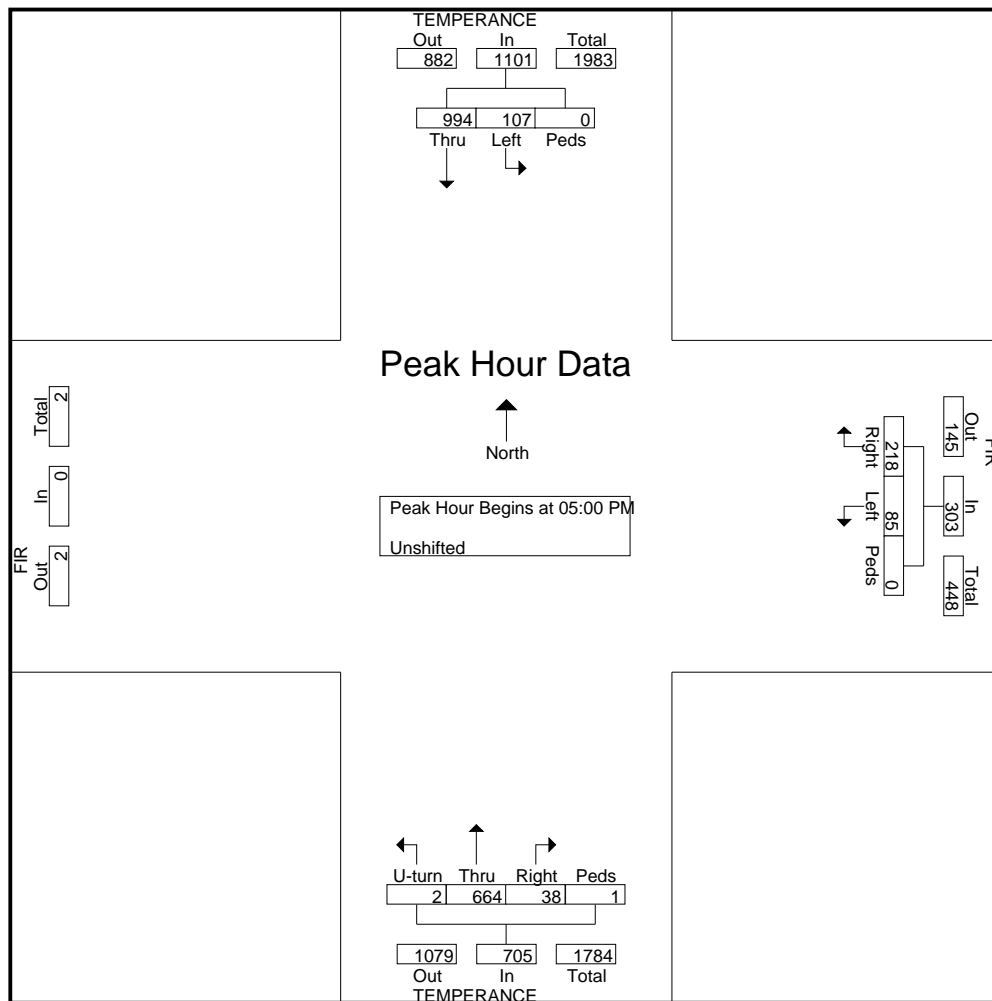






Figure 6  
 Clovis Community Medical Center  
 Peak Hour Turning Movement Volumes - Existing Conditions

Traffic counts collected on Wednesday, March 30, 2016

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File Name : 07 Herndon at Armstrong

Site Code : 00000000

Start Date : 1/14/2016

Page No : 1

## Groups Printed- Unshifted

|             | ARMSTRONG<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | ARMSTRONG<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|-------------|-------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time  | Left                    | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 7                       | 10   | 14    | 1    | 32         | 11                   | 102  | 4     | 0    | 117        | 49                      | 18   | 4     | 0    | 71         | 6                    | 50   | 5     | 0    | 61         | 281        |
| 07:15 AM    | 7                       | 18   | 10    | 0    | 35         | 13                   | 133  | 10    | 1    | 157        | 56                      | 25   | 3     | 2    | 86         | 5                    | 49   | 10    | 0    | 64         | 342        |
| 07:30 AM    | 9                       | 19   | 10    | 0    | 38         | 12                   | 181  | 8     | 1    | 202        | 72                      | 28   | 4     | 0    | 104        | 4                    | 75   | 20    | 0    | 99         | 443        |
| 07:45 AM    | 9                       | 14   | 13    | 0    | 36         | 4                    | 147  | 13    | 0    | 164        | 60                      | 44   | 3     | 0    | 107        | 9                    | 80   | 16    | 0    | 105        | 412        |
| Total       | 32                      | 61   | 47    | 1    | 141        | 40                   | 563  | 35    | 2    | 640        | 237                     | 115  | 14    | 2    | 368        | 24                   | 254  | 51    | 0    | 329        | 1478       |
| 08:00 AM    | 3                       | 19   | 24    | 0    | 46         | 13                   | 128  | 8     | 0    | 149        | 71                      | 27   | 8     | 0    | 106        | 10                   | 69   | 9     | 0    | 88         | 389        |
| 08:15 AM    | 4                       | 15   | 21    | 0    | 40         | 13                   | 148  | 2     | 0    | 163        | 57                      | 27   | 0     | 0    | 84         | 8                    | 85   | 16    | 0    | 109        | 396        |
| 08:30 AM    | 6                       | 12   | 19    | 0    | 37         | 22                   | 162  | 9     | 0    | 193        | 45                      | 32   | 3     | 0    | 80         | 11                   | 66   | 15    | 0    | 92         | 402        |
| 08:45 AM    | 2                       | 21   | 10    | 0    | 33         | 14                   | 145  | 3     | 0    | 162        | 48                      | 21   | 2     | 0    | 71         | 6                    | 73   | 16    | 0    | 95         | 361        |
| Total       | 15                      | 67   | 74    | 0    | 156        | 62                   | 583  | 22    | 0    | 667        | 221                     | 107  | 13    | 0    | 341        | 35                   | 293  | 56    | 0    | 384        | 1548       |
| *****       |                         |      |       |      |            |                      |      |       |      |            |                         |      |       |      |            |                      |      |       |      |            |            |
| 04:00 PM    | 10                      | 21   | 12    | 0    | 43         | 14                   | 112  | 3     | 0    | 129        | 29                      | 15   | 3     | 0    | 47         | 12                   | 149  | 58    | 1    | 220        | 439        |
| 04:15 PM    | 6                       | 27   | 7     | 0    | 40         | 15                   | 126  | 6     | 0    | 147        | 38                      | 26   | 6     | 0    | 70         | 17                   | 124  | 41    | 0    | 182        | 439        |
| 04:30 PM    | 8                       | 26   | 12    | 0    | 46         | 11                   | 119  | 7     | 0    | 137        | 35                      | 24   | 3     | 0    | 62         | 12                   | 127  | 48    | 2    | 189        | 434        |
| 04:45 PM    | 5                       | 27   | 15    | 0    | 47         | 8                    | 115  | 10    | 0    | 133        | 27                      | 34   | 3     | 0    | 64         | 10                   | 143  | 41    | 0    | 194        | 438        |
| Total       | 29                      | 101  | 46    | 0    | 176        | 48                   | 472  | 26    | 0    | 546        | 129                     | 99   | 15    | 0    | 243        | 51                   | 543  | 188   | 3    | 785        | 1750       |
| 05:00 PM    | 4                       | 31   | 22    | 0    | 57         | 12                   | 131  | 3     | 0    | 146        | 29                      | 33   | 5     | 0    | 67         | 9                    | 165  | 50    | 1    | 225        | 495        |
| 05:15 PM    | 4                       | 31   | 17    | 0    | 52         | 11                   | 115  | 2     | 0    | 128        | 46                      | 32   | 1     | 0    | 79         | 15                   | 149  | 56    | 0    | 220        | 479        |
| 05:30 PM    | 4                       | 32   | 15    | 0    | 51         | 8                    | 102  | 6     | 0    | 116        | 50                      | 35   | 1     | 0    | 86         | 14                   | 176  | 60    | 0    | 250        | 503        |
| 05:45 PM    | 4                       | 30   | 19    | 0    | 53         | 6                    | 125  | 3     | 1    | 135        | 28                      | 13   | 2     | 0    | 43         | 8                    | 139  | 46    | 0    | 193        | 424        |
| Total       | 16                      | 124  | 73    | 0    | 213        | 37                   | 473  | 14    | 1    | 525        | 153                     | 113  | 9     | 0    | 275        | 46                   | 629  | 212   | 1    | 888        | 1901       |
| Grand Total | 92                      | 353  | 240   | 1    | 686        | 187                  | 2091 | 97    | 3    | 2378       | 740                     | 434  | 51    | 2    | 1227       | 156                  | 1719 | 507   | 4    | 2386       | 6677       |
| Apprch %    | 13.4                    | 51.5 | 35    | 0.1  |            | 7.9                  | 87.9 | 4.1   | 0.1  |            | 60.3                    | 35.4 | 4.2   | 0.2  |            | 6.5                  | 72   | 21.2  | 0.2  |            |            |
| Total %     | 1.4                     | 5.3  | 3.6   | 0    | 10.3       | 2.8                  | 31.3 | 1.5   | 0    | 35.6       | 11.1                    | 6.5  | 0.8   | 0    | 18.4       | 2.3                  | 25.7 | 7.6   | 0.1  | 35.7       |            |



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File Name : 07 Herndon at Armstrong

Site Code : 00000000

Start Date : 1/14/2016

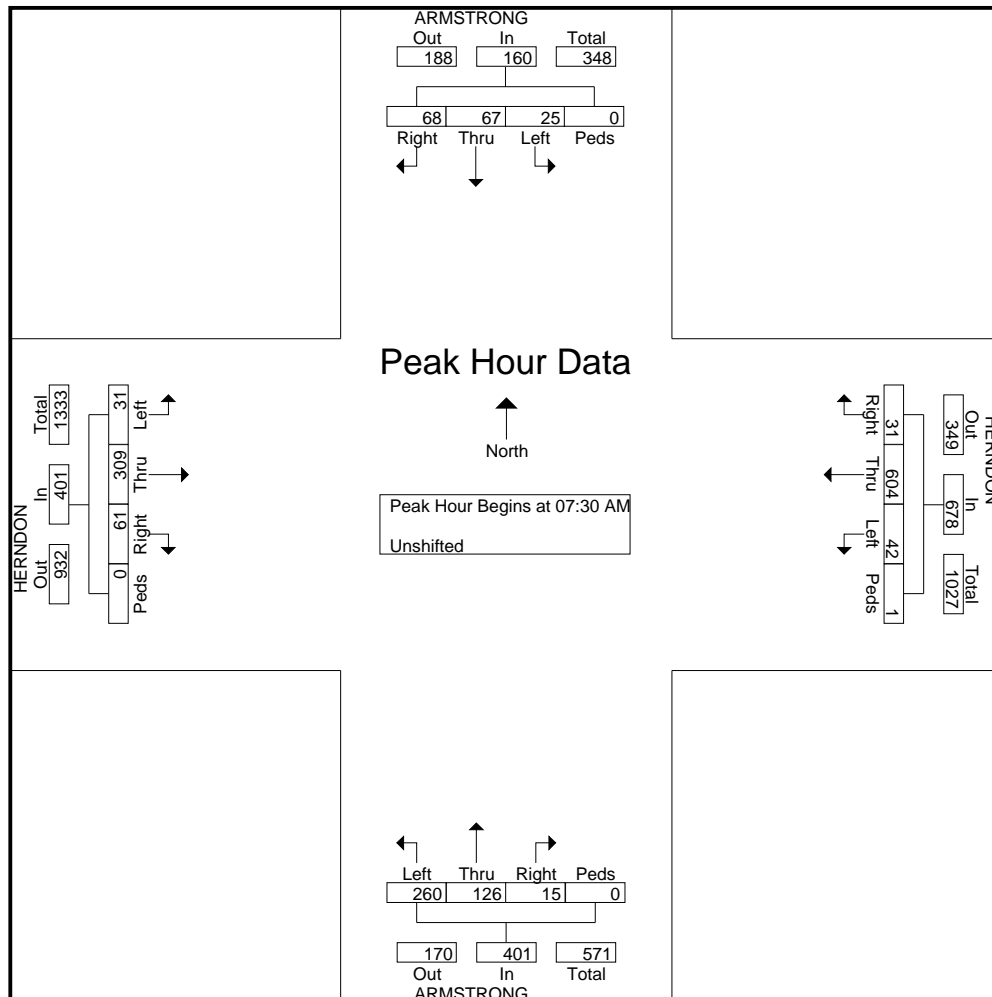
Page No : 2

|            | ARMSTRONG<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | ARMSTRONG<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|------------|-------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time | Left                    | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:30 AM     | 9    | 19   | 10   | 0    | 38   | 12   | 181  | 8    | 1    | 202  | 72   | 28   | 4    | 0    | 104  | 4    | 75   | 20   | 0    | 99   | 443  |
| 07:45 AM     | 9    | 14   | 13   | 0    | 36   | 4    | 147  | 13   | 0    | 164  | 60   | 44   | 3    | 0    | 107  | 9    | 80   | 16   | 0    | 105  | 412  |
| 08:00 AM     | 3    | 19   | 24   | 0    | 46   | 13   | 128  | 8    | 0    | 149  | 71   | 27   | 8    | 0    | 106  | 10   | 69   | 9    | 0    | 88   | 389  |
| 08:15 AM     | 4    | 15   | 21   | 0    | 40   | 13   | 148  | 2    | 0    | 163  | 57   | 27   | 0    | 0    | 84   | 8    | 85   | 16   | 0    | 109  | 396  |
| Total Volume | 25   | 67   | 68   | 0    | 160  | 42   | 604  | 31   | 1    | 678  | 260  | 126  | 15   | 0    | 401  | 31   | 309  | 61   | 0    | 401  | 1640 |
| % App. Total | 15.6 | 41.9 | 42.5 | 0    |      | 6.2  | 89.1 | 4.6  | 0.1  |      | 64.8 | 31.4 | 3.7  | 0    |      | 7.7  | 77.1 | 15.2 | 0    |      |      |
| PHF          | .694 | .882 | .708 | .000 | .870 | .808 | .834 | .596 | .250 | .839 | .903 | .716 | .469 | .000 | .937 | .775 | .909 | .763 | .000 | .920 | .926 |



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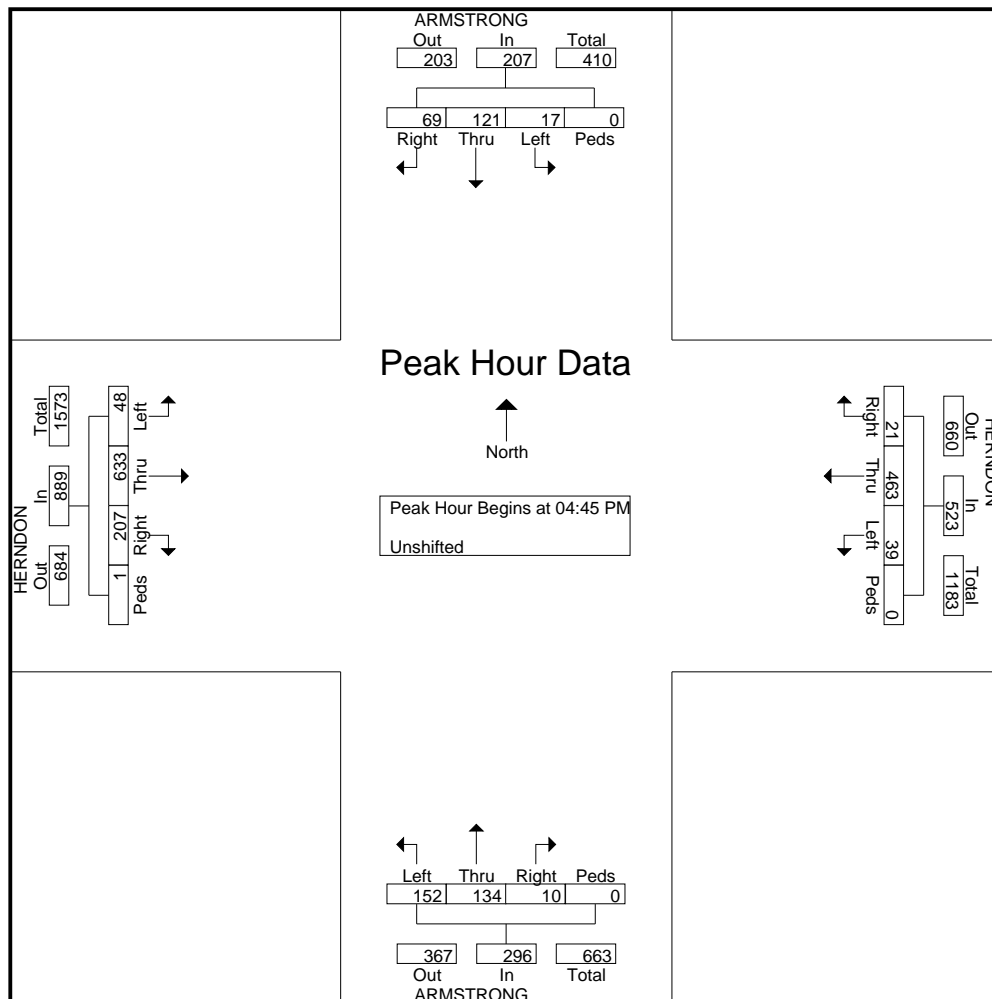
File Name : 07 Herndon at Armstrong

Site Code : 00000000

Start Date : 1/14/2016

Page No : 3

|  | ARMSTRONG<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | ARMSTRONG<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|--|-------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time   | Left                    | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                    | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                         |      |       |      |            |                      |      |       |      |            |                         |      |       |      |            |                      |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                         |      |       |      |            |                      |      |       |      |            |                         |      |       |      |            |                      |      |       |      |            |            |
| 04:45 PM   | 5                       | 27   | 15    | 0    | 47         | 8                    | 115  | 10    | 0    | 133        | 27                      | 34   | 3     | 0    | 64         | 10                   | 143  | 41    | 0    | 194        | 438        |
| 05:00 PM   | 4                       | 31   | 22    | 0    | 57         | 12                   | 131  | 3     | 0    | 146        | 29                      | 33   | 5     | 0    | 67         | 9                    | 165  | 50    | 1    | 225        | 495        |
| 05:15 PM   | 4                       | 31   | 17    | 0    | 52         | 11                   | 115  | 2     | 0    | 128        | 46                      | 32   | 1     | 0    | 79         | 15                   | 149  | 56    | 0    | 220        | 479        |
| 05:30 PM   | 4                       | 32   | 15    | 0    | 51         | 8                    | 102  | 6     | 0    | 116        | 50                      | 35   | 1     | 0    | 86         | 14                   | 176  | 60    | 0    | 250        | 503        |
| Total Volume   | 17                      | 121  | 69    | 0    | 207        | 39                   | 463  | 21    | 0    | 523        | 152                     | 134  | 10    | 0    | 296        | 48                   | 633  | 207   | 1    | 889        | 1915       |
| % App. Total   | 8.2                     | 58.5 | 33.3  | 0    |            | 7.5                  | 88.5 | 4     | 0    |            | 51.4                    | 45.3 | 3.4   | 0    |            | 5.4                  | 71.2 | 23.3  | 0.1  |            |            |
| PHF  | .850                    | .945 | .784  | .000 | .908       | .813                 | .884 | .525  | .000 | .896       | .760                    | .957 | .500  | .000 | .860       | .800                 | .899 | .863  | .250 | .889       | .952       |



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File Name : 08 Herndon at Tollhouse

Site Code : 00000000

Start Date : 1/13/2016

Page No : 1

## Groups Printed- Unshifted

|             | TOLLHOUSE  |      |            |        | HERNDON   |       |      |            |       | TOLLHOUSE  |            |      | HERNDON   |      |            |            |  |
|-------------|------------|------|------------|--------|-----------|-------|------|------------|-------|------------|------------|------|-----------|------|------------|------------|--|
|             | Southbound |      |            |        | Westbound |       |      |            |       | Northbound |            |      | Eastbound |      |            |            |  |
| Start Time  | Right      | Peds | App. Total | U-Turn | Thru      | Right | Peds | App. Total | Right | Peds       | App. Total | Left | Thru      | Peds | App. Total | Int. Total |  |
| 07:00 AM    | 1          | 0    | 1          | 0      | 122       | 3     | 0    | 125        | 7     | 0          | 7          | 10   | 37        | 0    | 47         | 180        |  |
| 07:15 AM    | 5          | 0    | 5          | 3      | 143       | 1     | 0    | 147        | 14    | 0          | 14         | 7    | 55        | 0    | 62         | 228        |  |
| 07:30 AM    | 5          | 0    | 5          | 3      | 212       | 0     | 0    | 215        | 20    | 0          | 20         | 4    | 68        | 0    | 72         | 312        |  |
| 07:45 AM    | 3          | 0    | 3          | 2      | 186       | 2     | 0    | 190        | 21    | 0          | 21         | 3    | 89        | 0    | 92         | 306        |  |
| Total       | 14         | 0    | 14         | 8      | 663       | 6     | 0    | 677        | 62    | 0          | 62         | 24   | 249       | 0    | 273        | 1026       |  |
|             |            |      |            |        |           |       |      |            |       |            |            |      |           |      |            |            |  |
| 08:00 AM    | 4          | 0    | 4          | 3      | 146       | 0     | 0    | 149        | 16    | 0          | 16         | 8    | 70        | 0    | 78         | 247        |  |
| 08:15 AM    | 5          | 0    | 5          | 3      | 199       | 2     | 0    | 204        | 16    | 1          | 17         | 4    | 86        | 1    | 91         | 317        |  |
| 08:30 AM    | 8          | 0    | 8          | 1      | 200       | 0     | 0    | 201        | 14    | 0          | 14         | 3    | 81        | 0    | 84         | 307        |  |
| 08:45 AM    | 11         | 0    | 11         | 3      | 147       | 3     | 0    | 153        | 10    | 0          | 10         | 3    | 58        | 0    | 61         | 235        |  |
| Total       | 28         | 0    | 28         | 10     | 692       | 5     | 0    | 707        | 56    | 1          | 57         | 18   | 295       | 1    | 314        | 1106       |  |
| *****       |            |      |            |        |           |       |      |            |       |            |            |      |           |      |            |            |  |
|             |            |      |            |        |           |       |      |            |       |            |            |      |           |      |            |            |  |
| 04:00 PM    | 12         | 0    | 12         | 4      | 127       | 1     | 0    | 132        | 29    | 0          | 29         | 12   | 155       | 0    | 167        | 340        |  |
| 04:15 PM    | 7          | 0    | 7          | 8      | 154       | 1     | 0    | 163        | 16    | 0          | 16         | 9    | 132       | 0    | 141        | 327        |  |
| 04:30 PM    | 11         | 0    | 11         | 9      | 135       | 1     | 0    | 145        | 20    | 0          | 20         | 15   | 123       | 0    | 138        | 314        |  |
| 04:45 PM    | 8          | 0    | 8          | 6      | 166       | 1     | 0    | 173        | 27    | 0          | 27         | 14   | 153       | 0    | 167        | 375        |  |
| Total       | 38         | 0    | 38         | 27     | 582       | 4     | 0    | 613        | 92    | 0          | 92         | 50   | 563       | 0    | 613        | 1356       |  |
|             |            |      |            |        |           |       |      |            |       |            |            |      |           |      |            |            |  |
| 05:00 PM    | 12         | 0    | 12         | 10     | 141       | 1     | 0    | 152        | 32    | 0          | 32         | 9    | 177       | 0    | 186        | 382        |  |
| 05:15 PM    | 8          | 0    | 8          | 10     | 162       | 0     | 0    | 172        | 28    | 0          | 28         | 15   | 189       | 0    | 204        | 412        |  |
| 05:30 PM    | 10         | 0    | 10         | 12     | 98        | 0     | 0    | 110        | 19    | 0          | 19         | 17   | 160       | 0    | 177        | 316        |  |
| 05:45 PM    | 6          | 0    | 6          | 12     | 131       | 1     | 0    | 144        | 17    | 0          | 17         | 18   | 169       | 0    | 187        | 354        |  |
| Total       | 36         | 0    | 36         | 44     | 532       | 2     | 0    | 578        | 96    | 0          | 96         | 59   | 695       | 0    | 754        | 1464       |  |
|             |            |      |            |        |           |       |      |            |       |            |            |      |           |      |            |            |  |
| Grand Total | 116        | 0    | 116        | 89     | 2469      | 17    | 0    | 2575       | 306   | 1          | 307        | 151  | 1802      | 1    | 1954       | 4952       |  |
| Apprch      | 100        | 0    |            | 3.5    | 95.9      | 0.7   | 0    |            | 99.7  | 0.3        |            | 7.7  | 92.2      | 0.1  |            |            |  |
| Total %     | 2.3        | 0    | 2.3        | 1.8    | 49.9      | 0.3   | 0    | 52         | 6.2   | 0          | 6.2        | 3    | 36.4      | 0    | 39.5       |            |  |

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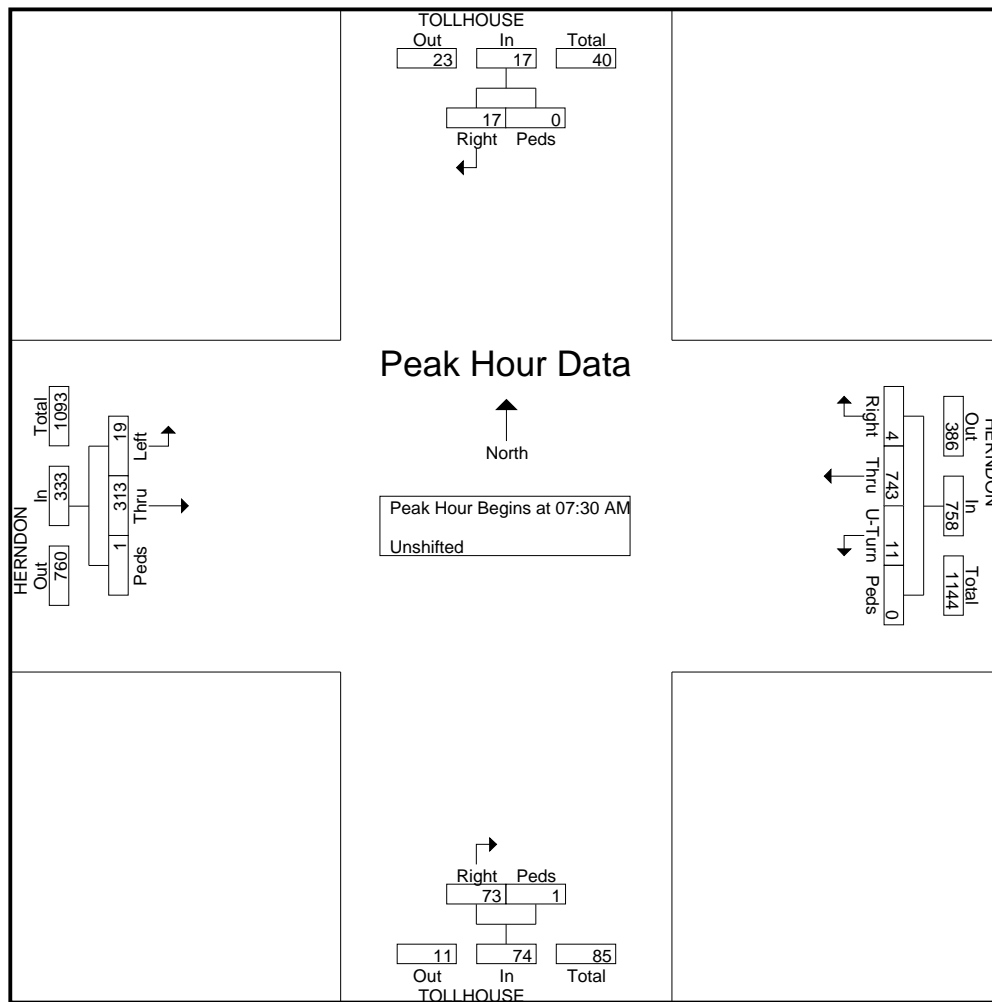
File Name : 08 Herndon at Tollhouse

Site Code : 00000000

Start Date : 1/13/2016

Page No : 2

|  | TOLLHOUSE  |      |            | HERNDON   |      |       |      |            | TOLLHOUSE  |      |            | HERNDON   |      |      |            |            |  |
|--|------------|------|------------|-----------|------|-------|------|------------|------------|------|------------|-----------|------|------|------------|------------|--|
|  | Southbound |      |            | Westbound |      |       |      |            | Northbound |      |            | Eastbound |      |      |            |            |  |
| Start Time   | Right      | Peds | App. Total | U-Turn    | Thru | Right | Peds | App. Total | Right      | Peds | App. Total | Left      | Thru | Peds | App. Total | Int. Total |  |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |            |      |            |           |      |       |      |            |            |      |            |           |      |      |            |            |  |
| Peak Hour for Entire Intersection Begins at 07:30 AM       |            |      |            |           |      |       |      |            |            |      |            |           |      |      |            |            |  |
| 07:30 AM   | 5          | 0    | 5          | 3         | 212  | 0     | 0    | 215        | 20         | 0    | 20         | 4         | 68   | 0    | 72         | 312        |  |
| 07:45 AM   | 3          | 0    | 3          | 2         | 186  | 2     | 0    | 190        | 21         | 0    | 21         | 3         | 89   | 0    | 92         | 306        |  |
| 08:00 AM   | 4          | 0    | 4          | 3         | 146  | 0     | 0    | 149        | 16         | 0    | 16         | 8         | 70   | 0    | 78         | 247        |  |
| 08:15 AM   | 5          | 0    | 5          | 3         | 199  | 2     | 0    | 204        | 16         | 1    | 17         | 4         | 86   | 1    | 91         | 317        |  |
| Total Volume   | 17         | 0    | 17         | 11        | 743  | 4     | 0    | 758        | 73         | 1    | 74         | 19        | 313  | 1    | 333        | 1182       |  |
| % App. Total   | 100        | 0    |            | 1.5       | 98   | 0.5   | 0    |            | 98.6       | 1.4  |            | 5.7       | 94   | 0.3  |            |            |  |
| PHF  | .850       | .000 | .850       | .917      | .876 | .500  | .000 | .881       | .869       | .250 | .881       | .594      | .879 | .250 | .905       | .932       |  |



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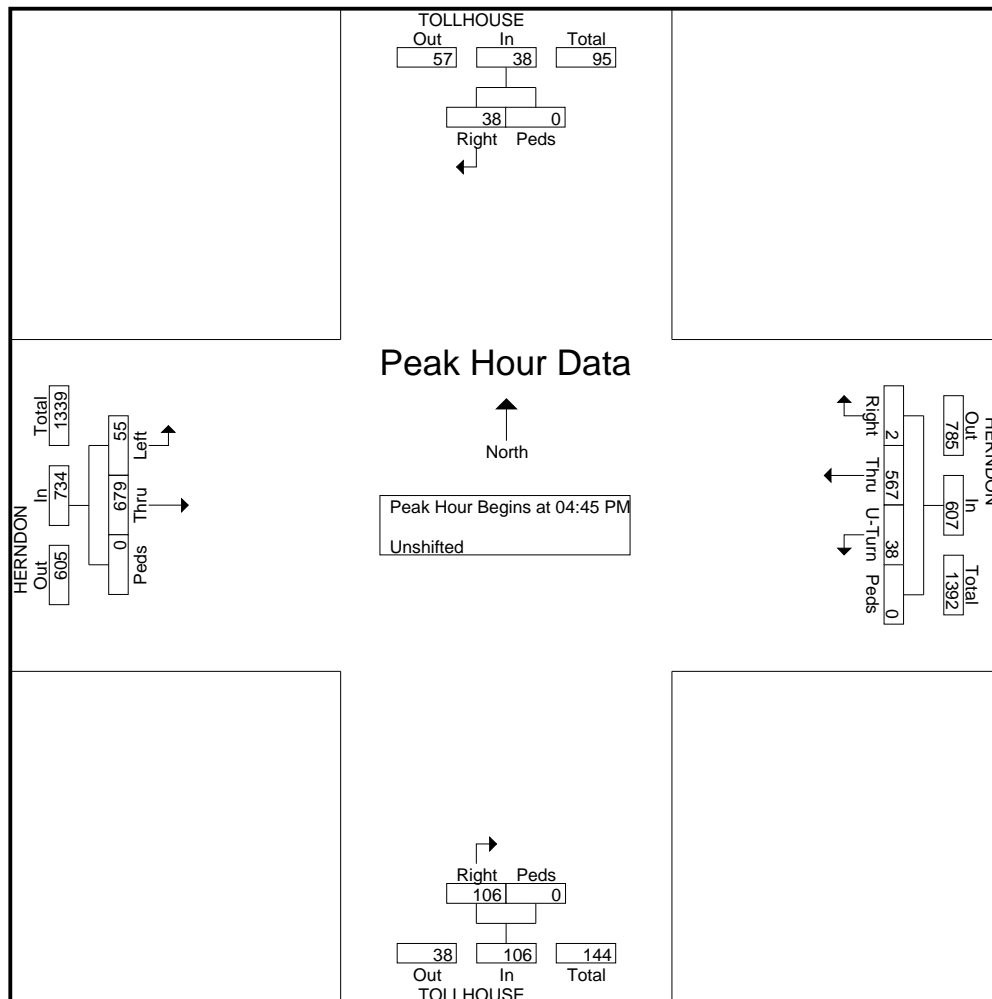
File Name : 08 Herndon at Tollhouse

Site Code : 00000000

Start Date : 1/13/2016

Page No : 3

|  | TOLLHOUSE  |      |            | HERNDON   |      |       |      |            | TOLLHOUSE  |      |            | HERNDON   |      |      |            |            |  |
|--|------------|------|------------|-----------|------|-------|------|------------|------------|------|------------|-----------|------|------|------------|------------|--|
|  | Southbound |      |            | Westbound |      |       |      |            | Northbound |      |            | Eastbound |      |      |            |            |  |
| Start Time   | Right      | Peds | App. Total | U-Turn    | Thru | Right | Peds | App. Total | Right      | Peds | App. Total | Left      | Thru | Peds | App. Total | Int. Total |  |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |            |      |            |           |      |       |      |            |            |      |            |           |      |      |            |            |  |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |            |      |            |           |      |       |      |            |            |      |            |           |      |      |            |            |  |
| 04:45 PM   | 8          | 0    | 8          | 6         | 166  | 1     | 0    | 173        | 27         | 0    | 27         | 14        | 153  | 0    | 167        | 375        |  |
| 05:00 PM   | 12         | 0    | 12         | 10        | 141  | 1     | 0    | 152        | 32         | 0    | 32         | 9         | 177  | 0    | 186        | 382        |  |
| 05:15 PM   | 8          | 0    | 8          | 10        | 162  | 0     | 0    | 172        | 28         | 0    | 28         | 15        | 189  | 0    | 204        | 412        |  |
| 05:30 PM   | 10         | 0    | 10         | 12        | 98   | 0     | 0    | 110        | 19         | 0    | 19         | 17        | 160  | 0    | 177        | 316        |  |
| Total Volume   | 38         | 0    | 38         | 38        | 567  | 2     | 0    | 607        | 106        | 0    | 106        | 55        | 679  | 0    | 734        | 1485       |  |
| % App. Total   | 100        | 0    |            | 6.3       | 93.4 | 0.3   | 0    |            | 100        | 0    |            | 7.5       | 92.5 | 0    |            |            |  |
| PHF  | .792       | .000 | .792       | .792      | .854 | .500  | .000 | .877       | .828       | .000 | .828       | .809      | .898 | .000 | .900       | .901       |  |



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File Name : 09 Herndon at Temperence

Site Code : 00000000

Start Date : 12/17/2015

Page No : 1

## Groups Printed- Unshifted

|             | TEMPERANCE<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|-------------|--------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time  | Left                     | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 46                       | 63   | 13    | 0    | 122        | 2                    | 56   | 107   | 0    | 165        | 25                       | 143  | 5     | 0    | 173        | 14                   | 24   | 14    | 0    | 52         | 512        |
| 07:15 AM    | 45                       | 54   | 11    | 0    | 110        | 3                    | 94   | 108   | 0    | 205        | 31                       | 172  | 8     | 0    | 211        | 26                   | 51   | 19    | 0    | 96         | 622        |
| 07:30 AM    | 49                       | 67   | 22    | 0    | 138        | 8                    | 124  | 136   | 0    | 268        | 47                       | 218  | 4     | 0    | 269        | 33                   | 54   | 21    | 2    | 110        | 785        |
| 07:45 AM    | 74                       | 84   | 23    | 0    | 181        | 11                   | 113  | 136   | 0    | 260        | 56                       | 163  | 4     | 0    | 223        | 31                   | 53   | 24    | 2    | 110        | 774        |
| Total       | 214                      | 268  | 69    | 0    | 551        | 24                   | 387  | 487   | 0    | 898        | 159                      | 696  | 21    | 0    | 876        | 104                  | 182  | 78    | 4    | 368        | 2693       |
| 08:00 AM    | 63                       | 68   | 25    | 0    | 156        | 8                    | 86   | 114   | 0    | 208        | 59                       | 146  | 6     | 0    | 211        | 28                   | 61   | 25    | 0    | 114        | 689        |
| 08:15 AM    | 65                       | 62   | 24    | 0    | 151        | 5                    | 111  | 114   | 0    | 230        | 44                       | 165  | 3     | 1    | 213        | 36                   | 47   | 14    | 0    | 97         | 691        |
| 08:30 AM    | 49                       | 67   | 21    | 0    | 137        | 6                    | 116  | 111   | 0    | 233        | 31                       | 118  | 7     | 0    | 156        | 25                   | 46   | 17    | 0    | 88         | 614        |
| 08:45 AM    | 40                       | 67   | 25    | 0    | 132        | 2                    | 77   | 98    | 0    | 177        | 34                       | 97   | 5     | 0    | 136        | 24                   | 48   | 20    | 1    | 93         | 538        |
| Total       | 217                      | 264  | 95    | 0    | 576        | 21                   | 390  | 437   | 0    | 848        | 168                      | 526  | 21    | 1    | 716        | 113                  | 202  | 76    | 1    | 392        | 2532       |
| *****       |                          |      |       |      |            |                      |      |       |      |            |                          |      |       |      |            |                      |      |       |      |            |            |
| 04:00 PM    | 78                       | 127  | 29    | 1    | 235        | 3                    | 78   | 52    | 1    | 134        | 24                       | 76   | 10    | 0    | 110        | 34                   | 84   | 38    | 1    | 157        | 636        |
| 04:15 PM    | 75                       | 106  | 28    | 0    | 209        | 3                    | 104  | 62    | 0    | 169        | 44                       | 60   | 5     | 2    | 111        | 33                   | 100  | 36    | 0    | 169        | 658        |
| 04:30 PM    | 82                       | 127  | 37    | 0    | 246        | 8                    | 90   | 65    | 2    | 165        | 28                       | 95   | 6     | 0    | 129        | 29                   | 83   | 50    | 2    | 164        | 704        |
| 04:45 PM    | 85                       | 118  | 40    | 0    | 243        | 11                   | 81   | 69    | 0    | 161        | 49                       | 88   | 7     | 0    | 144        | 35                   | 94   | 55    | 0    | 184        | 732        |
| Total       | 320                      | 478  | 134   | 1    | 933        | 25                   | 353  | 248   | 3    | 629        | 145                      | 319  | 28    | 2    | 494        | 131                  | 361  | 179   | 3    | 674        | 2730       |
| 05:00 PM    | 79                       | 140  | 30    | 0    | 249        | 7                    | 87   | 87    | 0    | 181        | 45                       | 56   | 8     | 0    | 109        | 29                   | 99   | 44    | 0    | 172        | 711        |
| 05:15 PM    | 97                       | 138  | 29    | 0    | 264        | 1                    | 77   | 61    | 0    | 139        | 37                       | 91   | 3     | 1    | 132        | 14                   | 99   | 61    | 7    | 181        | 716        |
| 05:30 PM    | 110                      | 121  | 29    | 0    | 260        | 6                    | 57   | 68    | 0    | 131        | 38                       | 86   | 2     | 0    | 126        | 28                   | 79   | 54    | 0    | 161        | 678        |
| 05:45 PM    | 90                       | 134  | 24    | 0    | 248        | 5                    | 88   | 57    | 0    | 150        | 36                       | 78   | 2     | 0    | 116        | 18                   | 104  | 56    | 0    | 178        | 692        |
| Total       | 376                      | 533  | 112   | 0    | 1021       | 19                   | 309  | 273   | 0    | 601        | 156                      | 311  | 15    | 1    | 483        | 89                   | 381  | 215   | 7    | 692        | 2797       |
| Grand Total | 1127                     | 1543 | 410   | 1    | 3081       | 89                   | 1439 | 1445  | 3    | 2976       | 628                      | 1852 | 85    | 4    | 2569       | 437                  | 1126 | 548   | 15   | 2126       | 10752      |
| Apprch %    | 36.6                     | 50.1 | 13.3  | 0    |            | 3                    | 48.4 | 48.6  | 0.1  |            | 24.4                     | 72.1 | 3.3   | 0.2  |            | 20.6                 | 53   | 25.8  | 0.7  |            |            |
| Total %     | 10.5                     | 14.4 | 3.8   | 0    | 28.7       | 0.8                  | 13.4 | 13.4  | 0    | 27.7       | 5.8                      | 17.2 | 0.8   | 0    | 23.9       | 4.1                  | 10.5 | 5.1   | 0.1  | 19.8       |            |

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File Name : 09 Herndon at Temperance

Site Code : 00000000

Start Date : 12/17/2015

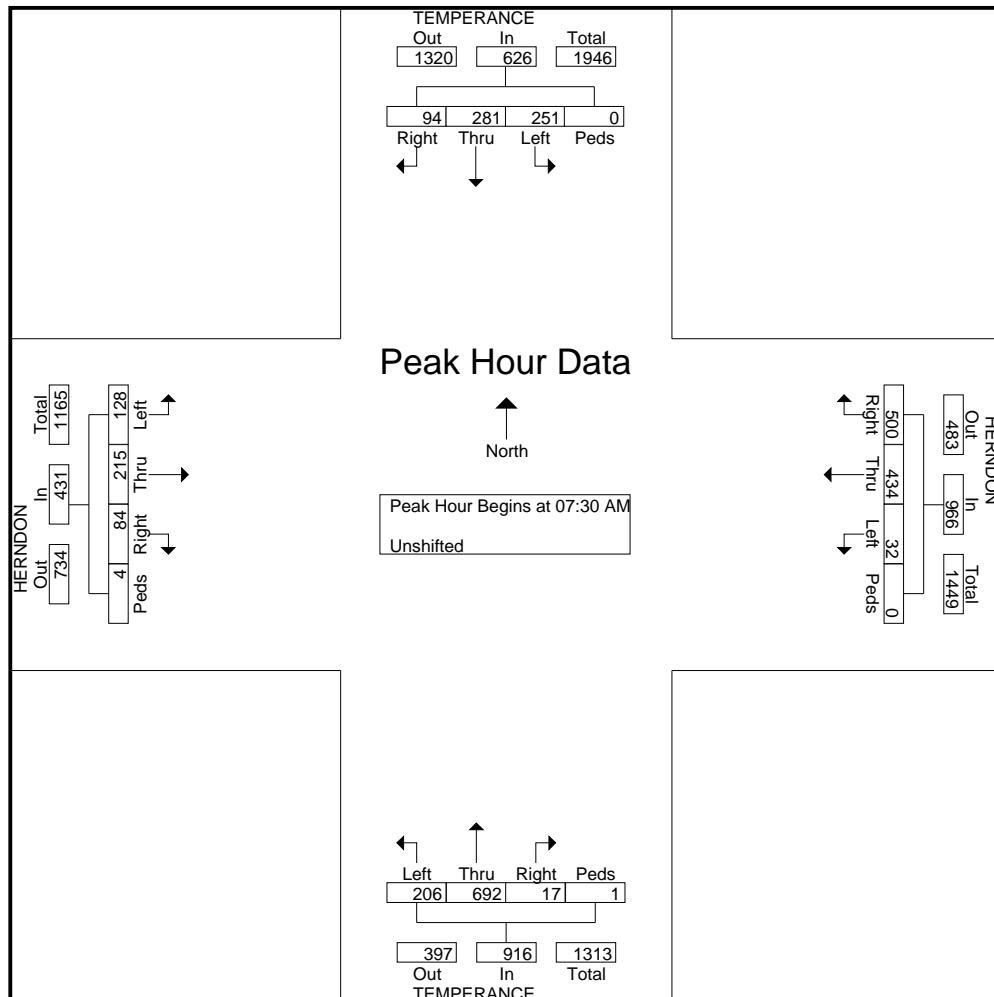
Page No : 2

|            | TEMPERANCE<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|------------|--------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time | Left                     | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:30 AM     | 49   | 67   | 22   | 0    | 138  | 8    | 124  | 136  | 0    | 268  | 47   | 218  | 4    | 0    | 269  | 33   | 54   | 21   | 2    | 110  | 785  |
| 07:45 AM     | 74   | 84   | 23   | 0    | 181  | 11   | 113  | 136  | 0    | 260  | 56   | 163  | 4    | 0    | 223  | 31   | 53   | 24   | 2    | 110  | 774  |
| 08:00 AM     | 63   | 68   | 25   | 0    | 156  | 8    | 86   | 114  | 0    | 208  | 59   | 146  | 6    | 0    | 211  | 28   | 61   | 25   | 0    | 114  | 689  |
| 08:15 AM     | 65   | 62   | 24   | 0    | 151  | 5    | 111  | 114  | 0    | 230  | 44   | 165  | 3    | 1    | 213  | 36   | 47   | 14   | 0    | 97   | 691  |
| Total Volume | 251  | 281  | 94   | 0    | 626  | 32   | 434  | 500  | 0    | 966  | 206  | 692  | 17   | 1    | 916  | 128  | 215  | 84   | 4    | 431  | 2939 |
| % App. Total | 40.1 | 44.9 | 15   | 0    |      | 3.3  | 44.9 | 51.8 | 0    |      | 22.5 | 75.5 | 1.9  | 0.1  |      | 29.7 | 49.9 | 19.5 | 0.9  |      |      |
| PHF          | .848 | .836 | .940 | .000 | .865 | .727 | .875 | .919 | .000 | .901 | .873 | .794 | .708 | .250 | .851 | .889 | .881 | .840 | .500 | .945 | .936 |



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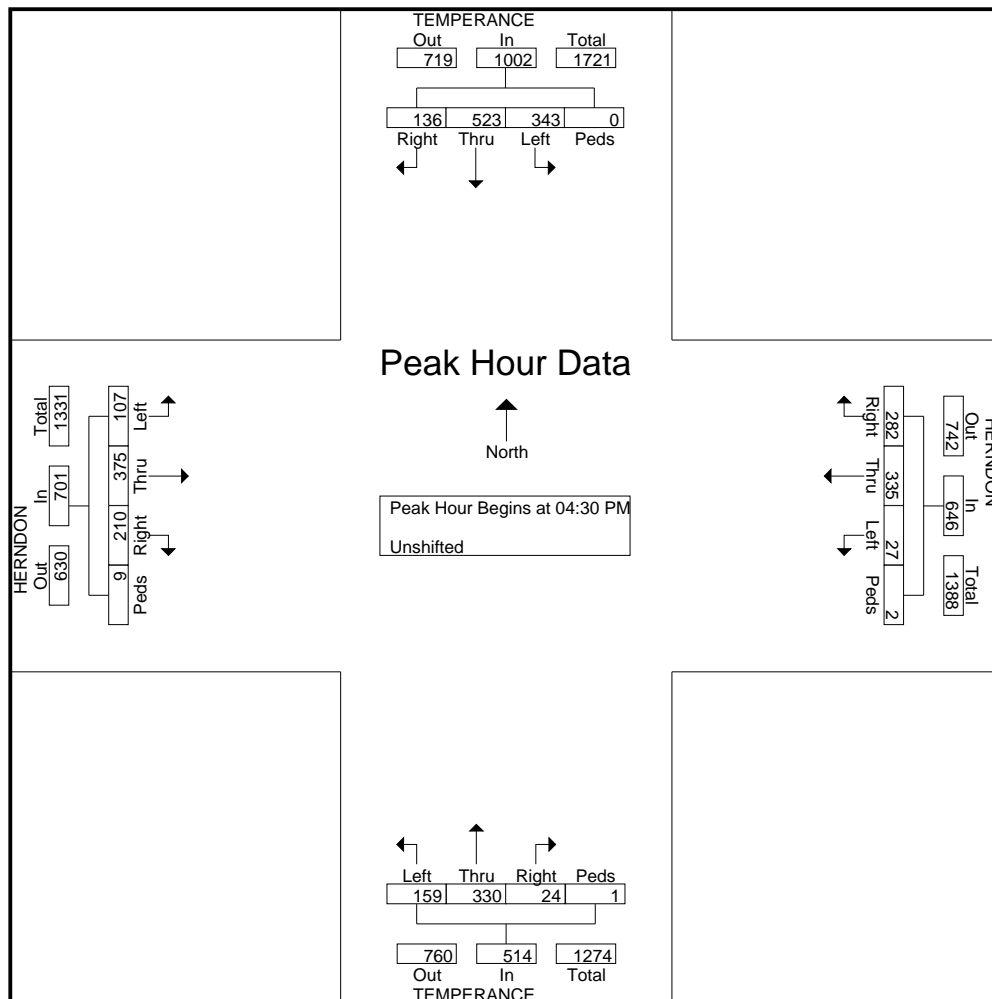
File Name : 09 Herndon at Temperence

Site Code : 00000000

Start Date : 12/17/2015

Page No : 3

|  | TEMPERANCE<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | TEMPERANCE<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|--|--------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|--------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time   | Left                     | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                     | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                          |      |       |      |            |                      |      |       |      |            |                          |      |       |      |            |                      |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:30 PM       |                          |      |       |      |            |                      |      |       |      |            |                          |      |       |      |            |                      |      |       |      |            |            |
| 04:30 PM   | 82                       | 127  | 37    | 0    | 246        | 8                    | 90   | 65    | 2    | 165        | 28                       | 95   | 6     | 0    | 129        | 29                   | 83   | 50    | 2    | 164        | 704        |
| 04:45 PM   | 85                       | 118  | 40    | 0    | 243        | 11                   | 81   | 69    | 0    | 161        | 49                       | 88   | 7     | 0    | 144        | 35                   | 94   | 55    | 0    | 184        | 732        |
| 05:00 PM   | 79                       | 140  | 30    | 0    | 249        | 7                    | 87   | 87    | 0    | 181        | 45                       | 56   | 8     | 0    | 109        | 29                   | 99   | 44    | 0    | 172        | 711        |
| 05:15 PM   | 97                       | 138  | 29    | 0    | 264        | 1                    | 77   | 61    | 0    | 139        | 37                       | 91   | 3     | 1    | 132        | 14                   | 99   | 61    | 7    | 181        | 716        |
| Total Volume   | 343                      | 523  | 136   | 0    | 1002       | 27                   | 335  | 282   | 2    | 646        | 159                      | 330  | 24    | 1    | 514        | 107                  | 375  | 210   | 9    | 701        | 2863       |
| % App. Total   | 34.2                     | 52.2 | 13.6  | 0    |            | 4.2                  | 51.9 | 43.7  | 0.3  |            | 30.9                     | 64.2 | 4.7   | 0.2  |            | 15.3                 | 53.5 | 30    | 1.3  |            |            |
| PHF  | .884                     | .934 | .850  | .000 | .949       | .614                 | .931 | .810  | .250 | .892       | .811                     | .868 | .750  | .250 | .892       | .764                 | .947 | .861  | .321 | .952       | .978       |





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File Name : 10 Herndon at Coventry

Site Code : 00000000

Start Date : 12/8/2015

Page No : 1

## Groups Printed- Unshifted

|             | COVENTRY<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | COVENTRY<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|-------------|------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time  | Left                   | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 1                      | 1    | 11    | 0    | 13         | 2                    | 137  | 4     | 0    | 143        | 17                     | 1    | 0     | 0    | 18         | 6                    | 52   | 3     | 0    | 61         | 235        |
| 07:15 AM    | 4                      | 0    | 5     | 0    | 9          | 1                    | 174  | 4     | 0    | 179        | 23                     | 0    | 6     | 0    | 29         | 13                   | 59   | 8     | 0    | 80         | 297        |
| 07:30 AM    | 4                      | 0    | 21    | 0    | 25         | 3                    | 214  | 4     | 0    | 221        | 29                     | 1    | 2     | 0    | 32         | 15                   | 73   | 15    | 0    | 103        | 381        |
| 07:45 AM    | 3                      | 1    | 9     | 0    | 13         | 4                    | 198  | 12    | 0    | 214        | 23                     | 2    | 0     | 0    | 25         | 14                   | 78   | 23    | 1    | 116        | 368        |
| Total       | 12                     | 2    | 46    | 0    | 60         | 10                   | 723  | 24    | 0    | 757        | 92                     | 4    | 8     | 0    | 104        | 48                   | 262  | 49    | 1    | 360        | 1281       |
| 08:00 AM    | 4                      | 0    | 4     | 0    | 8          | 6                    | 131  | 7     | 0    | 144        | 29                     | 3    | 3     | 0    | 35         | 17                   | 62   | 24    | 0    | 103        | 290        |
| 08:15 AM    | 2                      | 1    | 6     | 0    | 9          | 9                    | 148  | 6     | 0    | 163        | 61                     | 3    | 10    | 0    | 74         | 15                   | 68   | 35    | 0    | 118        | 364        |
| 08:30 AM    | 2                      | 0    | 10    | 0    | 12         | 10                   | 139  | 7     | 0    | 156        | 92                     | 2    | 19    | 0    | 113        | 10                   | 55   | 28    | 0    | 93         | 374        |
| 08:45 AM    | 0                      | 1    | 9     | 0    | 10         | 1                    | 137  | 6     | 0    | 144        | 37                     | 0    | 6     | 0    | 43         | 21                   | 59   | 10    | 0    | 90         | 287        |
| Total       | 8                      | 2    | 29    | 0    | 39         | 26                   | 555  | 26    | 0    | 607        | 219                    | 8    | 38    | 0    | 265        | 63                   | 244  | 97    | 0    | 404        | 1315       |
| *****       |                        |      |       |      |            |                      |      |       |      |            |                        |      |       |      |            |                      |      |       |      |            |            |
| 04:00 PM    | 4                      | 0    | 18    | 0    | 22         | 0                    | 102  | 3     | 0    | 105        | 19                     | 1    | 2     | 0    | 22         | 19                   | 130  | 22    | 0    | 171        | 320        |
| 04:15 PM    | 6                      | 0    | 14    | 0    | 20         | 1                    | 102  | 1     | 0    | 104        | 12                     | 0    | 2     | 0    | 14         | 14                   | 134  | 20    | 0    | 168        | 306        |
| 04:30 PM    | 2                      | 3    | 22    | 0    | 27         | 1                    | 109  | 2     | 0    | 112        | 43                     | 0    | 13    | 0    | 56         | 5                    | 146  | 22    | 0    | 173        | 368        |
| 04:45 PM    | 7                      | 1    | 20    | 0    | 28         | 1                    | 102  | 3     | 0    | 106        | 19                     | 0    | 2     | 0    | 21         | 12                   | 173  | 17    | 0    | 202        | 357        |
| Total       | 19                     | 4    | 74    | 0    | 97         | 3                    | 415  | 9     | 0    | 427        | 93                     | 1    | 19    | 0    | 113        | 50                   | 583  | 81    | 0    | 714        | 1351       |
| 05:00 PM    | 7                      | 0    | 17    | 0    | 24         | 3                    | 107  | 4     | 0    | 114        | 34                     | 0    | 4     | 0    | 38         | 9                    | 167  | 15    | 0    | 191        | 367        |
| 05:15 PM    | 7                      | 1    | 14    | 0    | 22         | 0                    | 115  | 5     | 0    | 120        | 9                      | 0    | 2     | 0    | 11         | 6                    | 193  | 17    | 0    | 216        | 369        |
| 05:30 PM    | 7                      | 0    | 6     | 0    | 13         | 1                    | 107  | 3     | 0    | 111        | 12                     | 0    | 1     | 0    | 13         | 4                    | 160  | 22    | 0    | 186        | 323        |
| 05:45 PM    | 6                      | 0    | 10    | 0    | 16         | 3                    | 110  | 4     | 0    | 117        | 16                     | 0    | 0     | 0    | 16         | 9                    | 142  | 23    | 0    | 174        | 323        |
| Total       | 27                     | 1    | 47    | 0    | 75         | 7                    | 439  | 16    | 0    | 462        | 71                     | 0    | 7     | 0    | 78         | 28                   | 662  | 77    | 0    | 767        | 1382       |
| Grand Total | 66                     | 9    | 196   | 0    | 271        | 46                   | 2132 | 75    | 0    | 2253       | 475                    | 13   | 72    | 0    | 560        | 189                  | 1751 | 304   | 1    | 2245       | 5329       |
| Apprch %    | 24.4                   | 3.3  | 72.3  | 0    |            | 2                    | 94.6 | 3.3   | 0    |            | 84.8                   | 2.3  | 12.9  | 0    |            | 8.4                  | 78   | 13.5  | 0    |            |            |
| Total %     | 1.2                    | 0.2  | 3.7   | 0    | 5.1        | 0.9                  | 40   | 1.4   | 0    | 42.3       | 8.9                    | 0.2  | 1.4   | 0    | 10.5       | 3.5                  | 32.9 | 5.7   | 0    | 42.1       |            |

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File Name : 10 Herndon at Coventry

Site Code : 00000000

Start Date : 12/8/2015

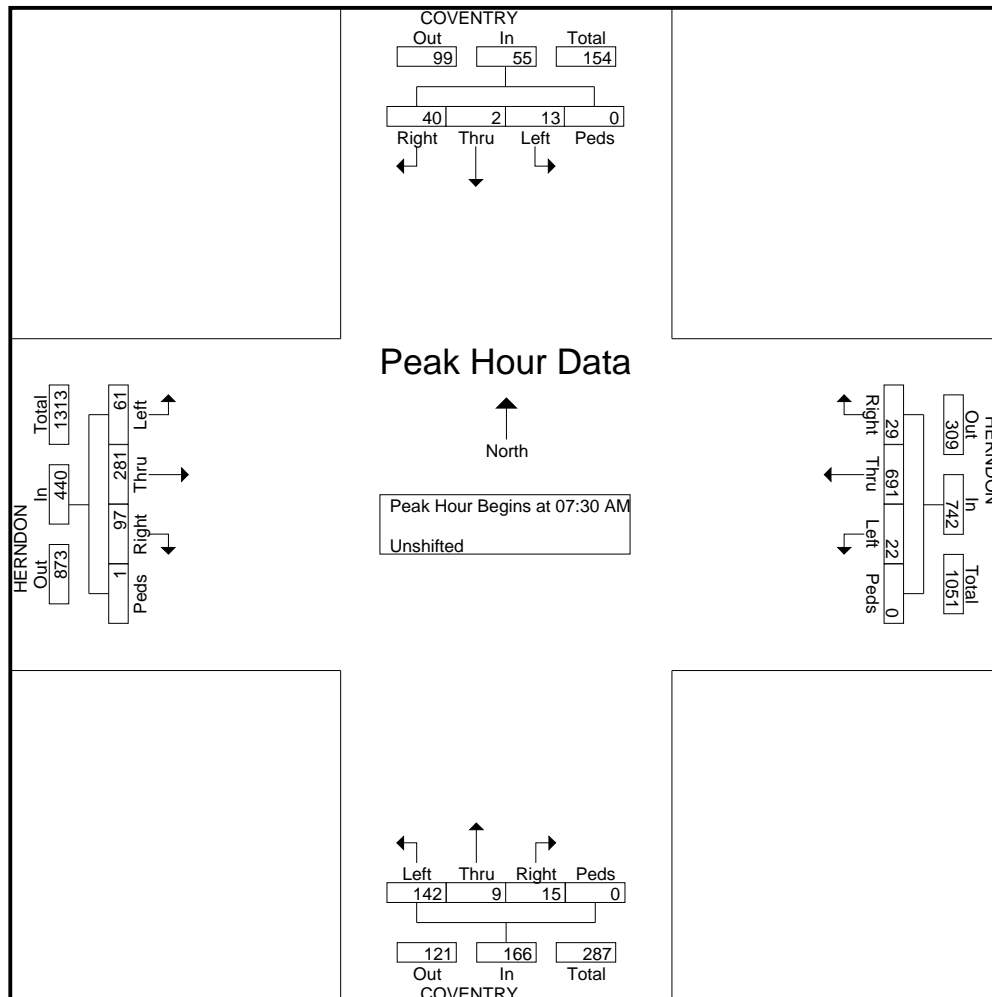
Page No : 2

|            | COVENTRY<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | COVENTRY<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|------------|------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time | Left                   | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:30 AM     | 4    | 0    | 21   | 0    | 25   | 3    | 214  | 4    | 0    | 221  | 29   | 1    | 2    | 0    | 32   | 15   | 73   | 15   | 0    | 103  | 381  |
| 07:45 AM     | 3    | 1    | 9    | 0    | 13   | 4    | 198  | 12   | 0    | 214  | 23   | 2    | 0    | 0    | 25   | 14   | 78   | 23   | 1    | 116  | 368  |
| 08:00 AM     | 4    | 0    | 4    | 0    | 8    | 6    | 131  | 7    | 0    | 144  | 29   | 3    | 3    | 0    | 35   | 17   | 62   | 24   | 0    | 103  | 290  |
| 08:15 AM     | 2    | 1    | 6    | 0    | 9    | 9    | 148  | 6    | 0    | 163  | 61   | 3    | 10   | 0    | 74   | 15   | 68   | 35   | 0    | 118  | 364  |
| Total Volume | 13   | 2    | 40   | 0    | 55   | 22   | 691  | 29   | 0    | 742  | 142  | 9    | 15   | 0    | 166  | 61   | 281  | 97   | 1    | 440  | 1403 |
| % App. Total | 23.6 | 3.6  | 72.7 | 0    |      | 3    | 93.1 | 3.9  | 0    |      | 85.5 | 5.4  | 9    | 0    |      | 13.9 | 63.9 | 22   | 0.2  |      |      |
| PHF          | .813 | .500 | .476 | .000 | .550 | .611 | .807 | .604 | .000 | .839 | .582 | .750 | .375 | .000 | .561 | .897 | .901 | .693 | .250 | .932 | .921 |



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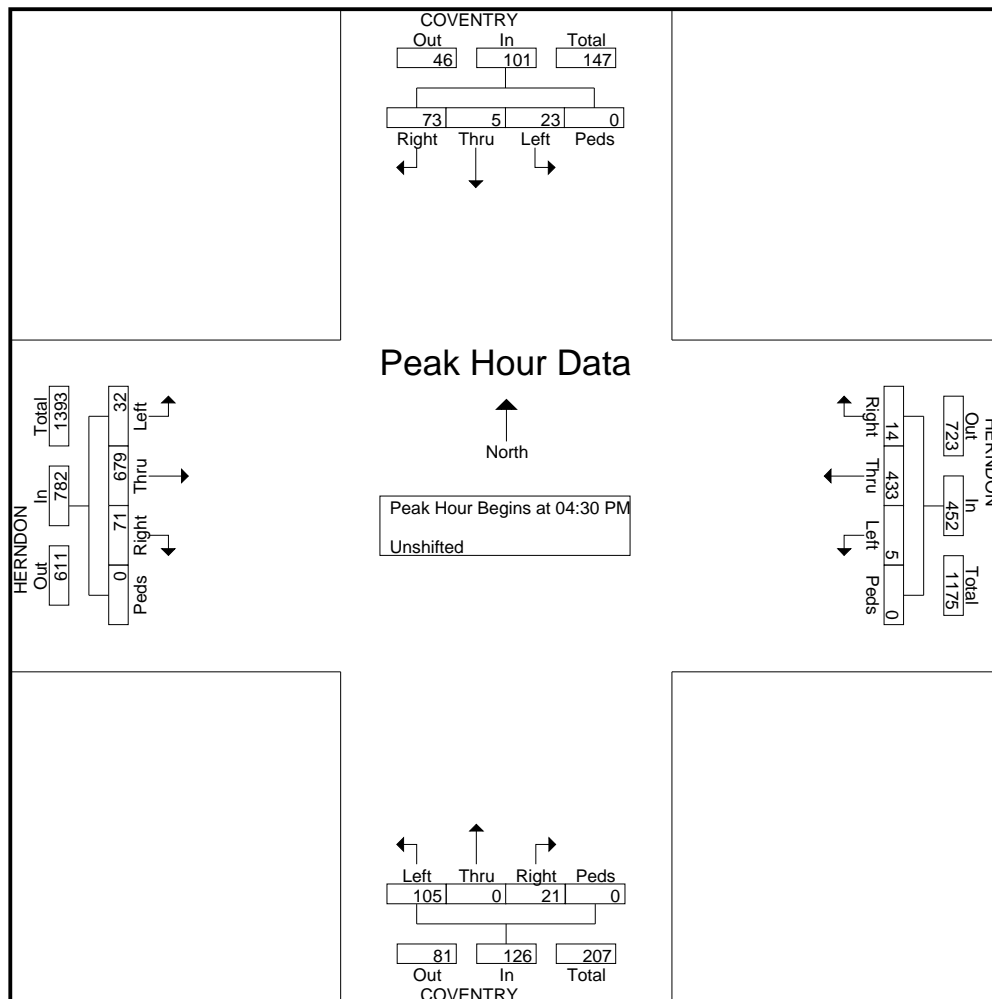
File Name : 10 Herndon at Coventry

Site Code : 00000000

Start Date : 12/8/2015

Page No : 3

|  | COVENTRY<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | COVENTRY<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|--|------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time   | Left                   | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                   | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                        |      |       |      |            |                      |      |       |      |            |                        |      |       |      |            |                      |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:30 PM       |                        |      |       |      |            |                      |      |       |      |            |                        |      |       |      |            |                      |      |       |      |            |            |
| 04:30 PM   | 2                      | 3    | 22    | 0    | 27         | 1                    | 109  | 2     | 0    | 112        | 43                     | 0    | 13    | 0    | 56         | 5                    | 146  | 22    | 0    | 173        | 368        |
| 04:45 PM   | 7                      | 1    | 20    | 0    | 28         | 1                    | 102  | 3     | 0    | 106        | 19                     | 0    | 2     | 0    | 21         | 12                   | 173  | 17    | 0    | 202        | 357        |
| 05:00 PM   | 7                      | 0    | 17    | 0    | 24         | 3                    | 107  | 4     | 0    | 114        | 34                     | 0    | 4     | 0    | 38         | 9                    | 167  | 15    | 0    | 191        | 367        |
| 05:15 PM   | 7                      | 1    | 14    | 0    | 22         | 0                    | 115  | 5     | 0    | 120        | 9                      | 0    | 2     | 0    | 11         | 6                    | 193  | 17    | 0    | 216        | 369        |
| Total Volume   | 23                     | 5    | 73    | 0    | 101        | 5                    | 433  | 14    | 0    | 452        | 105                    | 0    | 21    | 0    | 126        | 32                   | 679  | 71    | 0    | 782        | 1461       |
| % App. Total   | 22.8                   | 5    | 72.3  | 0    |            | 1.1                  | 95.8 | 3.1   | 0    |            | 83.3                   | 0    | 16.7  | 0    |            | 4.1                  | 86.8 | 9.1   | 0    |            |            |
| PHF  | .821                   | .417 | .830  | .000 | .902       | .417                 | .941 | .700  | .000 | .942       | .610                   | .000 | .404  | .000 | .563       | .667                 | .880 | .807  | .000 | .905       | .990       |



# JLB Traffic Engineering, Inc.

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File Name : 11 Conentry at Medical Center

Site Code : 00000011

Start Date : 12/8/2015

Page No : 1

## Groups Printed- Unshifted

| Start Time  | Medical Center<br>Westbound |      |      |            | Coventry<br>Northbound |       |      |            | Medical Cetner<br>Eastbound |       |      |            | Int. Total |
|-------------|-----------------------------|------|------|------------|------------------------|-------|------|------------|-----------------------------|-------|------|------------|------------|
|             | Left                        | Thru | Peds | App. Total | Left                   | Right | Peds | App. Total | Thru                        | Right | Peds | App. Total |            |
| 07:00 AM    | 10                          | 4    | 0    | 14         | 4                      | 8     | 0    | 12         | 16                          | 2     | 0    | 18         | 44         |
| 07:15 AM    | 7                           | 4    | 0    | 11         | 6                      | 10    | 0    | 16         | 10                          | 2     | 0    | 12         | 39         |
| 07:30 AM    | 21                          | 23   | 0    | 44         | 5                      | 15    | 0    | 20         | 12                          | 5     | 0    | 17         | 81         |
| 07:45 AM    | 10                          | 1    | 0    | 11         | 14                     | 14    | 0    | 28         | 6                           | 3     | 0    | 9          | 48         |
| Total       | 48                          | 32   | 0    | 80         | 29                     | 47    | 0    | 76         | 44                          | 12    | 0    | 56         | 212        |
| 08:00 AM    | 5                           | 3    | 0    | 8          | 10                     | 15    | 0    | 25         | 16                          | 4     | 0    | 20         | 53         |
| 08:15 AM    | 6                           | 4    | 0    | 10         | 9                      | 14    | 0    | 23         | 11                          | 1     | 0    | 12         | 45         |
| 08:30 AM    | 12                          | 5    | 0    | 17         | 8                      | 12    | 0    | 20         | 10                          | 2     | 0    | 12         | 49         |
| 08:45 AM    | 8                           | 5    | 0    | 13         | 5                      | 22    | 0    | 27         | 4                           | 1     | 0    | 5          | 45         |
| Total       | 31                          | 17   | 0    | 48         | 32                     | 63    | 0    | 95         | 41                          | 8     | 0    | 49         | 192        |
| *****       |                             |      |      |            |                        |       |      |            |                             |       |      |            |            |
| 04:00 PM    | 14                          | 4    | 0    | 18         | 4                      | 14    | 0    | 18         | 6                           | 7     | 0    | 13         | 49         |
| 04:15 PM    | 15                          | 6    | 0    | 21         | 0                      | 10    | 0    | 10         | 10                          | 5     | 0    | 15         | 46         |
| 04:30 PM    | 21                          | 6    | 0    | 27         | 2                      | 3     | 0    | 5          | 2                           | 8     | 0    | 10         | 42         |
| 04:45 PM    | 21                          | 9    | 0    | 30         | 3                      | 9     | 0    | 12         | 6                           | 9     | 0    | 15         | 57         |
| Total       | 71                          | 25   | 0    | 96         | 9                      | 36    | 0    | 45         | 24                          | 29    | 0    | 53         | 194        |
| 05:00 PM    | 21                          | 6    | 0    | 27         | 5                      | 6     | 0    | 11         | 6                           | 9     | 0    | 15         | 53         |
| 05:15 PM    | 16                          | 7    | 0    | 23         | 6                      | 5     | 0    | 11         | 4                           | 6     | 0    | 10         | 44         |
| 05:30 PM    | 9                           | 5    | 0    | 14         | 4                      | 3     | 0    | 7          | 6                           | 8     | 0    | 14         | 35         |
| 05:45 PM    | 11                          | 6    | 0    | 17         | 4                      | 8     | 0    | 12         | 11                          | 8     | 0    | 19         | 48         |
| Total       | 57                          | 24   | 0    | 81         | 19                     | 22    | 0    | 41         | 27                          | 31    | 0    | 58         | 180        |
| Grand Total | 207                         | 98   | 0    | 305        | 89                     | 168   | 0    | 257        | 136                         | 80    | 0    | 216        | 778        |
| Apprch %    | 67.9                        | 32.1 | 0    |            | 34.6                   | 65.4  | 0    |            | 63                          | 37    | 0    |            |            |
| Total %     | 26.6                        | 12.6 | 0    | 39.2       | 11.4                   | 21.6  | 0    | 33         | 17.5                        | 10.3  | 0    | 27.8       |            |

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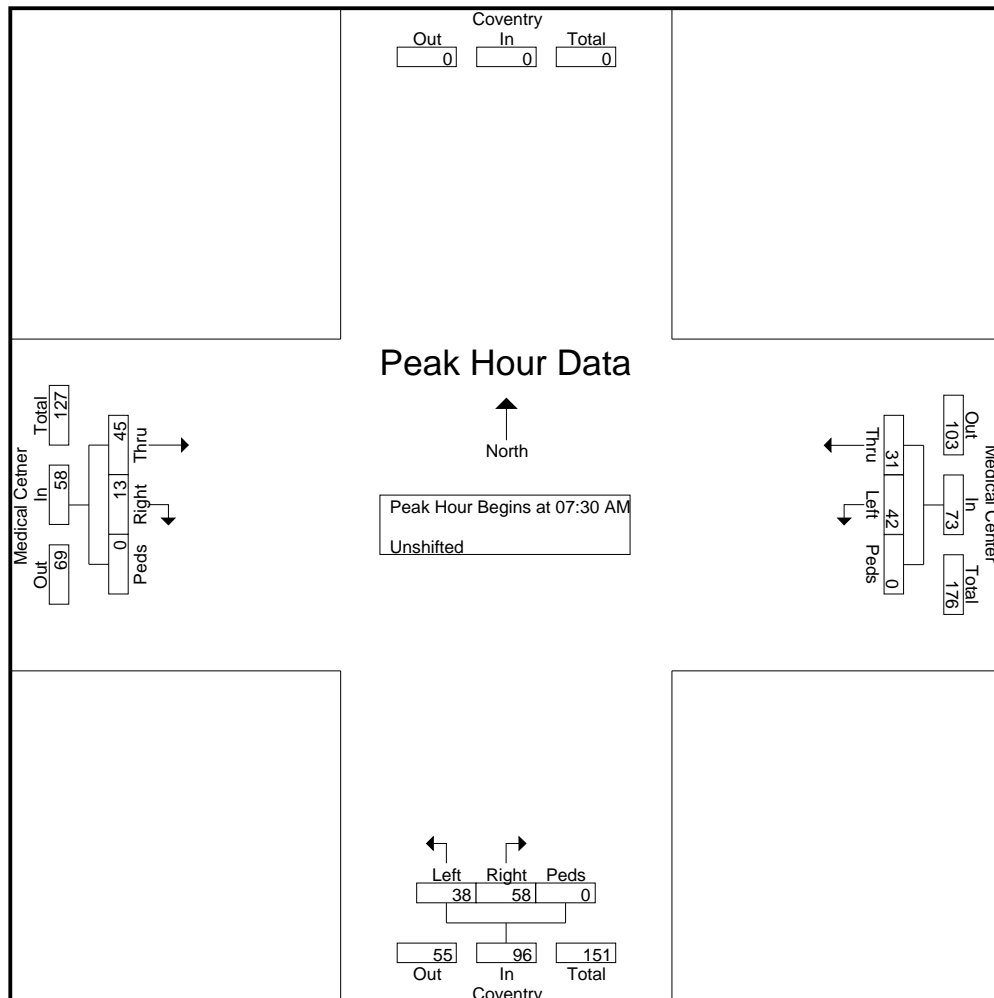
File Name : 11 Conentry at Medical Center

Site Code : 00000011

Start Date : 12/8/2015

Page No : 2

|  | Medical Center<br>Westbound |      |      |            | Coventry<br>Northbound |       |      |            | Medical Cetner<br>Eastbound |       |      |            |            |
|--|-----------------------------|------|------|------------|------------------------|-------|------|------------|-----------------------------|-------|------|------------|------------|
| Start Time   | Left                        | Thru | Peds | App. Total | Left                   | Right | Peds | App. Total | Thru                        | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                             |      |      |            |                        |       |      |            |                             |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:30 AM       |                             |      |      |            |                        |       |      |            |                             |       |      |            |            |
| 07:30 AM   | 21                          | 23   | 0    | 44         | 5                      | 15    | 0    | 20         | 12                          | 5     | 0    | 17         | 81         |
| 07:45 AM   | 10                          | 1    | 0    | 11         | 14                     | 14    | 0    | 28         | 6                           | 3     | 0    | 9          | 48         |
| 08:00 AM   | 5                           | 3    | 0    | 8          | 10                     | 15    | 0    | 25         | 16                          | 4     | 0    | 20         | 53         |
| 08:15 AM   | 6                           | 4    | 0    | 10         | 9                      | 14    | 0    | 23         | 11                          | 1     | 0    | 12         | 45         |
| Total Volume   | 42                          | 31   | 0    | 73         | 38                     | 58    | 0    | 96         | 45                          | 13    | 0    | 58         | 227        |
| % App. Total   | 57.5                        | 42.5 | 0    |            | 39.6                   | 60.4  | 0    |            | 77.6                        | 22.4  | 0    |            |            |
| PHF  | .500                        | .337 | .000 | .415       | .679                   | .967  | .000 | .857       | .703                        | .650  | .000 | .725       | .701       |



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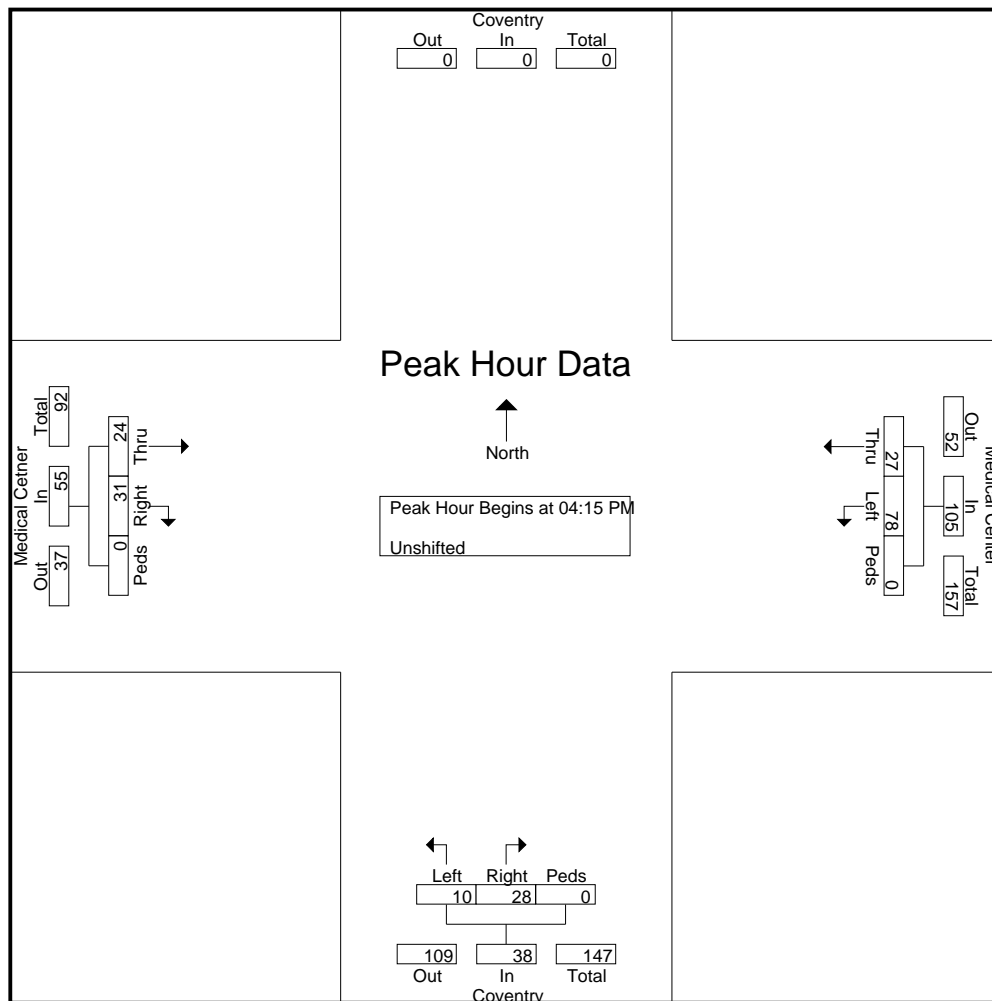
File Name : 11 Conentry at Medical Center

Site Code : 00000011

Start Date : 12/8/2015

Page No : 3

|  | Medical Center<br>Westbound |      |      |            | Coventry<br>Northbound |       |      |            | Medical Cetner<br>Eastbound |       |      |            |            |
|--|-----------------------------|------|------|------------|------------------------|-------|------|------------|-----------------------------|-------|------|------------|------------|
| Start Time   | Left                        | Thru | Peds | App. Total | Left                   | Right | Peds | App. Total | Thru                        | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                             |      |      |            |                        |       |      |            |                             |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:15 PM       |                             |      |      |            |                        |       |      |            |                             |       |      |            |            |
| 04:15 PM   | 15                          | 6    | 0    | 21         | 0                      | 10    | 0    | 10         | 10                          | 5     | 0    | 15         | 46         |
| 04:30 PM   | 21                          | 6    | 0    | 27         | 2                      | 3     | 0    | 5          | 2                           | 8     | 0    | 10         | 42         |
| 04:45 PM   | 21                          | 9    | 0    | 30         | 3                      | 9     | 0    | 12         | 6                           | 9     | 0    | 15         | 57         |
| 05:00 PM   | 21                          | 6    | 0    | 27         | 5                      | 6     | 0    | 11         | 6                           | 9     | 0    | 15         | 53         |
| Total Volume   | 78                          | 27   | 0    | 105        | 10                     | 28    | 0    | 38         | 24                          | 31    | 0    | 55         | 198        |
| % App. Total   | 74.3                        | 25.7 | 0    |            | 26.3                   | 73.7  | 0    |            | 43.6                        | 56.4  | 0    |            |            |
| PHF  | .929                        | .750 | .000 | .875       | .500                   | .700  | .000 | .792       | .600                        | .861  | .000 | .917       | .868       |



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File Name : 12 Herndon at CCMC Access Rd

Site Code : 00000000

Start Date : 12/16/2015

Page No : 1

## Groups Printed- Unshifted

|             | CCMC ACCESS RD<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | CCMC ACCESS RD<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|-------------|------------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time  | Left                         | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                         | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 1                            | 0    | 0     | 0    | 1          | 0                    | 148  | 2     | 0    | 150        | 0                            | 0    | 0     | 0    | 0          | 1                    | 67   | 0     | 0    | 68         | 219        |
| 07:15 AM    | 0                            | 0    | 0     | 0    | 0          | 0                    | 171  | 4     | 0    | 175        | 0                            | 0    | 0     | 0    | 0          | 0                    | 62   | 0     | 0    | 62         | 237        |
| 07:30 AM    | 0                            | 0    | 0     | 0    | 0          | 0                    | 236  | 4     | 0    | 240        | 0                            | 0    | 0     | 0    | 0          | 1                    | 85   | 0     | 0    | 86         | 326        |
| 07:45 AM    | 0                            | 0    | 1     | 0    | 1          | 0                    | 216  | 5     | 0    | 221        | 0                            | 0    | 0     | 0    | 0          | 2                    | 92   | 0     | 0    | 94         | 316        |
| Total       | 1                            | 0    | 1     | 0    | 2          | 0                    | 771  | 15    | 0    | 786        | 0                            | 0    | 0     | 0    | 0          | 4                    | 306  | 0     | 0    | 310        | 1098       |
| 08:00 AM    | 0                            | 0    | 1     | 0    | 1          | 0                    | 200  | 8     | 0    | 208        | 0                            | 0    | 0     | 0    | 0          | 0                    | 81   | 0     | 0    | 81         | 290        |
| 08:15 AM    | 2                            | 0    | 0     | 0    | 2          | 0                    | 184  | 10    | 0    | 194        | 0                            | 0    | 0     | 0    | 0          | 0                    | 94   | 0     | 0    | 94         | 290        |
| 08:30 AM    | 2                            | 0    | 0     | 0    | 2          | 0                    | 204  | 3     | 0    | 207        | 0                            | 0    | 0     | 0    | 0          | 1                    | 73   | 0     | 0    | 74         | 283        |
| 08:45 AM    | 2                            | 0    | 0     | 0    | 2          | 0                    | 154  | 5     | 0    | 159        | 0                            | 0    | 0     | 0    | 0          | 2                    | 76   | 0     | 0    | 78         | 239        |
| Total       | 6                            | 0    | 1     | 0    | 7          | 0                    | 742  | 26    | 0    | 768        | 0                            | 0    | 0     | 0    | 0          | 3                    | 324  | 0     | 0    | 327        | 1102       |
| *****       |                              |      |       |      |            |                      |      |       |      |            |                              |      |       |      |            |                      |      |       |      |            |            |
| 04:00 PM    | 0                            | 0    | 1     | 0    | 1          | 0                    | 103  | 2     | 0    | 105        | 0                            | 0    | 0     | 0    | 0          | 0                    | 145  | 0     | 0    | 145        | 251        |
| 04:15 PM    | 0                            | 0    | 1     | 0    | 1          | 0                    | 110  | 1     | 0    | 111        | 0                            | 0    | 0     | 0    | 0          | 0                    | 180  | 0     | 0    | 180        | 292        |
| 04:30 PM    | 2                            | 0    | 0     | 0    | 2          | 0                    | 107  | 0     | 0    | 107        | 0                            | 0    | 0     | 0    | 0          | 0                    | 177  | 0     | 0    | 177        | 286        |
| 04:45 PM    | 3                            | 0    | 0     | 0    | 3          | 0                    | 93   | 0     | 0    | 93         | 0                            | 0    | 0     | 0    | 0          | 1                    | 172  | 0     | 0    | 173        | 269        |
| Total       | 5                            | 0    | 2     | 0    | 7          | 0                    | 413  | 3     | 0    | 416        | 0                            | 0    | 0     | 0    | 0          | 1                    | 674  | 0     | 0    | 675        | 1098       |
| 05:00 PM    | 7                            | 0    | 1     | 0    | 8          | 0                    | 116  | 0     | 0    | 116        | 0                            | 0    | 0     | 0    | 0          | 1                    | 190  | 0     | 0    | 191        | 315        |
| 05:15 PM    | 4                            | 0    | 0     | 0    | 4          | 0                    | 130  | 0     | 0    | 130        | 0                            | 0    | 0     | 0    | 0          | 2                    | 178  | 0     | 0    | 180        | 314        |
| 05:30 PM    | 2                            | 0    | 1     | 0    | 3          | 0                    | 106  | 3     | 0    | 109        | 0                            | 0    | 0     | 0    | 0          | 1                    | 183  | 0     | 0    | 184        | 296        |
| 05:45 PM    | 3                            | 0    | 0     | 0    | 3          | 0                    | 108  | 1     | 0    | 109        | 0                            | 0    | 0     | 0    | 0          | 1                    | 160  | 0     | 0    | 161        | 273        |
| Total       | 16                           | 0    | 2     | 0    | 18         | 0                    | 460  | 4     | 0    | 464        | 0                            | 0    | 0     | 0    | 0          | 5                    | 711  | 0     | 0    | 716        | 1198       |
| Grand Total | 28                           | 0    | 6     | 0    | 34         | 0                    | 2386 | 48    | 0    | 2434       | 0                            | 0    | 0     | 0    | 0          | 13                   | 2015 | 0     | 0    | 2028       | 4496       |
| Apprch %    | 82.4                         | 0    | 17.6  | 0    |            | 0                    | 98   | 2     | 0    |            | 0                            | 0    | 0     | 0    |            | 0.6                  | 99.4 | 0     | 0    |            |            |
| Total %     | 0.6                          | 0    | 0.1   | 0    | 0.8        | 0                    | 53.1 | 1.1   | 0    | 54.1       | 0                            | 0    | 0     | 0    | 0          | 0.3                  | 44.8 | 0     | 0    | 45.1       |            |

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File Name : 12 Herndon at CCMC Access Rd

Site Code : 00000000

Start Date : 12/16/2015

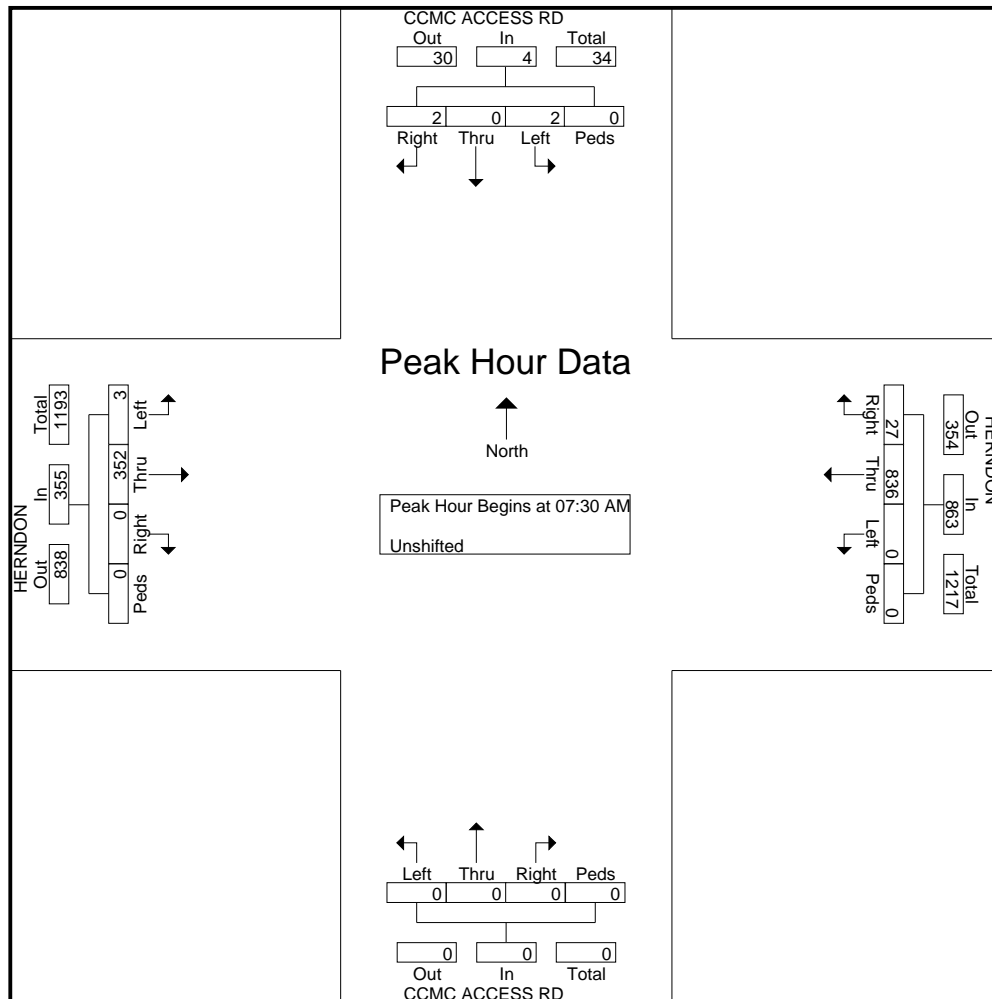
Page No : 2

|            | CCMC ACCESS RD<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | CCMC ACCESS RD<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|------------|------------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time | Left                         | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                         | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

|              |      |      |          |      |      |      |            |           |      |            |      |      |      |      |      |      |           |      |      |           |            |
|--------------|------|------|----------|------|------|------|------------|-----------|------|------------|------|------|------|------|------|------|-----------|------|------|-----------|------------|
| 07:30 AM     | 0    | 0    | 0        | 0    | 0    | 0    | <b>236</b> | 4         | 0    | <b>240</b> | 0    | 0    | 0    | 0    | 0    | 1    | 85        | 0    | 0    | 86        | <b>326</b> |
| 07:45 AM     | 0    | 0    | <b>1</b> | 0    | 1    | 0    | 216        | 5         | 0    | 221        | 0    | 0    | 0    | 0    | 0    | 2    | 92        | 0    | 0    | <b>94</b> | 316        |
| 08:00 AM     | 0    | 0    | 1        | 0    | 1    | 0    | 200        | 8         | 0    | 208        | 0    | 0    | 0    | 0    | 0    | 0    | 81        | 0    | 0    | 81        | 290        |
| 08:15 AM     | 2    | 0    | 0        | 0    | 2    | 0    | 184        | <b>10</b> | 0    | 194        | 0    | 0    | 0    | 0    | 0    | 0    | <b>94</b> | 0    | 0    | 94        | 290        |
| Total Volume | 2    | 0    | 2        | 0    | 4    | 0    | 836        | 27        | 0    | 863        | 0    | 0    | 0    | 0    | 0    | 3    | 352       | 0    | 0    | 355       | 1222       |
| % App. Total | 50   | 0    | 50       | 0    |      | 0    | 96.9       | 3.1       | 0    |            | 0    | 0    | 0    | 0    |      | 0.8  | 99.2      | 0    | 0    |           |            |
| PHF          | .250 | .000 | .500     | .000 | .500 | .000 | .886       | .675      | .000 | .899       | .000 | .000 | .000 | .000 | .000 | .375 | .936      | .000 | .000 | .944      | .937       |





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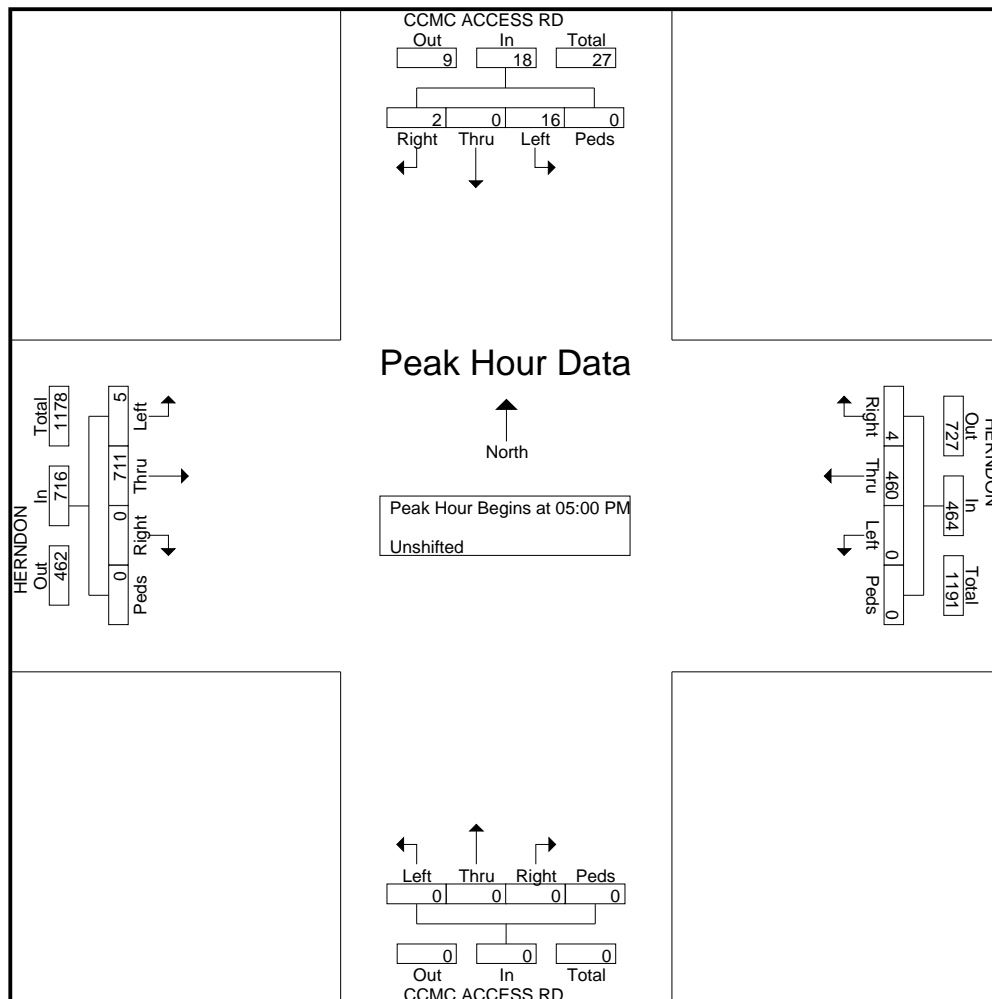
File Name : 12 Herndon at CCMC Access Rd

Site Code : 00000000

Start Date : 12/16/2015

Page No : 3

|  | CCMC ACCESS RD<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | CCMC ACCESS RD<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|--|------------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time   | Left                         | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                         | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                              |      |       |      |            |                      |      |       |      |            |                              |      |       |      |            |                      |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                              |      |       |      |            |                      |      |       |      |            |                              |      |       |      |            |                      |      |       |      |            |            |
| 05:00 PM   | 7                            | 0    | 1     | 0    | 8          | 0                    | 116  | 0     | 0    | 116        | 0                            | 0    | 0     | 0    | 0          | 1                    | 190  | 0     | 0    | 191        | 315        |
| 05:15 PM   | 4                            | 0    | 0     | 0    | 4          | 0                    | 130  | 0     | 0    | 130        | 0                            | 0    | 0     | 0    | 0          | 2                    | 178  | 0     | 0    | 180        | 314        |
| 05:30 PM   | 2                            | 0    | 1     | 0    | 3          | 0                    | 106  | 3     | 0    | 109        | 0                            | 0    | 0     | 0    | 0          | 1                    | 183  | 0     | 0    | 184        | 296        |
| 05:45 PM   | 3                            | 0    | 0     | 0    | 3          | 0                    | 108  | 1     | 0    | 109        | 0                            | 0    | 0     | 0    | 0          | 1                    | 160  | 0     | 0    | 161        | 273        |
| Total Volume   | 16                           | 0    | 2     | 0    | 18         | 0                    | 460  | 4     | 0    | 464        | 0                            | 0    | 0     | 0    | 0          | 5                    | 711  | 0     | 0    | 716        | 1198       |
| % App. Total   | 88.9                         | 0    | 11.1  | 0    |            | 0                    | 99.1 | 0.9   | 0    |            | 0                            | 0    | 0     | 0    |            | 0.7                  | 99.3 | 0     | 0    |            |            |
| PHF  | .571                         | .000 | .500  | .000 | .563       | .000                 | .885 | .333  | .000 | .892       | .000                         | .000 | .000  | .000 | .000       | .625                 | .936 | .000  | .000 | .937       | .951       |



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File Name : 13 Herndon at Locan

Site Code : 00000000

Start Date : 12/15/2015

Page No : 1

## Groups Printed- Unshifted

|             | LOCAN<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | LOCAN<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|-------------|---------------------|------|-------|------|------------|----------------------|------|-------|------|------------|---------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time  | Left                | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 0                   | 0    | 0     | 0    | 0          | 8                    | 118  | 0     | 0    | 126        | 40                  | 0    | 1     | 0    | 41         | 0                    | 48   | 17    | 0    | 65         | 232        |
| 07:15 AM    | 0                   | 0    | 0     | 0    | 0          | 7                    | 136  | 0     | 0    | 143        | 41                  | 0    | 2     | 0    | 43         | 0                    | 54   | 6     | 0    | 60         | 246        |
| 07:30 AM    | 0                   | 0    | 0     | 0    | 0          | 16                   | 171  | 0     | 0    | 187        | 43                  | 0    | 1     | 0    | 44         | 0                    | 68   | 18    | 0    | 86         | 317        |
| 07:45 AM    | 0                   | 0    | 0     | 0    | 0          | 7                    | 163  | 0     | 0    | 170        | 47                  | 0    | 5     | 0    | 52         | 0                    | 51   | 21    | 0    | 72         | 294        |
| Total       | 0                   | 0    | 0     | 0    | 0          | 38                   | 588  | 0     | 0    | 626        | 171                 | 0    | 9     | 0    | 180        | 0                    | 221  | 62    | 0    | 283        | 1089       |
| 08:00 AM    | 0                   | 0    | 0     | 0    | 0          | 6                    | 135  | 0     | 0    | 141        | 45                  | 0    | 6     | 0    | 51         | 0                    | 55   | 19    | 0    | 74         | 266        |
| 08:15 AM    | 0                   | 0    | 0     | 0    | 0          | 15                   | 152  | 0     | 0    | 167        | 38                  | 0    | 3     | 0    | 41         | 0                    | 70   | 21    | 0    | 91         | 299        |
| 08:30 AM    | 0                   | 0    | 0     | 0    | 0          | 8                    | 134  | 0     | 0    | 142        | 33                  | 0    | 4     | 0    | 37         | 0                    | 58   | 36    | 0    | 94         | 273        |
| 08:45 AM    | 0                   | 0    | 0     | 0    | 0          | 1                    | 127  | 0     | 0    | 128        | 38                  | 0    | 0     | 0    | 38         | 0                    | 63   | 19    | 0    | 82         | 248        |
| Total       | 0                   | 0    | 0     | 0    | 0          | 30                   | 548  | 0     | 0    | 578        | 154                 | 0    | 13    | 0    | 167        | 0                    | 246  | 95    | 0    | 341        | 1086       |
| *****       |                     |      |       |      |            |                      |      |       |      |            |                     |      |       |      |            |                      |      |       |      |            |            |
| 04:00 PM    | 0                   | 0    | 0     | 0    | 0          | 4                    | 102  | 0     | 0    | 106        | 19                  | 0    | 5     | 0    | 24         | 0                    | 110  | 31    | 0    | 141        | 271        |
| 04:15 PM    | 0                   | 0    | 0     | 0    | 0          | 10                   | 92   | 0     | 0    | 102        | 24                  | 0    | 3     | 0    | 27         | 0                    | 115  | 43    | 0    | 158        | 287        |
| 04:30 PM    | 0                   | 0    | 0     | 0    | 0          | 3                    | 70   | 0     | 0    | 73         | 35                  | 0    | 7     | 0    | 42         | 0                    | 128  | 38    | 0    | 166        | 281        |
| 04:45 PM    | 0                   | 0    | 0     | 0    | 0          | 6                    | 100  | 0     | 0    | 106        | 24                  | 0    | 10    | 0    | 34         | 0                    | 148  | 46    | 0    | 194        | 334        |
| Total       | 0                   | 0    | 0     | 0    | 0          | 23                   | 364  | 0     | 0    | 387        | 102                 | 0    | 25    | 0    | 127        | 0                    | 501  | 158   | 0    | 659        | 1173       |
| 05:00 PM    | 0                   | 0    | 0     | 0    | 0          | 5                    | 100  | 0     | 0    | 105        | 23                  | 0    | 5     | 0    | 28         | 0                    | 145  | 61    | 0    | 206        | 339        |
| 05:15 PM    | 0                   | 0    | 0     | 0    | 0          | 6                    | 87   | 0     | 0    | 93         | 17                  | 0    | 7     | 0    | 24         | 0                    | 163  | 49    | 0    | 212        | 329        |
| 05:30 PM    | 0                   | 0    | 0     | 0    | 0          | 2                    | 100  | 0     | 0    | 102        | 21                  | 0    | 8     | 0    | 29         | 0                    | 139  | 52    | 0    | 191        | 322        |
| 05:45 PM    | 0                   | 0    | 0     | 0    | 0          | 12                   | 71   | 0     | 0    | 83         | 19                  | 0    | 3     | 0    | 22         | 0                    | 135  | 53    | 0    | 188        | 293        |
| Total       | 0                   | 0    | 0     | 0    | 0          | 25                   | 358  | 0     | 0    | 383        | 80                  | 0    | 23    | 0    | 103        | 0                    | 582  | 215   | 0    | 797        | 1283       |
| Grand Total | 0                   | 0    | 0     | 0    | 0          | 116                  | 1858 | 0     | 0    | 1974       | 507                 | 0    | 70    | 0    | 577        | 0                    | 1550 | 530   | 0    | 2080       | 4631       |
| Apprch %    | 0                   | 0    | 0     | 0    |            | 5.9                  | 94.1 | 0     | 0    |            | 87.9                | 0    | 12.1  | 0    |            | 0                    | 74.5 | 25.5  | 0    |            |            |
| Total %     | 0                   | 0    | 0     | 0    | 0          | 2.5                  | 40.1 | 0     | 0    | 42.6       | 10.9                | 0    | 1.5   | 0    | 12.5       | 0                    | 33.5 | 11.4  | 0    | 44.9       |            |

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File Name : 13 Herndon at Locan

Site Code : 00000000

Start Date : 12/15/2015

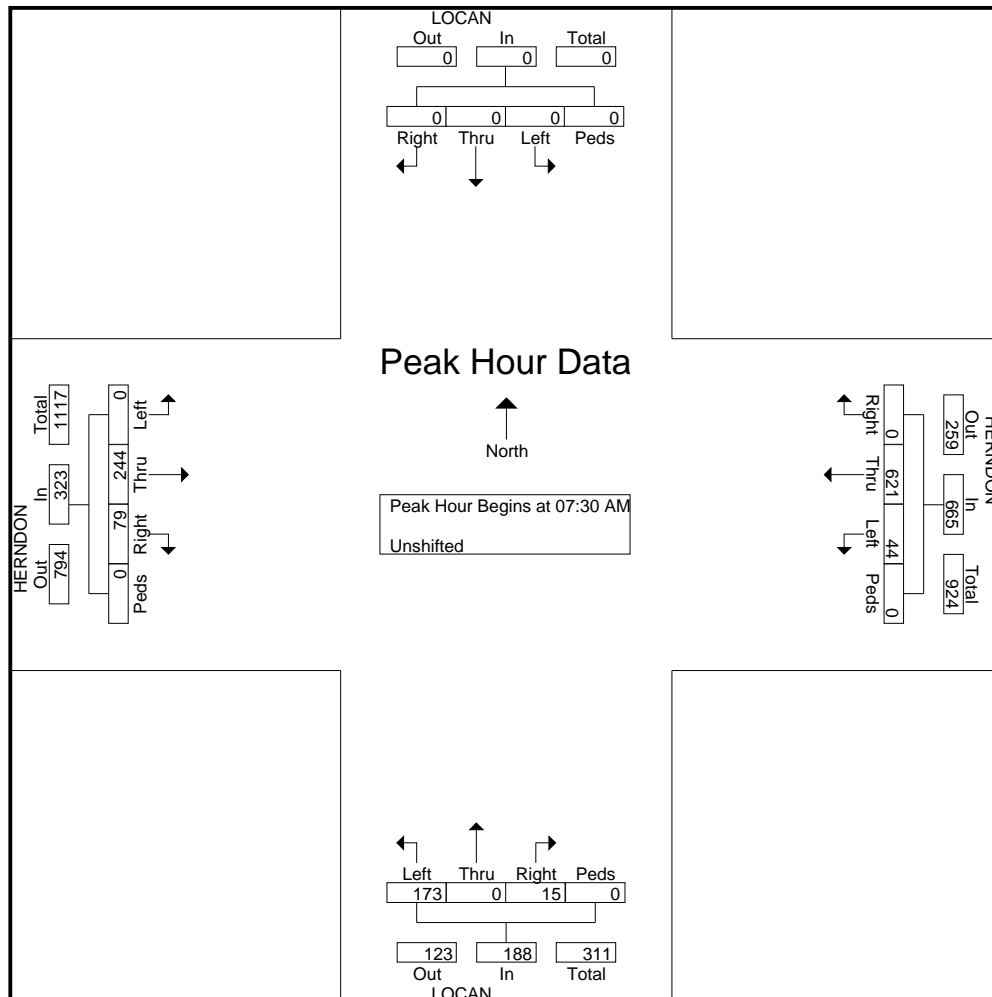
Page No : 2

| Start Time | LOCAN Southbound |      |       |      |            | HERNDON Westbound |      |       |      |            | LOCAN Northbound |      |       |      |            | HERNDON Eastbound |      |       |      |            | Int. Total |
|------------|------------------|------|-------|------|------------|-------------------|------|-------|------|------------|------------------|------|-------|------|------------|-------------------|------|-------|------|------------|------------|
|            | Left             | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total | Left             | Thru | Right | Peds | App. Total | Left              | Thru | Right | Peds | App. Total |            |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:30 AM     | 0    | 0    | 0    | 0    | 0    | 16   | 171  | 0    | 0    | 187  | 43   | 0    | 1    | 0    | 44   | 0    | 68   | 18   | 0    | 86   | 317  |
| 07:45 AM     | 0    | 0    | 0    | 0    | 0    | 7    | 163  | 0    | 0    | 170  | 47   | 0    | 5    | 0    | 52   | 0    | 51   | 21   | 0    | 72   | 294  |
| 08:00 AM     | 0    | 0    | 0    | 0    | 0    | 6    | 135  | 0    | 0    | 141  | 45   | 0    | 6    | 0    | 51   | 0    | 55   | 19   | 0    | 74   | 266  |
| 08:15 AM     | 0    | 0    | 0    | 0    | 0    | 15   | 152  | 0    | 0    | 167  | 38   | 0    | 3    | 0    | 41   | 0    | 70   | 21   | 0    | 91   | 299  |
| Total Volume | 0    | 0    | 0    | 0    | 0    | 44   | 621  | 0    | 0    | 665  | 173  | 0    | 15   | 0    | 188  | 0    | 244  | 79   | 0    | 323  | 1176 |
| % App. Total | 0    | 0    | 0    | 0    | 0    | 6.6  | 93.4 | 0    | 0    | 0    | 92   | 0    | 8    | 0    | 0    | 0    | 75.5 | 24.5 | 0    | 0    | 0    |
| PHF          | .000 | .000 | .000 | .000 | .000 | .688 | .908 | .000 | .000 | .889 | .920 | .000 | .625 | .000 | .904 | .000 | .871 | .940 | .000 | .887 | .927 |



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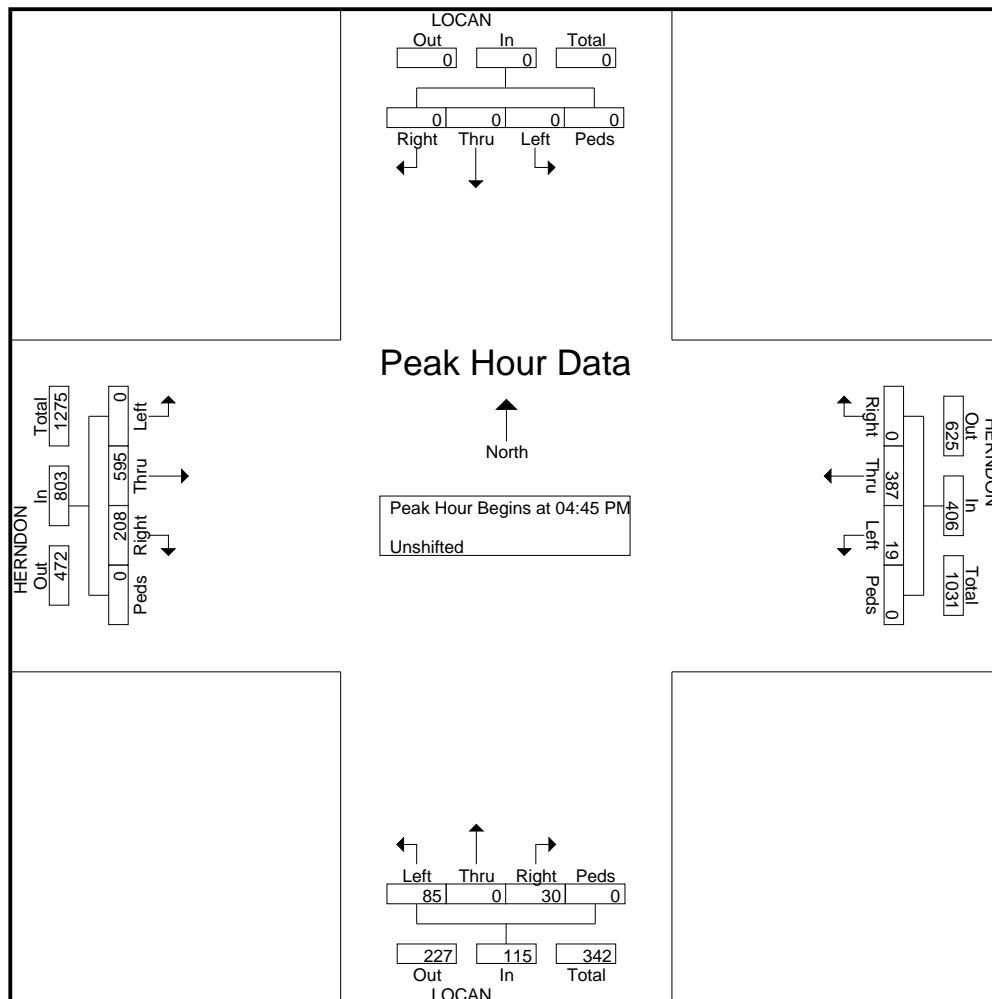
File Name : 13 Herndon at Locan

Site Code : 00000000

Start Date : 12/15/2015

Page No : 3

|  | LOCAN<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | LOCAN<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|--|---------------------|------|-------|------|------------|----------------------|------|-------|------|------------|---------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time   | Left                | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                     |      |       |      |            |                      |      |       |      |            |                     |      |       |      |            |                      |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:45 PM       |                     |      |       |      |            |                      |      |       |      |            |                     |      |       |      |            |                      |      |       |      |            |            |
| 04:45 PM   | 0                   | 0    | 0     | 0    | 0          | 6                    | 100  | 0     | 0    | 106        | 24                  | 0    | 10    | 0    | 34         | 0                    | 148  | 46    | 0    | 194        | 334        |
| 05:00 PM   | 0                   | 0    | 0     | 0    | 0          | 5                    | 100  | 0     | 0    | 105        | 23                  | 0    | 5     | 0    | 28         | 0                    | 145  | 61    | 0    | 206        | 339        |
| 05:15 PM   | 0                   | 0    | 0     | 0    | 0          | 6                    | 87   | 0     | 0    | 93         | 17                  | 0    | 7     | 0    | 24         | 0                    | 163  | 49    | 0    | 212        | 329        |
| 05:30 PM   | 0                   | 0    | 0     | 0    | 0          | 2                    | 100  | 0     | 0    | 102        | 21                  | 0    | 8     | 0    | 29         | 0                    | 139  | 52    | 0    | 191        | 322        |
| Total Volume   | 0                   | 0    | 0     | 0    | 0          | 19                   | 387  | 0     | 0    | 406        | 85                  | 0    | 30    | 0    | 115        | 0                    | 595  | 208   | 0    | 803        | 1324       |
| % App. Total   | 0                   | 0    | 0     | 0    | 0          | 4.7                  | 95.3 | 0     | 0    | 0          | 73.9                | 0    | 26.1  | 0    | 0          | 0                    | 74.1 | 25.9  | 0    | 0          | 0          |
| PHF  | .000                | .000 | .000  | .000 | .000       | .792                 | .968 | .000  | .000 | .958       | .885                | .000 | .750  | .000 | .846       | .000                 | .913 | .852  | .000 | .947       | .976       |



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File Name : Herndon Dewolf north leg

Site Code : 00000000

Start Date : 1/12/2016

Page No : 1

## Groups Printed- Unshifted

| Start Time  | DEWOLF<br>Southbound |       |      |            | HERNDON<br>Westbound |       |      |            | HERNDON<br>Eastbound |      |      |            | Int. Total |
|-------------|----------------------|-------|------|------------|----------------------|-------|------|------------|----------------------|------|------|------------|------------|
|             | Left                 | Right | Peds | App. Total | Thru                 | Right | Peds | App. Total | Left                 | Thru | Peds | App. Total |            |
| 07:00 AM    | 2                    | 7     | 0    | 9          | 111                  | 1     | 0    | 112        | 3                    | 58   | 0    | 61         | 182        |
| 07:15 AM    | 7                    | 13    | 0    | 20         | 142                  | 7     | 0    | 149        | 8                    | 56   | 0    | 64         | 233        |
| 07:30 AM    | 4                    | 14    | 0    | 18         | 181                  | 4     | 0    | 185        | 8                    | 57   | 0    | 65         | 268        |
| 07:45 AM    | 3                    | 19    | 0    | 22         | 150                  | 3     | 0    | 153        | 5                    | 48   | 0    | 53         | 228        |
| Total       | 16                   | 53    | 0    | 69         | 584                  | 15    | 0    | 599        | 24                   | 219  | 0    | 243        | 911        |
| 08:00 AM    | 4                    | 14    | 0    | 18         | 159                  | 1     | 0    | 160        | 5                    | 59   | 0    | 64         | 242        |
| 08:15 AM    | 5                    | 9     | 0    | 14         | 167                  | 4     | 0    | 171        | 13                   | 70   | 0    | 83         | 268        |
| 08:30 AM    | 1                    | 9     | 0    | 10         | 131                  | 2     | 0    | 133        | 9                    | 65   | 0    | 74         | 217        |
| 08:45 AM    | 1                    | 10    | 0    | 11         | 104                  | 1     | 0    | 105        | 5                    | 50   | 0    | 55         | 171        |
| Total       | 11                   | 42    | 0    | 53         | 561                  | 8     | 0    | 569        | 32                   | 244  | 0    | 276        | 898        |
| *****       |                      |       |      |            |                      |       |      |            |                      |      |      |            |            |
| 04:00 PM    | 2                    | 10    | 0    | 12         | 87                   | 5     | 0    | 92         | 11                   | 110  | 0    | 121        | 225        |
| 04:15 PM    | 1                    | 9     | 0    | 10         | 88                   | 3     | 0    | 91         | 8                    | 141  | 0    | 149        | 250        |
| 04:30 PM    | 4                    | 9     | 0    | 13         | 92                   | 3     | 0    | 95         | 9                    | 127  | 0    | 136        | 244        |
| 04:45 PM    | 7                    | 10    | 0    | 17         | 83                   | 3     | 0    | 86         | 14                   | 129  | 0    | 143        | 246        |
| Total       | 14                   | 38    | 0    | 52         | 350                  | 14    | 0    | 364        | 42                   | 507  | 0    | 549        | 965        |
| 05:00 PM    | 1                    | 10    | 0    | 11         | 107                  | 1     | 0    | 108        | 12                   | 146  | 0    | 158        | 277        |
| 05:15 PM    | 1                    | 11    | 0    | 12         | 79                   | 2     | 0    | 81         | 16                   | 157  | 0    | 173        | 266        |
| 05:30 PM    | 4                    | 11    | 0    | 15         | 74                   | 4     | 0    | 78         | 11                   | 132  | 0    | 143        | 236        |
| 05:45 PM    | 7                    | 8     | 0    | 15         | 72                   | 2     | 0    | 74         | 10                   | 137  | 0    | 147        | 236        |
| Total       | 13                   | 40    | 0    | 53         | 332                  | 9     | 0    | 341        | 49                   | 572  | 0    | 621        | 1015       |
| Grand Total | 54                   | 173   | 0    | 227        | 1827                 | 46    | 0    | 1873       | 147                  | 1542 | 0    | 1689       | 3789       |
| Apprch %    | 23.8                 | 76.2  | 0    |            | 97.5                 | 2.5   | 0    |            | 8.7                  | 91.3 | 0    |            |            |
| Total %     | 1.4                  | 4.6   | 0    | 6          | 48.2                 | 1.2   | 0    | 49.4       | 3.9                  | 40.7 | 0    | 44.6       |            |

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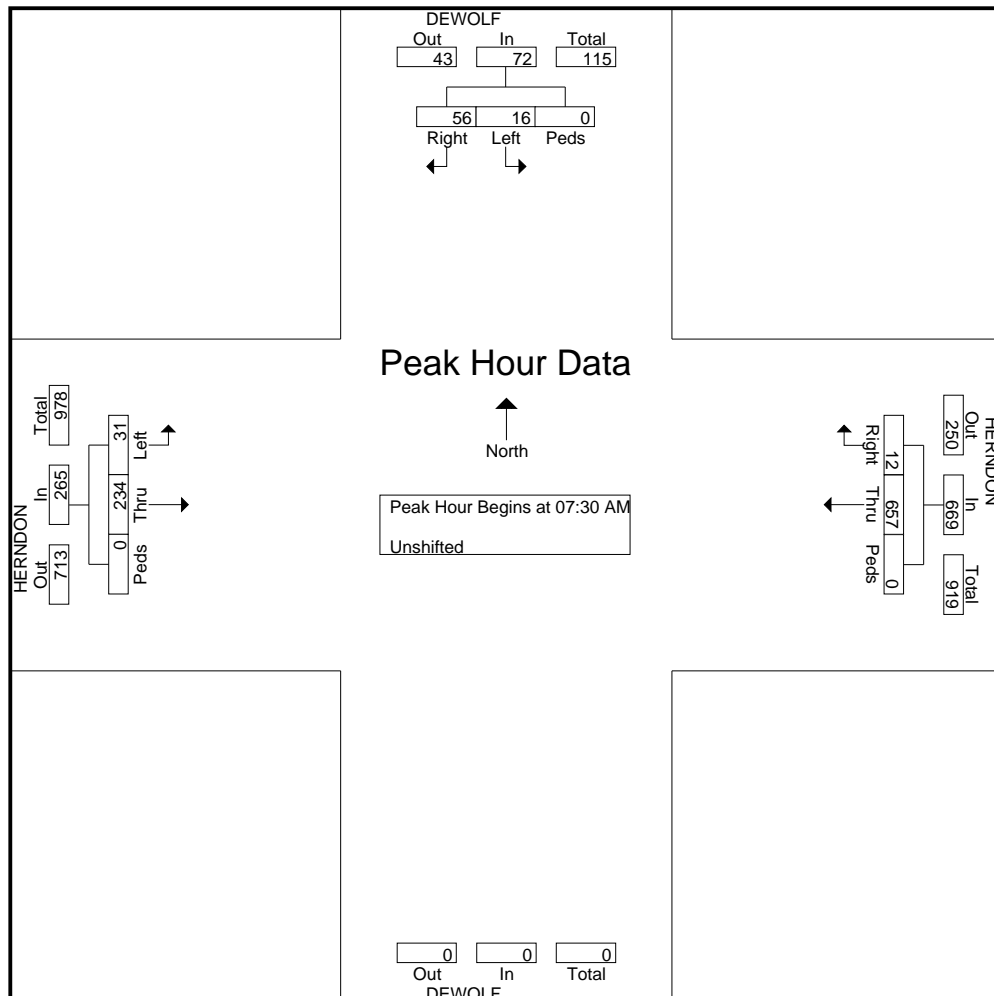
File Name : Herndon Dewolf north leg

Site Code : 00000000

Start Date : 1/12/2016

Page No : 2

|  | DEWOLF<br>Southbound |       |      |            | HERNDON<br>Westbound |       |      |            | HERNDON<br>Eastbound |      |      |            |            |
|--|----------------------|-------|------|------------|----------------------|-------|------|------------|----------------------|------|------|------------|------------|
| Start Time   | Left                 | Right | Peds | App. Total | Thru                 | Right | Peds | App. Total | Left                 | Thru | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 |                      |       |      |            |                      |       |      |            |                      |      |      |            |            |
| Peak Hour for Entire Intersection Begins at 07:30 AM       |                      |       |      |            |                      |       |      |            |                      |      |      |            |            |
| 07:30 AM   | 4                    | 14    | 0    | 18         | 181                  | 4     | 0    | 185        | 8                    | 57   | 0    | 65         | 268        |
| 07:45 AM   | 3                    | 19    | 0    | 22         | 150                  | 3     | 0    | 153        | 5                    | 48   | 0    | 53         | 228        |
| 08:00 AM   | 4                    | 14    | 0    | 18         | 159                  | 1     | 0    | 160        | 5                    | 59   | 0    | 64         | 242        |
| 08:15 AM   | 5                    | 9     | 0    | 14         | 167                  | 4     | 0    | 171        | 13                   | 70   | 0    | 83         | 268        |
| Total Volume   | 16                   | 56    | 0    | 72         | 657                  | 12    | 0    | 669        | 31                   | 234  | 0    | 265        | 1006       |
| % App. Total   | 22.2                 | 77.8  | 0    |            | 98.2                 | 1.8   | 0    |            | 11.7                 | 88.3 | 0    |            |            |
| PHF  | .800                 | .737  | .000 | .818       | .907                 | .750  | .000 | .904       | .596                 | .836 | .000 | .798       | .938       |



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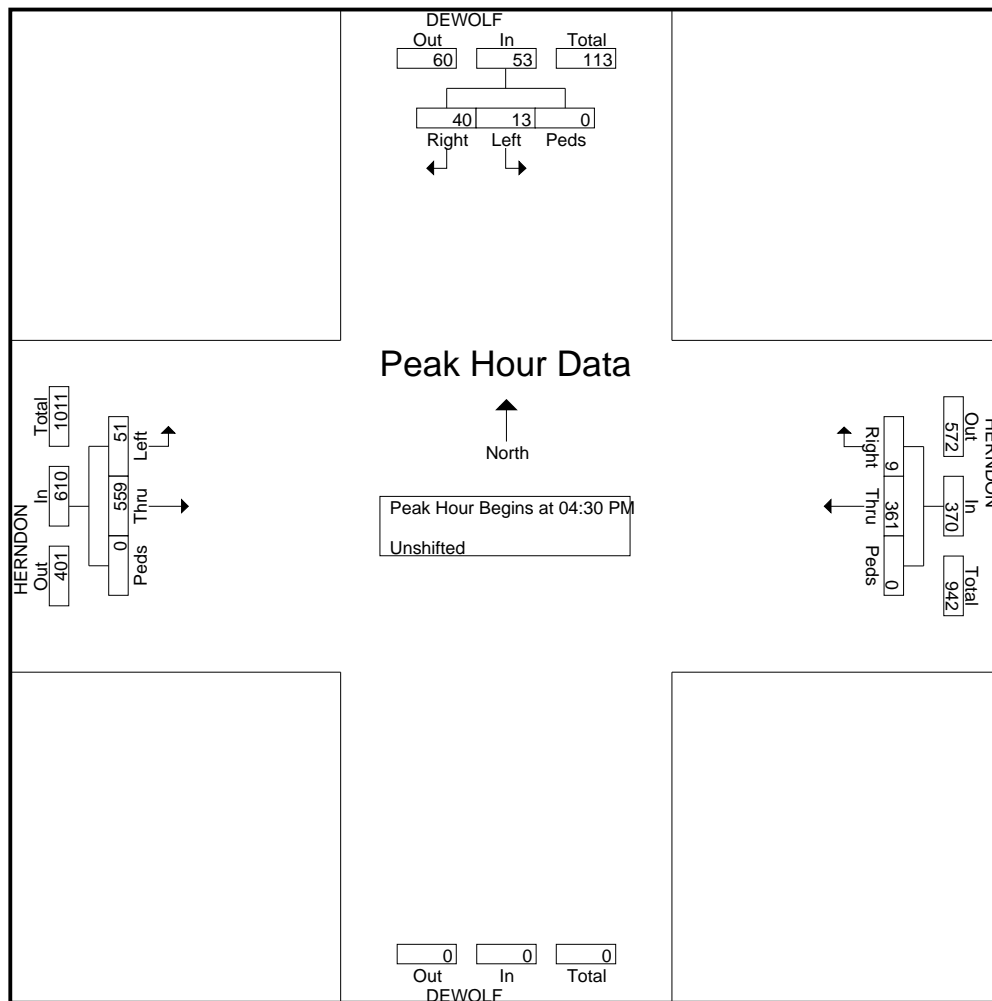
File Name : Herndon Dewolf north leg

Site Code : 00000000

Start Date : 1/12/2016

Page No : 3

|  | DEWOLF<br>Southbound |       |      |            | HERNDON<br>Westbound |       |      |            | HERNDON<br>Eastbound |      |      |            |            |
|--|----------------------|-------|------|------------|----------------------|-------|------|------------|----------------------|------|------|------------|------------|
| Start Time   | Left                 | Right | Peds | App. Total | Thru                 | Right | Peds | App. Total | Left                 | Thru | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                      |       |      |            |                      |       |      |            |                      |      |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:30 PM       |                      |       |      |            |                      |       |      |            |                      |      |      |            |            |
| 04:30 PM   | 4                    | 9     | 0    | 13         | 92                   | 3     | 0    | 95         | 9                    | 127  | 0    | 136        | 244        |
| 04:45 PM   | 7                    | 10    | 0    | 17         | 83                   | 3     | 0    | 86         | 14                   | 129  | 0    | 143        | 246        |
| 05:00 PM   | 1                    | 10    | 0    | 11         | 107                  | 1     | 0    | 108        | 12                   | 146  | 0    | 158        | 277        |
| 05:15 PM   | 1                    | 11    | 0    | 12         | 79                   | 2     | 0    | 81         | 16                   | 157  | 0    | 173        | 266        |
| Total Volume   | 13                   | 40    | 0    | 53         | 361                  | 9     | 0    | 370        | 51                   | 559  | 0    | 610        | 1033       |
| % App. Total   | 24.5                 | 75.5  | 0    |            | 97.6                 | 2.4   | 0    |            | 8.4                  | 91.6 | 0    |            |            |
| PHF  | .464                 | .909  | .000 | .779       | .843                 | .750  | .000 | .856       | .797                 | .890 | .000 | .882       | .932       |



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File Name : 15 Herndon at Dewolf south leg

Site Code : 00000000

Start Date : 1/12/2016

Page No : 1

## Groups Printed- Unshifted

|             | HERNDON<br>Westbound |      |      |            | DE WOLF<br>Northbound |       |      |            | HERNDON<br>Eastbound |       |      |            |            |
|-------------|----------------------|------|------|------------|-----------------------|-------|------|------------|----------------------|-------|------|------------|------------|
| Start Time  | Left                 | Thru | Peds | App. Total | Left                  | Right | Peds | App. Total | Thru                 | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 2                    | 80   | 0    | 82         | 33                    | 2     | 0    | 35         | 34                   | 28    | 0    | 62         | 179        |
| 07:15 AM    | 1                    | 109  | 0    | 110        | 43                    | 1     | 0    | 44         | 32                   | 31    | 0    | 63         | 217        |
| 07:30 AM    | 1                    | 148  | 0    | 149        | 44                    | 0     | 0    | 44         | 37                   | 23    | 0    | 60         | 253        |
| 07:45 AM    | 1                    | 118  | 0    | 119        | 38                    | 2     | 0    | 40         | 31                   | 19    | 0    | 50         | 209        |
| Total       | 5                    | 455  | 0    | 460        | 158                   | 5     | 0    | 163        | 134                  | 101   | 0    | 235        | 858        |
| 08:00 AM    | 1                    | 120  | 0    | 121        | 39                    | 2     | 0    | 41         | 42                   | 22    | 0    | 64         | 226        |
| 08:15 AM    | 0                    | 129  | 0    | 129        | 38                    | 1     | 0    | 39         | 55                   | 18    | 0    | 73         | 241        |
| 08:30 AM    | 0                    | 104  | 0    | 104        | 34                    | 0     | 0    | 34         | 38                   | 26    | 0    | 64         | 202        |
| 08:45 AM    | 0                    | 80   | 0    | 80         | 21                    | 2     | 0    | 23         | 43                   | 13    | 0    | 56         | 159        |
| Total       | 1                    | 433  | 0    | 434        | 132                   | 5     | 0    | 137        | 178                  | 79    | 0    | 257        | 828        |
| *****       |                      |      |      |            |                       |       |      |            |                      |       |      |            |            |
| 04:00 PM    | 1                    | 62   | 0    | 63         | 30                    | 0     | 0    | 30         | 77                   | 34    | 0    | 111        | 204        |
| 04:15 PM    | 0                    | 63   | 0    | 63         | 25                    | 0     | 0    | 25         | 102                  | 39    | 0    | 141        | 229        |
| 04:30 PM    | 1                    | 77   | 0    | 78         | 21                    | 1     | 0    | 22         | 111                  | 23    | 0    | 134        | 234        |
| 04:45 PM    | 1                    | 51   | 0    | 52         | 34                    | 4     | 0    | 38         | 97                   | 35    | 0    | 132        | 222        |
| Total       | 3                    | 253  | 0    | 256        | 110                   | 5     | 0    | 115        | 387                  | 131   | 0    | 518        | 889        |
| 05:00 PM    | 1                    | 59   | 0    | 60         | 43                    | 0     | 0    | 43         | 104                  | 43    | 0    | 147        | 250        |
| 05:15 PM    | 1                    | 47   | 0    | 48         | 34                    | 4     | 0    | 38         | 113                  | 43    | 0    | 156        | 242        |
| 05:30 PM    | 1                    | 61   | 0    | 62         | 16                    | 2     | 0    | 18         | 103                  | 32    | 0    | 135        | 215        |
| 05:45 PM    | 4                    | 56   | 0    | 60         | 20                    | 1     | 0    | 21         | 108                  | 39    | 0    | 147        | 228        |
| Total       | 7                    | 223  | 0    | 230        | 113                   | 7     | 0    | 120        | 428                  | 157   | 0    | 585        | 935        |
| Grand Total | 16                   | 1364 | 0    | 1380       | 513                   | 22    | 0    | 535        | 1127                 | 468   | 0    | 1595       | 3510       |
| Apprch %    | 1.2                  | 98.8 | 0    |            | 95.9                  | 4.1   | 0    |            | 70.7                 | 29.3  | 0    |            |            |
| Total %     | 0.5                  | 38.9 | 0    | 39.3       | 14.6                  | 0.6   | 0    | 15.2       | 32.1                 | 13.3  | 0    | 45.4       |            |



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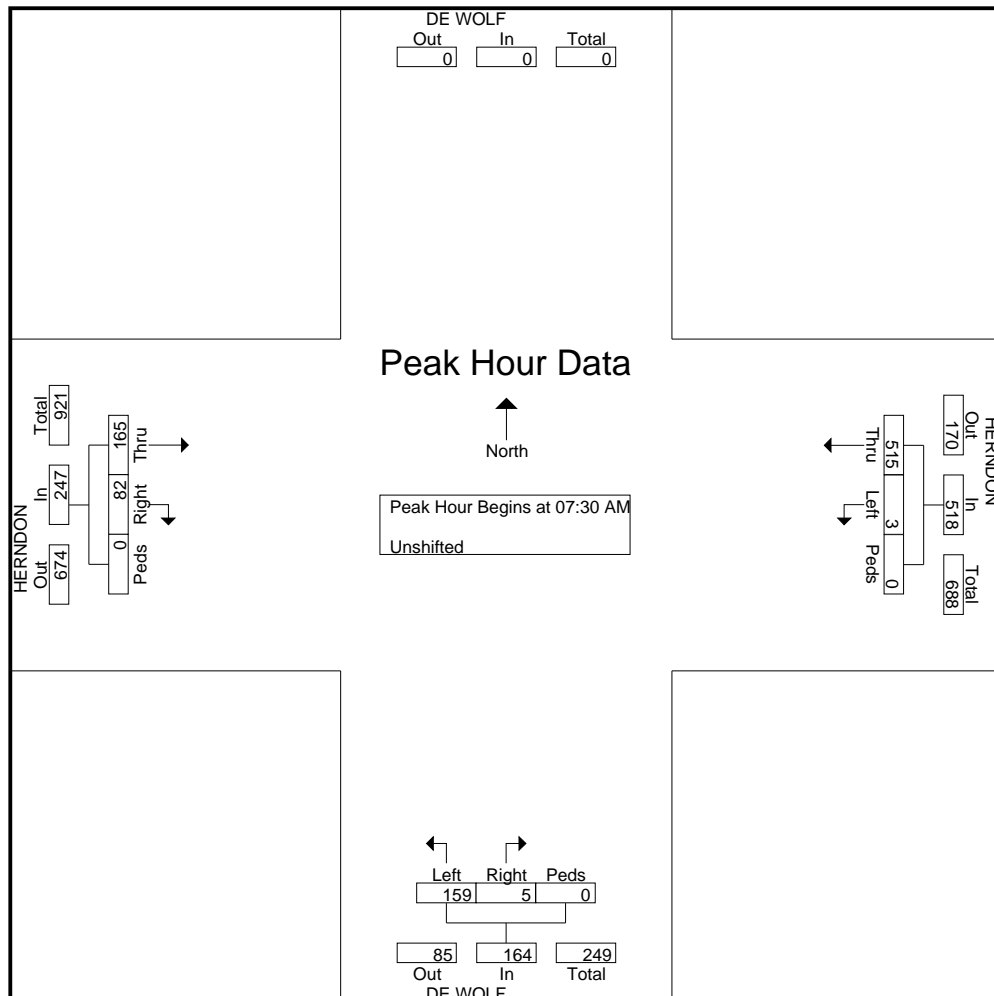
File Name : 15 Herndon at Dewolf south leg

Site Code : 00000000

Start Date : 1/12/2016

Page No : 2

|  | HERNDON<br>Westbound |      |      |            | DE WOLF<br>Northbound |       |      |            | HERNDON<br>Eastbound |       |      |            |            |
|--|----------------------|------|------|------------|-----------------------|-------|------|------------|----------------------|-------|------|------------|------------|
| Start Time   | Left                 | Thru | Peds | App. Total | Left                  | Right | Peds | App. Total | Thru                 | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1<br>Peak Hour for Entire Intersection Begins at 07:30 AM |                      |      |      |            |                       |       |      |            |                      |       |      |            |            |
| 07:30 AM   | 1                    | 148  | 0    | 149        | 44                    | 0     | 0    | 44         | 37                   | 23    | 0    | 60         | 253        |
| 07:45 AM   | 1                    | 118  | 0    | 119        | 38                    | 2     | 0    | 40         | 31                   | 19    | 0    | 50         | 209        |
| 08:00 AM   | 1                    | 120  | 0    | 121        | 39                    | 2     | 0    | 41         | 42                   | 22    | 0    | 64         | 226        |
| 08:15 AM   | 0                    | 129  | 0    | 129        | 38                    | 1     | 0    | 39         | 55                   | 18    | 0    | 73         | 241        |
| Total Volume   | 3                    | 515  | 0    | 518        | 159                   | 5     | 0    | 164        | 165                  | 82    | 0    | 247        | 929        |
| % App. Total   | 0.6                  | 99.4 | 0    |            | 97                    | 3     | 0    |            | 66.8                 | 33.2  | 0    |            |            |
| PHF  | .750                 | .870 | .000 | .869       | .903                  | .625  | .000 | .932       | .750                 | .891  | .000 | .846       | .918       |



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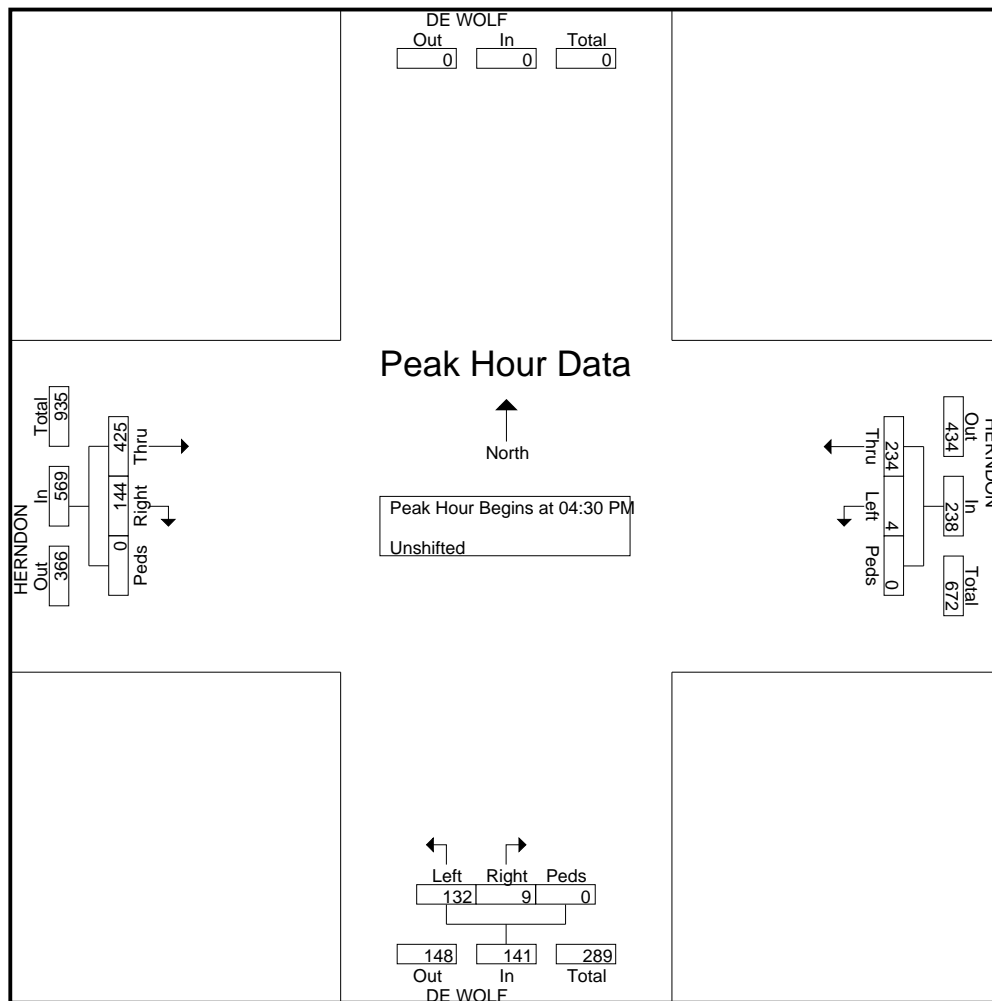
File Name : 15 Herndon at Dewolf south leg

Site Code : 00000000

Start Date : 1/12/2016

Page No : 3

|  | HERNDON<br>Westbound |      |      |            | DE WOLF<br>Northbound |       |      |            | HERNDON<br>Eastbound |       |      |            |            |
|--|----------------------|------|------|------------|-----------------------|-------|------|------------|----------------------|-------|------|------------|------------|
| Start Time   | Left                 | Thru | Peds | App. Total | Left                  | Right | Peds | App. Total | Thru                 | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                      |      |      |            |                       |       |      |            |                      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 04:30 PM       |                      |      |      |            |                       |       |      |            |                      |       |      |            |            |
| 04:30 PM   | 1                    | 77   | 0    | 78         | 21                    | 1     | 0    | 22         | 111                  | 23    | 0    | 134        | 234        |
| 04:45 PM   | 1                    | 51   | 0    | 52         | 34                    | 4     | 0    | 38         | 97                   | 35    | 0    | 132        | 222        |
| 05:00 PM   | 1                    | 59   | 0    | 60         | 43                    | 0     | 0    | 43         | 104                  | 43    | 0    | 147        | 250        |
| 05:15 PM   | 1                    | 47   | 0    | 48         | 34                    | 4     | 0    | 38         | 113                  | 43    | 0    | 156        | 242        |
| Total Volume   | 4                    | 234  | 0    | 238        | 132                   | 9     | 0    | 141        | 425                  | 144   | 0    | 569        | 948        |
| % App. Total   | 1.7                  | 98.3 | 0    |            | 93.6                  | 6.4   | 0    |            | 74.7                 | 25.3  | 0    |            |            |
| PHF  | 1.00                 | .760 | .000 | .763       | .767                  | .563  | .000 | .820       | .940                 | .837  | .000 | .912       | .948       |



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File Name : 16 Herndon at Leonard

Site Code : 00000000

Start Date : 12/10/2015

Page No : 1

## Groups Printed- Unshifted

|             | LEONARD<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | LEONARD<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|-------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time  | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 65   | 0     | 0    | 65         | 5                     | 0    | 0     | 0    | 5          | 0                    | 33   | 0     | 0    | 33         | 103        |
| 07:15 AM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 115  | 0     | 0    | 115        | 2                     | 0    | 0     | 0    | 2          | 0                    | 34   | 1     | 0    | 35         | 152        |
| 07:30 AM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 128  | 0     | 0    | 128        | 3                     | 0    | 0     | 0    | 3          | 0                    | 27   | 0     | 0    | 27         | 158        |
| 07:45 AM    | 0                     | 0    | 0     | 0    | 0          | 1                    | 133  | 0     | 0    | 134        | 6                     | 0    | 1     | 0    | 7          | 0                    | 47   | 2     | 0    | 49         | 190        |
| Total       | 0                     | 0    | 0     | 0    | 0          | 1                    | 441  | 0     | 0    | 442        | 16                    | 0    | 1     | 0    | 17         | 0                    | 141  | 3     | 0    | 144        | 603        |
| 08:00 AM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 98   | 0     | 0    | 98         | 5                     | 0    | 1     | 0    | 6          | 0                    | 39   | 1     | 0    | 40         | 144        |
| 08:15 AM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 116  | 0     | 0    | 116        | 0                     | 0    | 0     | 0    | 0          | 0                    | 41   | 1     | 0    | 42         | 158        |
| 08:30 AM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 86   | 0     | 0    | 86         | 3                     | 0    | 0     | 0    | 3          | 0                    | 47   | 0     | 0    | 47         | 136        |
| 08:45 AM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 87   | 0     | 0    | 87         | 3                     | 0    | 0     | 0    | 3          | 0                    | 41   | 0     | 0    | 41         | 131        |
| Total       | 0                     | 0    | 0     | 0    | 0          | 0                    | 387  | 0     | 0    | 387        | 11                    | 0    | 1     | 0    | 12         | 0                    | 168  | 2     | 0    | 170        | 569        |
| *****       |                       |      |       |      |            |                      |      |       |      |            |                       |      |       |      |            |                      |      |       |      |            |            |
| 04:00 PM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 55   | 0     | 0    | 55         | 3                     | 0    | 0     | 0    | 3          | 0                    | 72   | 7     | 0    | 79         | 137        |
| 04:15 PM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 48   | 0     | 0    | 48         | 0                     | 0    | 1     | 0    | 1          | 0                    | 78   | 7     | 0    | 85         | 134        |
| 04:30 PM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 49   | 0     | 0    | 49         | 2                     | 0    | 0     | 0    | 2          | 0                    | 83   | 1     | 0    | 84         | 135        |
| 04:45 PM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 54   | 0     | 0    | 54         | 1                     | 0    | 0     | 0    | 1          | 0                    | 78   | 3     | 0    | 81         | 136        |
| Total       | 0                     | 0    | 0     | 0    | 0          | 0                    | 206  | 0     | 0    | 206        | 6                     | 0    | 1     | 0    | 7          | 0                    | 311  | 18    | 0    | 329        | 542        |
| 05:00 PM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 53   | 0     | 0    | 53         | 0                     | 0    | 0     | 0    | 0          | 0                    | 104  | 3     | 0    | 107        | 160        |
| 05:15 PM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 65   | 0     | 0    | 65         | 3                     | 0    | 0     | 0    | 3          | 0                    | 106  | 3     | 0    | 109        | 177        |
| 05:30 PM    | 0                     | 0    | 0     | 0    | 0          | 1                    | 53   | 0     | 0    | 54         | 2                     | 0    | 0     | 0    | 2          | 0                    | 104  | 1     | 0    | 105        | 161        |
| 05:45 PM    | 0                     | 0    | 0     | 0    | 0          | 0                    | 53   | 0     | 0    | 53         | 5                     | 0    | 0     | 0    | 5          | 0                    | 83   | 3     | 0    | 86         | 144        |
| Total       | 0                     | 0    | 0     | 0    | 0          | 1                    | 224  | 0     | 0    | 225        | 10                    | 0    | 0     | 0    | 10         | 0                    | 397  | 10    | 0    | 407        | 642        |
| Grand Total | 0                     | 0    | 0     | 0    | 0          | 2                    | 1258 | 0     | 0    | 1260       | 43                    | 0    | 3     | 0    | 46         | 0                    | 1017 | 33    | 0    | 1050       | 2356       |
| Apprch %    | 0                     | 0    | 0     | 0    |            | 0.2                  | 99.8 | 0     | 0    |            | 93.5                  | 0    | 6.5   | 0    |            | 0                    | 96.9 | 3.1   | 0    |            |            |
| Total %     | 0                     | 0    | 0     | 0    | 0          | 0.1                  | 53.4 | 0     | 0    | 53.5       | 1.8                   | 0    | 0.1   | 0    | 2          | 0                    | 43.2 | 1.4   | 0    | 44.6       |            |

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File Name : 16 Herndon at Leonard

Site Code : 00000000

Start Date : 12/10/2015

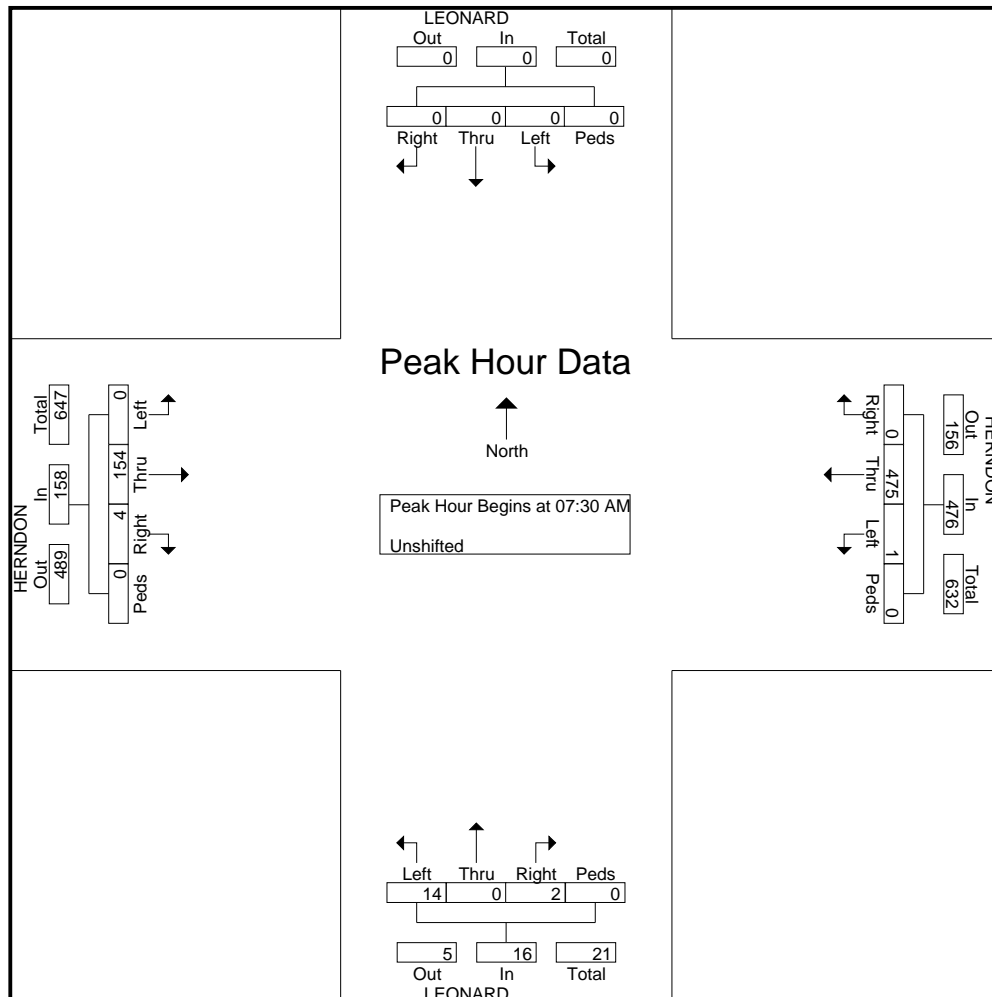
Page No : 2

|               | LEONARD<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | LEONARD<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|---------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start<br>Time | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:30 AM     | 0    | 0    | 0    | 0    | 0    | 0    | 128  | 0    | 0    | 128  | 3    | 0    | 0    | 0    | 3    | 0    | 27   | 0    | 0    | 27   | 158  |
| 07:45 AM     | 0    | 0    | 0    | 0    | 0    | 1    | 133  | 0    | 0    | 134  | 6    | 0    | 1    | 0    | 7    | 0    | 47   | 2    | 0    | 49   | 190  |
| 08:00 AM     | 0    | 0    | 0    | 0    | 0    | 0    | 98   | 0    | 0    | 98   | 5    | 0    | 1    | 0    | 6    | 0    | 39   | 1    | 0    | 40   | 144  |
| 08:15 AM     | 0    | 0    | 0    | 0    | 0    | 0    | 116  | 0    | 0    | 116  | 0    | 0    | 0    | 0    | 0    | 0    | 41   | 1    | 0    | 42   | 158  |
| Total Volume | 0    | 0    | 0    | 0    | 0    | 1    | 475  | 0    | 0    | 476  | 14   | 0    | 2    | 0    | 16   | 0    | 154  | 4    | 0    | 158  | 650  |
| % App. Total | 0    | 0    | 0    | 0    | 0    | 0.2  | 99.8 | 0    | 0    |      | 87.5 | 0    | 12.5 | 0    |      | 0    | 97.5 | 2.5  | 0    |      |      |
| PHF          | .000 | .000 | .000 | .000 | .000 | .250 | .893 | .000 | .000 | .888 | .583 | .000 | .500 | .000 | .571 | .000 | .819 | .500 | .000 | .806 | .855 |



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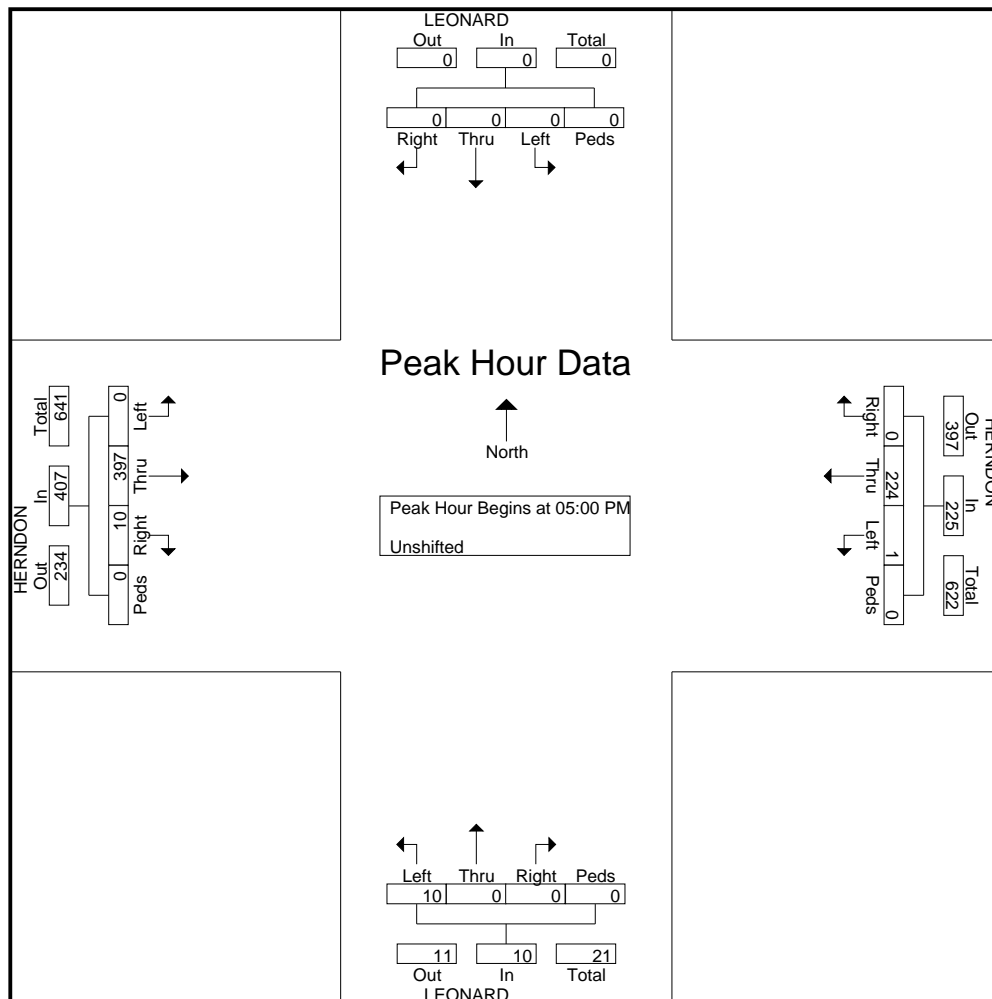
File Name : 16 Herndon at Leonard

Site Code : 00000000

Start Date : 12/10/2015

Page No : 3

|  | LEONARD<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | LEONARD<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|--|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time   | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                       |      |       |      |            |                      |      |       |      |            |                       |      |       |      |            |                      |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                       |      |       |      |            |                      |      |       |      |            |                       |      |       |      |            |                      |      |       |      |            |            |
| 05:00 PM   | 0                     | 0    | 0     | 0    | 0          | 0                    | 53   | 0     | 0    | 53         | 0                     | 0    | 0     | 0    | 0          | 0                    | 104  | 3     | 0    | 107        | 160        |
| 05:15 PM   | 0                     | 0    | 0     | 0    | 0          | 0                    | 65   | 0     | 0    | 65         | 3                     | 0    | 0     | 0    | 3          | 0                    | 106  | 3     | 0    | 109        | 177        |
| 05:30 PM   | 0                     | 0    | 0     | 0    | 0          | 1                    | 53   | 0     | 0    | 54         | 2                     | 0    | 0     | 0    | 2          | 0                    | 104  | 1     | 0    | 105        | 161        |
| 05:45 PM   | 0                     | 0    | 0     | 0    | 0          | 0                    | 53   | 0     | 0    | 53         | 5                     | 0    | 0     | 0    | 5          | 0                    | 83   | 3     | 0    | 86         | 144        |
| Total Volume   | 0                     | 0    | 0     | 0    | 0          | 1                    | 224  | 0     | 0    | 225        | 10                    | 0    | 0     | 0    | 10         | 0                    | 397  | 10    | 0    | 407        | 642        |
| % App. Total   | 0                     | 0    | 0     | 0    | 0          | 0.4                  | 99.6 | 0     | 0    | 100        | 0                     | 0    | 0     | 0    | 0          | 0                    | 97.5 | 2.5   | 0    | 100        | 100        |
| PHF  | .000                  | .000 | .000  | .000 | .000       | .250                 | .862 | .000  | .000 | .865       | .500                  | .000 | .000  | .000 | .500       | .000                 | .936 | .833  | .000 | .933       | .907       |



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File Name : 17 Herndon at McCall

Site Code : 00000000

Start Date : 12/9/2015

Page No : 1

## Groups Printed- Unshifted

|             | MCCALL<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | MCCALL<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|-------------|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time  | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 0                    | 0    | 0     | 0    | 0          | 0                    | 46   | 0     | 0    | 46         | 35                   | 0    | 0     | 0    | 35         | 0                    | 28   | 13    | 0    | 41         | 122        |
| 07:15 AM    | 0                    | 0    | 0     | 0    | 0          | 2                    | 60   | 0     | 0    | 62         | 39                   | 0    | 0     | 0    | 39         | 0                    | 25   | 14    | 0    | 39         | 140        |
| 07:30 AM    | 0                    | 0    | 0     | 0    | 0          | 0                    | 66   | 0     | 0    | 66         | 53                   | 0    | 0     | 0    | 53         | 0                    | 26   | 16    | 0    | 42         | 161        |
| 07:45 AM    | 0                    | 0    | 0     | 0    | 0          | 1                    | 49   | 0     | 0    | 50         | 55                   | 0    | 2     | 0    | 57         | 0                    | 26   | 39    | 0    | 65         | 172        |
| Total       | 0                    | 0    | 0     | 0    | 0          | 3                    | 221  | 0     | 0    | 224        | 182                  | 0    | 2     | 0    | 184        | 0                    | 105  | 82    | 0    | 187        | 595        |
| 08:00 AM    | 0                    | 0    | 0     | 0    | 0          | 0                    | 48   | 0     | 0    | 48         | 67                   | 0    | 3     | 0    | 70         | 0                    | 29   | 24    | 0    | 53         | 171        |
| 08:15 AM    | 0                    | 0    | 0     | 0    | 0          | 1                    | 68   | 0     | 0    | 69         | 52                   | 0    | 0     | 0    | 52         | 0                    | 31   | 24    | 0    | 55         | 176        |
| 08:30 AM    | 0                    | 0    | 0     | 0    | 0          | 2                    | 41   | 0     | 0    | 43         | 41                   | 0    | 1     | 0    | 42         | 0                    | 15   | 13    | 0    | 28         | 113        |
| 08:45 AM    | 0                    | 0    | 0     | 0    | 0          | 1                    | 33   | 0     | 0    | 34         | 54                   | 0    | 1     | 0    | 55         | 0                    | 19   | 15    | 0    | 34         | 123        |
| Total       | 0                    | 0    | 0     | 0    | 0          | 4                    | 190  | 0     | 0    | 194        | 214                  | 0    | 5     | 0    | 219        | 0                    | 94   | 76    | 0    | 170        | 583        |
| *****       |                      |      |       |      |            |                      |      |       |      |            |                      |      |       |      |            |                      |      |       |      |            |            |
| 04:00 PM    | 0                    | 0    | 0     | 0    | 0          | 0                    | 38   | 0     | 0    | 38         | 27                   | 0    | 0     | 0    | 27         | 0                    | 52   | 43    | 0    | 95         | 160        |
| 04:15 PM    | 0                    | 0    | 0     | 0    | 0          | 2                    | 28   | 0     | 0    | 30         | 30                   | 0    | 2     | 0    | 32         | 0                    | 46   | 27    | 0    | 73         | 135        |
| 04:30 PM    | 0                    | 0    | 0     | 0    | 0          | 3                    | 31   | 0     | 0    | 34         | 15                   | 0    | 2     | 0    | 17         | 0                    | 56   | 43    | 0    | 99         | 150        |
| 04:45 PM    | 0                    | 0    | 0     | 0    | 0          | 1                    | 30   | 0     | 0    | 31         | 22                   | 0    | 2     | 0    | 24         | 0                    | 51   | 49    | 0    | 100        | 155        |
| Total       | 0                    | 0    | 0     | 0    | 0          | 6                    | 127  | 0     | 0    | 133        | 94                   | 0    | 6     | 0    | 100        | 0                    | 205  | 162   | 0    | 367        | 600        |
| 05:00 PM    | 0                    | 0    | 0     | 0    | 0          | 0                    | 44   | 0     | 0    | 44         | 31                   | 0    | 5     | 0    | 36         | 0                    | 57   | 56    | 0    | 113        | 193        |
| 05:15 PM    | 0                    | 0    | 0     | 0    | 0          | 0                    | 33   | 0     | 0    | 33         | 26                   | 0    | 2     | 0    | 28         | 0                    | 42   | 60    | 0    | 102        | 163        |
| 05:30 PM    | 0                    | 0    | 0     | 0    | 0          | 1                    | 38   | 0     | 0    | 39         | 35                   | 0    | 2     | 0    | 37         | 0                    | 36   | 53    | 0    | 89         | 165        |
| 05:45 PM    | 0                    | 0    | 0     | 0    | 0          | 1                    | 44   | 0     | 0    | 45         | 32                   | 0    | 1     | 0    | 33         | 0                    | 46   | 41    | 0    | 87         | 165        |
| Total       | 0                    | 0    | 0     | 0    | 0          | 2                    | 159  | 0     | 0    | 161        | 124                  | 0    | 10    | 0    | 134        | 0                    | 181  | 210   | 0    | 391        | 686        |
| Grand Total | 0                    | 0    | 0     | 0    | 0          | 15                   | 697  | 0     | 0    | 712        | 614                  | 0    | 23    | 0    | 637        | 0                    | 585  | 530   | 0    | 1115       | 2464       |
| Apprch %    | 0                    | 0    | 0     | 0    |            | 2.1                  | 97.9 | 0     | 0    |            | 96.4                 | 0    | 3.6   | 0    |            | 0                    | 52.5 | 47.5  | 0    |            |            |
| Total %     | 0                    | 0    | 0     | 0    | 0          | 0.6                  | 28.3 | 0     | 0    | 28.9       | 24.9                 | 0    | 0.9   | 0    | 25.9       | 0                    | 23.7 | 21.5  | 0    | 45.3       |            |

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File Name : 17 Herndon at McCall

Site Code : 00000000

Start Date : 12/9/2015

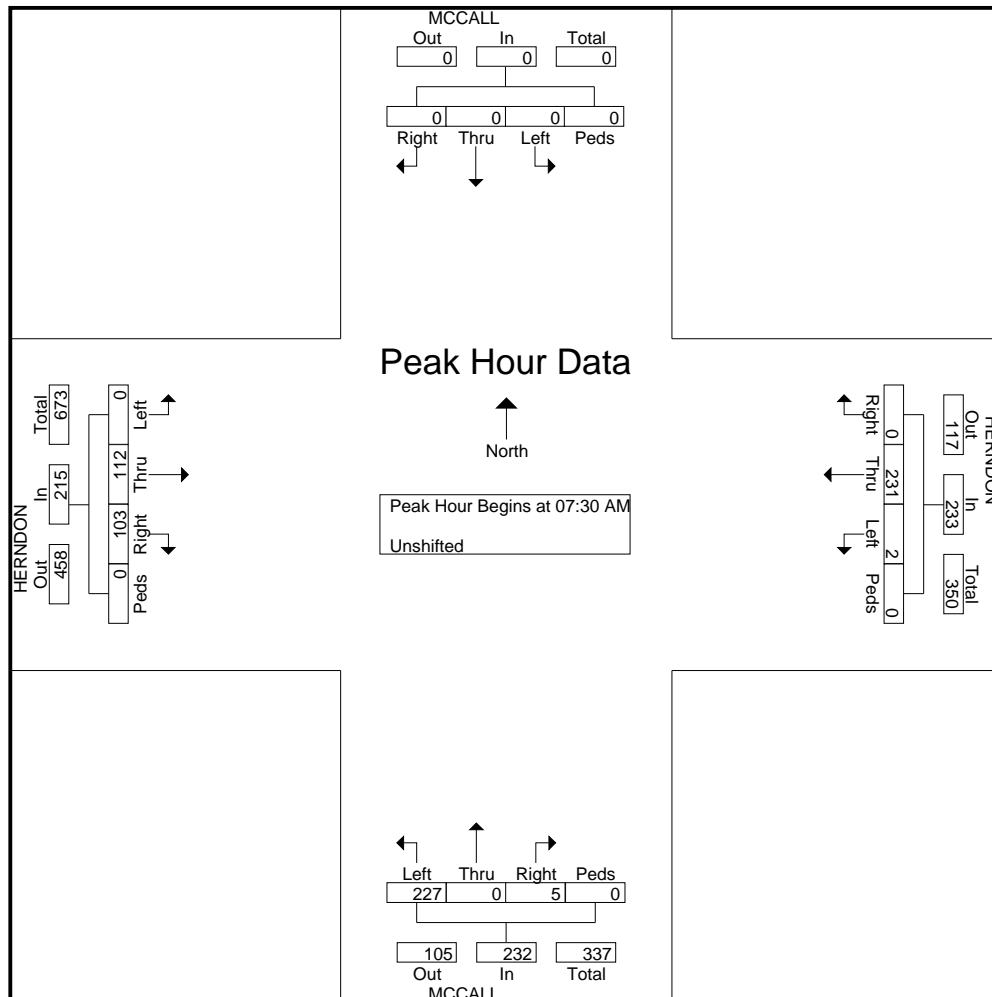
Page No : 2

|            | MCCALL<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | MCCALL<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|------------|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:30 AM     | 0    | 0    | 0    | 0    | 0    | 0    | 66   | 0    | 0    | 66   | 53   | 0    | 0    | 0    | 53   | 0    | 26   | 16   | 0    | 42   | 161  |
| 07:45 AM     | 0    | 0    | 0    | 0    | 0    | 1    | 49   | 0    | 0    | 50   | 55   | 0    | 2    | 0    | 57   | 0    | 26   | 39   | 0    | 65   | 172  |
| 08:00 AM     | 0    | 0    | 0    | 0    | 0    | 0    | 48   | 0    | 0    | 48   | 67   | 0    | 3    | 0    | 70   | 0    | 29   | 24   | 0    | 53   | 171  |
| 08:15 AM     | 0    | 0    | 0    | 0    | 0    | 1    | 68   | 0    | 0    | 69   | 52   | 0    | 0    | 0    | 52   | 0    | 31   | 24   | 0    | 55   | 176  |
| Total Volume | 0    | 0    | 0    | 0    | 0    | 2    | 231  | 0    | 0    | 233  | 227  | 0    | 5    | 0    | 232  | 0    | 112  | 103  | 0    | 215  | 680  |
| % App. Total | 0    | 0    | 0    | 0    | 0    | 0.9  | 99.1 | 0    | 0    | 0    | 97.8 | 0    | 2.2  | 0    | 0    | 0    | 52.1 | 47.9 | 0    | 0    | 0    |
| PHF          | .000 | .000 | .000 | .000 | .000 | .500 | .849 | .000 | .000 | .844 | .847 | .000 | .417 | .000 | .829 | .000 | .903 | .660 | .000 | .827 | .966 |



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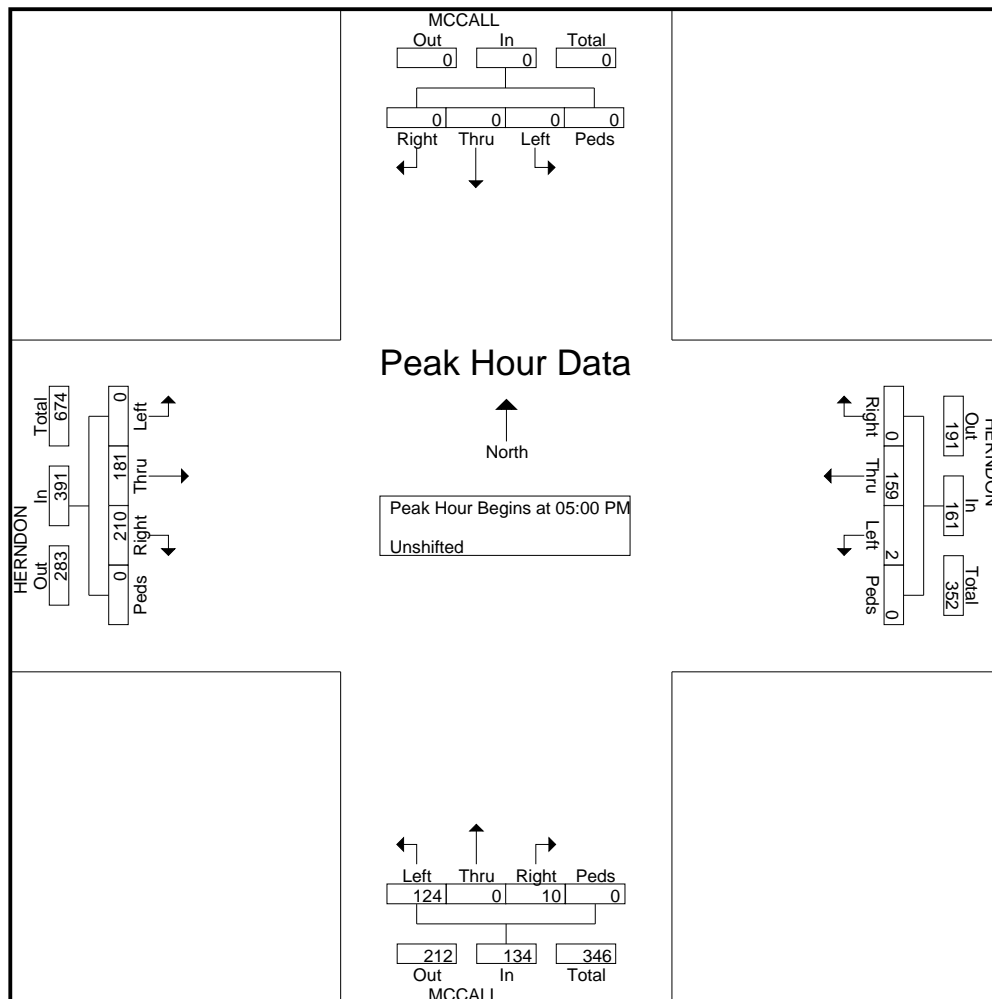
File Name : 17 Herndon at McCall

Site Code : 00000000

Start Date : 12/9/2015

Page No : 3

|  | MCCALL<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | MCCALL<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|--|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time   | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                      |      |       |      |            |                      |      |       |      |            |                      |      |       |      |            |                      |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                      |      |       |      |            |                      |      |       |      |            |                      |      |       |      |            |                      |      |       |      |            |            |
| 05:00 PM   | 0                    | 0    | 0     | 0    | 0          | 0                    | 44   | 0     | 0    | 44         | 31                   | 0    | 5     | 0    | 36         | 0                    | 57   | 56    | 0    | 113        | 193        |
| 05:15 PM   | 0                    | 0    | 0     | 0    | 0          | 0                    | 33   | 0     | 0    | 33         | 26                   | 0    | 2     | 0    | 28         | 0                    | 42   | 60    | 0    | 102        | 163        |
| 05:30 PM   | 0                    | 0    | 0     | 0    | 0          | 1                    | 38   | 0     | 0    | 39         | 35                   | 0    | 2     | 0    | 37         | 0                    | 36   | 53    | 0    | 89         | 165        |
| 05:45 PM   | 0                    | 0    | 0     | 0    | 0          | 1                    | 44   | 0     | 0    | 45         | 32                   | 0    | 1     | 0    | 33         | 0                    | 46   | 41    | 0    | 87         | 165        |
| Total Volume   | 0                    | 0    | 0     | 0    | 0          | 2                    | 159  | 0     | 0    | 161        | 124                  | 0    | 10    | 0    | 134        | 0                    | 181  | 210   | 0    | 391        | 686        |
| % App. Total   | 0                    | 0    | 0     | 0    |            | 1.2                  | 98.8 | 0     | 0    |            | 92.5                 | 0    | 7.5   | 0    |            | 0                    | 46.3 | 53.7  | 0    |            |            |
| PHF  | .000                 | .000 | .000  | .000 | .000       | .500                 | .903 | .000  | .000 | .894       | .886                 | .000 | .500  | .000 | .905       | .000                 | .794 | .875  | .000 | .865       | .889       |





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File Name : 18 Herndon at Academy

Site Code : 00000000

Start Date : 12/3/2015

Page No : 1

## Groups Printed- Unshifted

|             | ACADEMY<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | ACADEMY<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|-------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start Time  | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| 07:00 AM    | 0                     | 17   | 0     | 0    | 17         | 6                    | 6    | 0     | 0    | 12         | 18                    | 7    | 1     | 0    | 26         | 0                    | 4    | 22    | 0    | 26         | 81         |
| 07:15 AM    | 0                     | 21   | 1     | 0    | 22         | 7                    | 3    | 0     | 0    | 10         | 28                    | 19   | 1     | 0    | 48         | 0                    | 0    | 20    | 0    | 20         | 100        |
| 07:30 AM    | 0                     | 25   | 1     | 0    | 26         | 7                    | 2    | 0     | 0    | 9          | 29                    | 9    | 6     | 0    | 44         | 1                    | 0    | 12    | 0    | 13         | 92         |
| 07:45 AM    | 0                     | 11   | 1     | 0    | 12         | 4                    | 6    | 0     | 0    | 10         | 27                    | 11   | 0     | 0    | 38         | 0                    | 1    | 16    | 0    | 17         | 77         |
| Total       | 0                     | 74   | 3     | 0    | 77         | 24                   | 17   | 0     | 0    | 41         | 102                   | 46   | 8     | 0    | 156        | 1                    | 5    | 70    | 0    | 76         | 350        |
| 08:00 AM    | 0                     | 21   | 0     | 0    | 21         | 5                    | 1    | 0     | 0    | 6          | 25                    | 7    | 2     | 0    | 34         | 0                    | 0    | 13    | 0    | 13         | 74         |
| 08:15 AM    | 0                     | 15   | 1     | 0    | 16         | 2                    | 2    | 0     | 0    | 4          | 28                    | 13   | 1     | 0    | 42         | 0                    | 1    | 19    | 0    | 20         | 82         |
| 08:30 AM    | 0                     | 12   | 0     | 0    | 12         | 6                    | 5    | 0     | 0    | 11         | 25                    | 7    | 1     | 0    | 33         | 1                    | 1    | 20    | 0    | 22         | 78         |
| 08:45 AM    | 0                     | 16   | 1     | 0    | 17         | 6                    | 4    | 0     | 0    | 10         | 18                    | 17   | 2     | 0    | 37         | 2                    | 1    | 10    | 0    | 13         | 77         |
| Total       | 0                     | 64   | 2     | 0    | 66         | 19                   | 12   | 0     | 0    | 31         | 96                    | 44   | 6     | 0    | 146        | 3                    | 3    | 62    | 0    | 68         | 311        |
| *****       |                       |      |       |      |            |                      |      |       |      |            |                       |      |       |      |            |                      |      |       |      |            |            |
| 04:00 PM    | 0                     | 22   | 2     | 0    | 24         | 4                    | 2    | 1     | 0    | 7          | 26                    | 19   | 9     | 0    | 54         | 2                    | 3    | 32    | 0    | 37         | 122        |
| 04:15 PM    | 2                     | 10   | 3     | 0    | 15         | 3                    | 2    | 0     | 0    | 5          | 18                    | 27   | 5     | 0    | 50         | 2                    | 1    | 28    | 0    | 31         | 101        |
| 04:30 PM    | 0                     | 15   | 3     | 0    | 18         | 4                    | 0    | 1     | 0    | 5          | 16                    | 25   | 3     | 0    | 44         | 2                    | 2    | 19    | 0    | 23         | 90         |
| 04:45 PM    | 0                     | 13   | 0     | 0    | 13         | 2                    | 2    | 0     | 0    | 4          | 19                    | 17   | 4     | 0    | 40         | 0                    | 0    | 31    | 0    | 31         | 88         |
| Total       | 2                     | 60   | 8     | 0    | 70         | 13                   | 6    | 2     | 0    | 21         | 79                    | 88   | 21    | 0    | 188        | 6                    | 6    | 110   | 0    | 122        | 401        |
| 05:00 PM    | 0                     | 14   | 0     | 0    | 14         | 5                    | 1    | 0     | 0    | 6          | 21                    | 18   | 5     | 0    | 44         | 0                    | 2    | 30    | 0    | 32         | 96         |
| 05:15 PM    | 0                     | 16   | 1     | 0    | 17         | 2                    | 1    | 0     | 0    | 3          | 20                    | 26   | 7     | 0    | 53         | 2                    | 4    | 26    | 0    | 32         | 105        |
| 05:30 PM    | 0                     | 15   | 2     | 0    | 17         | 9                    | 3    | 1     | 0    | 13         | 16                    | 28   | 4     | 0    | 48         | 3                    | 5    | 45    | 0    | 53         | 131        |
| 05:45 PM    | 0                     | 14   | 0     | 0    | 14         | 0                    | 2    | 0     | 0    | 2          | 28                    | 20   | 5     | 0    | 53         | 0                    | 5    | 23    | 0    | 28         | 97         |
| Total       | 0                     | 59   | 3     | 0    | 62         | 16                   | 7    | 1     | 0    | 24         | 85                    | 92   | 21    | 0    | 198        | 5                    | 16   | 124   | 0    | 145        | 429        |
| Grand Total | 2                     | 257  | 16    | 0    | 275        | 72                   | 42   | 3     | 0    | 117        | 362                   | 270  | 56    | 0    | 688        | 15                   | 30   | 366   | 0    | 411        | 1491       |
| Apprch %    | 0.7                   | 93.5 | 5.8   | 0    |            | 61.5                 | 35.9 | 2.6   | 0    |            | 52.6                  | 39.2 | 8.1   | 0    |            | 3.6                  | 7.3  | 89.1  | 0    |            |            |
| Total %     | 0.1                   | 17.2 | 1.1   | 0    | 18.4       | 4.8                  | 2.8  | 0.2   | 0    | 7.8        | 24.3                  | 18.1 | 3.8   | 0    | 46.1       | 1                    | 2    | 24.5  | 0    | 27.6       |            |

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File Name : 18 Herndon at Academy

Site Code : 00000000

Start Date : 12/3/2015

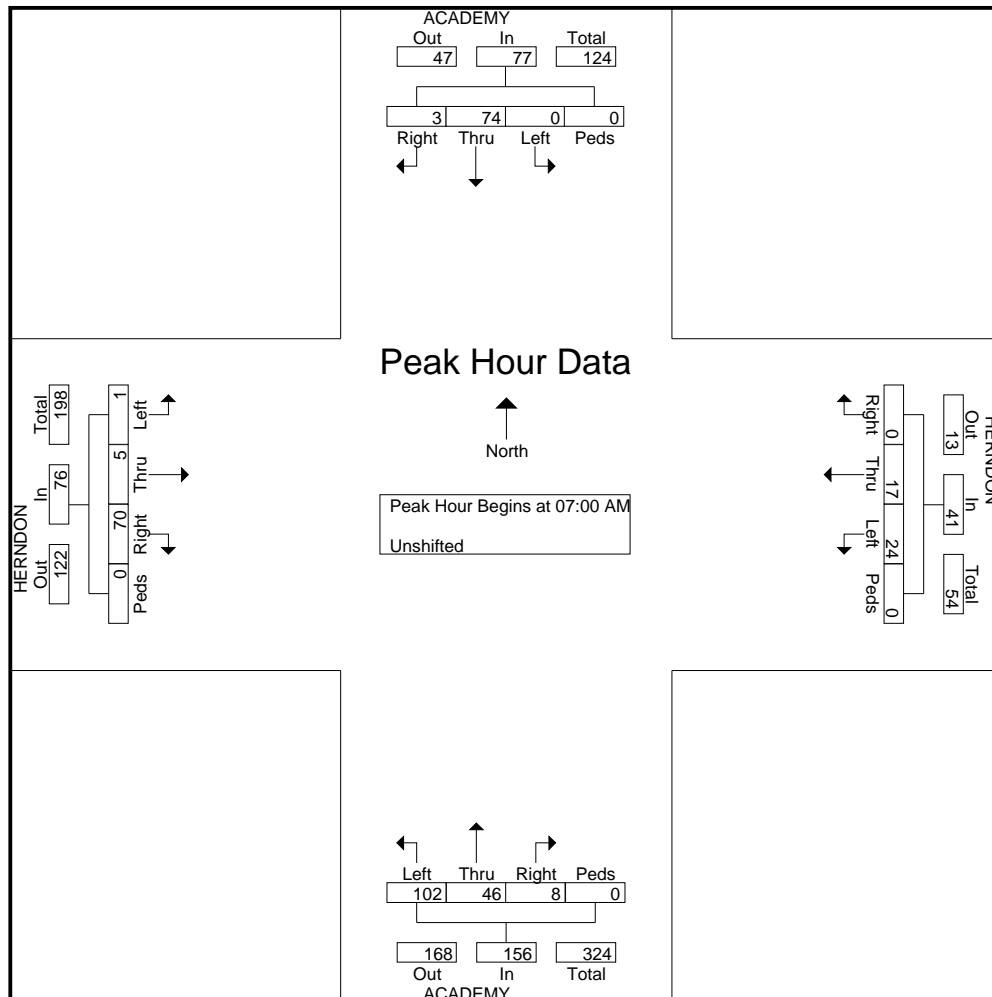
Page No : 2

|               | ACADEMY<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | ACADEMY<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|---------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start<br>Time | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |

Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:00 AM

|              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 07:00 AM     | 0    | 17   | 0    | 0    | 17   | 6    | 6    | 0    | 0    | 12   | 18   | 7    | 1    | 0    | 26   | 0    | 4    | 22   | 0    | 26   | 81   |
| 07:15 AM     | 0    | 21   | 1    | 0    | 22   | 7    | 3    | 0    | 0    | 10   | 28   | 19   | 1    | 0    | 48   | 0    | 0    | 20   | 0    | 20   | 100  |
| 07:30 AM     | 0    | 25   | 1    | 0    | 26   | 7    | 2    | 0    | 0    | 9    | 29   | 9    | 6    | 0    | 44   | 1    | 0    | 12   | 0    | 13   | 92   |
| 07:45 AM     | 0    | 11   | 1    | 0    | 12   | 4    | 6    | 0    | 0    | 10   | 27   | 11   | 0    | 0    | 38   | 0    | 1    | 16   | 0    | 17   | 77   |
| Total Volume | 0    | 74   | 3    | 0    | 77   | 24   | 17   | 0    | 0    | 41   | 102  | 46   | 8    | 0    | 156  | 1    | 5    | 70   | 0    | 76   | 350  |
| % App. Total | 0    | 96.1 | 3.9  | 0    |      | 58.5 | 41.5 | 0    | 0    |      | 65.4 | 29.5 | 5.1  | 0    |      | 1.3  | 6.6  | 92.1 | 0    |      |      |
| PHF          | .000 | .740 | .750 | .000 | .740 | .857 | .708 | .000 | .000 | .854 | .879 | .605 | .333 | .000 | .813 | .250 | .313 | .795 | .000 | .731 | .875 |



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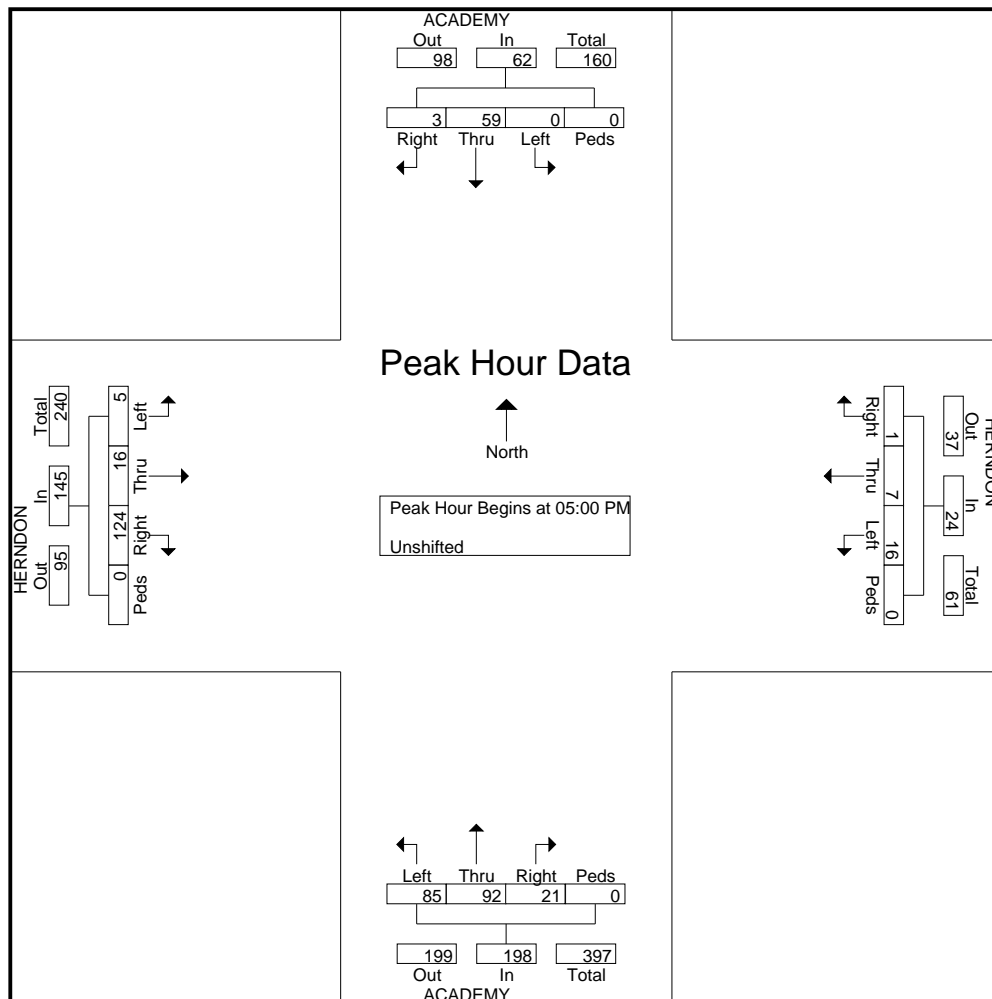
File Name : 18 Herndon at Academy

Site Code : 00000000

Start Date : 12/3/2015

Page No : 3

|  | ACADEMY<br>Southbound |      |       |      |            | HERNDON<br>Westbound |      |       |      |            | ACADEMY<br>Northbound |      |       |      |            | HERNDON<br>Eastbound |      |       |      |            |            |
|--|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|-----------------------|------|-------|------|------------|----------------------|------|-------|------|------------|------------|
| Start<br>Time  | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Left                  | Thru | Right | Peds | App. Total | Left                 | Thru | Right | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 |                       |      |       |      |            |                      |      |       |      |            |                       |      |       |      |            |                      |      |       |      |            |            |
| Peak Hour for Entire Intersection Begins at 05:00 PM       |                       |      |       |      |            |                      |      |       |      |            |                       |      |       |      |            |                      |      |       |      |            |            |
| 05:00 PM   | 0                     | 14   | 0     | 0    | 14         | 5                    | 1    | 0     | 0    | 6          | 21                    | 18   | 5     | 0    | 44         | 0                    | 2    | 30    | 0    | 32         | 96         |
| 05:15 PM   | 0                     | 16   | 1     | 0    | 17         | 2                    | 1    | 0     | 0    | 3          | 20                    | 26   | 7     | 0    | 53         | 2                    | 4    | 26    | 0    | 32         | 105        |
| 05:30 PM   | 0                     | 15   | 2     | 0    | 17         | 9                    | 3    | 1     | 0    | 13         | 16                    | 28   | 4     | 0    | 48         | 3                    | 5    | 45    | 0    | 53         | 131        |
| 05:45 PM   | 0                     | 14   | 0     | 0    | 14         | 0                    | 2    | 0     | 0    | 2          | 28                    | 20   | 5     | 0    | 53         | 0                    | 5    | 23    | 0    | 28         | 97         |
| Total Volume   | 0                     | 59   | 3     | 0    | 62         | 16                   | 7    | 1     | 0    | 24         | 85                    | 92   | 21    | 0    | 198        | 5                    | 16   | 124   | 0    | 145        | 429        |
| % App. Total   | 0                     | 95.2 | 4.8   | 0    |            | 66.7                 | 29.2 | 4.2   | 0    |            | 42.9                  | 46.5 | 10.6  | 0    |            | 3.4                  | 11   | 85.5  | 0    |            |            |
| PHF  | .000                  | .922 | .375  | .000 | .912       | .444                 | .583 | .250  | .000 | .462       | .759                  | .821 | .750  | .000 | .934       | .417                 | .800 | .689  | .000 | .684       | .819       |



**From:** Sean Smith  
**To:** [Susana Maciel](#)  
**Cc:** [Jose Benavides](#); [Scott Odell \(scott@odellplanning.com\)](#); [Mike Harrison](#); [Bryan Araki](#); [Mel Gonzalez Sanchez](#)  
**Subject:** RE: CCMC TIA: Projected Growth Rate  
**Date:** Thursday, March 02, 2017 9:17:39 AM

---

Susana,  
I spoke with Jose about this methodology this morning. The City accepts the proposal and looks forward to reviewing the updated TIS. If you have any questions, please feel free to contact me or other Engineering staff.

*Please note that our counter is open from 8am – 3pm; staff is available for appointments only after 3 pm.*

**Sean Smith**, RCE, QSD  
Interim DRU Manager  
City of Clovis  
[www.cityofclovis.com](http://www.cityofclovis.com)  
1033 Fifth Street | Clovis, CA 93612  
T 559.324.2363 | C 559.765.7505  
email [seans@cityofclovis.com](mailto:seans@cityofclovis.com)

cc: project file

---

**From:** Susana Maciel [mailto:[smaciel@jlbtraffic.com](mailto:smaciel@jlbtraffic.com)]  
**Sent:** Tuesday, February 28, 2017 12:28 PM  
**To:** Sean Smith  
**Cc:** Jose Benavides; Scott Odell ([scott@odellplanning.com](mailto:scott@odellplanning.com))  
**Subject:** CCMC TIA: Projected Growth Rate

Good afternoon Mr. Smith,

JLB has determined the growth rate for roadway segments at the intersections of Bullard Avenue at Locan Avenue and Bullard Avenue at DeWolf Avenue. Based on Base Year 2016 and Cumulative Year 2035 No Project Daily Volumes, the average growth rate was found to be 4.3% (see Table I below).

Table I: Projected Growth Rate

| Segment         | Limits                            | Base Year 2016 Daily Volumes |       |       | Cumulative Year 2035 No Project Daily Volumes |       |       | % Growth |
|-----------------|-----------------------------------|------------------------------|-------|-------|---|-------|-------|----------|
|                 |                                   | NB/EB                        | SB/WE | Total | NB/EB   | SB/WE | Total |          |
| Bullard Avenue  | Temperance Avenue to Locan Avenue | 3052                         | 3155  | 6207  | 3634  | 6402  | 10036 | 2.4%     |
| Locan Avenue    | Bullard Avenue to Barstow Avenue  | 469                          | 447   | 916   | 1614  | 1370  | 2984  | 6.1%     |
| Bullard Avenue  | Locan Avenue to DeWolf Avenue     | 2800                         | 2886  | 5686  | 6581  | 8144  | 14725 | 4.9%     |
| DeWolf Avenue   | Herndon Avenue to Bullard Avenue  | 795                          | 789   | 1584  | 1751  | 1367  | 3118  | 3.4%     |
| DeWolf Avenue   | Bullard Avenue to Barstow Avenue  | 1726                         | 1665  | 3391  | 5560  | 4504  | 10064 | 5.6%     |
| Bullard Avenue  | DeWolf Avenue to Leonard Avenue   | 1860                         | 1888  | 3748  | 3363  | 4254  | 7617  | 3.6%     |
| Average Growth: |                                   |                              |       |       |   |       |       | 4.3%     |

With the above in mind, JLB obtained turning movement counts for the intersection of Bullard Avenue at Locan Avenue (dated 2009) and will proceed to use the growth rate of 4.3% to expand those values to existing turning movement counts for that intersection as well as the intersection of Bullard Avenue and DeWolf Avenue and the segment of Bullard Avenue between Locan Avenue and DeWolf Avenue.

In the absence of comments by Friday, March 3, 2017, it will be assumed that utilizing a growth rate of 4.3% for the above mentioned (intersections and segment) is acceptable to the City and we will proceed with the preparation of the Traffic Impact Analysis report.

Best,

Susana Maciel, EIT  
Engineer I/II  
JLB Traffic Engineering, Inc.  
1300 E. Shaw Ave., Ste. 103  
Fresno, CA 93710  
Office: 559.570.8991  
Cell: 559.232.9474  
E-mail: [SMaciel@JLBtraffic.com](mailto:SMaciel@JLBtraffic.com)  
Web: [www.JLBtraffic.com](http://www.JLBtraffic.com)

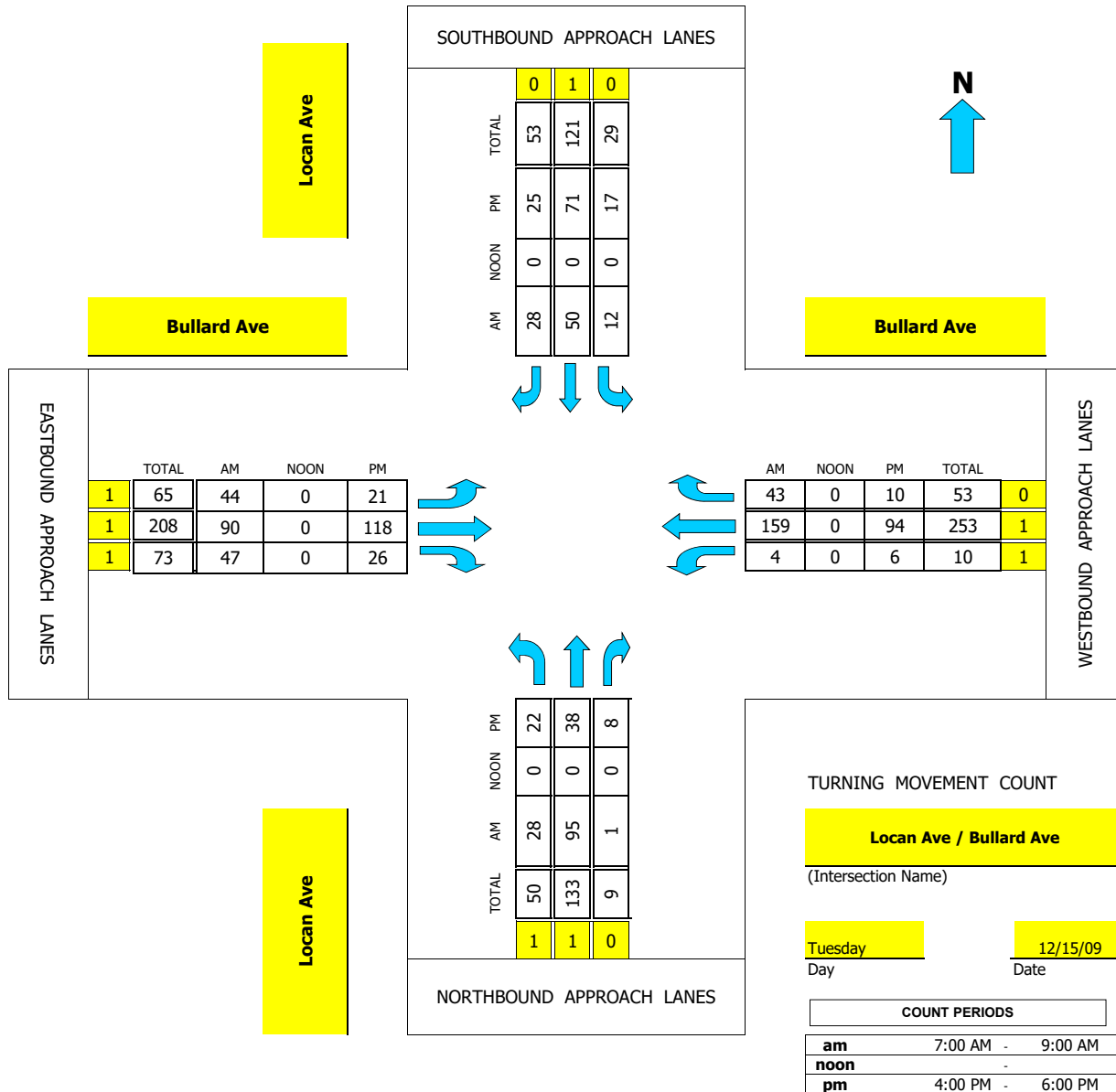
# Intersection Turning Movement



National Data & Surveying Services

## TMC Summary of Locan Ave/Bullard Ave

Project #: 09-8118-001



CONTROL: 4-Way Stop

AM PEAK HOUR 730 AM

NOON PEAK HOUR 0 AM

PM PEAK HOUR 430 PM

# Intersection Turning Movement

Prepared by:

**National Data & Surveying Services**

N-S STREET: **Locan Ave**

DATE: **12/15/2009**

LOCATION: **City of Clovis**

E-W STREET: **Bullard Ave**

DAY: **TUESDAY**

PROJECT# **09-8118-001**

|                    | NORTHBOUND |           |         | SOUTHBOUND |          |          | EASTBOUND |           |          | WESTBOUND |           |          |              |
|--------------------|------------|-----------|---------|------------|----------|----------|-----------|-----------|----------|-----------|-----------|----------|--------------|
| LANES:             | NL<br>1    | NT<br>1   | NR<br>0 | SL<br>0    | ST<br>1  | SR<br>0  | EL<br>1   | ET<br>1   | ER<br>1  | WL<br>1   | WT<br>1   | WR<br>0  | TOTAL        |
| 6:00 AM            |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 6:15 AM            |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 6:30 AM            |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 6:45 AM            |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 7:00 AM            | 4          | 8         | 0       | 1          | 4        | 2        | 1         | 15        | 2        | 1         | 25        | 1        | 64           |
| 7:15 AM            | 9          | 15        | 0       | 2          | 11       | 6        | 1         | 15        | 3        | 2         | 45        | 2        | 111          |
| 7:30 AM            | 5          | 19        | 1       | 2          | 15       | 12       | 7         | 39        | 13       | 0         | 54        | 6        | 173          |
| 7:45 AM            | 6          | 18        | 0       | 2          | 15       | 7        | 8         | 31        | 10       | 1         | 41        | 9        | 148          |
| 8:00 AM            | 8          | 21        | 0       | 3          | 10       | 3        | 9         | 15        | 13       | 0         | 35        | 10       | 127          |
| 8:15 AM            | 9          | 37        | 0       | 5          | 10       | 6        | 20        | 5         | 11       | 3         | 29        | 18       | 153          |
| 8:30 AM            | 7          | 11        | 4       | 5          | 8        | 12       | 22        | 7         | 2        | 2         | 15        | 22       | 117          |
| 8:45 AM            | 7          | 11        | 0       | 4          | 12       | 7        | 2         | 7         | 7        | 2         | 17        | 1        | 77           |
| 9:00 AM            |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 9:15 AM            |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 9:30 AM            |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 9:45 AM            |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 10:00 AM           |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 10:15 AM           |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 10:30 AM           |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 10:45 AM           |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 11:00 AM           |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 11:15 AM           |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 11:30 AM           |            |           |         |            |          |          |           |           |          |           |           |          |              |
| 11:45 AM           |            |           |         |            |          |          |           |           |          |           |           |          |              |
| TOTAL<br>VOLUMES = | NL<br>55   | NT<br>140 | NR<br>5 | SL<br>24   | ST<br>85 | SR<br>55 | EL<br>70  | ET<br>134 | ER<br>61 | WL<br>11  | WT<br>261 | WR<br>69 | TOTAL<br>970 |

AM Peak Hr Begins at: 730 AM

|                     |       |    |   |       |    |    |       |    |    |       |     |    |       |
|---------------------|-------|----|---|-------|----|----|-------|----|----|-------|-----|----|-------|
| PEAK<br>VOLUMES =   | 28    | 95 | 1 | 12    | 50 | 28 | 44    | 90 | 47 | 4     | 159 | 43 | 601   |
| PEAK HR.<br>FACTOR: | 0.674 |    |   | 0.776 |    |    | 0.767 |    |    | 0.858 |     |    | 0.868 |

CONTROL: **4-Way Stop**

# Intersection Turning Movement

Prepared by:

**National Data & Surveying Services**

N-S STREET: [Locan Ave](#)

DATE: [12/15/2009](#)

LOCATION: [City of Clovis](#)

E-W STREET: [Bullard Ave](#)

DAY: [TUESDAY](#)

PROJECT# [09-8118-001](#)

|         | NORTHBOUND        |                    |                   | SOUTHBOUND        |                    |                    | EASTBOUND         |                    |                    | WESTBOUND         |                    |                   |       |
|---------|-------------------|--------------------|-------------------|-------------------|--------------------|--------------------|-------------------|--------------------|--------------------|-------------------|--------------------|-------------------|-------|
| LANES:  | NL                | NT                 | NR                | SL                | ST                 | SR                 | EL                | ET                 | ER                 | WL                | WT                 | WR                | TOTAL |
|         | <a href="#">1</a> | <a href="#">1</a>  | <a href="#">0</a> | <a href="#">0</a> | <a href="#">1</a>  | <a href="#">0</a>  | <a href="#">1</a> | <a href="#">1</a>  | <a href="#">1</a>  | <a href="#">1</a> | <a href="#">1</a>  | <a href="#">0</a> |       |
| 1:00 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 1:15 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 1:30 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 1:45 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 2:00 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 2:15 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 2:30 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 2:45 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 3:00 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 3:15 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 3:30 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 3:45 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 4:00 PM | <a href="#">9</a> | <a href="#">7</a>  | <a href="#">1</a> | <a href="#">4</a> | <a href="#">8</a>  | <a href="#">2</a>  | <a href="#">3</a> | <a href="#">26</a> | <a href="#">5</a>  | <a href="#">2</a> | <a href="#">31</a> | <a href="#">4</a> | 102   |
| 4:15 PM | <a href="#">3</a> | <a href="#">10</a> | <a href="#">1</a> | <a href="#">0</a> | <a href="#">9</a>  | <a href="#">6</a>  | <a href="#">8</a> | <a href="#">31</a> | <a href="#">5</a>  | <a href="#">1</a> | <a href="#">23</a> | <a href="#">6</a> | 103   |
| 4:30 PM | <a href="#">5</a> | <a href="#">15</a> | <a href="#">1</a> | <a href="#">8</a> | <a href="#">18</a> | <a href="#">12</a> | <a href="#">8</a> | <a href="#">38</a> | <a href="#">5</a>  | <a href="#">1</a> | <a href="#">17</a> | <a href="#">4</a> | 132   |
| 4:45 PM | <a href="#">9</a> | <a href="#">6</a>  | <a href="#">4</a> | <a href="#">5</a> | <a href="#">22</a> | <a href="#">5</a>  | <a href="#">5</a> | <a href="#">29</a> | <a href="#">5</a>  | <a href="#">4</a> | <a href="#">20</a> | <a href="#">1</a> | 115   |
| 5:00 PM | <a href="#">5</a> | <a href="#">5</a>  | <a href="#">1</a> | <a href="#">3</a> | <a href="#">12</a> | <a href="#">7</a>  | <a href="#">4</a> | <a href="#">23</a> | <a href="#">9</a>  | <a href="#">0</a> | <a href="#">23</a> | <a href="#">1</a> | 93    |
| 5:15 PM | <a href="#">3</a> | <a href="#">12</a> | <a href="#">2</a> | <a href="#">1</a> | <a href="#">19</a> | <a href="#">1</a>  | <a href="#">4</a> | <a href="#">28</a> | <a href="#">7</a>  | <a href="#">1</a> | <a href="#">34</a> | <a href="#">4</a> | 116   |
| 5:30 PM | <a href="#">5</a> | <a href="#">12</a> | <a href="#">3</a> | <a href="#">4</a> | <a href="#">9</a>  | <a href="#">2</a>  | <a href="#">5</a> | <a href="#">26</a> | <a href="#">11</a> | <a href="#">1</a> | <a href="#">19</a> | <a href="#">3</a> | 100   |
| 5:45 PM | <a href="#">2</a> | <a href="#">6</a>  | <a href="#">1</a> | <a href="#">1</a> | <a href="#">9</a>  | <a href="#">4</a>  | <a href="#">3</a> | <a href="#">21</a> | <a href="#">7</a>  | <a href="#">1</a> | <a href="#">12</a> | <a href="#">1</a> | 68    |
| 6:00 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 6:15 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 6:30 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |
| 6:45 PM |                   |                    |                   |                   |                    |                    |                   |                    |                    |                   |                    |                   |       |

|           |    |    |    |    |     |    |    |     |    |    |     |    |       |
|-----------|----|----|----|----|-----|----|----|-----|----|----|-----|----|-------|
| TOTAL     | NL | NT | NR | SL | ST  | SR | EL | ET  | ER | WL | WT  | WR | TOTAL |
| VOLUMES = | 41 | 73 | 14 | 26 | 106 | 39 | 40 | 222 | 54 | 11 | 179 | 24 | 829   |

PM Peak Hr Begins at: 430 PM

|           |    |                       |   |    |                       |    |    |                       |    |   |                       |    |                       |
|-----------|----|-----------------------|---|----|-----------------------|----|----|-----------------------|----|---|-----------------------|----|-----------------------|
| PEAK      |    |                       |   |    |                       |    |    |                       |    |   |                       |    |                       |
| VOLUMES = | 22 | 38                    | 8 | 17 | 71                    | 25 | 21 | 118                   | 26 | 6 | 94                    | 10 | 456                   |
| PEAK HR.  |    |                       |   |    |                       |    |    |                       |    |   |                       |    |                       |
| FACTOR:   |    | <a href="#">0.810</a> |   |    | <a href="#">0.743</a> |    |    | <a href="#">0.809</a> |    |   | <a href="#">0.705</a> |    | <a href="#">0.864</a> |

CONTROL: [4-Way Stop](#)

## Appendix D: Traffic Modeling



**Traffic Engineering, Inc.**

<http://www.JLBtraffic.com>

*Traffic Engineering, Transportation Planning, & Parking Solutions*

[info@JLBtraffic.com](mailto:info@JLBtraffic.com)

*1300 E. Shaw Ave., Ste. 103*

*Fresno, CA 93710*

*(559) 570-8991*

*Page | D*



~~September 29~~ [October 3](#), 2016

Kai Han, P.E.  
Council of Fresno County Governments  
2035 Tulare Street, Suite 201  
Fresno, CA 93721

Via Email Only:

**Subject: [Revised](#) Traffic Modeling Request for the Preparation of a Traffic Impact Analysis for the Proposed Master Plan Expansion of the Clovis Community Medical Center in the City of Clovis (JLB Project 006-009)**

Dear Mr. Han,

JLB Traffic Engineering, Inc. (JLB) hereby requests traffic modeling for the project described below. [The purpose of this revision is to correct the land use and trip generation for the 2 to 10 year plan.](#) The Project to be evaluated includes two components. The first component is the proposed Clovis Community Medical Center (CCMC) Expansion Project, which is a phased project over the next 20 years. The CCMC expansion plan includes construction of new inpatient bed towers, medical office buildings, a general support building, a cancer center, a central plant and a parking garage, as well as expansion of the emergency department, surgical facilities, materials management and the outpatient community center. In addition, the CCMC project includes the potential development of areas adjacent to the main campus, primarily with retail commercial buildings, as well as a hotel and an assisted living center.

The second project component is the proposed widening of Herndon Avenue from Temperance Avenue to De Wolf Avenue (South Leg). Per information provided to JLB, the Project is consistent with the City of Clovis General Plan. An aerial of the Project vicinity and the conceptual site plan are shown in Exhibits A and B respectively.

### Scenarios:

The following scenarios are requested:

1. Base Year 2016 (with Link and TAZ modifications);
2. Short Term Year 2026 Plus Project Phase I select zone analysis (with link and TAZ modifications);
3. Cumulative Year 2035 No Project (with Link and TAZ modifications);
4. Cumulative Year 2035 plus Project Phases I and 2 select zone analysis (with Link and TAZ modifications); and
5. Differences between model runs 3 and I and 4 and I above.



TRAFFIC ENGINEERING, INC.

Traffic Engineering, transportation Planning & Parking Solutions

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1300 E Shaw Ave, Ste. 103

Fresno, CA 93710

(559) 570-8991

Page | 1

## Changes and/or additions to the Model Network or TAZ Zones

### LINK MODIFICATIONS (All Scenarios):

1. Add Highland Avenue between Nees Avenue and Alluvial Avenue
  - a. Number of lanes: Two lanes, one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH
2. Add Tollhouse Road between Herndon Avenue and the north terminus of Old Temperance Road at a point approximately 2,000 feet to the northeast
  - a. Number of lanes: Two lanes one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH
3. Add Fir Avenue (approximately 350 feet in length) between Temperance Avenue and Medical Center Drive West
  - a. Number of lanes: Four lanes (divided), two in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH
4. Add Coventry Avenue (approximately 100 feet in length) between Herndon Avenue and Medical Center Drive
  - a. Number of lanes: Four lanes, two in each direction
  - b. Street classification: Local Collector
  - c. Speed: 25 MPH
5. Add Coventry Avenue between Herndon Avenue and a point approximately 1,000 feet to the south
  - a. Number of lanes: Two lanes, one in each direction
  - b. Street classification: Local
  - c. Speed: 25 MPH
6. Modify Locan Avenue between Shepherd Avenue and Nees Avenue to include two lanes (one in each direction).
7. Modify Fowler Avenue between Bullard Avenue and Sierra Avenue to four lanes (two lanes in each direction). There is a small segment in the southbound direction for which the base year 2016 model has one lane where two exist.
8. Add Medical Center Drive East and West to completely encircle the Medical Center Complex
  - a. Number of lanes: Two lanes, one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH
9. Extend Tollhouse Road to meet Medical Center Drive East
  - a. Number of lanes: Two lanes one in each direction
  - b. Street classification: Collector
  - c. Speed: 30 MPH



10. Add Medical Center Drive East and West completely encircle the Medical Center Complex
  - a. Number of lanes: Two lanes one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH

**LINK MODIFICATIONS (Base Year 2016 and Mid Term Year 2026 Scenarios):**

1. Modify Fowler Avenue between Herndon Avenue and Alluvial Avenue to four lanes (two lanes in each direction).
2. Modify Armstrong Avenue between Herndon Avenue and Alluvial Avenue to two lanes (one lane in each direction).
3. Modify Herndon Avenue between Fowler Avenue and Armstrong Avenue to six lanes (three lanes in each direction).
4. Modify Herndon Avenue between Armstrong Avenue and a point one quarter mile to the east to include three lanes in the eastbound direction.
5. Modify Herndon Avenue between Temperance Avenue and a point one quarter mile to the west to include three lanes in the westbound direction.
6. Extend Alluvial Avenue from its intersection with Temperance Avenue easterly to a point approximately 700 feet east to include:
  - a. Number of lanes: Two lanes (one in each direction)
  - b. Street classification: Arterial
  - c. Speed: 40 MPH

**LINK MODIFICATIONS (Base Year 2016 and 2026 Scenarios):**

1. Modify De Wolf Avenue between Bullard Avenue and Barstow Avenue to two lanes (one lanes in each direction).
2. Add Leonard Avenue between Nees Avenue and Alluvial Avenue
  - a. Number of lanes: Two lanes one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH

**LINK MODIFICATIONS (Year 2026 and Year 2035 plus and No Project Scenarios Only):**

1. Add Road A between Temperance Avenue and Medical Center Drive
  - a. Number of lanes: Two lanes (one in each direction)
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH

**LINK MODIFICATIONS (Year 2026 and Year 2035 plus Project Scenarios Only):**

1. Modify Herndon Avenue between Temperance Avenue and Coventry Road
  - a. Number of lanes: six lanes (three in each direction)



- b. Street classification: Arterial
- c. Speed: 45 MPH
- 2. Modify Herndon Avenue between Coventry Road and South Leg of De Wolf Avenue
  - a. Number of lanes: four lanes (two in each direction)
  - b. Street classification: Arterial
  - c. Speed: 45 MPH

**TAZ MODIFICATIONS (Base Year 2016 and Mid Term Year 2026 Scenarios):**

- 1. Add a connector from TAZ 265 to Leonard Avenue;

**TAZ MODIFICATIONS (All Scenarios):**

- 1. Add a connector from TAZ 1833 to Nees Avenue;
- 2. Add connectors from TAZ 671 to Leonard Avenue, and Highland Avenue;
- 3. Add a connector from TAZ 1834 to Highland Avenue;
- 4. Split TAZ number 264 into two (2) new TAZ zones as follows:
  - a. 264A bounded by Nees Avenue to the north, Temperance Avenue to the west, the canal to the south, and Locan Avenue to the east, with connectors to Nees Avenue, Temperance Avenue, and Locan Avenue.
  - b. 264B bounded by the Canal to the north, Temperance Avenue to the west, and SR 168 to the south. Add TAZ one TAZ connector to Alluvial Avenue.
- 5. Add a connector from TAZ 1724 to Tollhouse Road;
- 6. Add connectors from TAZ 669 to Tollhouse Road and Temperance Avenue.
- 7. Split TAZ number 670 to create three TAZs as follows:
  - a. 670A bounded by SR 168 to the north, TAZ 669 to the west, Herndon Avenue to the south, and Temperance Avenue to the east, with connectors to Herndon Avenue, Temperance Avenue and Tollhouse Avenue.
  - b. 670B bounded by SR 168 to the north, Temperance Avenue to the west, Herndon Avenue to the south, and irrigation canal to the east, with connectors to Medical Center Drive East, Medical Center Drive West, and Medical Drive North.
  - c. 670C is the remainder of TAZ 670 east of the canal, with connectors to Nees Avenue.
- 8. Split TAZ number 732 to create four TAZs as follows:
  - a. 732A bounded by Sierra Avenue Alignment to the south, Temperance to the west, Locan Avenue to the east, and the north edge of the existing residential and Cedarwood Elementary School to the North. TAZ 732A should have connectors to Temperance Avenue, Locan Avenue and to the south terminus of Coventry Avenue. Any portions of land remaining from original TAZ 732 after TAZ 732 B through D are created should be added to TAZ 732A.



- b. 732B bounded by Herndon Avenue to the north, Temperance Avenue to the west, the existing residential to the south, the west boundary of TAZ 732D to the east. TAZ 732B should have connectors to Herndon Avenue and to Coventry Avenue.
  - c. 732C bounded to the west at a point approximately 350 feet west of Coventry Avenue, Herndon to the north, Coventry Avenue to the east, and the existing residential to the south. TAZ 732C should have connectors to Herndon Avenue and Coventry Avenue. TAZ 732C shall retain the existing land uses which are not part of the CCMC.
  - d. 732D bound to the west by Coventry Avenue, Herndon Avenue to the north, a point approximately 870 feet to the east of Coventry Avenue and the north boundary of the Cedarwood Elementary School to the south. TAZ 732D should have connectors to Herndon Avenue and Coventry Avenue.
9. Modify TAZ number 732 as follow:
- e. Delete the connector to Herndon Avenue;
  - f. Add a connector to the south terminus of Coventry; and
  - g. Add a connector to Temperance Avenue.

**(Modifications are further illustrated in Exhibit C)**

### ***Trip Generation***

Trip generation for the proposed Project is based on information provided by the developer and the Institute of Transportation Engineers (ITE) reference, *Trip Generation, 9th Edition*. Table I below provides the trip generation for the Project under the Two to Ten Year Plan (Short Term), while Table II provides the trip generation of the Project under the Twenty Year Plan (Long Term Plan), while Table III provides the combined trip generation of both the short term and long term plans.

**Table I: Existing Land Use Trip Generation**

| Land Use (ITE CODE)                  | TAZ  | Size    | Unit   | Daily |               | A.M. Peak Hour |            |            |            |              | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|------|---------|--------|-------|---------------|----------------|------------|------------|------------|--------------|----------------|------------|------------|------------|--------------|
|                                      |      |         |        | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total        | Trip Rate      | In : Out % | In         | Out        | Total        |
| Hospital (610)                       | 670B | 471.715 | k.s.f. | 13.22 | 6,236         | 0.95           | 63 : 37    | 282        | 166        | 448          | 0.93           | 38 : 62    | 167        | 272        | 439          |
| Medical-Dental Office Building (710) | 670B | 247.833 | k.s.f. | 36.13 | 8,954         | 2.39           | 79 : 21    | 468        | 124        | 592          | 3.57           | 28 : 72    | 248        | 637        | 885          |
| <b>Total Project Trips</b>           |      |         |        |       | <b>15,190</b> |                |            | <b>750</b> | <b>290</b> | <b>1,040</b> |                |            | <b>415</b> | <b>909</b> | <b>1,324</b> |



**Table II: Year 2026 Project Only Trip Generation (Phase I: 2 to 10 Year Plan)**

| Land Use (ITE CODE)                  | TAZ  | Size                         | Unit          | Daily |                             | A.M. Peak Hour |            |                       |                       |                       | P.M. Peak Hour |            |                       |                       |                           |
|--------------------------------------|------|------------------------------|---------------|-------|-----------------------------|----------------|------------|-----------------------|-----------------------|-----------------------|----------------|------------|-----------------------|-----------------------|---------------------------|
|                                      |      |                              |               | Rate  | Total                       | Trip Rate      | In : Out % | In                    | Out                   | Total                 | Trip Rate      | In : Out % | In                    | Out                   | Total                     |
| Hotel (310)                          | 670A | 150                          | Occupied Beds | 8.92  | 1,338                       | 0.67           | 58 : 42    | 59                    | 42                    | 101                   | 0.70           | 49 : 51    | 51                    | 54                    | 105                       |
| Shopping Center (820)                | 670A | 150,000                      | k.s.f         | 42.70 | 6,405                       | 0.96           | 62 : 38    | 89                    | 55                    | 144                   | 3.71           | 48 : 52    | 267                   | 290                   | 557                       |
| Hospital (610)                       | 670B | 300,172                      | k.s.f.        | 13.22 | 3,968                       | 0.95           | 63 : 37    | 180                   | 105                   | 285                   | 0.93           | 38 : 62    | 106                   | 173                   | 279                       |
| Medical-Dental Office Building (710) | 670B | 94,392<br><del>161,500</del> | k.s.f         | 36.13 | 3,410<br><del>5,835</del>   | 2.39           | 79 : 21    | 179<br><del>305</del> | 47<br><del>81</del>   | 226<br><del>386</del> | 3.57           | 28 : 72    | 94<br><del>162</del>  | 243<br><del>415</del> | 337<br><del>577</del>     |
| <b>Total Project Trips</b>           |      |                              |               |       | 15,121<br><del>17,546</del> |                |            | 507<br><del>633</del> | 248<br><del>283</del> | 756<br><del>916</del> |                |            | 518<br><del>586</del> | 760<br><del>932</del> | 1,278<br><del>1,518</del> |

Notes: ksf = Thousand Square Feet

**Table III: Year 2035 Additional Project Only Trip Generation (Phase 2: 20 Year Plan)**

| Land Use (ITE CODE)                  | TAZ  | Size    | Unit          | Daily |        | A.M. Peak Hour |            |     |     |       | P.M. Peak Hour |            |     |     |       |
|--------------------------------------|------|---------|---------------|-------|--------|----------------|------------|-----|-----|-------|----------------|------------|-----|-----|-------|
|                                      |      |         |               | Rate  | Total  | Trip Rate      | In : Out % | In  | Out | Total | Trip Rate      | In : Out % | In  | Out | Total |
| Assisted Living (254)                | 732D | 100     | Occupied Beds | 2.74  | 274    | 0.18           | 68 : 32    | 12  | 6   | 18    | 0.29           | 50 : 50    | 15  | 14  | 29    |
| Hospital (610)                       | 670B | 168,672 | k.s.f.        | 13.22 | 2,230  | 0.95           | 63 : 37    | 101 | 59  | 160   | 0.93           | 38 : 62    | 60  | 97  | 157   |
| Medical-Dental Office Building (710) | 670B | 260,000 | k.s.f         | 36.13 | 9,394  | 2.39           | 79 : 21    | 491 | 130 | 621   | 3.57           | 28 : 72    | 260 | 668 | 928   |
| Shopping Center (820)                | 732B | 70,000  | k.s.f         | 42.70 | 2,989  | 0.96           | 62 : 38    | 42  | 25  | 67    | 3.71           | 48 : 52    | 125 | 135 | 260   |
| <b>Total Project Trips</b>           |      |         |               |       | 14,887 |                |            | 646 | 220 | 866   |                |            | 460 | 914 | 1,374 |

Notes: ksf = Thousand Square Feet

**Table IV: Year 2035 Total Project Only Trip Generation**

|                            | Daily                       |                           | A.M. Peak Hour        |                           |                         | P.M. Peak Hour            |                           |       |
|----------------------------|-----------------------------|---------------------------|-----------------------|---------------------------|-------------------------|---------------------------|---------------------------|-------|
|                            | Total                       |                           | In                    | Out                       | Total                   | In                        | Out                       | Total |
| <b>Total Project Trips</b> | 30,008<br><del>32,433</del> | 1,153<br><del>1,279</del> | 469<br><del>503</del> | 1,622<br><del>1,782</del> | 978<br><del>1,046</del> | 1,674<br><del>1,846</del> | 2,652<br><del>2,892</del> |       |



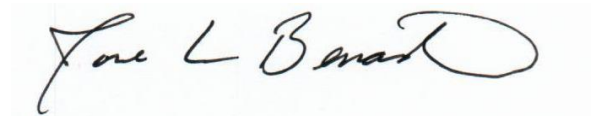
Mr. Han

Fresno COG Modeling Request (Project 006-009)

~~September 29~~ October 3, 2016

Since the City of Clovis is our Client we have assumed that Fresno COG will complete this modeling work at no cost to JLB. If this is not the case, please let us know ASAP so that we may communicate this with City of Clovis staff. Our contact person at the City of Clovis is Mr. Bryan Araki, If you have any questions or require additional information, please contact me at (559) 570-8991 or by email at [jbenavides@JLBtraffic.com](mailto:jbenavides@JLBtraffic.com).

Sincerely,



Jose Luis Benavides, P.E., T.E.

President

cc: Muyi Zhou, Senior Regional Planner

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TRAFFIC ENGINEERING, INC.

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1300 E Shaw Ave. Ste. 103

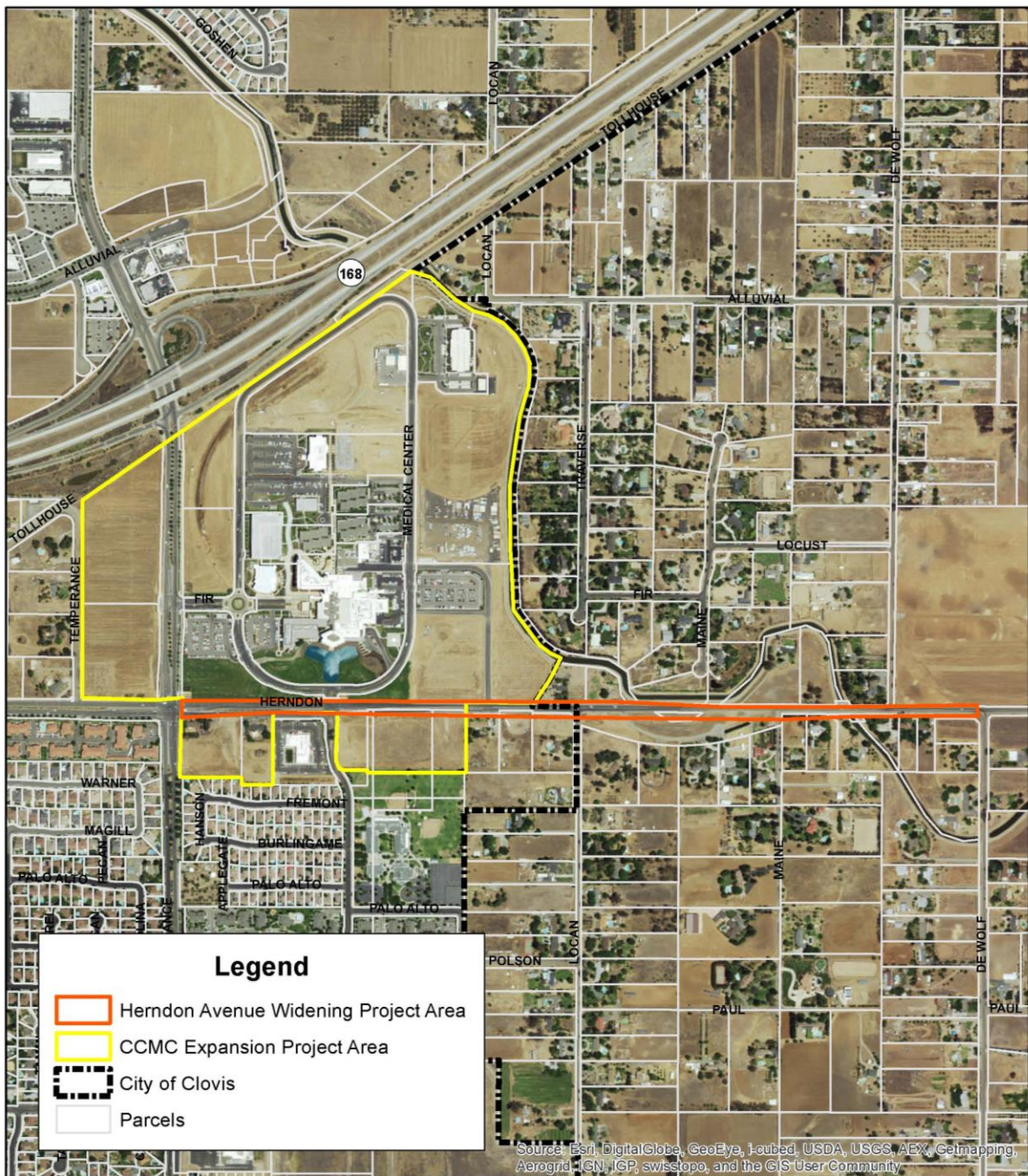
Fresno, CA 93710

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Page | 7



## Exhibit A – Aerial



Source: County of Fresno, City of Clovis, ESRI

### Project Area

Figure 2

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
 City of Clovis

ODELL Planning & Research, Inc.





## Exhibit B – Site Plan

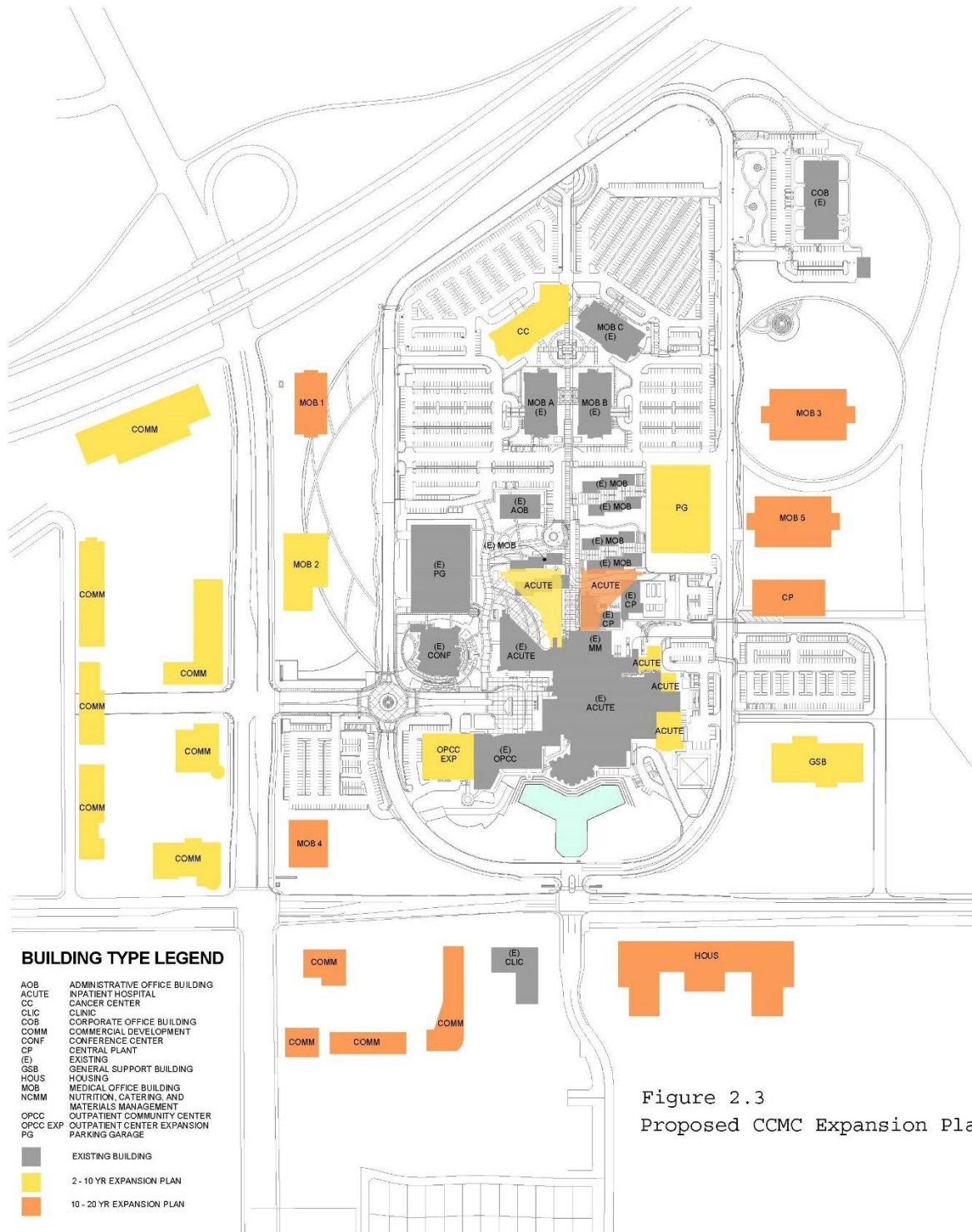
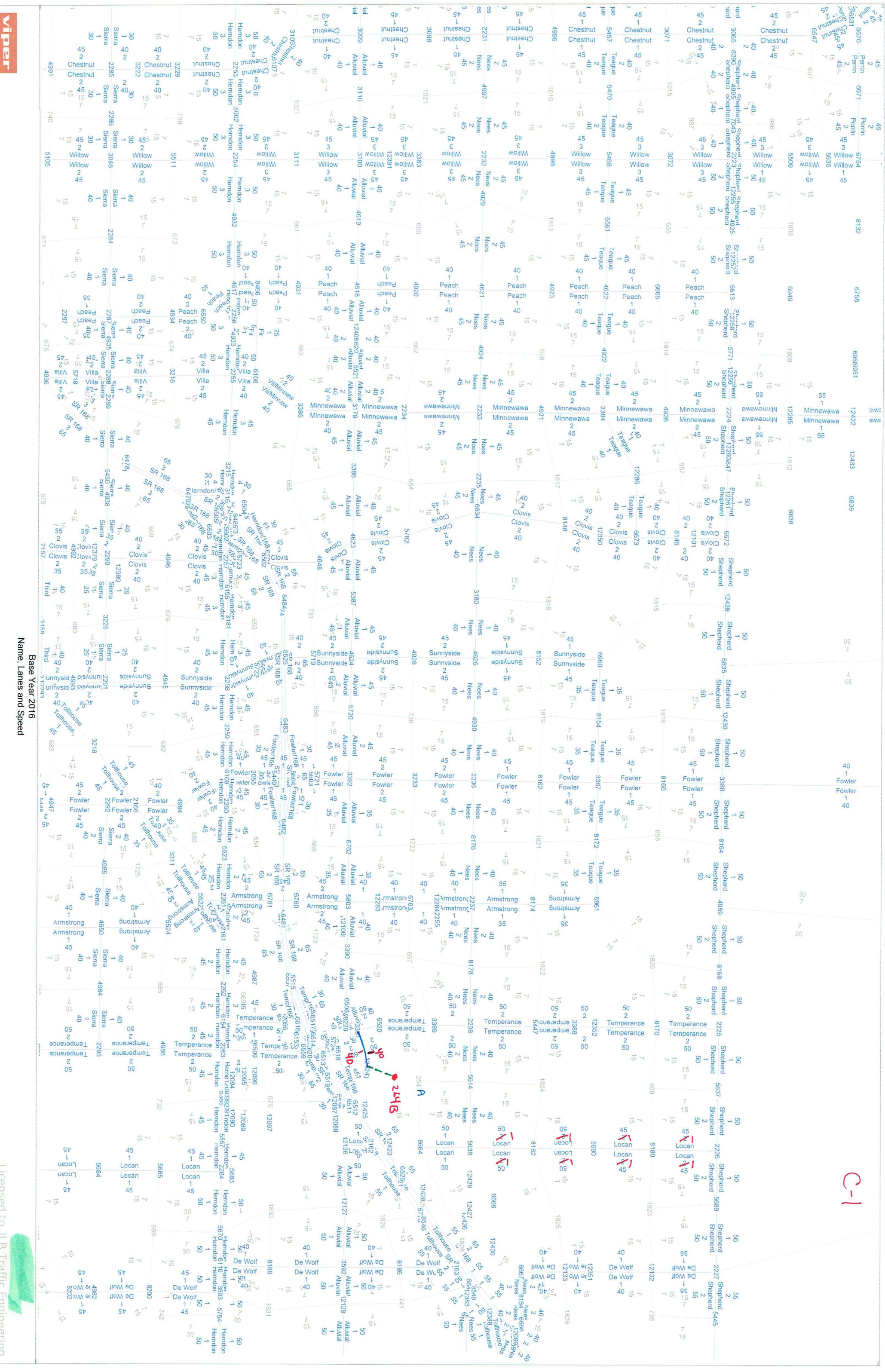


Figure 2.3  
 Proposed CCMC Expansion Plan

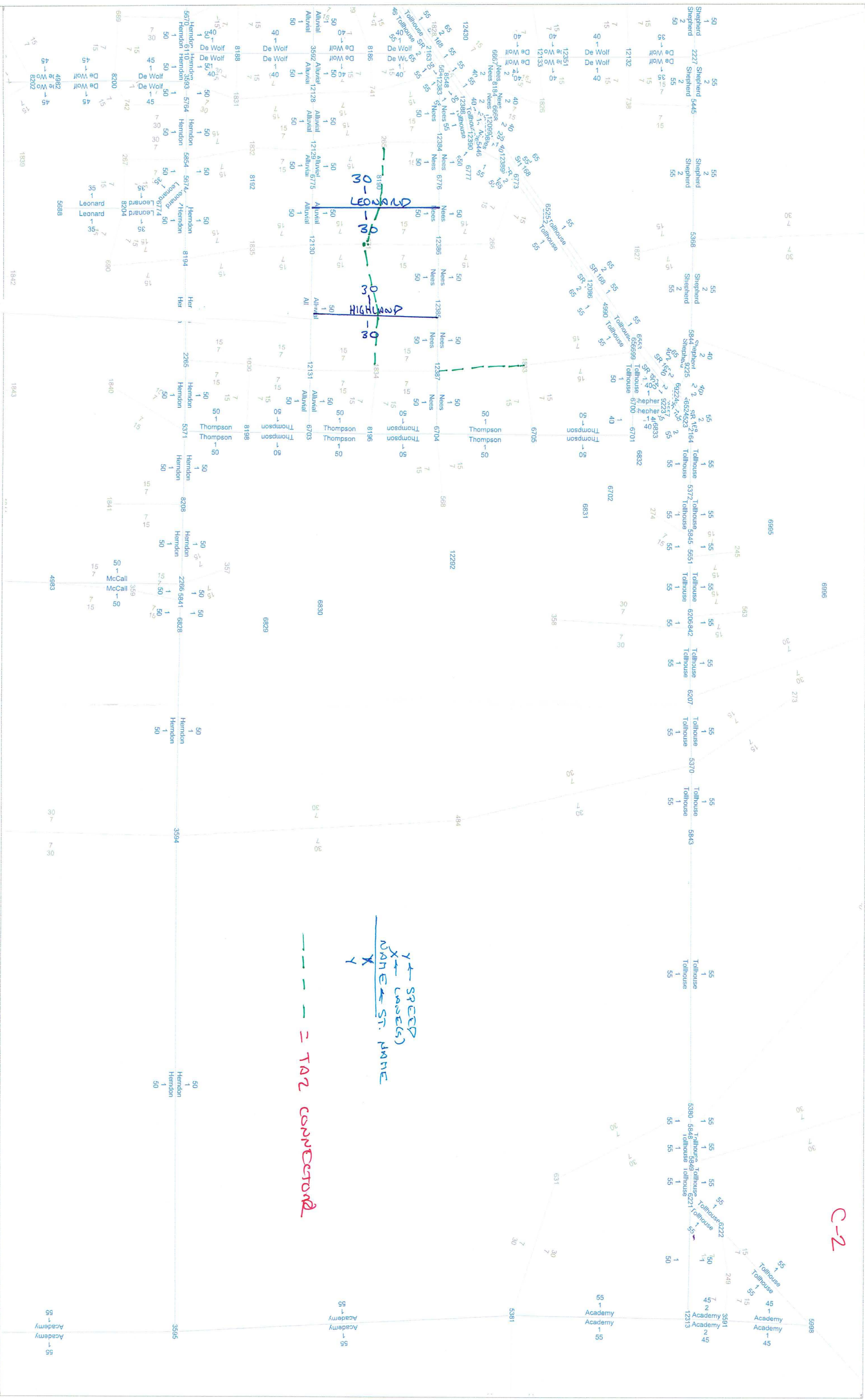




Base Year 2016  
Name, Lanes and Speed



Name, Lanes and Speed



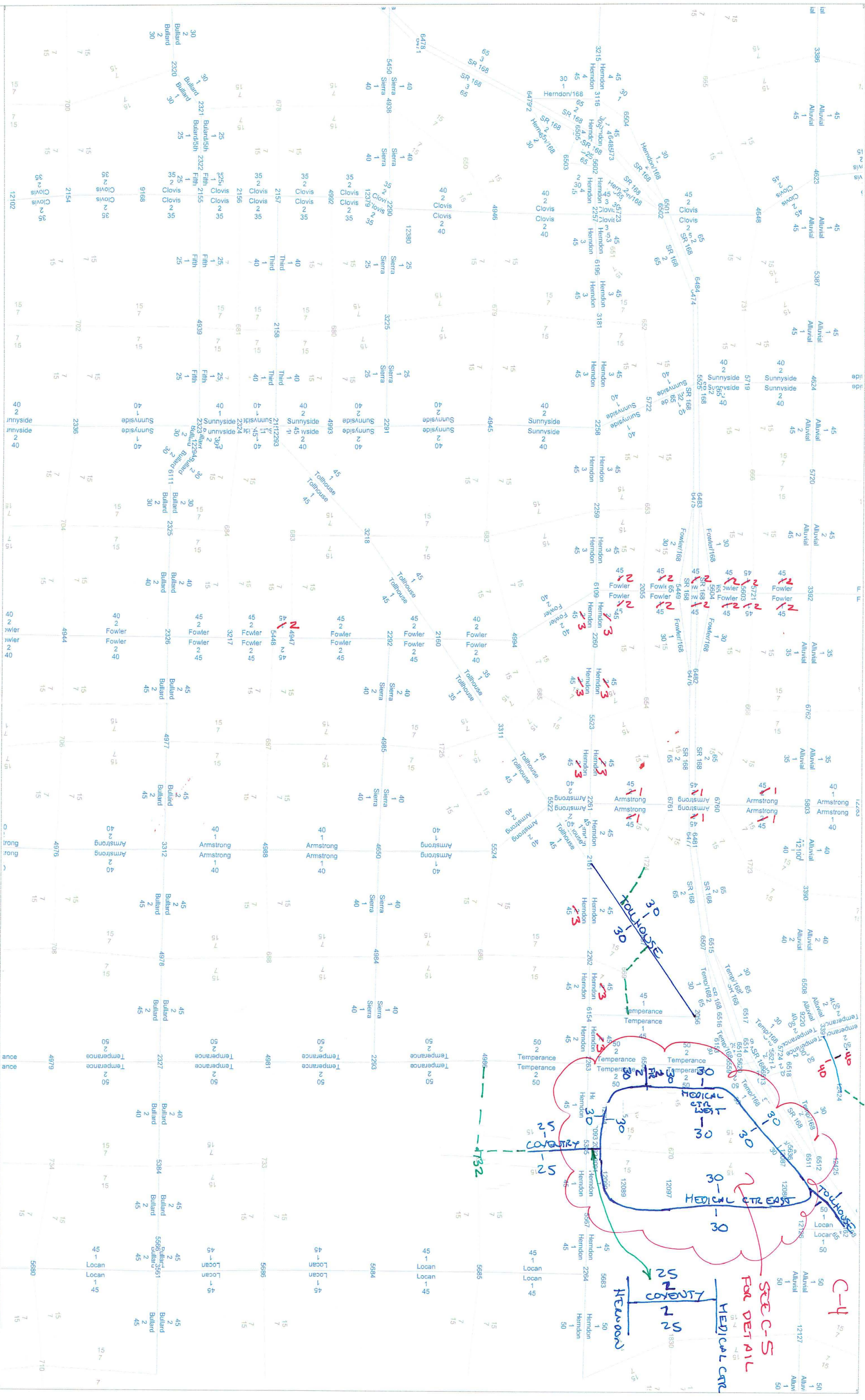
C-3

6829

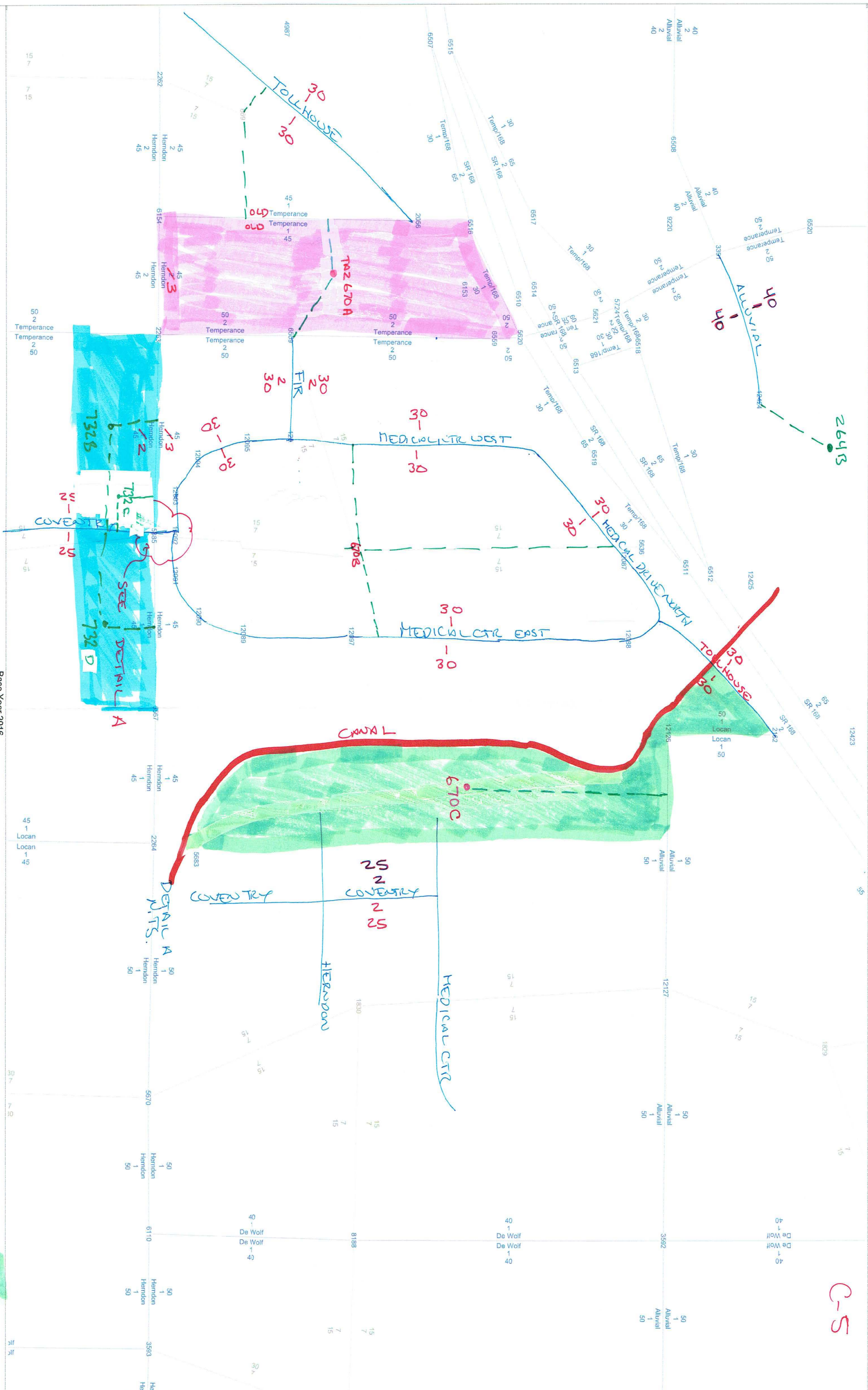


Base Year 2016  
Name, Lanes and Speed

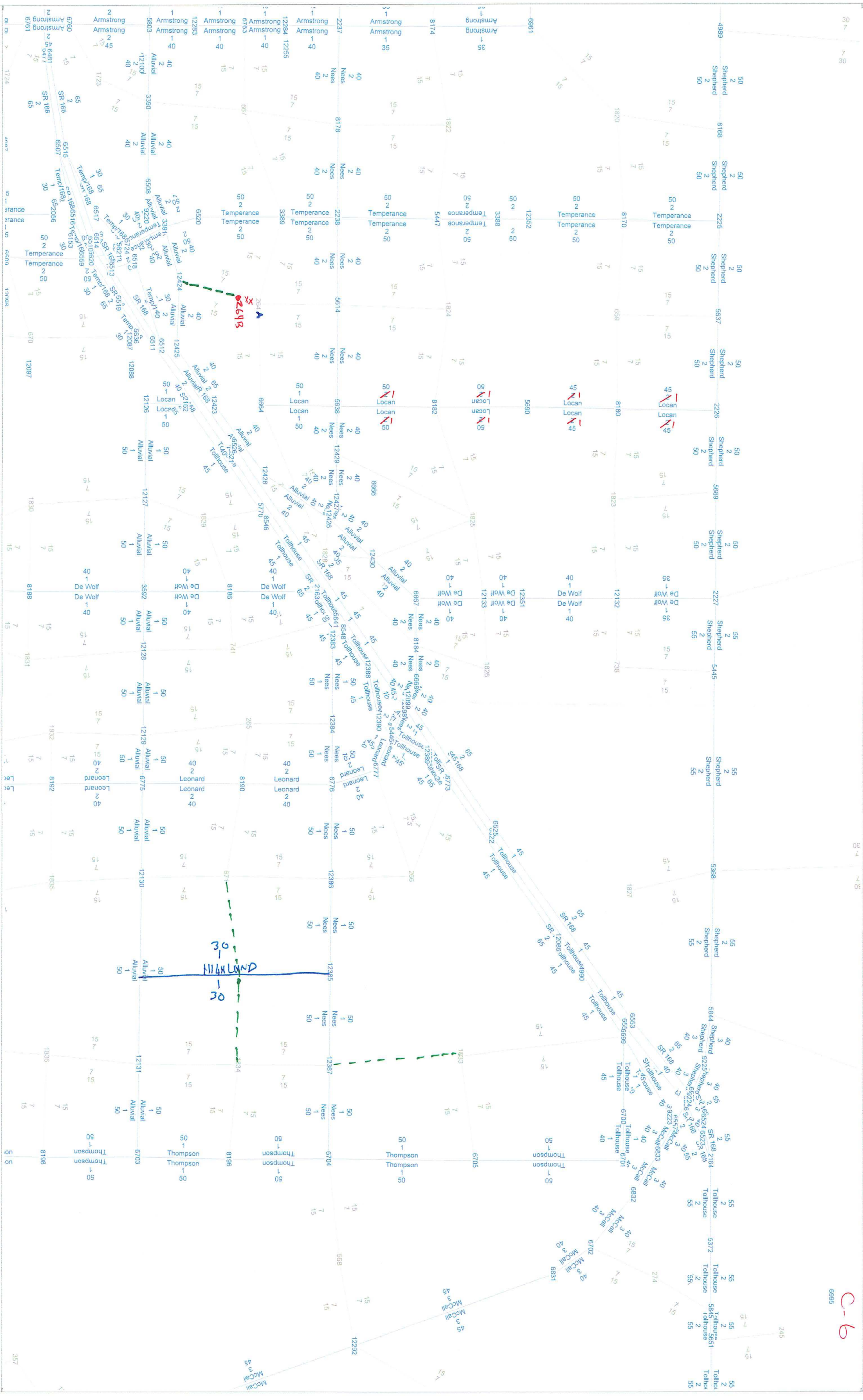




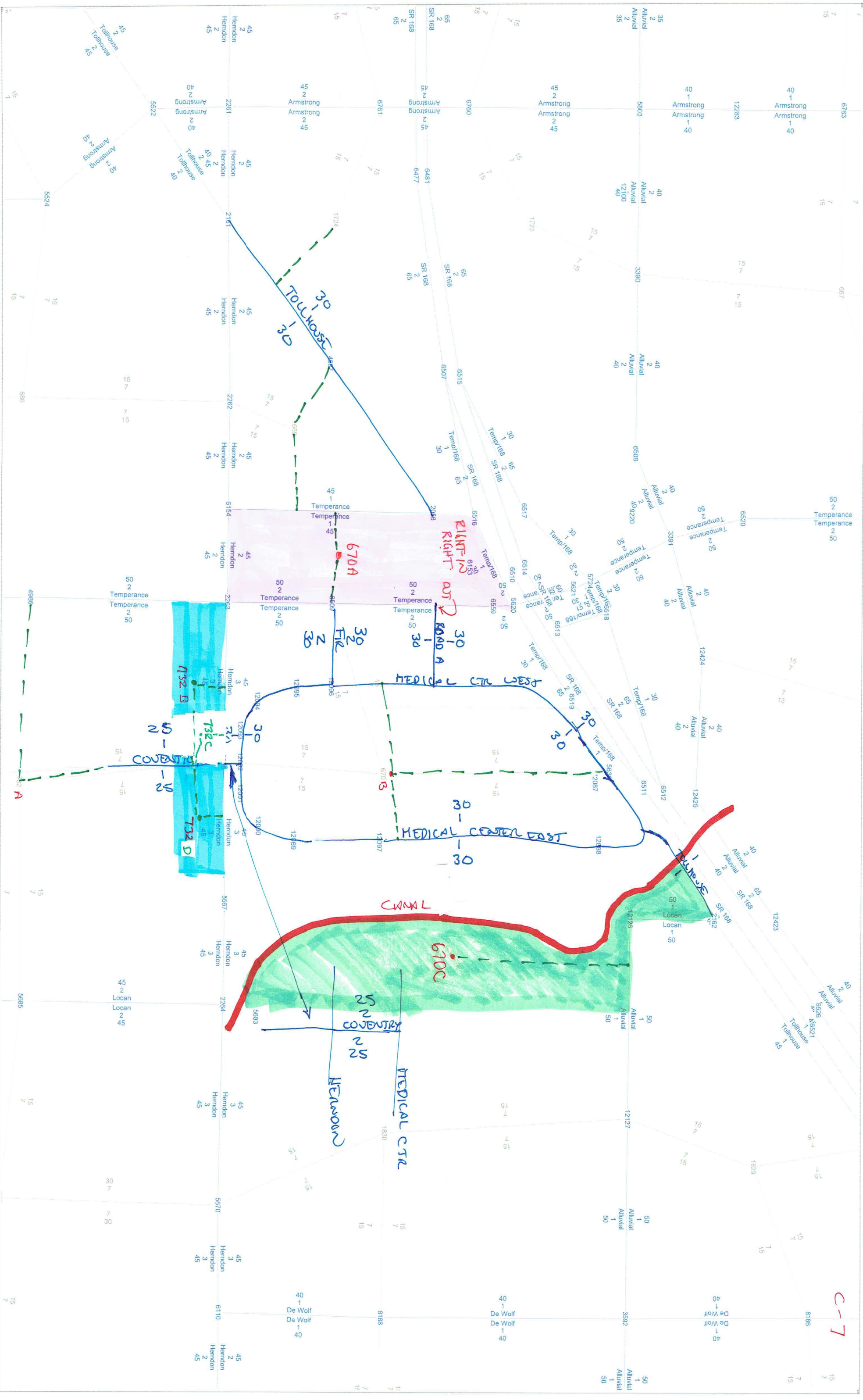








Base Year 2035  
Name, Lanes and Speed





September 20, 2016

Kai Han, P.E.  
Council of Fresno County Governments  
2035 Tulare Street, Suite 201  
Fresno, CA 93721

Via Email Only:

**Subject: Traffic Modeling Request for the Preparation of a Traffic Impact Analysis for the Proposed Master Plan Expansion of the Clovis Community Medical Center in the City of Clovis (JLB Project 006-009)**

Dear Mr. Han,

JLB Traffic Engineering, Inc. (JLB) hereby requests traffic modeling for the project described below. The Project to be evaluated includes two components. The first component is the proposed Clovis Community Medical Center (CCMC) Expansion Project, which is a phased project over the next 20 years. The CCMC expansion plan includes construction of new inpatient bed towers, medical office buildings, a general support building, a cancer center, a central plant and a parking garage, as well as expansion of the emergency department, surgical facilities, materials management and the outpatient community center. In addition, the CCMC project includes the potential development of areas adjacent to the main campus, primarily with retail commercial buildings, as well as a hotel and an assisted living center.

The second project component is the proposed widening of Herndon Avenue from Temperance Avenue to De Wolf Avenue (South Leg). Per information provided to JLB, the Project is consistent with the City of Clovis General Plan. An aerial of the Project vicinity and the conceptual site plan are shown in Exhibits A and B respectively.

#### **Scenarios:**

The following scenarios are requested:

1. Base Year 2016 (with Link and TAZ modifications);
2. Short Term Year 2026 Plus Project Phase I select zone analysis (with link and TAZ modifications);
3. Cumulative Year 2035 No Project (with Link and TAZ modifications);
4. Cumulative Year 2035 plus Project Phases I and 2 select zone analysis (with Link and TAZ modifications); and
5. Differences between model runs 3 and I and 4 and I above.



**TRAFFIC ENGINEERING, INC.**

*Traffic Engineering, transportation Planning & Parking Solutions*

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1300 E Shaw Ave, Ste. 103

Fresno, CA 93710

(559) 570-8991

*Page | 1*

## Changes and/or additions to the Model Network or TAZ Zones

### LINK MODIFICATIONS (All Scenarios):

1. Add Highland Avenue between Nees Avenue and Alluvial Avenue
  - a. Number of lanes: Two lanes, one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH
2. Add Tollhouse Road between Herndon Avenue and the north terminus of Old Temperance Road at a point approximately 2,000 feet to the northeast
  - a. Number of lanes: Two lanes one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH
3. Add Fir Avenue (approximately 350 feet in length) between Temperance Avenue and Medical Center Drive West
  - a. Number of lanes: Four lanes (divided), two in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH
4. Add Coventry Avenue (approximately 100 feet in length) between Herndon Avenue and Medical Center Drive
  - a. Number of lanes: Four lanes, two in each direction
  - b. Street classification: Local Collector
  - c. Speed: 25 MPH
5. Add Coventry Avenue between Herndon Avenue and a point approximately 1,000 feet to the south
  - a. Number of lanes: Two lanes, one in each direction
  - b. Street classification: Local
  - c. Speed: 25 MPH
6. Modify Locan Avenue between Shepherd Avenue and Nees Avenue to include two lanes (one in each direction).
7. Modify Fowler Avenue between Bullard Avenue and Sierra Avenue to four lanes (two lanes in each direction). There is a small segment in the southbound direction for which the base year 2016 model has one lane where two exist.
8. Add Medical Center Drive East and West to completely encircle the Medical Center Complex
  - a. Number of lanes: Two lanes, one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH
9. Extend Tollhouse Road to meet Medical Center Drive East
  - a. Number of lanes: Two lanes one in each direction
  - b. Street classification: Collector
  - c. Speed: 30 MPH



10. Add Medical Center Drive East and West completely encircle the Medical Center Complex
  - a. Number of lanes: Two lanes one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH

**LINK MODIFICATIONS (Base Year 2016 and Mid Term Year 2026 Scenarios):**

1. Modify Fowler Avenue between Herndon Avenue and Alluvial Avenue to four lanes (two lanes in each direction).
2. Modify Armstrong Avenue between Herndon Avenue and Alluvial Avenue to two lanes (one lane in each direction).
3. Modify Herndon Avenue between Fowler Avenue and Armstrong Avenue to six lanes (three lanes in each direction).
4. Modify Herndon Avenue between Armstrong Avenue and a point one quarter mile to the east to include three lanes in the eastbound direction.
5. Modify Herndon Avenue between Temperance Avenue and a point one quarter mile to the west to include three lanes in the westbound direction.
6. Extend Alluvial Avenue from its intersection with Temperance Avenue easterly to a point approximately 700 feet east to include:
  - a. Number of lanes: Two lanes (one in each direction)
  - b. Street classification: Arterial
  - c. Speed: 40 MPH

**LINK MODIFICATIONS (Base Year 2016 and 2026 Scenarios):**

1. Modify De Wolf Avenue between Bullard Avenue and Barstow Avenue to two lanes (one lanes in each direction).
2. Add Leonard Avenue between Nees Avenue and Alluvial Avenue
  - a. Number of lanes: Two lanes one in each direction
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH

**LINK MODIFICATIONS (Year 2026 and Year 2035 plus and No Project Scenarios Only):**

1. Add Road A between Temperance Avenue and Medical Center Drive
  - a. Number of lanes: Two lanes (one in each direction)
  - b. Street classification: Local Collector
  - c. Speed: 30 MPH

**LINK MODIFICATIONS (Year 2026 and Year 2035 plus Project Scenarios Only):**

1. Modify Herndon Avenue between Temperance Avenue and Coventry Road
  - a. Number of lanes: six lanes (three in each direction)



- b. Street classification: Arterial
  - c. Speed: 45 MPH
2. Modify Herndon Avenue between Coventry Road and South Leg of De Wolf Avenue
- a. Number of lanes: four lanes (two in each direction)
  - b. Street classification: Arterial
  - c. Speed: 45 MPH

**TAZ MODIFICATIONS (Base Year 2016 and Mid Term Year 2026 Scenarios):**

- 1. Add a connector from TAZ 265 to Leonard Avenue;

**TAZ MODIFICATIONS (All Scenarios):**

- 1. Add a connector from TAZ 1833 to Nees Avenue;
- 2. Add connectors from TAZ 671 to Leonard Avenue, and Highland Avenue;
- 3. Add a connector from TAZ 1834 to Highland Avenue;
- 4. Split TAZ number 264 into two (2) new TAZ zones as follows:
  - a. 264A bounded by Nees Avenue to the north, Temperance Avenue to the west, the canal to the south, and Locan Avenue to the east, with connectors to Nees Avenue, Temperance Avenue, and Locan Avenue.
  - b. 264B bounded by the Canal to the north, Temperance Avenue to the west, and SR 168 to the south. Add TAZ one TAZ connector to Alluvial Avenue.
- 5. Add a connector from TAZ 1724 to Tollhouse Road;
- 6. Add connectors from TAZ 669 to Tollhouse Road and Temperance Avenue.
- 7. Split TAZ number 670 to create three TAZs as follows:
  - a. 670A bounded by SR 168 to the north, TAZ 669 to the west, Herndon Avenue to the south, and Temperance Avenue to the east, with connectors to Herndon Avenue, Temperance Avenue and Tollhouse Avenue.
  - b. 670B bounded by SR 168 to the north, Temperance Avenue to the west, Herndon Avenue to the south, and irrigation canal to the east, with connectors to Medical Center Drive East, Medical Center Drive West, and Medical Drive North.
  - c. 670C is the remainder of TAZ 670 east of the canal, with connectors to Nees Avenue.
- 8. Split TAZ number 732 to create four TAZs as follows:
  - a. 732A bounded by Sierra Avenue Alignment to the south, Temperance to the west, Locan Avenue to the east, and the north edge of the existing residential and Cedarwood Elementary School to the North. TAZ 732A should have connectors to Temperance Avenue, Locan Avenue and to the south terminus of Coventry Avenue. Any portions of land remaining from original TAZ 732 after TAZ 732 B through D are created should be added to TAZ 732A.



- b. 732B bounded by Herndon Avenue to the north, Temperance Avenue to the west, the existing residential to the south, the west boundary of TAZ 732D to the east. TAZ 732B should have connectors to Herndon Avenue and to Coventry Avenue.
  - c. 732C bounded to the west at a point approximately 350 feet west of Coventry Avenue, Herndon to the north, Coventry Avenue to the east, and the existing residential to the south. TAZ 732C should have connectors to Herndon Avenue and Coventry Avenue. TAZ 732C shall retain the existing land uses which are not part of the CCMC.
  - d. 732D bound to the west by Coventry Avenue, Herndon Avenue to the north, a point approximately 870 feet to the east of Coventry Avenue and the north boundary of the Cedarwood Elementary School to the south. TAZ 732D should have connectors to Herndon Avenue and Coventry Avenue.
9. Modify TAZ number 732 as follow:
- e. Delete the connector to Herndon Avenue;
  - f. Add a connector to the south terminus of Coventry; and
  - g. Add a connector to Temperance Avenue.

**(Modifications are further illustrated in Exhibit C)**

### ***Trip Generation***

Trip generation for the proposed Project is based on information provided by the developer and the Institute of Transportation Engineers (ITE) reference, *Trip Generation, 9th Edition*. Table I below provides the trip generation for the Project under the Two to Ten Year Plan (Short Term), while Table II provides the trip generation of the Project under the Twenty Year Plan (Long Term Plan), while Table III provides the combined trip generation of both the short term and long term plans.

**Table I: Existing Land Use Trip Generation**

| Land Use (ITE CODE)                  | TAZ  | Size    | Unit   | Daily |               | A.M. Peak Hour |            |            |            |              | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|------|---------|--------|-------|---------------|----------------|------------|------------|------------|--------------|----------------|------------|------------|------------|--------------|
|                                      |      |         |        | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total        | Trip Rate      | In : Out % | In         | Out        | Total        |
| Hospital (610)                       | 670B | 471.715 | k.s.f. | 13.22 | 6,236         | 0.95           | 63 : 37    | 282        | 166        | 448          | 0.93           | 38 : 62    | 167        | 272        | 439          |
| Medical-Dental Office Building (710) | 670B | 247.833 | k.s.f. | 36.13 | 8,954         | 2.39           | 79 : 21    | 468        | 124        | 592          | 3.57           | 28 : 72    | 248        | 637        | 885          |
| <b>Total Project Trips</b>           |      |         |        |       | <b>15,190</b> |                |            | <b>750</b> | <b>290</b> | <b>1,040</b> |                |            | <b>415</b> | <b>909</b> | <b>1,324</b> |



**Table II: Year 2026 Project Only Trip Generation (Phase I: 2 to 10 Year Plan)**

| Land Use (ITE CODE)                  | TAZ  | Size    | Unit          | Daily |               | A.M. Peak Hour |            |            |            |            | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|------|---------|---------------|-------|---------------|----------------|------------|------------|------------|------------|----------------|------------|------------|------------|--------------|
|                                      |      |         |               | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total      | Trip Rate      | In : Out % | In         | Out        | Total        |
| Hotel (310)                          | 670A | 150     | Occupied Beds | 8.92  | 1,338         | 0.67           | 58 : 42    | 59         | 42         | 101        | 0.70           | 49 : 51    | 51         | 54         | 105          |
| Shopping Center (820)                | 670A | 150.000 | k.s.f         | 42.70 | 6,405         | 0.96           | 62 : 38    | 89         | 55         | 144        | 3.71           | 48 : 52    | 267        | 290        | 557          |
| Hospital (610)                       | 670B | 300.172 | k.s.f         | 13.22 | 3,968         | 0.95           | 63 : 37    | 180        | 105        | 285        | 0.93           | 38 : 62    | 106        | 173        | 279          |
| Medical-Dental Office Building (710) | 670B | 161.500 | k.s.f         | 36.13 | 5,835         | 2.39           | 79 : 21    | 305        | 81         | 386        | 3.57           | 28 : 72    | 162        | 415        | 577          |
| <b>Total Project Trips</b>           |      |         |               |       | <b>17,546</b> |                |            | <b>633</b> | <b>283</b> | <b>916</b> |                |            | <b>586</b> | <b>932</b> | <b>1,518</b> |

Notes: ksf = Thousand Square Feet

**Table III: Year 2035 Additional Project Only Trip Generation (Phase 2: 20 Year Plan)**

| Land Use (ITE CODE)                  | TAZ  | Size    | Unit          | Daily |               | A.M. Peak Hour |            |            |            |            | P.M. Peak Hour |            |            |            |              |
|--------------------------------------|------|---------|---------------|-------|---------------|----------------|------------|------------|------------|------------|----------------|------------|------------|------------|--------------|
|                                      |      |         |               | Rate  | Total         | Trip Rate      | In : Out % | In         | Out        | Total      | Trip Rate      | In : Out % | In         | Out        | Total        |
| Assisted Living (254)                | 732D | 100     | Occupied Beds | 2.74  | 274           | 0.18           | 68 : 32    | 12         | 6          | 18         | 0.29           | 50 : 50    | 15         | 14         | 29           |
| Hospital (610)                       | 670B | 168.672 | k.s.f         | 13.22 | 2,230         | 0.95           | 63 : 37    | 101        | 59         | 160        | 0.93           | 38 : 62    | 60         | 97         | 157          |
| Medical-Dental Office Building (710) | 670B | 260.000 | k.s.f         | 36.13 | 9,394         | 2.39           | 79 : 21    | 491        | 130        | 621        | 3.57           | 28 : 72    | 260        | 668        | 928          |
| Shopping Center (820)                | 732B | 70.000  | k.s.f         | 42.70 | 2,989         | 0.96           | 62 : 38    | 42         | 25         | 67         | 3.71           | 48 : 52    | 125        | 135        | 260          |
| <b>Total Project Trips</b>           |      |         |               |       | <b>14,887</b> |                |            | <b>646</b> | <b>220</b> | <b>866</b> |                |            | <b>460</b> | <b>914</b> | <b>1,374</b> |

Notes: ksf = Thousand Square Feet

**Table IV: Year 2035 Total Project Only Trip Generation**

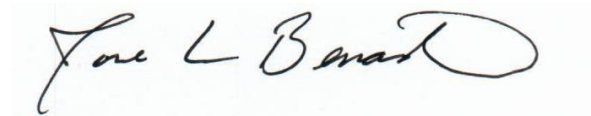
|                            | Daily         |  | A.M. Peak Hour |            |              | P.M. Peak Hour |              |              |
|----------------------------|---------------|--|----------------|------------|--------------|----------------|--------------|--------------|
|                            | Total         |  | In             | Out        | Total        | In             | Out          | Total        |
| <b>Total Project Trips</b> | <b>32,433</b> |  | <b>1,279</b>   | <b>503</b> | <b>1,782</b> | <b>1,046</b>   | <b>1,846</b> | <b>2,892</b> |



Mr. Han  
Fresno COG Modeling Request (Project 006-009)  
September 20, 2016

Since the City of Clovis is our Client we have assumed that Fresno COG will complete this modeling work at no cost to JLB. If this is not the case, please let us know ASAP so that we may communicate this with City of Clovis staff. Our contact person at the City of Clovis is Mr. Bryan Araki, If you have any questions or require additional information, please contact me at (559) 570-8991 or by email at [jbenavides@JLBtraffic.com](mailto:jbenavides@JLBtraffic.com).

Sincerely,



Jose Luis Benavides, P.E., T.E.

President

cc: Mui Zhou, Senior Regional Planner

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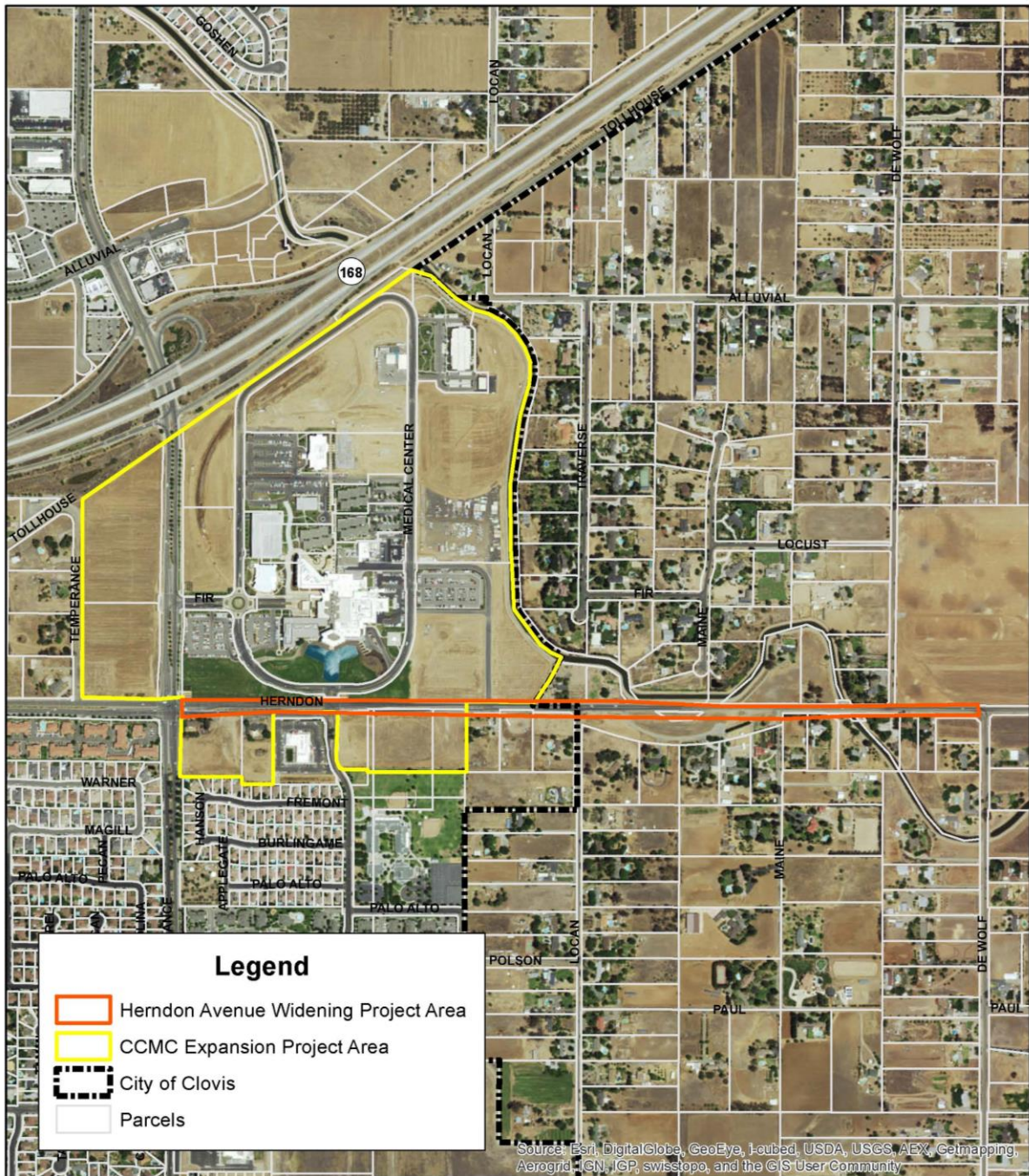
Fresno, CA 93710

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Page | 7



## Exhibit A – Aerial



Source: County of Fresno, City of Clovis, ESRI

### Project Area

Figure 2

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
 City of Clovis

ODELL Planning & Research, Inc.





## Exhibit B – Site Plan

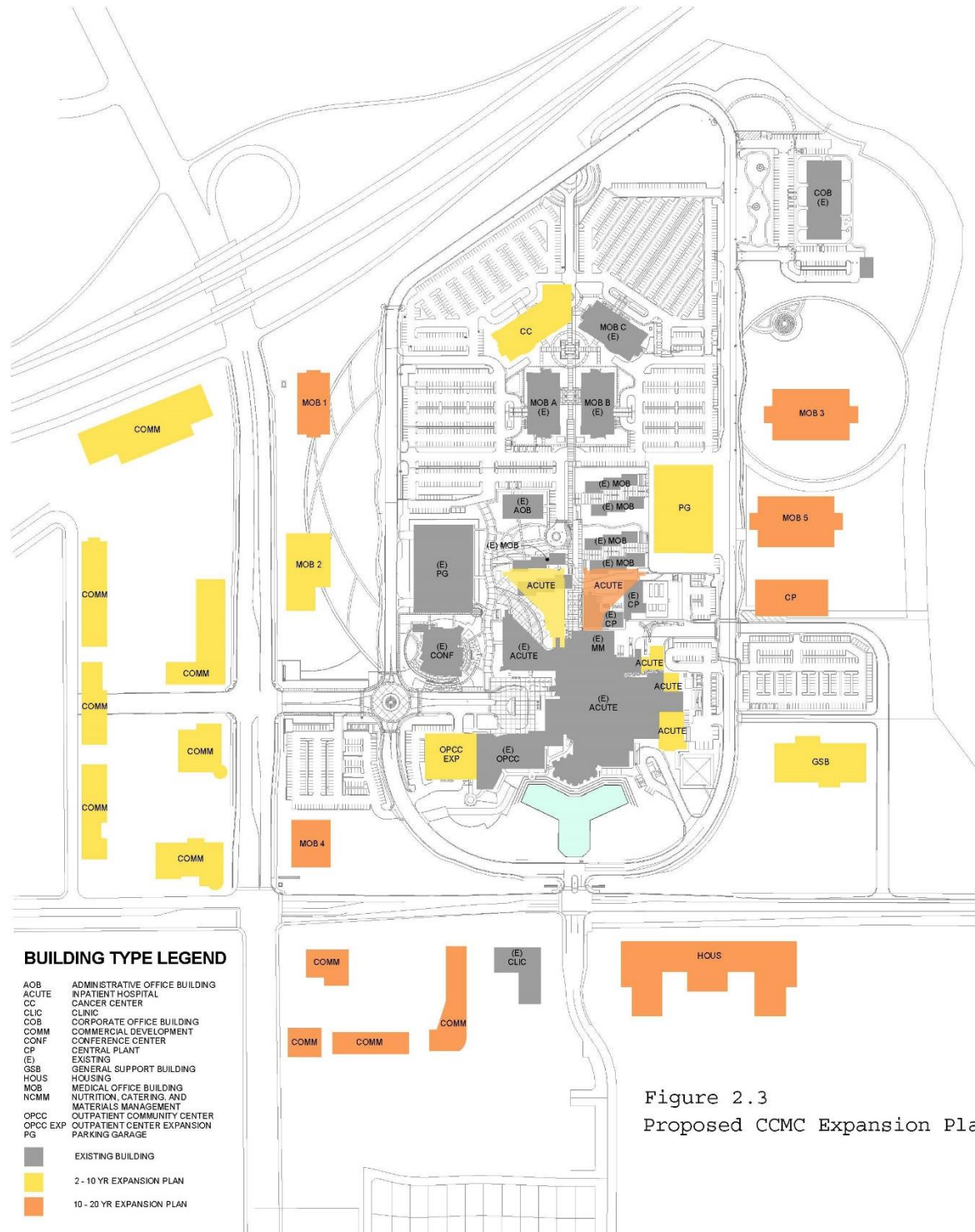


Figure 2.3  
Proposed CCMC Expansion Plan



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[www.JLBtraffic.com](http://www.JLBtraffic.com)

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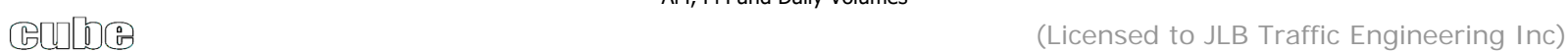
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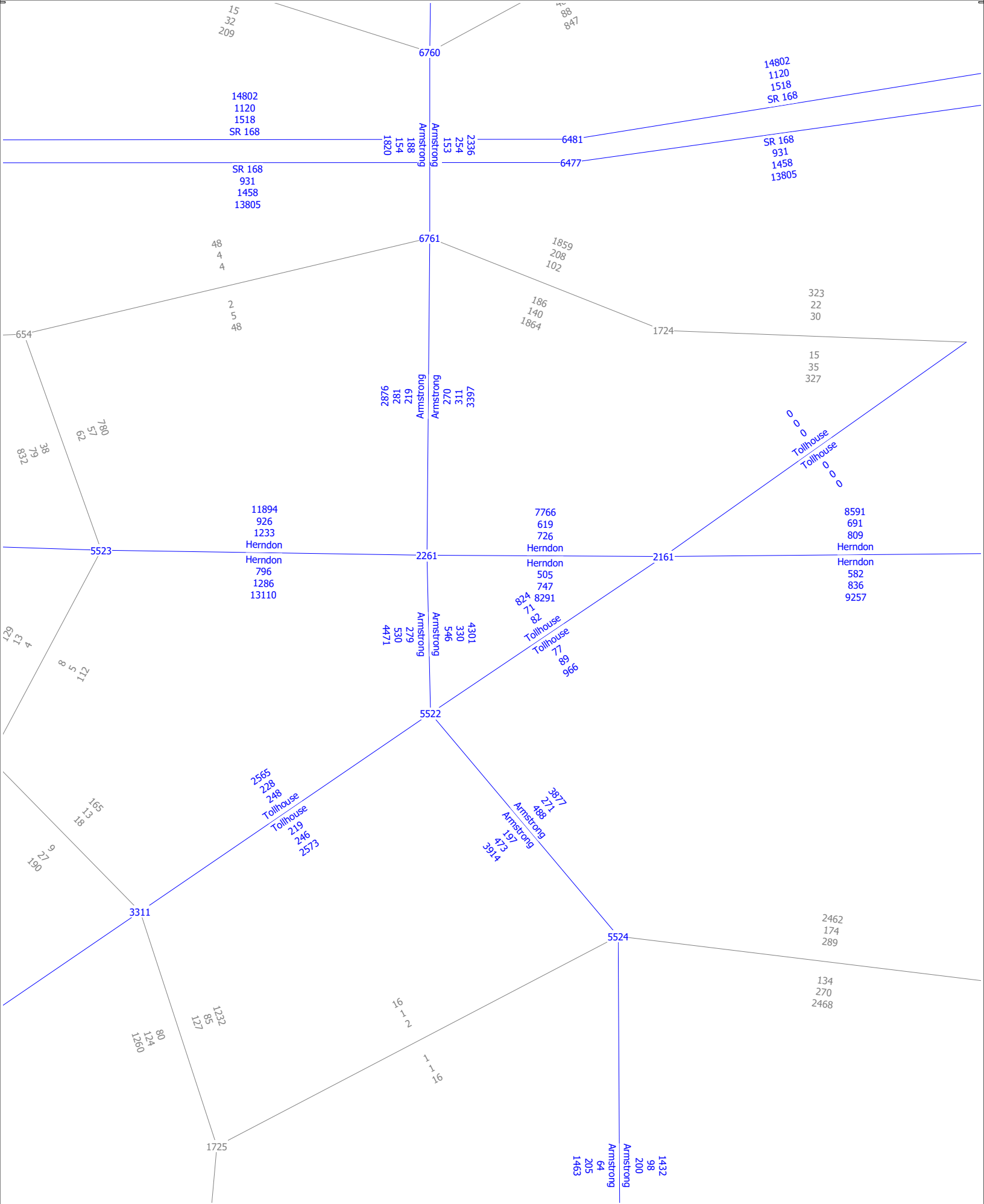
Fresno, CA 93710

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Page | 9

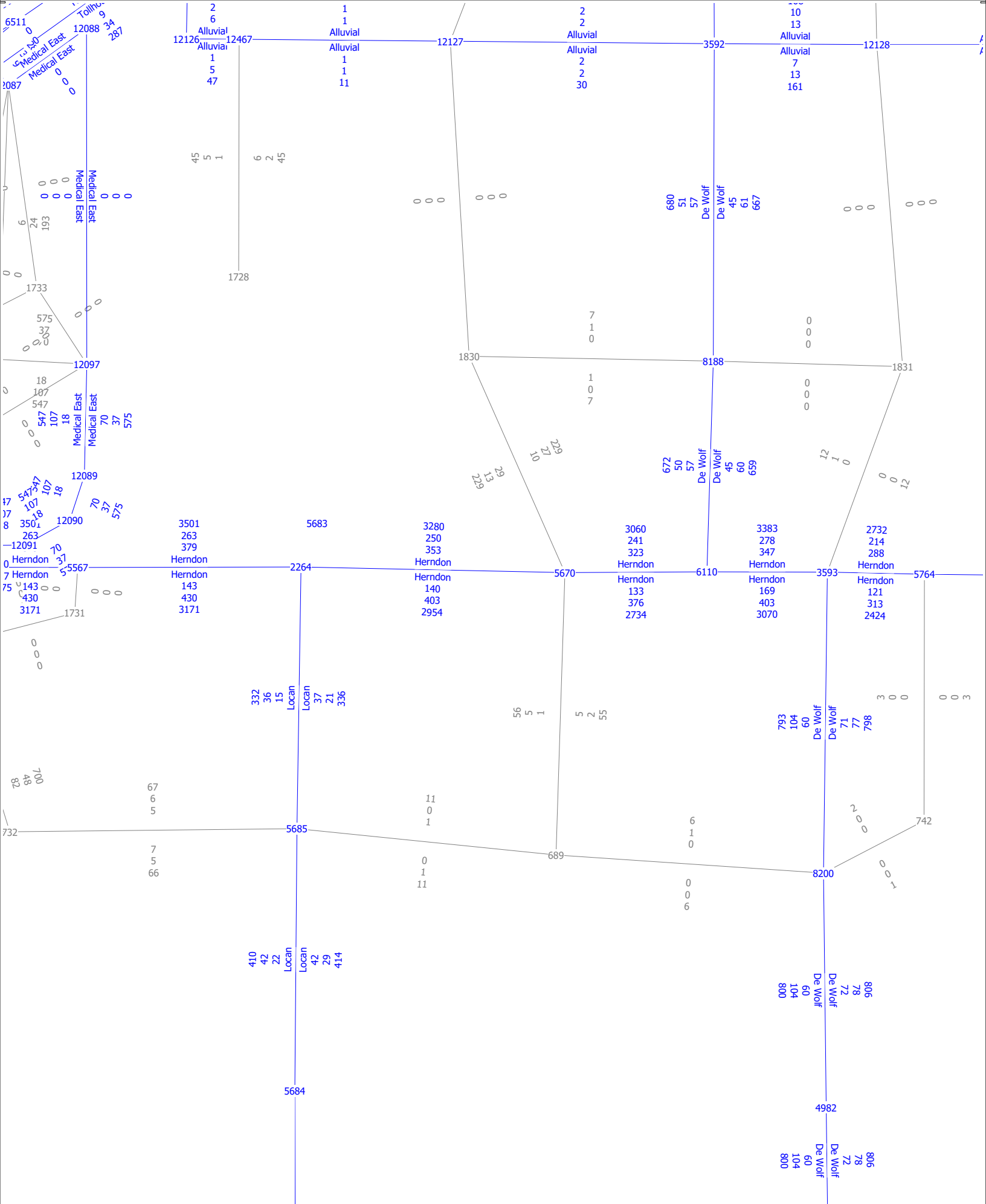






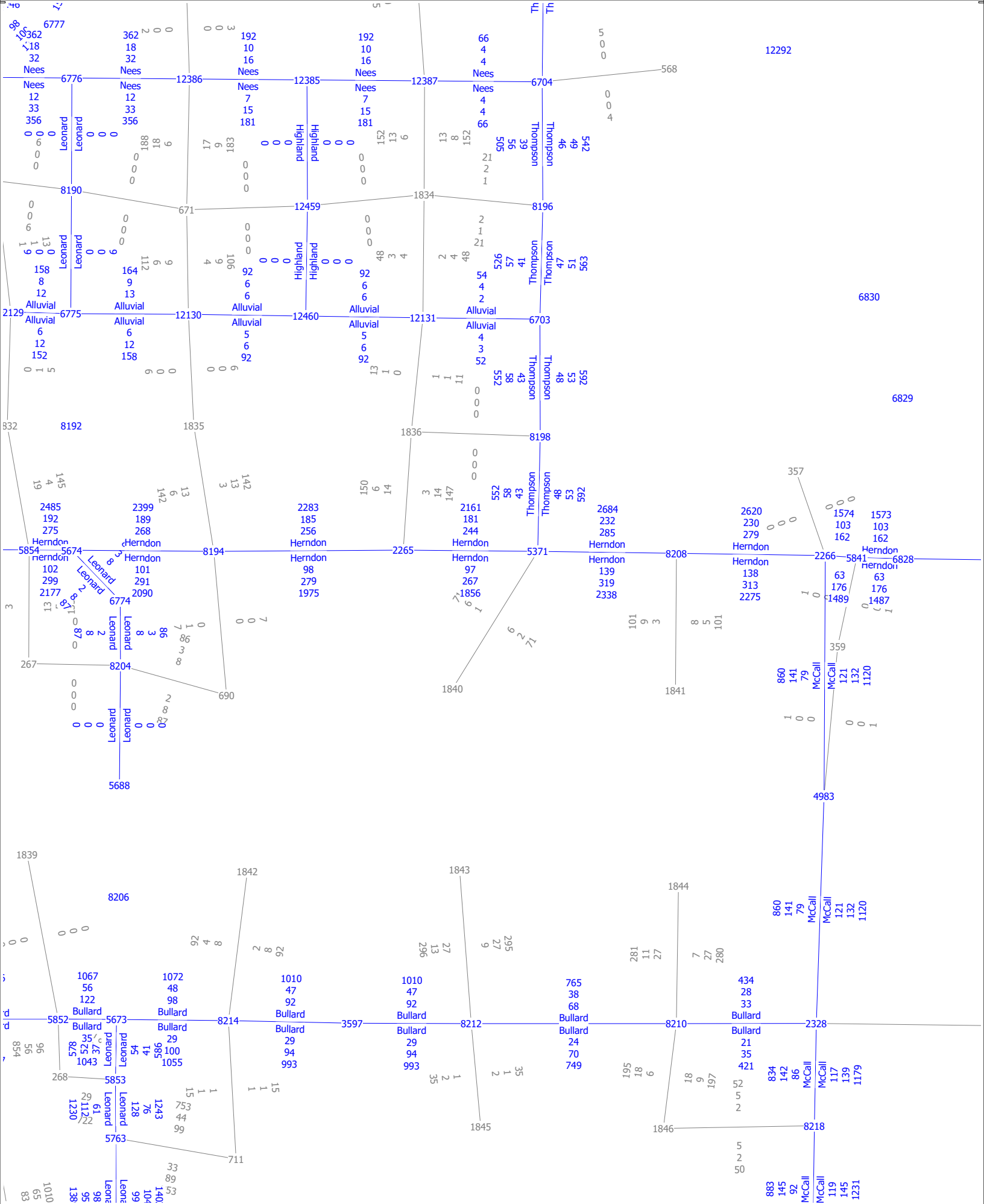
Base Year 2016  
AM, PM and Daily Volumes



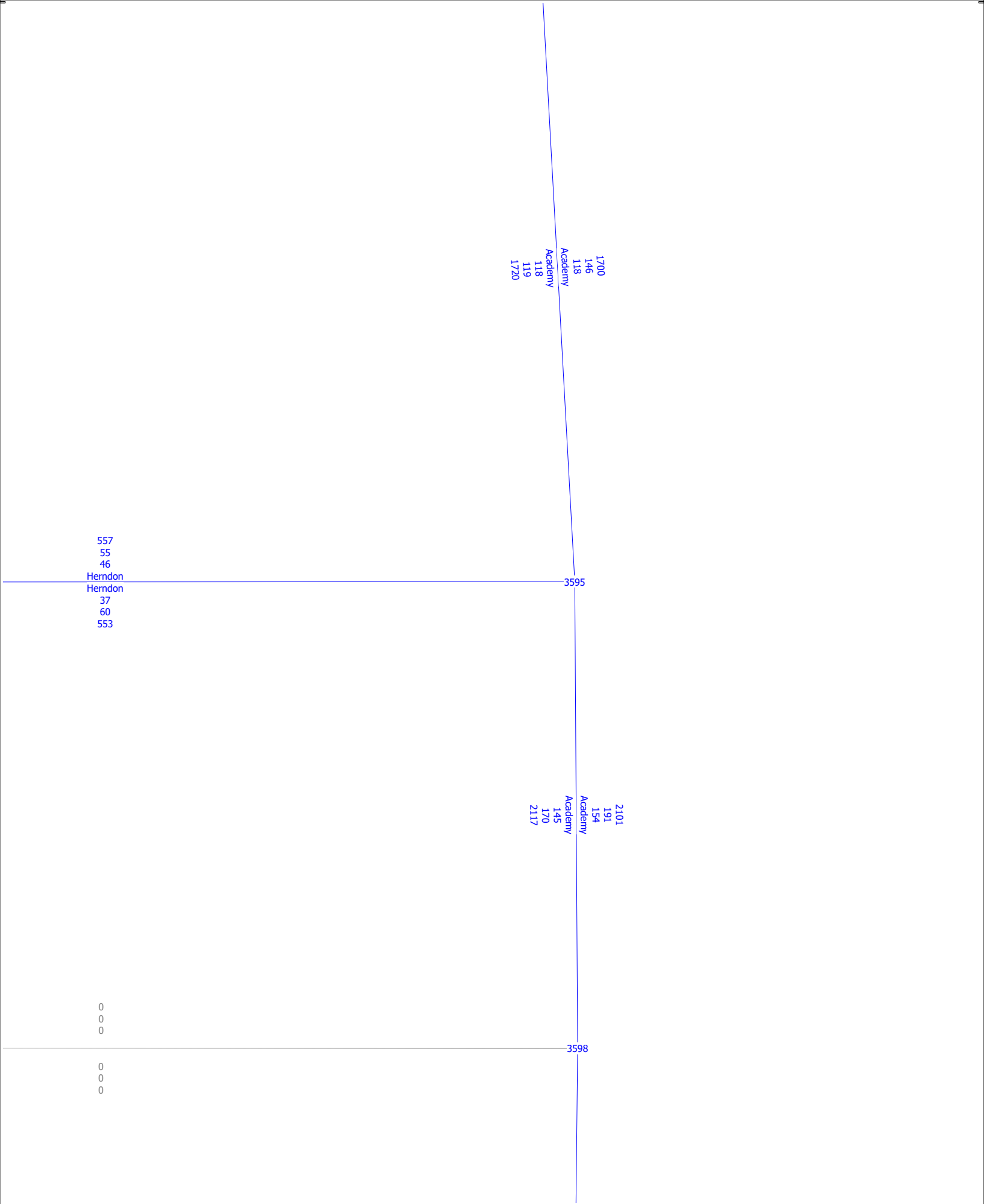


Base Year 2016  
AM, PM and Daily Volumes

(Licensed to JLB Traffic Engineering Inc)

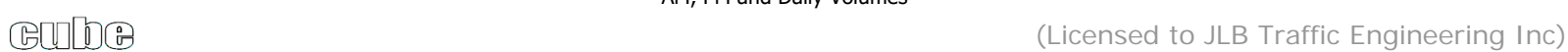


Base Year 2016  
AM, PM and Daily Volumes

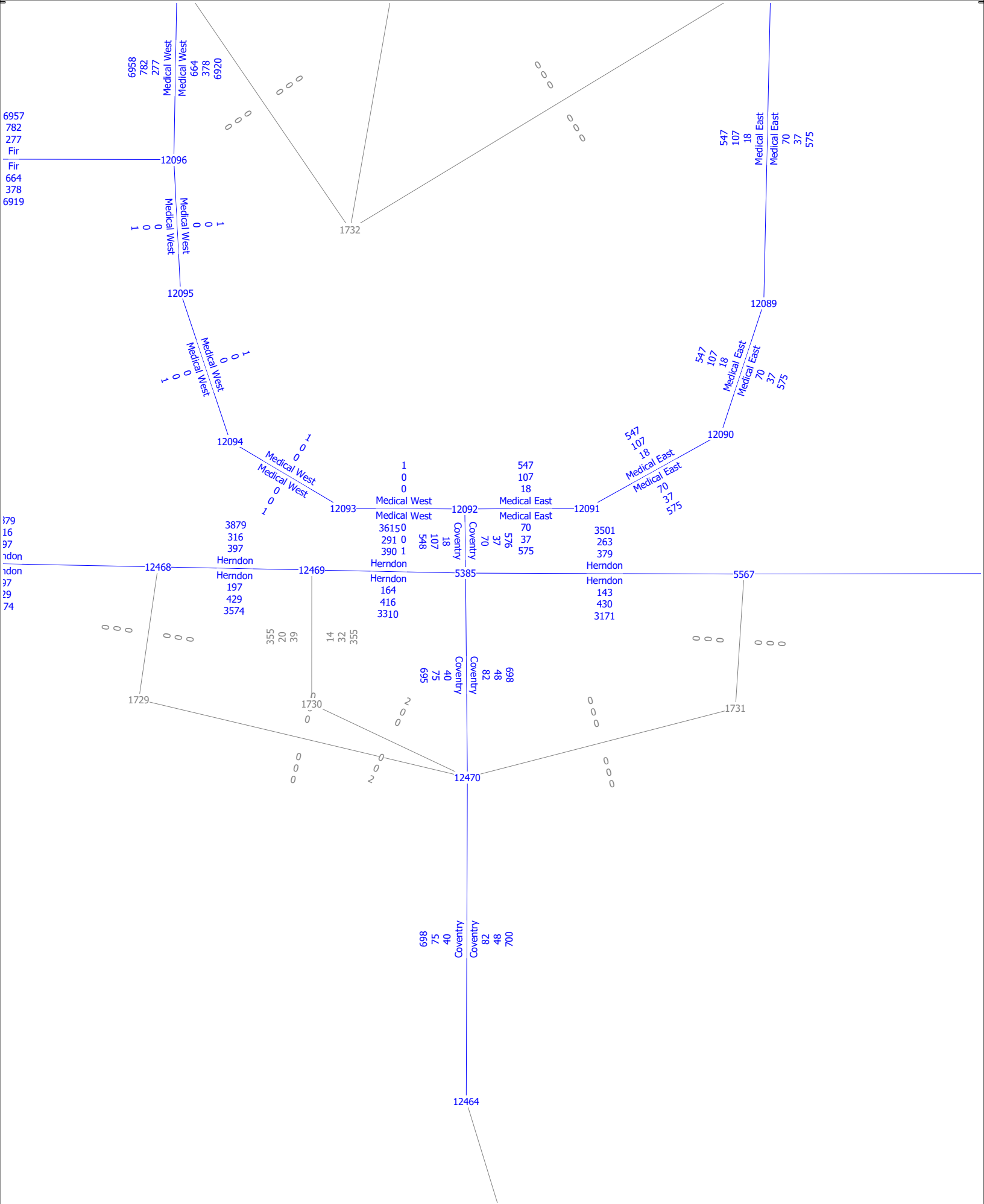


Base Year 2016  
AM, PM and Daily Volumes



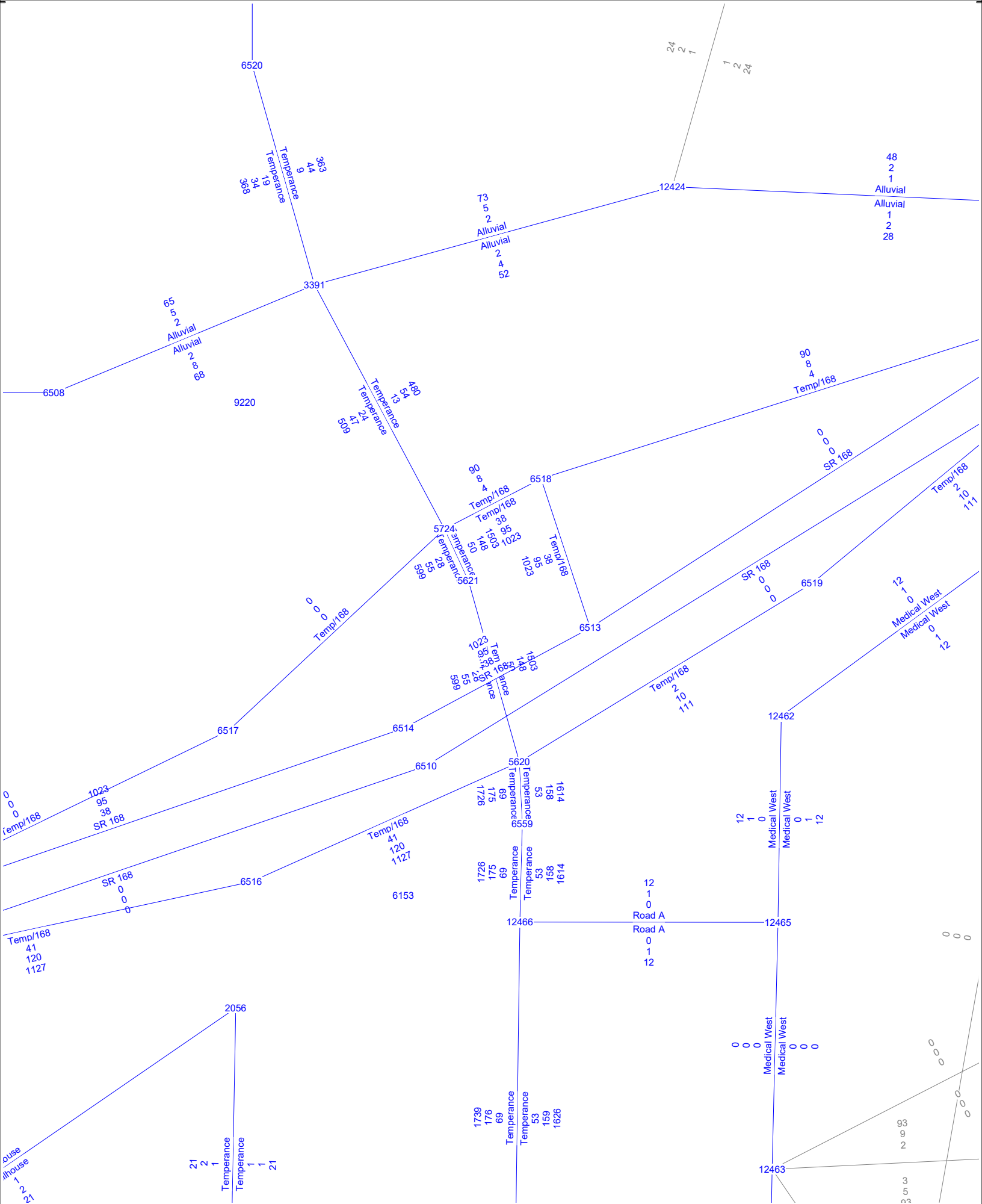




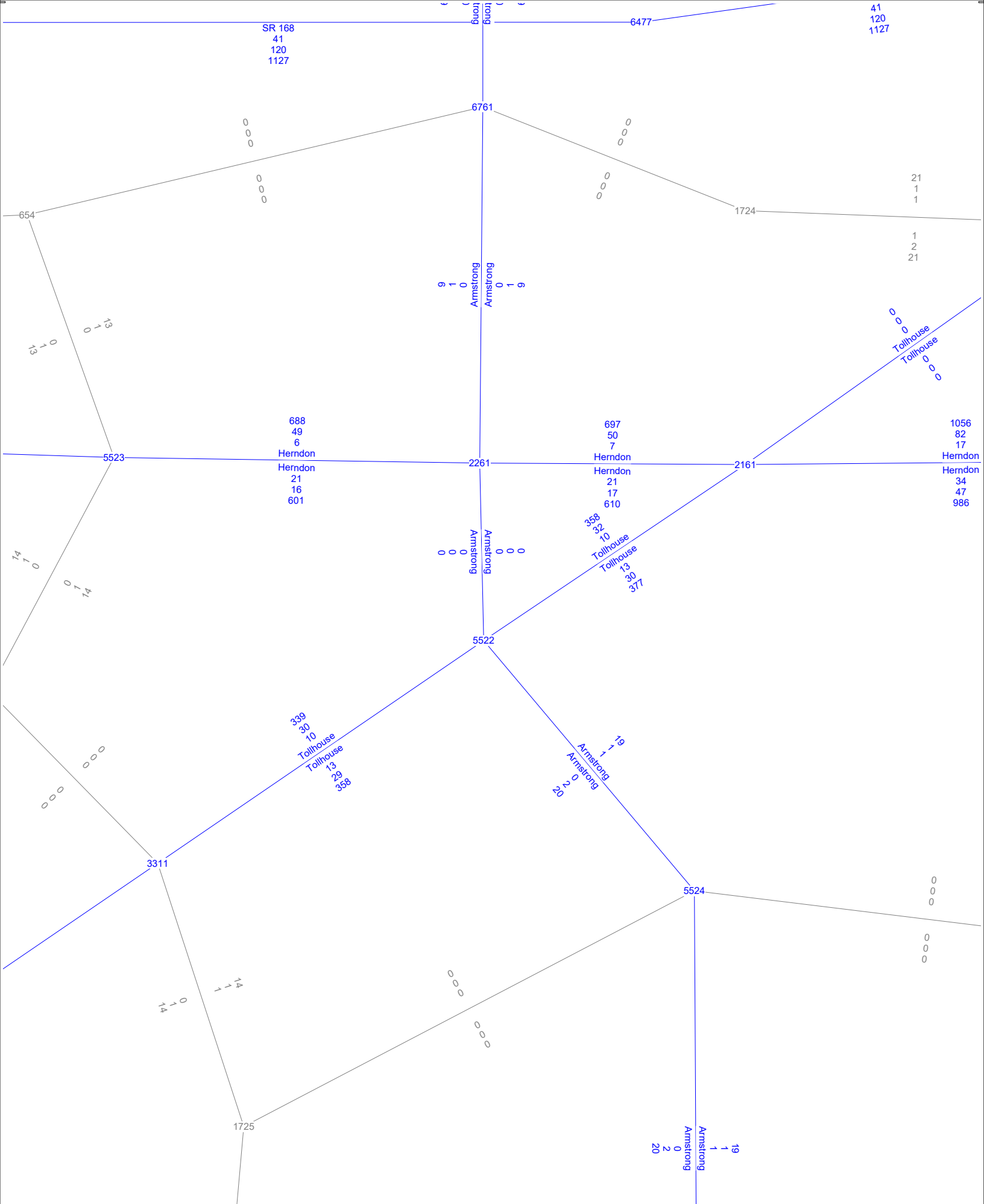


Base Year 2016  
AM, PM and Daily Volumes

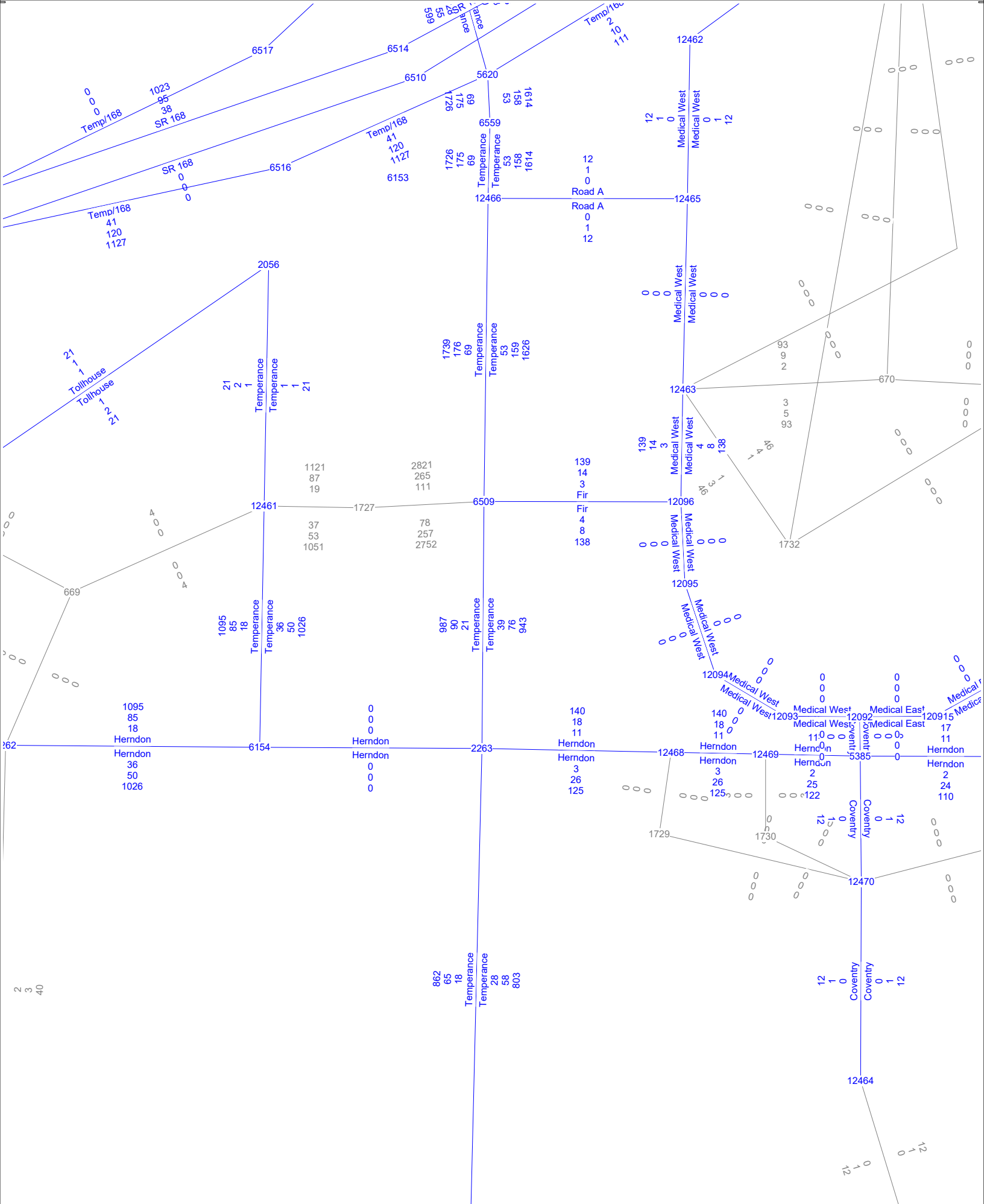
Hotel-Shopping Center Select Zone (2026)  
AM, PM and Daily Project Only Trips



Hotel-Shopping Center Select Zone (2026)  
AM, PM and Daily Project Only Trips



Hotel-Shopping Center Select Zone (2026)  
AM, PM and Daily Project Only Trips



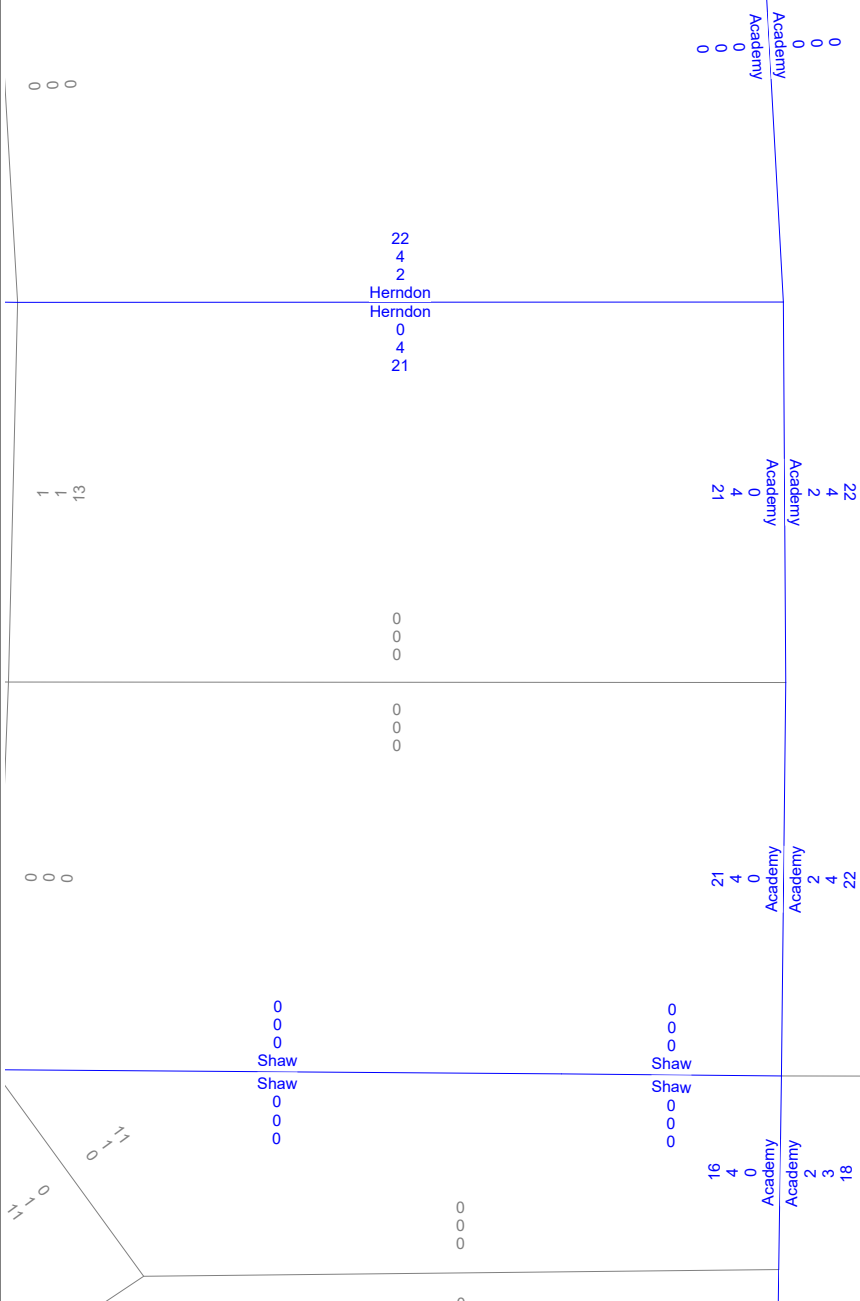
Hotel-Shopping Center Select Zone (2026)  
AM, PM and Daily Project Only Trips

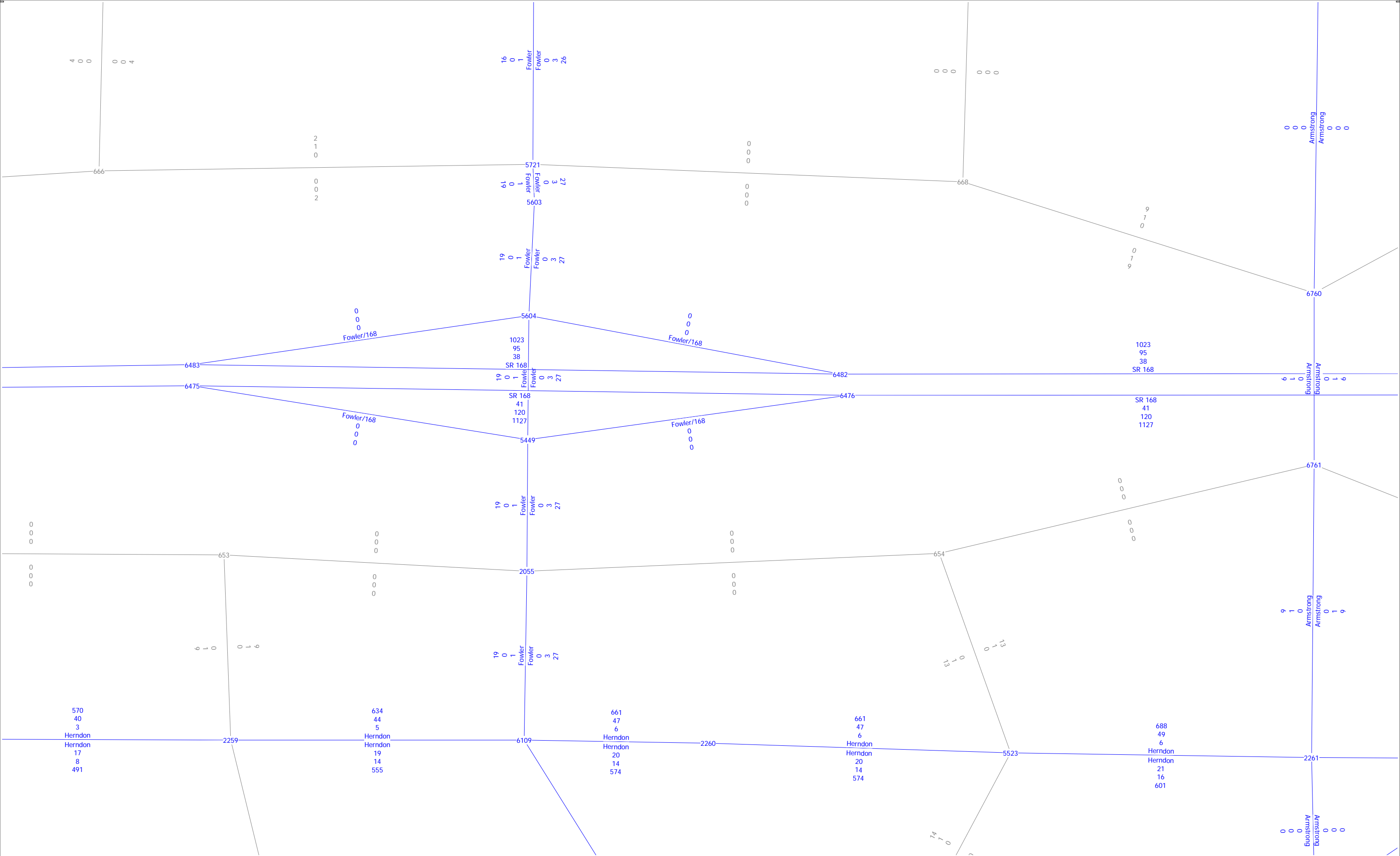






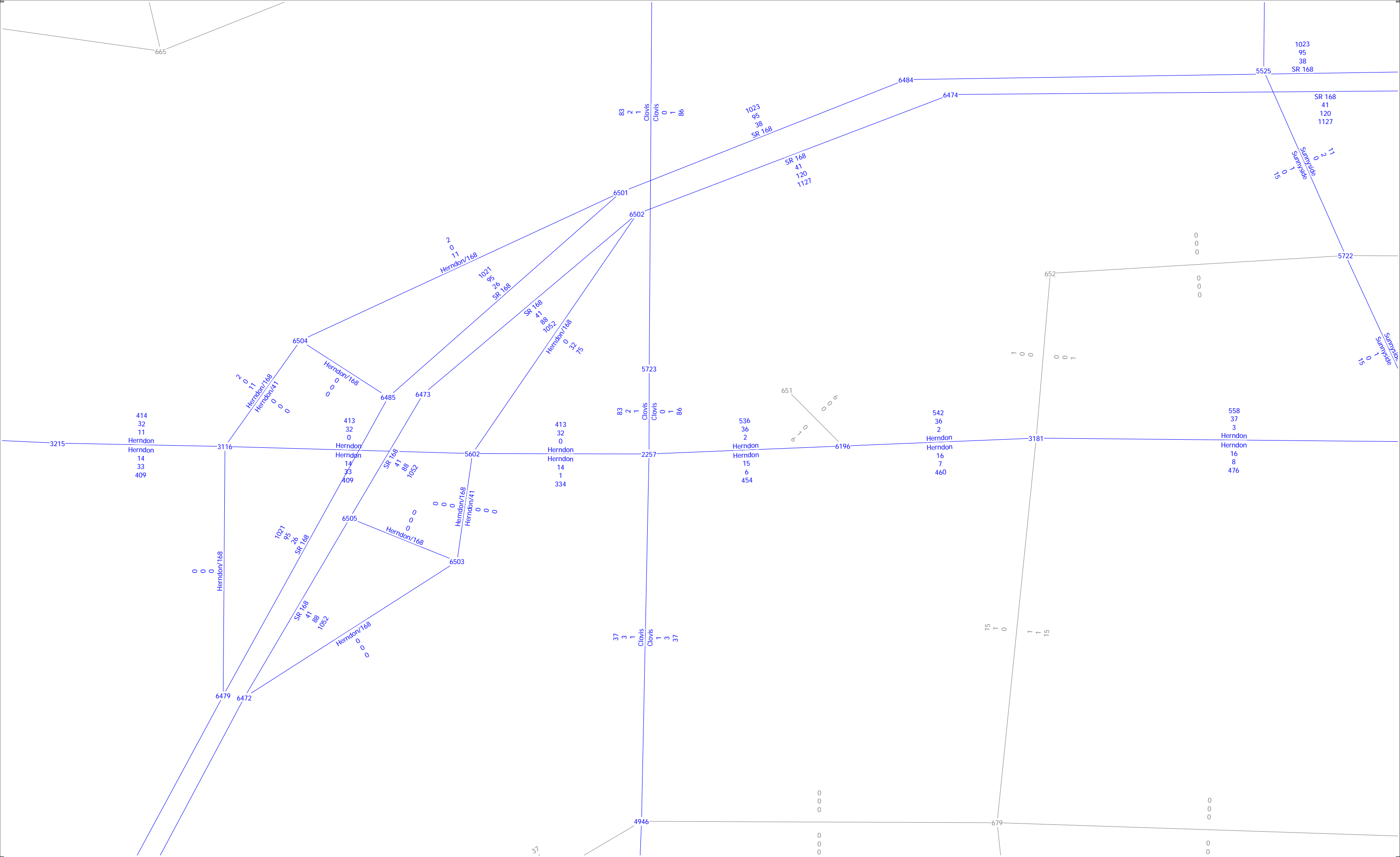




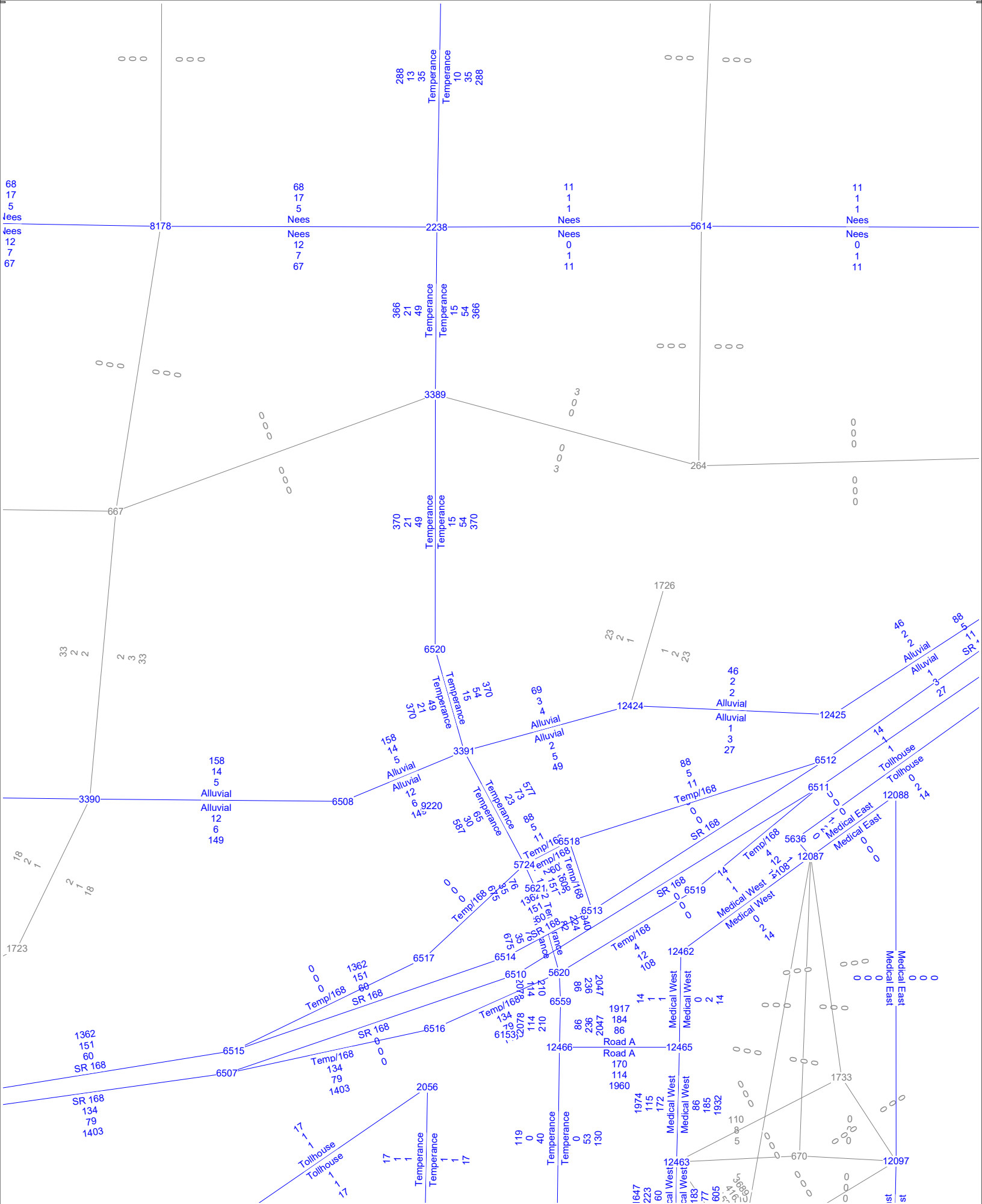


Hotel and Shopping Ctr Select Zone (2026)  
AM, PM, and Daily Project Only Trips

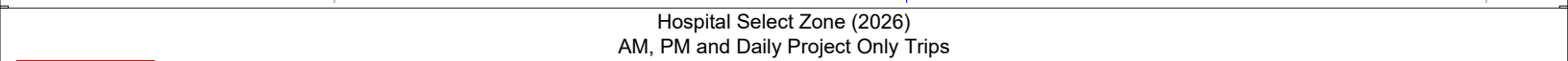




Hotel and Shopping Ctr Select Zone (2026)  
AM, PM, and Daily Project Only Trips

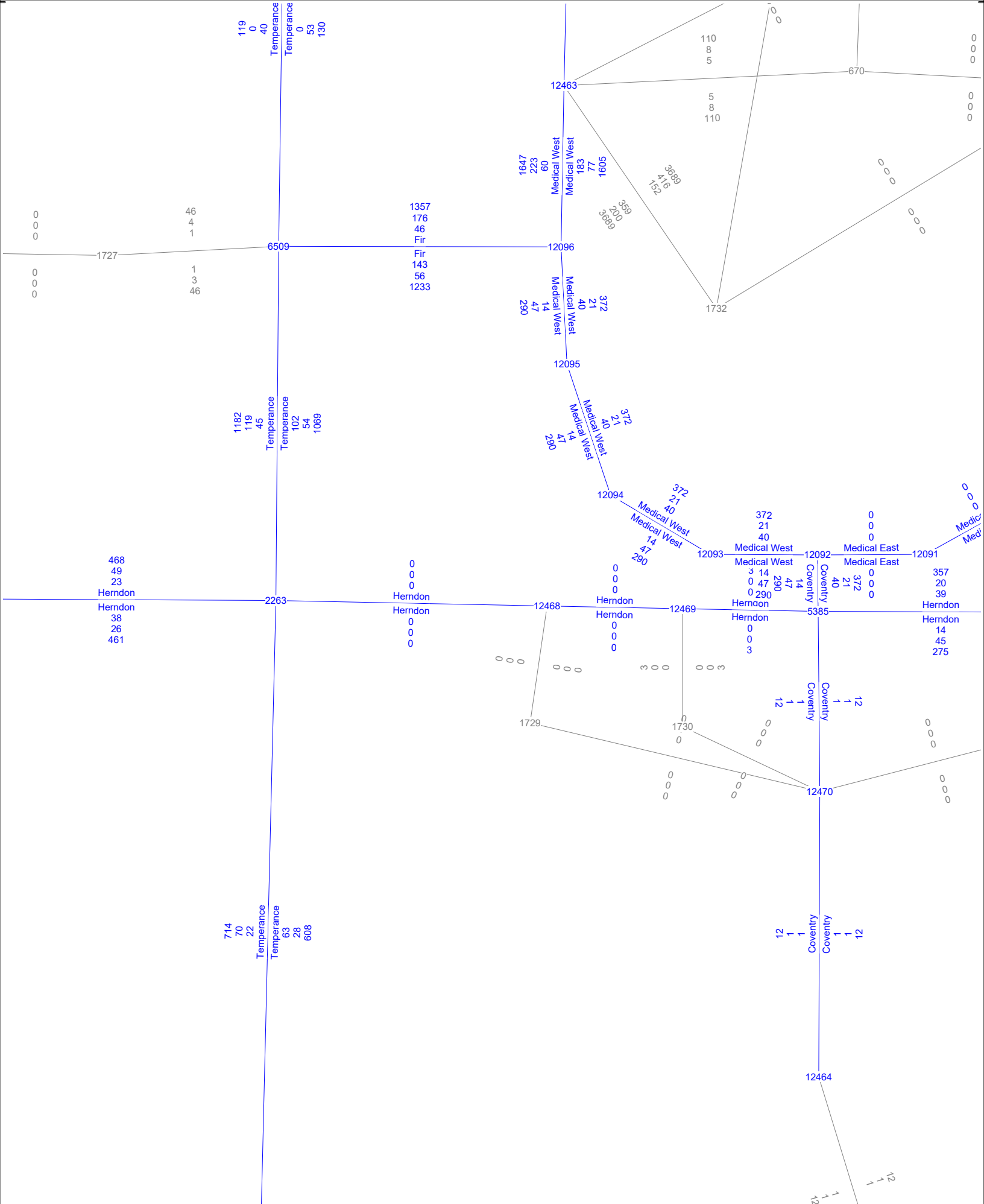


Hospital Select Zone (2026)  
AM, PM and Daily Project Only Trips

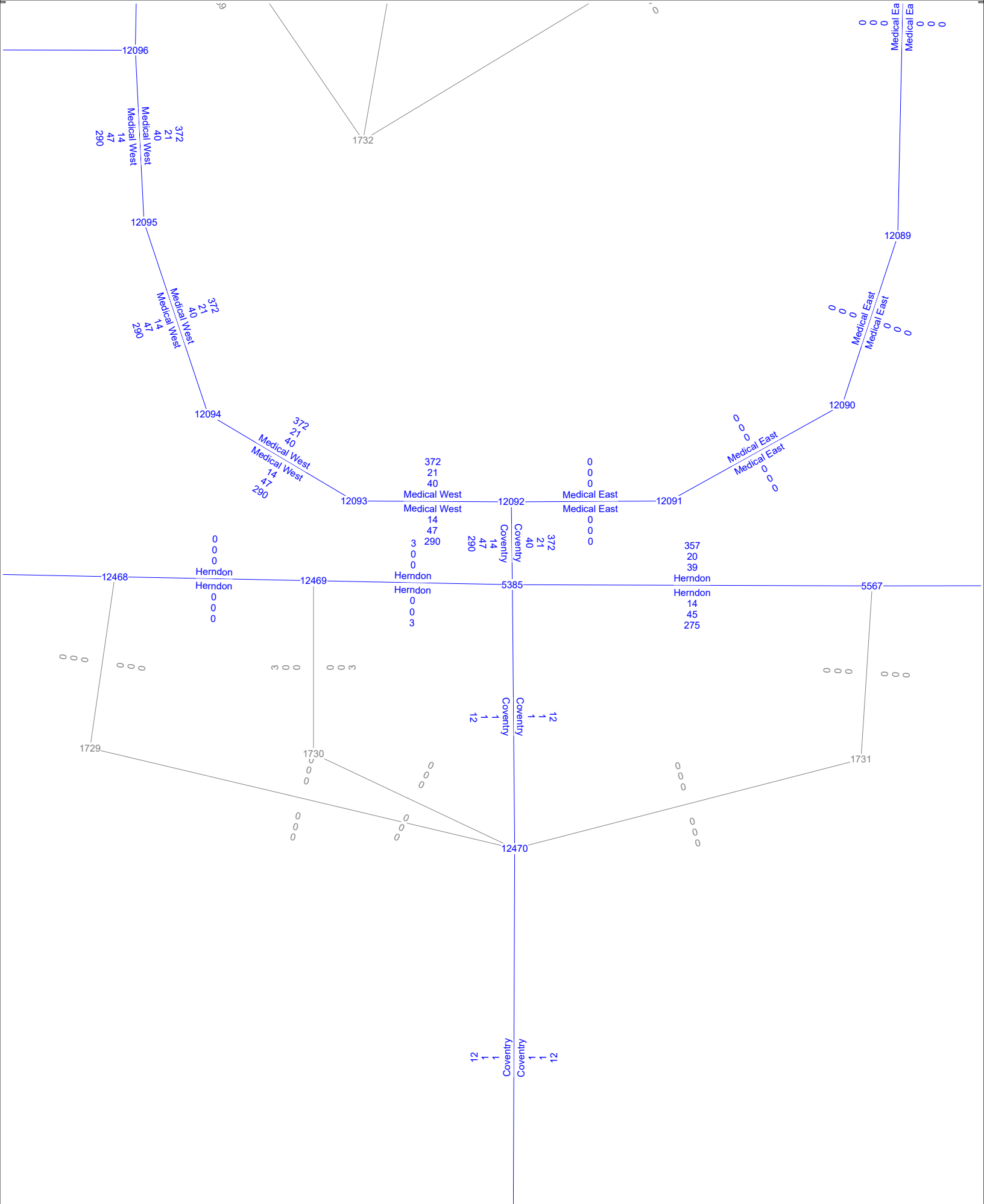




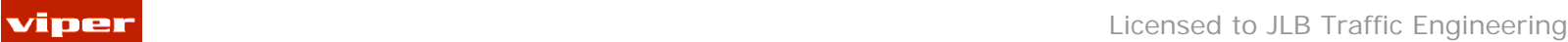




Hospital Select Zone (2026)  
AM, PM and Daily Project Only Trips



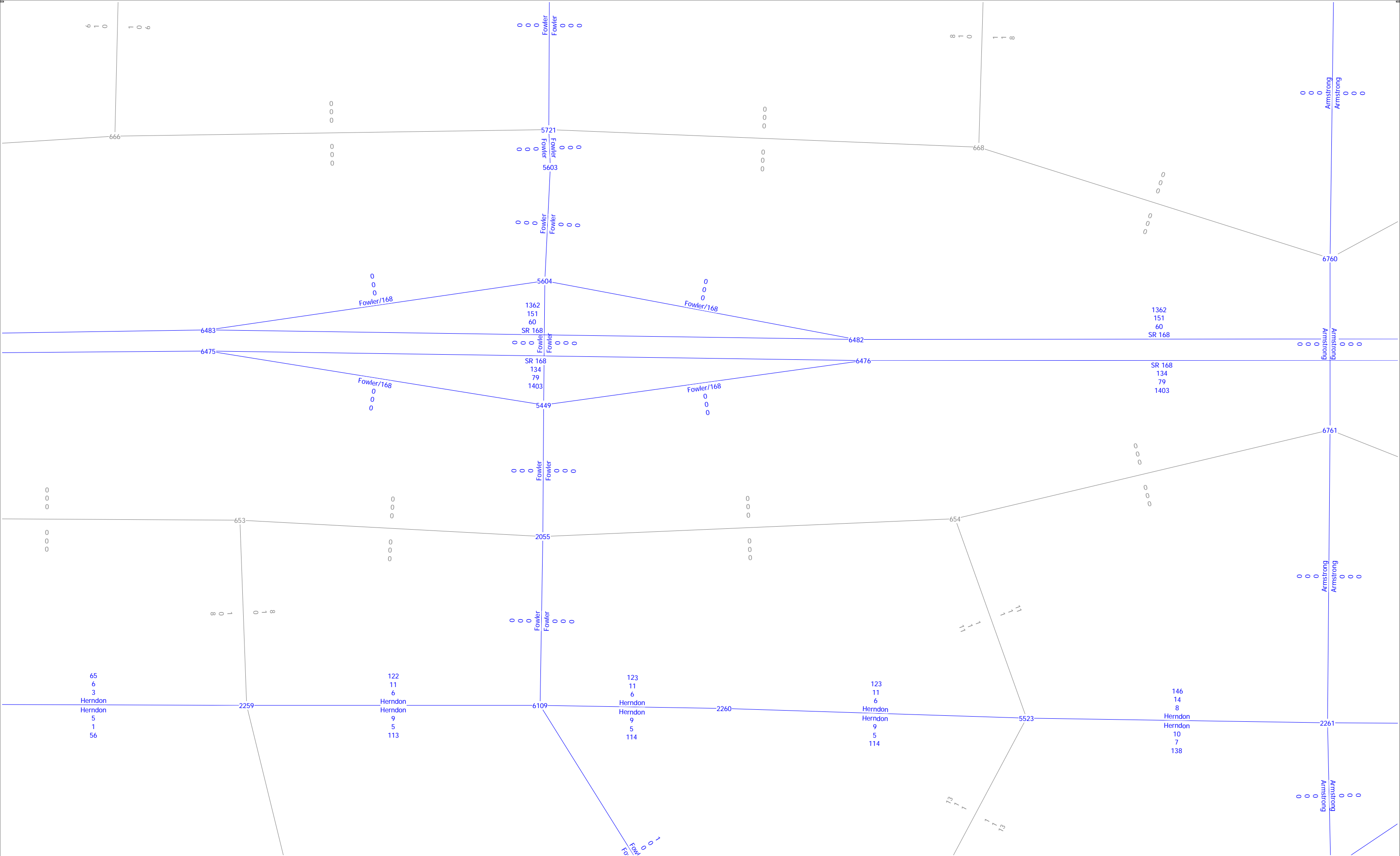
Hospital Select Zone (2026)  
AM, PM and Daily Project Only Trips



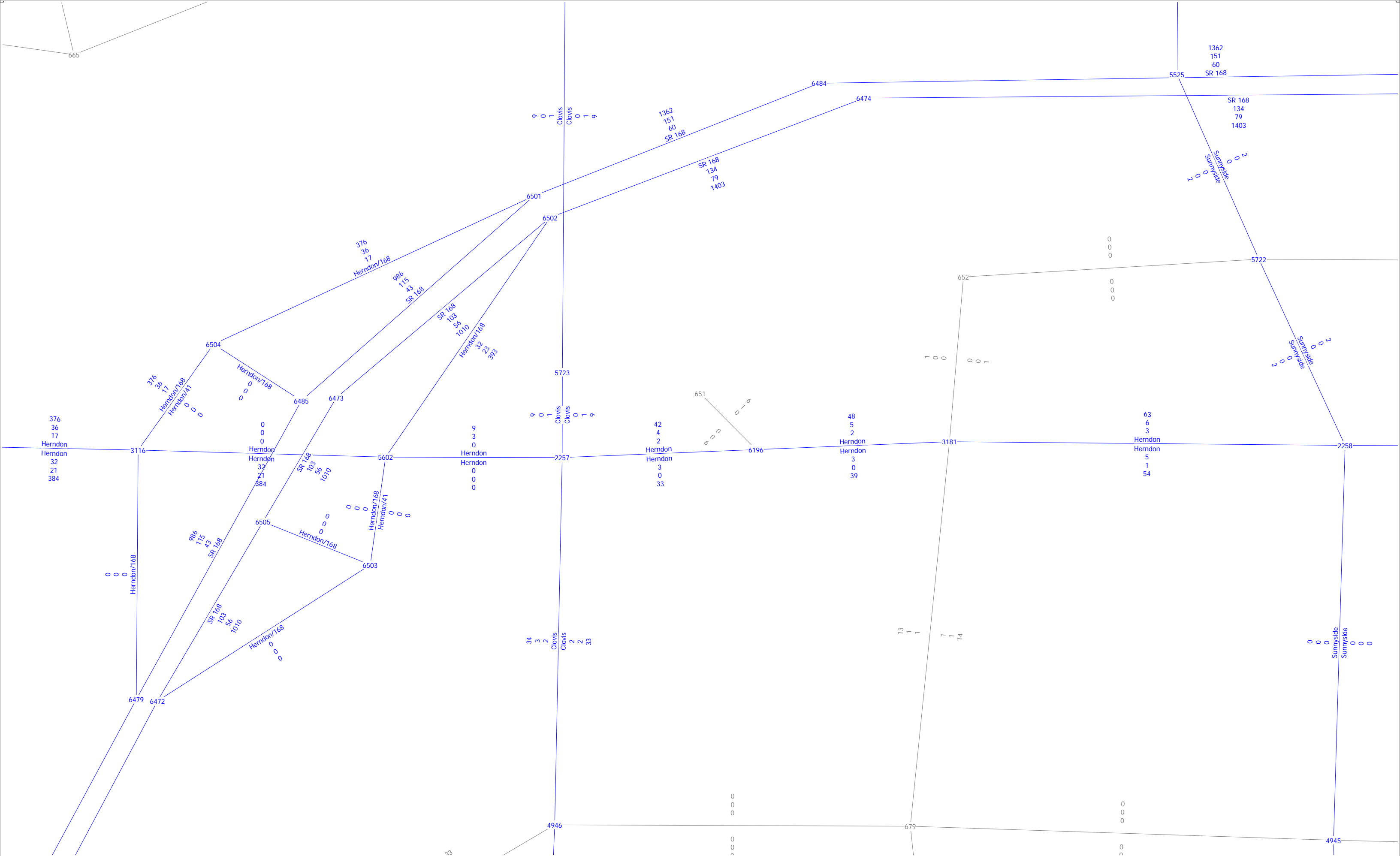




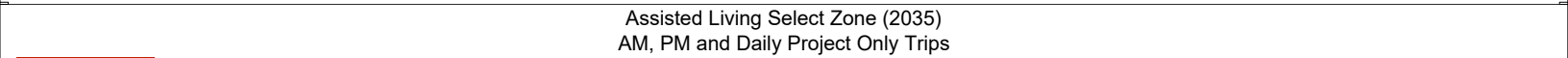




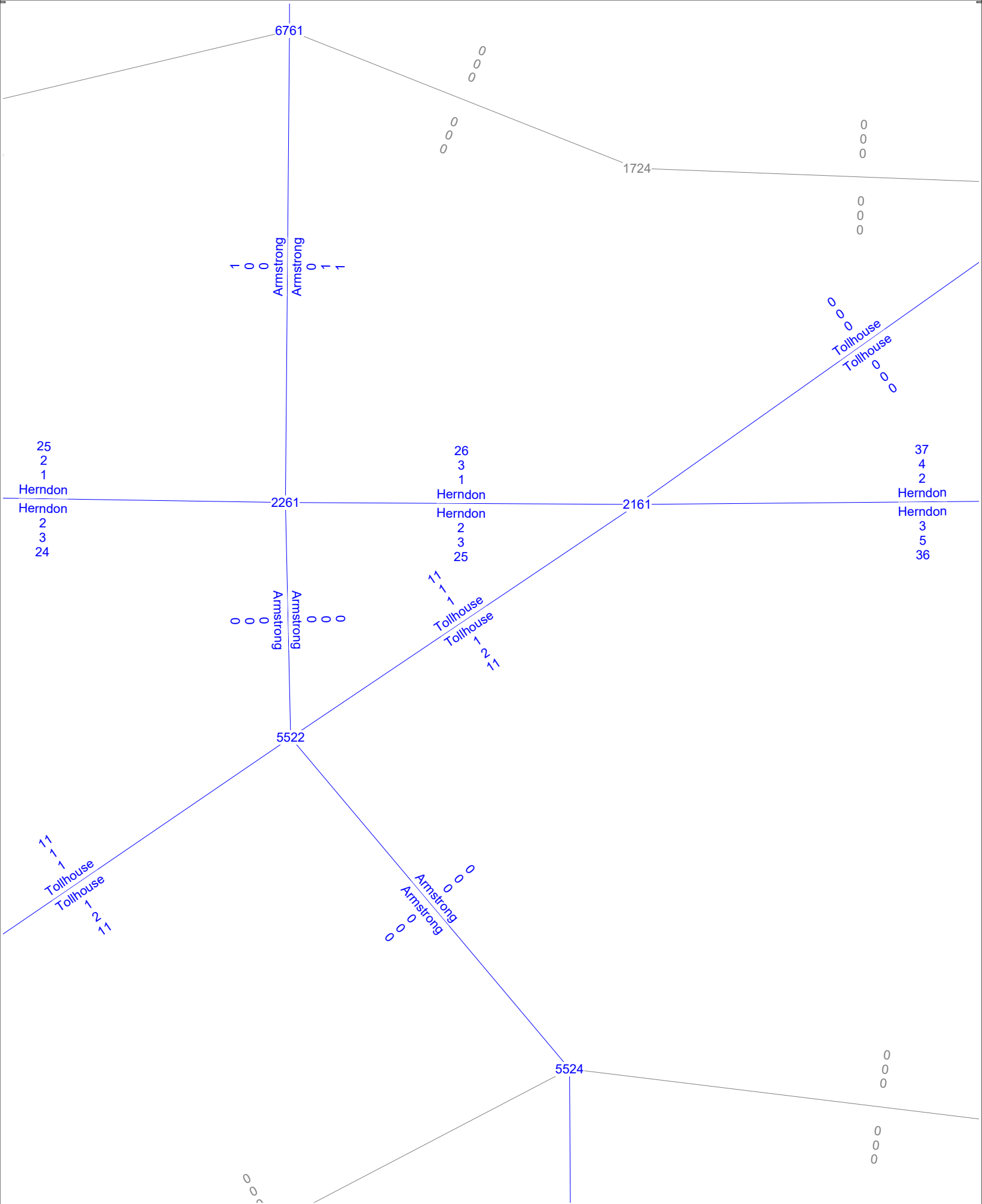
Hospital Select Zone (2026)  
AM, PM, and Daily Project Only Trips

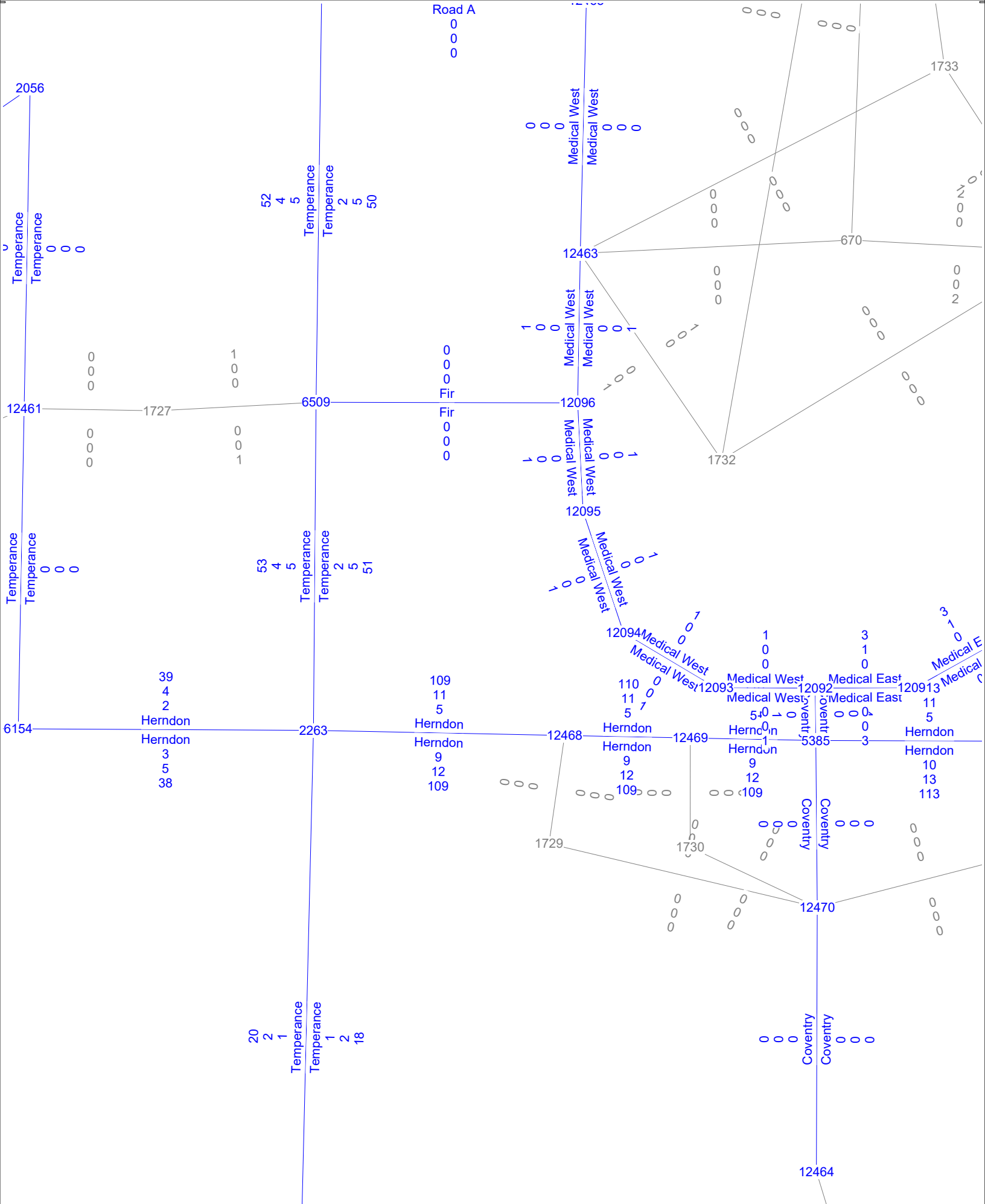


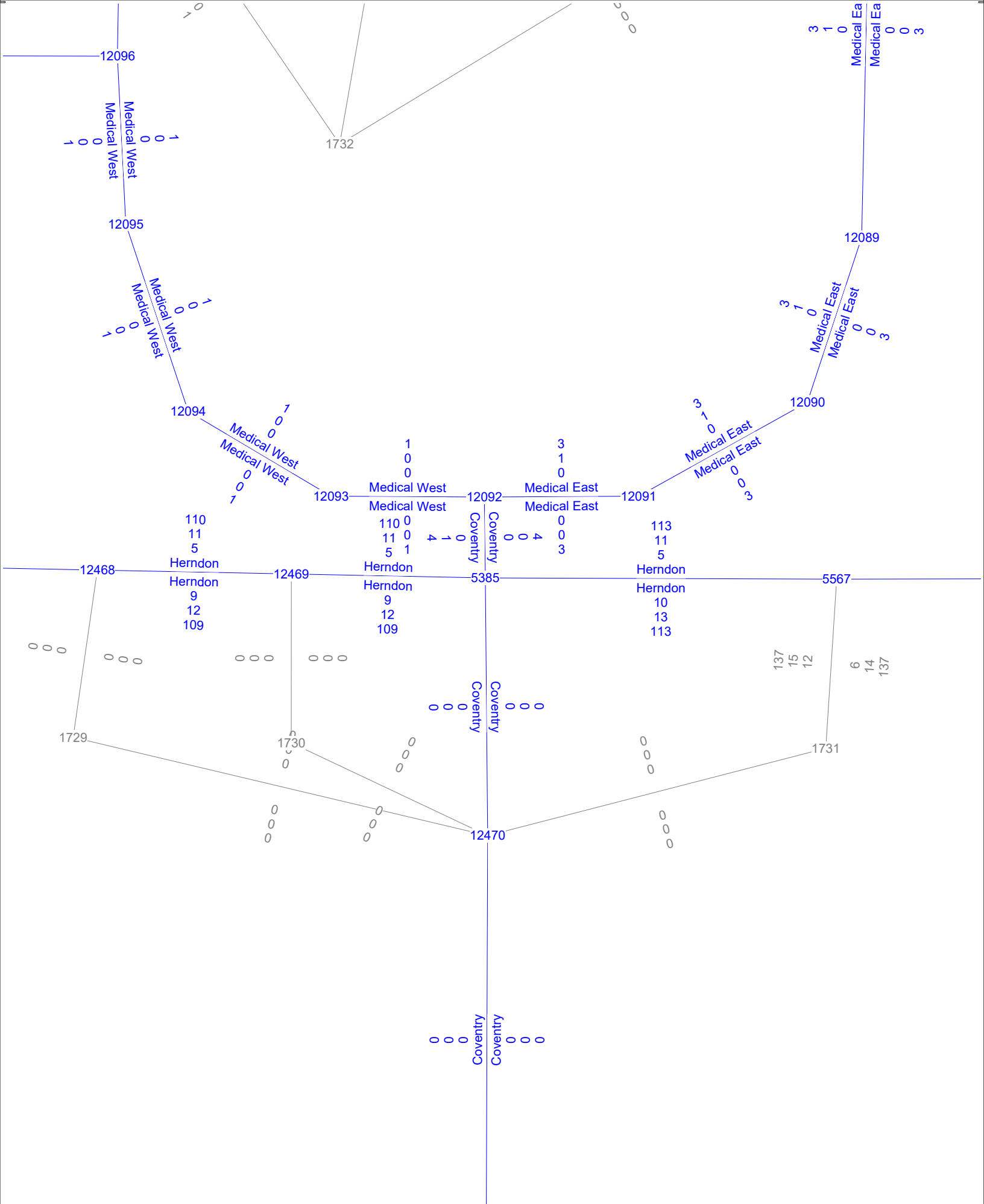




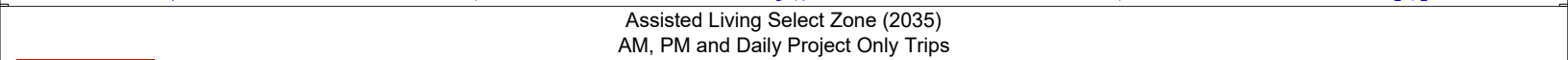


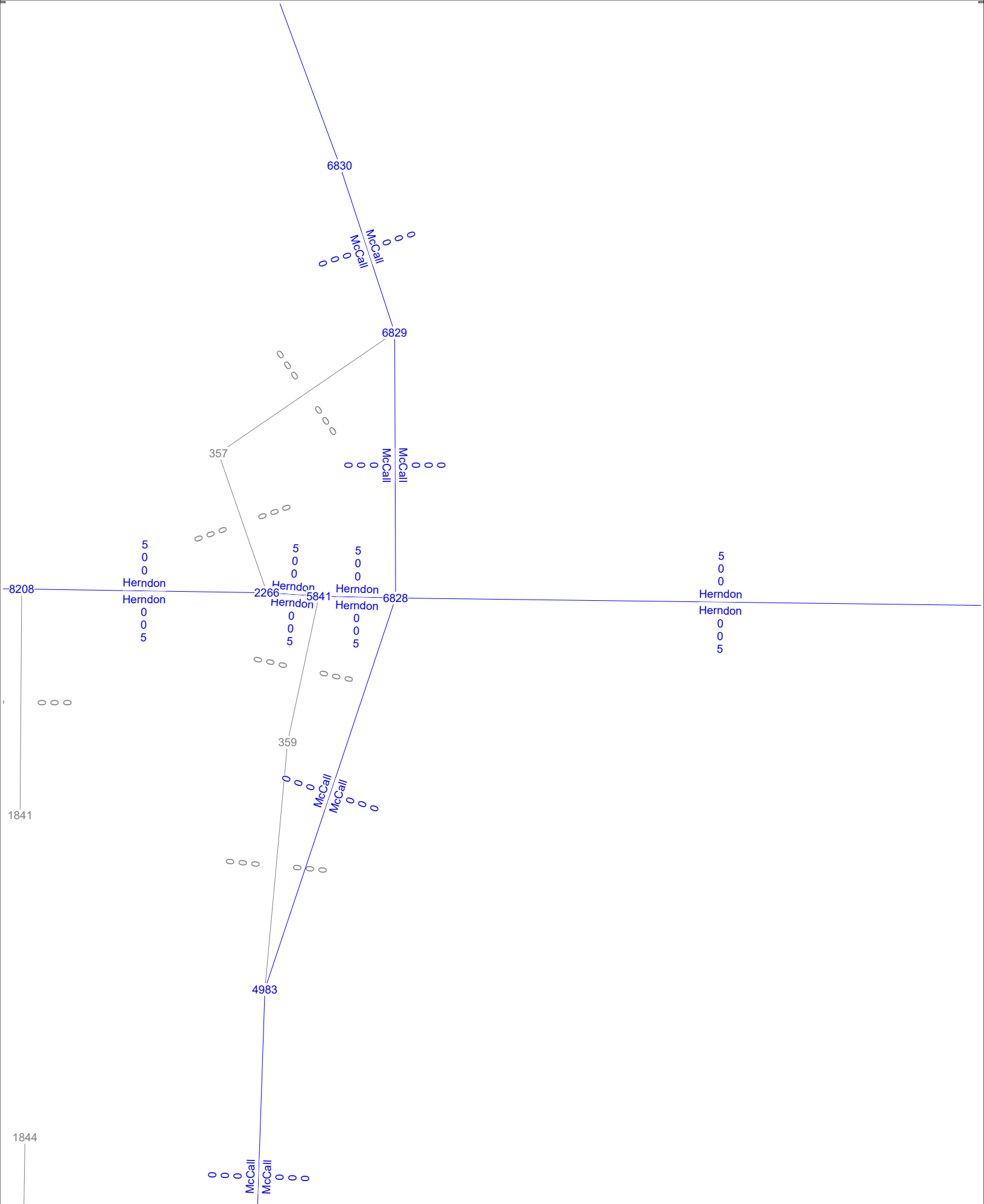


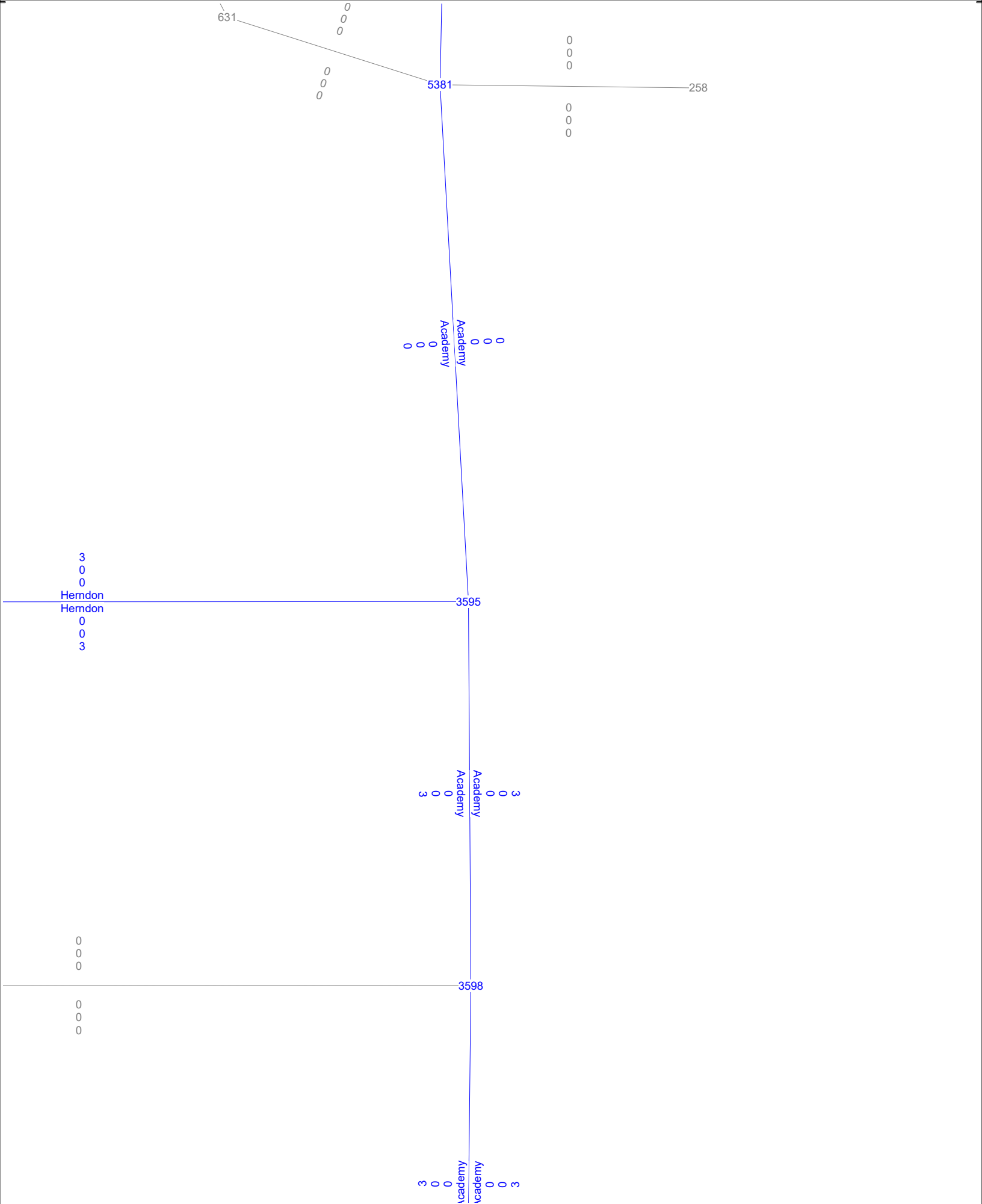




Assisted Living Select Zone (2035)  
AM, PM and Daily Project Only Trips

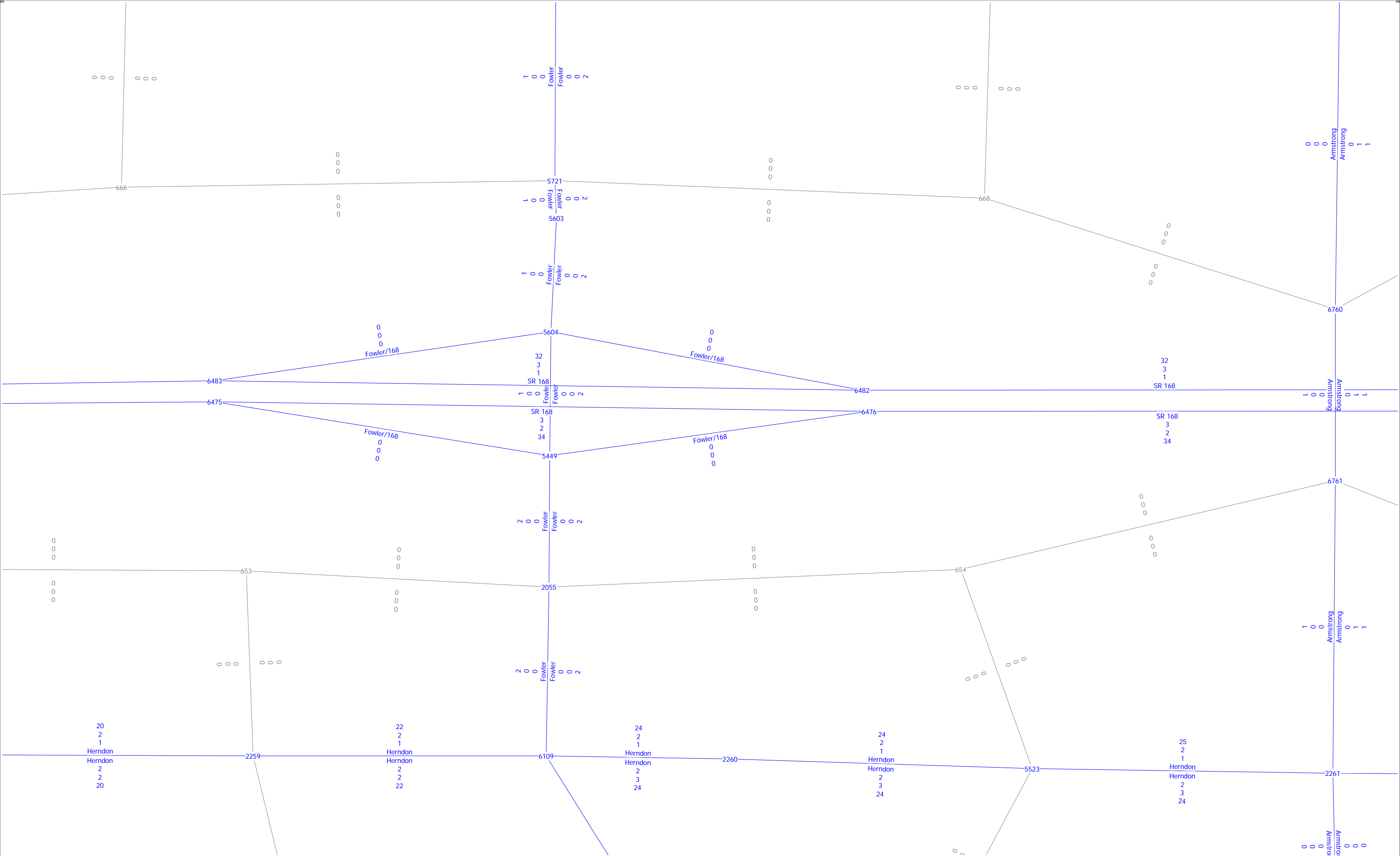




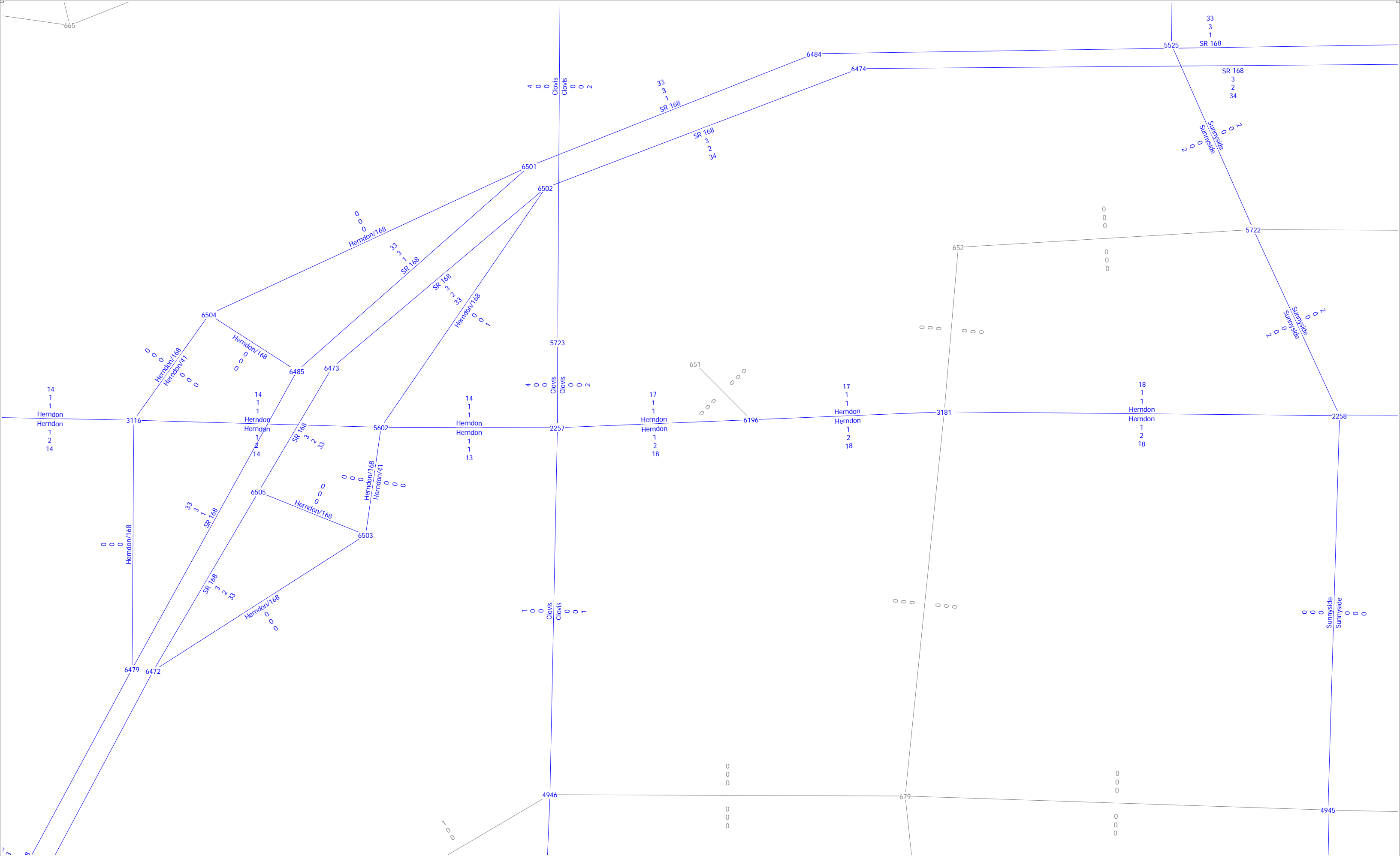


Assisted Living Select Zone (2035)  
AM, PM and Daily Project Only Trips





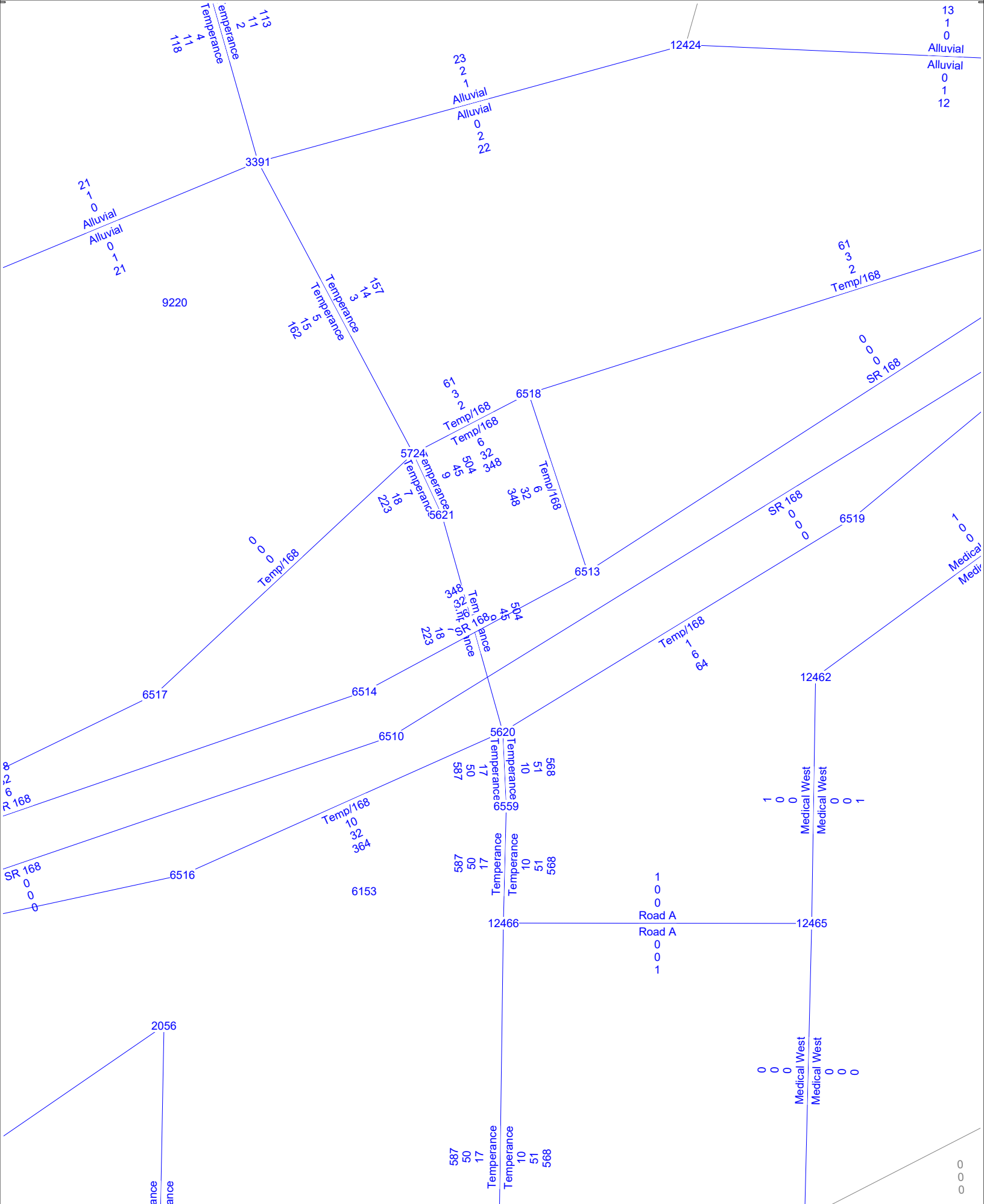
Assisted Living Select Zone (2035)  
AM, PM and Daily Project Only Trips



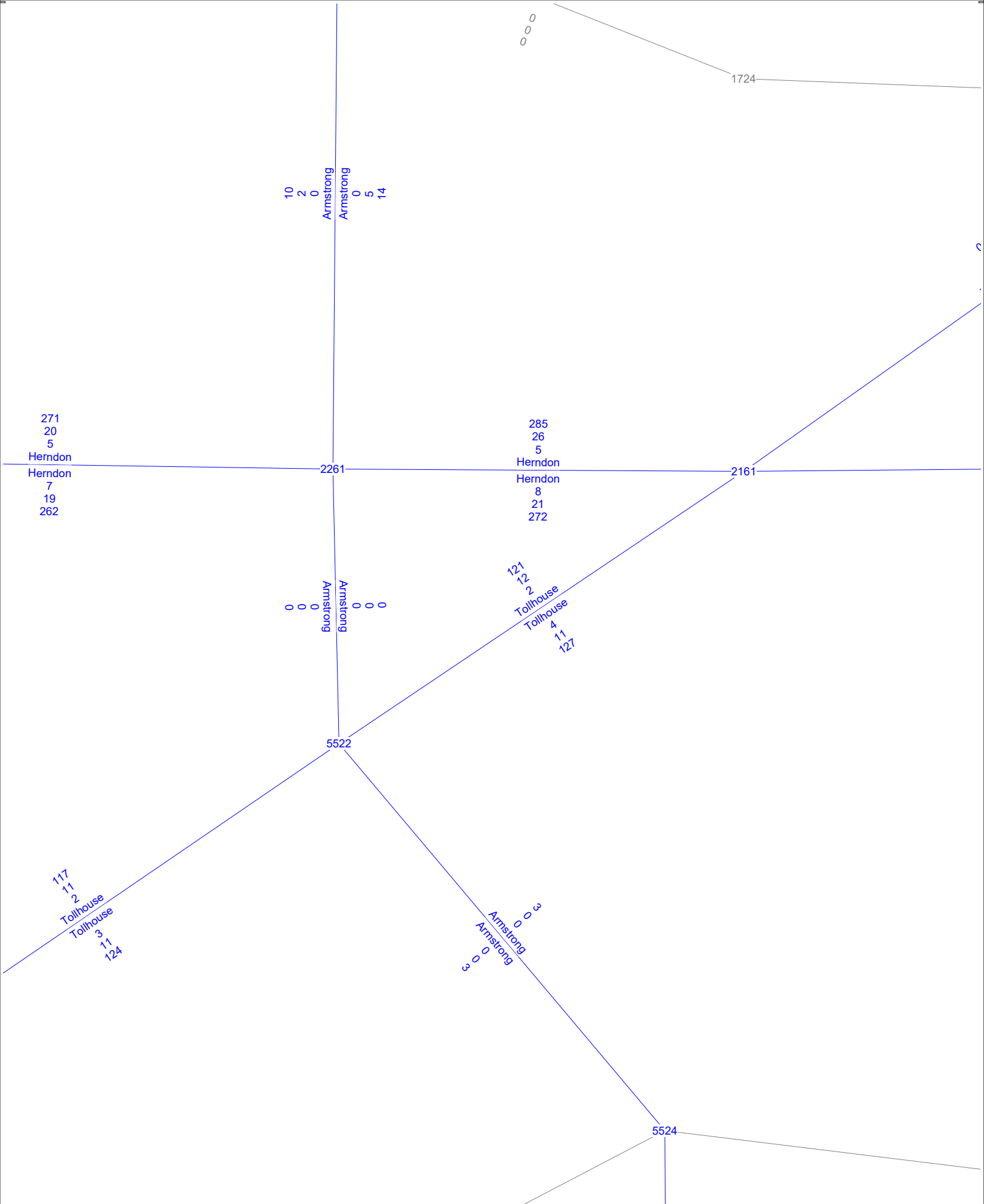
Assisted Living Select Zone (2035)  
AM, PM and Daily Project Only Trips







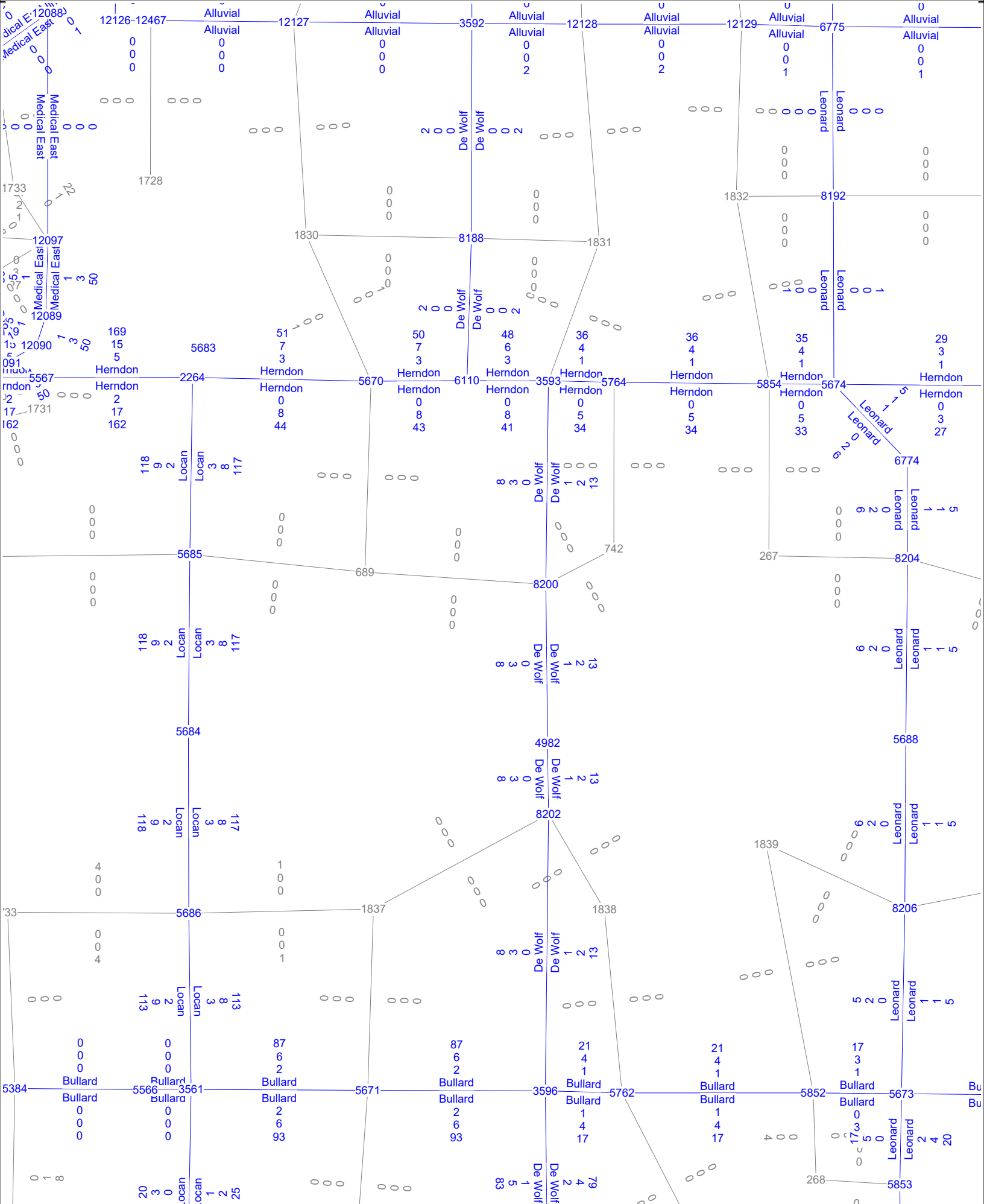
Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)  
AM, PM and Daily Project Only Trips



Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)  
AM, PM and Daily Project Only Trips

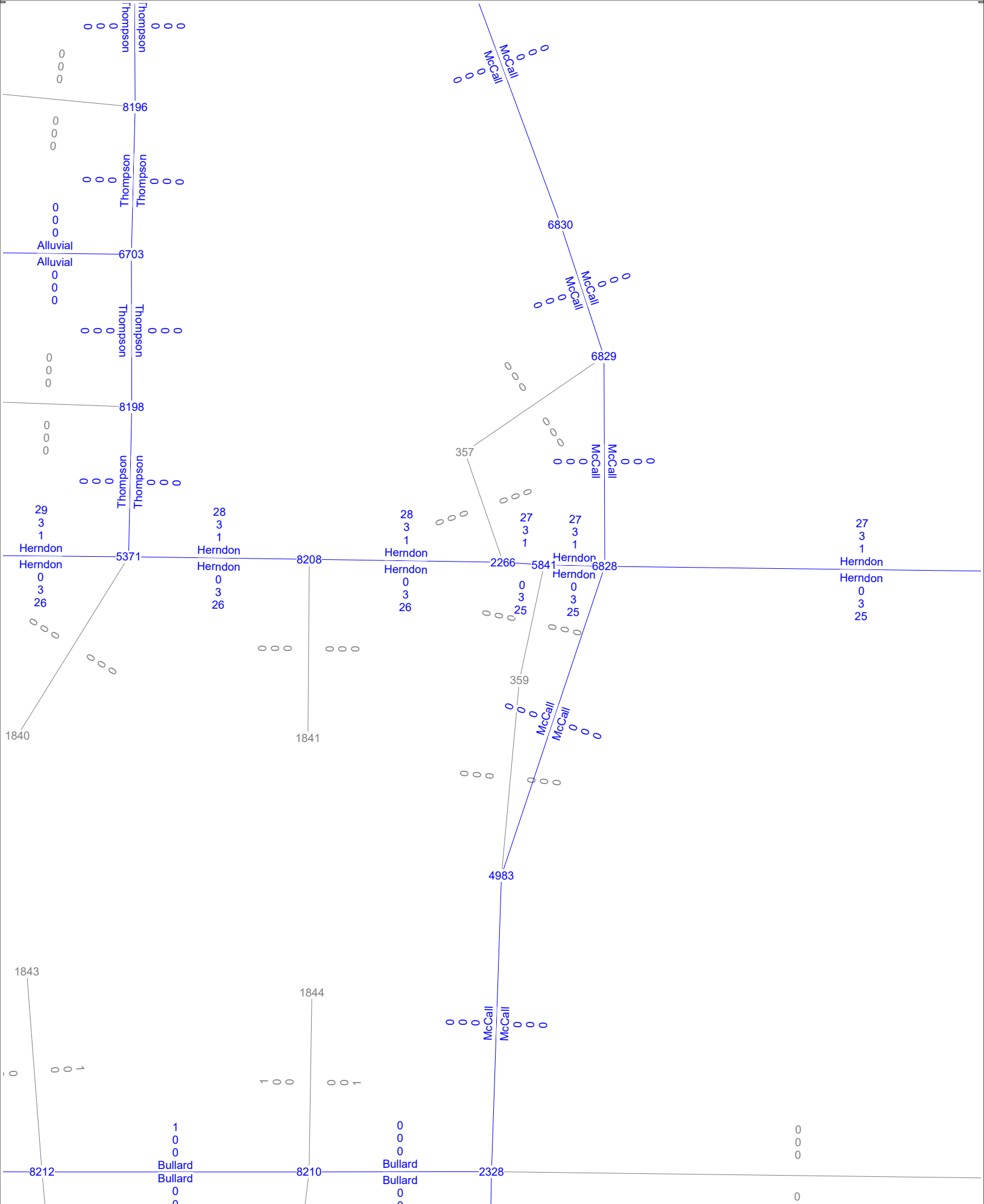




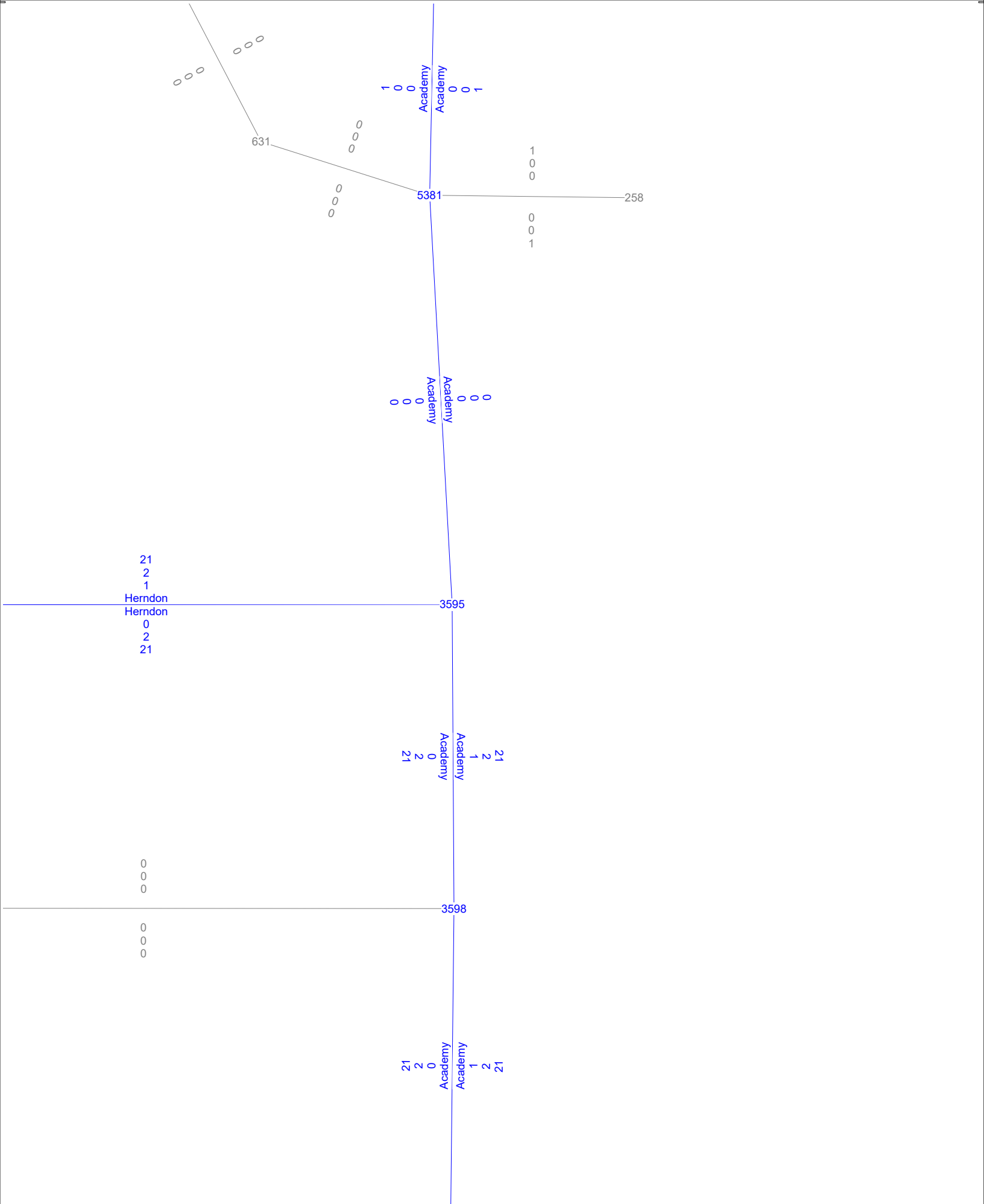


Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)  
AM, PM and Daily Project Only Trips

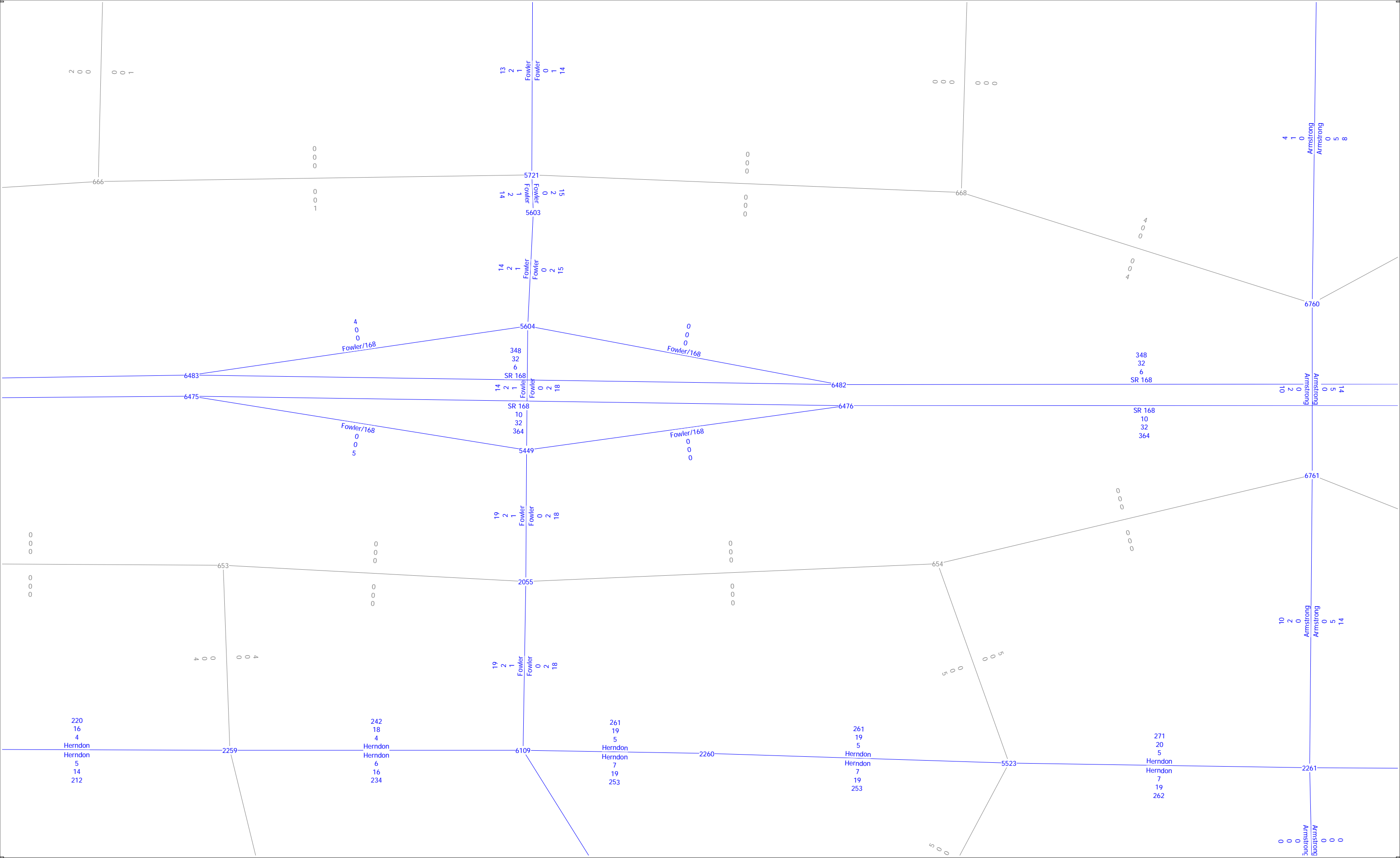




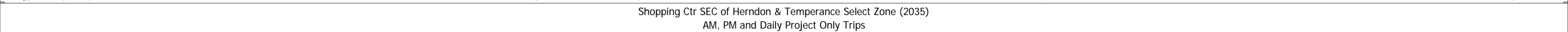
Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)  
AM, PM and Daily Project Only Trips



Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)  
AM, PM and Daily Project Only Trips

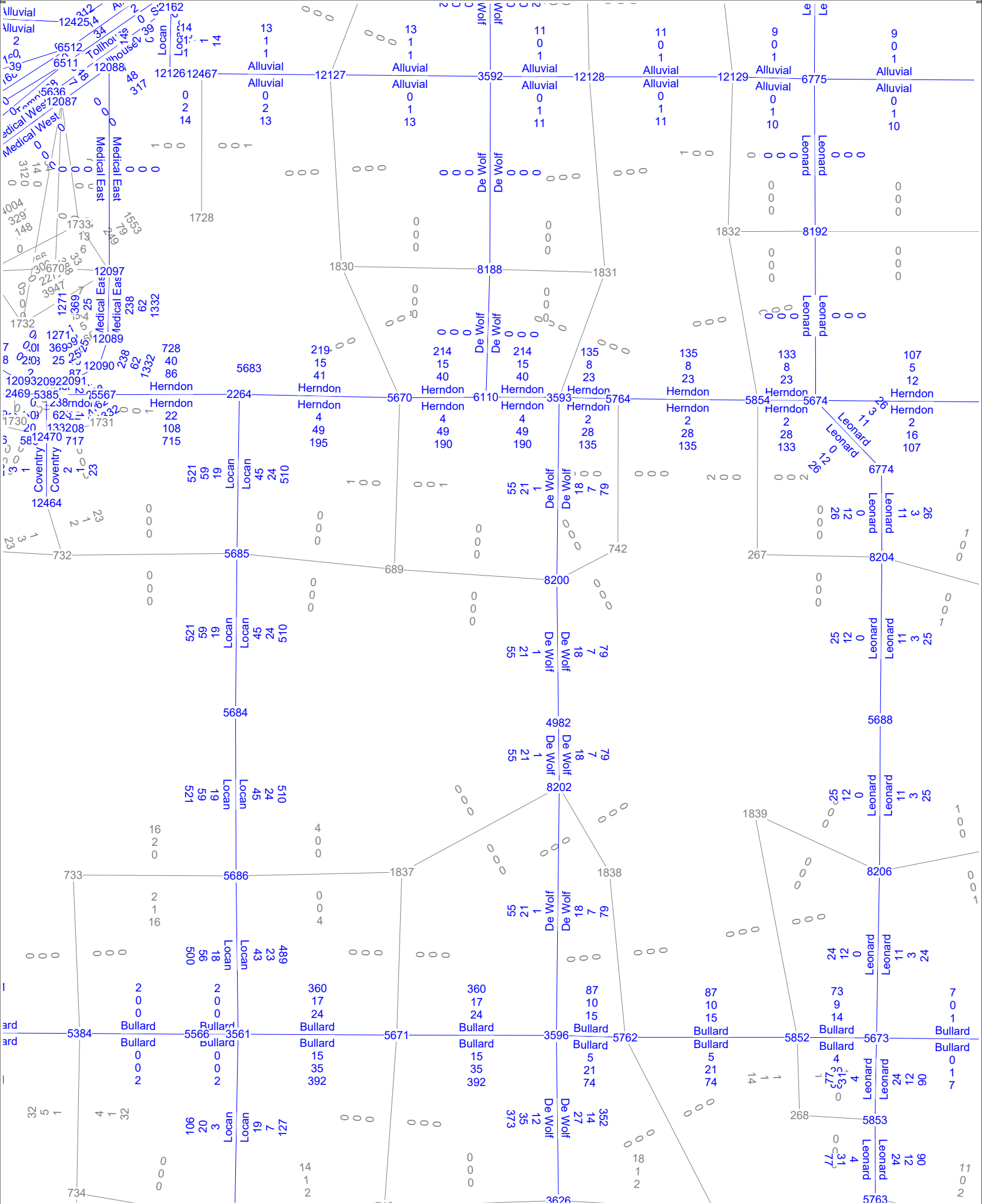


Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)  
AM, PM and Daily Project Only Trips

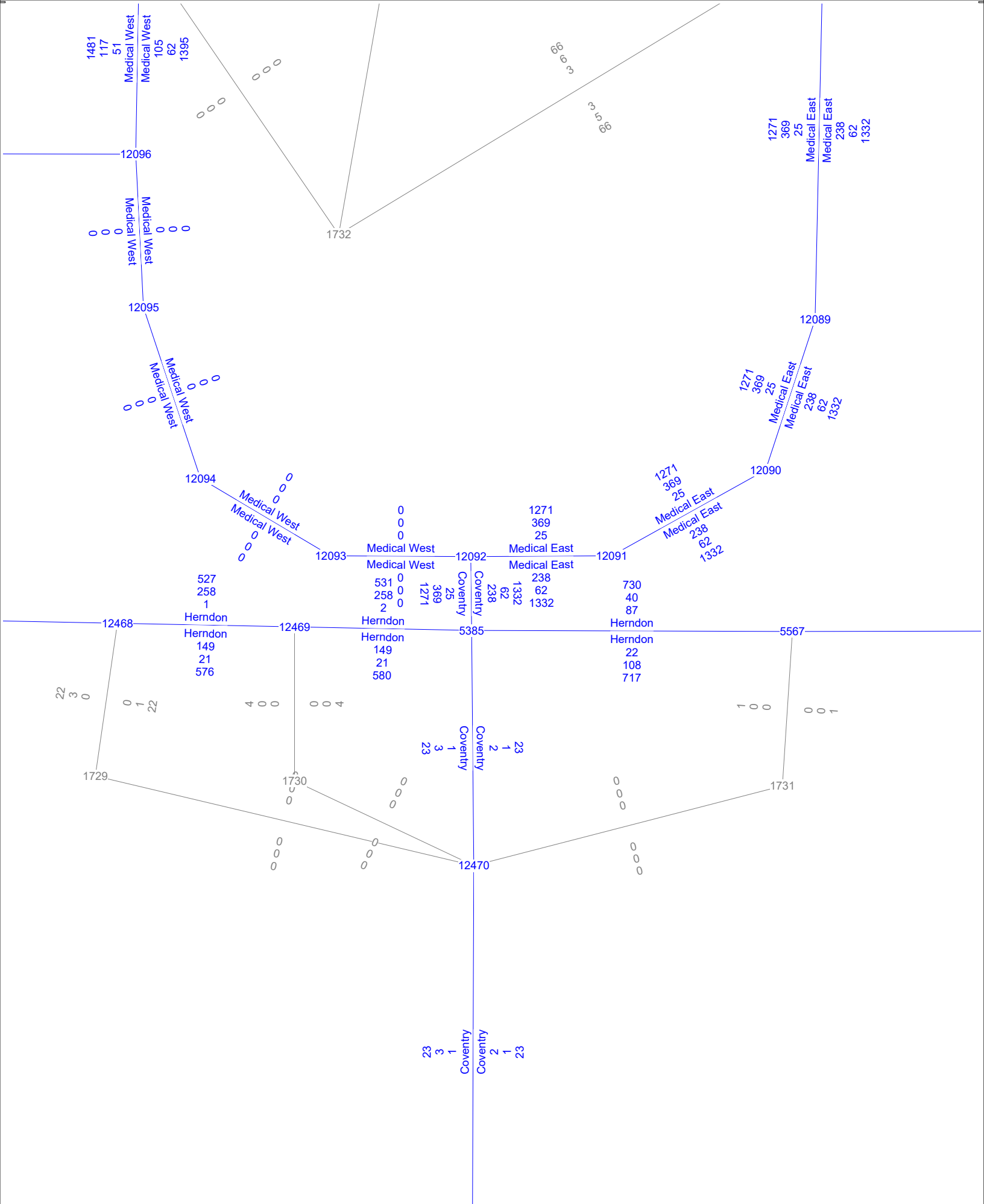






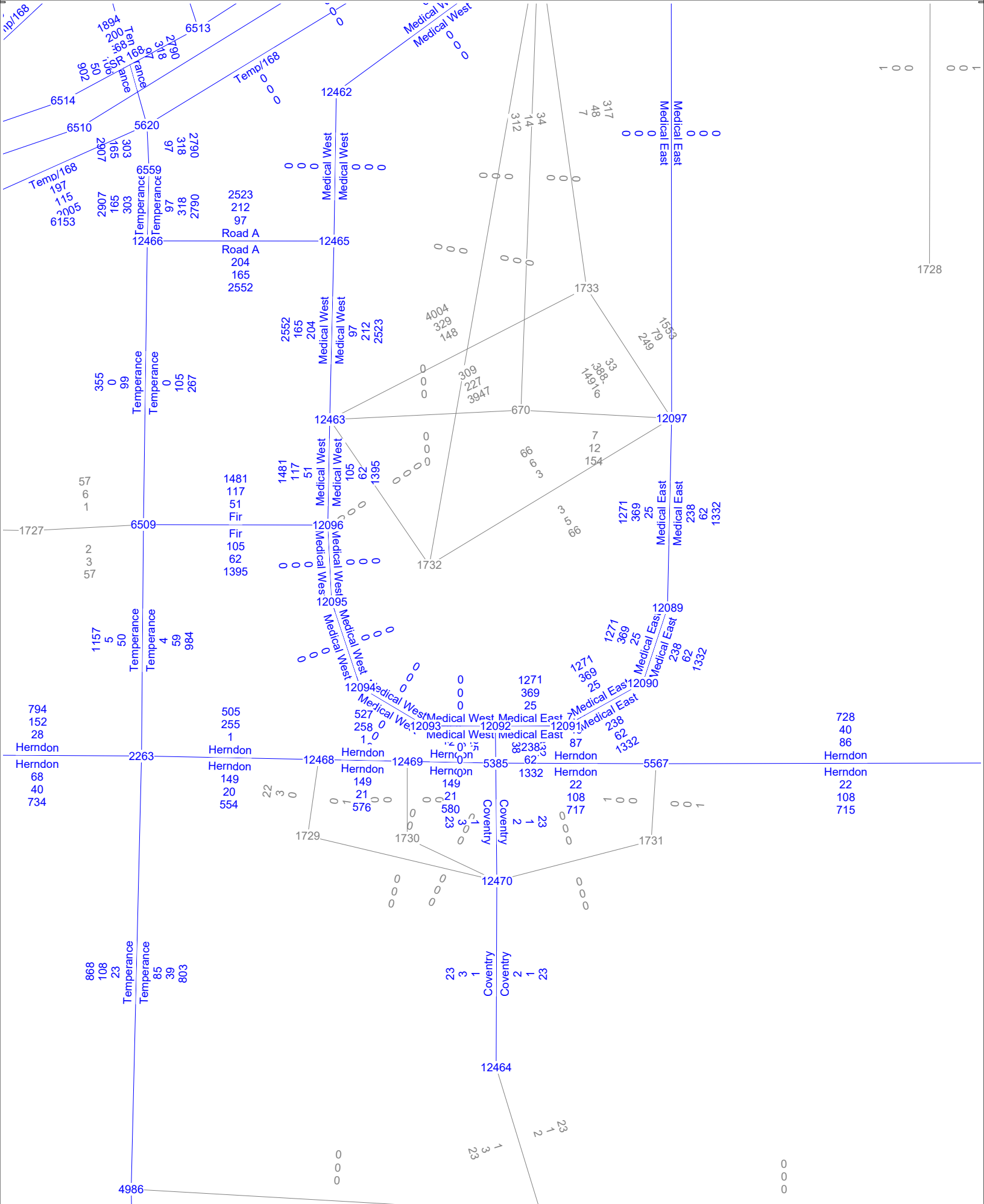


Hospital Phase 2 Select Zone (2035)  
AM, PM and Daily Project Only Trips



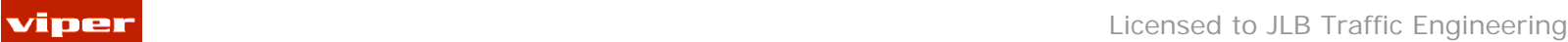
Hospital Phase 2 Select Zone (2035)  
AM, PM and Daily Project Only Trips



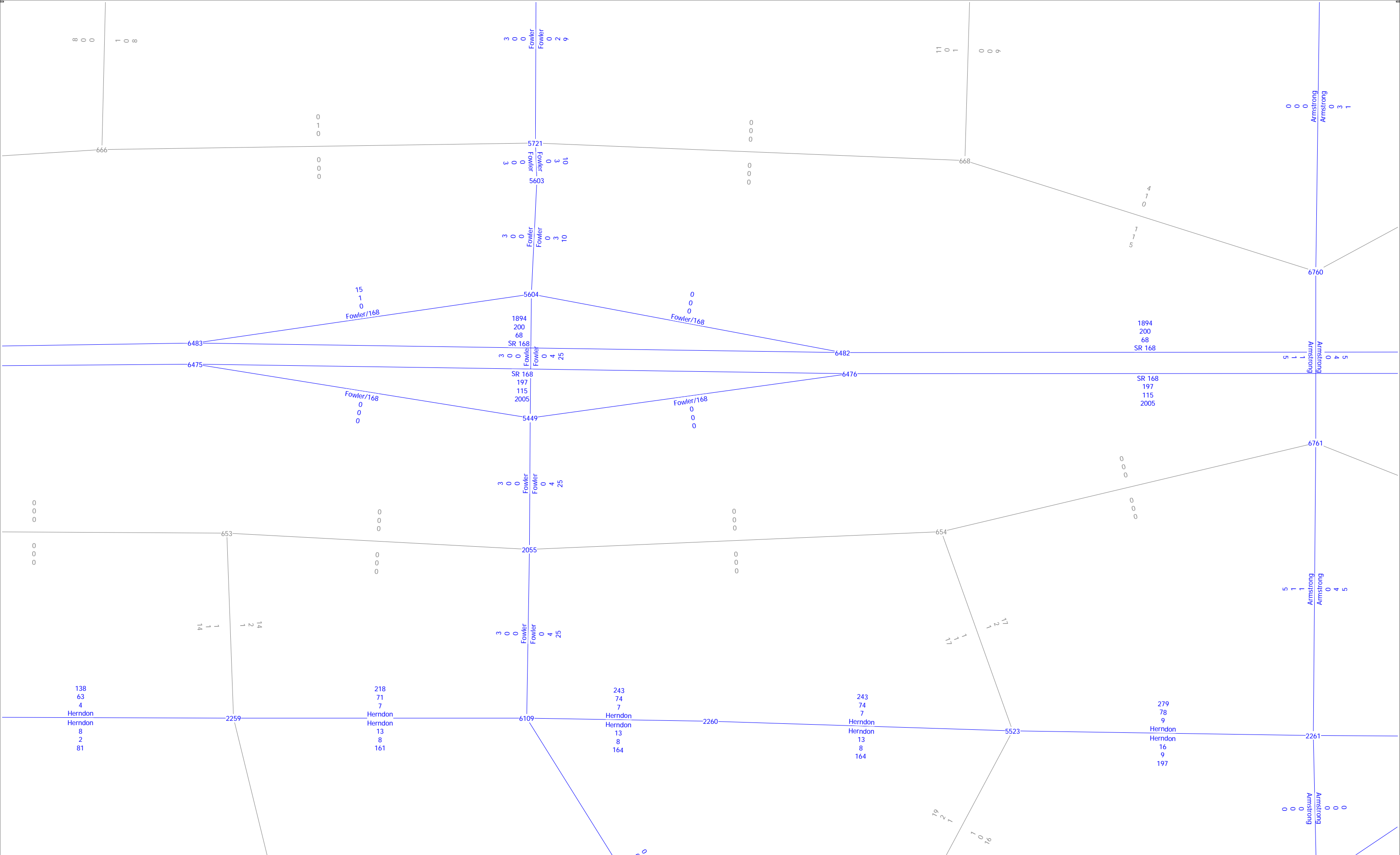


Hospital Phase 2 Select Zone (2035)  
AM, PM and Daily Project Only Trips

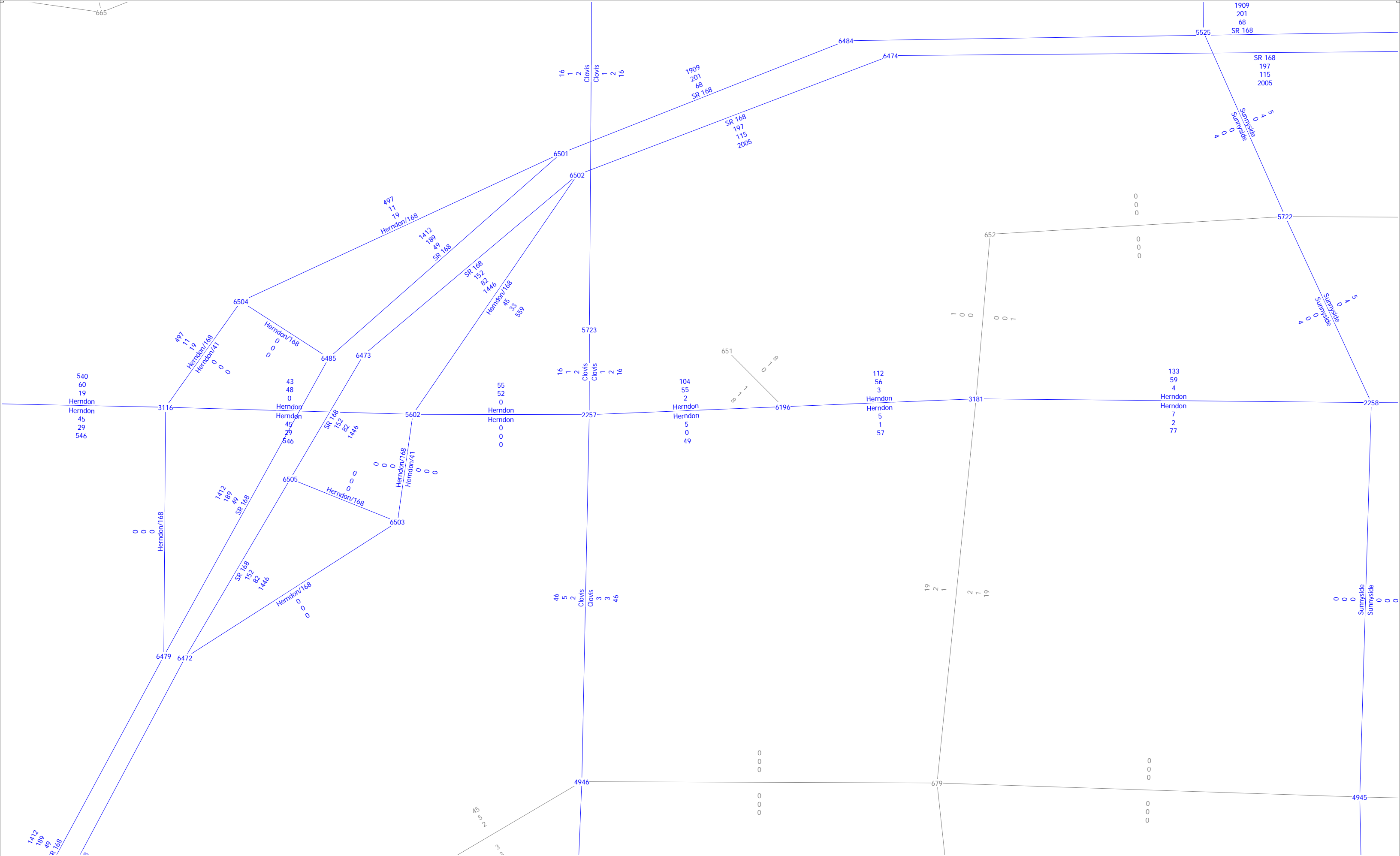








Hospital Phase 2 Select Zone (2035)  
AM, PM and Daily Project Only Trips



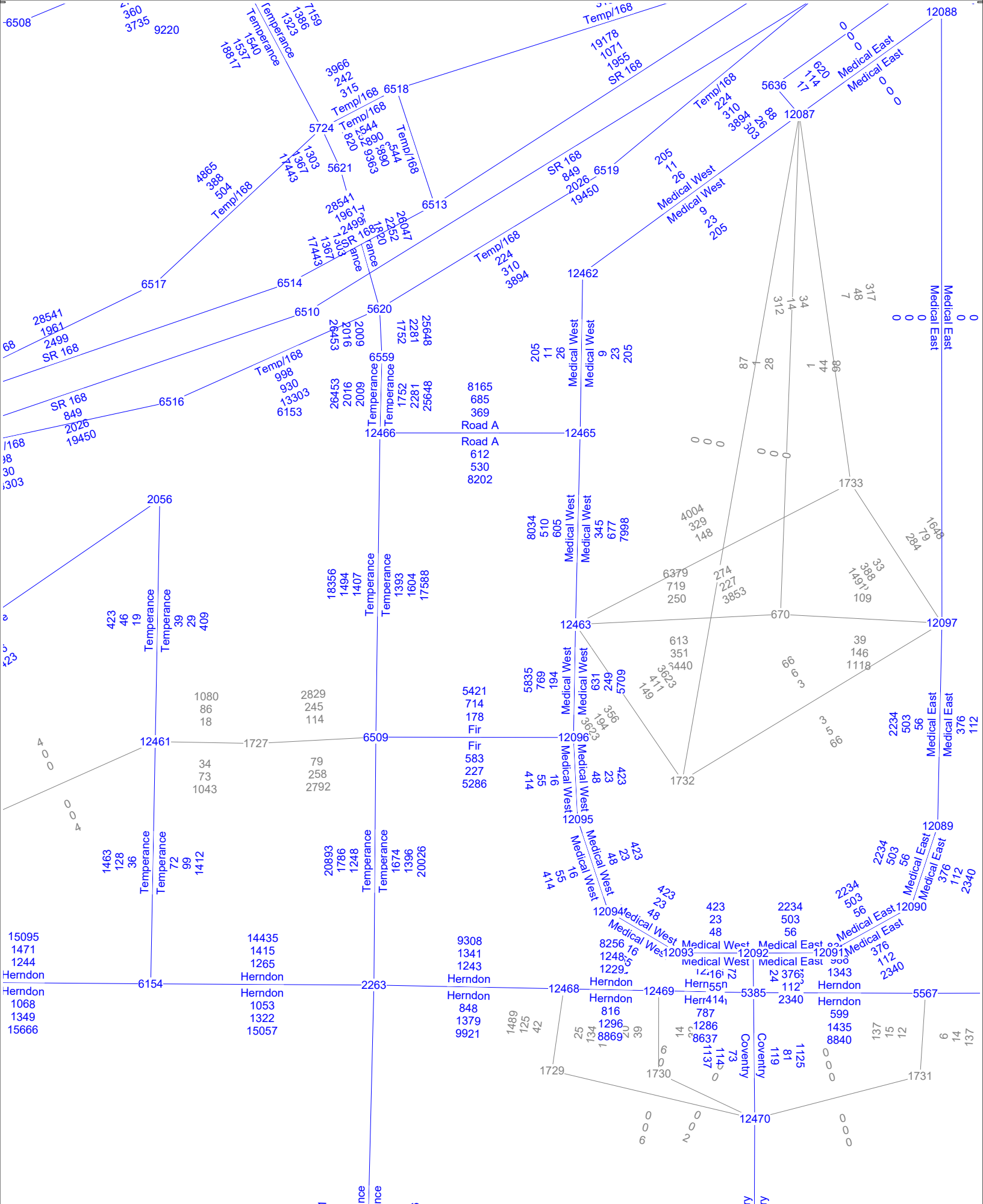
Hospital Phase 2 Select Zone (2035)  
AM, PM and Daily Project Only Trips

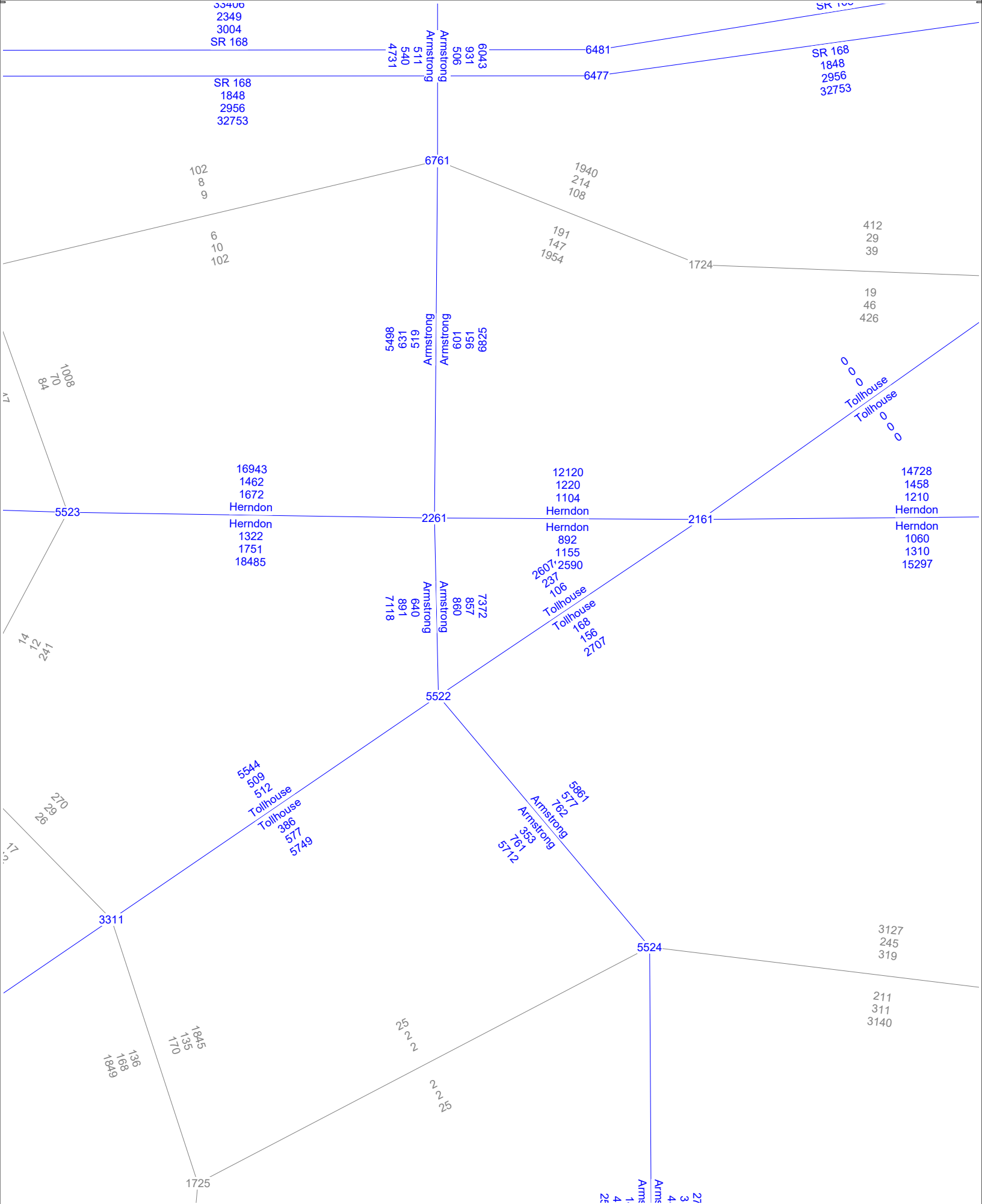






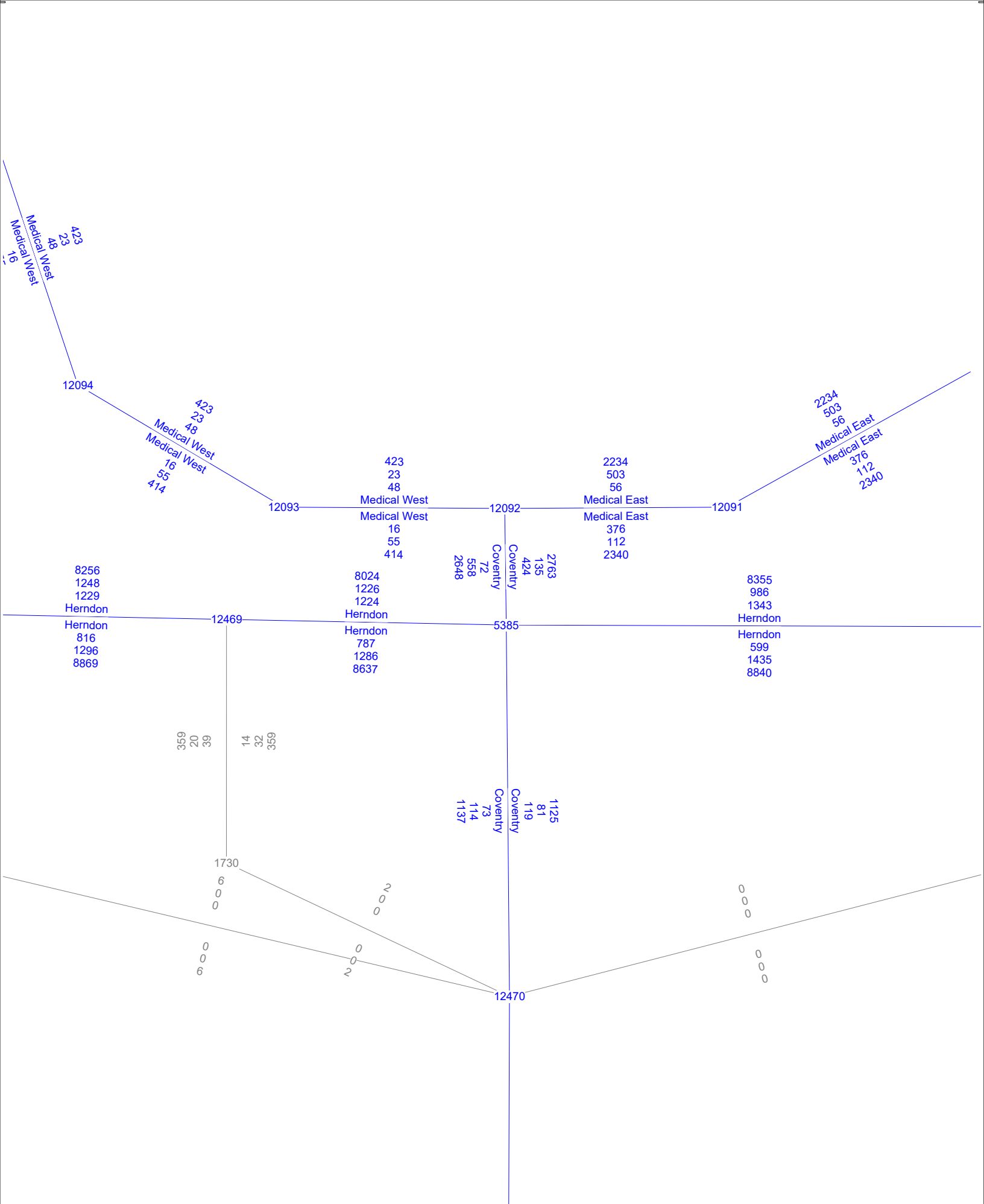






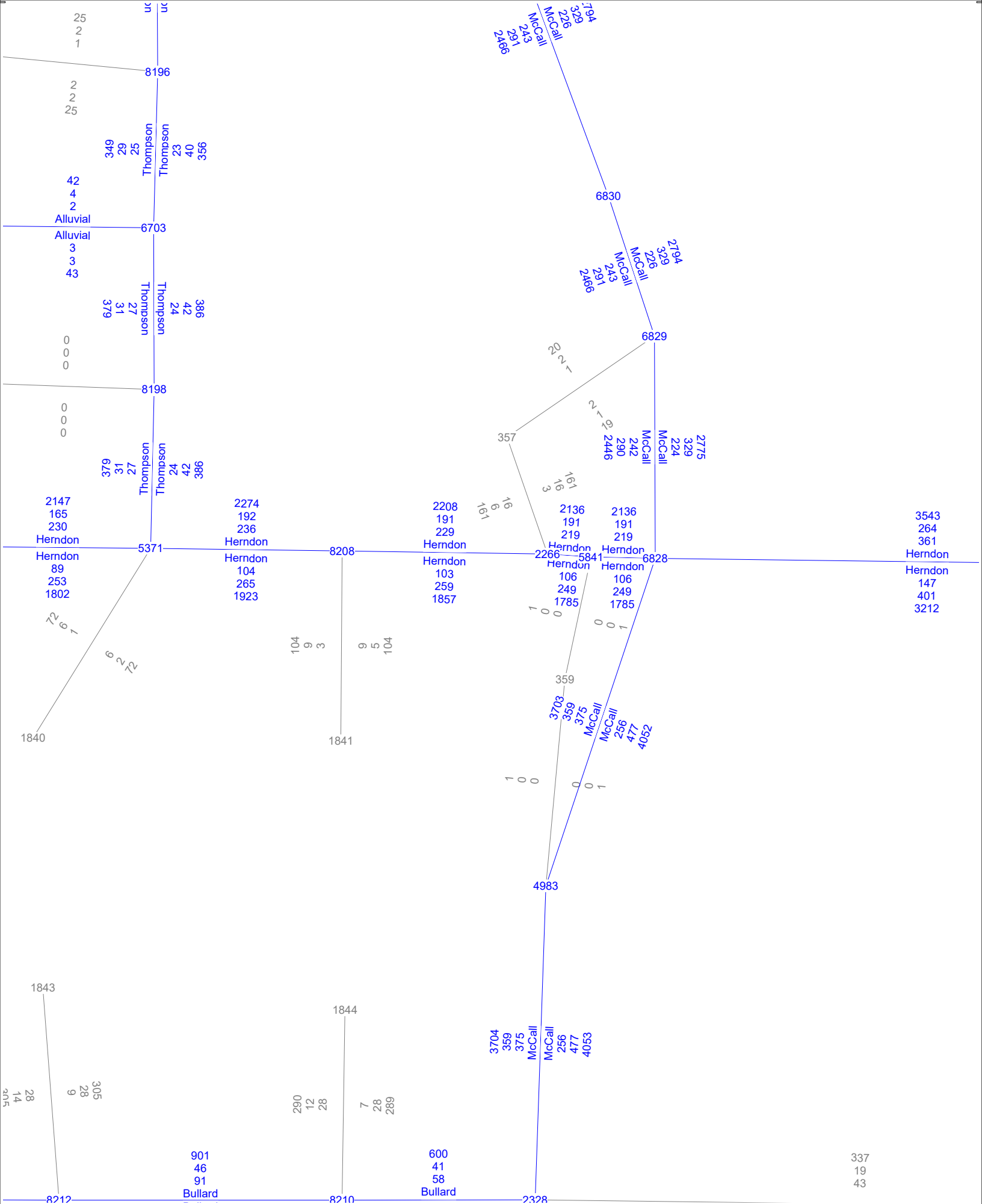
Cumulative Year 2035  
AM, PM and Daily Total Traffic Volumes



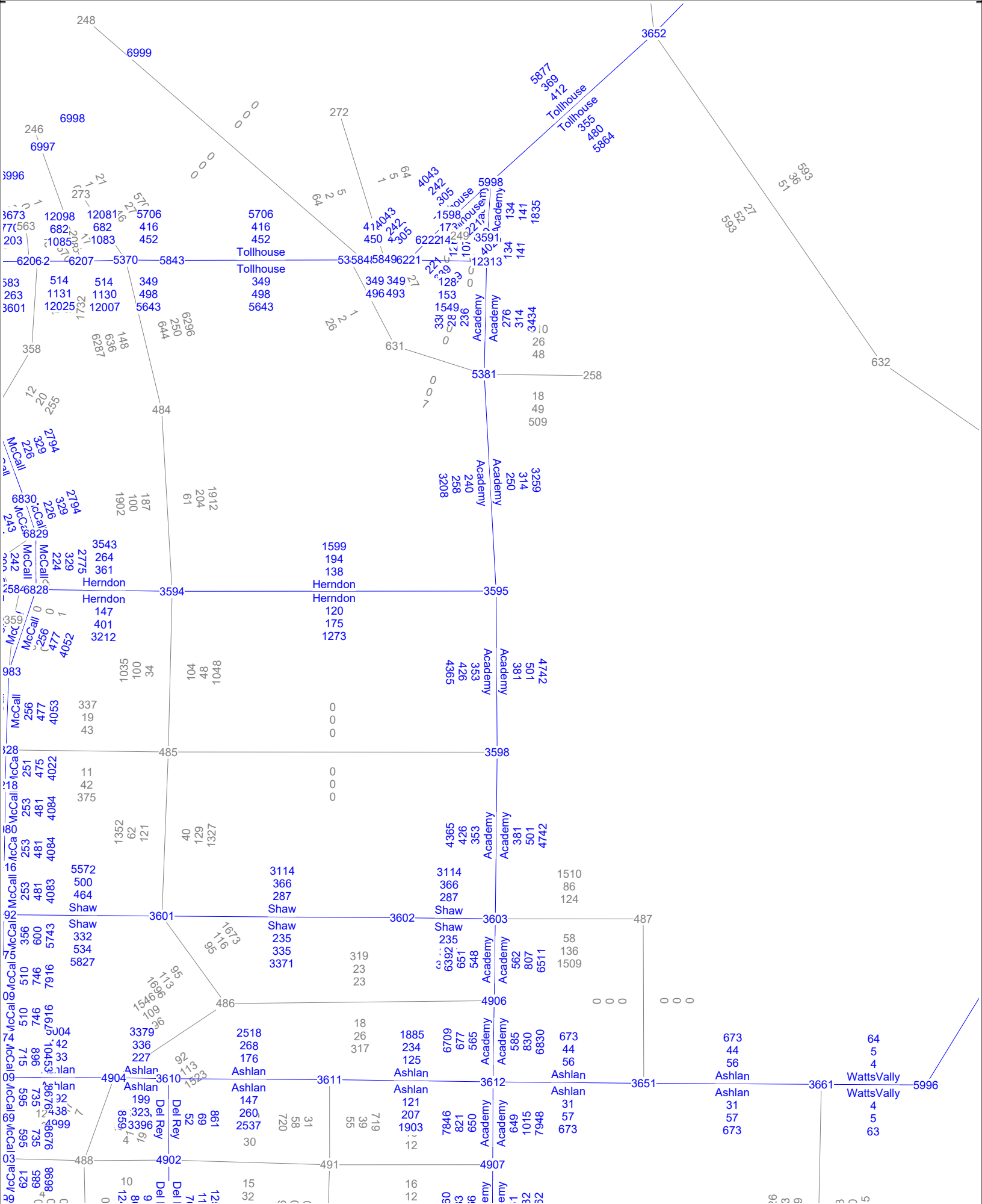


Cumulative Year 2035  
AM, PM and Daily Total Traffic Volumes





Cumulative Year 2035  
AM, PM and Daily Total Traffic Volumes



Cumulative Year 2035  
AM, PM and Daily Total Traffic Volumes



## Appendix E: LOS Worksheets, Existing



**Traffic Engineering, Inc.**

*Traffic Engineering, Transportation Planning, & Parking Solutions*

<http://www.JLBtraffic.com>

[info@JLBtraffic.com](mailto:info@JLBtraffic.com)

*1300 E. Shaw Ave., Ste. 103*

*Fresno, CA 93710*

*(559) 570-8991*
























*Page | E*

# HCM Signalized Intersection Capacity Analysis

Existing AM Peak

## 1: Temperance Avenue & Nees Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph)                      | 67  | 15  | 73  | 34  | 23  | 6   | 32   | 107   | 216   | 36  | 1   | 438   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  | 0.98  |  | 1.00  | 1.00  | 0.98  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1541  |  | 1752  | 3505  | 1532  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1541  |  | 1752  | 3505  | 1532  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90   | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)                   | 74  | 17  | 81  | 38  | 26  | 7   | 36   | 119   | 240   | 40  | 1   | 487   |
| RTOR Reduction (vph)              | 0   | 0   | 70  | 0   | 0   | 6   | 0  | 0   | 0   | 20  | 0   | 0   |
| Lane Group Flow (vph)             | 74  | 17  | 11  | 38  | 26  | 1   | 0  | 155   | 240   | 20  | 1   | 487   |
| Confl. Peds. (#/hr)               |   |   | 1   |   |   | 9   |  |   |   | 3   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 5.3   | 8.3   | 8.3   | 2.3   | 4.9   | 4.9   |  | 6.6   | 29.1  | 29.1  | 0.6   | 23.1  |
| Effective Green, g (s)            | 5.3   | 8.3   | 8.3   | 2.3   | 4.9   | 4.9   |  | 6.6   | 29.1  | 29.1  | 0.6   | 23.1  |
| Actuated g/C Ratio                | 0.09  | 0.14  | 0.14  | 0.04  | 0.08  | 0.08  |  | 0.11  | 0.49  | 0.49  | 0.01  | 0.39  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 156   | 258   | 216   | 67  | 152   | 127   |  | 194   | 1719  | 751   | 17  | 1365  |
| v/s Ratio Prot                    | c0.04   | 0.01  |   | c0.02   | c0.01   |   |  | c0.09   | 0.07  |   | c0.00   | c0.14   |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | 0.00  |  |   |   | 0.01  |   |   |
| v/c Ratio                         | 0.47  | 0.07  | 0.05  | 0.57  | 0.17  | 0.00  |  | 0.80  | 0.14  | 0.03  | 0.06  | 0.36  |
| Uniform Delay, d1                 | 25.7  | 22.1  | 22.1  | 28.0  | 25.3  | 25.0  |  | 25.7  | 8.3   | 7.8   | 29.1  | 12.8  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2             | 2.3   | 0.1   | 0.1   | 10.6  | 0.5   | 0.0   |  | 20.1  | 0.0   | 0.0   | 1.5   | 0.2   |
| Delay (s)                         | 27.9  | 22.2  | 22.2  | 38.6  | 25.8  | 25.0  |  | 45.8  | 8.3   | 7.8   | 30.5  | 13.0  |
| Level of Service                  | C   | C   | C   | D   | C   | C   |  | D   | A   | A   | C   | B   |
| Approach Delay (s)                |   | 24.7  |   |   | 32.6  |   |  |   | 21.6  |   |   | 12.7  |
| Approach LOS                      |   | C   |   |   | C   |   |  |   | C   |   |   | B   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 18.0  |   |   |   | HCM 2000 Level of Service  |   | B   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.42  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 59.3  |   |   |   | Sum of lost time (s)   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 46.2%   |   |   |   | ICU Level of Service   |   | A   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

Existing AM Peak

3/28/2017
























|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 185  |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.99 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1548 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1548 |
| Peak-hour factor, PHF  | 0.90 |
| Adj. Flow (vph)        | 206  |
| RTOR Reduction (vph)   | 126  |
| Lane Group Flow (vph)  | 80   |
| Confl. Peds. (#/hr)    | 1    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 23.1 |
| Effective Green, g (s) | 23.1 |
| Actuated g/C Ratio     | 0.39 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 603  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.05 |
| v/c Ratio              | 0.13 |
| Uniform Delay, d1      | 11.7 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.1  |
| Delay (s)              | 11.8 |
| Level of Service       | B    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# HCM 2010 Signalized Intersection Summary

## 2: Temperance Avenue & Alluvial Avenue

Existing AM Peak

3/28/2017



















|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 9   | 25  | 78  | 255   | 50  | 49  | 86   | 304   | 286   | 71  | 546   | 27  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 9   | 26  | 80  | 260   | 51  | 50  | 88   | 310   | 292   | 72  | 557   | 28  |
| Adj No. of Lanes  | 1   | 1   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 20  | 122   | 104   | 234   | 336   | 290   | 701  | 1990  | 889   | 96  | 741   | 331   |
| Arrive On Green   | 0.01  | 0.07  | 0.07  | 0.13  | 0.19  | 0.19  | 0.13   | 0.19  | 0.19  | 0.05  | 0.21  | 0.21  |
| Sat Flow, veh/h   | 1757  | 1845  | 1568  | 1757  | 1781  | 1541  | 1757   | 3505  | 1567  | 1757  | 3505  | 1566  |
| Grp Volume(v), veh/h  | 9   | 26  | 80  | 260   | 50  | 51  | 88   | 310   | 292   | 72  | 557   | 28  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1845  | 1568  | 1757  | 1752  | 1570  | 1757   | 1752  | 1567  | 1757  | 1752  | 1566  |
| Q Serve(g_s), s   | 0.5   | 1.2   | 2.0   | 12.0  | 2.1   | 2.4   | 4.0  | 6.7   | 14.5  | 3.6   | 13.4  | 1.1   |
| Cycle Q Clear(g_c), s   | 0.5   | 1.2   | 2.0   | 12.0  | 2.1   | 2.4   | 4.0  | 6.7   | 14.5  | 3.6   | 13.4  | 1.1   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.98  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 20  | 122   | 104   | 234   | 330   | 296   | 701  | 1990  | 889   | 96  | 741   | 331   |
| V/C Ratio(X)  | 0.46  | 0.21  | 0.77  | 1.11  | 0.15  | 0.17  | 0.13   | 0.16  | 0.33  | 0.75  | 0.75  | 0.08  |
| Avail Cap(c_a), veh/h   | 82  | 633   | 538   | 234   | 754   | 675   | 701  | 1990  | 889   | 187   | 1016  | 454   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 0.33   | 0.33  | 0.33  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 0.98   | 0.98  | 0.98  | 0.95  | 0.95  | 0.95  |
| Uniform Delay (d), s/veh  | 44.2  | 39.8  | 8.1   | 39.0  | 30.5  | 30.6  | 25.2   | 18.5  | 21.7  | 41.9  | 33.3  | 19.4  |
| Incr Delay (d2), s/veh  | 15.7  | 0.9   | 11.3  | 91.5  | 0.2   | 0.3   | 0.1  | 0.2   | 1.0   | 10.3  | 6.6   | 0.5   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.3   | 0.6   | 1.2   | 11.7  | 1.1   | 1.1   | 2.0  | 3.3   | 6.5   | 2.0   | 7.2   | 0.5   |
| LnGrp Delay(d),s/veh  | 60.0  | 40.7  | 19.5  | 130.5   | 30.7  | 30.9  | 25.3   | 18.7  | 22.7  | 52.2  | 39.9  | 19.9  |
| LnGrp LOS   | E   | D   | B   | F   | C   | C   | C  | B   | C   | D   | D   | B   |
| Approach Vol, veh/h   |   | 115   |   |   | 361   |   |  | 690   |   |   | 657   |   |
| Approach Delay, s/veh   |   | 27.4  |   |   | 102.6   |   |  | 21.2  |   |   | 40.4  |   |
| Approach LOS  |   | C   |   |   | F   |   |  | C   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 8.9   | 55.1  | 16.0  | 10.0  | 41.0  | 23.0  | 5.0  | 21.0  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | * 4.2   | 4.9   | 5.3   | * 5.7   | * 4.2  | 4.9   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 9.4   | 20.2  | * 12  | 30.0  | 4.8   | * 24  | * 4  | 37.8  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 5.6   | 16.5  | 14.0  | 4.0   | 6.0   | 15.4  | 2.5  | 4.4   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 1.1   | 0.0   | 0.8   | 0.0   | 1.7   | 0.0  | 0.8   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 44.6  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Avenue & SR 168 WB Ramp

Existing AM Peak

3/28/2017


















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |   |   |   |  |   |  |  |  |  |   |  |  |
| Volume (veh/h)               | 0   | 0   | 0   | 70  | 0   | 95  | 0  | 544   | 954   | 0   | 354   | 505   |
| Number                       |   |   |   | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          |   |   |   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          |   |   |   | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             |   |   |   | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       |   |   |   | 1845  | 0   | 1845  | 0  | 1845  | 1845  | 0   | 1845  | 1845  |
| Adj Flow Rate, veh/h         |   |   |   | 76  | 0   | 103   | 0  | 591   | 0   | 0   | 385   | 549   |
| Adj No. of Lanes             |   |   |   | 1   | 0   | 1   | 0  | 2   | 1   | 0   | 2   | 1   |
| Peak Hour Factor             |   |   |   | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         |   |   |   | 3   | 0   | 3   | 0  | 3   | 3   | 0   | 3   | 3   |
| Cap, veh/h                   |   |   |   | 161   | 0   | 151   | 0  | 2871  | 1262  | 0   | 2871  | 1285  |
| Arrive On Green              |   |   |   | 0.09  | 0.00  | 0.10  | 0.00   | 1.00  | 0.00  | 0.00  | 1.00  | 1.00  |
| Sat Flow, veh/h              |   |   |   | 1757  | 0   | 1568  | 0  | 3597  | 1568  | 0   | 3597  | 1568  |
| Grp Volume(v), veh/h         |   |   |   | 76  | 0   | 103   | 0  | 591   | 0   | 0   | 385   | 549   |
| Grp Sat Flow(s),veh/h/ln     |   |   |   | 1757  | 0   | 1568  | 0  | 1752  | 1568  | 0   | 1752  | 1568  |
| Q Serve(g_s), s              |   |   |   | 3.7   | 0.0   | 5.7   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        |   |   |   | 3.7   | 0.0   | 5.7   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Prop In Lane                 |   |   |   | 1.00  |   | 1.00  | 0.00   |   | 1.00  | 0.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       |   |   |   | 161   | 0   | 151   | 0  | 2871  | 1262  | 0   | 2871  | 1285  |
| V/C Ratio(X)                 |   |   |   | 0.47  | 0.00  | 0.68  | 0.00   | 0.21  | 0.00  | 0.00  | 0.13  | 0.43  |
| Avail Cap(c_a), veh/h        |   |   |   | 351   | 0   | 321   | 0  | 2871  | 1262  | 0   | 2871  | 1285  |
| HCM Platoon Ratio            |   |   |   | 1.00  | 1.00  | 1.00  | 1.00   | 1.67  | 1.67  | 1.00  | 1.67  | 1.67  |
| Upstream Filter(I)           |   |   |   | 1.00  | 0.00  | 1.00  | 0.00   | 0.75  | 0.00  | 0.00  | 0.86  | 0.86  |
| Uniform Delay (d), s/veh     |   |   |   | 38.8  | 0.0   | 39.3  | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       |   |   |   | 2.1   | 0.0   | 5.3   | 0.0  | 0.1   | 0.0   | 0.0   | 0.1   | 0.9   |
| Initial Q Delay(d3),s/veh    |   |   |   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     |   |   |   | 1.9   | 0.0   | 2.7   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.3   |
| LnGrp Delay(d),s/veh         |   |   |   | 40.9  | 0.0   | 44.7  | 0.0  | 0.1   | 0.0   | 0.0   | 0.1   | 0.9   |
| LnGrp LOS                    |   |   |   | D   |   | D   |  | A   |   |   | A   | A   |
| Approach Vol, veh/h          |   |   |   |   | 179   |   |  | 591   |   |   | 934   |   |
| Approach Delay, s/veh        |   |   |   |   | 43.1  |   |  | 0.1   |   |   | 0.6   |   |
| Approach LOS                 |   |   |   |   | D   |   |  | A   |   |   | A   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 |   | 2   |   |   |   | 6   |  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     |   | 77.7  |   |   |   | 77.7  |  | 12.3  |   |   |   |   |
| Change Period (Y+Rc), s      |   | 5.3   |   |   |   | 5.3   |  | 4.2   |   |   |   |   |
| Max Green Setting (Gmax), s  |   | 62.7  |   |   |   | 62.7  |  | 17.8  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s |   | 2.0   |   |   |   | 2.0   |  | 7.7   |   |   |   |   |
| Green Ext Time (p_c), s      |   | 8.9   |   |   |   | 8.9   |  | 0.4   |   |   |   |   |
| <b>Intersection Summary</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   |   | 4.9   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   |   | A   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

Existing AM Peak

3/28/2017















|                              |   |   |   |   |   |   |  |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
|                              |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 168   | 0   | 390   | 0   | 0   | 0   | 0  | 1385  | 30  | 23  | 402   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 181   | 0   | 419   |   |   |   | 0  | 1489  | 32  | 25  | 432   | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 429   | 0   | 390   |   |   |   | 0  | 1530  | 33  | 306   | 2337  | 0   |
| Arrive On Green              | 0.24  | 0.00  | 0.25  |   |   |   | 0.00   | 0.87  | 0.84  | 0.06  | 0.22  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0  | 3601  | 75  | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 181   | 0   | 419   |   |   |   | 0  | 743   | 778   | 25  | 432   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0  | 1752  | 1831  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 7.8   | 0.0   | 22.4  |   |   |   | 0.0  | 32.1  | 32.6  | 1.2   | 9.0   | 0.0   |
| Cycle Q Clear(g_c), s        | 7.8   | 0.0   | 22.4  |   |   |   | 0.0  | 32.1  | 32.6  | 1.2   | 9.0   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.04  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 429   | 0   | 390   |   |   |   | 0  | 764   | 799   | 306   | 2337  | 0   |
| V/C Ratio(X)                 | 0.42  | 0.00  | 1.07  |   |   |   | 0.00   | 0.97  | 0.97  | 0.08  | 0.18  | 0.00  |
| Avail Cap(c_a), veh/h        | 429   | 0   | 390   |   |   |   | 0  | 993   | 1038  | 306   | 2337  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 0.33  | 0.33  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 0.76  | 0.76  | 0.99  | 0.99  | 0.00  |
| Uniform Delay (d), s/veh     | 28.6  | 0.0   | 33.8  |   |   |   | 0.0  | 5.3   | 5.4   | 35.6  | 15.2  | 0.0   |
| Incr Delay (d2), s/veh       | 0.7   | 0.0   | 66.6  |   |   |   | 0.0  | 22.4  | 22.3  | 0.1   | 0.2   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.8   | 0.0   | 16.9  |   |   |   | 0.0  | 18.0  | 18.8  | 0.6   | 4.4   | 0.0   |
| LnGrp Delay(d),s/veh         | 29.3  | 0.0   | 100.4   |   |   |   | 0.0  | 27.7  | 27.7  | 35.7  | 15.4  | 0.0   |
| LnGrp LOS                    | C   |   | F   |   |   |   |  | C   | C   | D   | B   |   |
| Approach Vol, veh/h          |   | 600   |   |   |   |   |  | 1521  |   |   | 457   |   |
| Approach Delay, s/veh        |   | 79.0  |   |   |   |   |  | 27.7  |   |   | 16.5  |   |
| Approach LOS                 |   | E   |   |   |   |   |  | C   |   |   | B   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 19.3  | 44.7  |   | 26.0  |   | 64.0  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 4.8   | * 50  |   | * 22  |   | 58.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 3.2   | 34.6  |   | 24.4  |   | 11.0  |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.3   | 6.3   |   | 0.0   |   | 2.0   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 37.6  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

Existing AM Peak

3/28/2017

|                                   |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBU   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |
| Volume (vph)                      | 47  | 149   | 1   | 1250  | 86  | 265   | 600   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 0.95  | 1.00  | 0.97  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1568  | 1752  | 3505  | 1547  | 3400  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1568  | 1752  | 3505  | 1547  | 3400  | 3505  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 51  | 162   | 1   | 1359  | 93  | 288   | 652   |
| RTOR Reduction (vph)              | 0   | 147   | 0   | 0   | 26  | 0   | 0   |
| Lane Group Flow (vph)             | 51  | 15  | 1   | 1359  | 67  | 288   | 652   |
| Confl. Peds. (#/hr)               |   |   |   |   | 1   |   |   |
| Turn Type                         | Prot  | Perm  | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 8   |   | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   | 8   |   |   | 2   |   |   |
| Actuated Green, G (s)             | 8.3   | 8.3   | 0.8   | 52.3  | 52.3  | 15.7  | 67.2  |
| Effective Green, g (s)            | 8.5   | 8.5   | 1.0   | 53.6  | 53.6  | 15.9  | 68.5  |
| Actuated g/C Ratio                | 0.09  | 0.09  | 0.01  | 0.60  | 0.60  | 0.18  | 0.76  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 5.3   | 5.3   | 4.2   | 5.3   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 165   | 148   | 19  | 2087  | 921   | 600   | 2667  |
| v/s Ratio Prot                    | c0.03   |   | 0.00  | c0.39   |   | c0.08   | 0.19  |
| v/s Ratio Perm                    |   | 0.01  |   |   | 0.04  |   |   |
| v/c Ratio                         | 0.31  | 0.10  | 0.05  | 0.65  | 0.07  | 0.48  | 0.24  |
| Uniform Delay, d1                 | 38.0  | 37.3  | 44.0  | 12.0  | 7.7   | 33.3  | 3.2   |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 0.89  | 1.03  |
| Incremental Delay, d2             | 1.1   | 0.3   | 1.2   | 1.6   | 0.2   | 0.6   | 0.2   |
| Delay (s)                         | 39.1  | 37.6  | 45.2  | 13.6  | 7.8   | 30.2  | 3.4   |
| Level of Service                  | D   | D   | D   | B   | A   | C   | A   |
| Approach Delay (s)                | 37.9  |   |   | 13.3  |   |   | 11.6  |
| Approach LOS                      | D   |   |   | B   |   |   | B   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 14.7  |   | HCM 2000 Level of Service   |   | B   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.58  |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 90.0  |   | Sum of lost time (s)  |   | 12.0  |
| Intersection Capacity Utilization |   |   | 55.4%   |   | ICU Level of Service  |   | B   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |   |

| Intersection                |       |       |       |       |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh   | 6.1   |       |       |       |
| Intersection LOS            | A     |       |       |       |
| Approach                    | EB    | WB    | NB    | SB    |
| Entry Lanes                 | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes    | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h    | 376   | 34    | 49    | 108   |
| Demand Flow Rate, veh/h     | 388   | 34    | 50    | 111   |
| Vehicles Circulating, veh/h | 8     | 310   | 322   | 51    |
| Vehicles Exiting, veh/h     | 154   | 62    | 74    | 293   |
| Follow-Up Headway, s        | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h   | 0     | 0     | 0     | 0     |
| Ped Cap Adj                 | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh       | 6.8   | 4.8   | 5.1   | 4.4   |
| Approach LOS                | A     | A     | A     | A     |
| Lane                        | Left  | Left  | Left  | Left  |
| Designated Moves            | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves               | LTR   | LTR   | LTR   | LTR   |
| RT Channelized              |       |       |       |       |
| Lane Util                   | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s         | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h           | 388   | 34    | 50    | 111   |
| Cap Entry Lane, veh/h       | 1121  | 829   | 819   | 1074  |
| Entry HV Adj Factor         | 0.970 | 0.986 | 0.971 | 0.972 |
| Flow Entry, veh/h           | 376   | 34    | 49    | 108   |
| Cap Entry, veh/h            | 1087  | 817   | 795   | 1044  |
| V/C Ratio                   | 0.346 | 0.041 | 0.061 | 0.103 |
| Control Delay, s/veh        | 6.8   | 4.8   | 5.1   | 4.4   |
| LOS                         | A     | A     | A     | A     |
| 95th %tile Queue, veh       | 2     | 0     | 0     | 0     |


























# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

Existing AM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 31  | 309   | 61  | 42  | 604   | 31  | 260  | 126   | 15  | 25  | 67  | 68  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 33  | 332   | 66  | 45  | 649   | 33  | 280  | 135   | 16  | 27  | 72  | 73  |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 60  | 1524  | 475   | 74  | 976   | 50  | 346  | 1016  | 454   | 52  | 428   | 191   |
| Arrive On Green   | 0.03  | 0.30  | 0.30  | 0.04  | 0.29  | 0.26  | 0.20   | 0.29  | 0.29  | 0.03  | 0.12  | 0.12  |
| Sat Flow, veh/h   | 1757  | 5036  | 1568  | 1757  | 3394  | 172   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 33  | 332   | 66  | 45  | 335   | 347   | 280  | 135   | 16  | 27  | 72  | 73  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1568  | 1757  | 1752  | 1814  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 0.9   | 2.3   | 1.5   | 1.2   | 8.0   | 8.0   | 7.2  | 1.4   | 0.3   | 0.7   | 0.9   | 1.4   |
| Cycle Q Clear(g_c), s   | 0.9   | 2.3   | 1.5   | 1.2   | 8.0   | 8.0   | 7.2  | 1.4   | 0.3   | 0.7   | 0.9   | 1.4   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.10  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 60  | 1524  | 475   | 74  | 504   | 522   | 346  | 1016  | 454   | 52  | 428   | 191   |
| V/C Ratio(X)  | 0.55  | 0.22  | 0.14  | 0.61  | 0.66  | 0.67  | 0.81   | 0.13  | 0.04  | 0.52  | 0.17  | 0.38  |
| Avail Cap(c_a), veh/h   | 155   | 2646  | 824   | 174   | 939   | 972   | 406  | 2843  | 1272  | 210   | 2453  | 1097  |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 22.6  | 12.4  | 12.1  | 22.4  | 14.9  | 15.0  | 18.2   | 12.5  | 12.1  | 22.8  | 18.7  | 8.9   |
| Incr Delay (d2), s/veh  | 7.8   | 0.1   | 0.1   | 8.0   | 1.5   | 1.5   | 10.1   | 0.1   | 0.0   | 7.9   | 0.2   | 1.2   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.6   | 1.1   | 0.6   | 0.7   | 4.0   | 4.2   | 4.5  | 0.7   | 0.2   | 0.5   | 0.4   | 0.9   |
| LnGrp Delay(d),s/veh  | 30.4  | 12.5  | 12.2  | 30.4  | 16.4  | 16.5  | 28.3   | 12.5  | 12.2  | 30.7  | 18.9  | 10.2  |
| LnGrp LOS   | C   | B   | B   | C   | B   | B   | C  | B   | B   | C   | B   | B   |
| Approach Vol, veh/h   |   | 431   |   |   | 727   |   |  | 431   |   |   | 172   |   |
| Approach Delay, s/veh   |   | 13.8  |   |   | 17.3  |   |  | 22.8  |   |   | 17.0  |   |
| Approach LOS  |   | B   |   |   | B   |   |  | C   |   |   | B   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 5.4   | 17.8  | 6.0   | 18.4  | 13.4  | 9.8   | 6.7  | 17.7  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 5.5   | 37.3  | * 4.5   | 23.7  | * 11  | 32.0  | 4.0  | * 24  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 2.7   | 3.4   | 3.2   | 4.3   | 9.2   | 3.4   | 2.9  | 10.0  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 1.2   | 0.0   | 1.7   | 0.2   | 1.2   | 0.2  | 2.3   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 17.8  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | B   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

HCM 2010 TWSC  
8: Tollhouse Road & Herndon Avenue

Existing AM Peak  
3/28/2017

| Intersection     |   |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 19   | 313  | 0    | 11   | 0    | 743  | 4    | 0    | 0    | 73   | 0    | 0    | 17   |
| Conflicting Peds, #/hr   | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 400  | -    | -    | -    | 120  | -    | 85   | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | -    | 0    | -    | -    | 1    | -    | -    | 1    | -    |
| Grade, %                 | -    | 0    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 20   | 337  | 0    | 12   | 0    | 799  | 4    | 0    | 0    | 78   | 0    | 0    | 18   |

| Major/Minor          | Major1 |   | Major2 |      |      |   | Minor1 |      |      | Minor2 |      |      |      |
|----------------------|--------|---|--------|------|------|---|--------|------|------|--------|------|------|------|
| Conflicting Flow All | 799    | 0 | 0      | 324  | 338  | 0 | 0      | 801  | 1201 | 169    | 999  | 1201 | 400  |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 378  | 378  | -      | 823  | 823  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 423  | 823  | -      | 176  | 378  | -    |
| Critical Hdwy        | 4.16   | - | -      | 5.66 | 5.36 | - | -      | 7.01 | 6.56 | 7.16   | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1  | -      | - | -      | -    | -    | - | -      | 7.36 | 5.56 | -      | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2  | -      | - | -      | -    | -    | - | -      | 6.56 | 5.56 | -      | 6.76 | 5.56 | -    |
| Follow-up Hdwy       | 2.23   | - | -      | 2.33 | 3.13 | - | -      | 3.68 | 4.03 | 3.93   | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver   | 813    | - | -      | 1029 | 803  | - | -      | 301  | 182  | 717    | 223  | 182  | 597  |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 545  | 611  | -      | 323  | 384  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 557  | 384  | -      | 768  | 611  | -    |
| Platoon blocked, %   |        | - | -      |      |      | - | -      |      |      |        |      |      |      |
| Mov Cap-1 Maneuver   | 812    | - | -      | 924  | 803  | - | -      | 286  | 177  | 716    | 195  | 177  | 597  |
| Mov Cap-2 Maneuver   | -      | - | -      | -    | -    | - | -      | 370  | 279  | -      | 265  | 287  | -    |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 531  | 595  | -      | 315  | 384  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 539  | 384  | -      | 667  | 595  | -    |

| Approach             | EB  | WB  | NE   | SW   |
|----------------------|-----|-----|------|------|
| HCM Control Delay, s | 0.5 | 0.1 | 10.6 | 11.2 |
| HCM LOS              | B   |     | B    |      |

























| Minor Lane/Major Mvmt | NELn1 | EBL   | EBT | EBR | WBU   | WBL | WBT | WBR | SWLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 716   | 812   | -   | -   | 924   | 803 | -   | -   | 597   |
| HCM Lane V/C Ratio    | 0.11  | 0.025 | -   | -   | 0.013 | -   | -   | -   | 0.031 |
| HCM Control Delay (s) | 10.6  | 9.5   | -   | -   | 8.9   | -   | -   | -   | 11.2  |
| HCM Lane LOS          | B     | A     | -   | -   | A     | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0.4   | 0.1   | -   | -   | 0     | 0   | -   | -   | 0.1   |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

Existing AM Peak

3/28/2017






















|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)  | 128   | 215   | 84  | 32  | 434   | 500   | 206  | 692   | 17  | 251   | 281   | 94  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 136   | 229   | 89  | 34  | 462   | 532   | 219  | 736   | 18  | 267   | 299   | 100   |
| Adj No. of Lanes  | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94   | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 224   | 490   | 217   | 796   | 1549  | 482   | 757  | 1001  | 447   | 378   | 537   | 240   |
| Arrive On Green   | 0.07  | 0.14  | 0.14  | 0.23  | 0.31  | 0.31  | 0.22   | 0.29  | 0.29  | 0.11  | 0.15  | 0.15  |
| Sat Flow, veh/h   | 3408  | 3505  | 1554  | 3408  | 5036  | 1568  | 3408   | 3505  | 1566  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 136   | 229   | 89  | 34  | 462   | 532   | 219  | 736   | 18  | 267   | 299   | 100   |
| Grp Sat Flow(s),veh/h/ln  | 1704  | 1752  | 1554  | 1704  | 1679  | 1568  | 1704   | 1752  | 1566  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s   | 2.7   | 4.2   | 3.6   | 0.5   | 4.9   | 13.2  | 3.7  | 13.2  | 0.3   | 5.3   | 5.5   | 4.0   |
| Cycle Q Clear(g_c), s   | 2.7   | 4.2   | 3.6   | 0.5   | 4.9   | 13.2  | 3.7  | 13.2  | 0.3   | 5.3   | 5.5   | 4.0   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 224   | 490   | 217   | 796   | 1549  | 482   | 757  | 1001  | 447   | 378   | 537   | 240   |
| V/C Ratio(X)  | 0.61  | 0.47  | 0.41  | 0.04  | 0.30  | 1.10  | 0.29   | 0.74  | 0.04  | 0.71  | 0.56  | 0.42  |
| Avail Cap(c_a), veh/h   | 240   | 1714  | 760   | 796   | 2412  | 751   | 757  | 1533  | 685   | 510   | 1689  | 756   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 31.6  | 27.5  | 27.3  | 20.6  | 18.3  | 9.2   | 22.5   | 22.5  | 3.5   | 29.8  | 27.3  | 26.6  |
| Incr Delay (d2), s/veh  | 3.9   | 0.7   | 1.2   | 0.0   | 0.1   | 62.5  | 0.2  | 1.1   | 0.0   | 2.8   | 0.9   | 1.2   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 1.4   | 2.1   | 1.6   | 0.3   | 2.2   | 14.7  | 1.8  | 6.5   | 0.2   | 2.6   | 2.7   | 1.8   |
| LnGrp Delay(d),s/veh  | 35.5  | 28.2  | 28.5  | 20.6  | 18.5  | 71.7  | 22.7   | 23.5  | 3.6   | 32.6  | 28.2  | 27.8  |
| LnGrp LOS   | D   | C   | C   | C   | B   | F   | C  | C   | A   | C   | C   | C   |
| Approach Vol, veh/h   |   | 454   |   |   | 1028  |   |  | 973   |   |   | 666   |   |
| Approach Delay, s/veh   |   | 30.5  |   |   | 46.1  |   |  | 23.0  |   |   | 29.9  |   |
| Approach LOS  |   | C   |   |   | D   |   |  | C   |   |   | C   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 11.7  | 23.9  | 20.2  | 13.7  | 20.9  | 14.6  | 8.6  | 25.4  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.7   | 4.2   | * 5.3   | 5.7   | * 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 10  | 28.7  | 4.0   | * 33  | 7.1   | * 32  | 4.7  | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 7.3   | 15.2  | 2.5   | 6.2   | 5.7   | 7.5   | 4.7  | 15.2  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.3   | 2.9   | 0.1   | 1.3   | 0.7   | 1.6   | 0.0  | 4.4   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 33.2  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | C   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 10: Coventry Avenue & Herndon Avenue

Existing AM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |  |  |  |   |   |  |  |
| Volume (veh/h)  | 61  | 281   | 97  | 22  | 691   | 29  | 142  | 9   | 15  | 13  | 2   | 40  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900   | 1845  | 1900  | 1900  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 66  | 305   | 105   | 24  | 751   | 32  | 154  | 10  | 16  | 14  | 2   | 43  |
| Adj No. of Lanes  | 1   | 2   | 1   | 1   | 3   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Peak Hour Factor  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 113   | 1267  | 514   | 50  | 1499  | 467   | 216  | 14  | 22  | 83  | 12  | 84  |
| Arrive On Green   | 0.06  | 0.36  | 0.33  | 0.03  | 0.30  | 0.30  | 0.14   | 0.14  | 0.14  | 0.05  | 0.05  | 0.05  |
| Sat Flow, veh/h   | 1757  | 3505  | 1566  | 1757  | 5036  | 1568  | 1491   | 97  | 155   | 1546  | 221   | 1568  |
| Grp Volume(v), veh/h  | 66  | 305   | 105   | 24  | 751   | 32  | 180  | 0   | 0   | 16  | 0   | 43  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1752  | 1566  | 1757  | 1679  | 1568  | 1743   | 0   | 0   | 1767  | 0   | 1568  |
| Q Serve(g_s), s   | 1.4   | 2.4   | 1.9   | 0.5   | 4.8   | 0.6   | 3.8  | 0.0   | 0.0   | 0.3   | 0.0   | 1.0   |
| Cycle Q Clear(g_c), s   | 1.4   | 2.4   | 1.9   | 0.5   | 4.8   | 0.6   | 3.8  | 0.0   | 0.0   | 0.3   | 0.0   | 1.0   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 0.86   |   | 0.09  | 0.87  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 113   | 1267  | 514   | 50  | 1499  | 467   | 252  | 0   | 0   | 95  | 0   | 84  |
| V/C Ratio(X)  | 0.58  | 0.24  | 0.20  | 0.48  | 0.50  | 0.07  | 0.71   | 0.00  | 0.00  | 0.17  | 0.00  | 0.51  |
| Avail Cap(c_a), veh/h   | 452   | 2793  | 1195  | 271   | 3496  | 1088  | 807  | 0   | 0   | 863   | 0   | 766   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 0.00  | 0.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh  | 17.7  | 8.7   | 9.4   | 18.6  | 11.3  | 9.8   | 15.9   | 0.0   | 0.0   | 17.6  | 0.0   | 17.9  |
| Incr Delay (d2), s/veh  | 4.7   | 0.1   | 0.2   | 6.9   | 0.3   | 0.1   | 3.7  | 0.0   | 0.0   | 0.8   | 0.0   | 4.7   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.8   | 1.2   | 0.8   | 0.3   | 2.3   | 0.2   | 2.1  | 0.0   | 0.0   | 0.2   | 0.0   | 0.6   |
| LnGrp Delay(d),s/veh  | 22.4  | 8.8   | 9.6   | 25.5  | 11.5  | 9.9   | 19.6   | 0.0   | 0.0   | 18.4  | 0.0   | 22.7  |
| LnGrp LOS   | C   | A   | A   | C   | B   | A   | B  |   |   | B   |   | C   |
| Approach Vol, veh/h   |   | 476   |   |   | 807   |   |  | 180   |   |   | 59  |   |
| Approach Delay, s/veh   |   | 10.9  |   |   | 11.9  |   |  | 19.6  |   |   | 21.5  |   |
| Approach LOS  |   | B   |   |   | B   |   |  | B   |   |   | C   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  |   | 2   | 3   | 4   |   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  |   | 9.6   | 5.1   | 18.1  |   | 6.1   | 7.6  | 15.6  |   |   |   |   |
| Change Period (Y+Rc), s   |   | * 4.2   | * 4.2   | 5.3   |   | 4.2   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   |   | * 18  | * 5.8   | 29.7  |   | 18.8  | 9.8  | * 26  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  |   | 5.8   | 2.5   | 4.4   |   | 3.0   | 3.4  | 6.8   |   |   |   |   |
| Green Ext Time (p_c), s   |   | 0.5   | 0.0   | 1.9   |   | 0.1   | 1.1  | 3.4   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 12.8  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | B   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

Existing AM Peak

3/28/2017

|                                   | →    | ↘    | ↙     | ←                    | ↖    | ↗    |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Movement                          | EBT  | EBR  | WBL   | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↑    | ↑    | ↑     | ↑                    | ↑    | ↑    |
| Volume (veh/h)                    | 45   | 13   | 42    | 31                   | 38   | 58   |
| Sign Control                      | Stop |      |       | Stop                 | Free |      |
| Grade                             | 0%   |      |       | 0%                   | 0%   |      |
| Peak Hour Factor                  | 0.70 | 0.70 | 0.70  | 0.70                 | 0.70 | 0.70 |
| Hourly flow rate (vph)            | 64   | 19   | 60    | 44                   | 54   | 83   |
| Pedestrians                       |      |      |       |                      |      |      |
| Lane Width (ft)                   |      |      |       |                      |      |      |
| Walking Speed (ft/s)              |      |      |       |                      |      |      |
| Percent Blockage                  |      |      |       |                      |      |      |
| Right turn flare (veh)            |      | 4    |       |                      |      |      |
| Median type                       |      |      |       |                      | None |      |
| Median storage (veh)              |      |      |       |                      |      |      |
| Upstream signal (ft)              |      |      |       |                      | 110  |      |
| pX, platoon unblocked             |      |      |       |                      |      |      |
| vC, conflicting volume            | 191  | 0    | 141   | 109                  | 0    |      |
| vC1, stage 1 conf vol             |      |      |       |                      |      |      |
| vC2, stage 2 conf vol             |      |      |       |                      |      |      |
| vCu, unblocked vol                | 191  | 0    | 141   | 109                  | 0    |      |
| tC, single (s)                    | 6.5  | 6.2  | 7.1   | 6.5                  | 4.1  |      |
| tC, 2 stage (s)                   |      |      |       |                      |      |      |
| tF (s)                            | 4.0  | 3.3  | 3.5   | 4.0                  | 2.2  |      |
| p0 queue free %                   | 91   | 98   | 92    | 94                   | 97   |      |
| cM capacity (veh/h)               | 678  | 1082 | 735   | 753                  | 1617 |      |
| Direction, Lane #                 | EB 1 | WB 1 | WB 2  | NB 1                 | NB 2 |      |
| Volume Total                      | 83   | 60   | 44    | 54                   | 83   |      |
| Volume Left                       | 0    | 60   | 0     | 54                   | 0    |      |
| Volume Right                      | 19   | 0    | 0     | 0                    | 83   |      |
| cSH                               | 874  | 735  | 753   | 1617                 | 1700 |      |
| Volume to Capacity                | 0.09 | 0.08 | 0.06  | 0.03                 | 0.05 |      |
| Queue Length 95th (ft)            | 8    | 7    | 5     | 3                    | 0    |      |
| Control Delay (s)                 | 10.3 | 10.3 | 10.1  | 7.3                  | 0.0  |      |
| Lane LOS                          | B    | B    | B     | A                    |      |      |
| Approach Delay (s)                | 10.3 | 10.2 |       | 2.9                  |      |      |
| Approach LOS                      | B    | B    |       |                      |      |      |
| Intersection Summary              |      |      |       |                      |      |      |
| Average Delay                     |      |      | 7.1   |                      |      |      |
| Intersection Capacity Utilization |      |      | 19.0% | ICU Level of Service |      | A    |
| Analysis Period (min)             |      |      | 15    |                      |      |      |

Intersection

Int Delay, s/veh 0.1

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 3    | 352  | 836  | 27   | 2    | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 3    | 374  | 889  | 29   | 2    | 2    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 918    | 0      | 1285   |
| Stage 1              | -      | -      | 904    |
| Stage 2              | -      | -      | 381    |
| Critical Hdwy        | 4.13   | -      | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | 2.227  | -      | 3.527  |
| Pot Cap-1 Maneuver   | 739    | -      | 181    |
| Stage 1              | -      | -      | 393    |
| Stage 2              | -      | -      | 688    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 739    | -      | 180    |
| Mov Cap-2 Maneuver   | -      | -      | 301    |
| Stage 1              | -      | -      | 393    |
| Stage 2              | -      | -      | 685    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.1 | 0  | 16.5 |
| HCM LOS              |     |    | C    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 739   | -   | -   | -   | 317   |
| HCM Lane V/C Ratio    | 0.004 | -   | -   | -   | 0.013 |
| HCM Control Delay (s) | 9.9   | -   | -   | -   | 16.5  |
| HCM Lane LOS          | A     | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0     |

Intersection

Int Delay, s/veh 4.6

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 244  | 79   | 44   | 621  | 173  | 15   |
| Conflicting Peds, #/hr   | 0    | 3    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | 75   | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 262  | 85   | 47   | 668  | 186  | 16   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 1067   |
| Stage 1              | -      | -      | 305    |
| Stage 2              | -      | -      | 762    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 1206   | 245    |
| Stage 1              | -      | -      | 745    |
| Stage 2              | -      | -      | 459    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 1206   | 235    |
| Mov Cap-2 Maneuver   | -      | -      | 348    |
| Stage 1              | -      | -      | 745    |
| Stage 2              | -      | -      | 440    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.5 | 26.7 |
| HCM LOS              |    |     | D    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 363   | -   | -   | 1206  | -   |
| HCM Lane V/C Ratio    | 0.557 | -   | -   | 0.039 | -   |
| HCM Control Delay (s) | 26.7  | -   | -   | 8.1   | -   |
| HCM Lane LOS          | D     | -   | -   | A     | -   |
| HCM 95th %tile Q(veh) | 3.2   | -   | -   | 0.1   | -   |

Intersection

Int Delay, s/veh 1.5

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 31   | 234  | 657  | 12   | 16   | 56   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 3    | 0    | 3    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 33   | 249  | 699  | 13   | 17   | 60   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 715    | 0      | 1023   |
| Stage 1              | -      | -      | 708    |
| Stage 2              | -      | -      | 315    |
| Critical Hdwy        | 4.13   | -      | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | 2.227  | -      | 3.527  |
| Pot Cap-1 Maneuver   | 881    | -      | 260    |
| Stage 1              | -      | -      | 486    |
| Stage 2              | -      | -      | 738    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 881    | -      | 248    |
| Mov Cap-2 Maneuver   | -      | -      | 248    |
| Stage 1              | -      | -      | 485    |
| Stage 2              | -      | -      | 705    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 1.1 | 0  | 17.2 |
| HCM LOS              |     |    | C    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 881   | -   | -   | -   | 371   |
| HCM Lane V/C Ratio    | 0.037 | -   | -   | -   | 0.206 |
| HCM Control Delay (s) | 9.2   | 0   | -   | -   | 17.2  |
| HCM Lane LOS          | A     | A   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | -   | 0.8   |



Intersection

Int Delay, s/veh 4.3

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 165  | 82   | 3    | 515  | 159  | 5    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 179  | 89   | 3    | 560  | 173  | 5    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 268    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 24.1 |
| HCM LOS              |    |    | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 363   | -   | -   | 1290  | -   |
| HCM Lane V/C Ratio    | 0.491 | -   | -   | 0.003 | -   |
| HCM Control Delay (s) | 24.1  | -   | -   | 7.8   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 2.6   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 0.3

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 154  | 4    | 1    | 475  | 14   | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 86   | 86   | 86   | 86   | 86   | 86   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 179  | 5    | 1    | 552  | 16   | 2    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 184    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 14.1 |
| HCM LOS              |    |    | B    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 414   | -   | -   | 1385  | -   |
| HCM Lane V/C Ratio    | 0.045 | -   | -   | 0.001 | -   |
| HCM Control Delay (s) | 14.1  | -   | -   | 7.6   | 0   |
| HCM Lane LOS          | B     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 5.2

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 112  | 103  | 2    | 231  | 227  | 5    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 97   | 97   | 97   | 97   | 97   | 97   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 115  | 106  | 2    | 238  | 234  | 5    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 411    |
| Stage 1              | -      | -      | 169    |
| Stage 2              | -      | -      | 242    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 1341   | 595    |
| Stage 1              | -      | -      | 858    |
| Stage 2              | -      | -      | 796    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 1341   | 594    |
| Mov Cap-2 Maneuver   | -      | -      | 594    |
| Stage 1              | -      | -      | 858    |
| Stage 2              | -      | -      | 794    |

| Approach             | EB | WB  | NB |
|----------------------|----|-----|----|
| HCM Control Delay, s | 0  | 0.1 | 15 |
| HCM LOS              |    |     | C  |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 598   | -   | -   | 1341  | -   |
| HCM Lane V/C Ratio    | 0.4   | -   | -   | 0.002 | -   |
| HCM Control Delay (s) | 15    | -   | -   | 7.7   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 1.9   | -   | -   | 0     | -   |

| Intersection     |     |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-----|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 5.8 |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 1    | 5    | 70   | 24   | 17   | 0    | 102  | 46   | 8    | 0    | 74   | 3    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 88   | 88   | 88   | 88   | 88   | 88   | 88   | 88   | 88   | 88   | 88   | 88   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 1    | 6    | 80   | 27   | 19   | 0    | 116  | 52   | 9    | 0    | 84   | 3    |

| Major/Minor          | Minor2 |       |       | Minor1 |       |       | Major1 |   |   | Major2 |   |   |
|----------------------|--------|-------|-------|--------|-------|-------|--------|---|---|--------|---|---|
| Conflicting Flow All | 384    | 379   | 86    | 417    | 377   | 57    | 88     | 0 | 0 | 61     | 0 | 0 |
| Stage 1              | 86     | 86    | -     | 289    | 289   | -     | -      | - | - | -      | - | - |
| Stage 2              | 298    | 293   | -     | 128    | 88    | -     | -      | - | - | -      | - | - |
| Critical Hdwy        | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | - | - | 4.13   | - | - |
| Critical Hdwy Stg 1  | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | - | - | -      | - | - |
| Critical Hdwy Stg 2  | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | - | - | -      | - | - |
| Follow-up Hdwy       | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | - | - | 2.227  | - | - |
| Pot Cap-1 Maneuver   | 572    | 552   | 970   | 544    | 553   | 1006  | 1501   | - | - | 1536   | - | - |
| Stage 1              | 919    | 822   | -     | 716    | 671   | -     | -      | - | - | -      | - | - |
| Stage 2              | 709    | 668   | -     | 873    | 820   | -     | -      | - | - | -      | - | - |
| Platoon blocked, %   |        |       |       |        |       |       |        | - | - |        | - | - |
| Mov Cap-1 Maneuver   | 522    | 508   | 970   | 465    | 509   | 1006  | 1501   | - | - | 1536   | - | - |
| Mov Cap-2 Maneuver   | 522    | 508   | -     | 465    | 509   | -     | -      | - | - | -      | - | - |
| Stage 1              | 845    | 822   | -     | 659    | 617   | -     | -      | - | - | -      | - | - |
| Stage 2              | 632    | 615   | -     | 796    | 820   | -     | -      | - | - | -      | - | - |

| Approach             | EB  | WB   | NB | SB |
|----------------------|-----|------|----|----|
| HCM Control Delay, s | 9.4 | 13.3 | 5  | 0  |
| HCM LOS              | A   | B    |    |    |

| Minor Lane/Major Mvmt | NBL   | NBT | NBR | EBLn1WBLn1  | SBL  | SBT | SBR |
|-----------------------|-------|-----|-----|-------------|------|-----|-----|
| Capacity (veh/h)      | 1501  | -   | -   | 906 482     | 1536 | -   | -   |
| HCM Lane V/C Ratio    | 0.077 | -   | -   | 0.095 0.097 | -    | -   | -   |
| HCM Control Delay (s) | 7.6   | 0   | -   | 9.4 13.3    | 0    | -   | -   |
| HCM Lane LOS          | A     | A   | -   | A B         | A    | -   | -   |
| HCM 95th %tile Q(veh) | 0.3   | -   | -   | 0.3 0.3     | 0    | -   | -   |

| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 12.9 |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | B    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 59   | 121  | 63   | 0    | 5    | 213  | 58   | 0    | 38   | 128  | 1    |
| Peak Hour Factor          | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 67   | 137  | 72   | 0    | 6    | 242  | 66   | 0    | 43   | 145  | 1    |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB | NB   |
|----------------------------|------|----|------|
| Opposing Approach          | WB   | EB | SB   |
| Opposing Lanes             | 2    | 3  | 1    |
| Conflicting Approach Left  | SB   | NB | EB   |
| Conflicting Lanes Left     | 1    | 3  | 3    |
| Conflicting Approach Right | NB   | SB | WB   |
| Conflicting Lanes Right    | 3    | 1  | 2    |
| HCM Control Delay          | 10.8 | 16 | 11.4 |
| HCM LOS                    | B    | C  | B    |

| Lane                   | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 13%   |
| Vol Thru, %            | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 79%   | 55%   |
| Vol Right, %           | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 21%   | 31%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 38    | 128   | 1     | 59    | 121   | 63    | 5     | 271   | 121   |
| LT Vol                 | 38    | 0     | 0     | 59    | 0     | 0     | 5     | 0     | 16    |
| Through Vol            | 0     | 128   | 0     | 0     | 121   | 0     | 0     | 213   | 67    |
| RT Vol                 | 0     | 0     | 1     | 0     | 0     | 63    | 0     | 58    | 38    |
| Lane Flow Rate         | 43    | 145   | 1     | 67    | 138   | 72    | 6     | 308   | 138   |
| Geometry Grp           | 7     | 7     | 7     | 8     | 8     | 8     | 8     | 8     | 8     |
| Degree of Util (X)     | 0.084 | 0.264 | 0.002 | 0.132 | 0.251 | 0.116 | 0.011 | 0.536 | 0.26  |
| Departure Headway (Hd) | 7.04  | 6.534 | 5.826 | 7.067 | 6.561 | 5.851 | 6.927 | 6.27  | 6.798 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 507   | 547   | 610   | 506   | 545   | 609   | 515   | 573   | 525   |
| Service Time           | 4.811 | 4.305 | 3.597 | 4.84  | 4.333 | 3.623 | 4.695 | 4.037 | 4.577 |
| HCM Lane V/C Ratio     | 0.085 | 0.265 | 0.002 | 0.132 | 0.253 | 0.118 | 0.012 | 0.538 | 0.263 |
| HCM Control Delay      | 10.5  | 11.7  | 8.6   | 10.9  | 11.5  | 9.4   | 9.8   | 16.1  | 12    |
| HCM Lane LOS           | B     | B     | A     | B     | B     | A     | A     | C     | B     |
| HCM 95th-tile Q        | 0.3   | 1.1   | 0     | 0.5   | 1     | 0.4   | 0     | 3.2   | 1     |

Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 16   | 67   | 38   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 18   | 76   | 43   |
| Number of Lanes   | 0    | 0    | 1    | 0    |

| Approach                   | SB |
|----------------------------|----|
| Opposing Approach          | NB |
| Opposing Lanes             | 3  |
| Conflicting Approach Left  | WB |
| Conflicting Lanes Left     | 2  |
| Conflicting Approach Right | EB |
| Conflicting Lanes Right    | 3  |
| HCM Control Delay          | 12 |
| HCM LOS                    | B  |

Lane

| Intersection                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh14.3 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS B            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                      | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                    | 0    | 56   | 115  | 60   | 0    | 5    | 203  | 55   | 0    | 59   | 198  | 2    | 0    | 25   | 104  | 59   |
| Peak Hour Factor              | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %             | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                     | 0    | 64   | 131  | 68   | 0    | 6    | 231  | 62   | 0    | 67   | 225  | 2    | 0    | 28   | 118  | 67   |
| Number of Lanes               | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 13.9 | 14.8 | 15.4 | 12.7 |
| HCM LOS                    | B    | B    | C    | B    |
























| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 23%   | 24%   | 2%    | 13%   |
| Vol Thru, %            | 76%   | 50%   | 77%   | 55%   |
| Vol Right, %           | 1%    | 26%   | 21%   | 31%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 259   | 231   | 263   | 188   |
| LT Vol                 | 59    | 56    | 5     | 25    |
| Through Vol            | 198   | 115   | 203   | 104   |
| RT Vol                 | 2     | 60    | 55    | 59    |
| Lane Flow Rate         | 294   | 262   | 299   | 214   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.504 | 0.442 | 0.496 | 0.365 |
| Departure Headway (Hd) | 6.169 | 6.066 | 5.978 | 6.159 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 583   | 593   | 604   | 583   |
| Service Time           | 4.211 | 4.107 | 4.018 | 4.206 |
| HCM Lane V/C Ratio     | 0.504 | 0.442 | 0.495 | 0.367 |
| HCM Control Delay      | 15.4  | 13.9  | 14.8  | 12.7  |
| HCM Lane LOS           | C     | B     | B     | B     |
| HCM 95th-tile Q        | 2.8   | 2.3   | 2.8   | 1.7   |

# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

Existing PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph)                      | 90  | 27  | 102   | 23  | 18  | 5   | 13   | 130   | 442   | 38  | 11  | 242   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.98  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1535  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1535  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.92   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Adj. Flow (vph)                   | 97  | 29  | 110   | 25  | 19  | 5   | 14   | 140   | 475   | 41  | 12  | 260   |
| RTOR Reduction (vph)              | 0   | 0   | 86  | 0   | 0   | 5   | 0  | 0   | 0   | 23  | 0   | 0   |
| Lane Group Flow (vph)             | 97  | 29  | 24  | 25  | 19  | 0   | 0  | 154   | 475   | 18  | 12  | 260   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 7.4   | 12.2  | 12.2  | 0.4   | 4.8   | 4.8   |  | 6.7   | 24.4  | 24.4  | 0.6   | 18.3  |
| Effective Green, g (s)            | 7.4   | 12.2  | 12.2  | 0.4   | 4.8   | 4.8   |  | 6.7   | 24.4  | 24.4  | 0.6   | 18.3  |
| Actuated g/C Ratio                | 0.13  | 0.22  | 0.22  | 0.01  | 0.08  | 0.08  |  | 0.12  | 0.43  | 0.43  | 0.01  | 0.32  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 229   | 397   | 337   | 12  | 156   | 132   |  | 207   | 1510  | 661   | 18  | 1133  |
| v/s Ratio Prot                    | c0.06   | 0.02  |   | c0.01   | c0.01   |   |  | c0.09   | c0.14   |   | c0.01   | 0.07  |
| v/s Ratio Perm                    |   |   | 0.02  |   |   | 0.00  |  |   |   | 0.01  |   |   |
| v/c Ratio                         | 0.42  | 0.07  | 0.07  | 2.08  | 0.12  | 0.00  |  | 0.74  | 0.31  | 0.03  | 0.67  | 0.23  |
| Uniform Delay, d1                 | 22.6  | 17.7  | 17.7  | 28.1  | 24.0  | 23.7  |  | 24.1  | 10.6  | 9.3   | 27.9  | 14.0  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2             | 1.3   | 0.1   | 0.1   | 691.0   | 0.4   | 0.0   |  | 13.5  | 0.1   | 0.0   | 66.1  | 0.1   |
| Delay (s)                         | 23.9  | 17.8  | 17.8  | 719.1   | 24.3  | 23.7  |  | 37.6  | 10.7  | 9.3   | 94.0  | 14.1  |
| Level of Service                  | C   | B   | B   | F   | C   | C   |  | D   | B   | A   | F   | B   |
| Approach Delay (s)                |   | 20.3  |   |   | 378.7   |   |  |   | 16.8  |   |   | 16.8  |
| Approach LOS                      |   | C   |   |   | F   |   |  |   | B   |   |   | B   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 31.2  |   |   |   | HCM 2000 Level of Service  |   | C   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.40  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 56.6  |   |   |   | Sum of lost time (s)   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 43.0%   |   |   |   | ICU Level of Service   |   | A   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

Existing PM Peak

3/28/2017
























|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 58   |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.99 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1545 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1545 |
| Peak-hour factor, PHF  | 0.93 |
| Adj. Flow (vph)        | 62   |
| RTOR Reduction (vph)   | 42   |
| Lane Group Flow (vph)  | 20   |
| Confl. Peds. (#/hr)    | 5    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 18.3 |
| Effective Green, g (s) | 18.3 |
| Actuated g/C Ratio     | 0.32 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 499  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.01 |
| v/c Ratio              | 0.04 |
| Uniform Delay, d1      | 13.1 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.0  |
| Delay (s)              | 13.2 |
| Level of Service       | B    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# HCM 2010 Signalized Intersection Summary

## 2: Temperance Avenue & Alluvial Avenue

Existing PM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 41  | 28  | 81  | 203   | 22  | 64  | 67   | 531   | 223   | 65  | 359   | 17  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 0.99  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 42  | 29  | 83  | 207   | 22  | 65  | 68   | 542   | 228   | 66  | 366   | 17  |
| Adj No. of Lanes  | 1   | 1   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 257   | 246   | 208   | 266   | 215   | 191   | 97   | 936   | 419   | 107   | 1072  | 480   |
| Arrive On Green   | 0.15  | 0.13  | 0.13  | 0.15  | 0.12  | 0.12  | 0.06   | 0.27  | 0.27  | 0.06  | 0.31  | 0.31  |
| Sat Flow, veh/h   | 1757  | 1845  | 1564  | 1757  | 1752  | 1556  | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 42  | 29  | 83  | 207   | 22  | 65  | 68   | 542   | 228   | 66  | 366   | 17  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1845  | 1564  | 1757  | 1752  | 1556  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 0.9   | 0.6   | 2.2   | 5.1   | 0.5   | 1.7   | 1.7  | 6.1   | 2.7   | 1.7   | 3.7   | 0.1   |
| Cycle Q Clear(g_c), s   | 0.9   | 0.6   | 2.2   | 5.1   | 0.5   | 1.7   | 1.7  | 6.1   | 2.7   | 1.7   | 3.7   | 0.1   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 257   | 246   | 208   | 266   | 215   | 191   | 97   | 936   | 419   | 107   | 1072  | 480   |
| V/C Ratio(X)  | 0.16  | 0.12  | 0.40  | 0.78  | 0.10  | 0.34  | 0.70   | 0.58  | 0.54  | 0.62  | 0.34  | 0.04  |
| Avail Cap(c_a), veh/h   | 257   | 1262  | 1071  | 311   | 1257  | 1117  | 163  | 1630  | 729   | 354   | 2010  | 899   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 16.9  | 17.2  | 17.9  | 18.4  | 17.6  | 18.1  | 21.0   | 14.3  | 3.2   | 20.7  | 12.1  | 1.8   |
| Incr Delay (d2), s/veh  | 0.3   | 0.2   | 1.2   | 10.2  | 0.2   | 1.0   | 8.8  | 0.6   | 1.1   | 5.7   | 0.2   | 0.0   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.5   | 0.3   | 1.0   | 3.2   | 0.3   | 0.8   | 1.1  | 2.9   | 2.1   | 1.0   | 1.8   | 0.1   |
| LnGrp Delay(d),s/veh  | 17.2  | 17.4  | 19.1  | 28.7  | 17.8  | 19.2  | 29.8   | 14.9  | 4.3   | 26.3  | 12.3  | 1.8   |
| LnGrp LOS   | B   | B   | B   | C   | B   | B   | C  | B   | A   | C   | B   | A   |
| Approach Vol, veh/h   |   | 154   |   |   | 294   |   |  | 838   |   |   | 449   |   |
| Approach Delay, s/veh   |   | 18.3  |   |   | 25.8  |   |  | 13.2  |   |   | 14.0  |   |
| Approach LOS  |   | B   |   |   | C   |   |  | B   |   |   | B   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 8.3   | 16.1  | 10.8  | 10.0  | 6.5   | 17.8  | 11.3   | 9.5   |   |   |   |   |
| Change Period (Y+Rc), s   | 5.7   | * 5.3   | * 4.2   | 4.9   | * 4.2   | 5.7   | 4.9  | * 4.9   |   |   |   |   |
| Max Green Setting (Gmax), s   | 8.9   | * 20  | * 7.8   | 30.0  | * 4   | 24.2  | 6.3  | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 3.7   | 8.1   | 7.1   | 4.2   | 3.7   | 5.7   | 2.9  | 3.7   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.9   | 2.7   | 0.1   | 0.5   | 0.0   | 1.7   | 0.1  | 0.3   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 16.0  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | B   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Avenue & SR 168 WB Ramp

Existing PM Peak

3/28/2017


















| Movement                     | EBL | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |     |      |     |      |      |      |      |      |      |      |      |      |
| Volume (veh/h)               | 0   | 0    | 0   | 46   | 0    | 47   | 0    | 755  | 428  | 0    | 406  | 211  |
| Number                       |     |      |     | 3    | 8    | 18   | 5    | 2    | 12   | 1    | 6    | 16   |
| Initial Q (Qb), veh          |     |      |     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          |     |      |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       |     |      |     | 1845 | 0    | 1845 | 0    | 1845 | 1845 | 0    | 1845 | 1845 |
| Adj Flow Rate, veh/h         |     |      |     | 49   | 0    | 50   | 0    | 803  | 0    | 0    | 432  | 224  |
| Adj No. of Lanes             |     |      |     | 1    | 0    | 1    | 0    | 2    | 1    | 0    | 2    | 1    |
| Peak Hour Factor             |     |      |     | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %         |     |      |     | 3    | 0    | 3    | 0    | 3    | 3    | 0    | 3    | 3    |
| Cap, veh/h                   |     |      |     | 98   | 0    | 97   | 0    | 2908 | 1272 | 0    | 2908 | 1300 |
| Arrive On Green              |     |      |     | 0.06 | 0.00 | 0.06 | 0.00 | 1.00 | 0.00 | 0.00 | 0.83 | 0.83 |
| Sat Flow, veh/h              |     |      |     | 1757 | 0    | 1568 | 0    | 3597 | 1568 | 0    | 3597 | 1567 |
| Grp Volume(v), veh/h         |     |      |     | 49   | 0    | 50   | 0    | 803  | 0    | 0    | 432  | 224  |
| Grp Sat Flow(s),veh/h/ln     |     |      |     | 1757 | 0    | 1568 | 0    | 1752 | 1568 | 0    | 1752 | 1567 |
| Q Serve(g_s), s              |     |      |     | 1.9  | 0.0  | 2.2  | 0.0  | 0.0  | 0.0  | 0.0  | 1.7  | 2.0  |
| Cycle Q Clear(g_c), s        |     |      |     | 1.9  | 0.0  | 2.2  | 0.0  | 0.0  | 0.0  | 0.0  | 1.7  | 2.0  |
| Prop In Lane                 |     |      |     | 1.00 |      | 1.00 | 0.00 |      | 1.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       |     |      |     | 98   | 0    | 97   | 0    | 2908 | 1272 | 0    | 2908 | 1300 |
| V/C Ratio(X)                 |     |      |     | 0.50 | 0.00 | 0.52 | 0.00 | 0.28 | 0.00 | 0.00 | 0.15 | 0.17 |
| Avail Cap(c_a), veh/h        |     |      |     | 351  | 0    | 323  | 0    | 2908 | 1272 | 0    | 2908 | 1300 |
| HCM Platoon Ratio            |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)           |     |      |     | 1.00 | 0.00 | 1.00 | 0.00 | 0.78 | 0.00 | 0.00 | 0.91 | 0.91 |
| Uniform Delay (d), s/veh     |     |      |     | 32.1 | 0.0  | 31.8 | 0.0  | 0.0  | 0.0  | 0.0  | 1.2  | 1.2  |
| Incr Delay (d2), s/veh       |     |      |     | 3.9  | 0.0  | 4.2  | 0.0  | 0.2  | 0.0  | 0.0  | 0.1  | 0.3  |
| Initial Q Delay(d3),s/veh    |     |      |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |     |      |     | 1.0  | 0.0  | 1.0  | 0.0  | 0.1  | 0.0  | 0.0  | 0.8  | 0.9  |
| LnGrp Delay(d),s/veh         |     |      |     | 36.0 | 0.0  | 36.1 | 0.0  | 0.2  | 0.0  | 0.0  | 1.3  | 1.4  |
| LnGrp LOS                    |     |      |     | D    |      | D    |      | A    |      |      | A    | A    |
| Approach Vol, veh/h          |     |      |     |      | 99   |      |      | 803  |      |      | 656  |      |
| Approach Delay, s/veh        |     |      |     |      | 36.0 |      |      | 0.2  |      |      | 1.3  |      |
| Approach LOS                 |     |      |     |      | D    |      |      | A    |      |      | A    |      |
| Timer                        | 1   | 2    | 3   | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Assigned Phs                 |     | 2    |     |      |      | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |     | 62.1 |     |      |      | 62.1 |      | 7.9  |      |      |      |      |
| Change Period (Y+Rc), s      |     | 5.3  |     |      |      | 5.3  |      | 4.2  |      |      |      |      |
| Max Green Setting (Gmax), s  |     | 46.7 |     |      |      | 46.7 |      | 13.8 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |     | 2.0  |     |      |      | 4.0  |      | 4.2  |      |      |      |      |
| Green Ext Time (p_c), s      |     | 8.0  |     |      |      | 8.0  |      | 0.2  |      |      |      |      |
| <b>Intersection Summary</b>  |     |      |     |      |      |      |      |      |      |      |      |      |
| HCM 2010 Ctrl Delay          |     |      |     | 2.9  |      |      |      |      |      |      |      |      |
| HCM 2010 LOS                 |     |      |     | A    |      |      |      |      |      |      |      |      |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

Existing PM Peak

3/28/2017















|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)  | 350   | 0   | 746   | 0   | 0   | 0   | 0  | 792   | 68  | 51  | 434   | 0   |
| Number  | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h  | 357   | 0   | 761   |   |   |   | 0  | 808   | 69  | 52  | 443   | 0   |
| Adj No. of Lanes  | 1   | 0   | 1   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor  | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %  | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h  | 803   | 0   | 726   |   |   |   | 0  | 1084  | 93  | 70  | 1502  | 0   |
| Arrive On Green   | 0.46  | 0.00  | 0.46  |   |   |   | 0.00   | 0.66  | 0.63  | 0.03  | 0.29  | 0.00  |
| Sat Flow, veh/h   | 1757  | 0   | 1568  |   |   |   | 0  | 3360  | 279   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h  | 357   | 0   | 761   |   |   |   | 0  | 433   | 444   | 52  | 443   | 0   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 0   | 1568  |   |   |   | 0  | 1752  | 1794  | 1757  | 1752  | 0   |
| Q Serve(g_s), s   | 9.7   | 0.0   | 32.4  |   |   |   | 0.0  | 11.5  | 11.6  | 2.1   | 6.9   | 0.0   |
| Cycle Q Clear(g_c), s   | 9.7   | 0.0   | 32.4  |   |   |   | 0.0  | 11.5  | 11.6  | 2.1   | 6.9   | 0.0   |
| Prop In Lane  | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.16  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h  | 803   | 0   | 726   |   |   |   | 0  | 581   | 595   | 70  | 1502  | 0   |
| V/C Ratio(X)  | 0.44  | 0.00  | 1.05  |   |   |   | 0.00   | 0.75  | 0.75  | 0.74  | 0.29  | 0.00  |
| Avail Cap(c_a), veh/h   | 803   | 0   | 726   |   |   |   | 0  | 581   | 595   | 110   | 1502  | 0   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 0.67  | 0.67  | 1.00  |
| Upstream Filter(I)  | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 0.93  | 0.93  | 0.99  | 0.99  | 0.00  |
| Uniform Delay (d), s/veh  | 12.9  | 0.0   | 18.8  |   |   |   | 0.0  | 9.8   | 10.0  | 33.7  | 16.7  | 0.0   |
| Incr Delay (d2), s/veh  | 0.4   | 0.0   | 46.8  |   |   |   | 0.0  | 7.9   | 7.7   | 14.4  | 0.5   | 0.0   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 4.7   | 0.0   | 23.4  |   |   |   | 0.0  | 6.6   | 6.7   | 1.3   | 3.4   | 0.0   |
| LnGrp Delay(d),s/veh  | 13.3  | 0.0   | 65.6  |   |   |   | 0.0  | 17.7  | 17.7  | 48.1  | 17.2  | 0.0   |
| LnGrp LOS   | B   |   | F   |   |   |   |  | B   | B   | D   | B   |   |
| Approach Vol, veh/h   |   | 1118  |   |   |   |   |  | 877   |   |   | 495   |   |
| Approach Delay, s/veh   |   | 48.9  |   |   |   |   |  | 17.7  |   |   | 20.5  |   |
| Approach LOS  |   | D   |   |   |   |   |  | B   |   |   | C   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 6.8   | 27.2  |   | 36.0  |   | 34.0  |  |   |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 4.2   | 20.3  |   | * 32  |   | 28.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 4.1   | 13.6  |   | 34.4  |   | 8.9   |  |   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 3.2   |   | 0.0   |   | 5.5   |  |   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 32.3  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | C   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

Existing PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBU   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |
| Volume (vph)                      | 85  | 218   | 2   | 664   | 38  | 107   | 994   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 0.95  | 1.00  | 0.97  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1568  | 1752  | 3505  | 1548  | 3400  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1568  | 1752  | 3505  | 1548  | 3400  | 3505  |
| Peak-hour factor, PHF             | 0.96  | 0.96  | 0.96  | 0.96  | 0.96  | 0.96  | 0.96  |
| Adj. Flow (vph)                   | 89  | 227   | 2   | 692   | 40  | 111   | 1035  |
| RTOR Reduction (vph)              | 0   | 197   | 0   | 0   | 17  | 0   | 0   |
| Lane Group Flow (vph)             | 89  | 30  | 2   | 692   | 23  | 111   | 1035  |
| Confl. Peds. (#/hr)               |   |   |   |   | 1   |   |   |
| Turn Type                         | Prot  | Perm  | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 8   |   | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   | 8   |   |   | 2   |   |   |
| Actuated Green, G (s)             | 8.9   | 8.9   | 1.2   | 38.1  | 38.1  | 9.3   | 46.2  |
| Effective Green, g (s)            | 9.1   | 9.1   | 1.4   | 39.4  | 39.4  | 9.5   | 47.5  |
| Actuated g/C Ratio                | 0.13  | 0.13  | 0.02  | 0.56  | 0.56  | 0.14  | 0.68  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 5.3   | 5.3   | 4.2   | 5.3   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 227   | 203   | 35  | 1972  | 871   | 461   | 2378  |
| v/s Ratio Prot                    | c0.05   |   | 0.00  | c0.20   |   | 0.03  | c0.30   |
| v/s Ratio Perm                    |   | 0.02  |   |   | 0.01  |   |   |
| v/c Ratio                         | 0.39  | 0.15  | 0.06  | 0.35  | 0.03  | 0.24  | 0.44  |
| Uniform Delay, d1                 | 27.9  | 27.0  | 33.7  | 8.3   | 6.8   | 27.0  | 5.1   |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 0.81  | 0.60  |
| Incremental Delay, d2             | 1.1   | 0.3   | 0.7   | 0.5   | 0.1   | 0.2   | 0.4   |
| Delay (s)                         | 29.0  | 27.3  | 34.3  | 8.8   | 6.8   | 22.2  | 3.5   |
| Level of Service                  | C   | C   | C   | A   | A   | C   | A   |
| Approach Delay (s)                | 27.8  |   |   | 8.8   |   |   | 5.3   |
| Approach LOS                      | C   |   |   | A   |   |   | A   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 9.7   |   | HCM 2000 Level of Service   |   | A   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.44  |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 70.0  |   | Sum of lost time (s)  |   | 12.0  |
| Intersection Capacity Utilization |   |   | 45.5%   |   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |   |
























| Intersection                |       |       |       |       |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh   | 5.6   |       |       |       |
| Intersection LOS            | A     |       |       |       |
| Approach                    | EB    | WB    | NB    | SB    |
| Entry Lanes                 | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes    | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h    | 177   | 62    | 55    | 275   |
| Demand Flow Rate, veh/h     | 182   | 64    | 56    | 283   |
| Vehicles Circulating, veh/h | 42    | 153   | 162   | 113   |
| Vehicles Exiting, veh/h     | 354   | 65    | 62    | 104   |
| Follow-Up Headway, s        | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h   | 0     | 0     | 0     | 0     |
| Ped Cap Adj                 | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh       | 4.9   | 4.4   | 4.4   | 6.5   |
| Approach LOS                | A     | A     | A     | A     |
| Lane                        | Left  | Left  | Left  | Left  |
| Designated Moves            | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves               | LTR   | LTR   | LTR   | LTR   |
| RT Channelized              |       |       |       |       |
| Lane Util                   | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s         | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h           | 182   | 64    | 56    | 283   |
| Cap Entry Lane, veh/h       | 1083  | 970   | 961   | 1009  |
| Entry HV Adj Factor         | 0.973 | 0.967 | 0.980 | 0.973 |
| Flow Entry, veh/h           | 177   | 62    | 55    | 275   |
| Cap Entry, veh/h            | 1055  | 938   | 942   | 982   |
| V/C Ratio                   | 0.168 | 0.066 | 0.058 | 0.280 |
| Control Delay, s/veh        | 4.9   | 4.4   | 4.4   | 6.5   |
| LOS                         | A     | A     | A     | A     |
| 95th %tile Queue, veh       | 1     | 0     | 0     | 1     |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

Existing PM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 48  | 633   | 207   | 39  | 463   | 21  | 152  | 134   | 10  | 17  | 121   | 69  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 51  | 666   | 218   | 41  | 487   | 22  | 160  | 141   | 11  | 18  | 127   | 73  |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95   | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 141   | 1447  | 450   | 72  | 848   | 38  | 211  | 920   | 412   | 40  | 487   | 218   |
| Arrive On Green   | 0.08  | 0.29  | 0.29  | 0.04  | 0.25  | 0.22  | 0.12   | 0.26  | 0.26  | 0.02  | 0.14  | 0.14  |
| Sat Flow, veh/h   | 1757  | 5036  | 1566  | 1757  | 3416  | 154   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 51  | 666   | 218   | 41  | 249   | 260   | 160  | 141   | 11  | 18  | 127   | 73  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1566  | 1757  | 1752  | 1817  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 1.1   | 4.5   | 4.8   | 0.9   | 5.2   | 5.2   | 3.7  | 1.3   | 0.1   | 0.4   | 1.3   | 1.7   |
| Cycle Q Clear(g_c), s   | 1.1   | 4.5   | 4.8   | 0.9   | 5.2   | 5.2   | 3.7  | 1.3   | 0.1   | 0.4   | 1.3   | 1.7   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.08  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 141   | 1447  | 450   | 72  | 435   | 451   | 211  | 920   | 412   | 40  | 487   | 218   |
| V/C Ratio(X)  | 0.36  | 0.46  | 0.48  | 0.57  | 0.57  | 0.58  | 0.76   | 0.15  | 0.03  | 0.45  | 0.26  | 0.34  |
| Avail Cap(c_a), veh/h   | 178   | 3087  | 960   | 182   | 1079  | 1119  | 254  | 2969  | 1328  | 178   | 2817  | 1260  |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 18.1  | 12.1  | 12.2  | 19.5  | 13.6  | 13.7  | 17.6   | 11.7  | 4.0   | 20.0  | 15.9  | 16.1  |
| Incr Delay (d2), s/veh  | 1.6   | 0.2   | 0.8   | 6.8   | 1.2   | 1.2   | 10.3   | 0.1   | 0.0   | 7.6   | 0.3   | 0.9   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.6   | 2.1   | 2.1   | 0.6   | 2.6   | 2.7   | 2.4  | 0.6   | 0.1   | 0.3   | 0.7   | 0.8   |
| LnGrp Delay(d),s/veh  | 19.6  | 12.4  | 13.0  | 26.3  | 14.8  | 14.9  | 27.9   | 11.8  | 4.1   | 27.6  | 16.2  | 17.0  |
| LnGrp LOS   | B   | B   | B   | C   | B   | B   | C  | B   | A   | C   | B   | B   |
| Approach Vol, veh/h   |   | 935   |   |   | 550   |   |  | 312   |   |   | 218   |   |
| Approach Delay, s/veh   |   | 12.9  |   |   | 15.7  |   |  | 19.8  |   |   | 17.4  |   |
| Approach LOS  |   | B   |   |   | B   |   |  | B   |   |   | B   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 4.9   | 14.9  | 5.7   | 15.9  | 10.1  | 9.8   | 7.3  | 14.3  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | 4.2   | * 5.3   | 5.3   | * 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 4   | 33.8  | 4.1   | * 24  | 5.8   | * 32  | 4.0  | * 24  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 2.4   | 3.3   | 2.9   | 6.8   | 5.7   | 3.7   | 3.1  | 7.2   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 1.2   | 0.0   | 3.8   | 0.0   | 0.8   | 0.0  | 1.7   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 15.2  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | B   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

| Intersection     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 1.9 |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 55   | 679  | 0    | 38   | 0    | 567  | 2    | 0    | 0    | 106  | 0    | 0    | 38   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 400  | -    | -    | -    | 120  | -    | 85   | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | -    | 0    | -    | -    | 1    | -    | -    | 1    | -    |
| Grade, %                 | -    | 0    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 61   | 754  | 0    | 42   | 0    | 630  | 2    | 0    | 0    | 118  | 0    | 0    | 42   |

| Major/Minor          | Major1 |   | Major2 |      |      |   | Minor1 |      |      | Minor2 |      |      |      |
|----------------------|--------|---|--------|------|------|---|--------|------|------|--------|------|------|------|
| Conflicting Flow All | 630    | 0 | 0      | 669  | 754  | 0 | 0      | 1276 | 1591 | 377    | 1138 | 1591 | 315  |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 877  | 877  | -      | 714  | 714  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 399  | 714  | -      | 424  | 877  | -    |
| Critical Hdwy        | 4.16   | - | -      | 5.66 | 5.36 | - | -      | 7.01 | 6.56 | 7.16   | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1  | -      | - | -      | -    | -    | - | -      | 7.36 | 5.56 | -      | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2  | -      | - | -      | -    | -    | - | -      | 6.56 | 5.56 | -      | 6.76 | 5.56 | -    |
| Follow-up Hdwy       | 2.23   | - | -      | 2.33 | 3.13 | - | -      | 3.68 | 4.03 | 3.93   | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver   | 942    | - | -      | 665  | 510  | - | -      | 146  | 105  | 528    | 180  | 105  | 678  |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 247  | 362  | -      | 375  | 431  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 576  | 431  | -      | 544  | 362  | -    |
| Platoon blocked, %   |        | - | -      |      |      | - | -      |      |      |        |      |      |      |
| Mov Cap-1 Maneuver   | 942    | - | -      | 531  | 510  | - | -      | 130  | 98   | 528    | 133  | 98   | 678  |
| Mov Cap-2 Maneuver   | -      | - | -      | -    | -    | - | -      | 190  | 206  | -      | 221  | 203  | -    |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 231  | 339  | -      | 351  | 431  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 540  | 431  | -      | 395  | 339  | -    |

| Approach             | EB  | WB  | NE   | SW   |
|----------------------|-----|-----|------|------|
| HCM Control Delay, s | 0.7 | 0.8 | 13.8 | 10.7 |
| HCM LOS              | B   |     | B    |      |

| Minor Lane/Major Mvmt | NELn1 | EBL   | EBT | EBR | WBU  | WBL | WBT | WBR | SWLn1 |
|-----------------------|-------|-------|-----|-----|------|-----|-----|-----|-------|
| Capacity (veh/h)      | 528   | 942   | -   | -   | 531  | 510 | -   | -   | 678   |
| HCM Lane V/C Ratio    | 0.223 | 0.065 | -   | -   | 0.08 | -   | -   | -   | 0.062 |
| HCM Control Delay (s) | 13.8  | 9.1   | -   | -   | 12.4 | -   | -   | -   | 10.7  |
| HCM Lane LOS          | B     | A     | -   | -   | B    | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0.8   | 0.2   | -   | -   | 0.3  | 0   | -   | -   | 0.2   |



























# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

Existing PM Peak

3/28/2017






















|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)  | 107   | 375   | 210   | 27  | 335   | 282   | 159  | 330   | 24  | 343   | 523   | 136   |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 109   | 383   | 214   | 28  | 342   | 288   | 162  | 337   | 24  | 350   | 534   | 139   |
| Adj No. of Lanes  | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 224   | 930   | 412   | 150   | 1227  | 381   | 294  | 780   | 348   | 520   | 908   | 406   |
| Arrive On Green   | 0.07  | 0.27  | 0.27  | 0.04  | 0.24  | 0.24  | 0.09   | 0.22  | 0.22  | 0.15  | 0.26  | 0.26  |
| Sat Flow, veh/h   | 3408  | 3505  | 1552  | 3408  | 5036  | 1564  | 3408   | 3505  | 1566  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 109   | 383   | 214   | 28  | 342   | 288   | 162  | 337   | 24  | 350   | 534   | 139   |
| Grp Sat Flow(s),veh/h/ln  | 1704  | 1752  | 1552  | 1704  | 1679  | 1564  | 1704   | 1752  | 1566  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s   | 1.6   | 4.6   | 6.0   | 0.4   | 2.8   | 4.5   | 2.3  | 4.2   | 0.4   | 4.9   | 6.7   | 3.7   |
| Cycle Q Clear(g_c), s   | 1.6   | 4.6   | 6.0   | 0.4   | 2.8   | 4.5   | 2.3  | 4.2   | 0.4   | 4.9   | 6.7   | 3.7   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 224   | 930   | 412   | 150   | 1227  | 381   | 294  | 780   | 348   | 520   | 908   | 406   |
| V/C Ratio(X)  | 0.49  | 0.41  | 0.52  | 0.19  | 0.28  | 0.76  | 0.55   | 0.43  | 0.07  | 0.67  | 0.59  | 0.34  |
| Avail Cap(c_a), veh/h   | 336   | 2358  | 1044  | 282   | 3309  | 1028  | 390  | 1985  | 887   | 807   | 2414  | 1080  |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 22.8  | 15.4  | 15.9  | 23.3  | 15.6  | 4.8   | 22.2   | 17.0  | 6.7   | 20.3  | 16.4  | 15.3  |
| Incr Delay (d2), s/veh  | 1.6   | 0.3   | 1.0   | 0.6   | 0.1   | 3.1   | 1.6  | 0.4   | 0.1   | 1.5   | 0.6   | 0.5   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.8   | 2.2   | 2.6   | 0.2   | 1.3   | 3.3   | 1.1  | 2.1   | 0.3   | 2.4   | 3.3   | 1.6   |
| LnGrp Delay(d),s/veh  | 24.5  | 15.6  | 16.9  | 23.9  | 15.7  | 7.9   | 23.8   | 17.3  | 6.7   | 21.8  | 17.0  | 15.8  |
| LnGrp LOS   | C   | B   | B   | C   | B   | A   | C  | B   | A   | C   | B   | B   |
| Approach Vol, veh/h   |   | 706   |   |   | 658   |   |  | 523   |   |   | 1023  |   |
| Approach Delay, s/veh   |   | 17.4  |   |   | 12.6  |   |  | 18.9  |   |   | 18.5  |   |
| Approach LOS  |   | B   |   |   | B   |   |  | B   |   |   | B   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 11.7  | 15.3  | 6.2   | 17.4  | 9.9   | 17.1  | 7.3  | 16.3  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.7   | 4.2   | * 5.3   | 5.7   | * 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 12  | 27.0  | 4.0   | * 33  | 5.6   | * 34  | 4.8  | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 6.9   | 6.2   | 2.4   | 8.0   | 4.3   | 8.7   | 3.6  | 6.5   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.7   | 2.1   | 0.1   | 2.6   | 0.3   | 2.9   | 0.1  | 2.8   |   |   |   |   |
| Intersection Summary  |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 17.0  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | B   |   |   |   |  |   |   |   |   |   |
| Notes   |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 10: Coventry Avenue & Herndon Avenue

Existing PM Peak

3/28/2017













|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |  |  |  |   |   |  |  |
| Volume (veh/h)  | 32  | 679   | 71  | 5   | 433   | 14  | 105  | 0   | 21  | 23  | 5   | 73  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900   | 1845  | 1900  | 1900  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 32  | 686   | 72  | 5   | 437   | 14  | 106  | 0   | 21  | 23  | 5   | 74  |
| Adj No. of Lanes  | 1   | 2   | 1   | 1   | 3   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Peak Hour Factor  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99   | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 63  | 1185  | 473   | 19  | 1731  | 539   | 142  | 0   | 28  | 112   | 24  | 120   |
| Arrive On Green   | 0.04  | 0.34  | 0.30  | 0.01  | 0.34  | 0.34  | 0.10   | 0.00  | 0.09  | 0.08  | 0.08  | 0.08  |
| Sat Flow, veh/h   | 1757  | 3505  | 1568  | 1757  | 5036  | 1568  | 1438   | 0   | 285   | 1455  | 316   | 1568  |
| Grp Volume(v), veh/h  | 32  | 686   | 72  | 5   | 437   | 14  | 127  | 0   | 0   | 28  | 0   | 74  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1752  | 1568  | 1757  | 1679  | 1568  | 1723   | 0   | 0   | 1772  | 0   | 1568  |
| Q Serve(g_s), s   | 0.6   | 5.8   | 1.2   | 0.1   | 2.2   | 0.2   | 2.6  | 0.0   | 0.0   | 0.5   | 0.0   | 1.6   |
| Cycle Q Clear(g_c), s   | 0.6   | 5.8   | 1.2   | 0.1   | 2.2   | 0.2   | 2.6  | 0.0   | 0.0   | 0.5   | 0.0   | 1.6   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 0.83   |   | 0.17  | 0.82  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 63  | 1185  | 473   | 19  | 1731  | 539   | 170  | 0   | 0   | 136   | 0   | 120   |
| V/C Ratio(X)  | 0.51  | 0.58  | 0.15  | 0.26  | 0.25  | 0.03  | 0.75   | 0.00  | 0.00  | 0.21  | 0.00  | 0.62  |
| Avail Cap(c_a), veh/h   | 274   | 2438  | 1034  | 205   | 3307  | 1030  | 316  | 0   | 0   | 897   | 0   | 794   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 0.00  | 0.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh  | 17.0  | 9.8   | 9.2   | 17.6  | 8.5   | 7.8   | 15.8   | 0.0   | 0.0   | 15.6  | 0.0   | 16.1  |
| Incr Delay (d2), s/veh  | 6.1   | 0.5   | 0.1   | 6.9   | 0.1   | 0.0   | 6.5  | 0.0   | 0.0   | 0.7   | 0.0   | 5.0   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.4   | 2.8   | 0.5   | 0.1   | 1.0   | 0.1   | 1.5  | 0.0   | 0.0   | 0.3   | 0.0   | 0.9   |
| LnGrp Delay(d),s/veh  | 23.1  | 10.2  | 9.3   | 24.5  | 8.6   | 7.8   | 22.2   | 0.0   | 0.0   | 16.3  | 0.0   | 21.1  |
| LnGrp LOS   | C   | B   | A   | C   | A   | A   | C  |   |   | B   |   | C   |
| Approach Vol, veh/h   |   | 790   |   |   | 456   |   |  | 127   |   |   | 102   |   |
| Approach Delay, s/veh   |   | 10.7  |   |   | 8.7   |   |  | 22.2  |   |   | 19.8  |   |
| Approach LOS  |   | B   |   |   | A   |   |  | C   |   |   | B   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  |   | 2   | 3   | 4   |   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  |   | 7.5   | 5.5   | 16.2  |   | 6.8   | 5.3  | 16.4  |   |   |   |   |
| Change Period (Y+Rc), s   |   | * 4.2   | 5.3   | * 5.3   |   | 4.2   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   |   | * 6.4   | 4.0   | * 24  |   | 18.0  | * 5.4  | 22.3  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  |   | 4.6   | 2.1   | 7.8   |   | 3.6   | 2.6  | 4.2   |   |   |   |   |
| Green Ext Time (p_c), s   |   | 0.1   | 0.4   | 3.1   |   | 0.3   | 0.0  | 1.8   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 11.7  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | B   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

Existing PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |  |
| Volume (veh/h)                    | 24  | 31  | 78  | 27  | 10  | 28  |
| Sign Control                      | Stop  |   |   | Stop  | Free  |   |
| Grade                             | 0%  |   |   | 0%  | 0%  |   |
| Peak Hour Factor                  | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  |
| Hourly flow rate (vph)            | 28  | 36  | 90  | 31  | 11  | 32  |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (ft)                   |   |   |   |   |   |   |
| Walking Speed (ft/s)              |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   | 4   |   |   |   |   |
| Median type                       |   |   |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   | 110   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 55  | 0   | 37  | 23  | 0   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 55  | 0   | 37  | 23  | 0   |   |
| tC, single (s)                    | 6.5   | 6.2   | 7.1   | 6.5   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.0   | 3.3   | 3.5   | 4.0   | 2.2   |   |
| p0 queue free %                   | 97  | 97  | 90  | 96  | 99  |   |
| cM capacity (veh/h)               | 828   | 1082  | 906   | 862   | 1617  |   |
| Direction, Lane #                 | EB 1  | WB 1  | WB 2  | NB 1  | NB 2  |   |
| Volume Total                      | 63  | 90  | 31  | 11  | 32  |   |
| Volume Left                       | 0   | 90  | 0   | 11  | 0   |   |
| Volume Right                      | 36  | 0   | 0   | 0   | 32  |   |
| cSH                               | 1898  | 906   | 862   | 1617  | 1700  |   |
| Volume to Capacity                | 0.03  | 0.10  | 0.04  | 0.01  | 0.02  |   |
| Queue Length 95th (ft)            | 3   | 8   | 3   | 1   | 0   |   |
| Control Delay (s)                 | 8.9   | 9.4   | 9.3   | 7.2   | 0.0   |   |
| Lane LOS                          | A   | A   | A   | A   |   |   |
| Approach Delay (s)                | 8.9   | 9.4   |   | 1.9   |   |   |
| Approach LOS                      | A   | A   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   |   | 7.8   |   |   |   |
| Intersection Capacity Utilization |   |   | 21.0%   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

Intersection

Int Delay, s/veh 0.3

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 5    | 711  | 460  | 4    | 16   | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 5    | 748  | 484  | 4    | 17   | 2    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 488    | 0      | 1245   |
| Stage 1              | -      | -      | 486    |
| Stage 2              | -      | -      | 759    |
| Critical Hdwy        | 4.13   | -      | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | 2.227  | -      | 3.527  |
| Pot Cap-1 Maneuver   | 1070   | -      | 191    |
| Stage 1              | -      | -      | 616    |
| Stage 2              | -      | -      | 460    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 1070   | -      | 190    |
| Mov Cap-2 Maneuver   | -      | -      | 324    |
| Stage 1              | -      | -      | 616    |
| Stage 2              | -      | -      | 458    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.1 | 0  | 16.2 |
| HCM LOS              |     |    | C    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 1070  | -   | -   | -   | 341   |
| HCM Lane V/C Ratio    | 0.005 | -   | -   | -   | 0.056 |
| HCM Control Delay (s) | 8.4   | -   | -   | -   | 16.2  |
| HCM Lane LOS          | A     | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0.2   |

Intersection

Int Delay, s/veh 1.8

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 595  | 208  | 19   | 387  | 85   | 30   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | 75   | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 98   | 98   | 98   | 98   | 98   | 98   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 607  | 212  | 19   | 395  | 87   | 31   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 1147   |
| Stage 1              | -      | -      | 713    |
| Stage 2              | -      | -      | 434    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 805    | 219    |
| Stage 1              | -      | -      | 484    |
| Stage 2              | -      | -      | 651    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 805    | 214    |
| Mov Cap-2 Maneuver   | -      | -      | 346    |
| Stage 1              | -      | -      | 484    |
| Stage 2              | -      | -      | 636    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.4 | 19.5 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 365   | -   | -   | 805   | -   |
| HCM Lane V/C Ratio    | 0.321 | -   | -   | 0.024 | -   |
| HCM Control Delay (s) | 19.5  | -   | -   | 9.6   | -   |
| HCM Lane LOS          | C     | -   | -   | A     | -   |
| HCM 95th %tile Q(veh) | 1.4   | -   | -   | 0.1   | -   |

Intersection

Int Delay, s/veh 1.2

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 51   | 559  | 361  | 9    | 13   | 40   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 55   | 601  | 388  | 10   | 14   | 43   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 398    | 0      | 1104   |
| Stage 1              | -      | -      | 393    |
| Stage 2              | -      | -      | 711    |
| Critical Hdwy        | 4.13   | -      | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | 2.227  | -      | 3.527  |
| Pot Cap-1 Maneuver   | 1155   | -      | 233    |
| Stage 1              | -      | -      | 680    |
| Stage 2              | -      | -      | 485    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 1155   | -      | 216    |
| Mov Cap-2 Maneuver   | -      | -      | 216    |
| Stage 1              | -      | -      | 680    |
| Stage 2              | -      | -      | 451    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.7 | 0  | 14.5 |
| HCM LOS              |     |    | B    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 1155  | -   | -   | -   | 437   |
| HCM Lane V/C Ratio    | 0.047 | -   | -   | -   | 0.13  |
| HCM Control Delay (s) | 8.3   | 0   | -   | -   | 14.5  |
| HCM Lane LOS          | A     | A   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | -   | 0.4   |

Intersection

Int Delay, s/veh 3.2

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 425  | 144  | 4    | 234  | 132  | 9    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 447  | 152  | 4    | 246  | 139  | 9    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 599    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.1 | 21.2 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 369   | -   | -   | 973   | -   |
| HCM Lane V/C Ratio    | 0.402 | -   | -   | 0.004 | -   |
| HCM Control Delay (s) | 21.2  | -   | -   | 8.7   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 1.9   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 0.2

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 397  | 10   | 1    | 224  | 10   | 0    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 91   | 91   | 91   | 91   | 91   | 91   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 436  | 11   | 1    | 246  | 11   | 0    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 447    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB | NB |
|----------------------|----|----|----|
| HCM Control Delay, s | 0  | 0  | 14 |
| HCM LOS              |    |    | B  |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 409   | -   | -   | 1108  | -   |
| HCM Lane V/C Ratio    | 0.027 | -   | -   | 0.001 | -   |
| HCM Control Delay (s) | 14    | -   | -   | 8.3   | 0   |
| HCM Lane LOS          | B     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | 0     | -   |



Intersection

Int Delay, s/veh 2.8

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 181  | 210  | 2    | 159  | 124  | 10   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 89   | 89   | 89   | 89   | 89   | 89   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 203  | 236  | 2    | 179  | 139  | 11   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 439    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.1 | 14.3 |
| HCM LOS              |    |     | B    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 536   | -   | -   | 1116  | -   |
| HCM Lane V/C Ratio    | 0.281 | -   | -   | 0.002 | -   |
| HCM Control Delay (s) | 14.3  | -   | -   | 8.2   | 0   |
| HCM Lane LOS          | B     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 1.1   | -   | -   | 0     | -   |

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 5.8    |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 5      | 16    | 124   | 16     | 7     | 1     | 85     | 92   | 21   | 0      | 59   | 3    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 82     | 82    | 82    | 82     | 82    | 82    | 82     | 82   | 82   | 82     | 82   | 82   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 6      | 20    | 151   | 20     | 9     | 1     | 104    | 112  | 26   | 0      | 72   | 4    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 411    | 419   | 74    | 491    | 408   | 125   | 76     | 0    | 0    | 138    | 0    | 0    |
| Stage 1                  | 74     | 74    | -     | 332    | 332   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 337    | 345   | -     | 159    | 76    | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 549    | 524   | 985   | 486    | 531   | 923   | 1517   | -    | -    | 1440   | -    | -    |
| Stage 1                  | 933    | 831   | -     | 679    | 643   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 675    | 634   | -     | 841    | 830   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 510    | 485   | 985   | 376    | 492   | 923   | 1517   | -    | -    | 1440   | -    | -    |
| Mov Cap-2 Maneuver       | 510    | 485   | -     | 376    | 492   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 864    | 831   | -     | 629    | 595   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 615    | 587   | -     | 695    | 830   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 10.3   |       |       | 14.3   |       |       | 3.2    |      |      | 0      |      |      |
| HCM LOS                  | B      |       |       | B      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1517   | -     | -     | 860    | 415   | 1440  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.068  | -     | -     | 0.206  | 0.071 | -     | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 7.5    | 0     | -     | 10.3   | 14.3  | 0     | -      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | B      | B     | A     | -      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.2    | -     | -     | 0.8    | 0.2   | 0     | -      | -    |      |        |      |      |

| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 10.5 |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | B    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 28   | 158  | 35   | 0    | 8    | 126  | 13   | 0    | 30   | 51   | 11   |
| Peak Hour Factor          | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 32   | 180  | 40   | 0    | 9    | 143  | 15   | 0    | 34   | 58   | 12   |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB   | NB  |
|----------------------------|------|------|-----|
| Opposing Approach          | WB   | EB   | SB  |
| Opposing Lanes             | 2    | 3    | 1   |
| Conflicting Approach Left  | SB   | NB   | EB  |
| Conflicting Lanes Left     | 1    | 3    | 3   |
| Conflicting Approach Right | NB   | SB   | WB  |
| Conflicting Lanes Right    | 3    | 1    | 2   |
| HCM Control Delay          | 10.4 | 10.8 | 9.3 |
| HCM LOS                    | B    | B    | A   |

| Lane                   | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 15%   |
| Vol Thru, %            | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 91%   | 62%   |
| Vol Right, %           | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 9%    | 22%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 30    | 51    | 11    | 28    | 158   | 35    | 8     | 139   | 152   |
| LT Vol                 | 30    | 0     | 0     | 28    | 0     | 0     | 8     | 0     | 23    |
| Through Vol            | 0     | 51    | 0     | 0     | 158   | 0     | 0     | 126   | 95    |
| RT Vol                 | 0     | 0     | 11    | 0     | 0     | 35    | 0     | 13    | 34    |
| Lane Flow Rate         | 34    | 58    | 12    | 32    | 180   | 40    | 9     | 158   | 173   |
| Geometry Grp           | 7     | 7     | 7     | 8     | 8     | 8     | 8     | 8     | 8     |
| Degree of Util (X)     | 0.062 | 0.097 | 0.018 | 0.057 | 0.294 | 0.057 | 0.017 | 0.263 | 0.289 |
| Departure Headway (Hd) | 6.501 | 5.997 | 5.292 | 6.405 | 5.901 | 5.196 | 6.573 | 6.002 | 6.027 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 552   | 598   | 677   | 560   | 610   | 689   | 545   | 599   | 596   |
| Service Time           | 4.232 | 3.728 | 3.022 | 4.136 | 3.632 | 2.927 | 4.306 | 3.736 | 3.759 |
| HCM Lane V/C Ratio     | 0.062 | 0.097 | 0.018 | 0.057 | 0.295 | 0.058 | 0.017 | 0.264 | 0.29  |
| HCM Control Delay      | 9.7   | 9.4   | 8.1   | 9.5   | 11.1  | 8.2   | 9.4   | 10.9  | 11.2  |
| HCM Lane LOS           | A     | A     | A     | A     | B     | A     | A     | B     | B     |
| HCM 95th-tile Q        | 0.2   | 0.3   | 0.1   | 0.2   | 1.2   | 0.2   | 0.1   | 1.1   | 1.2   |

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Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 23   | 95   | 34   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 26   | 108  | 39   |
| Number of Lanes   | 0    | 0    | 1    | 0    |

Approach SB

|                            |      |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 11.2 |
| HCM LOS                    | B    |

Lane

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| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 11   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | B    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                | 0    | 27   | 151  | 33   | 0    | 8    | 120  | 13   | 0    | 46   | 79   | 17   | 0    | 36   | 148  | 52   |
| Peak Hour Factor          | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 31   | 172  | 37   | 0    | 9    | 136  | 15   | 0    | 52   | 90   | 19   | 0    | 41   | 168  | 59   |
| Number of Lanes           | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 11.3 | 10.3 | 10.3 | 11.5 |
| HCM LOS                    | B    | B    | B    | B    |


















| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 32%   | 13%   | 6%    | 15%   |
| Vol Thru, %            | 56%   | 72%   | 85%   | 63%   |
| Vol Right, %           | 12%   | 16%   | 9%    | 22%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 142   | 211   | 141   | 236   |
| LT Vol                 | 46    | 27    | 8     | 36    |
| Through Vol            | 79    | 151   | 120   | 148   |
| RT Vol                 | 17    | 33    | 13    | 52    |
| Lane Flow Rate         | 161   | 240   | 160   | 268   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.245 | 0.354 | 0.243 | 0.388 |
| Departure Headway (Hd) | 5.472 | 5.313 | 5.467 | 5.213 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 655   | 676   | 655   | 689   |
| Service Time           | 3.512 | 3.349 | 3.507 | 3.247 |
| HCM Lane V/C Ratio     | 0.246 | 0.355 | 0.244 | 0.389 |
| HCM Control Delay      | 10.3  | 11.3  | 10.3  | 11.5  |
| HCM Lane LOS           | B     | B     | B     | B     |
| HCM 95th-tile Q        | 1     | 1.6   | 0.9   | 1.8   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

Existing AM Peak

4/3/2017


















|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)  | 168   | 0   | 390   | 0   | 0   | 0   | 0  | 1385  | 30  | 23  | 402   | 0   |
| Number  | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h  | 181   | 0   | 419   |   |   |   | 0  | 1489  | 32  | 25  | 432   | 0   |
| Adj No. of Lanes  | 1   | 0   | 2   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h  | 330   | 0   | 530   |   |   |   | 0  | 1530  | 33  | 405   | 2535  | 0   |
| Arrive On Green   | 0.19  | 0.00  | 0.19  |   |   |   | 0.00   | 0.87  | 0.84  | 0.08  | 0.24  | 0.00  |
| Sat Flow, veh/h   | 1757  | 0   | 2760  |   |   |   | 0  | 3601  | 75  | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h  | 181   | 0   | 419   |   |   |   | 0  | 743   | 778   | 25  | 432   | 0   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 0   | 1380  |   |   |   | 0  | 1752  | 1831  | 1757  | 1752  | 0   |
| Q Serve(g_s), s   | 8.4   | 0.0   | 13.0  |   |   |   | 0.0  | 32.1  | 32.6  | 1.2   | 8.8   | 0.0   |
| Cycle Q Clear(g_c), s   | 8.4   | 0.0   | 13.0  |   |   |   | 0.0  | 32.1  | 32.6  | 1.2   | 8.8   | 0.0   |
| Prop In Lane  | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.04  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h  | 330   | 0   | 530   |   |   |   | 0  | 764   | 799   | 405   | 2535  | 0   |
| V/C Ratio(X)  | 0.55  | 0.00  | 0.79  |   |   |   | 0.00   | 0.97  | 0.97  | 0.06  | 0.17  | 0.00  |
| Avail Cap(c_a), veh/h   | 429   | 0   | 687   |   |   |   | 0  | 993   | 1038  | 405   | 2535  | 0   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 0.33  | 0.33  | 1.00  |
| Upstream Filter(I)  | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 0.76  | 0.76  | 0.99  | 0.99  | 0.00  |
| Uniform Delay (d), s/veh  | 33.1  | 0.0   | 34.6  |   |   |   | 0.0  | 5.3   | 5.4   | 32.5  | 12.8  | 0.0   |
| Incr Delay (d2), s/veh  | 1.4   | 0.0   | 4.7   |   |   |   | 0.0  | 22.4  | 22.3  | 0.1   | 0.1   | 0.0   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 4.2   | 0.0   | 5.3   |   |   |   | 0.0  | 18.0  | 18.8  | 0.6   | 4.3   | 0.0   |
| LnGrp Delay(d),s/veh  | 34.5  | 0.0   | 39.4  |   |   |   | 0.0  | 27.7  | 27.7  | 32.6  | 13.0  | 0.0   |
| LnGrp LOS   | C   |   | D   |   |   |   |  | C   | C   | C   | B   |   |
| Approach Vol, veh/h   |   | 600   |   |   |   |   |  | 1521  |   |   | 457   |   |
| Approach Delay, s/veh   |   | 37.9  |   |   |   |   |  | 27.7  |   |   | 14.0  |   |
| Approach LOS  |   | D   |   |   |   |   |  | C   |   |   | B   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 24.4  | 44.7  |   | 20.9  |   | 69.1  |  |   |   |   |   |   |
| Change Period (Y+Rc), s   | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s   | 4.8   | * 50  |   | * 22  |   | 58.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 3.2   | 34.6  |   | 15.0  |   | 10.8  |  |   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.3   | 6.3   |   | 1.7   |   | 2.0   |  |   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 27.7  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | C   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

Existing PM Peak

4/3/2017

|                              |   |   |   |   |   |   |  |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
|                              |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 350   | 0   | 746   | 0   | 0   | 0   | 0  | 792   | 68  | 51  | 434   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 357   | 0   | 761   |   |   |   | 0  | 808   | 69  | 52  | 443   | 0   |
| Adj No. of Lanes             | 1   | 0   | 2   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 607   | 0   | 969   |   |   |   | 0  | 1449  | 124   | 70  | 1893  | 0   |
| Arrive On Green              | 0.35  | 0.00  | 0.35  |   |   |   | 0.00   | 0.89  | 0.85  | 0.04  | 0.54  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 2760  |   |   |   | 0  | 3360  | 279   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 357   | 0   | 761   |   |   |   | 0  | 433   | 444   | 52  | 443   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1380  |   |   |   | 0  | 1752  | 1794  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 11.7  | 0.0   | 17.3  |   |   |   | 0.0  | 3.9   | 4.1   | 2.1   | 4.7   | 0.0   |
| Cycle Q Clear(g_c), s        | 11.7  | 0.0   | 17.3  |   |   |   | 0.0  | 3.9   | 4.1   | 2.1   | 4.7   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.16  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 607   | 0   | 969   |   |   |   | 0  | 777   | 796   | 70  | 1893  | 0   |
| V/C Ratio(X)                 | 0.59  | 0.00  | 0.79  |   |   |   | 0.00   | 0.56  | 0.56  | 0.75  | 0.23  | 0.00  |
| Avail Cap(c_a), veh/h        | 803   | 0   | 1277  |   |   |   | 0  | 777   | 796   | 110   | 1893  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 0.93  | 0.93  | 0.99  | 0.99  | 0.00  |
| Uniform Delay (d), s/veh     | 18.8  | 0.0   | 20.3  |   |   |   | 0.0  | 2.4   | 2.6   | 33.3  | 8.5   | 0.0   |
| Incr Delay (d2), s/veh       | 0.9   | 0.0   | 2.4   |   |   |   | 0.0  | 2.7   | 2.6   | 14.5  | 0.3   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 5.8   | 0.0   | 6.9   |   |   |   | 0.0  | 2.0   | 2.3   | 1.3   | 2.3   | 0.0   |
| LnGrp Delay(d),s/veh         | 19.7  | 0.0   | 22.8  |   |   |   | 0.0  | 5.1   | 5.2   | 47.7  | 8.8   | 0.0   |
| LnGrp LOS                    | B   |   | C   |   |   |   |  | A   | A   | D   | A   |   |
| Approach Vol, veh/h          |   | 1118  |   |   |   |   |  | 877   |   |   | 495   |   |
| Approach Delay, s/veh        |   | 21.8  |   |   |   |   |  | 5.1   |   |   | 12.9  |   |
| Approach LOS                 |   | C   |   |   |   |   |  | A   |   |   | B   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 6.8   | 35.0  |   | 28.2  |   | 41.8  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 4.2   | 20.3  |   | * 32  |   | 28.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 4.1   | 6.1   |   | 19.3  |   | 6.7   |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 4.9   |   | 4.7   |   | 5.7   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 14.2  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | B   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | EB   | EB | EB | WB   | WB  | WB | NB   | NB | NB | NB   | SB  | SB  |      |
|-----------------------|------|----|----|------|-----|----|------|----|----|------|-----|-----|------|
| Directions Served     | L    | T  | R  | L    | T   | R  | UL   | T  | T  | R    | L   | T   |      |
| Maximum Queue (ft)    | 90   | 43 | 78 | 93   | 115 | 21 | 134  | 46 | 64 | 38   | 27  | 161 |      |
| Average Queue (ft)    | 27   | 7  | 21 | 23   | 22  | 4  | 64   | 11 | 21 | 4    | 1   | 59  |      |
| 95th Queue (ft)       | 68   | 26 | 51 | 52   | 61  | 17 | 118  | 32 | 54 | 19   | 9   | 117 |      |
| Link Distance (ft)    | 1573 |    |    | 1457 |     |    | 2703 |    |    | 2703 |     |     | 1298 |
| Upstream Blk Time (%) |      |    |    |      |     |    |      |    |    |      |     |     |      |
| Queuing Penalty (veh) |      |    |    |      |     |    |      |    |    |      |     |     |      |
| Storage Bay Dist (ft) | 240  |    | 80 | 100  |     | 25 | 240  |    |    | 120  | 250 |     |      |
| Storage Blk Time (%)  |      |    | 1  | 0    | 13  | 1  |      |    |    |      |     |     |      |
| Queuing Penalty (veh) |      |    | 1  | 0    | 5   | 0  |      |    |    |      |     |     |      |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | SB   | SB |
|-----------------------|------|----|
| Directions Served     | T    | R  |
| Maximum Queue (ft)    | 169  | 74 |
| Average Queue (ft)    | 56   | 42 |
| 95th Queue (ft)       | 119  | 66 |
| Link Distance (ft)    | 1298 |    |
| Upstream Blk Time (%) |      |    |
| Queuing Penalty (veh) |      |    |
| Storage Bay Dist (ft) |      | 95 |
| Storage Blk Time (%)  | 2    |    |
| Queuing Penalty (veh) | 4    |    |



Intersection: 2: Temperance Avenue & Alluvial Avenue

| Movement              | EB  | EB   | EB   | WB  | WB   | WB   | NB  | NB  | NB  | NB  | SB  | SB   |
|-----------------------|-----|------|------|-----|------|------|-----|-----|-----|-----|-----|------|
| Directions Served     | L   | T    | R    | L   | T    | TR   | L   | T   | T   | R   | L   | T    |
| Maximum Queue (ft)    | 53  | 54   | 87   | 205 | 324  | 275  | 110 | 112 | 108 | 124 | 133 | 221  |
| Average Queue (ft)    | 11  | 26   | 30   | 141 | 89   | 26   | 47  | 47  | 34  | 45  | 58  | 77   |
| 95th Queue (ft)       | 39  | 59   | 62   | 219 | 286  | 107  | 96  | 103 | 84  | 91  | 110 | 181  |
| Link Distance (ft)    |     | 2839 | 2839 |     | 1365 | 1365 |     | 448 | 448 |     |     | 2703 |
| Upstream Blk Time (%) |     |      |      |     |      |      |     |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |      |      |     |     |     |     |     |      |
| Storage Bay Dist (ft) | 250 |      |      | 85  |      |      | 225 |     |     | 125 | 275 |      |
| Storage Blk Time (%)  |     |      |      | 39  | 0    |      |     |     | 0   | 0   |     |      |
| Queuing Penalty (veh) |     |      |      | 10  | 0    |      |     |     | 0   | 0   |     |      |

Intersection: 2: Temperance Avenue & Alluvial Avenue

| Movement              | SB   | SB  |
|-----------------------|------|-----|
| Directions Served     | T    | R   |
| Maximum Queue (ft)    | 269  | 29  |
| Average Queue (ft)    | 125  | 9   |
| 95th Queue (ft)       | 243  | 30  |
| Link Distance (ft)    | 2703 |     |
| Upstream Blk Time (%) |      |     |
| Queuing Penalty (veh) |      |     |
| Storage Bay Dist (ft) |      | 275 |
| Storage Blk Time (%)  | 0    |     |
| Queuing Penalty (veh) | 0    |     |

Intersection: 3: Temperance Avenue & SR 168 WB Ramp

| Movement              | WB  | WB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | T   | T   | T   | T   | R   |
| Maximum Queue (ft)    | 94  | 53  | 70  | 71  | 74  | 52  | 78  |
| Average Queue (ft)    | 39  | 30  | 18  | 24  | 27  | 8   | 47  |
| 95th Queue (ft)       | 78  | 54  | 57  | 61  | 70  | 34  | 81  |
| Link Distance (ft)    | 478 |     | 578 | 578 | 448 | 448 | 448 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 385 |     |     |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |

Intersection: 4: Temperance Avenue & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | NB   | NB   | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|------|------|-----|-----|-----|
| Directions Served     | L   | R   | R   | T    | TR   | L   | T   | T   |
| Maximum Queue (ft)    | 183 | 147 | 64  | 373  | 560  | 109 | 128 | 64  |
| Average Queue (ft)    | 80  | 65  | 28  | 42   | 305  | 24  | 32  | 13  |
| 95th Queue (ft)       | 152 | 113 | 51  | 168  | 547  | 64  | 88  | 43  |
| Link Distance (ft)    | 607 | 607 |     | 1113 | 1113 |     | 578 | 578 |
| Upstream Blk Time (%) |     |     |     |      |      |     |     |     |
| Queuing Penalty (veh) |     |     |     |      |      |     |     |     |
| Storage Bay Dist (ft) |     |     | 380 |      |      | 250 |     |     |
| Storage Blk Time (%)  |     |     |     |      |      |     |     |     |
| Queuing Penalty (veh) |     |     |     |      |      |     |     |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | WB  | WB  | NB  | NB  | NB  | SB  | SB  | SB   | SB   |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|
| Directions Served     | L   | R   | T   | T   | R   | L   | L   | T    | T    |
| Maximum Queue (ft)    | 106 | 178 | 300 | 358 | 255 | 189 | 173 | 96   | 79   |
| Average Queue (ft)    | 37  | 78  | 110 | 195 | 48  | 110 | 60  | 20   | 20   |
| 95th Queue (ft)       | 83  | 152 | 241 | 332 | 181 | 163 | 128 | 58   | 58   |
| Link Distance (ft)    |     | 355 | 528 | 528 |     |     |     | 1113 | 1113 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |
| Storage Bay Dist (ft) | 130 |     |     |     | 105 | 225 | 225 |      |      |
| Storage Blk Time (%)  |     | 2   | 5   | 16  |     |     |     |      |      |
| Queuing Penalty (veh) |     | 1   | 0   | 14  |     |     |     |      |      |

Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|
| Directions Served     | ULTR | LTR | LTR | LTR |
| Maximum Queue (ft)    | 124  | 31  | 55  | 56  |
| Average Queue (ft)    | 31   | 3   | 4   | 3   |
| 95th Queue (ft)       | 94   | 18  | 24  | 21  |
| Link Distance (ft)    | 71   | 230 | 784 | 335 |
| Upstream Blk Time (%) | 1    |     |     |     |
| Queuing Penalty (veh) | 5    |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | TR  | L   | T   | T   | R   |
| Maximum Queue (ft)    | 70  | 88   | 90   | 21   | 20  | 64  | 172 | 201 | 164 | 257 | 63  | 18  |
| Average Queue (ft)    | 28  | 42   | 34   | 2    | 12  | 24  | 86  | 104 | 107 | 51  | 13  | 3   |
| 95th Queue (ft)       | 59  | 80   | 65   | 12   | 22  | 53  | 158 | 187 | 158 | 160 | 39  | 14  |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 637 | 637 |     | 441 | 441 |     |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     | 105 |     |     | 130 |
| Storage Blk Time (%)  |     |      |      |      |     |     | 5   |     | 11  |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     | 2   |     | 7   |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | SB  | SB   | SB   | SB |
|-----------------------|-----|------|------|----|
| Directions Served     | L   | T    | T    | R  |
| Maximum Queue (ft)    | 50  | 79   | 67   | 53 |
| Average Queue (ft)    | 19  | 34   | 21   | 25 |
| 95th Queue (ft)       | 47  | 61   | 52   | 51 |
| Link Distance (ft)    |     | 2411 | 2411 |    |
| Upstream Blk Time (%) |     |      |      |    |
| Queuing Penalty (veh) |     |      |      |    |
| Storage Bay Dist (ft) | 100 |      |      | 80 |
| Storage Blk Time (%)  |     |      | 0    |    |
| Queuing Penalty (veh) |     |      | 0    |    |

Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | WB | NE  | SW   |
|-----------------------|-----|----|-----|------|
| Directions Served     | L   | R  | R   | R    |
| Maximum Queue (ft)    | 14  | 32 | 45  | 40   |
| Average Queue (ft)    | 0   | 1  | 19  | 2    |
| 95th Queue (ft)       | 5   | 11 | 34  | 16   |
| Link Distance (ft)    |     |    | 775 | 1210 |
| Upstream Blk Time (%) |     |    |     |      |
| Queuing Penalty (veh) |     |    |     |      |
| Storage Bay Dist (ft) | 400 | 85 |     |      |
| Storage Blk Time (%)  |     |    |     |      |
| Queuing Penalty (veh) |     |    |     |      |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 118 | 148 | 170  | 88   | 56  | 27  | 60  | 155 | 126 | 108 | 286 | 70  |
| Average Queue (ft)    | 31  | 67  | 50   | 19   | 20  | 1   | 16  | 72  | 70  | 27  | 156 | 34  |
| 95th Queue (ft)       | 74  | 123 | 105  | 54   | 44  | 9   | 45  | 120 | 122 | 80  | 248 | 65  |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 150 | 150 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  |     | 0   | 1    |      |     |     |     | 0   |     |     |     |     |
| Queuing Penalty (veh) |     | 0   | 1    |      |     |     |     | 0   |     |     |     |     |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R  |
| Maximum Queue (ft)    | 132 | 238  | 338  | 21  | 150 | 198 | 109 | 126 | 61 |
| Average Queue (ft)    | 69  | 135  | 199  | 7   | 84  | 85  | 58  | 71  | 24 |
| 95th Queue (ft)       | 115 | 216  | 281  | 24  | 143 | 149 | 94  | 118 | 48 |
| Link Distance (ft)    |     | 2738 | 2738 |     |     |     | 528 | 528 |    |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |    |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |    |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     | 150 |    |
| Storage Blk Time (%)  |     | 0    | 38   |     |     | 0   |     |     |    |
| Queuing Penalty (veh) |     | 0    | 6    |     |     | 1   |     |     |    |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB | WB  | WB  | WB  | WB  | WB  | NB  | SB | SB |
|-----------------------|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|----|----|
| Directions Served     | L   | T   | T   | R  | L   | T   | T   | T   | R   | LTR | LT | R  |
| Maximum Queue (ft)    | 83  | 128 | 50  | 38 | 68  | 78  | 92  | 180 | 50  | 151 | 56 | 54 |
| Average Queue (ft)    | 27  | 43  | 3   | 9  | 20  | 32  | 36  | 83  | 11  | 60  | 15 | 36 |
| 95th Queue (ft)       | 59  | 111 | 22  | 28 | 47  | 63  | 75  | 131 | 37  | 104 | 43 | 73 |
| Link Distance (ft)    |     | 997 | 997 |    |     | 286 | 286 | 286 |     | 354 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |    |     |     |     |     |     |     | 2  | 0  |
| Queuing Penalty (veh) |     |     |     |    |     |     |     |     |     |     | 1  | 0  |
| Storage Bay Dist (ft) | 145 |     |     | 75 | 190 |     |     |     | 120 |     |    |    |
| Storage Blk Time (%)  |     | 0   |     |    |     |     |     | 2   |     |     |    |    |
| Queuing Penalty (veh) |     | 0   |     |    |     |     |     | 0   |     |     |    |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  | NB |
|-----------------------|-----|-----|-----|-----|----|
| Directions Served     | T   | R   | L   | T   | L  |
| Maximum Queue (ft)    | 93  | 32  | 50  | 79  | 31 |
| Average Queue (ft)    | 30  | 11  | 25  | 27  | 1  |
| 95th Queue (ft)       | 60  | 36  | 46  | 57  | 10 |
| Link Distance (ft)    | 784 |     |     | 364 | 0  |
| Upstream Blk Time (%) |     |     |     |     |    |
| Queuing Penalty (veh) |     |     |     |     |    |
| Storage Bay Dist (ft) |     | 100 | 100 |     |    |
| Storage Blk Time (%)  | 0   |     |     |     |    |
| Queuing Penalty (veh) | 0   |     |     |     |    |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | EB  | SB  |
|-----------------------|-----|-----|
| Directions Served     | L   | LR  |
| Maximum Queue (ft)    | 27  | 31  |
| Average Queue (ft)    | 1   | 5   |
| 95th Queue (ft)       | 9   | 22  |
| Link Distance (ft)    |     | 915 |
| Upstream Blk Time (%) |     |     |
| Queuing Penalty (veh) |     |     |
| Storage Bay Dist (ft) | 100 |     |
| Storage Blk Time (%)  |     |     |
| Queuing Penalty (veh) |     |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | WB | NB   |
|-----------------------|----|------|
| Directions Served     | L  | LR   |
| Maximum Queue (ft)    | 31 | 179  |
| Average Queue (ft)    | 10 | 74   |
| 95th Queue (ft)       | 32 | 137  |
| Link Distance (ft)    |    | 5163 |
| Upstream Blk Time (%) |    |      |
| Queuing Penalty (veh) |    |      |
| Storage Bay Dist (ft) | 75 |      |
| Storage Blk Time (%)  |    |      |
| Queuing Penalty (veh) |    |      |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB   | SB   |
|-----------------------|------|------|
| Directions Served     | LT   | LR   |
| Maximum Queue (ft)    | 162  | 75   |
| Average Queue (ft)    | 16   | 36   |
| 95th Queue (ft)       | 67   | 57   |
| Link Distance (ft)    | 2039 | 2534 |
| Upstream Blk Time (%) |      |      |
| Queuing Penalty (veh) |      |      |
| Storage Bay Dist (ft) |      |      |
| Storage Blk Time (%)  |      |      |
| Queuing Penalty (veh) |      |      |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | WB   | NB   |
|-----------------------|------|------|
| Directions Served     | LT   | LR   |
| Maximum Queue (ft)    | 75   | 144  |
| Average Queue (ft)    | 3    | 67   |
| 95th Queue (ft)       | 25   | 114  |
| Link Distance (ft)    | 2682 | 5186 |
| Upstream Blk Time (%) |      |      |
| Queuing Penalty (veh) |      |      |
| Storage Bay Dist (ft) |      |      |
| Storage Blk Time (%)  |      |      |
| Queuing Penalty (veh) |      |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 31   |
| Average Queue (ft)    | 12   |
| 95th Queue (ft)       | 36   |
| Link Distance (ft)    | 2484 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 135  |
| Average Queue (ft)    | 67   |
| 95th Queue (ft)       | 111  |
| Link Distance (ft)    | 2410 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | WB   | NB   |
|-----------------------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 55   | 31   | 124  |
| Average Queue (ft)    | 30   | 19   | 10   |
| 95th Queue (ft)       | 44   | 40   | 51   |
| Link Distance (ft)    | 6447 | 2721 | 2320 |
| Upstream Blk Time (%) |      |      |      |
| Queuing Penalty (veh) |      |      |      |
| Storage Bay Dist (ft) |      |      |      |
| Storage Blk Time (%)  |      |      |      |
| Queuing Penalty (veh) |      |      |      |

Intersection: 20: Locan Avenue & Bullard Ave

| Movement              | EB  | EB   | EB   | WB  | WB   | NB  | NB   | NB | SB   |
|-----------------------|-----|------|------|-----|------|-----|------|----|------|
| Directions Served     | L   | T    | R    | L   | TR   | L   | T    | R  | LTR  |
| Maximum Queue (ft)    | 49  | 61   | 61   | 22  | 64   | 69  | 67   | 13 | 70   |
| Average Queue (ft)    | 20  | 32   | 29   | 3   | 29   | 21  | 33   | 1  | 38   |
| 95th Queue (ft)       | 39  | 49   | 54   | 16  | 54   | 43  | 54   | 6  | 62   |
| Link Distance (ft)    |     | 2664 | 2664 |     | 2564 |     | 2642 |    | 5163 |
| Upstream Blk Time (%) |     |      |      |     |      |     |      |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     |      |    |      |
| Storage Bay Dist (ft) | 270 |      |      | 260 |      | 125 |      | 50 |      |
| Storage Blk Time (%)  |     |      |      |     |      |     | 1    |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     | 0    |    |      |

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Intersection: 21: De Wolf Ave & Bullard Ave

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| Movement              | EB   | WB   | NB   | SB   |
|-----------------------|------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 102  | 98   | 113  | 102  |
| Average Queue (ft)    | 45   | 52   | 62   | 48   |
| 95th Queue (ft)       | 79   | 82   | 91   | 83   |
| Link Distance (ft)    | 2564 | 2476 | 2636 | 5186 |
| Upstream Blk Time (%) |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |
| Storage Bay Dist (ft) |      |      |      |      |
| Storage Blk Time (%)  |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |

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Network Summary

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Network wide Queuing Penalty: 58

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Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | EB   | EB | EB | WB   | WB  | WB | NB   | NB | NB  | NB   | SB      | SB  |      |
|-----------------------|------|----|----|------|-----|----|------|----|-----|------|---------|-----|------|
| Directions Served     | L    | T  | R  | L    | T   | R  | UL   | T  | T   | R    | L       | T   |      |
| Maximum Queue (ft)    | 85   | 45 | 80 | 66   | 72  | 20 | 155  | 70 | 106 | 56   | 52      | 110 |      |
| Average Queue (ft)    | 45   | 13 | 27 | 19   | 19  | 2  | 67   | 24 | 33  | 6    | 15      | 43  |      |
| 95th Queue (ft)       | 75   | 36 | 56 | 46   | 52  | 12 | 115  | 62 | 72  | 25   | 39      | 84  |      |
| Link Distance (ft)    | 1573 |    |    | 1457 |     |    | 2703 |    |     | 2703 |         |     | 1298 |
| Upstream Blk Time (%) |      |    |    |      |     |    |      |    |     |      |         |     |      |
| Queuing Penalty (veh) |      |    |    |      |     |    |      |    |     |      |         |     |      |
| Storage Bay Dist (ft) | 240  |    | 80 |      | 100 |    | 25   |    | 240 |      | 120 250 |     |      |
| Storage Blk Time (%)  |      |    | 0  |      | 14  |    | 0    |    | 0   |      |         |     |      |
| Queuing Penalty (veh) |      |    | 0  |      | 4   |    | 0    |    | 0   |      |         |     |      |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | SB   | SB |
|-----------------------|------|----|
| Directions Served     | T    | R  |
| Maximum Queue (ft)    | 73   | 76 |
| Average Queue (ft)    | 30   | 25 |
| 95th Queue (ft)       | 66   | 51 |
| Link Distance (ft)    | 1298 |    |
| Upstream Blk Time (%) |      |    |
| Queuing Penalty (veh) |      |    |
| Storage Bay Dist (ft) | 95   |    |
| Storage Blk Time (%)  | 0    |    |
| Queuing Penalty (veh) | 0    |    |

Intersection: 2: Temperance Avenue & Alluvial Avenue

| Movement              | EB  | EB   | EB   | WB  | WB   | WB   | NB  | NB  | NB  | NB  | SB  | SB   |
|-----------------------|-----|------|------|-----|------|------|-----|-----|-----|-----|-----|------|
| Directions Served     | L   | T    | R    | L   | T    | TR   | L   | T   | T   | R   | L   | T    |
| Maximum Queue (ft)    | 71  | 70   | 52   | 192 | 47   | 67   | 88  | 152 | 139 | 65  | 75  | 129  |
| Average Queue (ft)    | 28  | 21   | 28   | 91  | 13   | 25   | 37  | 59  | 57  | 35  | 35  | 45   |
| 95th Queue (ft)       | 61  | 53   | 49   | 167 | 38   | 55   | 69  | 111 | 117 | 62  | 68  | 89   |
| Link Distance (ft)    |     | 2839 | 2839 |     | 1365 | 1365 |     | 448 | 448 |     |     | 2703 |
| Upstream Blk Time (%) |     |      |      |     |      |      |     |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |      |      |     |     |     |     |     |      |
| Storage Bay Dist (ft) | 250 |      |      | 85  |      |      | 225 |     |     | 125 | 275 |      |
| Storage Blk Time (%)  |     |      |      | 13  |      |      |     |     | 1   |     |     |      |
| Queuing Penalty (veh) |     |      |      | 1   |      |      |     |     | 3   |     |     |      |

Intersection: 2: Temperance Avenue & Alluvial Avenue

| Movement              | SB   | SB |
|-----------------------|------|----|
| Directions Served     | T    | R  |
| Maximum Queue (ft)    | 95   | 26 |
| Average Queue (ft)    | 50   | 8  |
| 95th Queue (ft)       | 93   | 26 |
| Link Distance (ft)    | 2703 |    |
| Upstream Blk Time (%) |      |    |
| Queuing Penalty (veh) |      |    |
| Storage Bay Dist (ft) | 275  |    |
| Storage Blk Time (%)  |      |    |
| Queuing Penalty (veh) |      |    |

Intersection: 3: Temperance Avenue & SR 168 WB Ramp

| Movement              | WB  | WB | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R  | T   | T   | T   | T   | R   |
| Maximum Queue (ft)    | 72  | 51 | 88  | 98  | 71  | 50  | 71  |
| Average Queue (ft)    | 26  | 22 | 27  | 32  | 19  | 20  | 26  |
| 95th Queue (ft)       | 54  | 44 | 68  | 83  | 52  | 50  | 64  |
| Link Distance (ft)    | 478 |    | 578 | 578 | 448 | 448 | 448 |
| Upstream Blk Time (%) |     |    |     |     |     |     |     |
| Queuing Penalty (veh) |     |    |     |     |     |     |     |
| Storage Bay Dist (ft) | 385 |    |     |     |     |     |     |
| Storage Blk Time (%)  |     |    |     |     |     |     |     |
| Queuing Penalty (veh) |     |    |     |     |     |     |     |

Intersection: 4: Temperance Avenue & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | NB   | NB   | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|------|------|-----|-----|-----|
| Directions Served     | L   | R   | R   | T    | TR   | L   | T   | T   |
| Maximum Queue (ft)    | 338 | 204 | 208 | 155  | 274  | 83  | 170 | 124 |
| Average Queue (ft)    | 99  | 128 | 65  | 53   | 134  | 16  | 71  | 66  |
| 95th Queue (ft)       | 194 | 202 | 164 | 115  | 236  | 47  | 133 | 112 |
| Link Distance (ft)    | 607 | 607 |     | 1113 | 1113 |     | 578 | 578 |
| Upstream Blk Time (%) |     |     |     |      |      |     |     |     |
| Queuing Penalty (veh) |     |     |     |      |      |     |     |     |
| Storage Bay Dist (ft) |     |     | 380 |      |      | 250 |     |     |
| Storage Blk Time (%)  |     |     |     |      |      |     |     |     |
| Queuing Penalty (veh) |     |     |     |      |      |     |     |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | WB  | WB  | NB  | NB  | NB  | SB  | SB  | SB   | SB   |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|
| Directions Served     | L   | R   | T   | T   | R   | L   | L   | T    | T    |
| Maximum Queue (ft)    | 107 | 124 | 179 | 248 | 251 | 93  | 97  | 131  | 98   |
| Average Queue (ft)    | 42  | 57  | 68  | 109 | 18  | 56  | 21  | 54   | 56   |
| 95th Queue (ft)       | 89  | 100 | 137 | 196 | 95  | 88  | 61  | 107  | 95   |
| Link Distance (ft)    |     | 355 | 528 | 528 |     |     |     | 1113 | 1113 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |      |      |
| Storage Bay Dist (ft) | 130 |     |     |     | 105 | 225 | 225 |      |      |
| Storage Blk Time (%)  |     | 0   | 3   | 7   |     |     |     |      |      |
| Queuing Penalty (veh) |     | 0   | 0   | 3   |     |     |     |      |      |

Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|
| Directions Served     | ULTR | LTR | LTR | LTR |
| Maximum Queue (ft)    | 55   | 31  | 31  | 56  |
| Average Queue (ft)    | 10   | 1   | 5   | 10  |
| 95th Queue (ft)       | 41   | 10  | 24  | 38  |
| Link Distance (ft)    | 71   | 230 | 785 | 335 |
| Upstream Blk Time (%) | 0    |     |     |     |
| Queuing Penalty (veh) | 0    |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | TR  | L   | T   | T   | R   |
| Maximum Queue (ft)    | 92  | 110  | 146  | 132  | 62  | 46  | 157 | 169 | 151 | 90  | 45  | 17  |
| Average Queue (ft)    | 36  | 64   | 60   | 15   | 29  | 23  | 45  | 72  | 65  | 24  | 10  | 2   |
| 95th Queue (ft)       | 74  | 100  | 102  | 56   | 54  | 49  | 107 | 127 | 113 | 55  | 30  | 11  |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 637 | 637 |     | 441 | 441 |     |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     | 105 |     |     | 130 |
| Storage Blk Time (%)  |     |      |      | 0    |     |     | 1   |     | 4   | 0   |     |     |
| Queuing Penalty (veh) |     |      |      | 0    |     |     | 1   |     | 2   | 0   |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | SB  | SB   | SB   | SB |
|-----------------------|-----|------|------|----|
| Directions Served     | L   | T    | T    | R  |
| Maximum Queue (ft)    | 31  | 96   | 78   | 48 |
| Average Queue (ft)    | 7   | 43   | 17   | 23 |
| 95th Queue (ft)       | 27  | 70   | 55   | 49 |
| Link Distance (ft)    |     | 2411 | 2411 |    |
| Upstream Blk Time (%) |     |      |      |    |
| Queuing Penalty (veh) |     |      |      |    |
| Storage Bay Dist (ft) | 100 |      |      | 80 |
| Storage Blk Time (%)  |     | 0    | 0    |    |
| Queuing Penalty (veh) |     | 0    | 0    |    |

Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | WB  | NE  | SW   |
|-----------------------|-----|-----|-----|------|
| Directions Served     | L   | U   | R   | R    |
| Maximum Queue (ft)    | 61  | 11  | 49  | 13   |
| Average Queue (ft)    | 6   | 1   | 25  | 0    |
| 95th Queue (ft)       | 27  | 7   | 43  | 4    |
| Link Distance (ft)    |     |     | 775 | 1210 |
| Upstream Blk Time (%) |     |     |     |      |
| Queuing Penalty (veh) |     |     |     |      |
| Storage Bay Dist (ft) | 400 | 120 |     |      |
| Storage Blk Time (%)  |     |     |     |      |
| Queuing Penalty (veh) |     |     |     |      |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 66  | 88  | 211  | 161  | 147 | 27  | 48  | 112 | 129 | 93  | 124 | 68  |
| Average Queue (ft)    | 23  | 41  | 88   | 47   | 49  | 7   | 12  | 63  | 59  | 21  | 45  | 31  |
| 95th Queue (ft)       | 50  | 81  | 156  | 110  | 96  | 24  | 35  | 100 | 115 | 71  | 85  | 59  |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 150 | 150 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  |     |     | 1    | 0    | 0   |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     | 1    | 0    | 0   |     |     |     |     |     |     |     |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R   |
| Maximum Queue (ft)    | 91  | 150  | 170  | 45  | 221 | 218 | 239 | 185 | 73  |
| Average Queue (ft)    | 54  | 65   | 82   | 9   | 103 | 81  | 97  | 106 | 26  |
| 95th Queue (ft)       | 97  | 118  | 138  | 29  | 164 | 156 | 169 | 176 | 49  |
| Link Distance (ft)    |     | 2738 | 2738 |     |     |     | 528 | 528 |     |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     |     | 150 |
| Storage Blk Time (%)  |     |      | 5    |     | 2   | 0   | 0   | 3   |     |
| Queuing Penalty (veh) |     |      | 1    |     | 6   | 0   | 1   | 4   |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB | WB  | WB  | WB  | WB  | WB  | NB  | SB | SB |
|-----------------------|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|----|----|
| Directions Served     | L   | T   | T   | R  | L   | T   | T   | T   | R   | LTR | LT | R  |
| Maximum Queue (ft)    | 43  | 347 | 250 | 38 | 26  | 52  | 51  | 92  | 30  | 88  | 63 | 93 |
| Average Queue (ft)    | 15  | 85  | 11  | 9  | 2   | 23  | 16  | 35  | 8   | 41  | 24 | 41 |
| 95th Queue (ft)       | 35  | 193 | 86  | 21 | 12  | 51  | 46  | 71  | 27  | 74  | 62 | 75 |
| Link Distance (ft)    |     | 997 | 997 |    |     | 286 | 286 | 286 |     | 354 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |    |     |     |     |     |     |     | 6  | 7  |
| Queuing Penalty (veh) |     |     |     |    |     |     |     |     |     |     | 3  | 4  |
| Storage Bay Dist (ft) | 145 |     |     | 75 | 190 |     |     |     | 120 |     |    |    |
| Storage Blk Time (%)  |     | 2   |     |    |     |     |     |     |     |     |    |    |
| Queuing Penalty (veh) |     | 1   |     |    |     |     |     |     |     |     |    |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  | NB | NB |
|-----------------------|-----|-----|-----|-----|----|----|
| Directions Served     | T   | R   | L   | T   | L  | R  |
| Maximum Queue (ft)    | 50  | 79  | 68  | 50  | 52 | 45 |
| Average Queue (ft)    | 21  | 29  | 29  | 20  | 2  | 9  |
| 95th Queue (ft)       | 46  | 66  | 52  | 46  | 17 | 38 |
| Link Distance (ft)    | 785 |     |     | 364 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |     |    |    |
| Queuing Penalty (veh) |     |     |     |     |    |    |
| Storage Bay Dist (ft) |     | 100 | 100 |     |    |    |
| Storage Blk Time (%)  |     |     |     |     |    |    |
| Queuing Penalty (veh) |     |     |     |     |    |    |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | EB  | SB  |
|-----------------------|-----|-----|
| Directions Served     | L   | LR  |
| Maximum Queue (ft)    | 28  | 32  |
| Average Queue (ft)    | 1   | 12  |
| 95th Queue (ft)       | 9   | 37  |
| Link Distance (ft)    |     | 915 |
| Upstream Blk Time (%) |     |     |
| Queuing Penalty (veh) |     |     |
| Storage Bay Dist (ft) | 100 |     |
| Storage Blk Time (%)  |     |     |
| Queuing Penalty (veh) |     |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | WB | NB   |
|-----------------------|----|------|
| Directions Served     | L  | LR   |
| Maximum Queue (ft)    | 26 | 182  |
| Average Queue (ft)    | 10 | 65   |
| 95th Queue (ft)       | 29 | 127  |
| Link Distance (ft)    |    | 5217 |
| Upstream Blk Time (%) |    |      |
| Queuing Penalty (veh) |    |      |
| Storage Bay Dist (ft) | 75 |      |
| Storage Blk Time (%)  |    |      |
| Queuing Penalty (veh) |    |      |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB   | SB   |
|-----------------------|------|------|
| Directions Served     | LT   | LR   |
| Maximum Queue (ft)    | 30   | 75   |
| Average Queue (ft)    | 6    | 30   |
| 95th Queue (ft)       | 23   | 59   |
| Link Distance (ft)    | 2039 | 2534 |
| Upstream Blk Time (%) |      |      |
| Queuing Penalty (veh) |      |      |
| Storage Bay Dist (ft) |      |      |
| Storage Blk Time (%)  |      |      |
| Queuing Penalty (veh) |      |      |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 141  |
| Average Queue (ft)    | 59   |
| 95th Queue (ft)       | 101  |
| Link Distance (ft)    | 5233 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 31   |
| Average Queue (ft)    | 4    |
| 95th Queue (ft)       | 21   |
| Link Distance (ft)    | 2484 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 76   |
| Average Queue (ft)    | 42   |
| 95th Queue (ft)       | 63   |
| Link Distance (ft)    | 2410 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | WB   | NB   |
|-----------------------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 99   | 54   | 31   |
| Average Queue (ft)    | 34   | 14   | 6    |
| 95th Queue (ft)       | 60   | 38   | 26   |
| Link Distance (ft)    | 6447 | 2721 | 2320 |
| Upstream Blk Time (%) |      |      |      |
| Queuing Penalty (veh) |      |      |      |
| Storage Bay Dist (ft) |      |      |      |
| Storage Blk Time (%)  |      |      |      |
| Queuing Penalty (veh) |      |      |      |

Intersection: 20: Locan Avenue & Bullard Avenue

| Movement              | EB  | EB   | EB   | WB  | WB   | NB  | NB   | NB | SB   |
|-----------------------|-----|------|------|-----|------|-----|------|----|------|
| Directions Served     | L   | T    | R    | L   | TR   | L   | T    | R  | LTR  |
| Maximum Queue (ft)    | 27  | 98   | 44   | 22  | 64   | 45  | 44   | 18 | 79   |
| Average Queue (ft)    | 13  | 36   | 20   | 5   | 21   | 15  | 22   | 2  | 40   |
| 95th Queue (ft)       | 35  | 61   | 38   | 18  | 43   | 36  | 38   | 9  | 71   |
| Link Distance (ft)    |     | 2614 | 2614 |     | 2615 |     | 2605 |    | 5217 |
| Upstream Blk Time (%) |     |      |      |     |      |     |      |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     |      |    |      |
| Storage Bay Dist (ft) | 270 |      |      | 260 |      | 125 |      | 50 |      |
| Storage Blk Time (%)  |     |      |      |     |      |     | 0    |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     | 0    |    |      |



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Intersection: 21: De Wolf Ave & Bullard Avenue

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| Movement              | EB   | WB   | NB   | SB   |
|-----------------------|------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 101  | 103  | 102  | 120  |
| Average Queue (ft)    | 53   | 45   | 48   | 55   |
| 95th Queue (ft)       | 83   | 73   | 78   | 88   |
| Link Distance (ft)    | 2615 | 2621 | 2617 | 5233 |
| Upstream Blk Time (%) |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |
| Storage Bay Dist (ft) |      |      |      |      |
| Storage Blk Time (%)  |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |

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Network Summary

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Network wide Queuing Penalty: 36

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## Appendix F: LOS Worksheets, Existing plus Project Phase 1



**Traffic Engineering, Inc.**

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





















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# HCM Signalized Intersection Capacity Analysis

Existing + Proj Phase 1 AM Peak

## 1: Temperance Avenue & Nees Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph)                      | 67  | 15  | 90  | 36  | 23  | 6   | 32   | 115   | 232   | 36  | 1   | 487   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  | 0.98  |  | 1.00  | 1.00  | 0.97  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1534  |  | 1752  | 3505  | 1528  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1534  |  | 1752  | 3505  | 1528  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90   | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)                   | 74  | 17  | 100   | 40  | 26  | 7   | 36   | 128   | 258   | 40  | 1   | 541   |
| RTOR Reduction (vph)              | 0   | 0   | 90  | 0   | 0   | 6   | 0  | 0   | 0   | 14  | 0   | 0   |
| Lane Group Flow (vph)             | 74  | 17  | 10  | 40  | 26  | 1   | 0  | 164   | 258   | 26  | 1   | 541   |
| Confl. Peds. (#/hr)               |   |   | 1   |   |   | 9   |  |   |   | 3   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 10.9  | 12.1  | 12.1  | 9.7   | 10.5  | 10.5  |  | 16.4  | 78.0  | 78.0  | 1.2   | 62.8  |
| Effective Green, g (s)            | 10.9  | 12.1  | 12.1  | 9.7   | 10.5  | 10.5  |  | 16.4  | 78.0  | 78.0  | 1.2   | 62.8  |
| Actuated g/C Ratio                | 0.09  | 0.10  | 0.10  | 0.08  | 0.09  | 0.09  |  | 0.14  | 0.65  | 0.65  | 0.01  | 0.52  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 159   | 186   | 156   | 141   | 161   | 134   |  | 239   | 2278  | 993   | 17  | 1834  |
| v/s Ratio Prot                    | c0.04   | 0.01  |   | c0.02   | 0.01  |   |  | c0.09   | 0.07  |   | 0.00  | c0.15   |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | 0.00  |  |   |   | 0.02  |   |   |
| v/c Ratio                         | 0.47  | 0.09  | 0.06  | 0.28  | 0.16  | 0.00  |  | 0.69  | 0.11  | 0.03  | 0.06  | 0.29  |
| Uniform Delay, d1                 | 51.8  | 49.0  | 48.8  | 51.9  | 50.7  | 50.0  |  | 49.3  | 7.9   | 7.5   | 58.8  | 16.1  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 0.89  | 0.58  | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2             | 2.1   | 0.2   | 0.2   | 1.1   | 0.5   | 0.0   |  | 7.9   | 0.1   | 0.0   | 1.5   | 0.4   |
| Delay (s)                         | 53.9  | 49.2  | 49.0  | 53.0  | 51.1  | 50.0  |  | 51.8  | 4.7   | 7.5   | 60.3  | 16.5  |
| Level of Service                  | D   | D   | D   | D   | D   | D   |  | D   | A   | A   | E   | B   |
| Approach Delay (s)                |   | 50.9  |   |   | 52.0  |   |  |   | 21.7  |   |   | 16.2  |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | C   |   |   | B   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 24.2  |   |   |   | HCM 2000 Level of Service  |   | C   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.37  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 60.0%   |   |   |   | ICU Level of Service   |   | B   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

Existing + Proj Phase 1 AM Peak

3/28/2017
























|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 185  |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.99 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1547 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1547 |
| Peak-hour factor, PHF  | 0.90 |
| Adj. Flow (vph)        | 206  |
| RTOR Reduction (vph)   | 86   |
| Lane Group Flow (vph)  | 120  |
| Confl. Peds. (#/hr)    | 1    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 62.8 |
| Effective Green, g (s) | 62.8 |
| Actuated g/C Ratio     | 0.52 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 809  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.08 |
| v/c Ratio              | 0.15 |
| Uniform Delay, d1      | 14.8 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.4  |
| Delay (s)              | 15.2 |
| Level of Service       | B    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# HCM 2010 Signalized Intersection Summary

## 2: Temperance Avenue & Alluvial Avenue

Existing + Proj Phase 1 AM Peak

3/28/2017








|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)               | 9   | 25  | 92  | 262   | 50  | 49  | 93   | 329   | 290   | 71  | 614   | 27  |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 9   | 26  | 94  | 267   | 51  | 50  | 95   | 336   | 296   | 72  | 627   | 28  |
| Adj No. of Lanes             | 1   | 1   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 18  | 163   | 139   | 306   | 460   | 398   | 661  | 1908  | 853   | 94  | 746   | 333   |
| Arrive On Green              | 0.01  | 0.09  | 0.09  | 0.17  | 0.26  | 0.26  | 0.38   | 0.54  | 0.54  | 0.07  | 0.28  | 0.28  |
| Sat Flow, veh/h              | 1757  | 1845  | 1568  | 1757  | 1781  | 1541  | 1757   | 3505  | 1567  | 1757  | 3505  | 1566  |
| Grp Volume(v), veh/h         | 9   | 26  | 94  | 267   | 50  | 51  | 95   | 336   | 296   | 72  | 627   | 28  |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1845  | 1568  | 1757  | 1752  | 1571  | 1757   | 1752  | 1567  | 1757  | 1752  | 1566  |
| Q Serve(g_s), s              | 0.6   | 1.6   | 7.0   | 17.8  | 2.6   | 3.0   | 4.3  | 5.8   | 5.2   | 4.8   | 20.2  | 1.4   |
| Cycle Q Clear(g_c), s        | 0.6   | 1.6   | 7.0   | 17.8  | 2.6   | 3.0   | 4.3  | 5.8   | 5.2   | 4.8   | 20.2  | 1.4   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 0.98  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 18  | 163   | 139   | 306   | 453   | 406   | 661  | 1908  | 853   | 94  | 746   | 333   |
| V/C Ratio(X)                 | 0.50  | 0.16  | 0.68  | 0.87  | 0.11  | 0.13  | 0.14   | 0.18  | 0.35  | 0.76  | 0.84  | 0.08  |
| Avail Cap(c_a), veh/h        | 61  | 475   | 404   | 427   | 816   | 732   | 661  | 1908  | 853   | 158   | 888   | 397   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.33  | 1.33  | 1.33  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 0.98   | 0.98  | 0.98  | 0.97  | 0.97  | 0.97  |
| Uniform Delay (d), s/veh     | 59.1  | 50.6  | 53.0  | 48.2  | 34.0  | 34.1  | 24.7   | 13.8  | 2.6   | 55.0  | 41.1  | 25.8  |
| Incr Delay (d2), s/veh       | 19.5  | 0.5   | 5.7   | 13.3  | 0.1   | 0.1   | 0.1  | 0.2   | 1.1   | 11.5  | 10.7  | 0.5   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 0.4   | 0.8   | 3.2   | 9.7   | 1.3   | 1.3   | 2.1  | 2.9   | 2.4   | 2.6   | 10.9  | 0.6   |
| LnGrp Delay(d),s/veh         | 78.6  | 51.0  | 58.7  | 61.5  | 34.1  | 34.3  | 24.8   | 14.0  | 3.7   | 66.5  | 51.8  | 26.3  |
| LnGrp LOS                    | E   | D   | E   | E   | C   | C   | C  | B   | A   | E   | D   | C   |
| Approach Vol, veh/h          |   | 129   |   |   | 368   |   |  | 727   |   |   | 727   |   |
| Approach Delay, s/veh        |   | 58.6  |   |   | 54.0  |   |  | 11.2  |   |   | 52.3  |   |
| Approach LOS                 |   | E   |   |   | D   |   |  | B   |   |   | D   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 10.5  | 69.3  | 25.6  | 14.6  | 50.2  | 29.5  | 5.2  | 35.0  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   | 4.9   | * 4.9   | 5.3   | * 5.7   | * 4.2  | 4.9   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 11  | 31.8  | 29.0  | * 30  | 13.3  | * 29  | * 4  | 55.0  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 6.8   | 7.8   | 19.8  | 9.0   | 6.3   | 22.2  | 2.6  | 5.0   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 3.1   | 1.0   | 0.4   | 1.9   | 1.6   | 0.0  | 1.5   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   |   | 37.7  |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   |   | D   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Avenue & SR 168 WB Ramp

Existing + Proj Phase 1 AM Peak

3/28/2017


















|                              |  |       |     |   |      |   |      |   |   |      |   |   |
|------------------------------|--|-------|-----|---|------|---|------|---|---|------|---|---|
| Movement                     | EBL  | EBT   | EBR | WBL   | WBT  | WBR   | NBL  | NBT   | NBR   | SBL  | SBT   | SBR   |
| Lane Configurations          |  |       |     |  |      |  |      |  |  |      |  |  |
| Volume (veh/h)               | 0  | 0     | 0   | 85  | 0    | 95  | 0    | 580   | 1050  | 0    | 443   | 505   |
| Number                       |  |       |     | 3   | 8    | 18  | 5    | 2   | 12  | 1    | 6   | 16  |
| Initial Q (Qb), veh          |  |       |     | 0   | 0    | 0   | 0    | 0   | 0   | 0    | 0   | 0   |
| Ped-Bike Adj(A_pbT)          |  |       |     | 1.00  |      | 1.00  | 1.00 |   | 1.00  | 1.00 |   | 1.00  |
| Parking Bus, Adj             |  |       |     | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       |  |       |     | 1845  | 0    | 1845  | 0    | 1845  | 1845  | 0    | 1845  | 1845  |
| Adj Flow Rate, veh/h         |  |       |     | 92  | 0    | 103   | 0    | 630   | 0   | 0    | 482   | 549   |
| Adj No. of Lanes             |  |       |     | 1   | 0    | 1   | 0    | 2   | 1   | 0    | 2   | 1   |
| Peak Hour Factor             |  |       |     | 0.92  | 0.92 | 0.92  | 0.92 | 0.92  | 0.92  | 0.92 | 0.92  | 0.92  |
| Percent Heavy Veh, %         |  |       |     | 3   | 0    | 3   | 0    | 3   | 3   | 0    | 3   | 3   |
| Cap, veh/h                   |  |       |     | 153   | 0    | 142   | 0    | 2966  | 1310  | 0    | 2966  | 1327  |
| Arrive On Green              |  |       |     | 0.09  | 0.00 | 0.09  | 0.00 | 1.00  | 0.00  | 0.00 | 1.00  | 1.00  |
| Sat Flow, veh/h              |  |       |     | 1757  | 0    | 1568  | 0    | 3597  | 1568  | 0    | 3597  | 1568  |
| Grp Volume(v), veh/h         |  |       |     | 92  | 0    | 103   | 0    | 630   | 0   | 0    | 482   | 549   |
| Grp Sat Flow(s),veh/h/ln     |  |       |     | 1757  | 0    | 1568  | 0    | 1752  | 1568  | 0    | 1752  | 1568  |
| Q Serve(g_s), s              |  |       |     | 6.1   | 0.0  | 7.7   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        |  |       |     | 6.1   | 0.0  | 7.7   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| Prop In Lane                 |  |       |     | 1.00  |      | 1.00  | 0.00 |   | 1.00  | 0.00 |   | 1.00  |
| Lane Grp Cap(c), veh/h       |  |       |     | 153   | 0    | 142   | 0    | 2966  | 1310  | 0    | 2966  | 1327  |
| V/C Ratio(X)                 |  |       |     | 0.60  | 0.00 | 0.73  | 0.00 | 0.21  | 0.00  | 0.00 | 0.16  | 0.41  |
| Avail Cap(c_a), veh/h        |  |       |     | 351   | 0    | 319   | 0    | 2966  | 1310  | 0    | 2966  | 1327  |
| HCM Platoon Ratio            |  |       |     | 1.00  | 1.00 | 1.00  | 1.00 | 1.67  | 1.67  | 1.00 | 1.67  | 1.67  |
| Upstream Filter(I)           |  |       |     | 1.00  | 0.00 | 1.00  | 0.00 | 0.61  | 0.00  | 0.00 | 0.87  | 0.87  |
| Uniform Delay (d), s/veh     |  |       |     | 52.8  | 0.0  | 53.1  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       |  |       |     | 3.8   | 0.0  | 6.9   | 0.0  | 0.1   | 0.0   | 0.0  | 0.1   | 0.8   |
| Initial Q Delay(d3),s/veh    |  |       |     | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     |  |       |     | 3.1   | 0.0  | 3.6   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.3   |
| LnGrp Delay(d),s/veh         |  |       |     | 56.5  | 0.0  | 60.0  | 0.0  | 0.1   | 0.0   | 0.0  | 0.1   | 0.8   |
| LnGrp LOS                    |  |       |     | E   |      | E   |      | A   |   |      | A   | A   |
| Approach Vol, veh/h          |  |       |     |   | 195  |   |      | 630   |   |      | 1031  |   |
| Approach Delay, s/veh        |  |       |     |   | 58.4 |   |      | 0.1   |   |      | 0.5   |   |
| Approach LOS                 |  |       |     |   | E    |   |      | A   |   |      | A   |   |
| Timer                        | 1  | 2     | 3   | 4   | 5    | 6   | 7    | 8   |   |      |   |   |
| Assigned Phs                 |  | 2     |     |   |      | 6   |      | 8   |   |      |   |   |
| Phs Duration (G+Y+Rc), s     |  | 105.5 |     |   |      | 105.5   |      | 14.5  |   |      |   |   |
| Change Period (Y+Rc), s      |  | 5.3   |     |   |      | 5.3   |      | 4.2   |   |      |   |   |
| Max Green Setting (Gmax), s  |  | 86.7  |     |   |      | 86.7  |      | 23.8  |   |      |   |   |
| Max Q Clear Time (g_c+I1), s |  | 2.0   |     |   |      | 2.0   |      | 9.7   |   |      |   |   |
| Green Ext Time (p_c), s      |  | 10.2  |     |   |      | 10.2  |      | 0.6   |   |      |   |   |
| <b>Intersection Summary</b>  |  |       |     |   |      |   |      |   |   |      |   |   |
| HCM 2010 Ctrl Delay          |  |       | 6.4 |   |      |   |      |   |   |      |   |   |
| HCM 2010 LOS                 |  |       | A   |   |      |   |      |   |   |      |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

Existing + Proj Phase 1 AM Peak

3/28/2017























|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |   |  |   |  |  |   |
| Volume (veh/h)               | 168   | 0   | 565   | 0   | 0   | 0   | 0   | 1517  | 39  | 23  | 506   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5   | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0   | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00  |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0   | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 181   | 0   | 608   |   |   |   | 0   | 1631  | 42  | 25  | 544   | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0   | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  |   |   |   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0   | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 589   | 0   | 530   |   |   |   | 0   | 1527  | 39  | 208   | 2097  | 0   |
| Arrive On Green              | 0.34  | 0.00  | 0.34  |   |   |   | 0.00  | 0.87  | 0.85  | 0.04  | 0.20  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0   | 3584  | 90  | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 181   | 0   | 608   |   |   |   | 0   | 817   | 856   | 25  | 544   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0   | 1752  | 1829  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 9.2   | 0.0   | 40.6  |   |   |   | 0.0   | 52.5  | 52.5  | 1.6   | 15.8  | 0.0   |
| Cycle Q Clear(g_c), s        | 9.2   | 0.0   | 40.6  |   |   |   | 0.0   | 52.5  | 52.5  | 1.6   | 15.8  | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00  |   | 0.05  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 589   | 0   | 530   |   |   |   | 0   | 766   | 800   | 208   | 2097  | 0   |
| V/C Ratio(X)                 | 0.31  | 0.00  | 1.15  |   |   |   | 0.00  | 1.07  | 1.07  | 0.12  | 0.26  | 0.00  |
| Avail Cap(c_a), veh/h        | 589   | 0   | 530   |   |   |   | 0   | 924   | 965   | 208   | 2097  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00  | 2.00  | 2.00  | 0.33  | 0.33  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00  | 1.00  | 1.00  | 0.98  | 0.98  | 0.00  |
| Uniform Delay (d), s/veh     | 29.6  | 0.0   | 39.7  |   |   |   | 0.0   | 7.5   | 7.6   | 51.6  | 25.7  | 0.0   |
| Incr Delay (d2), s/veh       | 0.3   | 0.0   | 86.1  |   |   |   | 0.0   | 51.6  | 52.5  | 0.3   | 0.3   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 4.5   | 0.0   | 30.2  |   |   |   | 0.0   | 33.5  | 35.2  | 0.8   | 7.8   | 0.0   |
| LnGrp Delay(d),s/veh         | 29.9  | 0.0   | 125.8   |   |   |   | 0.0   | 59.1  | 60.1  | 51.9  | 26.0  | 0.0   |
| LnGrp LOS                    | C   |   | F   |   |   |   |   | F   | F   | D   | C   |   |
| Approach Vol, veh/h          | 789   |   |   |   |   |   |   | 1673  |   |   | 569   |   |
| Approach Delay, s/veh        | 103.8   |   |   |   |   |   |   | 59.6  |   |   | 27.1  |   |
| Approach LOS                 | F   |   |   |   |   |   |   | E   |   |   | C   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |   |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 15.4  | 60.4  |   | 44.2  |   | 75.8  |   |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |   |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 4.3   | * 62  |   | * 40  |   | 70.5  |   |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 3.6   | 54.5  |   | 42.6  |   | 17.8  |   |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.2   | 4.6   |   | 0.0   |   | 2.6   |   |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |   |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 65.0  |   |   |   |   |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | E   |   |   |   |   |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

Existing + Proj Phase 1 AM Peak

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBU   | SBL   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |   |  |
| Volume (vph)                      | 53  | 5   | 148   | 95  | 4   | 151   | 1  | 69  | 1262  | 112   | 21  | 454   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.2   | 4.2   | 4.0   | 4.2   | 4.0   |  | 5.3   | 4.0   | 4.0   |   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  |   | 0.97  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.99  |   | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  |   | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  |   | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1546  |   | 3400  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.38  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 692   | 3505  | 1546  |   | 3400  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 58  | 5   | 161   | 103   | 4   | 164   | 1  | 75  | 1372  | 122   | 23  | 493   |
| RTOR Reduction (vph)              | 0   | 0   | 143   | 0   | 0   | 136   | 0  | 0   | 0   | 73  | 0   | 0   |
| Lane Group Flow (vph)             | 58  | 5   | 18  | 103   | 4   | 28  | 0  | 76  | 1372  | 49  | 0   | 516   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Perm  | NA  | Perm  | Prot  | Prot  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  |   | 2   |   | 1   | 1   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  | 2   |   | 2   |   |   |
| Actuated Green, G (s)             | 7.3   | 13.2  | 13.2  | 14.7  | 20.6  | 20.6  |  | 47.2  | 47.2  | 47.2  |   | 27.0  |
| Effective Green, g (s)            | 7.3   | 13.2  | 13.2  | 14.9  | 20.6  | 20.8  |  | 47.2  | 48.5  | 48.5  |   | 27.2  |
| Actuated g/C Ratio                | 0.06  | 0.11  | 0.11  | 0.12  | 0.17  | 0.17  |  | 0.39  | 0.40  | 0.40  |   | 0.23  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   |  | 5.3   | 5.3   | 5.3   |   | 4.2   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   |   | 3.0   |
| Lane Grp Cap (vph)                | 106   | 202   | 172   | 217   | 316   | 271   |  | 272   | 1416  | 624   |   | 770   |
| v/s Ratio Prot                    | c0.03   | 0.00  |   | c0.06   | 0.00  |   |  | c0.39   |   |   |   | c0.15   |
| v/s Ratio Perm                    |   |   | c0.01   |   |   | 0.02  |  | 0.11  |   | 0.03  |   |   |
| v/c Ratio                         | 0.55  | 0.02  | 0.10  | 0.47  | 0.01  | 0.10  |  | 0.28  | 0.97  | 0.08  |   | 0.67  |
| Uniform Delay, d1                 | 54.7  | 47.7  | 48.1  | 48.9  | 41.3  | 41.8  |  | 24.8  | 35.0  | 22.0  |   | 42.3  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 0.59  | 0.72  | 0.08  |   | 1.09  |
| Incremental Delay, d2             | 5.7   | 0.0   | 0.3   | 1.6   | 0.0   | 0.2   |  | 2.0   | 15.1  | 0.2   |   | 2.0   |
| Delay (s)                         | 60.4  | 47.7  | 48.3  | 50.5  | 41.3  | 41.9  |  | 16.6  | 40.3  | 2.0   |   | 48.0  |
| Level of Service                  | E   | D   | D   | D   | D   | D   |  | B   | D   | A   |   | D   |
| Approach Delay (s)                |   | 51.4  |   |   | 45.2  |   |  |   | 36.2  |   |   |   |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | D   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 33.6  |   |   |   | HCM 2000 Level of Service  |   | C   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.74  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 16.6  |   |   |   |
| Intersection Capacity Utilization |   |   | 74.6%   |   |   |   | ICU Level of Service   |   | D   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

Existing + Proj Phase 1 AM Peak

3/28/2017



| Movement                 | SBT  | SBR  |
|--------------------------|------|------|
| Left Lane Configurations | ↑↑   | ↑    |
| Volume (vph)             | 600  | 69   |
| Ideal Flow (vphpl)       | 1900 | 1900 |
| Total Lost time (s)      | 4.0  |      |
| Lane Util. Factor        | 0.95 |      |
| Frpb, ped/bikes          | 1.00 |      |
| Flpb, ped/bikes          | 1.00 |      |
| Frt                      | 0.98 |      |
| Flt Protected            | 1.00 |      |
| Satd. Flow (prot)        | 3451 |      |
| Flt Permitted            | 1.00 |      |
| Satd. Flow (perm)        | 3451 |      |
| Peak-hour factor, PHF    | 0.92 | 0.92 |
| Adj. Flow (vph)          | 652  | 75   |
| RTOR Reduction (vph)     | 4    | 0    |
| Lane Group Flow (vph)    | 723  | 0    |
| Confl. Peds. (#/hr)      |      |      |
| Turn Type                | NA   |      |
| Protected Phases         | 6    |      |
| Permitted Phases         |      |      |
| Actuated Green, G (s)    | 78.4 |      |
| Effective Green, g (s)   | 79.7 |      |
| Actuated g/C Ratio       | 0.66 |      |
| Clearance Time (s)       | 5.3  |      |
| Vehicle Extension (s)    | 3.0  |      |
| Lane Grp Cap (vph)       | 2292 |      |
| v/s Ratio Prot           | 0.21 |      |
| v/s Ratio Perm           |      |      |
| v/c Ratio                | 0.32 |      |
| Uniform Delay, d1        | 8.6  |      |
| Progression Factor       | 0.93 |      |
| Incremental Delay, d2    | 0.3  |      |
| Delay (s)                | 8.2  |      |
| Level of Service         | A    |      |
| Approach Delay (s)       | 24.7 |      |
| Approach LOS             | C    |      |
| Intersection Summary     |      |      |

Intersection

Intersection Delay, s/veh 9.2

Intersection LOS A

| Approach                    | EB    | WB    | NB    | SB    |
|-----------------------------|-------|-------|-------|-------|
| Entry Lanes                 | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes    | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h    | 616   | 34    | 141   | 182   |
| Demand Flow Rate, veh/h     | 635   | 34    | 145   | 188   |
| Vehicles Circulating, veh/h | 24    | 652   | 569   | 51    |
| Vehicles Exiting, veh/h     | 215   | 62    | 90    | 635   |
| Follow-Up Headway, s        | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h   | 0     | 0     | 0     | 0     |
| Ped Cap Adj                 | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh       | 10.7  | 6.9   | 8.6   | 5.1   |
| Approach LOS                | B     | A     | A     | A     |
























| Lane                  | Left  | Left  | Left  | Left  |
|-----------------------|-------|-------|-------|-------|
| Designated Moves      | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves         | LTR   | LTR   | LTR   | LTR   |
| RT Channelized        |       |       |       |       |
| Lane Util             | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s   | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h     | 635   | 34    | 145   | 188   |
| Cap Entry Lane, veh/h | 1103  | 589   | 640   | 1074  |
| Entry HV Adj Factor   | 0.971 | 0.986 | 0.971 | 0.971 |
| Flow Entry, veh/h     | 616   | 34    | 141   | 182   |
| Cap Entry, veh/h      | 1071  | 581   | 621   | 1042  |
| V/C Ratio             | 0.576 | 0.058 | 0.227 | 0.175 |
| Control Delay, s/veh  | 10.7  | 6.9   | 8.6   | 5.1   |
| LOS                   | B     | A     | A     | A     |
| 95th %tile Queue, veh | 4     | 0     | 1     | 1     |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

Existing + Proj Phase 1 AM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |   |    |   |  |  |  |
| Volume (veh/h)  | 31  | 340   | 61  | 65  | 618   | 32  | 260  | 126   | 15  | 25  | 67  | 68  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 33  | 366   | 66  | 70  | 665   | 34  | 280  | 135   | 16  | 27  | 72  | 73  |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 44  | 569   | 177   | 845   | 1960  | 100   | 322  | 849   | 380   | 38  | 251   | 112   |
| Arrive On Green   | 0.03  | 0.11  | 0.11  | 0.48  | 0.58  | 0.57  | 0.18   | 0.24  | 0.24  | 0.02  | 0.07  | 0.07  |
| Sat Flow, veh/h   | 1757  | 5036  | 1568  | 1757  | 3393  | 173   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 33  | 366   | 66  | 70  | 343   | 356   | 280  | 135   | 16  | 27  | 72  | 73  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1568  | 1757  | 1752  | 1814  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 2.2   | 8.3   | 4.7   | 2.6   | 12.3  | 12.4  | 18.6   | 3.6   | 0.2   | 1.8   | 2.3   | 4.8   |
| Cycle Q Clear(g_c), s   | 2.2   | 8.3   | 4.7   | 2.6   | 12.3  | 12.4  | 18.6   | 3.6   | 0.2   | 1.8   | 2.3   | 4.8   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.10  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 44  | 569   | 177   | 845   | 1012  | 1048  | 322  | 849   | 380   | 38  | 251   | 112   |
| V/C Ratio(X)  | 0.74  | 0.64  | 0.37  | 0.08  | 0.34  | 0.34  | 0.87   | 0.16  | 0.04  | 0.72  | 0.29  | 0.65  |
| Avail Cap(c_a), veh/h   | 100   | 1251  | 389   | 845   | 1012  | 1048  | 441  | 1674  | 749   | 89  | 973   | 435   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 58.1  | 50.9  | 49.3  | 16.8  | 13.3  | 13.4  | 47.6   | 35.8  | 2.0   | 58.4  | 52.8  | 41.8  |
| Incr Delay (d2), s/veh  | 21.4  | 5.5   | 5.9   | 0.0   | 0.9   | 0.9   | 13.2   | 0.1   | 0.0   | 22.2  | 0.6   | 6.2   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 1.4   | 4.2   | 2.3   | 1.3   | 6.2   | 6.4   | 10.2   | 1.8   | 0.1   | 1.1   | 1.2   | 2.3   |
| LnGrp Delay(d),s/veh  | 79.5  | 56.4  | 55.2  | 16.9  | 14.2  | 14.2  | 60.8   | 35.9  | 2.0   | 80.6  | 53.4  | 48.0  |
| LnGrp LOS   | E   | E   | E   | B   | B   | B   | E  | D   | A   | F   | D   | D   |
| Approach Vol, veh/h   |   | 465   |   |   | 769   |   |  | 431   |   |   | 172   |   |
| Approach Delay, s/veh   |   | 57.9  |   |   | 14.5  |   |  | 50.8  |   |   | 55.4  |   |
| Approach LOS  |   | E   |   |   | B   |   |  | D   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 6.6   | 33.1  | 62.8  | 17.6  | 27.1  | 12.6  | 7.0  | 73.3  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | 5.3   | * 5.3   | 5.3   | * 5.3   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 5.9   | 56.0  | 10.6  | * 29  | 29.9  | * 32  | * 6.6  | 32.5  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 3.8   | 5.6   | 4.6   | 10.3  | 20.6  | 6.8   | 4.2  | 14.4  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 1.7   | 1.7   | 1.7   | 1.2   | 0.5   | 0.0  | 2.8   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 37.8  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

| Intersection     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 1.3 |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 19   | 344  | 0    | 11   | 0    | 781  | 4    | 0    | 0    | 109  | 0    | 0    | 17   |
| Conflicting Peds, #/hr   | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 400  | -    | -    | -    | 120  | -    | 85   | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | -    | 0    | -    | -    | 1    | -    | -    | 1    | -    |
| Grade, %                 | -    | 0    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 20   | 370  | 0    | 12   | 0    | 840  | 4    | 0    | 0    | 117  | 0    | 0    | 18   |

| Major/Minor          | Major1 |   |   | Major2 |      |   |   | Minor1 |      |      | Minor2 |      |      |
|----------------------|--------|---|---|--------|------|---|---|--------|------|------|--------|------|------|
| Conflicting Flow All | 840    | 0 | 0 | 387    | 371  | 0 | 0 | 856    | 1275 | 186  | 1053   | 1275 | 421  |
| Stage 1              | -      | - | - | -      | -    | - | - | 412    | 412  | -    | 863    | 863  | -    |
| Stage 2              | -      | - | - | -      | -    | - | - | 444    | 863  | -    | 190    | 412  | -    |
| Critical Hdwy        | 4.16   | - | - | 5.66   | 5.36 | - | - | 7.01   | 6.56 | 7.16 | 7.01   | 6.56 | 6.96 |
| Critical Hdwy Stg 1  | -      | - | - | -      | -    | - | - | 7.36   | 5.56 | -    | 6.56   | 5.56 | -    |
| Critical Hdwy Stg 2  | -      | - | - | -      | -    | - | - | 6.56   | 5.56 | -    | 6.76   | 5.56 | -    |
| Follow-up Hdwy       | 2.23   | - | - | 2.33   | 3.13 | - | - | 3.68   | 4.03 | 3.93 | 3.68   | 4.03 | 3.33 |
| Pot Cap-1 Maneuver   | 784    | - | - | 951    | 775  | - | - | 277    | 164  | 699  | 206    | 164  | 578  |
| Stage 1              | -      | - | - | -      | -    | - | - | 516    | 590  | -    | 306    | 367  | -    |
| Stage 2              | -      | - | - | -      | -    | - | - | 542    | 367  | -    | 753    | 590  | -    |
| Platoon blocked, %   |        | - | - |        |      | - | - |        |      |      |        |      |      |
| Mov Cap-1 Maneuver   | 783    | - | - | 802    | 775  | - | - | 263    | 160  | 698  | 168    | 160  | 578  |
| Mov Cap-2 Maneuver   | -      | - | - | -      | -    | - | - | 350    | 264  | -    | 245    | 271  | -    |
| Stage 1              | -      | - | - | -      | -    | - | - | 502    | 574  | -    | 298    | 367  | -    |
| Stage 2              | -      | - | - | -      | -    | - | - | 524    | 367  | -    | 611    | 574  | -    |

| Approach             | EB  | WB  | NE   | SW   |
|----------------------|-----|-----|------|------|
| HCM Control Delay, s | 0.5 | 0.1 | 11.2 | 11.4 |
| HCM LOS              |     |     | B    | B    |

























| Minor Lane/Major Mvmt | NELn1 | EBL   | EBT | EBR | WBU   | WBL | WBT | WBR | SWLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 698   | 783   | -   | -   | 802   | 775 | -   | -   | 578   |
| HCM Lane V/C Ratio    | 0.168 | 0.026 | -   | -   | 0.015 | -   | -   | -   | 0.032 |
| HCM Control Delay (s) | 11.2  | 9.7   | -   | -   | 9.6   | -   | -   | -   | 11.4  |
| HCM Lane LOS          | B     | A     | -   | -   | A     | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0.6   | 0.1   | -   | -   | 0     | 0   | -   | -   | 0.1   |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

Existing + Proj Phase 1 AM Peak

3/28/2017





















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)               | 178   | 240   | 84  | 32  | 436   | 509   | 210  | 740   | 61  | 254   | 322   | 125   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 189   | 255   | 89  | 34  | 464   | 541   | 223  | 787   | 65  | 270   | 343   | 133   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94   | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 253   | 1375  | 613   | 83  | 1679  | 523   | 1068   | 930   | 416   | 629   | 479   | 214   |
| Arrive On Green              | 0.07  | 0.39  | 0.39  | 0.01  | 0.11  | 0.11  | 0.31   | 0.27  | 0.27  | 0.31  | 0.23  | 0.23  |
| Sat Flow, veh/h              | 3408  | 3505  | 1563  | 3408  | 5036  | 1568  | 3408   | 3505  | 1566  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 189   | 255   | 89  | 34  | 464   | 541   | 223  | 787   | 65  | 270   | 343   | 133   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1563  | 1704  | 1679  | 1568  | 1704   | 1752  | 1566  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 6.5   | 5.7   | 1.5   | 1.2   | 10.1  | 40.0  | 5.8  | 25.5  | 3.2   | 7.6   | 10.8  | 9.2   |
| Cycle Q Clear(g_c), s        | 6.5   | 5.7   | 1.5   | 1.2   | 10.1  | 40.0  | 5.8  | 25.5  | 3.2   | 7.6   | 10.8  | 9.2   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 253   | 1375  | 613   | 83  | 1679  | 523   | 1068   | 930   | 416   | 629   | 479   | 214   |
| V/C Ratio(X)                 | 0.75  | 0.19  | 0.15  | 0.41  | 0.28  | 1.04  | 0.21   | 0.85  | 0.16  | 0.43  | 0.72  | 0.62  |
| Avail Cap(c_a), veh/h        | 312   | 1375  | 613   | 119   | 1679  | 523   | 1068   | 1110  | 496   | 629   | 1145  | 512   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  | 1.00   | 1.00  | 1.00  | 1.67  | 1.67  | 1.67  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.97  | 0.97  | 0.97  | 1.00   | 1.00  | 1.00  | 0.94  | 0.94  | 0.94  |
| Uniform Delay (d), s/veh     | 54.4  | 23.9  | 2.7   | 58.7  | 40.1  | 53.4  | 30.3   | 41.8  | 23.7  | 36.5  | 44.2  | 43.5  |
| Incr Delay (d2), s/veh       | 7.5   | 0.1   | 0.1   | 3.1   | 0.1   | 48.1  | 0.1  | 9.4   | 0.8   | 0.4   | 8.3   | 12.0  |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.3   | 2.8   | 0.7   | 0.6   | 4.7   | 24.4  | 2.7  | 13.6  | 1.5   | 3.6   | 5.8   | 4.6   |
| LnGrp Delay(d),s/veh         | 62.0  | 23.9  | 2.8   | 61.8  | 40.2  | 101.5   | 30.4   | 51.2  | 24.5  | 36.9  | 52.5  | 55.5  |
| LnGrp LOS                    | E   | C   | A   | E   | D   | F   | C  | D   | C   | D   | D   | E   |
| Approach Vol, veh/h          | 533   |   |   | 1039  |   |   | 1075   |   |   | 746   |   |   |
| Approach Delay, s/veh        | 33.9  |   |   | 72.8  |   |   | 45.2   |   |   | 47.4  |   |   |
| Approach LOS                 | C   |   |   | E   |   |   | D  |   |   | D   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 26.2  | 35.8  | 6.9   | 51.1  | 41.6  | 20.4  | 14.0   | 44.0  |   |   |   |   |
| Change Period (Y+Rc), s      | 4.2   | * 5.7   | * 4.2   | 5.3   | 4.2   | * 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 14.8  | * 36  | * 4   | 45.5  | 13.6  | * 38  | 10.8   | * 39  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 9.6   | 27.5  | 3.2   | 7.7   | 7.8   | 12.8  | 8.5  | 42.0  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.6   | 2.6   | 0.0   | 2.3   | 1.1   | 2.0   | 0.2  | 0.0   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 52.4  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 10: Coventry Avenue & Herndon Avenue

Existing + Proj Phase 1 AM Peak

3/28/2017

|                              |   |   |   |   |   |   |  |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
|                              |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |   |  |  |  |  |  |   |   |  |  |
| Volume (veh/h)               | 130   | 283   | 97  | 23  | 702   | 43  | 142  | 10  | 15  | 29  | 2   | 40  |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1900  | 1845  | 1845  | 1845  | 1900   | 1845  | 1900  | 1900  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 141   | 308   | 105   | 25  | 763   | 47  | 154  | 11  | 16  | 32  | 2   | 43  |
| Adj No. of Lanes             | 1   | 3   | 0   | 1   | 3   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Peak Hour Factor             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 865   | 2560  | 826   | 36  | 996   | 310   | 184  | 13  | 19  | 72  | 4   | 68  |
| Arrive On Green              | 0.49  | 0.68  | 0.67  | 0.02  | 0.20  | 0.20  | 0.12   | 0.12  | 0.12  | 0.04  | 0.04  | 0.04  |
| Sat Flow, veh/h              | 1757  | 3770  | 1216  | 1757  | 5036  | 1568  | 1483   | 106   | 154   | 1658  | 104   | 1568  |
| Grp Volume(v), veh/h         | 141   | 272   | 141   | 25  | 763   | 47  | 181  | 0   | 0   | 34  | 0   | 43  |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1679  | 1629  | 1757  | 1679  | 1568  | 1743   | 0   | 0   | 1762  | 0   | 1568  |
| Q Serve(g_s), s              | 5.3   | 3.4   | 3.7   | 1.7   | 17.2  | 3.0   | 12.2   | 0.0   | 0.0   | 2.3   | 0.0   | 3.2   |
| Cycle Q Clear(g_c), s        | 5.3   | 3.4   | 3.7   | 1.7   | 17.2  | 3.0   | 12.2   | 0.0   | 0.0   | 2.3   | 0.0   | 3.2   |
| Prop In Lane                 | 1.00  |   | 0.75  | 1.00  |   | 1.00  | 0.85   |   | 0.09  | 0.94  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 865   | 2280  | 1106  | 36  | 996   | 310   | 216  | 0   | 0   | 76  | 0   | 68  |
| V/C Ratio(X)                 | 0.16  | 0.12  | 0.13  | 0.69  | 0.77  | 0.15  | 0.84   | 0.00  | 0.00  | 0.44  | 0.00  | 0.63  |
| Avail Cap(c_a), veh/h        | 865   | 2280  | 1106  | 117   | 1469  | 457   | 378  | 0   | 0   | 294   | 0   | 261   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 0.91  | 0.91  | 0.91  | 1.00  | 1.00  | 1.00  | 1.00   | 0.00  | 0.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh     | 16.8  | 6.7   | 7.0   | 58.4  | 45.5  | 39.8  | 51.4   | 0.0   | 0.0   | 56.0  | 0.0   | 56.5  |
| Incr Delay (d2), s/veh       | 0.1   | 0.1   | 0.2   | 21.2  | 5.6   | 1.0   | 8.4  | 0.0   | 0.0   | 4.0   | 0.0   | 9.3   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 2.6   | 1.6   | 1.7   | 1.0   | 8.5   | 1.4   | 6.4  | 0.0   | 0.0   | 1.2   | 0.0   | 1.6   |
| LnGrp Delay(d),s/veh         | 16.9  | 6.8   | 7.2   | 79.6  | 51.1  | 40.8  | 59.8   | 0.0   | 0.0   | 60.0  | 0.0   | 65.7  |
| LnGrp LOS                    | B   | A   | A   | E   | D   | D   | E  |   |   | E   |   | E   |
| Approach Vol, veh/h          |   | 554   |   |   | 835   |   |  | 181   |   |   | 77  |   |
| Approach Delay, s/veh        |   | 9.5   |   |   | 51.4  |   |  | 59.8  |   |   | 63.2  |   |
| Approach LOS                 |   | A   |   |   | D   |   |  | E   |   |   | E   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 |   | 2   | 3   | 4   |   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     |   | 18.9  | 6.5   | 85.5  |   | 9.2   | 64.2   | 27.7  |   |   |   |   |
| Change Period (Y+Rc), s      |   | * 4.2   | * 4.2   | 5.3   |   | 4.2   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  |   | * 26  | * 7.8   | 48.7  |   | 19.8  | 22.8   | * 34  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s |   | 14.2  | 3.7   | 5.7   |   | 5.2   | 7.3  | 19.2  |   |   |   |   |
| Green Ext Time (p_c), s      |   | 0.5   | 0.0   | 2.3   |   | 0.2   | 2.0  | 3.3   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 38.8  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

Existing + Proj Phase 1 AM Peak

3/28/2017

|                                   | →    | ↘    | ↙     | ←                    | ↖    | ↗    |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Movement                          | EBT  | EBR  | WBL   | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↑    | ↑    | ↑     | ↑                    | ↑    | ↑    |
| Volume (veh/h)                    | 45   | 27   | 44    | 31                   | 122  | 58   |
| Sign Control                      | Stop |      |       | Stop                 | Free |      |
| Grade                             | 0%   |      |       | 0%                   | 0%   |      |
| Peak Hour Factor                  | 0.70 | 0.70 | 0.70  | 0.70                 | 0.70 | 0.70 |
| Hourly flow rate (vph)            | 64   | 39   | 63    | 44                   | 174  | 83   |
| Pedestrians                       |      |      |       |                      |      |      |
| Lane Width (ft)                   |      |      |       |                      |      |      |
| Walking Speed (ft/s)              |      |      |       |                      |      |      |
| Percent Blockage                  |      |      |       |                      |      |      |
| Right turn flare (veh)            |      | 4    |       |                      |      |      |
| Median type                       |      |      |       |                      | None |      |
| Median storage (veh)              |      |      |       |                      |      |      |
| Upstream signal (ft)              |      |      |       |                      | 110  |      |
| pX, platoon unblocked             |      |      |       |                      |      |      |
| vC, conflicting volume            | 431  | 0    | 381   | 349                  | 0    |      |
| vC1, stage 1 conf vol             |      |      |       |                      |      |      |
| vC2, stage 2 conf vol             |      |      |       |                      |      |      |
| vCu, unblocked vol                | 431  | 0    | 381   | 349                  | 0    |      |
| tC, single (s)                    | 6.5  | 6.2  | 7.1   | 6.5                  | 4.1  |      |
| tC, 2 stage (s)                   |      |      |       |                      |      |      |
| tF (s)                            | 4.0  | 3.3  | 3.5   | 4.0                  | 2.2  |      |
| p0 queue free %                   | 86   | 96   | 86    | 91                   | 89   |      |
| cM capacity (veh/h)               | 460  | 1082 | 455   | 512                  | 1617 |      |
| Direction, Lane #                 | EB 1 | WB 1 | WB 2  | NB 1                 | NB 2 |      |
| Volume Total                      | 103  | 63   | 44    | 174                  | 83   |      |
| Volume Left                       | 0    | 63   | 0     | 174                  | 0    |      |
| Volume Right                      | 39   | 0    | 0     | 0                    | 83   |      |
| cSH                               | 736  | 455  | 512   | 1617                 | 1700 |      |
| Volume to Capacity                | 0.14 | 0.14 | 0.09  | 0.11                 | 0.05 |      |
| Queue Length 95th (ft)            | 12   | 12   | 7     | 9                    | 0    |      |
| Control Delay (s)                 | 12.0 | 14.2 | 12.7  | 7.5                  | 0.0  |      |
| Lane LOS                          | B    | B    | B     | A                    |      |      |
| Approach Delay (s)                | 12.0 | 13.6 |       | 5.1                  |      |      |
| Approach LOS                      | B    | B    |       |                      |      |      |
| Intersection Summary              |      |      |       |                      |      |      |
| Average Delay                     |      |      | 8.5   |                      |      |      |
| Intersection Capacity Utilization |      |      | 22.5% | ICU Level of Service |      | A    |
| Analysis Period (min)             |      |      | 15    |                      |      |      |

Intersection

Int Delay, s/veh 0.1

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 3    | 370  | 861  | 52   | 0    | 3    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 3    | 394  | 916  | 55   | 0    | 3    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 971    | 0      | 1147   |
| Stage 1              | -      | -      | 944    |
| Stage 2              | -      | -      | 203    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 699    | -      | 191    |
| Stage 1              | -      | -      | 336    |
| Stage 2              | -      | -      | 808    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 699    | -      | 190    |
| Mov Cap-2 Maneuver   | -      | -      | 190    |
| Stage 1              | -      | -      | 336    |
| Stage 2              | -      | -      | 805    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.1 | 0  | 11.9 |
| HCM LOS              |     |    | B    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 699   | -   | -   | -   | 525   |
| HCM Lane V/C Ratio    | 0.005 | -   | -   | -   | 0.006 |
| HCM Control Delay (s) | 10.2  | -   | -   | -   | 11.9  |
| HCM Lane LOS          | B     | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0     |



Intersection

Int Delay, s/veh 5.3

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 250  | 89   | 44   | 642  | 202  | 15   |
| Conflicting Peds, #/hr   | 0    | 3    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 250  | 250  | -    | 0    | 250  |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 269  | 96   | 47   | 690  | 217  | 16   |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |      |
|----------------------|--------|---|--------|---|--------|------|
| Conflicting Flow All | 0      | 0 | 269    | 0 | 709    | 134  |
| Stage 1              | -      | - | -      | - | 269    | -    |
| Stage 2              | -      | - | -      | - | 440    | -    |
| Critical Hdwy        | -      | - | 4.16   | - | 6.86   | 6.96 |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.86   | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.86   | -    |
| Follow-up Hdwy       | -      | - | 2.23   | - | 3.53   | 3.33 |
| Pot Cap-1 Maneuver   | -      | - | 1284   | - | 366    | 887  |
| Stage 1              | -      | - | -      | - | 749    | -    |
| Stage 2              | -      | - | -      | - | 613    | -    |
| Platoon blocked, %   | -      | - |        | - |        |      |
| Mov Cap-1 Maneuver   | -      | - | 1284   | - | 352    | 887  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 352    | -    |
| Stage 1              | -      | - | -      | - | 749    | -    |
| Stage 2              | -      | - | -      | - | 589    | -    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.5 | 28.9 |
| HCM LOS              |    |     | D    |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 352   | 887   | -   | -   | 1284  | -   |
| HCM Lane V/C Ratio    | 0.617 | 0.018 | -   | -   | 0.037 | -   |
| HCM Control Delay (s) | 30.4  | 9.1   | -   | -   | 7.9   | -   |
| HCM Lane LOS          | D     | A     | -   | -   | A     | -   |
| HCM 95th %tile Q(veh) | 3.9   | 0.1   | -   | -   | 0.1   | -   |

Intersection

Int Delay, s/veh 1.2

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 31   | 240  | 678  | 12   | 16   | 56   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 3    | 0    | 3    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 250  | -    | -    | 250  | 250  | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 33   | 255  | 721  | 13   | 17   | 60   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 724    | 0      | 918    |
| Stage 1              | -      | -      | 724    |
| Stage 2              | -      | -      | 194    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 868    | -      | 269    |
| Stage 1              | -      | -      | 438    |
| Stage 2              | -      | -      | 817    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 868    | -      | 257    |
| Mov Cap-2 Maneuver   | -      | -      | 257    |
| Stage 1              | -      | -      | 437    |
| Stage 2              | -      | -      | 784    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 1.1 | 0  | 13.2 |
| HCM LOS              |     |    | B    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 | SBLn2 |
|-----------------------|-------|-----|-----|-----|-------|-------|
| Capacity (veh/h)      | 868   | -   | -   | -   | 257   | 628   |
| HCM Lane V/C Ratio    | 0.038 | -   | -   | -   | 0.066 | 0.095 |
| HCM Control Delay (s) | 9.3   | -   | -   | -   | 20    | 11.3  |
| HCM Lane LOS          | A     | -   | -   | -   | C     | B     |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | -   | 0.2   | 0.3   |

Intersection

Int Delay, s/veh 4.2

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 171  | 82   | 3    | 532  | 163  | 5    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 186  | 89   | 3    | 578  | 177  | 5    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 186    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 23.7 |
| HCM LOS              |    |    | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 372   | -   | -   | 1382  | -   |
| HCM Lane V/C Ratio    | 0.491 | -   | -   | 0.002 | -   |
| HCM Control Delay (s) | 23.7  | -   | -   | 7.6   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 2.6   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 0.3

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 160  | 4    | 1    | 491  | 14   | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 86   | 86   | 86   | 86   | 86   | 86   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 186  | 5    | 1    | 571  | 16   | 2    |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |       |
|----------------------|--------|---|--------|---|--------|-------|
| Conflicting Flow All | 0      | 0 | 191    | 0 | 761    | 188   |
| Stage 1              | -      | - | -      | - | 188    | -     |
| Stage 2              | -      | - | -      | - | 573    | -     |
| Critical Hdwy        | -      | - | 4.13   | - | 6.43   | 6.23  |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.43   | -     |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.43   | -     |
| Follow-up Hdwy       | -      | - | 2.227  | - | 3.527  | 3.327 |
| Pot Cap-1 Maneuver   | -      | - | 1377   | - | 372    | 851   |
| Stage 1              | -      | - | -      | - | 842    | -     |
| Stage 2              | -      | - | -      | - | 562    | -     |
| Platoon blocked, %   | -      | - |        | - |        |       |
| Mov Cap-1 Maneuver   | -      | - | 1377   | - | 372    | 851   |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 372    | -     |
| Stage 1              | -      | - | -      | - | 842    | -     |
| Stage 2              | -      | - | -      | - | 561    | -     |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 14.4 |
| HCM LOS              |    |    | B    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 400   | -   | -   | 1377  | -   |
| HCM Lane V/C Ratio    | 0.047 | -   | -   | 0.001 | -   |
| HCM Control Delay (s) | 14.4  | -   | -   | 7.6   | 0   |
| HCM Lane LOS          | B     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 5.3

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 115  | 106  | 2    | 239  | 235  | 5    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 97   | 97   | 97   | 97   | 97   | 97   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 119  | 109  | 2    | 246  | 242  | 5    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 424    |
| Stage 1              | -      | -      | 173    |
| Stage 2              | -      | -      | 251    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 1334   | 585    |
| Stage 1              | -      | -      | 855    |
| Stage 2              | -      | -      | 788    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 1334   | 584    |
| Mov Cap-2 Maneuver   | -      | -      | 584    |
| Stage 1              | -      | -      | 855    |
| Stage 2              | -      | -      | 786    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.1 | 15.5 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 588   | -   | -   | 1334  | -   |
| HCM Lane V/C Ratio    | 0.421 | -   | -   | 0.002 | -   |
| HCM Control Delay (s) | 15.5  | -   | -   | 7.7   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 2.1   | -   | -   | 0     | -   |

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 5.9    |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 1      | 5     | 71    | 24     | 17    | 0     | 108    | 46   | 8    | 0      | 74   | 3    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 88     | 88    | 88    | 88     | 88    | 88    | 88     | 88   | 88   | 88     | 88   | 88   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 1      | 6     | 81    | 27     | 19    | 0     | 123    | 52   | 9    | 0      | 84   | 3    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 398    | 393   | 86    | 431    | 390   | 57    | 88     | 0    | 0    | 61     | 0    | 0    |
| Stage 1                  | 86     | 86    | -     | 302    | 302   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 312    | 307   | -     | 129    | 88    | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 560    | 542   | 970   | 533    | 544   | 1006  | 1501   | -    | -    | 1536   | -    | -    |
| Stage 1                  | 919    | 822   | -     | 705    | 662   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 696    | 659   | -     | 872    | 820   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 508    | 496   | 970   | 453    | 498   | 1006  | 1501   | -    | -    | 1536   | -    | -    |
| Mov Cap-2 Maneuver       | 508    | 496   | -     | 453    | 498   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 841    | 822   | -     | 645    | 606   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 617    | 603   | -     | 794    | 820   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 9.4    |       |       | 13.5   |       |       | 5.1    |      |      | 0      |      |      |
| HCM LOS                  | A      |       |       | B      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1501   | -     | -     | 903    | 471   | 1536  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.082  | -     | -     | 0.097  | 0.099 | -     | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 7.6    | 0     | -     | 9.4    | 13.5  | 0     | -      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | A      | B     | A     | -      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.3    | -     | -     | 0.3    | 0.3   | 0     | -      | -    |      |        |      |      |

Intersection

Int Delay, s/veh 0.7

| Movement                 | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 0    | 86   | 1470 | 33   | 0    | 1071 |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Free | Free | Free | Free |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | -    | -    |
| Veh in Median Storage, # | 1    | -    | 0    | -    | -    | 0    |
| Grade, %                 | 0    | -    | 0    | -    | -    | 0    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 93   | 1598 | 36   | 0    | 1164 |

| Major/Minor          | Minor1 | Major1 | Major2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 2198   | 817    | 0      |
| Stage 1              | 1616   | -      | -      |
| Stage 2              | 582    | -      | -      |
| Critical Hdwy        | 6.86   | 6.96   | 4.16   |
| Critical Hdwy Stg 1  | 5.86   | -      | -      |
| Critical Hdwy Stg 2  | 5.86   | -      | -      |
| Follow-up Hdwy       | 3.53   | 3.33   | 2.23   |
| Pot Cap-1 Maneuver   | 38     | 317    | 388    |
| Stage 1              | 146    | -      | -      |
| Stage 2              | 519    | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 38     | 317    | 388    |
| Mov Cap-2 Maneuver   | 115    | -      | -      |
| Stage 1              | 146    | -      | -      |
| Stage 2              | 519    | -      | -      |

| Approach             | WB | NB | SB |
|----------------------|----|----|----|
| HCM Control Delay, s | 21 | 0  | 0  |
| HCM LOS              | C  |    |    |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL   | SBT |
|-----------------------|-----|----------|-------|-----|
| Capacity (veh/h)      | -   | -        | 317   | 388 |
| HCM Lane V/C Ratio    | -   | -        | 0.295 | -   |
| HCM Control Delay (s) | -   | -        | 21    | 0   |
| HCM Lane LOS          | -   | -        | C     | A   |
| HCM 95th %tile Q(veh) | -   | -        | 1.2   | 0   |

| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 13.7 |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | B    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 59   | 121  | 63   | 0    | 5    | 214  | 74   | 0    | 38   | 139  | 1    |
| Peak Hour Factor          | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 67   | 137  | 72   | 0    | 6    | 243  | 84   | 0    | 43   | 158  | 1    |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB   | NB   |
|----------------------------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   |
| Opposing Lanes             | 2    | 3    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   |
| Conflicting Lanes Left     | 1    | 3    | 3    |
| Conflicting Approach Right | NB   | SB   | WB   |
| Conflicting Lanes Right    | 3    | 1    | 2    |
| HCM Control Delay          | 11.1 | 17.5 | 11.8 |
| HCM LOS                    | B    | C    | B    |

| Lane                   | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 18%   |
| Vol Thru, %            | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 74%   | 52%   |
| Vol Right, %           | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 26%   | 29%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 38    | 139   | 1     | 59    | 121   | 63    | 5     | 288   | 130   |
| LT Vol                 | 38    | 0     | 0     | 59    | 0     | 0     | 5     | 0     | 24    |
| Through Vol            | 0     | 139   | 0     | 0     | 121   | 0     | 0     | 214   | 68    |
| RT Vol                 | 0     | 0     | 1     | 0     | 0     | 63    | 0     | 74    | 38    |
| Lane Flow Rate         | 43    | 158   | 1     | 67    | 138   | 72    | 6     | 327   | 148   |
| Geometry Grp           | 7     | 7     | 7     | 8     | 8     | 8     | 8     | 8     | 8     |
| Degree of Util (X)     | 0.086 | 0.292 | 0.002 | 0.135 | 0.257 | 0.12  | 0.011 | 0.578 | 0.286 |
| Departure Headway (Hd) | 7.155 | 6.649 | 5.94  | 7.231 | 6.724 | 6.013 | 7.043 | 6.354 | 6.968 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 498   | 537   | 598   | 493   | 531   | 591   | 505   | 563   | 511   |
| Service Time           | 4.941 | 4.434 | 3.725 | 5.021 | 4.513 | 3.802 | 4.824 | 4.134 | 4.764 |
| HCM Lane V/C Ratio     | 0.086 | 0.294 | 0.002 | 0.136 | 0.26  | 0.122 | 0.012 | 0.581 | 0.29  |
| HCM Control Delay      | 10.6  | 12.2  | 8.7   | 11.2  | 11.9  | 9.6   | 9.9   | 17.6  | 12.6  |
| HCM Lane LOS           | B     | B     | A     | B     | B     | A     | A     | C     | B     |
| HCM 95th-tile Q        | 0.3   | 1.2   | 0     | 0.5   | 1     | 0.4   | 0     | 3.7   | 1.2   |



Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 24   | 68   | 38   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 27   | 77   | 43   |
| Number of Lanes   | 0    | 0    | 1    | 0    |

| Approach                   | SB   |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 12.6 |
| HCM LOS                    | B    |

Lane

Intersection

Intersection Delay, s/veh15.1

Intersection LOS C

| Movement          | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h        | 0    | 56   | 116  | 67   | 0    | 5    | 213  | 55   | 0    | 66   | 201  | 2    | 0    | 25   | 104  | 59   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 64   | 132  | 76   | 0    | 6    | 242  | 62   | 0    | 75   | 228  | 2    | 0    | 28   | 118  | 67   |
| Number of Lanes   | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 14.5 | 15.7 | 16.3 | 13.1 |
| HCM LOS                    | B    | C    | C    | B    |
























| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 25%   | 23%   | 2%    | 13%   |
| Vol Thru, %            | 75%   | 49%   | 78%   | 55%   |
| Vol Right, %           | 1%    | 28%   | 20%   | 31%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 269   | 239   | 273   | 188   |
| LT Vol                 | 66    | 56    | 5     | 25    |
| Through Vol            | 201   | 116   | 213   | 104   |
| RT Vol                 | 2     | 67    | 55    | 59    |
| Lane Flow Rate         | 306   | 272   | 310   | 214   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.533 | 0.465 | 0.524 | 0.374 |
| Departure Headway (Hd) | 6.277 | 6.16  | 6.082 | 6.298 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 575   | 584   | 593   | 570   |
| Service Time           | 4.328 | 4.212 | 4.133 | 4.355 |
| HCM Lane V/C Ratio     | 0.532 | 0.466 | 0.523 | 0.375 |
| HCM Control Delay      | 16.3  | 14.5  | 15.7  | 13.1  |
| HCM Lane LOS           | C     | B     | C     | B     |
| HCM 95th-tile Q        | 3.1   | 2.5   | 3     | 1.7   |

# HCM Signalized Intersection Capacity Analysis

Existing + Proj Phase 1 PM Peak

## 1: Temperance Avenue & Nees Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBU   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |   |  |  |
| Volume (vph)                      | 90  | 27  | 120   | 25  | 18  | 5   | 161  | 507   | 40  | 13  | 11  | 277   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   | 4.2  | 5.7   | 5.7   |   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 0.95  | 1.00  |   | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 0.98  |   | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  |   | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  | 1.00   | 1.00  | 0.85  |   | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95   | 1.00  | 1.00  |   | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  | 1752   | 3505  | 1534  |   | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95   | 1.00  | 1.00  |   | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  | 1752   | 3505  | 1534  |   | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93   | 0.93  | 0.93  | 0.92  | 0.93  | 0.93  |
| Adj. Flow (vph)                   | 97  | 29  | 129   | 27  | 19  | 5   | 173  | 545   | 43  | 14  | 12  | 298   |
| RTOR Reduction (vph)              | 0   | 0   | 112   | 0   | 0   | 5   | 0  | 0   | 18  | 0   | 0   | 0   |
| Lane Group Flow (vph)             | 97  | 29  | 17  | 27  | 19  | 0   | 173  | 545   | 25  | 0   | 26  | 298   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   | 1   |   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | NA  | Perm  | Prot  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 2   |   | 1   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   | 2   |   |   |   |
| Actuated Green, G (s)             | 10.2  | 13.5  | 13.5  | 6.3   | 9.2   | 9.2   | 14.7   | 57.5  | 57.5  |   | 3.7   | 46.5  |
| Effective Green, g (s)            | 10.2  | 13.5  | 13.5  | 6.3   | 9.2   | 9.2   | 14.7   | 57.5  | 57.5  |   | 3.7   | 46.5  |
| Actuated g/C Ratio                | 0.10  | 0.14  | 0.14  | 0.06  | 0.09  | 0.09  | 0.15   | 0.58  | 0.58  |   | 0.04  | 0.46  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   | 4.2  | 5.7   | 5.7   |   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0  | 3.0   | 3.0   |   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 178   | 249   | 211   | 110   | 169   | 144   | 257  | 2015  | 882   |   | 64  | 1629  |
| v/s Ratio Prot                    | c0.06   | 0.02  |   | c0.02   | c0.01   |   | c0.10  | c0.16   |   |   | c0.01   | 0.09  |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | 0.00  |  |   | 0.02  |   |   |   |
| v/c Ratio                         | 0.54  | 0.12  | 0.08  | 0.25  | 0.11  | 0.00  | 0.67   | 0.27  | 0.03  |   | 0.41  | 0.18  |
| Uniform Delay, d1                 | 42.7  | 38.0  | 37.8  | 44.6  | 41.7  | 41.2  | 40.4   | 10.7  | 9.2   |   | 47.1  | 15.6  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.09   | 0.31  | 1.00  |   | 1.00  | 1.00  |
| Incremental Delay, d2             | 3.4   | 0.2   | 0.2   | 1.2   | 0.3   | 0.0   | 6.5  | 0.3   | 0.1   |   | 4.2   | 0.2   |
| Delay (s)                         | 46.1  | 38.2  | 38.0  | 45.8  | 42.0  | 41.2  | 50.7   | 3.6   | 9.2   |   | 51.2  | 15.9  |
| Level of Service                  | D   | D   | D   | D   | D   | D   | D  | A   | A   |   | D   | B   |
| Approach Delay (s)                |   | 41.1  |   |   | 43.9  |   |  | 14.6  |   |   |   | 18.1  |
| Approach LOS                      |   | D   |   |   | D   |   |  | B   |   |   |   | B   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 21.2  |   |   |   |  |   |   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.37  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 100.0   |   |   |   |  |   |   |   |   |   |
| Intersection Capacity Utilization |   |   | 58.7%   |   |   |   |  |   |   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

Existing + Proj Phase 1 PM Peak

3/28/2017
























|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 58   |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.98 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1542 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1542 |
| Peak-hour factor, PHF  | 0.93 |
| Adj. Flow (vph)        | 62   |
| RTOR Reduction (vph)   | 33   |
| Lane Group Flow (vph)  | 29   |
| Confl. Peds. (#/hr)    | 5    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 46.5 |
| Effective Green, g (s) | 46.5 |
| Actuated g/C Ratio     | 0.46 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 717  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.02 |
| v/c Ratio              | 0.04 |
| Uniform Delay, d1      | 14.6 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.1  |
| Delay (s)              | 14.7 |
| Level of Service       | B    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# HCM 2010 Signalized Intersection Summary

## 2: Temperance Avenue & Alluvial Avenue

Existing + Proj Phase 1 PM Peak

3/28/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)               | 41  | 28  | 95  | 211   | 22  | 64  | 86   | 629   | 233   | 65  | 414   | 17  |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 0.99  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 42  | 29  | 97  | 215   | 22  | 65  | 88   | 642   | 238   | 66  | 422   | 17  |
| Adj No. of Lanes             | 1   | 1   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 286   | 192   | 163   | 253   | 149   | 132   | 734  | 1900  | 850   | 88  | 572   | 256   |
| Arrive On Green              | 0.16  | 0.10  | 0.10  | 0.14  | 0.09  | 0.09  | 0.84   | 1.00  | 1.00  | 0.07  | 0.22  | 0.22  |
| Sat Flow, veh/h              | 1757  | 1845  | 1563  | 1757  | 1752  | 1551  | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 42  | 29  | 97  | 215   | 22  | 65  | 88   | 642   | 238   | 66  | 422   | 17  |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1845  | 1563  | 1757  | 1752  | 1551  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s              | 2.1   | 1.4   | 5.9   | 11.9  | 1.2   | 4.0   | 0.9  | 0.0   | 0.0   | 3.7   | 11.2  | 0.9   |
| Cycle Q Clear(g_c), s        | 2.1   | 1.4   | 5.9   | 11.9  | 1.2   | 4.0   | 0.9  | 0.0   | 0.0   | 3.7   | 11.2  | 0.9   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 286   | 192   | 163   | 253   | 149   | 132   | 734  | 1900  | 850   | 88  | 572   | 256   |
| V/C Ratio(X)                 | 0.15  | 0.15  | 0.59  | 0.85  | 0.15  | 0.49  | 0.12   | 0.34  | 0.28  | 0.75  | 0.74  | 0.07  |
| Avail Cap(c_a), veh/h        | 286   | 570   | 483   | 316   | 736   | 652   | 734  | 1900  | 850   | 123   | 915   | 409   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 2.00   | 2.00  | 2.00  | 1.33  | 1.33  | 1.33  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 0.96   | 0.96  | 0.96  | 0.98  | 0.98  | 0.98  |
| Uniform Delay (d), s/veh     | 35.9  | 40.8  | 42.8  | 41.8  | 42.4  | 43.7  | 4.9  | 0.0   | 0.0   | 46.1  | 37.2  | 33.1  |
| Incr Delay (d2), s/veh       | 0.2   | 0.4   | 3.4   | 16.3  | 0.4   | 2.8   | 0.1  | 0.5   | 0.8   | 14.8  | 8.2   | 0.5   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 1.0   | 0.8   | 2.7   | 6.9   | 0.6   | 1.8   | 0.5  | 0.1   | 0.2   | 2.1   | 6.0   | 0.4   |
| LnGrp Delay(d),s/veh         | 36.1  | 41.1  | 46.2  | 58.1  | 42.8  | 46.5  | 4.9  | 0.5   | 0.8   | 60.9  | 45.3  | 33.6  |
| LnGrp LOS                    | D   | D   | D   | E   | D   | D   | A  | A   | A   | E   | D   | C   |
| Approach Vol, veh/h          | 168   |   |   |   | 302   |   |  | 968   |   |   | 505   |   |
| Approach Delay, s/veh        | 42.8  |   |   |   | 54.5  |   |  | 0.9   |   |   | 47.0  |   |
| Approach LOS                 | D   |   |   |   | D   |   |  | A   |   |   | D   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 9.0   | 58.2  | 18.4  | 14.4  | 46.9  | 20.3  | 20.3   | 12.5  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   | 4.2   | * 4.9   | 5.3   | * 5.7   | 4.2  | * 4.9   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 6.8   | 26.8  | 17.8  | * 30  | 8.8   | * 24  | 6.7  | * 41  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 5.7   | 2.0   | 13.9  | 7.9   | 2.9   | 13.2  | 4.1  | 6.0   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 4.4   | 0.3   | 0.4   | 2.3   | 1.4   | 0.2  | 0.3   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 24.8  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | C   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Avenue & SR 168 WB Ramp

Existing + Proj Phase 1 PM Peak

3/28/2017




















| Movement                     | EBL | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |     |      |     |      |      |      |      |      |      |      |      |      |
| Volume (veh/h)               | 0   | 0    | 0   | 59   | 0    | 47   | 0    | 882  | 673  | 0    | 483  | 211  |
| Number                       |     |      |     | 3    | 8    | 18   | 5    | 2    | 12   | 1    | 6    | 16   |
| Initial Q (Qb), veh          |     |      |     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          |     |      |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       |     |      |     | 1845 | 0    | 1845 | 0    | 1845 | 1845 | 0    | 1845 | 1845 |
| Adj Flow Rate, veh/h         |     |      |     | 63   | 0    | 50   | 0    | 938  | 0    | 0    | 514  | 224  |
| Adj No. of Lanes             |     |      |     | 1    | 0    | 1    | 0    | 2    | 1    | 0    | 2    | 1    |
| Peak Hour Factor             |     |      |     | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, %         |     |      |     | 3    | 0    | 3    | 0    | 3    | 3    | 0    | 3    | 3    |
| Cap, veh/h                   |     |      |     | 118  | 0    | 118  | 0    | 2708 | 1171 | 0    | 2708 | 1211 |
| Arrive On Green              |     |      |     | 0.07 | 0.00 | 0.08 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Sat Flow, veh/h              |     |      |     | 1757 | 0    | 1568 | 0    | 3597 | 1568 | 0    | 3597 | 1567 |
| Grp Volume(v), veh/h         |     |      |     | 63   | 0    | 50   | 0    | 938  | 0    | 0    | 514  | 224  |
| Grp Sat Flow(s),veh/h/ln     |     |      |     | 1757 | 0    | 1568 | 0    | 1752 | 1568 | 0    | 1752 | 1567 |
| Q Serve(g_s), s              |     |      |     | 1.7  | 0.0  | 1.5  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s        |     |      |     | 1.7  | 0.0  | 1.5  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Prop In Lane                 |     |      |     | 1.00 |      | 1.00 | 0.00 |      | 1.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       |     |      |     | 118  | 0    | 118  | 0    | 2708 | 1171 | 0    | 2708 | 1211 |
| V/C Ratio(X)                 |     |      |     | 0.53 | 0.00 | 0.42 | 0.00 | 0.35 | 0.00 | 0.00 | 0.19 | 0.19 |
| Avail Cap(c_a), veh/h        |     |      |     | 351  | 0    | 326  | 0    | 2708 | 1171 | 0    | 2708 | 1211 |
| HCM Platoon Ratio            |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 | 2.00 | 2.00 |
| Upstream Filter(I)           |     |      |     | 1.00 | 0.00 | 1.00 | 0.00 | 0.24 | 0.00 | 0.00 | 0.93 | 0.93 |
| Uniform Delay (d), s/veh     |     |      |     | 22.6 | 0.0  | 22.1 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Incr Delay (d2), s/veh       |     |      |     | 3.7  | 0.0  | 2.4  | 0.0  | 0.1  | 0.0  | 0.0  | 0.1  | 0.3  |
| Initial Q Delay(d3),s/veh    |     |      |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |     |      |     | 1.0  | 0.0  | 0.7  | 0.0  | 0.0  | 0.0  | 0.0  | 0.1  | 0.1  |
| LnGrp Delay(d),s/veh         |     |      |     | 26.2 | 0.0  | 24.5 | 0.0  | 0.1  | 0.0  | 0.0  | 0.1  | 0.3  |
| LnGrp LOS                    |     |      |     | C    |      | C    |      | A    |      |      | A    | A    |
| Approach Vol, veh/h          |     |      |     |      | 113  |      |      | 938  |      |      | 738  |      |
| Approach Delay, s/veh        |     |      |     |      | 25.5 |      |      | 0.1  |      |      | 0.2  |      |
| Approach LOS                 |     |      |     |      | C    |      |      | A    |      |      | A    |      |
| Timer                        | 1   | 2    | 3   | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Assigned Phs                 |     | 2    |     |      |      | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |     | 42.6 |     |      |      | 42.6 |      | 7.4  |      |      |      |      |
| Change Period (Y+Rc), s      |     | 5.3  |     |      |      | 5.3  |      | 4.2  |      |      |      |      |
| Max Green Setting (Gmax), s  |     | 30.7 |     |      |      | 30.7 |      | 9.8  |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |     | 2.0  |     |      |      | 2.0  |      | 3.7  |      |      |      |      |
| Green Ext Time (p_c), s      |     | 9.1  |     |      |      | 9.1  |      | 0.2  |      |      |      |      |
| <b>Intersection Summary</b>  |     |      |     |      |      |      |      |      |      |      |      |      |
| HCM 2010 Ctrl Delay          |     |      |     | 1.7  |      |      |      |      |      |      |      |      |
| HCM 2010 LOS                 |     |      |     | A    |      |      |      |      |      |      |      |      |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

Existing + Proj Phase 1 PM Peak

3/28/2017























|                              |  |  |  |  |  |  |  |    |  |  |    |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |   |   |  |   |   |
| Volume (veh/h)               | 350   | 0   | 945   | 0   | 0   | 0   | 0  | 1164  | 94  | 51  | 524   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 357   | 0   | 964   |   |   |   | 0  | 1188  | 96  | 52  | 535   | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 871   | 0   | 784   |   |   |   | 0  | 1117  | 90  | 258   | 1885  | 0   |
| Arrive On Green              | 0.50  | 0.00  | 0.50  |   |   |   | 0.00   | 0.45  | 0.43  | 0.29  | 1.00  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0  | 3376  | 265   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 357   | 0   | 964   |   |   |   | 0  | 633   | 651   | 52  | 535   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0  | 1752  | 1796  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 12.9  | 0.0   | 50.0  |   |   |   | 0.0  | 34.0  | 34.0  | 2.2   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        | 12.9  | 0.0   | 50.0  |   |   |   | 0.0  | 34.0  | 34.0  | 2.2   | 0.0   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.15  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 871   | 0   | 784   |   |   |   | 0  | 596   | 611   | 258   | 1885  | 0   |
| V/C Ratio(X)                 | 0.41  | 0.00  | 1.23  |   |   |   | 0.00   | 1.06  | 1.07  | 0.20  | 0.28  | 0.00  |
| Avail Cap(c_a), veh/h        | 871   | 0   | 784   |   |   |   | 0  | 596   | 611   | 258   | 1885  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.33  | 1.33  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.99  | 0.99  | 0.00  |
| Uniform Delay (d), s/veh     | 15.9  | 0.0   | 25.0  |   |   |   | 0.0  | 27.4  | 27.5  | 30.9  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       | 0.3   | 0.0   | 114.4   |   |   |   | 0.0  | 54.6  | 55.1  | 0.4   | 0.4   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 6.2   | 0.0   | 46.5  |   |   |   | 0.0  | 25.4  | 26.1  | 1.1   | 0.1   | 0.0   |
| LnGrp Delay(d),s/veh         | 16.2  | 0.0   | 139.4   |   |   |   | 0.0  | 82.0  | 82.6  | 31.3  | 0.4   | 0.0   |
| LnGrp LOS                    | B   |   | F   |   |   |   |  | F   | F   | C   | A   |   |
| Approach Vol, veh/h          | 1321  |   |   |   |   |   | 1284   |   |   | 587   |   |   |
| Approach Delay, s/veh        | 106.1   |   |   |   |   |   | 82.3   |   |   | 3.1   |   |   |
| Approach LOS                 | F   |   |   |   |   |   | F  |   |   | A   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 19.9  | 38.0  |   | 53.6  |   | 57.9  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 4.2   | * 33  |   | * 49  |   | 41.1  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 4.2   | 36.0  |   | 52.0  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 0.0   |   | 0.0   |   | 2.6   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 77.6  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | E   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

Existing + Proj Phase 1 PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBU   | SBL   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |   |  |
| Volume (vph)                      | 159   | 11  | 96  | 209   | 19  | 274   | 2  | 114   | 671   | 52  | 11  | 210   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.2   | 4.2   | 4.0   | 4.2   | 4.0   |  | 4.2   | 4.0   | 4.0   |   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  |   | 0.97  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.99  |   | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  |   | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  |   | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1547  |   | 3400  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1547  |   | 3400  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.96  | 0.92  | 0.96  | 0.96   | 0.92  | 0.96  | 0.96  | 0.92  | 0.96  |
| Adj. Flow (vph)                   | 173   | 12  | 104   | 218   | 21  | 285   | 2  | 124   | 699   | 54  | 12  | 219   |
| RTOR Reduction (vph)              | 0   | 0   | 91  | 0   | 0   | 237   | 0  | 0   | 0   | 33  | 0   | 0   |
| Lane Group Flow (vph)             | 173   | 12  | 13  | 218   | 21  | 48  | 0  | 126   | 699   | 21  | 0   | 231   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | Prot  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 1   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 24.5  | 12.9  | 12.9  | 21.1  | 9.5   | 9.5   |  | 6.8   | 37.8  | 37.8  |   | 10.3  |
| Effective Green, g (s)            | 24.5  | 12.9  | 12.9  | 21.3  | 9.5   | 9.7   |  | 6.8   | 39.1  | 39.1  |   | 10.5  |
| Actuated g/C Ratio                | 0.24  | 0.13  | 0.13  | 0.21  | 0.10  | 0.10  |  | 0.07  | 0.39  | 0.39  |   | 0.10  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   |  | 4.2   | 5.3   | 5.3   |   | 4.2   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   |   | 3.0   |
| Lane Grp Cap (vph)                | 429   | 238   | 202   | 373   | 175   | 152   |  | 119   | 1370  | 604   |   | 357   |
| v/s Ratio Prot                    | c0.10   | 0.01  |   | c0.12   | 0.01  |   |  | c0.07   | 0.20  |   |   | c0.07   |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | c0.03   |  |   |   | 0.01  |   |   |
| v/c Ratio                         | 0.40  | 0.05  | 0.07  | 0.58  | 0.12  | 0.31  |  | 1.06  | 0.51  | 0.03  |   | 0.65  |
| Uniform Delay, d1                 | 31.6  | 38.2  | 38.3  | 35.4  | 41.4  | 42.0  |  | 46.6  | 23.2  | 18.8  |   | 43.0  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 0.94  | 0.57  | 1.00  |   | 0.89  |
| Incremental Delay, d2             | 0.6   | 0.1   | 0.1   | 2.3   | 0.3   | 1.2   |  | 96.8  | 1.3   | 0.1   |   | 2.5   |
| Delay (s)                         | 32.2  | 38.3  | 38.4  | 37.7  | 41.7  | 43.2  |  | 140.7   | 14.6  | 18.9  |   | 40.6  |
| Level of Service                  | C   | D   | D   | D   | D   | D   |  | F   | B   | B   |   | D   |
| Approach Delay (s)                |   | 34.7  |   |   | 40.9  |   |  |   | 32.9  |   |   |   |
| Approach LOS                      |   | C   |   |   | D   |   |  |   | C   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 31.1  |   |   | HCM 2000 Level of Service   |  |   | C   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.69  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 100.0   |   |   | Sum of lost time (s)  |  |   | 16.6  |   |   |   |
| Intersection Capacity Utilization |   |   | 70.7%   |   |   | ICU Level of Service  |  |   | C   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

Existing + Proj Phase 1 PM Peak

3/28/2017



| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑    | ↑    |
| Volume (vph)           | 994   | 175  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 4.0   |      |
| Lane Util. Factor      | 0.95  |      |
| Frpb, ped/bikes        | 1.00  |      |
| Flpb, ped/bikes        | 1.00  |      |
| Frt                    | 0.98  |      |
| Flt Protected          | 1.00  |      |
| Satd. Flow (prot)      | 3423  |      |
| Flt Permitted          | 1.00  |      |
| Satd. Flow (perm)      | 3423  |      |
| Peak-hour factor, PHF  | 0.96  | 0.92 |
| Adj. Flow (vph)        | 1035  | 190  |
| RTOR Reduction (vph)   | 11    | 0    |
| Lane Group Flow (vph)  | 1214  | 0    |
| Confl. Peds. (#/hr)    |       |      |
| Turn Type              | NA    |      |
| Protected Phases       | 6     |      |
| Permitted Phases       |       |      |
| Actuated Green, G (s)  | 41.3  |      |
| Effective Green, g (s) | 42.6  |      |
| Actuated g/C Ratio     | 0.43  |      |
| Clearance Time (s)     | 5.3   |      |
| Vehicle Extension (s)  | 3.0   |      |
| Lane Grp Cap (vph)     | 1458  |      |
| v/s Ratio Prot         | c0.35 |      |
| v/s Ratio Perm         |       |      |
| v/c Ratio              | 0.83  |      |
| Uniform Delay, d1      | 25.5  |      |
| Progression Factor     | 0.76  |      |
| Incremental Delay, d2  | 3.6   |      |
| Delay (s)              | 23.0  |      |
| Level of Service       | C     |      |
| Approach Delay (s)     | 25.8  |      |
| Approach LOS           | C     |      |
| Intersection Summary   |       |      |

Intersection

Intersection Delay, s/veh 8.8

Intersection LOS A

| Approach                    | EB    | WB    | NB    | SB    |
|-----------------------------|-------|-------|-------|-------|
| Entry Lanes                 | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes    | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h    | 317   | 62    | 108   | 542   |
| Demand Flow Rate, veh/h     | 327   | 64    | 111   | 558   |
| Vehicles Circulating, veh/h | 93    | 353   | 307   | 113   |
| Vehicles Exiting, veh/h     | 578   | 65    | 113   | 304   |
| Follow-Up Headway, s        | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h   | 0     | 0     | 0     | 0     |
| Ped Cap Adj                 | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh       | 6.9   | 5.5   | 5.8   | 10.9  |
| Approach LOS                | A     | A     | A     | B     |
























| Lane                  | Left  | Left  | Left  | Left  |
|-----------------------|-------|-------|-------|-------|
| Designated Moves      | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves         | LTR   | LTR   | LTR   | LTR   |
| RT Channelized        |       |       |       |       |
| Lane Util             | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s   | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h     | 327   | 64    | 111   | 558   |
| Cap Entry Lane, veh/h | 1030  | 794   | 831   | 1009  |
| Entry HV Adj Factor   | 0.970 | 0.967 | 0.976 | 0.971 |
| Flow Entry, veh/h     | 317   | 62    | 108   | 542   |
| Cap Entry, veh/h      | 999   | 768   | 811   | 980   |
| V/C Ratio             | 0.318 | 0.081 | 0.134 | 0.553 |
| Control Delay, s/veh  | 6.9   | 5.5   | 5.8   | 10.9  |
| LOS                   | A     | A     | A     | B     |
| 95th %tile Queue, veh | 1     | 0     | 0     | 3     |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

Existing + Proj Phase 1 PM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 48  | 656   | 207   | 101   | 526   | 22  | 152   | 134   | 10  | 18  | 121   | 69  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5   | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 51  | 691   | 218   | 106   | 554   | 23  | 160   | 141   | 11  | 19  | 127   | 73  |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1   | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 773   | 975   | 303   | 791   | 699   | 29  | 195   | 272   | 122   | 209   | 299   | 134   |
| Arrive On Green   | 0.44  | 0.19  | 0.19  | 0.45  | 0.20  | 0.19  | 0.11  | 0.08  | 0.08  | 0.12  | 0.09  | 0.09  |
| Sat Flow, veh/h   | 1757  | 5036  | 1566  | 1757  | 3430  | 142   | 1757  | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 51  | 691   | 218   | 106   | 283   | 294   | 160   | 141   | 11  | 19  | 127   | 73  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1566  | 1757  | 1752  | 1820  | 1757  | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 1.7   | 12.8  | 13.0  | 3.5   | 15.3  | 15.4  | 8.9   | 3.9   | 0.7   | 1.0   | 3.4   | 4.5   |
| Cycle Q Clear(g_c), s   | 1.7   | 12.8  | 13.0  | 3.5   | 15.3  | 15.4  | 8.9   | 3.9   | 0.7   | 1.0   | 3.4   | 4.5   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.08  | 1.00  |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 773   | 975   | 303   | 791   | 357   | 371   | 195   | 272   | 122   | 209   | 299   | 134   |
| V/C Ratio(X)  | 0.07  | 0.71  | 0.72  | 0.13  | 0.79  | 0.79  | 0.82  | 0.52  | 0.09  | 0.09  | 0.43  | 0.55  |
| Avail Cap(c_a), veh/h   | 773   | 1294  | 402   | 791   | 513   | 533   | 246   | 1469  | 657   | 209   | 1167  | 522   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 16.2  | 37.7  | 37.8  | 16.1  | 37.8  | 37.9  | 43.5  | 44.3  | 42.8  | 39.3  | 43.4  | 43.9  |
| Incr Delay (d2), s/veh  | 0.0   | 4.3   | 13.7  | 0.1   | 16.3  | 15.9  | 15.8  | 1.5   | 0.3   | 0.2   | 1.0   | 3.4   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.8   | 6.3   | 6.8   | 1.7   | 9.0   | 9.3   | 5.2   | 1.9   | 0.3   | 0.5   | 1.7   | 2.1   |
| LnGrp Delay(d),s/veh  | 16.2  | 42.0  | 51.5  | 16.2  | 54.1  | 53.7  | 59.3  | 45.8  | 43.2  | 39.4  | 44.4  | 47.3  |
| LnGrp LOS   | B   | D   | D   | B   | D   | D   | E   | D   | D   | D   | D   | D   |
| Approach Vol, veh/h   |   | 960   |   |   | 683   |   |   | 312   |   |   | 219   |   |
| Approach Delay, s/veh   |   | 42.8  |   |   | 48.0  |   |   | 52.7  |   |   | 44.9  |   |
| Approach LOS  |   | D   |   |   | D   |   |   | D   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 15.9  | 11.8  | 49.0  | 23.4  | 15.1  | 12.5  | 48.0  | 24.4  |   |   |   |   |
| Change Period (Y+Rc), s   | 4.2   | * 5.3   | 4.2   | * 5.3   | 4.2   | * 5.3   | 4.2   | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | 5.2   | * 41  | 10.8  | * 24  | 13.8  | * 32  | 7.2   | * 28  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 3.0   | 5.9   | 5.5   | 15.0  | 10.9  | 6.5   | 3.7   | 17.4  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.1   | 0.6   | 0.2   | 2.9   | 0.1   | 0.8   | 0.1   | 1.7   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |   |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 46.1  |   |   |   |   |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |   |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |   |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |   |   |   |   |   |   |

| Intersection     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 2.3 |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 55   | 703  | 0    | 38   | 0    | 693  | 2    | 0    | 0    | 151  | 0    | 0    | 38   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 400  | -    | -    | -    | 120  | -    | 85   | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | -    | 0    | -    | -    | 1    | -    | -    | 1    | -    |
| Grade, %                 | -    | 0    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 61   | 781  | 0    | 42   | 0    | 770  | 2    | 0    | 0    | 168  | 0    | 0    | 42   |

| Major/Minor          | Major1 |   |   | Major2 |      |   | Minor1 |      |      | Minor2 |      |      |      |
|----------------------|--------|---|---|--------|------|---|--------|------|------|--------|------|------|------|
| Conflicting Flow All | 770    | 0 | 0 | 738    | 781  | 0 | 0      | 1372 | 1757 | 391    | 1289 | 1757 | 385  |
| Stage 1              | -      | - | - | -      | -    | - | -      | 903  | 903  | -      | 854  | 854  | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 469  | 854  | -      | 435  | 903  | -    |
| Critical Hdwy        | 4.16   | - | - | 5.66   | 5.36 | - | -      | 7.01 | 6.56 | 7.16   | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1  | -      | - | - | -      | -    | - | -      | 7.36 | 5.56 | -      | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2  | -      | - | - | -      | -    | - | -      | 6.56 | 5.56 | -      | 6.76 | 5.56 | -    |
| Follow-up Hdwy       | 2.23   | - | - | 2.33   | 3.13 | - | -      | 3.68 | 4.03 | 3.93   | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver   | 834    | - | - | 609    | 495  | - | -      | 126  | 83   | 517    | 143  | 83   | 610  |
| Stage 1              | -      | - | - | -      | -    | - | -      | 236  | 352  | -      | 309  | 371  | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 524  | 371  | -      | 535  | 352  | -    |
| Platoon blocked, %   |        | - | - |        |      | - | -      |      |      |        |      |      |      |
| Mov Cap-1 Maneuver   | 834    | - | - | 431    | 495  | - | -      | 111  | 77   | 517    | 91   | 77   | 610  |
| Mov Cap-2 Maneuver   | -      | - | - | -      | -    | - | -      | 175  | 180  | -      | 174  | 181  | -    |
| Stage 1              | -      | - | - | -      | -    | - | -      | 219  | 326  | -      | 286  | 371  | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 488  | 371  | -      | 335  | 326  | -    |

| Approach             | EB  | WB  | NE   | SW   |
|----------------------|-----|-----|------|------|
| HCM Control Delay, s | 0.7 | 0.7 | 15.3 | 11.3 |
| HCM LOS              |     |     | C    | B    |

























| Minor Lane/Major Mvmt | NELn1 | EBL   | EBT | EBR | WBU   | WBL | WBT | WBR | SWLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 517   | 834   | -   | -   | 431   | 495 | -   | -   | 610   |
| HCM Lane V/C Ratio    | 0.325 | 0.073 | -   | -   | 0.098 | -   | -   | -   | 0.069 |
| HCM Control Delay (s) | 15.3  | 9.7   | -   | -   | 14.3  | -   | -   | -   | 11.3  |
| HCM Lane LOS          | C     | A     | -   | -   | B     | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 1.4   | 0.2   | -   | -   | 0.3   | 0   | -   | -   | 0.2   |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

Existing + Proj Phase 1 PM Peak

3/28/2017





















|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |  |   |  |  |  |  |  |
| Volume (veh/h)  | 166   | 392   | 210   | 27  | 338   | 297   | 168   | 391   | 47  | 368   | 660   | 215   |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5   | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 169   | 400   | 214   | 28  | 345   | 303   | 171   | 399   | 48  | 376   | 673   | 219   |
| Adj No. of Lanes  | 2   | 2   | 1   | 2   | 3   | 1   | 2   | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 246   | 1111  | 493   | 81  | 1296  | 403   | 900   | 567   | 253   | 1151  | 825   | 369   |
| Arrive On Green   | 0.07  | 0.32  | 0.32  | 0.01  | 0.08  | 0.08  | 0.26  | 0.16  | 0.16  | 0.68  | 0.47  | 0.47  |
| Sat Flow, veh/h   | 3408  | 3505  | 1555  | 3408  | 5036  | 1564  | 3408  | 3505  | 1565  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 169   | 400   | 214   | 28  | 345   | 303   | 171   | 399   | 48  | 376   | 673   | 219   |
| Grp Sat Flow(s),veh/h/ln  | 1704  | 1752  | 1555  | 1704  | 1679  | 1564  | 1704  | 1752  | 1565  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s   | 4.8   | 8.8   | 5.0   | 0.8   | 6.4   | 18.9  | 3.9   | 10.8  | 2.2   | 4.6   | 16.5  | 10.3  |
| Cycle Q Clear(g_c), s   | 4.8   | 8.8   | 5.0   | 0.8   | 6.4   | 18.9  | 3.9   | 10.8  | 2.2   | 4.6   | 16.5  | 10.3  |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 246   | 1111  | 493   | 81  | 1296  | 403   | 900   | 567   | 253   | 1151  | 825   | 369   |
| V/C Ratio(X)  | 0.69  | 0.36  | 0.43  | 0.35  | 0.27  | 0.75  | 0.19  | 0.70  | 0.19  | 0.33  | 0.82  | 0.59  |
| Avail Cap(c_a), veh/h   | 259   | 1286  | 571   | 143   | 1677  | 521   | 900   | 985   | 440   | 1151  | 1241  | 555   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  | 1.00  | 1.00  | 1.00  | 2.00  | 2.00  | 2.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 0.99  | 0.99  | 0.99  | 1.00  | 1.00  | 1.00  | 0.56  | 0.56  | 0.56  |
| Uniform Delay (d), s/veh  | 45.3  | 26.3  | 5.7   | 48.8  | 36.9  | 42.6  | 28.5  | 39.7  | 25.3  | 11.5  | 24.6  | 22.9  |
| Incr Delay (d2), s/veh  | 7.0   | 0.2   | 0.6   | 2.5   | 0.1   | 4.5   | 0.1   | 7.2   | 1.7   | 0.1   | 5.1   | 3.9   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.5   | 4.3   | 2.2   | 0.4   | 3.0   | 8.7   | 1.8   | 5.8   | 1.1   | 2.1   | 8.4   | 4.7   |
| LnGrp Delay(d),s/veh  | 52.3  | 26.5  | 6.3   | 51.4  | 37.0  | 47.1  | 28.6  | 46.8  | 27.0  | 11.6  | 29.6  | 26.8  |
| LnGrp LOS   | D   | C   | A   | D   | D   | D   | C   | D   | C   | B   | C   | C   |
| Approach Vol, veh/h   |   | 783   |   |   | 676   |   |   | 618   |   |   | 1268  |   |
| Approach Delay, s/veh   |   | 26.6  |   |   | 42.1  |   |   | 40.2  |   |   | 23.8  |   |
| Approach LOS  |   | C   |   |   | D   |   |   | D   |   |   | C   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 37.8  | 20.2  | 6.4   | 35.7  | 30.4  | 27.5  | 12.3  | 29.7  |   |   |   |   |
| Change Period (Y+Rc), s   | 4.2   | * 5.7   | * 4.2   | 5.3   | 4.2   | * 5.3   | 5.3   | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | 14.8  | * 26  | * 4   | 35.4  | 7.5   | * 34  | 7.4   | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 6.6   | 12.8  | 2.8   | 10.8  | 5.9   | 18.5  | 6.8   | 20.9  |   |   |   |   |
| Green Ext Time (p_c), s   | 1.6   | 1.5   | 0.0   | 3.4   | 0.4   | 3.6   | 0.2   | 2.2   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |   |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 31.2  |   |   |   |   |   |   |   |   |   |
| HCM 2010 LOS  |   |   | C   |   |   |   |   |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |   |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |   |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 10: Coventry Avenue & Herndon Avenue

Existing + Proj Phase 1 PM Peak

3/28/2017













|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |   |  |  |  |  |  |   |   |  |  |
| Volume (veh/h)  | 72  | 703   | 72  | 5   | 450   | 21  | 106  | 1   | 21  | 83  | 7   | 73  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1900  | 1845  | 1845  | 1845  | 1900   | 1845  | 1900  | 1900  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 73  | 710   | 73  | 5   | 455   | 21  | 107  | 1   | 21  | 84  | 7   | 74  |
| Adj No. of Lanes  | 1   | 3   | 0   | 1   | 3   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Peak Hour Factor  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99   | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 912   | 3069  | 313   | 13  | 694   | 216   | 136  | 1   | 27  | 125   | 10  | 120   |
| Arrive On Green   | 1.00  | 1.00  | 1.00  | 0.01  | 0.14  | 0.14  | 0.10   | 0.10  | 0.09  | 0.08  | 0.08  | 0.08  |
| Sat Flow, veh/h   | 1757  | 4644  | 474   | 1757  | 5036  | 1568  | 1430   | 13  | 281   | 1628  | 136   | 1568  |
| Grp Volume(v), veh/h  | 73  | 512   | 271   | 5   | 455   | 21  | 129  | 0   | 0   | 91  | 0   | 74  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1761  | 1757  | 1679  | 1568  | 1724   | 0   | 0   | 1763  | 0   | 1568  |
| Q Serve(g_s), s   | 0.0   | 0.0   | 0.0   | 0.3   | 8.6   | 1.2   | 7.3  | 0.0   | 0.0   | 5.0   | 0.0   | 4.6   |
| Cycle Q Clear(g_c), s   | 0.0   | 0.0   | 0.0   | 0.3   | 8.6   | 1.2   | 7.3  | 0.0   | 0.0   | 5.0   | 0.0   | 4.6   |
| Prop In Lane  | 1.00  |   | 0.27  | 1.00  |   | 1.00  | 0.83   |   | 0.16  | 0.92  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 912   | 2219  | 1164  | 13  | 694   | 216   | 164  | 0   | 0   | 135   | 0   | 120   |
| V/C Ratio(X)  | 0.08  | 0.23  | 0.23  | 0.40  | 0.66  | 0.10  | 0.79   | 0.00  | 0.00  | 0.67  | 0.00  | 0.62  |
| Avail Cap(c_a), veh/h   | 912   | 2219  | 1164  | 105   | 1460  | 455   | 327  | 0   | 0   | 388   | 0   | 345   |
| HCM Platoon Ratio   | 2.00  | 2.00  | 2.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 0.81  | 0.81  | 0.81  | 1.00  | 1.00  | 1.00  | 1.00   | 0.00  | 0.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh  | 0.0   | 0.0   | 0.0   | 49.4  | 40.9  | 37.7  | 44.2   | 0.0   | 0.0   | 44.9  | 0.0   | 44.7  |
| Incr Delay (d2), s/veh  | 0.0   | 0.2   | 0.4   | 18.9  | 4.8   | 0.9   | 8.0  | 0.0   | 0.0   | 5.7   | 0.0   | 5.0   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.0   | 0.1   | 0.1   | 0.2   | 4.3   | 0.6   | 3.8  | 0.0   | 0.0   | 2.7   | 0.0   | 2.1   |
| LnGrp Delay(d),s/veh  | 0.0   | 0.2   | 0.4   | 68.3  | 45.7  | 38.6  | 52.2   | 0.0   | 0.0   | 50.7  | 0.0   | 49.8  |
| LnGrp LOS   | A   | A   | A   | E   | D   | D   | D  |   |   | D   |   | D   |
| Approach Vol, veh/h   |   | 856   |   |   | 481   |   |  | 129   |   |   | 165   |   |
| Approach Delay, s/veh   |   | 0.2   |   |   | 45.6  |   |  | 52.2  |   |   | 50.3  |   |
| Approach LOS  |   | A   |   |   | D   |   |  | D   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  |   | 2   | 3   | 4   |   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  |   | 13.5  | 4.7   | 70.1  |   | 11.7  | 57.0   | 17.8  |   |   |   |   |
| Change Period (Y+Rc), s   |   | * 4.2   | * 4.2   | 5.3   |   | 4.2   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   |   | * 19  | * 5.8   | 35.7  |   | 21.8  | 13.8   | * 28  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  |   | 9.3   | 2.3   | 2.0   |   | 7.0   | 2.0  | 10.6  |   |   |   |   |
| Green Ext Time (p_c), s   |   | 0.3   | 0.0   | 3.8   |   | 0.5   | 2.9  | 1.9   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 22.8  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | C   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

Existing + Proj Phase 1 PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |  |
| Volume (veh/h)                    | 24  | 77  | 94  | 27  | 58  | 28  |
| Sign Control                      | Stop  |   |   | Stop  | Free  |   |
| Grade                             | 0%  |   |   | 0%  | 0%  |   |
| Peak Hour Factor                  | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  |
| Hourly flow rate (vph)            | 28  | 89  | 108   | 31  | 67  | 32  |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (ft)                   |   |   |   |   |   |   |
| Walking Speed (ft/s)              |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   | 4   |   |   |   |   |
| Median type                       |   |   |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   | 110   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 166   | 0   | 147   | 133   | 0   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 166   | 0   | 147   | 133   | 0   |   |
| tC, single (s)                    | 6.5   | 6.2   | 7.1   | 6.5   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.0   | 3.3   | 3.5   | 4.0   | 2.2   |   |
| p0 queue free %                   | 96  | 92  | 85  | 96  | 96  |   |
| cM capacity (veh/h)               | 695   | 1082  | 706   | 724   | 1617  |   |
| Direction, Lane #                 | EB 1  | WB 1  | WB 2  | NB 1  | NB 2  |   |
| Volume Total                      | 116   | 108   | 31  | 67  | 32  |   |
| Volume Left                       | 0   | 108   | 0   | 67  | 0   |   |
| Volume Right                      | 89  | 0   | 0   | 0   | 32  |   |
| cSH                               | 1419  | 706   | 724   | 1617  | 1700  |   |
| Volume to Capacity                | 0.08  | 0.15  | 0.04  | 0.04  | 0.02  |   |
| Queue Length 95th (ft)            | 7   | 13  | 3   | 3   | 0   |   |
| Control Delay (s)                 | 9.0   | 11.0  | 10.2  | 7.3   | 0.0   |   |
| Lane LOS                          | A   | B   | B   | A   |   |   |
| Approach Delay (s)                | 9.0   | 10.8  |   | 4.9   |   |   |
| Approach LOS                      | A   | B   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   | 8.6   |   |   |   |   |
| Intersection Capacity Utilization |   | 21.9%   |   | ICU Level of Service  | A   |   |
| Analysis Period (min)             |   | 15  |   |   |   |   |

Intersection

Int Delay, s/veh 0.1

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 5    | 795  | 484  | 17   | 0    | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 5    | 837  | 509  | 18   | 0    | 2    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 527    | 0      | 947    |
| Stage 1              | -      | -      | 518    |
| Stage 2              | -      | -      | 429    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 1029   | -      | 258    |
| Stage 1              | -      | -      | 560    |
| Stage 2              | -      | -      | 621    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 1029   | -      | 257    |
| Mov Cap-2 Maneuver   | -      | -      | 257    |
| Stage 1              | -      | -      | 560    |
| Stage 2              | -      | -      | 618    |

| Approach             | EB  | WB | SB  |
|----------------------|-----|----|-----|
| HCM Control Delay, s | 0.1 | 0  | 9.9 |
| HCM LOS              |     |    | A   |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 1029  | -   | -   | -   | 731   |
| HCM Lane V/C Ratio    | 0.005 | -   | -   | -   | 0.003 |
| HCM Control Delay (s) | 8.5   | -   | -   | -   | 9.9   |
| HCM Lane LOS          | A     | -   | -   | -   | A     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0     |



Intersection

Int Delay, s/veh 2.3

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 626  | 245  | 19   | 400  | 109  | 30   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 250  | 250  | -    | 0    | 250  |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 98   | 98   | 98   | 98   | 98   | 98   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 639  | 250  | 19   | 408  | 111  | 31   |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |      |
|----------------------|--------|---|--------|---|--------|------|
| Conflicting Flow All | 0      | 0 | 639    | 0 | 882    | 319  |
| Stage 1              | -      | - | -      | - | 639    | -    |
| Stage 2              | -      | - | -      | - | 243    | -    |
| Critical Hdwy        | -      | - | 4.16   | - | 6.86   | 6.96 |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.86   | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.86   | -    |
| Follow-up Hdwy       | -      | - | 2.23   | - | 3.53   | 3.33 |
| Pot Cap-1 Maneuver   | -      | - | 934    | - | 284    | 674  |
| Stage 1              | -      | - | -      | - | 485    | -    |
| Stage 2              | -      | - | -      | - | 772    | -    |
| Platoon blocked, %   | -      | - | -      | - | -      | -    |
| Mov Cap-1 Maneuver   | -      | - | 934    | - | 278    | 674  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 278    | -    |
| Stage 1              | -      | - | -      | - | 485    | -    |
| Stage 2              | -      | - | -      | - | 756    | -    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.4 | 22.9 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 278   | 674   | -   | -   | 934   | -   |
| HCM Lane V/C Ratio    | 0.4   | 0.045 | -   | -   | 0.021 | -   |
| HCM Control Delay (s) | 26.3  | 10.6  | -   | -   | 8.9   | -   |
| HCM Lane LOS          | D     | B     | -   | -   | A     | -   |
| HCM 95th %tile Q(veh) | 1.8   | 0.1   | -   | -   | 0.1   | -   |

Intersection

Int Delay, s/veh 1

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 51   | 590  | 374  | 9    | 13   | 40   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 250  | -    | -    | 250  | 250  | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 55   | 634  | 402  | 10   | 14   | 43   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 402    | 0      | 829    |
| Stage 1              | -      | -      | 402    |
| Stage 2              | -      | -      | 427    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 1146   | -      | 307    |
| Stage 1              | -      | -      | 641    |
| Stage 2              | -      | -      | 623    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 1146   | -      | 292    |
| Mov Cap-2 Maneuver   | -      | -      | 292    |
| Stage 1              | -      | -      | 641    |
| Stage 2              | -      | -      | 593    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.7 | 0  | 11.7 |
| HCM LOS              |     |    | B    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 | SBLn2 |
|-----------------------|-------|-----|-----|-----|-------|-------|
| Capacity (veh/h)      | 1146  | -   | -   | -   | 292   | 803   |
| HCM Lane V/C Ratio    | 0.048 | -   | -   | -   | 0.048 | 0.054 |
| HCM Control Delay (s) | 8.3   | -   | -   | -   | 17.9  | 9.7   |
| HCM Lane LOS          | A     | -   | -   | -   | C     | A     |
| HCM 95th %tile Q(veh) | 0.2   | -   | -   | -   | 0.1   | 0.2   |

Intersection

Int Delay, s/veh 2.9

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 451  | 149  | 4    | 247  | 132  | 9    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 475  | 157  | 4    | 260  | 139  | 9    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 475    |
| Stage 1              | -      | -      | 475    |
| Stage 2              | -      | -      | 268    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 1082   | 381    |
| Stage 1              | -      | -      | 624    |
| Stage 2              | -      | -      | 775    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 1082   | 379    |
| Mov Cap-2 Maneuver   | -      | -      | 379    |
| Stage 1              | -      | -      | 624    |
| Stage 2              | -      | -      | 772    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.1 | 19.9 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 388   | -   | -   | 1082  | -   |
| HCM Lane V/C Ratio    | 0.383 | -   | -   | 0.004 | -   |
| HCM Control Delay (s) | 19.9  | -   | -   | 8.3   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 1.8   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 0.2

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 423  | 10   | 1    | 236  | 10   | 0    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 91   | 91   | 91   | 91   | 91   | 91   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 465  | 11   | 1    | 259  | 11   | 0    |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |       |
|----------------------|--------|---|--------|---|--------|-------|
| Conflicting Flow All | 0      | 0 | 476    | 0 | 732    | 470   |
| Stage 1              | -      | - | -      | - | 470    | -     |
| Stage 2              | -      | - | -      | - | 262    | -     |
| Critical Hdwy        | -      | - | 4.13   | - | 6.43   | 6.23  |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.43   | -     |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.43   | -     |
| Follow-up Hdwy       | -      | - | 2.227  | - | 3.527  | 3.327 |
| Pot Cap-1 Maneuver   | -      | - | 1081   | - | 387    | 591   |
| Stage 1              | -      | - | -      | - | 627    | -     |
| Stage 2              | -      | - | -      | - | 780    | -     |
| Platoon blocked, %   | -      | - |        | - |        |       |
| Mov Cap-1 Maneuver   | -      | - | 1081   | - | 387    | 591   |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 387    | -     |
| Stage 1              | -      | - | -      | - | 627    | -     |
| Stage 2              | -      | - | -      | - | 779    | -     |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 14.6 |
| HCM LOS              |    |    | B    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 387   | -   | -   | 1081  | -   |
| HCM Lane V/C Ratio    | 0.028 | -   | -   | 0.001 | -   |
| HCM Control Delay (s) | 14.6  | -   | -   | 8.3   | 0   |
| HCM Lane LOS          | B     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 2.9

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 194  | 221  | 2    | 165  | 130  | 10   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 89   | 89   | 89   | 89   | 89   | 89   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 218  | 248  | 2    | 185  | 146  | 11   |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |       |
|----------------------|--------|---|--------|---|--------|-------|
| Conflicting Flow All | 0      | 0 | 466    | 0 | 532    | 342   |
| Stage 1              | -      | - | -      | - | 342    | -     |
| Stage 2              | -      | - | -      | - | 190    | -     |
| Critical Hdwy        | -      | - | 4.13   | - | 6.43   | 6.23  |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.43   | -     |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.43   | -     |
| Follow-up Hdwy       | -      | - | 2.227  | - | 3.527  | 3.327 |
| Pot Cap-1 Maneuver   | -      | - | 1090   | - | 506    | 698   |
| Stage 1              | -      | - | -      | - | 717    | -     |
| Stage 2              | -      | - | -      | - | 840    | -     |
| Platoon blocked, %   | -      | - |        | - |        |       |
| Mov Cap-1 Maneuver   | -      | - | 1090   | - | 505    | 698   |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 505    | -     |
| Stage 1              | -      | - | -      | - | 717    | -     |
| Stage 2              | -      | - | -      | - | 838    | -     |

| Approach             | EB | WB  | NB |
|----------------------|----|-----|----|
| HCM Control Delay, s | 0  | 0.1 | 15 |
| HCM LOS              |    |     | C  |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 515   | -   | -   | 1090  | -   |
| HCM Lane V/C Ratio    | 0.305 | -   | -   | 0.002 | -   |
| HCM Control Delay (s) | 15    | -   | -   | 8.3   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 1.3   | -   | -   | 0     | -   |

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 6      |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 5      | 16    | 134   | 16     | 7     | 1     | 91     | 92   | 21   | 0      | 59   | 3    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 82     | 82    | 82    | 82     | 82    | 82    | 82     | 82   | 82   | 82     | 82   | 82   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 6      | 20    | 163   | 20     | 9     | 1     | 111    | 112  | 26   | 0      | 72   | 4    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 426    | 434   | 74    | 512    | 423   | 125   | 76     | 0    | 0    | 138    | 0    | 0    |
| Stage 1                  | 74     | 74    | -     | 347    | 347   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 352    | 360   | -     | 165    | 76    | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 537    | 514   | 985   | 471    | 521   | 923   | 1517   | -    | -    | 1440   | -    | -    |
| Stage 1                  | 933    | 831   | -     | 667    | 633   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 663    | 625   | -     | 835    | 830   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 497    | 473   | 985   | 358    | 480   | 923   | 1517   | -    | -    | 1440   | -    | -    |
| Mov Cap-2 Maneuver       | 497    | 473   | -     | 358    | 480   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 859    | 831   | -     | 614    | 583   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 601    | 576   | -     | 680    | 830   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 10.4   |       |       | 14.8   |       |       | 3.4    |      |      | 0      |      |      |
| HCM LOS                  | B      |       |       | B      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1517   | -     | -     | 861    | 398   | 1440  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.073  | -     | -     | 0.22   | 0.074 | -     | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 7.6    | 0     | -     | 10.4   | 14.8  | 0     | -      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | B      | B     | A     | -      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.2    | -     | -     | 0.8    | 0.2   | 0     | -      | -    |      |        |      |      |

| Intersection             |        |          |        |      |        |      |
|--------------------------|--------|----------|--------|------|--------|------|
| Int Delay, s/veh         | 1.3    |          |        |      |        |      |
|                          |        |          |        |      |        |      |
| Movement                 | WBL    | WBR      | NBT    | NBR  | SBL    | SBT  |
| Vol, veh/h               | 0      | 184      | 1074   | 19   | 0      | 1469 |
| Conflicting Peds, #/hr   | 0      | 0        | 0      | 0    | 0      | 0    |
| Sign Control             | Stop   | Stop     | Free   | Free | Free   | Free |
| RT Channelized           | -      | None     | -      | None | -      | None |
| Storage Length           | -      | 0        | -      | -    | -      | -    |
| Veh in Median Storage, # | 1      | -        | 0      | -    | -      | 0    |
| Grade, %                 | 0      | -        | 0      | -    | -      | 0    |
| Peak Hour Factor         | 92     | 92       | 92     | 92   | 92     | 92   |
| Heavy Vehicles, %        | 3      | 3        | 3      | 3    | 3      | 3    |
| Mvmt Flow                | 0      | 200      | 1167   | 21   | 0      | 1597 |
|                          |        |          |        |      |        |      |
| Major/Minor              | Minor1 |          | Major1 |      | Major2 |      |
| Conflicting Flow All     | 1976   | 594      | 0      | 0    | 1188   | 0    |
| Stage 1                  | 1178   | -        | -      | -    | -      | -    |
| Stage 2                  | 798    | -        | -      | -    | -      | -    |
| Critical Hdwy            | 6.86   | 6.96     | -      | -    | 4.16   | -    |
| Critical Hdwy Stg 1      | 5.86   | -        | -      | -    | -      | -    |
| Critical Hdwy Stg 2      | 5.86   | -        | -      | -    | -      | -    |
| Follow-up Hdwy           | 3.53   | 3.33     | -      | -    | 2.23   | -    |
| Pot Cap-1 Maneuver       | 53     | 446      | -      | -    | 578    | -    |
| Stage 1                  | 253    | -        | -      | -    | -      | -    |
| Stage 2                  | 401    | -        | -      | -    | -      | -    |
| Platoon blocked, %       |        |          | -      | -    |        | -    |
| Mov Cap-1 Maneuver       | 53     | 446      | -      | -    | 578    | -    |
| Mov Cap-2 Maneuver       | 164    | -        | -      | -    | -      | -    |
| Stage 1                  | 253    | -        | -      | -    | -      | -    |
| Stage 2                  | 401    | -        | -      | -    | -      | -    |
|                          |        |          |        |      |        |      |
| Approach                 | WB     |          | NB     |      | SB     |      |
| HCM Control Delay, s     | 19.5   |          | 0      |      | 0      |      |
| HCM LOS                  | C      |          |        |      |        |      |
|                          |        |          |        |      |        |      |
| Minor Lane/Major Mvmt    | NBT    | NBRWBLn1 | SBL    | SBT  |        |      |
| Capacity (veh/h)         | -      | - 446    | 578    | -    |        |      |
| HCM Lane V/C Ratio       | -      | - 0.448  | -      | -    |        |      |
| HCM Control Delay (s)    | -      | - 19.5   | 0      | -    |        |      |
| HCM Lane LOS             | -      | - C      | A      | -    |        |      |
| HCM 95th %tile Q(veh)    | -      | - 2.3    | 0      | -    |        |      |

| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 11.4 |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | B    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 28   | 158  | 35   | 0    | 8    | 129  | 31   | 0    | 30   | 54   | 11   |
| Peak Hour Factor          | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 32   | 180  | 40   | 0    | 9    | 147  | 35   | 0    | 34   | 61   | 12   |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB   | NB  |
|----------------------------|------|------|-----|
| Opposing Approach          | WB   | EB   | SB  |
| Opposing Lanes             | 2    | 3    | 1   |
| Conflicting Approach Left  | SB   | NB   | EB  |
| Conflicting Lanes Left     | 1    | 3    | 3   |
| Conflicting Approach Right | NB   | SB   | WB  |
| Conflicting Lanes Right    | 3    | 1    | 2   |
| HCM Control Delay          | 10.9 | 11.5 | 9.6 |
| HCM LOS                    | B    | B    | A   |

| Lane                   | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 28%   |
| Vol Thru, %            | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 81%   | 54%   |
| Vol Right, %           | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 19%   | 18%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 30    | 54    | 11    | 28    | 158   | 35    | 8     | 160   | 189   |
| LT Vol                 | 30    | 0     | 0     | 28    | 0     | 0     | 8     | 0     | 52    |
| Through Vol            | 0     | 54    | 0     | 0     | 158   | 0     | 0     | 129   | 103   |
| RT Vol                 | 0     | 0     | 11    | 0     | 0     | 35    | 0     | 31    | 34    |
| Lane Flow Rate         | 34    | 61    | 12    | 32    | 180   | 40    | 9     | 182   | 215   |
| Geometry Grp           | 7     | 7     | 7     | 8     | 8     | 8     | 8     | 8     | 8     |
| Degree of Util (X)     | 0.063 | 0.106 | 0.019 | 0.059 | 0.307 | 0.06  | 0.017 | 0.31  | 0.373 |
| Departure Headway (Hd) | 6.697 | 6.192 | 5.485 | 6.663 | 6.158 | 5.451 | 6.782 | 6.139 | 6.245 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 534   | 578   | 651   | 537   | 584   | 656   | 527   | 585   | 576   |
| Service Time           | 4.444 | 3.939 | 3.231 | 4.406 | 3.901 | 3.194 | 4.529 | 3.886 | 3.987 |
| HCM Lane V/C Ratio     | 0.064 | 0.106 | 0.018 | 0.06  | 0.308 | 0.061 | 0.017 | 0.311 | 0.373 |
| HCM Control Delay      | 9.9   | 9.7   | 8.3   | 9.8   | 11.6  | 8.5   | 9.6   | 11.6  | 12.7  |
| HCM Lane LOS           | A     | A     | A     | A     | B     | A     | A     | B     | B     |
| HCM 95th-tile Q        | 0.2   | 0.4   | 0.1   | 0.2   | 1.3   | 0.2   | 0.1   | 1.3   | 1.7   |



Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 52   | 103  | 34   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 59   | 117  | 39   |
| Number of Lanes   | 0    | 0    | 1    | 0    |

| Approach                   | SB   |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 12.7 |
| HCM LOS                    | B    |

Lane

Intersection

Intersection Delay, s/veh11.7

Intersection LOS B

| Movement          | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h        | 0    | 27   | 170  | 43   | 0    | 8    | 130  | 13   | 0    | 57   | 79   | 17   | 0    | 37   | 152  | 52   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 31   | 193  | 49   | 0    | 9    | 148  | 15   | 0    | 65   | 90   | 19   | 0    | 42   | 173  | 59   |
| Number of Lanes   | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 12.2 | 10.7 | 10.9 | 12.2 |
| HCM LOS                    | B    | B    | B    | B    |


















| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 37%   | 11%   | 5%    | 15%   |
| Vol Thru, %            | 52%   | 71%   | 86%   | 63%   |
| Vol Right, %           | 11%   | 18%   | 9%    | 22%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 153   | 240   | 151   | 241   |
| LT Vol                 | 57    | 27    | 8     | 37    |
| Through Vol            | 79    | 170   | 130   | 152   |
| RT Vol                 | 17    | 43    | 13    | 52    |
| Lane Flow Rate         | 174   | 273   | 172   | 274   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.274 | 0.41  | 0.268 | 0.41  |
| Departure Headway (Hd) | 5.666 | 5.412 | 5.627 | 5.395 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 633   | 663   | 637   | 665   |
| Service Time           | 3.719 | 3.461 | 3.681 | 3.443 |
| HCM Lane V/C Ratio     | 0.275 | 0.412 | 0.27  | 0.412 |
| HCM Control Delay      | 10.9  | 12.2  | 10.7  | 12.2  |
| HCM Lane LOS           | B     | B     | B     | B     |
| HCM 95th-tile Q        | 1.1   | 2     | 1.1   | 2     |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

Existing + Proj Phase 1 AM Peak

3/29/2017


















|   |   |   |   |   |   |   |  |   |   |   |   |   |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
|   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)  | 168   | 0   | 565   | 0   | 0   | 0   | 0  | 1517  | 39  | 23  | 506   | 0   |
| Number  | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h  | 181   | 0   | 608   |   |   |   | 0  | 1631  | 42  | 25  | 544   | 0   |
| Adj No. of Lanes  | 1   | 0   | 2   |   |   |   | 0  | 3   | 0   | 1   | 2   | 0   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h  | 437   | 0   | 704   |   |   |   | 0  | 2049  | 53  | 224   | 2167  | 0   |
| Arrive On Green   | 0.25  | 0.00  | 0.26  |   |   |   | 0.00   | 0.54  | 0.51  | 0.25  | 1.00  | 0.00  |
| Sat Flow, veh/h   | 1757  | 0   | 2760  |   |   |   | 0  | 5215  | 130   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h  | 181   | 0   | 608   |   |   |   | 0  | 1084  | 589   | 25  | 544   | 0   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 0   | 1380  |   |   |   | 0  | 1679  | 1822  | 1757  | 1752  | 0   |
| Q Serve(g_s), s   | 5.2   | 0.0   | 12.6  |   |   |   | 0.0  | 15.6  | 15.7  | 0.7   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s   | 5.2   | 0.0   | 12.6  |   |   |   | 0.0  | 15.6  | 15.7  | 0.7   | 0.0   | 0.0   |
| Prop In Lane  | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.07  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h  | 437   | 0   | 704   |   |   |   | 0  | 1363  | 739   | 224   | 2167  | 0   |
| V/C Ratio(X)  | 0.41  | 0.00  | 0.86  |   |   |   | 0.00   | 0.80  | 0.80  | 0.11  | 0.25  | 0.00  |
| Avail Cap(c_a), veh/h   | 439   | 0   | 708   |   |   |   | 0  | 1606  | 871   | 224   | 2167  | 0   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.33  | 1.33  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.98  | 0.98  | 0.00  |
| Uniform Delay (d), s/veh  | 18.9  | 0.0   | 21.3  |   |   |   | 0.0  | 11.8  | 11.9  | 19.8  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh  | 0.6   | 0.0   | 10.7  |   |   |   | 0.0  | 4.9   | 8.7   | 0.2   | 0.3   | 0.0   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.6   | 0.0   | 5.9   |   |   |   | 0.0  | 8.0   | 9.4   | 0.3   | 0.1   | 0.0   |
| LnGrp Delay(d),s/veh  | 19.5  | 0.0   | 32.1  |   |   |   | 0.0  | 16.7  | 20.5  | 20.0  | 0.3   | 0.0   |
| LnGrp LOS   | B   |   | C   |   |   |   |  | B   | C   | B   | A   |   |
| Approach Vol, veh/h   |   | 789   |   |   |   |   |  | 1673  |   |   | 569   |   |
| Approach Delay, s/veh   |   | 29.2  |   |   |   |   |  | 18.0  |   |   | 1.1   |   |
| Approach LOS  |   | C   |   |   |   |   |  | B   |   |   | A   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 12.7  | 28.4  |   | 18.9  |   | 41.1  |  |   |   |   |   |   |
| Change Period (Y+Rc), s   | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s   | 4.1   | * 27  |   | * 15  |   | 35.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 2.7   | 17.7  |   | 14.6  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.4   | 5.4   |   | 0.1   |   | 2.5   |  |   |   |   |   |   |
| Intersection Summary  |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 17.8  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | B   |   |   |   |  |   |   |   |   |   |
| Notes   |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

Existing + Proj Phase 1 PM Peak

3/29/2017

|                              |   |   |   |   |   |   |  |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
|                              |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 350   | 0   | 945   | 0   | 0   | 0   | 0  | 1164  | 94  | 51  | 524   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 0.99  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 357   | 0   | 964   |   |   |   | 0  | 1188  | 96  | 52  | 535   | 0   |
| Adj No. of Lanes             | 1   | 0   | 2   |   |   |   | 0  | 3   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 604   | 0   | 971   |   |   |   | 0  | 1435  | 116   | 161   | 1738  | 0   |
| Arrive On Green              | 0.34  | 0.00  | 0.35  |   |   |   | 0.00   | 0.60  | 0.55  | 0.18  | 0.99  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 2760  |   |   |   | 0  | 4914  | 384   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 357   | 0   | 964   |   |   |   | 0  | 840   | 444   | 52  | 535   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1380  |   |   |   | 0  | 1679  | 1775  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 8.4   | 0.0   | 17.4  |   |   |   | 0.0  | 9.9   | 10.0  | 1.3   | 0.1   | 0.0   |
| Cycle Q Clear(g_c), s        | 8.4   | 0.0   | 17.4  |   |   |   | 0.0  | 9.9   | 10.0  | 1.3   | 0.1   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.22  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 604   | 0   | 971   |   |   |   | 0  | 1015  | 536   | 161   | 1738  | 0   |
| V/C Ratio(X)                 | 0.59  | 0.00  | 0.99  |   |   |   | 0.00   | 0.83  | 0.83  | 0.32  | 0.31  | 0.00  |
| Avail Cap(c_a), veh/h        | 604   | 0   | 971   |   |   |   | 0  | 1108  | 586   | 161   | 1738  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.99  | 0.99  | 0.00  |
| Uniform Delay (d), s/veh     | 13.5  | 0.0   | 16.1  |   |   |   | 0.0  | 8.9   | 9.1   | 19.1  | 0.1   | 0.0   |
| Incr Delay (d2), s/veh       | 1.5   | 0.0   | 26.9  |   |   |   | 0.0  | 7.7   | 13.7  | 1.1   | 0.5   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 4.2   | 0.0   | 10.2  |   |   |   | 0.0  | 5.3   | 6.5   | 0.7   | 0.1   | 0.0   |
| LnGrp Delay(d),s/veh         | 15.0  | 0.0   | 43.1  |   |   |   | 0.0  | 16.6  | 22.8  | 20.2  | 0.6   | 0.0   |
| LnGrp LOS                    | B   |   | D   |   |   |   |  | B   | C   | C   | A   |   |
| Approach Vol, veh/h          | 1321  |   |   |   |   |   | 1284   |   |   | 587   |   |   |
| Approach Delay, s/veh        | 35.5  |   |   |   |   |   | 18.8   |   |   | 2.3   |   |   |
| Approach LOS                 | D   |   |   |   |   |   | B  |   |   | A   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 9.7   | 19.1  |   | 21.2  |   | 28.8  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 4.1   | * 15  |   | * 17  |   | 23.5  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 3.3   | 12.0  |   | 19.4  |   | 2.1   |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.2   | 1.8   |   | 0.0   |   | 2.4   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 22.7  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | C   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | EB   | EB | EB | WB   | WB  | WB | NB   | NB  | NB  | NB   | SB  | SB  |
|-----------------------|------|----|----|------|-----|----|------|-----|-----|------|-----|-----|
| Directions Served     | L    | T  | R  | L    | T   | R  | UL   | T   | T   | R    | L   | T   |
| Maximum Queue (ft)    | 128  | 45 | 63 | 73   | 149 | 20 | 218  | 89  | 126 | 41   | 26  | 176 |
| Average Queue (ft)    | 54   | 17 | 28 | 29   | 20  | 3  | 118  | 20  | 28  | 3    | 1   | 83  |
| 95th Queue (ft)       | 105  | 44 | 50 | 66   | 68  | 14 | 190  | 68  | 89  | 18   | 10  | 154 |
| Link Distance (ft)    | 1573 |    |    | 1457 |     |    | 2703 |     |     | 2703 |     |     |
| Upstream Blk Time (%) |      |    |    |      |     |    |      |     |     |      |     |     |
| Queuing Penalty (veh) |      |    |    |      |     |    |      |     |     |      |     |     |
| Storage Bay Dist (ft) | 240  | 80 |    | 100  | 25  |    | 240  | 120 |     |      | 250 |     |
| Storage Blk Time (%)  | 0    |    | 29 |      | 0   |    | 1    |     |     |      |     |     |
| Queuing Penalty (veh) | 0    |    | 12 |      | 0   |    | 0    |     |     |      |     |     |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | SB   | SB  |
|-----------------------|------|-----|
| Directions Served     | T    | R   |
| Maximum Queue (ft)    | 203  | 185 |
| Average Queue (ft)    | 76   | 37  |
| 95th Queue (ft)       | 167  | 92  |
| Link Distance (ft)    | 1298 |     |
| Upstream Blk Time (%) |      |     |
| Queuing Penalty (veh) |      |     |
| Storage Bay Dist (ft) |      | 95  |
| Storage Blk Time (%)  | 7    |     |
| Queuing Penalty (veh) | 13   |     |

Intersection: 2: Temperance Avenue & Alluvial Avenue

| Movement              | EB  | EB   | EB   | WB  | WB   | WB   | NB  | NB  | NB  | NB  | SB  | SB   |
|-----------------------|-----|------|------|-----|------|------|-----|-----|-----|-----|-----|------|
| Directions Served     | L   | T    | R    | L   | T    | TR   | L   | T   | T   | R   | L   | T    |
| Maximum Queue (ft)    | 52  | 74   | 76   | 204 | 413  | 131  | 128 | 181 | 146 | 112 | 140 | 223  |
| Average Queue (ft)    | 11  | 29   | 36   | 161 | 123  | 39   | 63  | 57  | 50  | 46  | 70  | 80   |
| 95th Queue (ft)       | 39  | 60   | 61   | 228 | 352  | 97   | 116 | 126 | 114 | 94  | 127 | 175  |
| Link Distance (ft)    |     | 2839 | 2839 |     | 1365 | 1365 |     | 448 | 448 |     |     | 2703 |
| Upstream Blk Time (%) |     |      |      |     |      |      |     |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |      |      |     |     |     |     |     |      |
| Storage Bay Dist (ft) | 250 |      |      | 85  |      |      | 225 |     |     | 125 | 275 |      |
| Storage Blk Time (%)  |     |      |      | 39  | 0    |      |     |     | 1   | 0   |     |      |
| Queuing Penalty (veh) |     |      |      | 10  | 0    |      |     |     | 2   | 0   |     |      |

Intersection: 2: Temperance Avenue & Alluvial Avenue

| Movement              | SB   | SB  |
|-----------------------|------|-----|
| Directions Served     | T    | R   |
| Maximum Queue (ft)    | 286  | 26  |
| Average Queue (ft)    | 124  | 7   |
| 95th Queue (ft)       | 236  | 25  |
| Link Distance (ft)    | 2703 |     |
| Upstream Blk Time (%) |      |     |
| Queuing Penalty (veh) |      |     |
| Storage Bay Dist (ft) |      | 275 |
| Storage Blk Time (%)  | 1    |     |
| Queuing Penalty (veh) | 0    |     |

Intersection: 3: Temperance Avenue & SR 168 WB Ramp

| Movement              | WB  | WB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | T   | T   | T   | T   | R   |
| Maximum Queue (ft)    | 179 | 72  | 111 | 136 | 114 | 94  | 132 |
| Average Queue (ft)    | 57  | 32  | 34  | 51  | 37  | 21  | 52  |
| 95th Queue (ft)       | 120 | 58  | 88  | 120 | 97  | 68  | 94  |
| Link Distance (ft)    | 478 |     | 581 | 581 | 448 | 448 | 448 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 385 |     |     |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |

Intersection: 4: Temperance Avenue & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | NB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | R   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 119 | 300 | 257 | 105 | 526 | 540 | 47  | 186 | 109 |
| Average Queue (ft)    | 56  | 125 | 47  | 38  | 194 | 270 | 19  | 72  | 34  |
| 95th Queue (ft)       | 105 | 225 | 133 | 94  | 483 | 504 | 40  | 151 | 76  |
| Link Distance (ft)    | 614 | 614 |     | 510 | 510 | 510 |     | 581 | 581 |
| Upstream Blk Time (%) |     |     |     |     | 1   | 2   |     |     |     |
| Queuing Penalty (veh) |     |     |     |     | 4   | 9   |     |     |     |
| Storage Bay Dist (ft) |     |     | 380 |     |     |     | 250 |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | EB  | EB  | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T   | R   | L   | T   | R   | UL  | T   | T   | R   | UL  | L   |
| Maximum Queue (ft)    | 92  | 31  | 92  | 173 | 196 | 172 | 194 | 547 | 551 | 255 | 310 | 393 |
| Average Queue (ft)    | 36  | 1   | 50  | 78  | 13  | 60  | 51  | 441 | 506 | 141 | 222 | 198 |
| 95th Queue (ft)       | 73  | 10  | 79  | 151 | 89  | 124 | 111 | 622 | 607 | 318 | 312 | 356 |
| Link Distance (ft)    |     | 578 | 578 |     | 355 | 355 |     | 528 | 528 |     |     |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     | 3   | 10  |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 18  | 75  |     |     |     |
| Storage Bay Dist (ft) | 130 |     |     | 130 |     |     | 100 |     |     | 105 | 225 | 225 |
| Storage Blk Time (%)  |     |     |     | 3   |     |     | 2   | 35  | 61  | 0   | 17  | 5   |
| Queuing Penalty (veh) |     |     |     | 0   |     |     | 11  | 25  | 68  | 1   | 50  | 15  |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | SB  | SB  |
|-----------------------|-----|-----|
| Directions Served     | T   | TR  |
| Maximum Queue (ft)    | 397 | 291 |
| Average Queue (ft)    | 113 | 81  |
| 95th Queue (ft)       | 293 | 170 |
| Link Distance (ft)    | 545 | 545 |
| Upstream Blk Time (%) |     |     |
| Queuing Penalty (veh) |     |     |
| Storage Bay Dist (ft) |     |     |
| Storage Blk Time (%)  | 1   |     |
| Queuing Penalty (veh) | 5   |     |

Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | B60 | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|-----|
| Directions Served     | ULTR | T   | LTR | LTR | LTR |
| Maximum Queue (ft)    | 162  | 406 | 55  | 80  | 31  |
| Average Queue (ft)    | 88   | 54  | 8   | 25  | 1   |
| 95th Queue (ft)       | 186  | 228 | 33  | 65  | 10  |
| Link Distance (ft)    | 70   | 355 | 230 | 784 | 335 |
| Upstream Blk Time (%) | 15   | 0   |     |     |     |
| Queuing Penalty (veh) | 84   | 1   |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | TR  | L   | T   | T   | R   |
| Maximum Queue (ft)    | 90  | 171  | 112  | 21   | 42  | 197 | 364 | 343 | 164 | 399 | 278 | 20  |
| Average Queue (ft)    | 17  | 66   | 44   | 1    | 9   | 67  | 123 | 127 | 128 | 123 | 54  | 3   |
| 95th Queue (ft)       | 53  | 130  | 92   | 8    | 25  | 137 | 241 | 242 | 182 | 298 | 194 | 15  |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 637 | 637 |     | 441 | 441 |     |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     | 105 |     |     | 130 |
| Storage Blk Time (%)  |     |      |      |      |     | 4   | 14  |     | 25  | 3   | 1   |     |
| Queuing Penalty (veh) |     |      |      |      |     | 12  | 9   |     | 16  | 9   | 0   |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | SB  | SB   | SB   | SB |
|-----------------------|-----|------|------|----|
| Directions Served     | L   | T    | T    | R  |
| Maximum Queue (ft)    | 53  | 74   | 53   | 73 |
| Average Queue (ft)    | 25  | 39   | 20   | 36 |
| 95th Queue (ft)       | 60  | 74   | 52   | 64 |
| Link Distance (ft)    |     | 2411 | 2411 |    |
| Upstream Blk Time (%) |     |      |      |    |
| Queuing Penalty (veh) |     |      |      |    |
| Storage Bay Dist (ft) | 100 |      |      | 80 |
| Storage Blk Time (%)  |     |      |      | 0  |
| Queuing Penalty (veh) |     |      |      | 0  |



Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | EB  | NE  | SW   |
|-----------------------|-----|-----|-----|------|
| Directions Served     | L   | T   | R   | R    |
| Maximum Queue (ft)    | 20  | 27  | 63  | 15   |
| Average Queue (ft)    | 1   | 1   | 23  | 1    |
| 95th Queue (ft)       | 7   | 9   | 41  | 7    |
| Link Distance (ft)    |     | 637 | 775 | 1210 |
| Upstream Blk Time (%) |     |     |     |      |
| Queuing Penalty (veh) |     |     |     |      |
| Storage Bay Dist (ft) | 400 |     |     |      |
| Storage Blk Time (%)  |     |     |     |      |
| Queuing Penalty (veh) |     |     |     |      |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 235 | 320 | 588  | 485  | 62  | 48  | 46  | 242 | 238 | 158 | 505 | 165 |
| Average Queue (ft)    | 138 | 201 | 195  | 83   | 18  | 6   | 21  | 120 | 119 | 59  | 268 | 62  |
| 95th Queue (ft)       | 273 | 368 | 517  | 262  | 47  | 25  | 50  | 198 | 202 | 143 | 453 | 138 |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 150 | 150 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  | 8   | 48  | 1    |      |     |     |     | 3   |     |     | 3   |     |
| Queuing Penalty (veh) | 10  | 58  | 1    |      |     |     |     | 1   |     |     | 5   |     |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R   |
| Maximum Queue (ft)    | 400 | 2682 | 2646 | 240 | 234 | 236 | 303 | 318 | 258 |
| Average Queue (ft)    | 265 | 1527 | 1560 | 162 | 86  | 103 | 89  | 104 | 35  |
| 95th Queue (ft)       | 537 | 2765 | 2778 | 344 | 181 | 191 | 194 | 200 | 106 |
| Link Distance (ft)    |     | 2737 | 2737 |     |     |     | 528 | 528 |     |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     |     | 150 |
| Storage Blk Time (%)  |     | 40   | 89   | 0   | 3   | 6   | 2   | 4   |     |
| Queuing Penalty (veh) |     | 83   | 54   | 1   | 5   | 10  | 4   | 5   |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB  | WB  | WB  | WB  | WB  | WB  | NB  | SB | SB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| Directions Served     | L   | T   | T   | TR  | L   | T   | T   | T   | R   | LTR | LT | R  |
| Maximum Queue (ft)    | 150 | 82  | 131 | 38  | 70  | 136 | 158 | 249 | 45  | 278 | 56 | 74 |
| Average Queue (ft)    | 63  | 16  | 23  | 7   | 25  | 52  | 54  | 118 | 15  | 132 | 26 | 41 |
| 95th Queue (ft)       | 123 | 55  | 70  | 21  | 61  | 111 | 122 | 211 | 41  | 219 | 52 | 77 |
| Link Distance (ft)    |     | 997 | 997 | 997 |     | 286 | 286 | 286 |     | 355 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |     |     | 6  | 2  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |     | 2  | 1  |
| Storage Bay Dist (ft) | 145 |     |     |     | 190 |     |     |     | 120 |     |    |    |
| Storage Blk Time (%)  | 0   |     |     |     |     |     |     | 10  |     |     |    |    |
| Queuing Penalty (veh) | 0   |     |     |     |     |     |     | 4   |     |     |    |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  | NB |
|-----------------------|-----|-----|-----|-----|----|
| Directions Served     | T   | R   | L   | T   | L  |
| Maximum Queue (ft)    | 74  | 56  | 70  | 55  | 75 |
| Average Queue (ft)    | 25  | 25  | 31  | 20  | 6  |
| 95th Queue (ft)       | 54  | 55  | 56  | 48  | 35 |
| Link Distance (ft)    | 784 |     |     | 364 | 0  |
| Upstream Blk Time (%) |     |     |     |     |    |
| Queuing Penalty (veh) |     |     |     |     |    |
| Storage Bay Dist (ft) |     | 100 | 100 |     |    |
| Storage Blk Time (%)  |     |     |     |     |    |
| Queuing Penalty (veh) |     |     |     |     |    |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | EB  | WB  |
|-----------------------|-----|-----|
| Directions Served     | L   | TR  |
| Maximum Queue (ft)    | 29  | 63  |
| Average Queue (ft)    | 4   | 3   |
| 95th Queue (ft)       | 20  | 25  |
| Link Distance (ft)    |     | 488 |
| Upstream Blk Time (%) |     |     |
| Queuing Penalty (veh) |     |     |
| Storage Bay Dist (ft) | 100 |     |
| Storage Blk Time (%)  |     |     |
| Queuing Penalty (veh) |     |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | WB   | NB  | NB  |
|-----------------------|------|-----|-----|
| Directions Served     | L    | L   | R   |
| Maximum Queue (ft)    | 53   | 278 | 19  |
| Average Queue (ft)    | 11   | 74  | 7   |
| 95th Queue (ft)       | 35   | 161 | 22  |
| Link Distance (ft)    | 5138 |     |     |
| Upstream Blk Time (%) |      |     |     |
| Queuing Penalty (veh) |      |     |     |
| Storage Bay Dist (ft) | 250  |     | 250 |
| Storage Blk Time (%)  | 0    |     |     |
| Queuing Penalty (veh) | 0    |     |     |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB  | WB | SB   | SB |
|-----------------------|-----|----|------|----|
| Directions Served     | L   | T  | L    | R  |
| Maximum Queue (ft)    | 52  | 25 | 47   | 43 |
| Average Queue (ft)    | 11  | 1  | 9    | 17 |
| 95th Queue (ft)       | 35  | 8  | 29   | 31 |
| Link Distance (ft)    | 550 |    | 2504 |    |
| Upstream Blk Time (%) |     |    |      |    |
| Queuing Penalty (veh) |     |    |      |    |
| Storage Bay Dist (ft) | 250 |    | 250  |    |
| Storage Blk Time (%)  |     |    |      |    |
| Queuing Penalty (veh) |     |    |      |    |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 108  |
| Average Queue (ft)    | 46   |
| 95th Queue (ft)       | 83   |
| Link Distance (ft)    | 5172 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 31   |
| Average Queue (ft)    | 14   |
| 95th Queue (ft)       | 39   |
| Link Distance (ft)    | 2484 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 120  |
| Average Queue (ft)    | 67   |
| 95th Queue (ft)       | 112  |
| Link Distance (ft)    | 2410 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | WB   | NB   |
|-----------------------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 56   | 53   | 54   |
| Average Queue (ft)    | 22   | 19   | 7    |
| 95th Queue (ft)       | 48   | 46   | 31   |
| Link Distance (ft)    | 6447 | 2721 | 2320 |
| Upstream Blk Time (%) |      |      |      |
| Queuing Penalty (veh) |      |      |      |
| Storage Bay Dist (ft) |      |      |      |
| Storage Blk Time (%)  |      |      |      |
| Queuing Penalty (veh) |      |      |      |

Intersection: 19: Temperance Avenue & New Access Road

| Movement              | WB  | NB  |
|-----------------------|-----|-----|
| Directions Served     | R   | TR  |
| Maximum Queue (ft)    | 157 | 375 |
| Average Queue (ft)    | 60  | 48  |
| 95th Queue (ft)       | 124 | 235 |
| Link Distance (ft)    | 487 | 545 |
| Upstream Blk Time (%) |     |     |
| Queuing Penalty (veh) |     |     |
| Storage Bay Dist (ft) |     |     |
| Storage Blk Time (%)  |     |     |
| Queuing Penalty (veh) |     |     |

Intersection: 20: Locan Avenue & Bullard Ave

| Movement              | EB  | EB   | EB   | WB  | WB   | NB  | NB   | NB | SB   |
|-----------------------|-----|------|------|-----|------|-----|------|----|------|
| Directions Served     | L   | T    | R    | L   | TR   | L   | T    | R  | LTR  |
| Maximum Queue (ft)    | 50  | 66   | 72   | 22  | 81   | 60  | 65   | 20 | 99   |
| Average Queue (ft)    | 23  | 31   | 25   | 3   | 34   | 18  | 33   | 1  | 47   |
| 95th Queue (ft)       | 42  | 46   | 44   | 16  | 64   | 40  | 53   | 7  | 79   |
| Link Distance (ft)    |     | 2664 | 2664 |     | 2564 |     | 2642 |    | 5138 |
| Upstream Blk Time (%) |     |      |      |     |      |     |      |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     |      |    |      |
| Storage Bay Dist (ft) | 270 |      |      | 260 |      | 125 |      | 50 |      |
| Storage Blk Time (%)  |     |      |      |     |      |     | 1    |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     | 1    |    |      |

Intersection: 21: De Wolf Ave & Bullard Ave

| Movement              | EB   | WB   | NB   | SB   |
|-----------------------|------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 76   | 101  | 144  | 78   |
| Average Queue (ft)    | 39   | 46   | 58   | 45   |
| 95th Queue (ft)       | 62   | 82   | 96   | 73   |
| Link Distance (ft)    | 2564 | 2476 | 2636 | 5172 |
| Upstream Blk Time (%) |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |
| Storage Bay Dist (ft) |      |      |      |      |
| Storage Blk Time (%)  |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |

Network Summary

Network wide Queuing Penalty: 694

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | EB   | EB | EB  | WB   | WB | WB | NB   | NB  | NB  | NB   | SB  | SB  |
|-----------------------|------|----|-----|------|----|----|------|-----|-----|------|-----|-----|
| Directions Served     | L    | T  | R   | L    | T  | R  | L    | T   | T   | R    | UL  | T   |
| Maximum Queue (ft)    | 126  | 45 | 152 | 66   | 67 | 21 | 281  | 261 | 171 | 39   | 52  | 140 |
| Average Queue (ft)    | 65   | 15 | 36  | 21   | 15 | 3  | 125  | 45  | 43  | 7    | 18  | 54  |
| 95th Queue (ft)       | 106  | 42 | 83  | 48   | 48 | 15 | 234  | 147 | 118 | 25   | 45  | 104 |
| Link Distance (ft)    | 1573 |    |     | 1457 |    |    | 2703 |     |     | 2703 |     |     |
| Upstream Blk Time (%) |      |    |     |      |    |    |      |     |     |      |     |     |
| Queuing Penalty (veh) |      |    |     |      |    |    |      |     |     |      |     |     |
| Storage Bay Dist (ft) | 240  |    | 80  | 100  |    | 25 | 240  |     |     | 120  | 250 |     |
| Storage Blk Time (%)  |      |    | 1   |      | 16 | 1  | 2    |     | 1   |      |     |     |
| Queuing Penalty (veh) |      |    | 1   |      | 5  | 0  | 4    |     | 0   |      |     |     |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | SB   | SB |
|-----------------------|------|----|
| Directions Served     | T    | R  |
| Maximum Queue (ft)    | 94   | 49 |
| Average Queue (ft)    | 25   | 16 |
| 95th Queue (ft)       | 61   | 39 |
| Link Distance (ft)    | 1298 |    |
| Upstream Blk Time (%) |      |    |
| Queuing Penalty (veh) |      |    |
| Storage Bay Dist (ft) |      | 95 |
| Storage Blk Time (%)  | 0    |    |
| Queuing Penalty (veh) | 0    |    |

Intersection: 2: Temperance Avenue & Alluvial Avenue

| Movement              | EB  | EB   | EB   | WB  | WB   | WB   | NB  | NB  | NB  | NB  | SB  | SB   |
|-----------------------|-----|------|------|-----|------|------|-----|-----|-----|-----|-----|------|
| Directions Served     | L   | T    | R    | L   | T    | TR   | L   | T   | T   | R   | L   | T    |
| Maximum Queue (ft)    | 114 | 96   | 108  | 201 | 277  | 151  | 132 | 261 | 276 | 245 | 119 | 138  |
| Average Queue (ft)    | 36  | 26   | 35   | 118 | 25   | 37   | 57  | 113 | 111 | 45  | 57  | 62   |
| 95th Queue (ft)       | 77  | 60   | 66   | 192 | 111  | 93   | 117 | 201 | 197 | 118 | 112 | 114  |
| Link Distance (ft)    |     | 2839 | 2839 |     | 1365 | 1365 |     | 448 | 448 |     |     | 2703 |
| Upstream Blk Time (%) |     |      |      |     |      |      |     |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |      |      |     |     |     |     |     |      |
| Storage Bay Dist (ft) | 250 |      |      | 85  |      |      | 225 |     |     | 125 | 275 |      |
| Storage Blk Time (%)  |     |      |      | 24  | 0    |      |     | 1   | 4   |     |     |      |
| Queuing Penalty (veh) |     |      |      | 3   | 0    |      |     | 1   | 10  |     |     |      |

Intersection: 2: Temperance Avenue & Alluvial Avenue

| Movement              | SB   | SB |
|-----------------------|------|----|
| Directions Served     | T    | R  |
| Maximum Queue (ft)    | 140  | 27 |
| Average Queue (ft)    | 81   | 7  |
| 95th Queue (ft)       | 144  | 25 |
| Link Distance (ft)    | 2703 |    |
| Upstream Blk Time (%) |      |    |
| Queuing Penalty (veh) |      |    |
| Storage Bay Dist (ft) | 275  |    |
| Storage Blk Time (%)  |      |    |
| Queuing Penalty (veh) |      |    |

Intersection: 3: Temperance Avenue & SR 168 WB Ramp

| Movement              | WB  | WB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | T   | T   | T   | T   | R   |
| Maximum Queue (ft)    | 76  | 54  | 110 | 182 | 86  | 76  | 56  |
| Average Queue (ft)    | 37  | 23  | 51  | 59  | 23  | 25  | 23  |
| 95th Queue (ft)       | 65  | 44  | 108 | 136 | 66  | 68  | 57  |
| Link Distance (ft)    | 478 |     | 581 | 581 | 448 | 448 | 448 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 385 |     |     |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |

Intersection: 4: Temperance Avenue & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | NB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | R   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 236 | 276 | 264 | 340 | 326 | 325 | 62  | 119 | 172 |
| Average Queue (ft)    | 107 | 159 | 121 | 106 | 152 | 201 | 25  | 59  | 66  |
| 95th Queue (ft)       | 191 | 262 | 236 | 238 | 289 | 324 | 54  | 112 | 138 |
| Link Distance (ft)    | 613 | 613 |     | 517 | 517 | 517 |     | 581 | 581 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     |     | 380 |     |     |     | 250 |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | EB  | EB  | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T   | R   | L   | T   | R   | UL  | T   | T   | R   | UL  | L   |
| Maximum Queue (ft)    | 215 | 52  | 149 | 174 | 341 | 203 | 194 | 376 | 464 | 254 | 200 | 394 |
| Average Queue (ft)    | 113 | 11  | 46  | 121 | 44  | 108 | 94  | 131 | 156 | 28  | 112 | 103 |
| 95th Queue (ft)       | 183 | 36  | 88  | 185 | 181 | 180 | 172 | 264 | 295 | 105 | 176 | 298 |
| Link Distance (ft)    |     | 549 | 549 |     | 355 | 355 |     | 528 | 528 |     |     |     |
| Upstream Blk Time (%) |     |     |     |     | 0   |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     | 0   |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 130 |     |     | 130 |     |     | 100 |     |     | 105 | 225 | 225 |
| Storage Blk Time (%)  | 8   |     |     | 15  |     |     | 14  | 12  | 24  |     |     | 0   |
| Queuing Penalty (veh) | 1   |     |     | 3   |     |     | 46  | 13  | 12  |     |     | 0   |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | SB  | SB  |
|-----------------------|-----|-----|
| Directions Served     | T   | TR  |
| Maximum Queue (ft)    | 476 | 480 |
| Average Queue (ft)    | 262 | 290 |
| 95th Queue (ft)       | 416 | 434 |
| Link Distance (ft)    | 537 | 537 |
| Upstream Blk Time (%) |     |     |
| Queuing Penalty (veh) |     |     |
| Storage Bay Dist (ft) |     |     |
| Storage Blk Time (%)  | 16  |     |
| Queuing Penalty (veh) | 34  |     |



Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | B60 | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|-----|
| Directions Served     | ULTR | T   | LTR | LTR | LTR |
| Maximum Queue (ft)    | 166  | 73  | 50  | 31  | 82  |
| Average Queue (ft)    | 30   | 2   | 12  | 5   | 31  |
| 95th Queue (ft)       | 98   | 24  | 37  | 24  | 78  |
| Link Distance (ft)    | 70   | 355 | 230 | 785 | 335 |
| Upstream Blk Time (%) | 2    |     |     |     |     |
| Queuing Penalty (veh) | 4    |     |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | TR  | L   | T   | T   | R   |
| Maximum Queue (ft)    | 72  | 187  | 174  | 139  | 70  | 147 | 178 | 173 | 164 | 198 | 61  | 15  |
| Average Queue (ft)    | 29  | 104  | 99   | 36   | 31  | 59  | 44  | 47  | 84  | 55  | 17  | 3   |
| 95th Queue (ft)       | 64  | 161  | 167  | 106  | 62  | 119 | 127 | 109 | 141 | 128 | 44  | 12  |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 637 | 637 |     | 441 | 441 |     |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     | 105 |     |     | 130 |
| Storage Blk Time (%)  |     |      |      | 0    |     | 2   | 2   |     | 5   | 3   |     |     |
| Queuing Penalty (veh) |     |      |      | 1    |     | 5   | 2   |     | 3   | 5   |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | SB  | SB   | SB   | SB |
|-----------------------|-----|------|------|----|
| Directions Served     | L   | T    | T    | R  |
| Maximum Queue (ft)    | 54  | 122  | 95   | 74 |
| Average Queue (ft)    | 18  | 53   | 32   | 37 |
| 95th Queue (ft)       | 47  | 98   | 78   | 67 |
| Link Distance (ft)    |     | 2411 | 2411 |    |
| Upstream Blk Time (%) |     |      |      |    |
| Queuing Penalty (veh) |     |      |      |    |
| Storage Bay Dist (ft) | 100 |      |      | 80 |
| Storage Blk Time (%)  |     | 1    | 2    | 0  |
| Queuing Penalty (veh) |     | 0    | 2    | 0  |

Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | WB  | WB | NE  | SW   |
|-----------------------|-----|-----|----|-----|------|
| Directions Served     | L   | U   | R  | R   | R    |
| Maximum Queue (ft)    | 41  | 9   | 21 | 134 | 22   |
| Average Queue (ft)    | 6   | 1   | 1  | 42  | 1    |
| 95th Queue (ft)       | 26  | 4   | 7  | 85  | 10   |
| Link Distance (ft)    |     |     |    | 775 | 1210 |
| Upstream Blk Time (%) |     |     |    |     |      |
| Queuing Penalty (veh) |     |     |    |     |      |
| Storage Bay Dist (ft) | 400 | 120 | 85 |     |      |
| Storage Blk Time (%)  |     |     |    |     |      |
| Queuing Penalty (veh) |     |     |    |     |      |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 98  | 154 | 192  | 190  | 98  | 26  | 47  | 192 | 239 | 193 | 193 | 95  |
| Average Queue (ft)    | 44  | 63  | 77   | 95   | 43  | 6   | 16  | 82  | 83  | 42  | 73  | 54  |
| 95th Queue (ft)       | 90  | 119 | 154  | 171  | 77  | 22  | 37  | 158 | 176 | 134 | 145 | 85  |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 150 | 150 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  |     | 0   | 2    | 1    |     |     |     | 1   |     |     |     |     |
| Queuing Penalty (veh) |     | 0   | 3    | 2    |     |     |     | 0   |     |     |     |     |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R   |
| Maximum Queue (ft)    | 120 | 167  | 241  | 240 | 260 | 301 | 232 | 249 | 89  |
| Average Queue (ft)    | 68  | 90   | 112  | 26  | 93  | 117 | 102 | 106 | 34  |
| 95th Queue (ft)       | 111 | 162  | 191  | 98  | 183 | 198 | 199 | 194 | 67  |
| Link Distance (ft)    |     | 2737 | 2737 |     |     |     | 528 | 528 |     |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     |     | 150 |
| Storage Blk Time (%)  |     |      | 18   |     | 1   | 3   | 2   | 4   |     |
| Queuing Penalty (veh) |     |      | 8    |     | 2   | 10  | 8   | 8   |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB  | WB  | WB  | WB  | WB  | WB  | NB  | SB | SB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| Directions Served     | L   | T   | T   | TR  | L   | T   | T   | T   | R   | LTR | LT | R  |
| Maximum Queue (ft)    | 107 | 127 | 172 | 16  | 25  | 94  | 94  | 151 | 74  | 177 | 78 | 69 |
| Average Queue (ft)    | 43  | 20  | 36  | 2   | 3   | 47  | 46  | 73  | 8   | 86  | 50 | 39 |
| 95th Queue (ft)       | 89  | 68  | 105 | 10  | 16  | 90  | 87  | 130 | 35  | 148 | 73 | 64 |
| Link Distance (ft)    |     | 997 | 997 | 997 |     | 286 | 286 | 286 |     | 355 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |     |     | 49 | 6  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |     | 42 | 5  |
| Storage Bay Dist (ft) | 145 |     |     |     | 190 |     |     |     | 120 |     |    |    |
| Storage Blk Time (%)  |     | 0   |     |     |     |     |     | 1   |     |     |    |    |
| Queuing Penalty (veh) |     | 0   |     |     |     |     |     | 0   |     |     |    |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  | NB  | NB |
|-----------------------|-----|-----|-----|-----|-----|----|
| Directions Served     | T   | R   | L   | T   | L   | R  |
| Maximum Queue (ft)    | 55  | 73  | 93  | 32  | 102 | 45 |
| Average Queue (ft)    | 15  | 38  | 42  | 13  | 10  | 3  |
| 95th Queue (ft)       | 43  | 60  | 77  | 39  | 51  | 22 |
| Link Distance (ft)    | 785 |     |     | 364 | 0   | 0  |
| Upstream Blk Time (%) |     |     |     |     | 0   |    |
| Queuing Penalty (veh) |     |     |     |     | 0   |    |
| Storage Bay Dist (ft) |     | 100 | 100 |     |     |    |
| Storage Blk Time (%)  |     |     | 0   |     |     |    |
| Queuing Penalty (veh) |     |     | 0   |     |     |    |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | SB  |
|-----------------------|-----|
| Directions Served     | R   |
| Maximum Queue (ft)    | 28  |
| Average Queue (ft)    | 1   |
| 95th Queue (ft)       | 9   |
| Link Distance (ft)    | 903 |
| Upstream Blk Time (%) |     |
| Queuing Penalty (veh) |     |
| Storage Bay Dist (ft) |     |
| Storage Blk Time (%)  |     |
| Queuing Penalty (veh) |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | EB   | WB  | NB  | NB |
|-----------------------|------|-----|-----|----|
| Directions Served     | R    | L   | L   | R  |
| Maximum Queue (ft)    | 23   | 27  | 90  | 53 |
| Average Queue (ft)    | 1    | 9   | 38  | 19 |
| 95th Queue (ft)       | 7    | 28  | 68  | 42 |
| Link Distance (ft)    | 5192 |     |     |    |
| Upstream Blk Time (%) |      |     |     |    |
| Queuing Penalty (veh) |      |     |     |    |
| Storage Bay Dist (ft) | 250  | 250 | 250 |    |
| Storage Blk Time (%)  |      |     |     |    |
| Queuing Penalty (veh) |      |     |     |    |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB  | WB  | SB   | SB |
|-----------------------|-----|-----|------|----|
| Directions Served     | L   | T   | L    | R  |
| Maximum Queue (ft)    | 63  | 22  | 25   | 65 |
| Average Queue (ft)    | 16  | 1   | 4    | 18 |
| 95th Queue (ft)       | 45  | 7   | 18   | 40 |
| Link Distance (ft)    | 550 |     | 2504 |    |
| Upstream Blk Time (%) |     |     |      |    |
| Queuing Penalty (veh) |     |     |      |    |
| Storage Bay Dist (ft) | 250 | 250 |      |    |
| Storage Blk Time (%)  |     |     |      |    |
| Queuing Penalty (veh) |     |     |      |    |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 107  |
| Average Queue (ft)    | 42   |
| 95th Queue (ft)       | 75   |
| Link Distance (ft)    | 5219 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 53   |
| Average Queue (ft)    | 11   |
| 95th Queue (ft)       | 37   |
| Link Distance (ft)    | 2484 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 78   |
| Average Queue (ft)    | 49   |
| 95th Queue (ft)       | 74   |
| Link Distance (ft)    | 2410 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | WB   | NB   |
|-----------------------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 56   | 30   | 31   |
| Average Queue (ft)    | 38   | 14   | 5    |
| 95th Queue (ft)       | 55   | 35   | 23   |
| Link Distance (ft)    | 6447 | 2721 | 2320 |
| Upstream Blk Time (%) |      |      |      |
| Queuing Penalty (veh) |      |      |      |
| Storage Bay Dist (ft) |      |      |      |
| Storage Blk Time (%)  |      |      |      |
| Queuing Penalty (veh) |      |      |      |

Intersection: 19: Temperance Avenue & New Access Road

| Movement              | WB  |
|-----------------------|-----|
| Directions Served     | R   |
| Maximum Queue (ft)    | 140 |
| Average Queue (ft)    | 69  |
| 95th Queue (ft)       | 122 |
| Link Distance (ft)    | 492 |
| Upstream Blk Time (%) |     |
| Queuing Penalty (veh) |     |
| Storage Bay Dist (ft) |     |
| Storage Blk Time (%)  |     |
| Queuing Penalty (veh) |     |

Intersection: 20: Locan Avenue & Bullard Avenue

| Movement              | EB  | EB   | EB   | WB  | WB   | NB  | NB   | NB | SB   |
|-----------------------|-----|------|------|-----|------|-----|------|----|------|
| Directions Served     | L   | T    | R    | L   | TR   | L   | T    | R  | LTR  |
| Maximum Queue (ft)    | 65  | 69   | 50   | 22  | 39   | 50  | 47   | 44 | 89   |
| Average Queue (ft)    | 16  | 35   | 20   | 5   | 21   | 18  | 25   | 7  | 50   |
| 95th Queue (ft)       | 44  | 56   | 41   | 17  | 38   | 43  | 45   | 25 | 74   |
| Link Distance (ft)    |     | 2614 | 2614 |     | 2615 |     | 2605 |    | 5192 |
| Upstream Blk Time (%) |     |      |      |     |      |     |      |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     |      |    |      |
| Storage Bay Dist (ft) | 270 |      |      | 260 |      | 125 |      | 50 |      |
| Storage Blk Time (%)  |     |      |      |     |      |     | 0    | 0  |      |
| Queuing Penalty (veh) |     |      |      |     |      |     | 0    | 0  |      |

Intersection: 21: De Wolf Ave & Bullard Avenue

| Movement              | EB   | WB   | NB   | SB   |
|-----------------------|------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 94   | 79   | 56   | 123  |
| Average Queue (ft)    | 55   | 43   | 42   | 60   |
| 95th Queue (ft)       | 78   | 66   | 60   | 93   |
| Link Distance (ft)    | 2615 | 2621 | 2617 | 5219 |
| Upstream Blk Time (%) |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |
| Storage Bay Dist (ft) |      |      |      |      |
| Storage Blk Time (%)  |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |

Network Summary

|                                   |
|-----------------------------------|
| Network wide Queuing Penalty: 245 |
|-----------------------------------|

## Appendix G: LOS Worksheets, Near Term plus Project Phase 1



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





















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# HCM Signalized Intersection Capacity Analysis

NT + Proj Phase 1 AM Peak

## 1: Temperance Avenue & Nees Ave

3/29/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph)                      | 70  | 67  | 162   | 184   | 67  | 25  | 32   | 136   | 285   | 152   | 100   | 705   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  | 0.98  |  | 1.00  | 1.00  | 0.97  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1534  |  | 1752  | 3505  | 1528  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1534  |  | 1752  | 3505  | 1528  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  | 0.90   | 0.90  | 0.90  | 0.90  | 0.90  | 0.90  |
| Adj. Flow (vph)                   | 78  | 74  | 180   | 204   | 74  | 28  | 36   | 151   | 317   | 169   | 111   | 783   |
| RTOR Reduction (vph)              | 0   | 0   | 158   | 0   | 0   | 24  | 0  | 0   | 0   | 111   | 0   | 0   |
| Lane Group Flow (vph)             | 78  | 74  | 22  | 204   | 74  | 4   | 0  | 187   | 317   | 58  | 111   | 783   |
| Confl. Peds. (#/hr)               |   |   | 1   |   |   | 9   |  |   |   | 3   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 15.7  | 14.4  | 14.4  | 18.9  | 17.2  | 17.2  |  | 16.9  | 41.0  | 41.0  | 26.7  | 50.8  |
| Effective Green, g (s)            | 15.7  | 14.4  | 14.4  | 18.9  | 17.2  | 17.2  |  | 16.9  | 41.0  | 41.0  | 26.7  | 50.8  |
| Actuated g/C Ratio                | 0.13  | 0.12  | 0.12  | 0.16  | 0.14  | 0.14  |  | 0.14  | 0.34  | 0.34  | 0.22  | 0.42  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 229   | 221   | 185   | 275   | 264   | 219   |  | 246   | 1197  | 522   | 389   | 1483  |
| v/s Ratio Prot                    | 0.04  | c0.04   |   | c0.12   | 0.04  |   |  | c0.11   | 0.09  |   | 0.06  | c0.22   |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | 0.00  |  |   |   | 0.04  |   |   |
| v/c Ratio                         | 0.34  | 0.33  | 0.12  | 0.74  | 0.28  | 0.02  |  | 0.76  | 0.26  | 0.11  | 0.29  | 0.53  |
| Uniform Delay, d1                 | 47.4  | 48.4  | 47.1  | 48.2  | 45.9  | 44.1  |  | 49.6  | 28.6  | 27.0  | 38.7  | 25.7  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 0.88  | 0.46  | 0.55  | 1.00  | 1.00  |
| Incremental Delay, d2             | 0.9   | 0.9   | 0.3   | 10.3  | 0.6   | 0.0   |  | 12.3  | 0.5   | 0.4   | 0.4   | 1.3   |
| Delay (s)                         | 48.3  | 49.3  | 47.4  | 58.5  | 46.5  | 44.2  |  | 55.7  | 13.7  | 15.3  | 39.1  | 27.0  |
| Level of Service                  | D   | D   | D   | E   | D   | D   |  | E   | B   | B   | D   | C   |
| Approach Delay (s)                |   | 48.0  |   |   | 54.3  |   |  |   | 25.8  |   |   | 27.4  |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | C   |   |   | C   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 33.2  |   |   |   | HCM 2000 Level of Service  |   | C   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.58  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 71.9%   |   |   |   | ICU Level of Service   |   | C   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

NT + Proj Phase 1 AM Peak

3/29/2017

|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 193  |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.99 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1547 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1547 |
| Peak-hour factor, PHF  | 0.90 |
| Adj. Flow (vph)        | 214  |
| RTOR Reduction (vph)   | 82   |
| Lane Group Flow (vph)  | 132  |
| Confl. Peds. (#/hr)    | 1    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 50.8 |
| Effective Green, g (s) | 50.8 |
| Actuated g/C Ratio     | 0.42 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 654  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.09 |
| v/c Ratio              | 0.20 |
| Uniform Delay, d1      | 21.8 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.7  |
| Delay (s)              | 22.5 |
| Level of Service       | C    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# MOVEMENT SUMMARY



Site: Near Term plus Project - AM Roundabout at Temperance and Owens Mt Parkway

New Site  
Roundabout

| Movement Performance - Vehicles |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
|---------------------------------|--------|--------------------------------|------------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID                          | OD Mov | Demand Flows<br>Total<br>veh/h | Flows<br>HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>ft | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>mph |
| South: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 3                               | L2     | 101                            | 3.0              | 0.708            | 13.3                 | LOS B            | 5.1                                  | 129.7                   | 0.71         | 0.87                           | 32.7                 |
| 8                               | T1     | 496                            | 3.0              | 0.708            | 7.2                  | LOS A            | 5.1                                  | 129.7                   | 0.71         | 0.87                           | 31.8                 |
| 18                              | R2     | 860                            | 3.0              | 0.918            | 13.0                 | LOS B            | 12.9                                 | 329.7                   | 0.94         | 1.25                           | 25.8                 |
| Approach                        |        | 1457                           | 3.0              | 0.918            | 11.1                 | LOS B            | 12.9                                 | 329.7                   | 0.85         | 1.10                           | 28.8                 |
| East: Owens Mt Parkway          |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 1                               | L2     | 384                            | 3.0              | 0.378            | 10.9                 | LOS B            | 2.3                                  | 60.1                    | 0.67         | 0.79                           | 26.2                 |
| 6                               | T1     | 76                             | 3.0              | 0.113            | 5.3                  | LOS A            | 0.5                                  | 12.6                    | 0.57         | 0.55                           | 33.5                 |
| 16                              | R2     | 80                             | 3.0              | 0.072            | 4.4                  | LOS A            | 0.3                                  | 8.6                     | 0.48         | 0.55                           | 32.6                 |
| Approach                        |        | 539                            | 3.0              | 0.378            | 9.2                  | LOS A            | 2.3                                  | 60.1                    | 0.63         | 0.72                           | 28.8                 |
| North: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 7                               | L2     | 276                            | 3.0              | 0.621            | 11.6                 | LOS B            | 3.7                                  | 95.6                    | 0.63         | 0.78                           | 32.6                 |
| 4                               | T1     | 858                            | 3.0              | 0.621            | 5.5                  | LOS A            | 3.8                                  | 96.0                    | 0.63         | 0.68                           | 32.2                 |
| 14                              | R2     | 41                             | 3.0              | 0.621            | 6.0                  | LOS A            | 3.8                                  | 96.0                    | 0.63         | 0.63                           | 32.9                 |
| Approach                        |        | 1174                           | 3.0              | 0.621            | 6.9                  | LOS A            | 3.8                                  | 96.0                    | 0.63         | 0.70                           | 32.4                 |
| West: Alluvial Avenue           |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 5                               | L2     | 14                             | 3.0              | 0.412            | 15.8                 | LOS C            | 2.0                                  | 51.5                    | 0.78         | 0.90                           | 33.0                 |
| 2                               | T1     | 306                            | 3.0              | 0.412            | 9.3                  | LOS A            | 2.1                                  | 54.7                    | 0.78         | 0.90                           | 32.4                 |
| 12                              | R2     | 102                            | 3.0              | 0.412            | 9.3                  | LOS A            | 2.1                                  | 54.7                    | 0.79         | 0.90                           | 30.9                 |
| Approach                        |        | 422                            | 3.0              | 0.412            | 9.5                  | LOS A            | 2.1                                  | 54.7                    | 0.78         | 0.90                           | 32.1                 |
| All Vehicles                    |        | 3593                           | 3.0              | 0.918            | 9.2                  | LOS A            | 12.9                                 | 329.7                   | 0.73         | 0.89                           | 30.6                 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: JLB TRAFFIC ENGINEERING, INC. | Processed: Wednesday, November 08, 2017 8:57:19 AM

Project: Z:\01 Projects\006 Clovis\006-009 CCMC Phase 2 TIA\Background\Alluvial at Temperance Roundabout\Temperance Alluvial.sip6

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Avenue & SR 168 WB Ramp

NT + Proj Phase 1 AM Peak

3/29/2017


















| Movement                     | EBL | EBT   | EBR | WBL  | WBT  | WBR   | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|-----|-------|-----|------|------|-------|------|------|------|------|------|------|
| Lane Configurations          |     |       |     |      |      |       |      |      |      |      |      |      |
| Volume (veh/h)               | 0   | 0     | 0   | 85   | 0    | 116   | 0    | 1375 | 1051 | 0    | 591  | 704  |
| Number                       |     |       |     | 3    | 8    | 18    | 5    | 2    | 12   | 1    | 6    | 16   |
| Initial Q (Qb), veh          |     |       |     | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          |     |       |     | 1.00 |      | 1.00  | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             |     |       |     | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       |     |       |     | 1845 | 0    | 1845  | 0    | 1845 | 1845 | 0    | 1845 | 1845 |
| Adj Flow Rate, veh/h         |     |       |     | 92   | 0    | 126   | 0    | 1495 | 0    | 0    | 642  | 765  |
| Adj No. of Lanes             |     |       |     | 1    | 0    | 1     | 0    | 2    | 1    | 0    | 2    | 1    |
| Peak Hour Factor             |     |       |     | 0.92 | 0.92 | 0.92  | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         |     |       |     | 3    | 0    | 3     | 0    | 3    | 3    | 0    | 3    | 3    |
| Cap, veh/h                   |     |       |     | 177  | 0    | 163   | 0    | 2919 | 1289 | 0    | 2919 | 1306 |
| Arrive On Green              |     |       |     | 0.10 | 0.00 | 0.10  | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Sat Flow, veh/h              |     |       |     | 1757 | 0    | 1568  | 0    | 3597 | 1568 | 0    | 3597 | 1568 |
| Grp Volume(v), veh/h         |     |       |     | 92   | 0    | 126   | 0    | 1495 | 0    | 0    | 642  | 765  |
| Grp Sat Flow(s),veh/h/ln     |     |       |     | 1757 | 0    | 1568  | 0    | 1752 | 1568 | 0    | 1752 | 1568 |
| Q Serve(g_s), s              |     |       |     | 6.0  | 0.0  | 9.4   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s        |     |       |     | 6.0  | 0.0  | 9.4   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Prop In Lane                 |     |       |     | 1.00 |      | 1.00  | 0.00 |      | 1.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       |     |       |     | 177  | 0    | 163   | 0    | 2919 | 1289 | 0    | 2919 | 1306 |
| V/C Ratio(X)                 |     |       |     | 0.52 | 0.00 | 0.77  | 0.00 | 0.51 | 0.00 | 0.00 | 0.22 | 0.59 |
| Avail Cap(c_a), veh/h        |     |       |     | 278  | 0    | 253   | 0    | 2919 | 1289 | 0    | 2919 | 1306 |
| HCM Platoon Ratio            |     |       |     | 1.00 | 1.00 | 1.00  | 1.00 | 2.00 | 2.00 | 1.00 | 1.67 | 1.67 |
| Upstream Filter(I)           |     |       |     | 1.00 | 0.00 | 1.00  | 0.00 | 0.09 | 0.00 | 0.00 | 0.43 | 0.43 |
| Uniform Delay (d), s/veh     |     |       |     | 51.2 | 0.0  | 52.4  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Incr Delay (d2), s/veh       |     |       |     | 2.4  | 0.0  | 7.6   | 0.0  | 0.1  | 0.0  | 0.0  | 0.1  | 0.8  |
| Initial Q Delay(d3),s/veh    |     |       |     | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |     |       |     | 3.0  | 0.0  | 4.4   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.3  |
| LnGrp Delay(d),s/veh         |     |       |     | 53.6 | 0.0  | 60.0  | 0.0  | 0.1  | 0.0  | 0.0  | 0.1  | 0.8  |
| LnGrp LOS                    |     |       |     | D    |      | E     |      | A    |      |      | A    | A    |
| Approach Vol, veh/h          |     |       |     |      | 218  |       |      | 1495 |      |      | 1407 |      |
| Approach Delay, s/veh        |     |       |     |      | 57.3 |       |      | 0.1  |      |      | 0.5  |      |
| Approach LOS                 |     |       |     |      | E    |       |      | A    |      |      | A    |      |
| Timer                        | 1   | 2     | 3   | 4    | 5    | 6     | 7    | 8    |      |      |      |      |
| Assigned Phs                 |     | 2     |     |      |      | 6     |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |     | 103.9 |     |      |      | 103.9 |      | 16.1 |      |      |      |      |
| Change Period (Y+Rc), s      |     | 5.3   |     |      |      | 5.3   |      | 4.2  |      |      |      |      |
| Max Green Setting (Gmax), s  |     | 91.7  |     |      |      | 91.7  |      | 18.8 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |     | 2.0   |     |      |      | 2.0   |      | 11.4 |      |      |      |      |
| Green Ext Time (p_c), s      |     | 33.5  |     |      |      | 33.5  |      | 0.5  |      |      |      |      |
| <b>Intersection Summary</b>  |     |       |     |      |      |       |      |      |      |      |      |      |
| HCM 2010 Ctrl Delay          |     |       |     | 4.3  |      |       |      |      |      |      |      |      |
| HCM 2010 LOS                 |     |       |     | A    |      |       |      |      |      |      |      |      |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

NT + Proj Phase 1 AM Peak

3/29/2017























|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 616   | 0   | 577   | 0   | 0   | 0   | 0  | 1864  | 53  | 26  | 652   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 662   | 0   | 620   |   |   |   | 0  | 2004  | 57  | 28  | 701   | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 600   | 0   | 541   |   |   |   | 0  | 1822  | 52  | 45  | 2074  | 0   |
| Arrive On Green              | 0.34  | 0.00  | 0.34  |   |   |   | 0.00   | 0.70  | 0.68  | 0.01  | 0.20  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0  | 3573  | 99  | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 662   | 0   | 620   |   |   |   | 0  | 1004  | 1057  | 28  | 701   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0  | 1752  | 1827  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 41.0  | 0.0   | 41.4  |   |   |   | 0.0  | 62.8  | 62.8  | 1.9   | 20.7  | 0.0   |
| Cycle Q Clear(g_c), s        | 41.0  | 0.0   | 41.4  |   |   |   | 0.0  | 62.8  | 62.8  | 1.9   | 20.7  | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.05  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 600   | 0   | 541   |   |   |   | 0  | 917   | 956   | 45  | 2074  | 0   |
| V/C Ratio(X)                 | 1.10  | 0.00  | 1.15  |   |   |   | 0.00   | 1.09  | 1.11  | 0.62  | 0.34  | 0.00  |
| Avail Cap(c_a), veh/h        | 600   | 0   | 541   |   |   |   | 0  | 917   | 956   | 61  | 2074  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.33  | 1.33  | 0.33  | 0.33  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.98  | 0.98  | 0.00  |
| Uniform Delay (d), s/veh     | 39.5  | 0.0   | 39.3  |   |   |   | 0.0  | 18.2  | 18.3  | 58.9  | 28.0  | 0.0   |
| Incr Delay (d2), s/veh       | 68.1  | 0.0   | 85.8  |   |   |   | 0.0  | 59.1  | 62.4  | 12.6  | 0.4   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 31.2  | 0.0   | 30.8  |   |   |   | 0.0  | 44.6  | 47.4  | 1.1   | 10.2  | 0.0   |
| LnGrp Delay(d),s/veh         | 107.6   | 0.0   | 125.1   |   |   |   | 0.0  | 77.3  | 80.7  | 71.4  | 28.5  | 0.0   |
| LnGrp LOS                    | F   |   | F   |   |   |   |  | F   | F   | E   | C   |   |
| Approach Vol, veh/h          | 1282  |   |   |   |   |   | 2061   |   |   | 729   |   |   |
| Approach Delay, s/veh        | 116.1   |   |   |   |   |   | 79.0   |   |   | 30.1  |   |   |
| Approach LOS                 | F   |   |   |   |   |   | E  |   |   | C   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 8.2   | 66.8  |   | 45.0  |   | 75.0  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 4.0   | * 62  |   | * 41  |   | 69.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 3.9   | 64.8  |   | 43.4  |   | 22.7  |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 0.0   |   | 0.0   |   | 3.5   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 81.9  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | F   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

NT + Proj Phase 1 AM Peak

3/29/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBU   | SBL   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |   |  |
| Volume (vph)                      | 53  | 5   | 148   | 95  | 4   | 151   | 1  | 69  | 1623  | 112   | 21  | 454   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.2   | 4.2   | 4.0   | 4.2   | 4.0   |  | 4.2   | 4.0   | 4.0   |   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  |   | 0.97  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.99  |   | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  |   | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  |   | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1546  |   | 3400  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1546  |   | 3400  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 58  | 5   | 161   | 103   | 4   | 164   | 1  | 75  | 1764  | 122   | 23  | 493   |
| RTOR Reduction (vph)              | 0   | 0   | 145   | 0   | 0   | 147   | 0  | 0   | 0   | 42  | 0   | 0   |
| Lane Group Flow (vph)             | 58  | 5   | 16  | 103   | 4   | 17  | 0  | 76  | 1764  | 80  | 0   | 516   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | Prot  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 1   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 14.8  | 12.0  | 12.0  | 14.7  | 11.9  | 11.9  |  | 20.9  | 60.8  | 60.8  |   | 14.6  |
| Effective Green, g (s)            | 14.8  | 12.0  | 12.0  | 14.9  | 11.9  | 12.1  |  | 20.9  | 62.1  | 62.1  |   | 14.8  |
| Actuated g/C Ratio                | 0.12  | 0.10  | 0.10  | 0.12  | 0.10  | 0.10  |  | 0.17  | 0.52  | 0.52  |   | 0.12  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   |  | 4.2   | 5.3   | 5.3   |   | 4.2   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   |   | 3.0   |
| Lane Grp Cap (vph)                | 216   | 184   | 156   | 217   | 182   | 158   |  | 305   | 1813  | 800   |   | 419   |
| v/s Ratio Prot                    | 0.03  | 0.00  |   | c0.06   | 0.00  |   |  | 0.04  | c0.50   |   |   | c0.15   |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | c0.01   |  |   |   | 0.05  |   |   |
| v/c Ratio                         | 0.27  | 0.03  | 0.10  | 0.47  | 0.02  | 0.10  |  | 0.25  | 0.97  | 0.10  |   | 1.23  |
| Uniform Delay, d1                 | 47.7  | 48.7  | 49.1  | 48.9  | 48.8  | 49.0  |  | 42.8  | 28.1  | 14.7  |   | 52.6  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.09  | 1.00  | 0.55  |   | 0.97  |
| Incremental Delay, d2             | 0.7   | 0.1   | 0.3   | 1.6   | 0.0   | 0.3   |  | 0.3   | 10.9  | 0.1   |   | 120.9   |
| Delay (s)                         | 48.4  | 48.8  | 49.4  | 50.5  | 48.8  | 49.3  |  | 47.0  | 39.2  | 8.2   |   | 172.1   |
| Level of Service                  | D   | D   | D   | D   | D   | D   |  | D   | D   | A   |   | F   |
| Approach Delay (s)                |   | 49.1  |   |   | 49.8  |   |  |   | 37.6  |   |   |   |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | D   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 54.3  |   |   | HCM 2000 Level of Service   |  |   | D   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.84  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   | Sum of lost time (s)  |  |   | 16.6  |   |   |   |
| Intersection Capacity Utilization |   |   | 84.6%   |   |   | ICU Level of Service  |  |   | E   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

NT + Proj Phase 1 AM Peak

3/29/2017



| Movement               | SBT  | SBR  |
|------------------------|------|------|
| Lane Configurations    | ↑↑   | ↑    |
| Volume (vph)           | 758  | 69   |
| Ideal Flow (vphpl)     | 1900 | 1900 |
| Total Lost time (s)    | 4.0  |      |
| Lane Util. Factor      | 0.95 |      |
| Frpb, ped/bikes        | 1.00 |      |
| Flpb, ped/bikes        | 1.00 |      |
| Frt                    | 0.99 |      |
| Flt Protected          | 1.00 |      |
| Satd. Flow (prot)      | 3461 |      |
| Flt Permitted          | 1.00 |      |
| Satd. Flow (perm)      | 3461 |      |
| Peak-hour factor, PHF  | 0.92 | 0.92 |
| Adj. Flow (vph)        | 824  | 75   |
| RTOR Reduction (vph)   | 5    | 0    |
| Lane Group Flow (vph)  | 894  | 0    |
| Confl. Peds. (#/hr)    |      |      |
| Turn Type              | NA   |      |
| Protected Phases       | 6    |      |
| Permitted Phases       |      |      |
| Actuated Green, G (s)  | 54.5 |      |
| Effective Green, g (s) | 55.8 |      |
| Actuated g/C Ratio     | 0.46 |      |
| Clearance Time (s)     | 5.3  |      |
| Vehicle Extension (s)  | 3.0  |      |
| Lane Grp Cap (vph)     | 1609 |      |
| v/s Ratio Prot         | 0.26 |      |
| v/s Ratio Perm         |      |      |
| v/c Ratio              | 0.56 |      |
| Uniform Delay, d1      | 23.2 |      |
| Progression Factor     | 1.06 |      |
| Incremental Delay, d2  | 1.2  |      |
| Delay (s)              | 25.8 |      |
| Level of Service       | C    |      |
| Approach Delay (s)     | 79.2 |      |
| Approach LOS           | E    |      |
| Intersection Summary   |      |      |
























| Intersection                |       |       |       |       |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh   | 9.2   |       |       |       |
| Intersection LOS            | A     |       |       |       |
| Approach                    | EB    | WB    | NB    | SB    |
| Entry Lanes                 | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes    | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h    | 616   | 34    | 141   | 182   |
| Demand Flow Rate, veh/h     | 635   | 34    | 145   | 188   |
| Vehicles Circulating, veh/h | 24    | 652   | 569   | 51    |
| Vehicles Exiting, veh/h     | 215   | 62    | 90    | 635   |
| Follow-Up Headway, s        | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h   | 0     | 0     | 0     | 0     |
| Ped Cap Adj                 | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh       | 10.7  | 6.9   | 8.6   | 5.1   |
| Approach LOS                | B     | A     | A     | A     |
| Lane                        | Left  | Left  | Left  | Left  |
| Designated Moves            | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves               | LTR   | LTR   | LTR   | LTR   |
| RT Channelized              |       |       |       |       |
| Lane Util                   | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s         | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h           | 635   | 34    | 145   | 188   |
| Cap Entry Lane, veh/h       | 1103  | 589   | 640   | 1074  |
| Entry HV Adj Factor         | 0.971 | 0.986 | 0.971 | 0.971 |
| Flow Entry, veh/h           | 616   | 34    | 141   | 182   |
| Cap Entry, veh/h            | 1071  | 581   | 621   | 1042  |
| V/C Ratio                   | 0.576 | 0.058 | 0.227 | 0.175 |
| Control Delay, s/veh        | 10.7  | 6.9   | 8.6   | 5.1   |
| LOS                         | B     | A     | A     | A     |
| 95th %tile Queue, veh       | 4     | 0     | 1     | 1     |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

NT + Proj Phase 1 AM Peak

3/29/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 34  | 399   | 62  | 68  | 650   | 38  | 261  | 131   | 15  | 28  | 82  | 71  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 37  | 429   | 67  | 73  | 699   | 41  | 281  | 141   | 16  | 30  | 88  | 76  |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 50  | 638   | 199   | 816   | 1926  | 113   | 322  | 852   | 381   | 40  | 258   | 116   |
| Arrive On Green   | 0.03  | 0.13  | 0.13  | 0.46  | 0.57  | 0.56  | 0.18   | 0.24  | 0.24  | 0.02  | 0.07  | 0.07  |
| Sat Flow, veh/h   | 1757  | 5036  | 1568  | 1757  | 3365  | 197   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 37  | 429   | 67  | 73  | 364   | 376   | 281  | 141   | 16  | 30  | 88  | 76  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1568  | 1757  | 1752  | 1810  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 2.5   | 9.8   | 4.7   | 2.8   | 13.4  | 13.5  | 18.7   | 3.8   | 0.2   | 2.0   | 2.9   | 4.9   |
| Cycle Q Clear(g_c), s   | 2.5   | 9.8   | 4.7   | 2.8   | 13.4  | 13.5  | 18.7   | 3.8   | 0.2   | 2.0   | 2.9   | 4.9   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.11  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 50  | 638   | 199   | 816   | 1003  | 1036  | 322  | 852   | 381   | 40  | 258   | 116   |
| V/C Ratio(X)  | 0.74  | 0.67  | 0.34  | 0.09  | 0.36  | 0.36  | 0.87   | 0.17  | 0.04  | 0.74  | 0.34  | 0.66  |
| Avail Cap(c_a), veh/h   | 88  | 1288  | 401   | 816   | 1003  | 1036  | 425  | 1633  | 730   | 94  | 973   | 435   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 57.9  | 50.0  | 47.8  | 17.9  | 13.9  | 13.9  | 47.7   | 35.8  | 2.3   | 58.3  | 52.8  | 41.3  |
| Incr Delay (d2), s/veh  | 19.4  | 5.6   | 4.5   | 0.0   | 1.0   | 1.0   | 14.5   | 0.1   | 0.0   | 23.3  | 0.8   | 6.2   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 1.5   | 4.9   | 2.3   | 1.4   | 6.8   | 7.0   | 10.3   | 1.9   | 0.1   | 1.3   | 1.4   | 2.3   |
| LnGrp Delay(d),s/veh  | 77.3  | 55.6  | 52.3  | 18.0  | 14.9  | 14.9  | 62.1   | 35.9  | 2.3   | 81.5  | 53.6  | 47.5  |
| LnGrp LOS   | E   | E   | D   | B   | B   | B   | E  | D   | A   | F   | D   | D   |
| Approach Vol, veh/h   |   | 533   |   |   | 813   |   |  | 438   |   |   | 194   |   |
| Approach Delay, s/veh   |   | 56.7  |   |   | 15.2  |   |  | 51.5  |   |   | 55.5  |   |
| Approach LOS  |   | E   |   |   | B   |   |  | D   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 6.8   | 33.2  | 60.9  | 19.2  | 27.1  | 12.8  | 7.4  | 72.7  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | 5.3   | * 5.3   | 5.3   | * 5.3   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 6.2   | 54.6  | 10.8  | * 29  | 28.8  | * 32  | * 5.8  | 34.4  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 4.0   | 5.8   | 4.8   | 11.8  | 20.7  | 6.9   | 4.5  | 15.5  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 1.8   | 1.8   | 2.0   | 1.1   | 0.6   | 0.0  | 3.0   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 38.4  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |



Intersection

Int Delay, s/veh 1.3

| Movement                 | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 19   | 406  | 0    | 11   | 0    | 822  | 7    | 0    | 0    | 116  | 0    | 0    | 17   |
| Conflicting Peds, #/hr   | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 400  | -    | -    | -    | 120  | -    | 85   | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | -    | 0    | -    | -    | 1    | -    | -    | 1    | -    |
| Grade, %                 | -    | 0    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 20   | 437  | 0    | 12   | 0    | 884  | 8    | 0    | 0    | 125  | 0    | 0    | 18   |

| Major/Minor          | Major1 |   | Major2 |      |      |   | Minor1 |      |      | Minor2 |      |      |      |
|----------------------|--------|---|--------|------|------|---|--------|------|------|--------|------|------|------|
| Conflicting Flow All | 884    | 0 | 0      | 443  | 438  | 0 | 0      | 944  | 1386 | 219    | 1124 | 1386 | 443  |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 478  | 478  | -      | 908  | 908  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 466  | 908  | -      | 216  | 478  | -    |
| Critical Hdwy        | 4.16   | - | -      | 5.66 | 5.36 | - | -      | 7.01 | 6.56 | 7.16   | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1  | -      | - | -      | -    | -    | - | -      | 7.36 | 5.56 | -      | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2  | -      | - | -      | -    | -    | - | -      | 6.56 | 5.56 | -      | 6.76 | 5.56 | -    |
| Follow-up Hdwy       | 2.23   | - | -      | 2.33 | 3.13 | - | -      | 3.68 | 4.03 | 3.93   | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver   | 755    | - | -      | 886  | 720  | - | -      | 243  | 141  | 666    | 184  | 141  | 560  |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 465  | 551  | -      | 287  | 350  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 526  | 350  | -      | 727  | 551  | -    |
| Platoon blocked, %   |        | - | -      |      |      | - | -      |      |      |        |      |      |      |
| Mov Cap-1 Maneuver   | 754    | - | -      | 731  | 720  | - | -      | 230  | 137  | 665    | 146  | 137  | 560  |
| Mov Cap-2 Maneuver   | -      | - | -      | -    | -    | - | -      | 319  | 244  | -      | 225  | 250  | -    |
| Stage 1              | -      | - | -      | -    | -    | - | -      | 452  | 536  | -      | 279  | 350  | -    |
| Stage 2              | -      | - | -      | -    | -    | - | -      | 508  | 350  | -      | 575  | 536  | -    |

| Approach             | EB  | WB  | NE   | SW   |
|----------------------|-----|-----|------|------|
| HCM Control Delay, s | 0.4 | 0.1 | 11.7 | 11.6 |
| HCM LOS              |     |     | B    | B    |

























| Minor Lane/Major Mvmt | NELn1 | EBL   | EBT | EBR | WBU   | WBL | WBT | WBR | SWLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 665   | 754   | -   | -   | 731   | 720 | -   | -   | 560   |
| HCM Lane V/C Ratio    | 0.188 | 0.027 | -   | -   | 0.016 | -   | -   | -   | 0.033 |
| HCM Control Delay (s) | 11.7  | 9.9   | -   | -   | 10    | -   | -   | -   | 11.6  |
| HCM Lane LOS          | B     | A     | -   | -   | B     | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0.7   | 0.1   | -   | -   | 0     | 0   | -   | -   | 0.1   |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

NT + Proj Phase 1 AM Peak

3/29/2017





















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)               | 221   | 240   | 111   | 45  | 436   | 530   | 241  | 1036  | 67  | 265   | 451   | 142   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 235   | 255   | 118   | 48  | 464   | 564   | 256  | 1102  | 71  | 282   | 480   | 151   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94   | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 295   | 422   | 187   | 907   | 1511  | 470   | 325  | 1222  | 546   | 417   | 1349  | 604   |
| Arrive On Green              | 0.09  | 0.12  | 0.12  | 0.09  | 0.10  | 0.10  | 0.10   | 0.35  | 0.35  | 0.24  | 0.77  | 0.77  |
| Sat Flow, veh/h              | 3408  | 3505  | 1552  | 3408  | 5036  | 1568  | 3408   | 3505  | 1567  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 235   | 255   | 118   | 48  | 464   | 564   | 256  | 1102  | 71  | 282   | 480   | 151   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1552  | 1704  | 1679  | 1568  | 1704   | 1752  | 1567  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 8.1   | 8.3   | 6.9   | 1.5   | 10.3  | 36.0  | 8.8  | 35.9  | 3.7   | 9.0   | 5.2   | 2.4   |
| Cycle Q Clear(g_c), s        | 8.1   | 8.3   | 6.9   | 1.5   | 10.3  | 36.0  | 8.8  | 35.9  | 3.7   | 9.0   | 5.2   | 2.4   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 295   | 422   | 187   | 907   | 1511  | 470   | 325  | 1222  | 546   | 417   | 1349  | 604   |
| V/C Ratio(X)                 | 0.80  | 0.60  | 0.63  | 0.05  | 0.31  | 1.20  | 0.79   | 0.90  | 0.13  | 0.68  | 0.36  | 0.25  |
| Avail Cap(c_a), veh/h        | 312   | 1221  | 541   | 907   | 1511  | 470   | 443  | 1285  | 574   | 417   | 1349  | 604   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  | 1.00   | 1.00  | 1.00  | 2.00  | 2.00  | 2.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.97  | 0.97  | 0.97  | 1.00   | 1.00  | 1.00  | 0.83  | 0.83  | 0.83  |
| Uniform Delay (d), s/veh     | 53.8  | 50.0  | 31.4  | 40.9  | 42.5  | 54.1  | 53.1   | 37.1  | 26.7  | 43.2  | 9.1   | 4.5   |
| Incr Delay (d2), s/veh       | 12.8  | 1.4   | 3.5   | 0.0   | 0.1   | 108.0   | 6.6  | 10.9  | 0.5   | 3.6   | 0.6   | 0.8   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 4.3   | 4.1   | 3.1   | 0.7   | 4.8   | 29.8  | 4.5  | 19.1  | 1.7   | 4.4   | 2.5   | 1.1   |
| LnGrp Delay(d),s/veh         | 66.6  | 51.4  | 34.9  | 40.9  | 42.6  | 162.1   | 59.7   | 48.0  | 27.2  | 46.7  | 9.7   | 5.4   |
| LnGrp LOS                    | E   | D   | C   | D   | D   | F   | E  | D   | C   | D   | A   | A   |
| Approach Vol, veh/h          | 608   |   |   | 1076  |   |   | 1429   |   |   | 913   |   |   |
| Approach Delay, s/veh        | 54.1  |   |   | 105.1   |   |   | 49.1   |   |   | 20.4  |   |   |
| Approach LOS                 | D   |   |   | F   |   |   | D  |   |   | C   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 19.8  | 45.8  | 35.9  | 18.5  | 15.4  | 50.2  | 14.4   | 40.0  |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.7   | 4.2   | * 5.3   | * 4.2   | 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 12.8  | * 42  | 5.0   | * 41  | * 15  | 40.1  | 10.8   | * 35  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 11.0  | 37.9  | 3.5   | 10.3  | 10.8  | 7.2   | 10.1   | 38.0  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.3   | 2.3   | 0.2   | 1.6   | 0.4   | 4.3   | 0.1  | 0.0   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 58.3  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | E   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 10: Coventry Avenue & Herndon Avenue

NT + Proj Phase 1 AM Peak

3/29/2017













|                              |   |   |   |   |   |   |  |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
|                              |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |   |  |  |  |  |  |   |   |  |  |
| Volume (veh/h)               | 130   | 299   | 98  | 23  | 734   | 43  | 144  | 10  | 15  | 29  | 2   | 40  |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1900  | 1845  | 1845  | 1845  | 1900   | 1845  | 1900  | 1900  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 141   | 325   | 107   | 25  | 798   | 47  | 157  | 11  | 16  | 32  | 2   | 43  |
| Adj No. of Lanes             | 1   | 3   | 0   | 1   | 3   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Peak Hour Factor             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 848   | 2575  | 805   | 36  | 1036  | 323   | 187  | 13  | 19  | 72  | 4   | 68  |
| Arrive On Green              | 0.32  | 0.45  | 0.45  | 0.02  | 0.21  | 0.21  | 0.13   | 0.13  | 0.12  | 0.04  | 0.04  | 0.04  |
| Sat Flow, veh/h              | 1757  | 3802  | 1189  | 1757  | 5036  | 1568  | 1488   | 104   | 152   | 1658  | 104   | 1568  |
| Grp Volume(v), veh/h         | 141   | 285   | 147   | 25  | 798   | 47  | 184  | 0   | 0   | 34  | 0   | 43  |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1679  | 1634  | 1757  | 1679  | 1568  | 1744   | 0   | 0   | 1762  | 0   | 1568  |
| Q Serve(g_s), s              | 6.9   | 5.9   | 6.3   | 1.7   | 17.9  | 2.9   | 12.4   | 0.0   | 0.0   | 2.3   | 0.0   | 3.2   |
| Cycle Q Clear(g_c), s        | 6.9   | 5.9   | 6.3   | 1.7   | 17.9  | 2.9   | 12.4   | 0.0   | 0.0   | 2.3   | 0.0   | 3.2   |
| Prop In Lane                 | 1.00  |   | 0.73  | 1.00  |   | 1.00  | 0.85   |   | 0.09  | 0.94  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 848   | 2274  | 1107  | 36  | 1036  | 323   | 219  | 0   | 0   | 76  | 0   | 68  |
| V/C Ratio(X)                 | 0.17  | 0.13  | 0.13  | 0.69  | 0.77  | 0.15  | 0.84   | 0.00  | 0.00  | 0.45  | 0.00  | 0.63  |
| Avail Cap(c_a), veh/h        | 848   | 2274  | 1107  | 117   | 1511  | 470   | 378  | 0   | 0   | 279   | 0   | 248   |
| HCM Platoon Ratio            | 0.67  | 0.67  | 0.67  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 0.83  | 0.83  | 0.83  | 1.00  | 1.00  | 1.00  | 1.00   | 0.00  | 0.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh     | 23.3  | 12.2  | 12.4  | 58.4  | 45.0  | 39.0  | 51.3   | 0.0   | 0.0   | 56.0  | 0.0   | 56.5  |
| Incr Delay (d2), s/veh       | 0.1   | 0.1   | 0.2   | 21.2  | 5.5   | 0.9   | 8.4  | 0.0   | 0.0   | 4.0   | 0.0   | 9.3   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.4   | 2.8   | 2.9   | 1.0   | 8.9   | 1.4   | 6.5  | 0.0   | 0.0   | 1.2   | 0.0   | 1.6   |
| LnGrp Delay(d),s/veh         | 23.4  | 12.3  | 12.6  | 79.6  | 50.5  | 40.0  | 59.7   | 0.0   | 0.0   | 60.0  | 0.0   | 65.8  |
| LnGrp LOS                    | C   | B   | B   | E   | D   | D   | E  |   |   | E   |   | E   |
| Approach Vol, veh/h          |   | 573   |   |   | 870   |   |  | 184   |   |   | 77  |   |
| Approach Delay, s/veh        |   | 15.1  |   |   | 50.8  |   |  | 59.7  |   |   | 63.3  |   |
| Approach LOS                 |   | B   |   |   | D   |   |  | E   |   |   | E   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 |   | 2   | 3   | 4   |   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     |   | 19.1  | 6.5   | 85.3  |   | 9.2   | 63.1   | 28.7  |   |   |   |   |
| Change Period (Y+Rc), s      |   | * 4.2   | * 4.2   | 5.3   |   | 4.2   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  |   | * 26  | * 7.8   | 49.7  |   | 18.8  | 22.8   | * 35  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s |   | 14.4  | 3.7   | 8.3   |   | 5.2   | 8.9  | 19.9  |   |   |   |   |
| Green Ext Time (p_c), s      |   | 0.5   | 0.0   | 2.4   |   | 0.2   | 2.0  | 3.4   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 40.3  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

NT + Proj Phase 1 AM Peak

3/29/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |  |
| Volume (veh/h)                    | 45  | 27  | 44  | 31  | 122   | 58  |
| Sign Control                      | Stop  |   |   | Stop  | Free  |   |
| Grade                             | 0%  |   |   | 0%  | 0%  |   |
| Peak Hour Factor                  | 0.70  | 0.70  | 0.70  | 0.70  | 0.70  | 0.70  |
| Hourly flow rate (vph)            | 64  | 39  | 63  | 44  | 174   | 83  |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (ft)                   |   |   |   |   |   |   |
| Walking Speed (ft/s)              |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   | 4   |   |   |   |   |
| Median type                       |   |   |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   | 110   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 431   | 0   | 381   | 349   | 0   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 431   | 0   | 381   | 349   | 0   |   |
| tC, single (s)                    | 6.5   | 6.2   | 7.1   | 6.5   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.0   | 3.3   | 3.5   | 4.0   | 2.2   |   |
| p0 queue free %                   | 86  | 96  | 86  | 91  | 89  |   |
| cM capacity (veh/h)               | 460   | 1082  | 455   | 512   | 1617  |   |
| Direction, Lane #                 | EB 1  | WB 1  | WB 2  | NB 1  | NB 2  |   |
| Volume Total                      | 103   | 63  | 44  | 174   | 83  |   |
| Volume Left                       | 0   | 63  | 0   | 174   | 0   |   |
| Volume Right                      | 39  | 0   | 0   | 0   | 83  |   |
| cSH                               | 736   | 455   | 512   | 1617  | 1700  |   |
| Volume to Capacity                | 0.14  | 0.14  | 0.09  | 0.11  | 0.05  |   |
| Queue Length 95th (ft)            | 12  | 12  | 7   | 9   | 0   |   |
| Control Delay (s)                 | 12.0  | 14.2  | 12.7  | 7.5   | 0.0   |   |
| Lane LOS                          | B   | B   | B   | A   |   |   |
| Approach Delay (s)                | 12.0  | 13.6  |   | 5.1   |   |   |
| Approach LOS                      | B   | B   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   | 8.5   |   |   |   |   |
| Intersection Capacity Utilization |   | 22.5%   |   | ICU Level of Service  | A   |   |
| Analysis Period (min)             |   | 15  |   |   |   |   |

Intersection

Int Delay, s/veh 0.1

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 3    | 386  | 893  | 52   | 0    | 3    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 3    | 411  | 950  | 55   | 0    | 3    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 1005   | 0      | 1190   |
| Stage 1              | -      | -      | 978    |
| Stage 2              | -      | -      | 212    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 679    | -      | 179    |
| Stage 1              | -      | -      | 323    |
| Stage 2              | -      | -      | 800    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 679    | -      | 178    |
| Mov Cap-2 Maneuver   | -      | -      | 178    |
| Stage 1              | -      | -      | 323    |
| Stage 2              | -      | -      | 796    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.1 | 0  | 12.1 |
| HCM LOS              |     |    | B    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 679   | -   | -   | -   | 511   |
| HCM Lane V/C Ratio    | 0.005 | -   | -   | -   | 0.006 |
| HCM Control Delay (s) | 10.3  | -   | -   | -   | 12.1  |
| HCM Lane LOS          | B     | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0     |

Intersection

Int Delay, s/veh 5.9

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 260  | 95   | 44   | 668  | 208  | 16   |
| Conflicting Peds, #/hr   | 0    | 3    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 250  | 250  | -    | 0    | 250  |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 280  | 102  | 47   | 718  | 224  | 17   |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |      |
|----------------------|--------|---|--------|---|--------|------|
| Conflicting Flow All | 0      | 0 | 280    | 0 | 734    | 140  |
| Stage 1              | -      | - | -      | - | 280    | -    |
| Stage 2              | -      | - | -      | - | 454    | -    |
| Critical Hdwy        | -      | - | 4.16   | - | 6.86   | 6.96 |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.86   | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.86   | -    |
| Follow-up Hdwy       | -      | - | 2.23   | - | 3.53   | 3.33 |
| Pot Cap-1 Maneuver   | -      | - | 1272   | - | 353    | 879  |
| Stage 1              | -      | - | -      | - | 739    | -    |
| Stage 2              | -      | - | -      | - | 603    | -    |
| Platoon blocked, %   | -      | - |        | - |        |      |
| Mov Cap-1 Maneuver   | -      | - | 1272   | - | 339    | 879  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 339    | -    |
| Stage 1              | -      | - | -      | - | 739    | -    |
| Stage 2              | -      | - | -      | - | 579    | -    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.5 | 32.2 |
| HCM LOS              |    |     | D    |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 339   | 879   | -   | -   | 1272  | -   |
| HCM Lane V/C Ratio    | 0.66  | 0.02  | -   | -   | 0.037 | -   |
| HCM Control Delay (s) | 34    | 9.2   | -   | -   | 7.9   | -   |
| HCM Lane LOS          | D     | A     | -   | -   | A     | -   |
| HCM 95th %tile Q(veh) | 4.4   | 0.1   | -   | -   | 0.1   | -   |

Intersection

Int Delay, s/veh 1.3

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 34   | 248  | 698  | 13   | 16   | 62   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 3    | 0    | 3    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 250  | -    | -    | 250  | 250  | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 36   | 264  | 743  | 14   | 17   | 66   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 746    | 0      | 950    |
| Stage 1              | -      | -      | 746    |
| Stage 2              | -      | -      | 204    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 851    | -      | 256    |
| Stage 1              | -      | -      | 427    |
| Stage 2              | -      | -      | 807    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 851    | -      | 244    |
| Mov Cap-2 Maneuver   | -      | -      | 244    |
| Stage 1              | -      | -      | 426    |
| Stage 2              | -      | -      | 771    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 1.1 | 0  | 13.4 |
| HCM LOS              |     |    | B    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 | SBLn2 |
|-----------------------|-------|-----|-----|-----|-------|-------|
| Capacity (veh/h)      | 851   | -   | -   | -   | 244   | 619   |
| HCM Lane V/C Ratio    | 0.043 | -   | -   | -   | 0.07  | 0.107 |
| HCM Control Delay (s) | 9.4   | -   | -   | -   | 20.9  | 11.5  |
| HCM Lane LOS          | A     | -   | -   | -   | C     | B     |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | -   | 0.2   | 0.4   |

Intersection

Int Delay, s/veh 4.5

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 177  | 84   | 5    | 548  | 167  | 5    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 192  | 91   | 5    | 596  | 182  | 5    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 192    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.1 | 25.7 |
| HCM LOS              |    |     | D    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 357   | -   | -   | 1375  | -   |
| HCM Lane V/C Ratio    | 0.524 | -   | -   | 0.004 | -   |
| HCM Control Delay (s) | 25.7  | -   | -   | 7.6   | 0   |
| HCM Lane LOS          | D     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 2.9   | -   | -   | 0     | -   |



Intersection

Int Delay, s/veh 0.4

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 165  | 4    | 1    | 504  | 16   | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 86   | 86   | 86   | 86   | 86   | 86   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 192  | 5    | 1    | 586  | 19   | 2    |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |       |
|----------------------|--------|---|--------|---|--------|-------|
| Conflicting Flow All | 0      | 0 | 197    | 0 | 782    | 194   |
| Stage 1              | -      | - | -      | - | 194    | -     |
| Stage 2              | -      | - | -      | - | 588    | -     |
| Critical Hdwy        | -      | - | 4.13   | - | 6.43   | 6.23  |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.43   | -     |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.43   | -     |
| Follow-up Hdwy       | -      | - | 2.227  | - | 3.527  | 3.327 |
| Pot Cap-1 Maneuver   | -      | - | 1370   | - | 361    | 845   |
| Stage 1              | -      | - | -      | - | 836    | -     |
| Stage 2              | -      | - | -      | - | 553    | -     |
| Platoon blocked, %   | -      | - |        | - |        |       |
| Mov Cap-1 Maneuver   | -      | - | 1370   | - | 361    | 845   |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 361    | -     |
| Stage 1              | -      | - | -      | - | 836    | -     |
| Stage 2              | -      | - | -      | - | 552    | -     |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 14.9 |
| HCM LOS              |    |    | B    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 386   | -   | -   | 1370  | -   |
| HCM Lane V/C Ratio    | 0.054 | -   | -   | 0.001 | -   |
| HCM Control Delay (s) | 14.9  | -   | -   | 7.6   | 0   |
| HCM Lane LOS          | B     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 0.2   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 5.4

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 116  | 106  | 2    | 244  | 236  | 5    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 97   | 97   | 97   | 97   | 97   | 97   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 120  | 109  | 2    | 252  | 243  | 5    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 430    |
| Stage 1              | -      | -      | 174    |
| Stage 2              | -      | -      | 256    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 1333   | 580    |
| Stage 1              | -      | -      | 854    |
| Stage 2              | -      | -      | 784    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 1333   | 579    |
| Mov Cap-2 Maneuver   | -      | -      | 579    |
| Stage 1              | -      | -      | 854    |
| Stage 2              | -      | -      | 782    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.1 | 15.7 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 583   | -   | -   | 1333  | -   |
| HCM Lane V/C Ratio    | 0.426 | -   | -   | 0.002 | -   |
| HCM Control Delay (s) | 15.7  | -   | -   | 7.7   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 2.1   | -   | -   | 0     | -   |

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 5.9    |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 1      | 5     | 71    | 24     | 17    | 0     | 109    | 46   | 8    | 0      | 75   | 4    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 88     | 88    | 88    | 88     | 88    | 88    | 88     | 88   | 88   | 88     | 88   | 88   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 1      | 6     | 81    | 27     | 19    | 0     | 124    | 52   | 9    | 0      | 85   | 5    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 402    | 397   | 88    | 436    | 395   | 57    | 90     | 0    | 0    | 61     | 0    | 0    |
| Stage 1                  | 88     | 88    | -     | 305    | 305   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 314    | 309   | -     | 131    | 90    | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 557    | 539   | 968   | 529    | 540   | 1006  | 1499   | -    | -    | 1536   | -    | -    |
| Stage 1                  | 917    | 820   | -     | 702    | 660   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 695    | 658   | -     | 870    | 818   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 505    | 493   | 968   | 449    | 494   | 1006  | 1499   | -    | -    | 1536   | -    | -    |
| Mov Cap-2 Maneuver       | 505    | 493   | -     | 449    | 494   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 838    | 820   | -     | 642    | 603   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 615    | 601   | -     | 792    | 818   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 9.4    |       |       | 13.6   |       |       | 5.1    |      |      | 0      |      |      |
| HCM LOS                  | A      |       |       | B      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1499   | -     | -     | 901    | 467   | 1536  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.083  | -     | -     | 0.097  | 0.1   | -     | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 7.6    | 0     | -     | 9.4    | 13.6  | 0     | -      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | A      | B     | A     | -      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.3    | -     | -     | 0.3    | 0.3   | 0     | -      | -    |      |        |      |      |

Intersection

Int Delay, s/veh 0.8

| Movement                 | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 0    | 86   | 1844 | 33   | 0    | 1228 |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Free | Free | Free | Free |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | -    | -    |
| Veh in Median Storage, # | 1    | -    | 0    | -    | -    | 0    |
| Grade, %                 | 0    | -    | 0    | -    | -    | 0    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 93   | 2004 | 36   | 0    | 1335 |

| Major/Minor          | Minor1 | Major1 | Major2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 2689   | 1020   | 0      |
| Stage 1              | 2022   | -      | -      |
| Stage 2              | 667    | -      | -      |
| Critical Hdwy        | 6.86   | 6.96   | 4.16   |
| Critical Hdwy Stg 1  | 5.86   | -      | -      |
| Critical Hdwy Stg 2  | 5.86   | -      | -      |
| Follow-up Hdwy       | 3.53   | 3.33   | 2.23   |
| Pot Cap-1 Maneuver   | 17     | 232    | 269    |
| Stage 1              | 87     | -      | -      |
| Stage 2              | 469    | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 17     | 232    | 269    |
| Mov Cap-2 Maneuver   | 71     | -      | -      |
| Stage 1              | 87     | -      | -      |
| Stage 2              | 469    | -      | -      |

| Approach             | WB   | NB | SB |
|----------------------|------|----|----|
| HCM Control Delay, s | 30.6 | 0  | 0  |
| HCM LOS              | D    |    |    |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT |
|-----------------------|-----|----------|-----|-----|
| Capacity (veh/h)      | -   | - 232    | 269 | -   |
| HCM Lane V/C Ratio    | -   | - 0.403  | -   | -   |
| HCM Control Delay (s) | -   | - 30.6   | 0   | -   |
| HCM Lane LOS          | -   | - D      | A   | -   |
| HCM 95th %tile Q(veh) | -   | - 1.8    | 0   | -   |

| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 15   |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | B    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 59   | 127  | 63   | 0    | 5    | 240  | 75   | 0    | 38   | 143  | 1    |
| Peak Hour Factor          | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 67   | 144  | 72   | 0    | 6    | 273  | 85   | 0    | 43   | 162  | 1    |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB | NB   |
|----------------------------|------|----|------|
| Opposing Approach          | WB   | EB | SB   |
| Opposing Lanes             | 2    | 3  | 1    |
| Conflicting Approach Left  | SB   | NB | EB   |
| Conflicting Lanes Left     | 1    | 3  | 3    |
| Conflicting Approach Right | NB   | SB | WB   |
| Conflicting Lanes Right    | 3    | 1  | 2    |
| HCM Control Delay          | 11.5 | 20 | 12.3 |
| HCM LOS                    | B    | C  | B    |

| Lane                   | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 20%   |
| Vol Thru, %            | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 76%   | 51%   |
| Vol Right, %           | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 24%   | 29%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 38    | 143   | 1     | 59    | 127   | 63    | 5     | 315   | 133   |
| LT Vol                 | 38    | 0     | 0     | 59    | 0     | 0     | 5     | 0     | 27    |
| Through Vol            | 0     | 143   | 0     | 0     | 127   | 0     | 0     | 240   | 68    |
| RT Vol                 | 0     | 0     | 1     | 0     | 0     | 63    | 0     | 75    | 38    |
| Lane Flow Rate         | 43    | 162   | 1     | 67    | 144   | 72    | 6     | 358   | 151   |
| Geometry Grp           | 7     | 7     | 7     | 8     | 8     | 8     | 8     | 8     | 8     |
| Degree of Util (X)     | 0.088 | 0.307 | 0.002 | 0.139 | 0.28  | 0.125 | 0.011 | 0.641 | 0.305 |
| Departure Headway (Hd) | 7.428 | 6.921 | 6.21  | 7.485 | 6.976 | 6.264 | 7.239 | 6.562 | 7.26  |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 485   | 523   | 580   | 481   | 518   | 575   | 497   | 555   | 497   |
| Service Time           | 5.128 | 4.621 | 3.91  | 5.195 | 4.687 | 3.974 | 4.939 | 4.262 | 4.972 |
| HCM Lane V/C Ratio     | 0.089 | 0.31  | 0.002 | 0.139 | 0.278 | 0.125 | 0.012 | 0.645 | 0.304 |
| HCM Control Delay      | 10.8  | 12.7  | 8.9   | 11.4  | 12.4  | 9.9   | 10    | 20.2  | 13.1  |
| HCM Lane LOS           | B     | B     | A     | B     | B     | A     | A     | C     | B     |
| HCM 95th-tile Q        | 0.3   | 1.3   | 0     | 0.5   | 1.1   | 0.4   | 0     | 4.5   | 1.3   |

Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 27   | 68   | 38   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 31   | 77   | 43   |
| Number of Lanes   | 0    | 0    | 1    | 0    |

| Approach                   | SB   |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 13.1 |
| HCM LOS                    | B    |

Lane

Intersection

Intersection Delay, s/veh16.1

Intersection LOS C

| Movement          | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h        | 0    | 56   | 119  | 69   | 0    | 5    | 232  | 56   | 0    | 66   | 204  | 2    | 0    | 25   | 108  | 59   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 64   | 135  | 78   | 0    | 6    | 264  | 64   | 0    | 75   | 232  | 2    | 0    | 28   | 123  | 67   |
| Number of Lanes   | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 15.2 | 17.3 | 17.2 | 13.7 |
| HCM LOS                    | C    | C    | C    | B    |
























| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 24%   | 23%   | 2%    | 13%   |
| Vol Thru, %            | 75%   | 49%   | 79%   | 56%   |
| Vol Right, %           | 1%    | 28%   | 19%   | 31%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 272   | 244   | 293   | 192   |
| LT Vol                 | 66    | 56    | 5     | 25    |
| Through Vol            | 204   | 119   | 232   | 108   |
| RT Vol                 | 2     | 69    | 56    | 59    |
| Lane Flow Rate         | 309   | 277   | 333   | 218   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.552 | 0.485 | 0.572 | 0.392 |
| Departure Headway (Hd) | 6.424 | 6.291 | 6.181 | 6.46  |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 559   | 571   | 583   | 554   |
| Service Time           | 4.489 | 4.357 | 4.243 | 4.531 |
| HCM Lane V/C Ratio     | 0.553 | 0.485 | 0.571 | 0.394 |
| HCM Control Delay      | 17.2  | 15.2  | 17.3  | 13.7  |
| HCM Lane LOS           | C     | C     | C     | B     |
| HCM 95th-tile Q        | 3.3   | 2.6   | 3.6   | 1.9   |

# HCM Signalized Intersection Capacity Analysis

NT+ Proj Phase 1 PM Peak

## 1: Temperance Avenue & Nees Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph)                      | 102   | 79  | 142   | 182   | 82  | 103   | 13   | 232   | 728   | 199   | 39  | 355   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.98  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1534  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1534  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.92   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Adj. Flow (vph)                   | 110   | 85  | 153   | 196   | 88  | 111   | 14   | 249   | 783   | 214   | 42  | 382   |
| RTOR Reduction (vph)              | 0   | 0   | 134   | 0   | 0   | 98  | 0  | 0   | 0   | 77  | 0   | 0   |
| Lane Group Flow (vph)             | 110   | 85  | 19  | 196   | 88  | 13  | 0  | 263   | 783   | 137   | 42  | 382   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 18.4  | 14.9  | 14.9  | 18.3  | 14.4  | 14.4  |  | 22.7  | 60.1  | 60.1  | 7.7   | 45.1  |
| Effective Green, g (s)            | 18.4  | 14.9  | 14.9  | 18.3  | 14.4  | 14.4  |  | 22.7  | 60.1  | 60.1  | 7.7   | 45.1  |
| Actuated g/C Ratio                | 0.15  | 0.12  | 0.12  | 0.15  | 0.12  | 0.12  |  | 0.19  | 0.50  | 0.50  | 0.06  | 0.38  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 268   | 229   | 194   | 267   | 221   | 188   |  | 331   | 1755  | 768   | 112   | 1317  |
| v/s Ratio Prot                    | c0.06   | 0.05  |   | c0.11   | 0.05  |   |  | c0.15   | c0.22   |   | c0.02   | 0.11  |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | 0.01  |  |   |   | 0.09  |   |   |
| v/c Ratio                         | 0.41  | 0.37  | 0.10  | 0.73  | 0.40  | 0.07  |  | 0.79  | 0.45  | 0.18  | 0.38  | 0.29  |
| Uniform Delay, d1                 | 45.9  | 48.2  | 46.6  | 48.5  | 48.8  | 46.9  |  | 46.4  | 19.3  | 16.4  | 53.8  | 26.2  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 0.96  | 0.49  | 0.10  | 1.00  | 1.00  |
| Incremental Delay, d2             | 1.0   | 1.0   | 0.2   | 10.0  | 1.2   | 0.2   |  | 10.6  | 0.7   | 0.4   | 2.1   | 0.6   |
| Delay (s)                         | 46.9  | 49.3  | 46.8  | 58.5  | 50.0  | 47.0  |  | 55.0  | 10.2  | 2.1   | 55.9  | 26.8  |
| Level of Service                  | D   | D   | D   | E   | D   | D   |  | D   | B   | A   | E   | C   |
| Approach Delay (s)                |   | 47.4  |   |   | 53.4  |   |  |   | 18.2  |   |   | 28.9  |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | B   |   |   | C   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 29.9  |   |   |   | HCM 2000 Level of Service  |   |   | C   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.57  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 74.1%   |   |   |   | ICU Level of Service   |   | D   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

NT+ Proj Phase 1 PM Peak

3/28/2017

|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 62   |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.98 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1540 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1540 |
| Peak-hour factor, PHF  | 0.93 |
| Adj. Flow (vph)        | 67   |
| RTOR Reduction (vph)   | 42   |
| Lane Group Flow (vph)  | 25   |
| Confl. Peds. (#/hr)    | 5    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 45.1 |
| Effective Green, g (s) | 45.1 |
| Actuated g/C Ratio     | 0.38 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 578  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.02 |
| v/c Ratio              | 0.04 |
| Uniform Delay, d1      | 23.8 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.1  |
| Delay (s)              | 23.9 |
| Level of Service       | C    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# MOVEMENT SUMMARY



## Site: Near Term plus Project - PM Roundabout at Temperance and Owens Mt Parkway

New Site  
Roundabout

| Movement Performance - Vehicles |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
|---------------------------------|--------|--------------------------------|------------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID                          | OD Mov | Demand Flows<br>Total<br>veh/h | Flows<br>HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>ft | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>mph |
| South: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 3                               | L2     | 95                             | 3.0              | 0.609            | 9.8                  | LOS A            | 3.3                                  | 84.6                    | 0.42         | 0.44                           | 33.8                 |
| 8                               | T1     | 893                            | 3.0              | 0.609            | 3.7                  | LOS A            | 3.3                                  | 84.6                    | 0.42         | 0.45                           | 33.2                 |
| 18                              | R2     | 386                            | 3.0              | 0.609            | 4.2                  | LOS A            | 3.3                                  | 84.6                    | 0.42         | 0.47                           | 30.7                 |
| Approach                        |        | 1373                           | 3.0              | 0.609            | 4.3                  | LOS A            | 3.3                                  | 84.6                    | 0.42         | 0.46                           | 32.8                 |
| East: Owens Mt Parkway          |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 1                               | L2     | 842                            | 3.0              | 0.861            | 18.3                 | LOS C            | 10.4                                 | 265.3                   | 0.90         | 1.26                           | 23.4                 |
| 6                               | T1     | 295                            | 3.0              | 0.421            | 6.8                  | LOS A            | 2.0                                  | 52.2                    | 0.68         | 0.75                           | 33.2                 |
| 16                              | R2     | 259                            | 3.0              | 0.250            | 5.1                  | LOS A            | 1.1                                  | 27.9                    | 0.58         | 0.64                           | 32.4                 |
| Approach                        |        | 1396                           | 3.0              | 0.861            | 13.4                 | LOS B            | 10.4                                 | 265.3                   | 0.80         | 1.04                           | 28.0                 |
| North: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 7                               | L2     | 103                            | 3.0              | 0.721            | 18.1                 | LOS C            | 5.0                                  | 129.1                   | 0.88         | 1.07                           | 30.9                 |
| 4                               | T1     | 642                            | 3.0              | 0.721            | 11.6                 | LOS B            | 5.3                                  | 136.3                   | 0.89         | 1.07                           | 30.0                 |
| 14                              | R2     | 27                             | 3.0              | 0.721            | 11.8                 | LOS B            | 5.3                                  | 136.3                   | 0.89         | 1.06                           | 31.7                 |
| Approach                        |        | 771                            | 3.0              | 0.721            | 12.5                 | LOS B            | 5.3                                  | 136.3                   | 0.89         | 1.07                           | 30.2                 |
| West: Alluvial Avenue           |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 5                               | L2     | 59                             | 3.0              | 0.267            | 17.0                 | LOS C            | 1.3                                  | 32.5                    | 0.81         | 0.91                           | 31.8                 |
| 2                               | T1     | 60                             | 3.0              | 0.267            | 10.6                 | LOS B            | 1.4                                  | 34.8                    | 0.81         | 0.90                           | 31.2                 |
| 12                              | R2     | 104                            | 3.0              | 0.267            | 10.5                 | LOS B            | 1.4                                  | 34.8                    | 0.82         | 0.89                           | 30.3                 |
| Approach                        |        | 223                            | 3.0              | 0.267            | 12.2                 | LOS B            | 1.4                                  | 34.8                    | 0.82         | 0.90                           | 31.0                 |
| All Vehicles                    |        | 3764                           | 3.0              | 0.861            | 9.8                  | LOS A            | 10.4                                 | 265.3                   | 0.68         | 0.82                           | 30.2                 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com**

Organisation: JLB TRAFFIC ENGINEERING, INC. | Processed: Wednesday, November 08, 2017 8:57:20 AM








Project: Z:\01 Projects\006 Clovis\006-009 CCMC Phase 2 TIA\Background\Alluvial at Temperance Roundabout\Temperance Alluvial.sip6

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Avenue & SR 168 WB Ramp

NT+ Proj Phase 1 PM Peak

3/28/2017




















|                              |  |       |     |   |      |   |      |   |   |      |   |   |
|------------------------------|--|-------|-----|---|------|---|------|---|---|------|---|---|
| Movement                     | EBL  | EBT   | EBR | WBL   | WBT  | WBR   | NBL  | NBT   | NBR   | SBL  | SBT   | SBR   |
| Lane Configurations          |  |       |     |  |      |  |      |  |  |      |  |  |
| Volume (veh/h)               | 0  | 0     | 0   | 64  | 0    | 50  | 0    | 1247  | 673   | 0    | 854   | 677   |
| Number                       |  |       |     | 3   | 8    | 18  | 5    | 2   | 12  | 1    | 6   | 16  |
| Initial Q (Qb), veh          |  |       |     | 0   | 0    | 0   | 0    | 0   | 0   | 0    | 0   | 0   |
| Ped-Bike Adj(A_pbT)          |  |       |     | 1.00  |      | 1.00  | 1.00 |   | 1.00  | 1.00 |   | 1.00  |
| Parking Bus, Adj             |  |       |     | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       |  |       |     | 1845  | 0    | 1845  | 0    | 1845  | 1845  | 0    | 1845  | 1845  |
| Adj Flow Rate, veh/h         |  |       |     | 68  | 0    | 53  | 0    | 1327  | 0   | 0    | 909   | 720   |
| Adj No. of Lanes             |  |       |     | 1   | 0    | 1   | 0    | 2   | 1   | 0    | 2   | 1   |
| Peak Hour Factor             |  |       |     | 0.94  | 0.94 | 0.94  | 0.94 | 0.94  | 0.94  | 0.94 | 0.94  | 0.94  |
| Percent Heavy Veh, %         |  |       |     | 3   | 0    | 3   | 0    | 3   | 3   | 0    | 3   | 3   |
| Cap, veh/h                   |  |       |     | 100   | 0    | 95  | 0    | 3071  | 1357  | 0    | 3071  | 1373  |
| Arrive On Green              |  |       |     | 0.06  | 0.00 | 0.06  | 0.00 | 1.00  | 0.00  | 0.00 | 1.00  | 1.00  |
| Sat Flow, veh/h              |  |       |     | 1757  | 0    | 1568  | 0    | 3597  | 1568  | 0    | 3597  | 1567  |
| Grp Volume(v), veh/h         |  |       |     | 68  | 0    | 53  | 0    | 1327  | 0   | 0    | 909   | 720   |
| Grp Sat Flow(s),veh/h/ln     |  |       |     | 1757  | 0    | 1568  | 0    | 1752  | 1568  | 0    | 1752  | 1567  |
| Q Serve(g_s), s              |  |       |     | 4.6   | 0.0  | 3.9   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        |  |       |     | 4.6   | 0.0  | 3.9   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| Prop In Lane                 |  |       |     | 1.00  |      | 1.00  | 0.00 |   | 1.00  | 0.00 |   | 1.00  |
| Lane Grp Cap(c), veh/h       |  |       |     | 100   | 0    | 95  | 0    | 3071  | 1357  | 0    | 3071  | 1373  |
| V/C Ratio(X)                 |  |       |     | 0.68  | 0.00 | 0.56  | 0.00 | 0.43  | 0.00  | 0.00 | 0.30  | 0.52  |
| Avail Cap(c_a), veh/h        |  |       |     | 220   | 0    | 201   | 0    | 3071  | 1357  | 0    | 3071  | 1373  |
| HCM Platoon Ratio            |  |       |     | 1.00  | 1.00 | 1.00  | 1.00 | 2.00  | 2.00  | 1.00 | 2.00  | 2.00  |
| Upstream Filter(I)           |  |       |     | 1.00  | 0.00 | 1.00  | 0.00 | 0.09  | 0.00  | 0.00 | 0.09  | 0.09  |
| Uniform Delay (d), s/veh     |  |       |     | 55.5  | 0.0  | 54.8  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       |  |       |     | 7.7   | 0.0  | 5.1   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.1   |
| Initial Q Delay(d3),s/veh    |  |       |     | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     |  |       |     | 2.4   | 0.0  | 1.8   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| LnGrp Delay(d),s/veh         |  |       |     | 63.2  | 0.0  | 59.9  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.1   |
| LnGrp LOS                    |  |       |     | E   |      | E   |      | A   |   |      | A   | A   |
| Approach Vol, veh/h          |  |       |     |   | 121  |   |      | 1327  |   |      | 1629  |   |
| Approach Delay, s/veh        |  |       |     |   | 61.8 |   |      | 0.0   |   |      | 0.1   |   |
| Approach LOS                 |  |       |     |   | E    |   |      | A   |   |      | A   |   |
| Timer                        | 1  | 2     | 3   | 4   | 5    | 6   | 7    | 8   |   |      |   |   |
| Assigned Phs                 |  | 2     |     |   |      | 6   |      | 8   |   |      |   |   |
| Phs Duration (G+Y+Rc), s     |  | 109.1 |     |   |      | 109.1   |      | 10.9  |   |      |   |   |
| Change Period (Y+Rc), s      |  | 5.3   |     |   |      | 5.3   |      | 4.2   |   |      |   |   |
| Max Green Setting (Gmax), s  |  | 95.7  |     |   |      | 95.7  |      | 14.8  |   |      |   |   |
| Max Q Clear Time (g_c+I1), s |  | 2.0   |     |   |      | 2.0   |      | 6.6   |   |      |   |   |
| Green Ext Time (p_c), s      |  | 34.1  |     |   |      | 34.1  |      | 0.2   |   |      |   |   |
| <b>Intersection Summary</b>  |  |       |     |   |      |   |      |   |   |      |   |   |
| HCM 2010 Ctrl Delay          |  |       |     | 2.5   |      |   |      |   |   |      |   |   |
| HCM 2010 LOS                 |  |       |     | A   |      |   |      |   |   |      |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

NT+ Proj Phase 1 PM Peak

3/28/2017























|                              |  |  |  |  |  |  |  |    |  |  |    |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |   |   |  |   |   |
| Volume (veh/h)               | 545   | 0   | 962   | 0   | 0   | 0   | 0  | 1345  | 110   | 69  | 985   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 556   | 0   | 982   |   |   |   | 0  | 1372  | 112   | 70  | 1005  | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 849   | 0   | 763   |   |   |   | 0  | 1231  | 100   | 605   | 2670  | 0   |
| Arrive On Green              | 0.48  | 0.00  | 0.49  |   |   |   | 0.00   | 0.38  | 0.36  | 0.23  | 0.51  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0  | 3374  | 267   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 556   | 0   | 982   |   |   |   | 0  | 730   | 754   | 70  | 1005  | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0  | 1752  | 1796  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 28.7  | 0.0   | 58.4  |   |   |   | 0.0  | 45.0  | 45.0  | 3.8   | 20.9  | 0.0   |
| Cycle Q Clear(g_c), s        | 28.7  | 0.0   | 58.4  |   |   |   | 0.0  | 45.0  | 45.0  | 3.8   | 20.9  | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.15  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 849   | 0   | 763   |   |   |   | 0  | 657   | 674   | 605   | 2670  | 0   |
| V/C Ratio(X)                 | 0.65  | 0.00  | 1.29  |   |   |   | 0.00   | 1.11  | 1.12  | 0.12  | 0.38  | 0.00  |
| Avail Cap(c_a), veh/h        | 849   | 0   | 763   |   |   |   | 0  | 657   | 674   | 605   | 2670  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 0.67  | 0.67  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.96  | 0.96  | 0.00  |
| Uniform Delay (d), s/veh     | 23.4  | 0.0   | 30.8  |   |   |   | 0.0  | 37.5  | 37.6  | 31.7  | 12.1  | 0.0   |
| Incr Delay (d2), s/veh       | 1.8   | 0.0   | 138.9   |   |   |   | 0.0  | 69.6  | 72.2  | 0.1   | 0.4   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 14.3  | 0.0   | 54.7  |   |   |   | 0.0  | 34.4  | 35.8  | 1.9   | 10.3  | 0.0   |
| LnGrp Delay(d),s/veh         | 25.3  | 0.0   | 169.7   |   |   |   | 0.0  | 107.1   | 109.8   | 31.8  | 12.5  | 0.0   |
| LnGrp LOS                    | C   |   | F   |   |   |   |  | F   | F   | C   | B   |   |
| Approach Vol, veh/h          | 1538  |   |   |   |   |   | 1484   |   |   | 1075  |   |   |
| Approach Delay, s/veh        | 117.5   |   |   |   |   |   | 108.5  |   |   | 13.8  |   |   |
| Approach LOS                 | F   |   |   |   |   |   | F  |   |   | B   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 47.5  | 49.0  |   | 62.0  |   | 96.5  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 4.8   | * 44  |   | * 58  |   | 52.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 5.8   | 47.0  |   | 60.4  |   | 22.9  |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 0.0   |   | 0.0   |   | 5.5   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 87.0  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | F   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

NT+ Proj Phase 1 PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU   | NBL   | NBT   | NBR   | SBU   | SBL   |
| Lane Configurations               |  |  |  |  |  |  |   |  |  |  |   |  |
| Volume (vph)                      | 159   | 11  | 96  | 209   | 19  | 274   | 2   | 114   | 868   | 52  | 11  | 210   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.2   | 4.2   | 4.0   | 4.2   | 4.0   |   | 4.2   | 4.0   | 4.0   |   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 0.95  | 1.00  |   | 0.97  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 1.00  | 0.99  |   | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  |   | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |   | 1.00  | 1.00  | 0.85  |   | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |   | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |   | 1752  | 3505  | 1546  |   | 3400  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |   | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |   | 1752  | 3505  | 1546  |   | 3400  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.96  | 0.92  | 0.96  | 0.96  | 0.92  | 0.96  | 0.96  | 0.92  | 0.96  |
| Adj. Flow (vph)                   | 173   | 12  | 104   | 218   | 21  | 285   | 2   | 124   | 904   | 54  | 12  | 219   |
| RTOR Reduction (vph)              | 0   | 0   | 88  | 0   | 0   | 203   | 0   | 0   | 0   | 30  | 0   | 0   |
| Lane Group Flow (vph)             | 173   | 12  | 16  | 218   | 21  | 82  | 0   | 126   | 904   | 24  | 0   | 231   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |   |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot  | Prot  | NA  | Perm  | Prot  | Prot  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5   | 5   | 2   |   | 1   | 1   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |   |   |   | 2   |   |   |
| Actuated Green, G (s)             | 18.7  | 18.8  | 18.8  | 11.8  | 11.9  | 11.9  |   | 7.8   | 51.4  | 51.4  |   | 20.1  |
| Effective Green, g (s)            | 18.7  | 18.8  | 18.8  | 12.0  | 11.9  | 12.1  |   | 7.8   | 52.7  | 52.7  |   | 20.3  |
| Actuated g/C Ratio                | 0.16  | 0.16  | 0.16  | 0.10  | 0.10  | 0.10  |   | 0.06  | 0.44  | 0.44  |   | 0.17  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   |   | 4.2   | 5.3   | 5.3   |   | 4.2   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   |   | 3.0   |
| Lane Grp Cap (vph)                | 273   | 289   | 245   | 175   | 182   | 158   |   | 113   | 1539  | 678   |   | 575   |
| v/s Ratio Prot                    | c0.10   | 0.01  |   | c0.12   | 0.01  |   |   | c0.07   | 0.26  |   |   | 0.07  |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | 0.05  |   |   |   | 0.02  |   |   |
| v/c Ratio                         | 0.63  | 0.04  | 0.07  | 1.25  | 0.12  | 0.52  |   | 1.12  | 0.59  | 0.03  |   | 0.40  |
| Uniform Delay, d1                 | 47.4  | 43.0  | 43.1  | 54.0  | 49.3  | 51.2  |   | 56.1  | 25.4  | 19.2  |   | 44.4  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 0.96  | 0.42  | 1.00  |   | 0.89  |
| Incremental Delay, d2             | 4.7   | 0.1   | 0.1   | 149.2   | 0.3   | 2.8   |   | 115.2   | 1.5   | 0.1   |   | 0.2   |
| Delay (s)                         | 52.2  | 43.0  | 43.2  | 203.2   | 49.5  | 54.0  |   | 169.3   | 12.3  | 19.3  |   | 39.6  |
| Level of Service                  | D   | D   | D   | F   | D   | D   |   | F   | B   | B   |   | D   |
| Approach Delay (s)                |   | 48.6  |   |   | 115.9   |   |   |   | 30.9  |   |   |   |
| Approach LOS                      |   | D   |   |   | F   |   |   |   | C   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 40.0  |   |   | HCM 2000 Level of Service   |   |   | D   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.92  |   |   |   |   |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   | Sum of lost time (s)  |   |   | 16.6  |   |   |   |
| Intersection Capacity Utilization |   |   | 83.8%   |   |   | ICU Level of Service  |   |   | E   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

NT+ Proj Phase 1 PM Peak

3/28/2017



| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑    | ↑    |
| Volume (vph)           | 1470  | 175  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 4.0   |      |
| Lane Util. Factor      | 0.95  |      |
| Frpb, ped/bikes        | 1.00  |      |
| Flpb, ped/bikes        | 1.00  |      |
| Frt                    | 0.98  |      |
| Flt Protected          | 1.00  |      |
| Satd. Flow (prot)      | 3447  |      |
| Flt Permitted          | 1.00  |      |
| Satd. Flow (perm)      | 3447  |      |
| Peak-hour factor, PHF  | 0.96  | 0.92 |
| Adj. Flow (vph)        | 1531  | 190  |
| RTOR Reduction (vph)   | 6     | 0    |
| Lane Group Flow (vph)  | 1716  | 0    |
| Confl. Peds. (#/hr)    |       |      |
| Turn Type              | NA    |      |
| Protected Phases       | 6     |      |
| Permitted Phases       |       |      |
| Actuated Green, G (s)  | 63.7  |      |
| Effective Green, g (s) | 65.0  |      |
| Actuated g/C Ratio     | 0.54  |      |
| Clearance Time (s)     | 5.3   |      |
| Vehicle Extension (s)  | 3.0   |      |
| Lane Grp Cap (vph)     | 1867  |      |
| v/s Ratio Prot         | c0.50 |      |
| v/s Ratio Perm         |       |      |
| v/c Ratio              | 0.92  |      |
| Uniform Delay, d1      | 25.1  |      |
| Progression Factor     | 0.67  |      |
| Incremental Delay, d2  | 4.4   |      |
| Delay (s)              | 21.2  |      |
| Level of Service       | C     |      |
| Approach Delay (s)     | 23.4  |      |
| Approach LOS           | C     |      |
| Intersection Summary   |       |      |

Intersection

Intersection Delay, s/veh 8.8

Intersection LOS A

| Approach                    | EB    | WB    | NB    | SB    |
|-----------------------------|-------|-------|-------|-------|
| Entry Lanes                 | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes    | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h    | 317   | 62    | 108   | 542   |
| Demand Flow Rate, veh/h     | 327   | 64    | 111   | 558   |
| Vehicles Circulating, veh/h | 93    | 353   | 307   | 113   |
| Vehicles Exiting, veh/h     | 578   | 65    | 113   | 304   |
| Follow-Up Headway, s        | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h   | 0     | 0     | 0     | 0     |
| Ped Cap Adj                 | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh       | 6.9   | 5.5   | 5.8   | 10.9  |
| Approach LOS                | A     | A     | A     | B     |
























| Lane                  | Left  | Left  | Left  | Left  |
|-----------------------|-------|-------|-------|-------|
| Designated Moves      | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves         | LTR   | LTR   | LTR   | LTR   |
| RT Channelized        |       |       |       |       |
| Lane Util             | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s   | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h     | 327   | 64    | 111   | 558   |
| Cap Entry Lane, veh/h | 1030  | 794   | 831   | 1009  |
| Entry HV Adj Factor   | 0.970 | 0.967 | 0.976 | 0.971 |
| Flow Entry, veh/h     | 317   | 62    | 108   | 542   |
| Cap Entry, veh/h      | 999   | 768   | 811   | 980   |
| V/C Ratio             | 0.318 | 0.081 | 0.134 | 0.553 |
| Control Delay, s/veh  | 6.9   | 5.5   | 5.8   | 10.9  |
| LOS                   | A     | A     | A     | B     |
| 95th %tile Queue, veh | 1     | 0     | 0     | 3     |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

NT+ Proj Phase 1 PM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |   |    |  |  |  |  |
| Volume (veh/h)  | 50  | 687   | 208   | 108   | 595   | 29  | 152  | 154   | 10  | 21  | 134   | 72  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 53  | 723   | 219   | 114   | 626   | 31  | 160  | 162   | 11  | 22  | 141   | 76  |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95   | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 813   | 959   | 298   | 867   | 751   | 37  | 193  | 274   | 122   | 168   | 257   | 115   |
| Arrive On Green   | 0.46  | 0.19  | 0.19  | 0.49  | 0.22  | 0.21  | 0.11   | 0.08  | 0.08  | 0.10  | 0.07  | 0.07  |
| Sat Flow, veh/h   | 1757  | 5036  | 1565  | 1757  | 3399  | 168   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 53  | 723   | 219   | 114   | 322   | 335   | 160  | 162   | 11  | 22  | 141   | 76  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1565  | 1757  | 1752  | 1815  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 2.0   | 16.3  | 11.9  | 4.2   | 21.1  | 21.1  | 10.7   | 5.4   | 0.8   | 1.4   | 4.7   | 2.3   |
| Cycle Q Clear(g_c), s   | 2.0   | 16.3  | 11.9  | 4.2   | 21.1  | 21.1  | 10.7   | 5.4   | 0.8   | 1.4   | 4.7   | 2.3   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.09  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 813   | 959   | 298   | 867   | 387   | 401   | 193  | 274   | 122   | 168   | 257   | 115   |
| V/C Ratio(X)  | 0.07  | 0.75  | 0.73  | 0.13  | 0.83  | 0.83  | 0.83   | 0.59  | 0.09  | 0.13  | 0.55  | 0.66  |
| Avail Cap(c_a), veh/h   | 813   | 1259  | 391   | 867   | 540   | 560   | 322  | 1460  | 653   | 168   | 993   | 444   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 17.9  | 45.9  | 26.1  | 16.5  | 44.6  | 44.7  | 52.3   | 53.5  | 51.4  | 49.7  | 53.7  | 8.9   |
| Incr Delay (d2), s/veh  | 0.0   | 5.5   | 14.9  | 0.1   | 18.6  | 18.2  | 8.8  | 2.0   | 0.3   | 0.3   | 1.8   | 6.4   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 1.0   | 8.1   | 6.4   | 2.1   | 12.2  | 12.6  | 5.7  | 2.7   | 0.3   | 0.7   | 2.3   | 1.2   |
| LnGrp Delay(d),s/veh  | 17.9  | 51.4  | 41.0  | 16.5  | 63.2  | 62.9  | 61.2   | 55.5  | 51.7  | 50.0  | 55.5  | 15.2  |
| LnGrp LOS   | B   | D   | D   | B   | E   | E   | E  | E   | D   | D   | E   | B   |
| Approach Vol, veh/h   |   | 995   |   |   | 771   |   |  | 333   |   |   | 239   |   |
| Approach Delay, s/veh   |   | 47.3  |   |   | 56.2  |   |  | 58.1  |   |   | 42.2  |   |
| Approach LOS  |   | D   |   |   | E   |   |  | E   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 16.6  | 13.4  | 63.2  | 26.9  | 17.2  | 12.8  | 59.5   | 30.5  |   |   |   |   |
| Change Period (Y+Rc), s   | 5.3   | * 5.3   | 4.2   | * 5.3   | * 4.2   | 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | 5.8   | * 49  | 17.8  | * 29  | * 22  | 32.7  | 10.8   | * 36  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 3.4   | 7.4   | 6.2   | 18.3  | 12.7  | 6.7   | 4.0  | 23.1  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.2   | 0.7   | 0.4   | 3.2   | 0.3   | 0.8   | 0.3  | 2.1   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 51.3  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |



| Intersection     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 1.9 |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 55   | 738  | 0    | 38   | 0    | 1279 | 6    | 0    | 0    | 160  | 0    | 0    | 38   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 400  | -    | -    | -    | 120  | -    | 85   | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | -    | 0    | -    | -    | 1    | -    | -    | 1    | -    |
| Grade, %                 | -    | 0    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   | 90   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 61   | 820  | 0    | 42   | 0    | 1421 | 7    | 0    | 0    | 178  | 0    | 0    | 42   |

| Major/Minor          | Major1 |   |   | Major2 |      |   |   | Minor1 |      |      | Minor2 |      |      |
|----------------------|--------|---|---|--------|------|---|---|--------|------|------|--------|------|------|
| Conflicting Flow All | 1421   | 0 | 0 | 776    | 820  | 0 | 0 | 1737   | 2448 | 410  | 1956   | 2448 | 711  |
| Stage 1              | -      | - | - | -      | -    | - | - | 942    | 942  | -    | 1506   | 1506 | -    |
| Stage 2              | -      | - | - | -      | -    | - | - | 795    | 1506 | -    | 450    | 942  | -    |
| Critical Hdwy        | 4.16   | - | - | 5.66   | 5.36 | - | - | 7.01   | 6.56 | 7.16 | 7.01   | 6.56 | 6.96 |
| Critical Hdwy Stg 1  | -      | - | - | -      | -    | - | - | 7.36   | 5.56 | -    | 6.56   | 5.56 | -    |
| Critical Hdwy Stg 2  | -      | - | - | -      | -    | - | - | 6.56   | 5.56 | -    | 6.76   | 5.56 | -    |
| Follow-up Hdwy       | 2.23   | - | - | 2.33   | 3.13 | - | - | 3.68   | 4.03 | 3.93 | 3.68   | 4.03 | 3.33 |
| Pot Cap-1 Maneuver   | 470    | - | - | 580    | 474  | - | - | 71     | 30   | 503  | 50     | 30   | 373  |
| Stage 1              | -      | - | - | -      | -    | - | - | 222    | 337  | -    | 123    | 181  | -    |
| Stage 2              | -      | - | - | -      | -    | - | - | 336    | 181  | -    | 524    | 337  | -    |
| Platoon blocked, %   |        | - | - |        |      | - | - |        |      |      |        |      |      |
| Mov Cap-1 Maneuver   | 470    | - | - | 396    | 474  | - | - | 57     | 26   | 503  | 29     | 26   | 373  |
| Mov Cap-2 Maneuver   | -      | - | - | -      | -    | - | - | 123    | 87   | -    | 79     | 108  | -    |
| Stage 1              | -      | - | - | -      | -    | - | - | 193    | 293  | -    | 107    | 181  | -    |
| Stage 2              | -      | - | - | -      | -    | - | - | 298    | 181  | -    | 295    | 293  | -    |

| Approach             | EB | WB  | NE | SW   |
|----------------------|----|-----|----|------|
| HCM Control Delay, s | 1  | 0.4 | 16 | 15.9 |
| HCM LOS              |    |     | C  | C    |

























| Minor Lane/Major Mvmt | NELn1 | EBL  | EBT | EBR | WBU   | WBL | WBT | WBR | SWLn1 |
|-----------------------|-------|------|-----|-----|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 503   | 470  | -   | -   | 396   | 474 | -   | -   | 373   |
| HCM Lane V/C Ratio    | 0.353 | 0.13 | -   | -   | 0.107 | -   | -   | -   | 0.113 |
| HCM Control Delay (s) | 16    | 13.8 | -   | -   | 15.2  | -   | -   | -   | 15.9  |
| HCM Lane LOS          | C     | B    | -   | -   | C     | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 1.6   | 0.4  | -   | -   | 0.4   | 0   | -   | -   | 0.4   |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

NT+ Proj Phase 1 PM Peak

3/28/2017





















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |   |  |  |  |  |  |
| Volume (veh/h)               | 185   | 392   | 237   | 37  | 338   | 310   | 196  | 549   | 54  | 401   | 1042  | 275   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 189   | 400   | 242   | 38  | 345   | 316   | 200  | 560   | 55  | 409   | 1063  | 281   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 252   | 736   | 325   | 376   | 1240  | 385   | 732  | 709   | 317   | 1173  | 1163  | 520   |
| Arrive On Green              | 0.07  | 0.21  | 0.21  | 0.04  | 0.08  | 0.08  | 0.21   | 0.20  | 0.20  | 0.69  | 0.66  | 0.66  |
| Sat Flow, veh/h              | 3408  | 3505  | 1548  | 3408  | 5036  | 1564  | 3408   | 3505  | 1566  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 189   | 400   | 242   | 38  | 345   | 316   | 200  | 560   | 55  | 409   | 1063  | 281   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1548  | 1704  | 1679  | 1564  | 1704   | 1752  | 1566  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 6.5   | 12.2  | 17.6  | 1.3   | 7.7   | 23.9  | 5.9  | 18.2  | 3.5   | 5.9   | 31.1  | 11.3  |
| Cycle Q Clear(g_c), s        | 6.5   | 12.2  | 17.6  | 1.3   | 7.7   | 23.9  | 5.9  | 18.2  | 3.5   | 5.9   | 31.1  | 11.3  |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 252   | 736   | 325   | 376   | 1240  | 385   | 732  | 709   | 317   | 1173  | 1163  | 520   |
| V/C Ratio(X)                 | 0.75  | 0.54  | 0.74  | 0.10  | 0.28  | 0.82  | 0.27   | 0.79  | 0.17  | 0.35  | 0.91  | 0.54  |
| Avail Cap(c_a), veh/h        | 312   | 1171  | 517   | 376   | 1397  | 434   | 732  | 1089  | 487   | 1173  | 1393  | 623   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  | 1.00   | 1.00  | 1.00  | 2.00  | 2.00  | 2.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.99  | 0.99  | 0.99  | 1.00   | 1.00  | 1.00  | 0.26  | 0.26  | 0.26  |
| Uniform Delay (d), s/veh     | 54.5  | 42.3  | 44.4  | 52.1  | 45.1  | 52.5  | 39.3   | 45.4  | 39.6  | 13.2  | 18.7  | 15.4  |
| Incr Delay (d2), s/veh       | 7.6   | 0.6   | 3.4   | 0.1   | 0.1   | 10.7  | 0.2  | 8.7   | 1.2   | 0.0   | 4.0   | 1.1   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.3   | 6.0   | 7.8   | 0.6   | 3.6   | 11.5  | 2.8  | 9.6   | 1.6   | 2.7   | 15.1  | 4.9   |
| LnGrp Delay(d),s/veh         | 62.1  | 42.9  | 47.8  | 52.2  | 45.2  | 63.2  | 39.5   | 54.1  | 40.8  | 13.2  | 22.7  | 16.5  |
| LnGrp LOS                    | E   | D   | D   | D   | D   | E   | D  | D   | D   | B   | C   | B   |
| Approach Vol, veh/h          | 831   |   |   | 699   |   |   | 815  |   |   | 1753  |   |   |
| Approach Delay, s/veh        | 48.7  |   |   | 53.7  |   |   | 49.7   |   |   | 19.5  |   |   |
| Approach LOS                 | D   |   |   | D   |   |   | D  |   |   | B   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 45.3  | 28.3  | 17.2  | 29.2  | 29.8  | 43.8  | 12.9   | 33.6  |   |   |   |   |
| Change Period (Y+Rc), s      | 4.2   | * 5.7   | 4.2   | * 5.3   | 4.2   | * 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 22.2  | * 36  | 4.0   | * 39  | 11.8  | * 46  | 10.8   | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 7.9   | 20.2  | 3.3   | 19.6  | 7.9   | 33.1  | 8.5  | 25.9  |   |   |   |   |
| Green Ext Time (p_c), s      | 2.3   | 2.3   | 0.1   | 2.6   | 0.3   | 5.4   | 0.2  | 1.6   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 37.2  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 10: Coventry Avenue & Herndon Avenue

NT+ Proj Phase 1 PM Peak

3/28/2017













|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |   |  |  |  |  |  |   |   |  |  |
| Volume (veh/h)               | 72  | 740   | 75  | 5   | 473   | 21  | 106  | 1   | 21  | 83  | 7   | 73  |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1900  | 1845  | 1845  | 1845  | 1900   | 1845  | 1900  | 1900  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 73  | 747   | 76  | 5   | 478   | 21  | 107  | 1   | 21  | 84  | 7   | 74  |
| Adj No. of Lanes             | 1   | 3   | 0   | 1   | 3   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Peak Hour Factor             | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99   | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 991   | 932   | 94  | 877   | 684   | 213   | 134  | 1   | 26  | 119   | 10  | 115   |
| Arrive On Green              | 1.00  | 0.40  | 0.38  | 0.50  | 0.14  | 0.14  | 0.09   | 0.09  | 0.09  | 0.07  | 0.07  | 0.07  |
| Sat Flow, veh/h              | 1757  | 4649  | 470   | 1757  | 5036  | 1568  | 1430   | 13  | 281   | 1628  | 136   | 1568  |
| Grp Volume(v), veh/h         | 73  | 538   | 285   | 5   | 478   | 21  | 129  | 0   | 0   | 91  | 0   | 74  |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1679  | 1762  | 1757  | 1679  | 1568  | 1724   | 0   | 0   | 1763  | 0   | 1568  |
| Q Serve(g_s), s              | 0.0   | 17.0  | 17.2  | 0.2   | 10.9  | 1.4   | 8.8  | 0.0   | 0.0   | 6.1   | 0.0   | 5.5   |
| Cycle Q Clear(g_c), s        | 0.0   | 17.0  | 17.2  | 0.2   | 10.9  | 1.4   | 8.8  | 0.0   | 0.0   | 6.1   | 0.0   | 5.5   |
| Prop In Lane                 | 1.00  |   | 0.27  | 1.00  |   | 1.00  | 0.83   |   | 0.16  | 0.92  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 991   | 673   | 353   | 877   | 684   | 213   | 161  | 0   | 0   | 129   | 0   | 115   |
| V/C Ratio(X)                 | 0.07  | 0.80  | 0.81  | 0.01  | 0.70  | 0.10  | 0.80   | 0.00  | 0.00  | 0.71  | 0.00  | 0.65  |
| Avail Cap(c_a), veh/h        | 991   | 1287  | 675   | 877   | 1469  | 457   | 373  | 0   | 0   | 367   | 0   | 327   |
| HCM Platoon Ratio            | 2.00  | 2.00  | 2.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 0.83  | 0.83  | 0.83  | 1.00  | 1.00  | 1.00  | 1.00   | 0.00  | 0.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh     | 0.0   | 33.8  | 34.2  | 15.1  | 49.5  | 45.4  | 53.3   | 0.0   | 0.0   | 54.4  | 0.0   | 54.1  |
| Incr Delay (d2), s/veh       | 0.0   | 8.1   | 15.1  | 0.0   | 5.9   | 0.9   | 8.8  | 0.0   | 0.0   | 6.9   | 0.0   | 6.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 0.0   | 8.5   | 9.7   | 0.1   | 5.4   | 0.7   | 4.6  | 0.0   | 0.0   | 3.2   | 0.0   | 2.6   |
| LnGrp Delay(d),s/veh         | 0.0   | 41.9  | 49.3  | 15.1  | 55.4  | 46.3  | 62.1   | 0.0   | 0.0   | 61.2  | 0.0   | 60.1  |
| LnGrp LOS                    | A   | D   | D   | B   | E   | D   | E  |   |   | E   |   | E   |
| Approach Vol, veh/h          |   | 896   |   |   | 504   |   |  | 129   |   |   | 165   |   |
| Approach Delay, s/veh        |   | 40.9  |   |   | 54.6  |   |  | 62.1  |   |   | 60.7  |   |
| Approach LOS                 |   | D   |   |   | D   |   |  | E   |   |   | E   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 |   | 2   | 3   | 4   |   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     |   | 15.2  | 63.9  | 28.1  |   | 12.8  | 71.7   | 20.3  |   |   |   |   |
| Change Period (Y+Rc), s      |   | * 4.2   | 4.2   | * 5.3   |   | 4.2   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  |   | * 26  | 6.8   | * 45  |   | 24.8  | 17.8   | * 34  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s |   | 10.8  | 2.2   | 19.2  |   | 8.1   | 2.0  | 12.9  |   |   |   |   |
| Green Ext Time (p_c), s      |   | 0.4   | 0.1   | 3.6   |   | 0.6   | 0.2  | 2.1   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 48.5  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | D   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

NT+ Proj Phase 1 PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |  |
| Volume (veh/h)                    | 24  | 77  | 94  | 27  | 58  | 28  |
| Sign Control                      | Stop  |   |   | Stop  | Free  |   |
| Grade                             | 0%  |   |   | 0%  | 0%  |   |
| Peak Hour Factor                  | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  |
| Hourly flow rate (vph)            | 28  | 89  | 108   | 31  | 67  | 32  |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (ft)                   |   |   |   |   |   |   |
| Walking Speed (ft/s)              |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   | 4   |   |   |   |   |
| Median type                       |   |   |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   | 110   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 166   | 0   | 147   | 133   | 0   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 166   | 0   | 147   | 133   | 0   |   |
| tC, single (s)                    | 6.5   | 6.2   | 7.1   | 6.5   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.0   | 3.3   | 3.5   | 4.0   | 2.2   |   |
| p0 queue free %                   | 96  | 92  | 85  | 96  | 96  |   |
| cM capacity (veh/h)               | 695   | 1082  | 706   | 724   | 1617  |   |
| Direction, Lane #                 | EB 1  | WB 1  | WB 2  | NB 1  | NB 2  |   |
| Volume Total                      | 116   | 108   | 31  | 67  | 32  |   |
| Volume Left                       | 0   | 108   | 0   | 67  | 0   |   |
| Volume Right                      | 89  | 0   | 0   | 0   | 32  |   |
| cSH                               | 1419  | 706   | 724   | 1617  | 1700  |   |
| Volume to Capacity                | 0.08  | 0.15  | 0.04  | 0.04  | 0.02  |   |
| Queue Length 95th (ft)            | 7   | 13  | 3   | 3   | 0   |   |
| Control Delay (s)                 | 9.0   | 11.0  | 10.2  | 7.3   | 0.0   |   |
| Lane LOS                          | A   | B   | B   | A   |   |   |
| Approach Delay (s)                | 9.0   | 10.8  |   | 4.9   |   |   |
| Approach LOS                      | A   | B   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   | 8.6   |   |   |   |   |
| Intersection Capacity Utilization |   | 21.9%   |   | ICU Level of Service  | A   |   |
| Analysis Period (min)             |   | 15  |   |   |   |   |

Intersection

Int Delay, s/veh 0.1

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 5    | 832  | 507  | 17   | 0    | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 5    | 876  | 534  | 18   | 0    | 2    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 552    | 0      | 991    |
| Stage 1              | -      | -      | 543    |
| Stage 2              | -      | -      | 448    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 1007   | -      | 241    |
| Stage 1              | -      | -      | 543    |
| Stage 2              | -      | -      | 608    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 1007   | -      | 240    |
| Mov Cap-2 Maneuver   | -      | -      | 240    |
| Stage 1              | -      | -      | 543    |
| Stage 2              | -      | -      | 605    |

| Approach             | EB  | WB | SB |
|----------------------|-----|----|----|
| HCM Control Delay, s | 0.1 | 0  | 10 |
| HCM LOS              |     |    | B  |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 1007  | -   | -   | -   | 718   |
| HCM Lane V/C Ratio    | 0.005 | -   | -   | -   | 0.003 |
| HCM Control Delay (s) | 8.6   | -   | -   | -   | 10    |
| HCM Lane LOS          | A     | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0     |

Intersection

Int Delay, s/veh 2.6

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 653  | 255  | 20   | 416  | 116  | 30   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 250  | 250  | -    | 0    | 250  |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 98   | 98   | 98   | 98   | 98   | 98   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 666  | 260  | 20   | 424  | 118  | 31   |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |      |
|----------------------|--------|---|--------|---|--------|------|
| Conflicting Flow All | 0      | 0 | 666    | 0 | 919    | 333  |
| Stage 1              | -      | - | -      | - | 666    | -    |
| Stage 2              | -      | - | -      | - | 253    | -    |
| Critical Hdwy        | -      | - | 4.16   | - | 6.86   | 6.96 |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.86   | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.86   | -    |
| Follow-up Hdwy       | -      | - | 2.23   | - | 3.53   | 3.33 |
| Pot Cap-1 Maneuver   | -      | - | 913    | - | 269    | 660  |
| Stage 1              | -      | - | -      | - | 470    | -    |
| Stage 2              | -      | - | -      | - | 763    | -    |
| Platoon blocked, %   | -      | - |        | - |        |      |
| Mov Cap-1 Maneuver   | -      | - | 913    | - | 263    | 660  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 263    | -    |
| Stage 1              | -      | - | -      | - | 470    | -    |
| Stage 2              | -      | - | -      | - | 746    | -    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.4 | 25.6 |
| HCM LOS              |    |     | D    |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 263   | 660   | -   | -   | 913   | -   |
| HCM Lane V/C Ratio    | 0.45  | 0.046 | -   | -   | 0.022 | -   |
| HCM Control Delay (s) | 29.4  | 10.7  | -   | -   | 9     | -   |
| HCM Lane LOS          | D     | B     | -   | -   | A     | -   |
| HCM 95th %tile Q(veh) | 2.2   | 0.1   | -   | -   | 0.1   | -   |

| Intersection             |        |      |        |      |        |       |
|--------------------------|--------|------|--------|------|--------|-------|
| Int Delay, s/veh         | 1.1    |      |        |      |        |       |
| Movement                 | EBL    | EBT  | WBT    | WBR  | SBL    | SBR   |
| Vol, veh/h               | 55     | 613  | 387    | 10   | 17     | 43    |
| Conflicting Peds, #/hr   | 0      | 0    | 0      | 0    | 0      | 0     |
| Sign Control             | Free   | Free | Free   | Free | Stop   | Stop  |
| RT Channelized           | -      | None | -      | None | -      | None  |
| Storage Length           | 250    | -    | -      | 250  | 250    | 0     |
| Veh in Median Storage, # | -      | 0    | 0      | -    | 0      | -     |
| Grade, %                 | -      | 0    | 0      | -    | 0      | -     |
| Peak Hour Factor         | 93     | 93   | 93     | 93   | 93     | 93    |
| Heavy Vehicles, %        | 3      | 3    | 3      | 3    | 3      | 3     |
| Mvmt Flow                | 59     | 659  | 416    | 11   | 18     | 46    |
| Major/Minor              | Major1 |      | Major2 |      | Minor2 |       |
| Conflicting Flow All     | 416    | 0    | -      | 0    | 864    | 208   |
| Stage 1                  | -      | -    | -      | -    | 416    | -     |
| Stage 2                  | -      | -    | -      | -    | 448    | -     |
| Critical Hdwy            | 4.16   | -    | -      | -    | 6.86   | 6.96  |
| Critical Hdwy Stg 1      | -      | -    | -      | -    | 5.86   | -     |
| Critical Hdwy Stg 2      | -      | -    | -      | -    | 5.86   | -     |
| Follow-up Hdwy           | 2.23   | -    | -      | -    | 3.53   | 3.33  |
| Pot Cap-1 Maneuver       | 1132   | -    | -      | -    | 291    | 795   |
| Stage 1                  | -      | -    | -      | -    | 631    | -     |
| Stage 2                  | -      | -    | -      | -    | 608    | -     |
| Platoon blocked, %       | -      | -    | -      | -    | -      | -     |
| Mov Cap-1 Maneuver       | 1132   | -    | -      | -    | 276    | 795   |
| Mov Cap-2 Maneuver       | -      | -    | -      | -    | 276    | -     |
| Stage 1                  | -      | -    | -      | -    | 631    | -     |
| Stage 2                  | -      | -    | -      | -    | 576    | -     |
| Approach                 | EB     |      | WB     |      | SB     |       |
| HCM Control Delay, s     | 0.7    |      | 0      |      | 12.4   |       |
| HCM LOS                  |        |      |        |      | B      |       |
| Minor Lane/Major Mvmt    | EBL    | EBT  | WBT    | WBR  | SBLn1  | SBLn2 |
| Capacity (veh/h)         | 1132   | -    | -      | -    | 276    | 795   |
| HCM Lane V/C Ratio       | 0.052  | -    | -      | -    | 0.066  | 0.058 |
| HCM Control Delay (s)    | 8.4    | -    | -      | -    | 19     | 9.8   |
| HCM Lane LOS             | A      | -    | -      | -    | C      | A     |
| HCM 95th %tile Q(veh)    | 0.2    | -    | -      | -    | 0.2    | 0.2   |

Intersection

Int Delay, s/veh 3.1

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 469  | 158  | 6    | 258  | 135  | 11   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 494  | 166  | 6    | 272  | 142  | 12   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 494    |
| Stage 1              | -      | -      | 494    |
| Stage 2              | -      | -      | 284    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 1064   | 363    |
| Stage 1              | -      | -      | 611    |
| Stage 2              | -      | -      | 762    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 1064   | 360    |
| Mov Cap-2 Maneuver   | -      | -      | 360    |
| Stage 1              | -      | -      | 611    |
| Stage 2              | -      | -      | 757    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.2 | 21.5 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 370   | -   | -   | 1064  | -   |
| HCM Lane V/C Ratio    | 0.415 | -   | -   | 0.006 | -   |
| HCM Control Delay (s) | 21.5  | -   | -   | 8.4   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 2     | -   | -   | 0     | -   |



Intersection

Int Delay, s/veh 0.2

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 437  | 13   | 1    | 244  | 11   | 0    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 91   | 91   | 91   | 91   | 91   | 91   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 480  | 14   | 1    | 268  | 12   | 0    |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 495    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 14.9 |
| HCM LOS              |    |    | B    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 374   | -   | -   | 1064  | -   |
| HCM Lane V/C Ratio    | 0.032 | -   | -   | 0.001 | -   |
| HCM Control Delay (s) | 14.9  | -   | -   | 8.4   | 0   |
| HCM Lane LOS          | B     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 0.1   | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 3

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 200  | 225  | 2    | 168  | 131  | 10   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 89   | 89   | 89   | 89   | 89   | 89   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 225  | 253  | 2    | 189  | 147  | 11   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 544    |
| Stage 1              | -      | -      | 351    |
| Stage 2              | -      | -      | 193    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 1079   | 498    |
| Stage 1              | -      | -      | 710    |
| Stage 2              | -      | -      | 837    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 1079   | 497    |
| Mov Cap-2 Maneuver   | -      | -      | 497    |
| Stage 1              | -      | -      | 710    |
| Stage 2              | -      | -      | 835    |

| Approach             | EB | WB  | NB   |
|----------------------|----|-----|------|
| HCM Control Delay, s | 0  | 0.1 | 15.3 |
| HCM LOS              |    |     | C    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 507   | -   | -   | 1079  | -   |
| HCM Lane V/C Ratio    | 0.312 | -   | -   | 0.002 | -   |
| HCM Control Delay (s) | 15.3  | -   | -   | 8.3   | 0   |
| HCM Lane LOS          | C     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 1.3   | -   | -   | 0     | -   |

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 6      |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 6      | 16    | 137   | 16     | 7     | 1     | 92     | 92   | 21   | 0      | 59   | 4    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 82     | 82    | 82    | 82     | 82    | 82    | 82     | 82   | 82   | 82     | 82   | 82   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 7      | 20    | 167   | 20     | 9     | 1     | 112    | 112  | 26   | 0      | 72   | 5    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 428    | 436   | 74    | 517    | 426   | 125   | 77     | 0    | 0    | 138    | 0    | 0    |
| Stage 1                  | 74     | 74    | -     | 349    | 349   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 354    | 362   | -     | 168    | 77    | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 535    | 512   | 985   | 467    | 519   | 923   | 1515   | -    | -    | 1440   | -    | -    |
| Stage 1                  | 933    | 831   | -     | 665    | 632   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 661    | 623   | -     | 832    | 829   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 495    | 471   | 985   | 353    | 477   | 923   | 1515   | -    | -    | 1440   | -    | -    |
| Mov Cap-2 Maneuver       | 495    | 471   | -     | 353    | 477   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 858    | 831   | -     | 612    | 581   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 598    | 573   | -     | 675    | 829   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 10.4   |       |       | 14.9   |       |       | 3.4    |      |      | 0      |      |      |
| HCM LOS                  | B      |       |       | B      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1515   | -     | -     | 859    | 393   | 1440  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.074  | -     | -     | 0.226  | 0.074 | -     | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 7.6    | 0     | -     | 10.4   | 14.9  | 0     | -      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | B      | B     | A     | -      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.2    | -     | -     | 0.9    | 0.2   | 0     | -      | -    |      |        |      |      |

Intersection

Int Delay, s/veh 1.3

| Movement                 | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 0    | 184  | 1262 | 19   | 0    | 1939 |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Free | Free | Free | Free |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | -    | -    |
| Veh in Median Storage, # | 1    | -    | 0    | -    | -    | 0    |
| Grade, %                 | 0    | -    | 0    | -    | -    | 0    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 200  | 1372 | 21   | 0    | 2108 |

| Major/Minor          | Minor1 | Major1 | Major2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 2436   | 696    | 0      |
| Stage 1              | 1382   | -      | -      |
| Stage 2              | 1054   | -      | -      |
| Critical Hdwy        | 6.86   | 6.96   | 4.16   |
| Critical Hdwy Stg 1  | 5.86   | -      | -      |
| Critical Hdwy Stg 2  | 5.86   | -      | -      |
| Follow-up Hdwy       | 3.53   | 3.33   | 2.23   |
| Pot Cap-1 Maneuver   | 26     | 382    | 482    |
| Stage 1              | 196    | -      | -      |
| Stage 2              | 294    | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 26     | 382    | 482    |
| Mov Cap-2 Maneuver   | 119    | -      | -      |
| Stage 1              | 196    | -      | -      |
| Stage 2              | 294    | -      | -      |

| Approach             | WB   | NB | SB |
|----------------------|------|----|----|
| HCM Control Delay, s | 24.3 | 0  | 0  |
| HCM LOS              | C    |    |    |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT |
|-----------------------|-----|----------|-----|-----|
| Capacity (veh/h)      | -   | - 382    | 482 | -   |
| HCM Lane V/C Ratio    | -   | - 0.524  | -   | -   |
| HCM Control Delay (s) | -   | - 24.3   | 0   | -   |
| HCM Lane LOS          | -   | - C      | A   | -   |
| HCM 95th %tile Q(veh) | -   | - 2.9    | 0   | -   |

| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 12.2 |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | B    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 28   | 189  | 35   | 0    | 8    | 138  | 34   | 0    | 30   | 59   | 11   |
| Peak Hour Factor          | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 32   | 215  | 40   | 0    | 9    | 157  | 39   | 0    | 34   | 67   | 12   |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB   | NB  |
|----------------------------|------|------|-----|
| Opposing Approach          | WB   | EB   | SB  |
| Opposing Lanes             | 2    | 3    | 1   |
| Conflicting Approach Left  | SB   | NB   | EB  |
| Conflicting Lanes Left     | 1    | 3    | 3   |
| Conflicting Approach Right | NB   | SB   | WB  |
| Conflicting Lanes Right    | 3    | 1    | 2   |
| HCM Control Delay          | 11.9 | 12.3 | 9.9 |
| HCM LOS                    | B    | B    | A   |

| Lane                   | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 27%   |
| Vol Thru, %            | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 80%   | 55%   |
| Vol Right, %           | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 20%   | 17%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 30    | 59    | 11    | 28    | 189   | 35    | 8     | 172   | 197   |
| LT Vol                 | 30    | 0     | 0     | 28    | 0     | 0     | 8     | 0     | 54    |
| Through Vol            | 0     | 59    | 0     | 0     | 189   | 0     | 0     | 138   | 109   |
| RT Vol                 | 0     | 0     | 11    | 0     | 0     | 35    | 0     | 34    | 34    |
| Lane Flow Rate         | 34    | 67    | 12    | 32    | 215   | 40    | 9     | 195   | 224   |
| Geometry Grp           | 7     | 7     | 7     | 8     | 8     | 8     | 8     | 8     | 8     |
| Degree of Util (X)     | 0.065 | 0.119 | 0.02  | 0.06  | 0.375 | 0.062 | 0.018 | 0.343 | 0.401 |
| Departure Headway (Hd) | 6.908 | 6.402 | 5.693 | 6.791 | 6.286 | 5.578 | 6.962 | 6.316 | 6.446 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 517   | 558   | 626   | 526   | 571   | 640   | 513   | 567   | 557   |
| Service Time           | 4.67  | 4.164 | 3.455 | 4.548 | 4.042 | 3.334 | 4.722 | 4.075 | 4.204 |
| HCM Lane V/C Ratio     | 0.066 | 0.12  | 0.019 | 0.061 | 0.377 | 0.063 | 0.018 | 0.344 | 0.402 |
| HCM Control Delay      | 10.2  | 10    | 8.6   | 10    | 12.8  | 8.7   | 9.9   | 12.4  | 13.5  |
| HCM Lane LOS           | B     | A     | A     | A     | B     | A     | A     | B     | B     |
| HCM 95th-tile Q        | 0.2   | 0.4   | 0.1   | 0.2   | 1.7   | 0.2   | 0.1   | 1.5   | 1.9   |

Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 54   | 109  | 34   |
| Peak Hour Factor  | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 61   | 124  | 39   |
| Number of Lanes   | 0    | 0    | 1    | 0    |

| Approach                   | SB   |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 13.5 |
| HCM LOS                    | B    |

Lane

| Intersection                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh12.4 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS B            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                      | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                    | 0    | 27   | 190  | 47   | 0    | 10   | 134  | 14   | 0    | 60   | 82   | 17   | 0    | 37   | 162  | 52   |
| Peak Hour Factor              | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 | 0.92 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, %             | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                     | 0    | 31   | 216  | 53   | 0    | 11   | 152  | 16   | 0    | 68   | 93   | 19   | 0    | 42   | 184  | 59   |
| Number of Lanes               | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 13.2 | 11.2 | 11.3 | 12.9 |
| HCM LOS                    | B    | B    | B    | B    |


















| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 38%   | 10%   | 6%    | 15%   |
| Vol Thru, %            | 52%   | 72%   | 85%   | 65%   |
| Vol Right, %           | 11%   | 18%   | 9%    | 21%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 159   | 264   | 158   | 251   |
| LT Vol                 | 60    | 27    | 10    | 37    |
| Through Vol            | 82    | 190   | 134   | 162   |
| RT Vol                 | 17    | 47    | 14    | 52    |
| Lane Flow Rate         | 181   | 300   | 180   | 285   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.293 | 0.46  | 0.288 | 0.439 |
| Departure Headway (Hd) | 5.833 | 5.518 | 5.775 | 5.546 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 613   | 651   | 619   | 647   |
| Service Time           | 3.903 | 3.577 | 3.843 | 3.607 |
| HCM Lane V/C Ratio     | 0.295 | 0.461 | 0.291 | 0.44  |
| HCM Control Delay      | 11.3  | 13.2  | 11.2  | 12.9  |
| HCM Lane LOS           | B     | B     | B     | B     |
| HCM 95th-tile Q        | 1.2   | 2.4   | 1.2   | 2.2   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

NT + Proj Phase 1 AM Peak

4/13/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 616   | 0   | 577   | 0   | 0   | 0   | 0  | 1864  | 53  | 26  | 652   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 662   | 0   | 620   |   |   |   | 0  | 2004  | 57  | 28  | 701   | 0   |
| Adj No. of Lanes             | 1   | 0   | 2   |   |   |   | 0  | 3   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 710   | 0   | 1125  |   |   |   | 0  | 2088  | 59  | 126   | 1854  | 0   |
| Arrive On Green              | 0.40  | 0.00  | 0.41  |   |   |   | 0.00   | 0.83  | 0.81  | 0.02  | 0.17  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 2760  |   |   |   | 0  | 5200  | 143   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 662   | 0   | 620   |   |   |   | 0  | 1336  | 725   | 28  | 701   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1380  |   |   |   | 0  | 1679  | 1819  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 43.2  | 0.0   | 20.6  |   |   |   | 0.0  | 39.8  | 40.3  | 1.9   | 21.2  | 0.0   |
| Cycle Q Clear(g_c), s        | 43.2  | 0.0   | 20.6  |   |   |   | 0.0  | 39.8  | 40.3  | 1.9   | 21.2  | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.08  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 710   | 0   | 1125  |   |   |   | 0  | 1393  | 755   | 126   | 1854  | 0   |
| V/C Ratio(X)                 | 0.93  | 0.00  | 0.55  |   |   |   | 0.00   | 0.96  | 0.96  | 0.22  | 0.38  | 0.00  |
| Avail Cap(c_a), veh/h        | 747   | 0   | 1182  |   |   |   | 0  | 1472  | 798   | 126   | 1854  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 0.33  | 0.33  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.98  | 0.98  | 0.00  |
| Uniform Delay (d), s/veh     | 34.2  | 0.0   | 27.2  |   |   |   | 0.0  | 9.4   | 9.5   | 55.3  | 32.1  | 0.0   |
| Incr Delay (d2), s/veh       | 18.0  | 0.0   | 0.5   |   |   |   | 0.0  | 16.1  | 24.6  | 0.9   | 0.6   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 24.5  | 0.0   | 7.9   |   |   |   | 0.0  | 20.2  | 23.7  | 0.9   | 10.5  | 0.0   |
| LnGrp Delay(d),s/veh         | 52.2  | 0.0   | 27.7  |   |   |   | 0.0  | 25.5  | 34.1  | 56.1  | 32.7  | 0.0   |
| LnGrp LOS                    | D   |   | C   |   |   |   |  | C   | C   | E   | C   |   |
| Approach Vol, veh/h          | 1282  |   |   |   |   |   |  | 2061  |   |   | 729   |   |
| Approach Delay, s/veh        | 40.3  |   |   |   |   |   |  | 28.5  |   |   | 33.6  |   |
| Approach LOS                 | D   |   |   |   |   |   |  | C   |   |   | C   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 13.7  | 53.8  |   | 52.5  |   | 67.5  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 4.2   | * 51  |   | * 51  |   | 59.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 3.9   | 42.3  |   | 45.2  |   | 23.2  |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.1   | 6.1   |   | 3.1   |   | 3.4   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 33.1  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | C   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |



























# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

NT + Proj Phase 1 AM Peak

4/13/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)  | 221   | 240   | 111   | 45  | 436   | 530   | 241  | 1036  | 67  | 265   | 451   | 142   |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 235   | 255   | 118   | 48  | 464   | 564   | 256  | 1102  | 71  | 282   | 480   | 151   |
| Adj No. of Lanes  | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94   | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 295   | 422   | 187   | 419   | 790   | 681   | 325  | 1212  | 542   | 915   | 1851  | 828   |
| Arrive On Green   | 0.09  | 0.12  | 0.12  | 0.21  | 0.26  | 0.26  | 0.10   | 0.35  | 0.35  | 0.27  | 0.53  | 0.53  |
| Sat Flow, veh/h   | 3408  | 3505  | 1552  | 3408  | 5036  | 1568  | 3408   | 3505  | 1567  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 235   | 255   | 118   | 48  | 464   | 564   | 256  | 1102  | 71  | 282   | 480   | 151   |
| Grp Sat Flow(s),veh/h/ln  | 1704  | 1752  | 1552  | 1704  | 1679  | 1568  | 1704   | 1752  | 1567  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s   | 8.1   | 8.3   | 6.9   | 1.4   | 9.6   | 0.0   | 8.8  | 36.0  | 3.7   | 7.9   | 9.0   | 3.8   |
| Cycle Q Clear(g_c), s   | 8.1   | 8.3   | 6.9   | 1.4   | 9.6   | 0.0   | 8.8  | 36.0  | 3.7   | 7.9   | 9.0   | 3.8   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 295   | 422   | 187   | 419   | 790   | 681   | 325  | 1212  | 542   | 915   | 1851  | 828   |
| V/C Ratio(X)  | 0.80  | 0.60  | 0.63  | 0.11  | 0.59  | 0.83  | 0.79   | 0.91  | 0.13  | 0.31  | 0.26  | 0.18  |
| Avail Cap(c_a), veh/h   | 312   | 1142  | 506   | 419   | 1397  | 870   | 443  | 1256  | 561   | 915   | 1851  | 828   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.67  | 1.67  | 1.67  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 0.97  | 0.97  | 0.97  | 1.00   | 1.00  | 1.00  | 0.83  | 0.83  | 0.83  |
| Uniform Delay (d), s/veh  | 53.8  | 50.1  | 31.5  | 42.4  | 40.9  | 24.5  | 53.1   | 37.5  | 26.9  | 35.0  | 15.5  | 5.9   |
| Incr Delay (d2), s/veh  | 12.8  | 1.4   | 3.5   | 0.1   | 0.7   | 5.2   | 6.6  | 11.6  | 0.5   | 0.2   | 0.3   | 0.4   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 4.3   | 4.1   | 3.1   | 0.7   | 4.5   | 14.4  | 4.5  | 19.4  | 1.7   | 3.7   | 4.4   | 1.7   |
| LnGrp Delay(d),s/veh  | 66.6  | 51.5  | 35.0  | 42.5  | 41.6  | 29.7  | 59.7   | 49.1  | 27.4  | 35.2  | 15.8  | 6.3   |
| LnGrp LOS   | E   | D   | C   | D   | D   | C   | E  | D   | C   | D   | B   | A   |
| Approach Vol, veh/h   |   | 608   |   |   | 1076  |   |  | 1429  |   |   | 913   |   |
| Approach Delay, s/veh   |   | 54.1  |   |   | 35.4  |   |  | 49.9  |   |   | 20.2  |   |
| Approach LOS  |   | D   |   |   | D   |   |  | D   |   |   | C   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 37.3  | 45.5  | 18.8  | 18.4  | 15.4  | 67.4  | 14.4   | 22.8  |   |   |   |   |
| Change Period (Y+Rc), s   | 5.3   | * 5.7   | 4.2   | * 5.3   | * 4.2   | 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | 16.5  | * 41  | 5.0   | * 38  | * 15  | 42.8  | 10.8   | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 9.9   | 38.0  | 3.4   | 10.3  | 10.8  | 11.0  | 10.1   | 11.6  |   |   |   |   |
| Green Ext Time (p_c), s   | 2.3   | 1.8   | 0.2   | 1.5   | 0.4   | 4.3   | 0.1  | 4.9   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 39.9  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

Intersection

Intersection Delay, s/veh20.5

Intersection LOS C

| Movement          | EBU  | EBT  | EBR  | WBU  | WBL  | WBT  | NBU  | NBL  | NBR  |
|-------------------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h        | 0    | 177  | 84   | 0    | 5    | 548  | 0    | 167  | 5    |
| Peak Hour Factor  | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 192  | 91   | 0    | 5    | 596  | 0    | 182  | 5    |
| Number of Lanes   | 0    | 1    | 1    | 0    | 0    | 1    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   |
|----------------------------|------|------|------|
| Opposing Approach          | WB   | EB   |      |
| Opposing Lanes             | 1    | 2    | 0    |
| Conflicting Approach Left  |      | NB   | EB   |
| Conflicting Lanes Left     | 0    | 1    | 2    |
| Conflicting Approach Right | NB   |      | WB   |
| Conflicting Lanes Right    | 1    | 0    | 1    |
| HCM Control Delay          | 10.4 | 27.8 | 12.3 |
| HCM LOS                    | B    | D    | B    |






















| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 97%   | 0%    | 0%    | 1%    |
| Vol Thru, %            | 0%    | 100%  | 0%    | 99%   |
| Vol Right, %           | 3%    | 0%    | 100%  | 0%    |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 172   | 177   | 84    | 553   |
| LT Vol                 | 167   | 0     | 0     | 5     |
| Through Vol            | 0     | 177   | 0     | 548   |
| RT Vol                 | 5     | 0     | 84    | 0     |
| Lane Flow Rate         | 187   | 192   | 91    | 601   |
| Geometry Grp           | 2     | 7     | 7     | 5     |
| Degree of Util (X)     | 0.326 | 0.311 | 0.13  | 0.83  |
| Departure Headway (Hd) | 6.282 | 5.824 | 5.114 | 5.088 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 574   | 619   | 703   | 715   |
| Service Time           | 4.295 | 3.542 | 2.832 | 3.088 |
| HCM Lane V/C Ratio     | 0.326 | 0.31  | 0.129 | 0.841 |
| HCM Control Delay      | 12.3  | 11.2  | 8.6   | 27.8  |
| HCM Lane LOS           | B     | B     | A     | D     |
| HCM 95th-tile Q        | 1.4   | 1.3   | 0.4   | 9.1   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

NT+ Proj Phase 1 PM Peak

4/13/2017

























|   |  |  |    |  |  |  |  |    |  |  |    |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |   |   |   |   |   |  |    |   |  |   |   |
| Volume (veh/h)  | 545   | 0   | 962   | 0   | 0   | 0   | 0  | 1345  | 110   | 69  | 985   | 0   |
| Number  | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h  | 556   | 0   | 982   |   |   |   | 0  | 1372  | 112   | 70  | 1005  | 0   |
| Adj No. of Lanes  | 1   | 0   | 2   |   |   |   | 0  | 3   | 0   | 1   | 2   | 0   |
| Peak Hour Factor  | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %  | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h  | 644   | 0   | 1030  |   |   |   | 0  | 1576  | 129   | 145   | 1752  | 0   |
| Arrive On Green   | 0.37  | 0.00  | 0.37  |   |   |   | 0.00   | 0.66  | 0.62  | 0.17  | 1.00  | 0.00  |
| Sat Flow, veh/h   | 1757  | 0   | 2760  |   |   |   | 0  | 4910  | 387   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h  | 556   | 0   | 982   |   |   |   | 0  | 971   | 513   | 70  | 1005  | 0   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 0   | 1380  |   |   |   | 0  | 1679  | 1774  | 1757  | 1752  | 0   |
| Q Serve(g_s), s   | 17.6  | 0.0   | 20.8  |   |   |   | 0.0  | 13.8  | 13.9  | 2.2   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s   | 17.6  | 0.0   | 20.8  |   |   |   | 0.0  | 13.8  | 13.9  | 2.2   | 0.0   | 0.0   |
| Prop In Lane  | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.22  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h  | 644   | 0   | 1030  |   |   |   | 0  | 1116  | 589   | 145   | 1752  | 0   |
| V/C Ratio(X)  | 0.86  | 0.00  | 0.95  |   |   |   | 0.00   | 0.87  | 0.87  | 0.48  | 0.57  | 0.00  |
| Avail Cap(c_a), veh/h   | 644   | 0   | 1030  |   |   |   | 0  | 1214  | 642   | 145   | 1752  | 0   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.96  | 0.96  | 0.00  |
| Uniform Delay (d), s/veh  | 17.6  | 0.0   | 18.3  |   |   |   | 0.0  | 9.0   | 9.3   | 23.9  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh  | 11.6  | 0.0   | 17.8  |   |   |   | 0.0  | 9.3   | 16.1  | 2.4   | 1.3   | 0.0   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 10.6  | 0.0   | 10.3  |   |   |   | 0.0  | 7.4   | 8.9   | 1.1   | 0.3   | 0.0   |
| LnGrp Delay(d),s/veh  | 29.2  | 0.0   | 36.1  |   |   |   | 0.0  | 18.4  | 25.4  | 26.2  | 1.3   | 0.0   |
| LnGrp LOS   | C   |   | D   |   |   |   |  | B   | C   | C   | A   |   |
| Approach Vol, veh/h   |   | 1538  |   |   |   |   |  | 1484  |   |   | 1075  |   |
| Approach Delay, s/veh   |   | 33.6  |   |   |   |   |  | 20.8  |   |   | 2.9   |   |
| Approach LOS  |   | C   |   |   |   |   |  | C   |   |   | A   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 10.1  | 23.9  |   | 26.0  |   | 34.0  |  |   |   |   |   |   |
| Change Period (Y+Rc), s   | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s   | 4.1   | * 20  |   | * 22  |   | 28.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 4.2   | 15.9  |   | 22.8  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 2.7   |   | 0.0   |   | 5.4   |  |   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 20.9  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | C   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

NT+ Proj Phase 1 PM Peak

4/13/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)               | 185   | 392   | 237   | 37  | 338   | 310   | 196  | 549   | 54  | 401   | 1042  | 275   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 189   | 400   | 242   | 38  | 345   | 316   | 200  | 560   | 55  | 409   | 1063  | 281   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 253   | 661   | 291   | 106   | 733   | 924   | 264  | 709   | 317   | 1484  | 1996  | 893   |
| Arrive On Green              | 0.07  | 0.19  | 0.19  | 0.01  | 0.05  | 0.05  | 0.08   | 0.20  | 0.20  | 0.87  | 1.00  | 1.00  |
| Sat Flow, veh/h              | 3408  | 3505  | 1546  | 3408  | 5036  | 1561  | 3408   | 3505  | 1566  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 189   | 400   | 242   | 38  | 345   | 316   | 200  | 560   | 55  | 409   | 1063  | 281   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1546  | 1704  | 1679  | 1561  | 1704   | 1752  | 1566  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 6.5   | 12.5  | 14.4  | 1.3   | 8.0   | 0.0   | 6.9  | 18.2  | 3.5   | 2.4   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        | 6.5   | 12.5  | 14.4  | 1.3   | 8.0   | 0.0   | 6.9  | 18.2  | 3.5   | 2.4   | 0.0   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 253   | 661   | 291   | 106   | 733   | 924   | 264  | 709   | 317   | 1484  | 1996  | 893   |
| V/C Ratio(X)                 | 0.75  | 0.61  | 0.83  | 0.36  | 0.47  | 0.34  | 0.76   | 0.79  | 0.17  | 0.28  | 0.53  | 0.31  |
| Avail Cap(c_a), veh/h        | 312   | 1171  | 516   | 119   | 1397  | 1130  | 341  | 1089  | 487   | 1484  | 1996  | 893   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  | 1.00   | 1.00  | 1.00  | 2.00  | 2.00  | 2.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.99  | 0.99  | 0.99  | 1.00   | 1.00  | 1.00  | 0.22  | 0.22  | 0.22  |
| Uniform Delay (d), s/veh     | 54.4  | 44.6  | 29.7  | 58.2  | 52.6  | 14.5  | 54.3   | 45.4  | 39.6  | 4.5   | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       | 7.5   | 0.9   | 6.1   | 2.0   | 0.5   | 0.2   | 7.1  | 8.7   | 1.2   | 0.0   | 0.2   | 0.2   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.3   | 6.1   | 6.6   | 0.7   | 3.8   | 6.1   | 3.5  | 9.6   | 1.6   | 1.0   | 0.1   | 0.1   |
| LnGrp Delay(d),s/veh         | 62.0  | 45.5  | 35.7  | 60.2  | 53.1  | 14.7  | 61.3   | 54.1  | 40.8  | 4.6   | 0.2   | 0.2   |
| LnGrp LOS                    | E   | D   | D   | E   | D   | B   | E  | D   | D   | A   | A   | A   |
| Approach Vol, veh/h          | 831   |   |   | 699   |   |   | 815  |   |   | 1753  |   |   |
| Approach Delay, s/veh        | 46.4  |   |   | 36.1  |   |   | 55.0   |   |   | 1.2   |   |   |
| Approach LOS                 | D   |   |   | D   |   |   | E  |   |   | A   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 57.4  | 28.3  | 7.7   | 26.6  | 13.3  | 72.3  | 12.9   | 21.5  |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.7   | 4.2   | * 5.3   | * 4.2   | 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 22.2  | * 36  | 4.0   | * 39  | * 12  | 46.4  | 10.8   | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 4.4   | 20.2  | 3.3   | 16.4  | 8.9   | 2.0   | 8.5  | 10.0  |   |   |   |   |
| Green Ext Time (p_c), s      | 8.1   | 2.3   | 0.1   | 2.7   | 0.2   | 10.9  | 0.2  | 2.9   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 27.0  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | C   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

Intersection

Intersection Delay, s/veh15.3

Intersection LOS C

| Movement          | EBU  | EBT  | EBR  | WBU  | WBL  | WBT  | NBU  | NBL  | NBR  |
|-------------------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h        | 0    | 469  | 158  | 0    | 6    | 258  | 0    | 135  | 11   |
| Peak Hour Factor  | 0.92 | 0.95 | 0.95 | 0.92 | 0.95 | 0.95 | 0.92 | 0.95 | 0.95 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 494  | 166  | 0    | 6    | 272  | 0    | 142  | 12   |
| Number of Lanes   | 0    | 1    | 1    | 0    | 0    | 1    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   |
|----------------------------|------|------|------|
| Opposing Approach          | WB   | EB   |      |
| Opposing Lanes             | 1    | 2    | 0    |
| Conflicting Approach Left  |      | NB   | EB   |
| Conflicting Lanes Left     | 0    | 1    | 2    |
| Conflicting Approach Right | NB   |      | WB   |
| Conflicting Lanes Right    | 1    | 0    | 1    |
| HCM Control Delay          | 17.7 | 11.8 | 11.4 |
| HCM LOS                    | C    | B    | B    |

| Lane                   | NBLn1 | EBLn1 | EBLn2 | WBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 92%   | 0%    | 0%    | 2%    |
| Vol Thru, %            | 0%    | 100%  | 0%    | 98%   |
| Vol Right, %           | 8%    | 0%    | 100%  | 0%    |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 146   | 469   | 158   | 264   |
| LT Vol                 | 135   | 0     | 0     | 6     |
| Through Vol            | 0     | 469   | 0     | 258   |
| RT Vol                 | 11    | 0     | 158   | 0     |
| Lane Flow Rate         | 154   | 494   | 166   | 278   |
| Geometry Grp           | 2     | 7     | 7     | 5     |
| Degree of Util (X)     | 0.264 | 0.724 | 0.211 | 0.402 |
| Departure Headway (Hd) | 6.179 | 5.28  | 4.574 | 5.315 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 586   | 676   | 775   | 681   |
| Service Time           | 4.179 | 3.069 | 2.362 | 3.315 |
| HCM Lane V/C Ratio     | 0.263 | 0.731 | 0.214 | 0.408 |
| HCM Control Delay      | 11.4  | 20.8  | 8.6   | 11.8  |
| HCM Lane LOS           | B     | C     | A     | B     |
| HCM 95th-tile Q        | 1.1   | 6.2   | 0.8   | 1.9   |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | EB  | EB   | EB  | WB  | WB   | WB  | NB  | NB   | NB   | NB  | SB  | SB   |
|-----------------------|-----|------|-----|-----|------|-----|-----|------|------|-----|-----|------|
| Directions Served     | L   | T    | R   | L   | T    | R   | UL  | T    | T    | R   | L   | T    |
| Maximum Queue (ft)    | 349 | 967  | 107 | 169 | 598  | 104 | 248 | 151  | 131  | 105 | 197 | 1085 |
| Average Queue (ft)    | 50  | 104  | 56  | 122 | 119  | 17  | 114 | 64   | 76   | 38  | 70  | 238  |
| 95th Queue (ft)       | 148 | 444  | 95  | 180 | 334  | 55  | 221 | 135  | 138  | 84  | 147 | 580  |
| Link Distance (ft)    |     | 1573 |     |     | 1457 |     |     | 2685 | 2685 |     |     | 1298 |
| Upstream Blk Time (%) |     |      |     |     |      |     |     |      |      |     |     |      |
| Queuing Penalty (veh) |     |      |     |     |      |     |     |      |      |     |     |      |
| Storage Bay Dist (ft) | 240 |      | 80  | 100 |      | 25  | 240 |      |      | 120 | 250 |      |
| Storage Blk Time (%)  |     | 13   | 13  | 28  | 46   | 3   | 4   |      | 8    | 0   |     | 10   |
| Queuing Penalty (veh) |     | 31   | 18  | 26  | 96   | 7   | 5   |      | 12   | 0   |     | 10   |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | SB   | SB  |
|-----------------------|------|-----|
| Directions Served     | T    | R   |
| Maximum Queue (ft)    | 1118 | 185 |
| Average Queue (ft)    | 243  | 93  |
| 95th Queue (ft)       | 588  | 216 |
| Link Distance (ft)    | 1298 |     |
| Upstream Blk Time (%) |      |     |
| Queuing Penalty (veh) |      |     |
| Storage Bay Dist (ft) |      | 95  |
| Storage Blk Time (%)  | 35   | 0   |
| Queuing Penalty (veh) | 68   | 0   |

Intersection: 3: Temperance Avenue & SR 168 WB Ramp

| Movement              | WB  | WB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | T   | T   | T   | T   | R   |
| Maximum Queue (ft)    | 284 | 135 | 177 | 396 | 458 | 474 | 453 |
| Average Queue (ft)    | 141 | 60  | 74  | 182 | 288 | 238 | 113 |
| 95th Queue (ft)       | 284 | 110 | 161 | 355 | 599 | 562 | 284 |
| Link Distance (ft)    | 478 |     | 581 | 581 | 442 | 442 | 442 |
| Upstream Blk Time (%) |     |     |     |     | 48  | 24  | 0   |
| Queuing Penalty (veh) |     |     |     |     | 210 | 107 | 2   |
| Storage Bay Dist (ft) |     | 385 |     |     |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |

Intersection: 4: Temperance Avenue & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | NB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | R   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 643 | 674 | 500 | 529 | 516 | 555 | 369 | 609 | 610 |
| Average Queue (ft)    | 506 | 468 | 362 | 194 | 374 | 414 | 47  | 476 | 312 |
| 95th Queue (ft)       | 769 | 846 | 688 | 429 | 569 | 572 | 226 | 788 | 698 |
| Link Distance (ft)    | 614 | 614 |     | 510 | 510 | 510 |     | 581 | 581 |
| Upstream Blk Time (%) | 21  | 38  |     | 1   | 1   | 4   |     | 59  | 20  |
| Queuing Penalty (veh) | 0   | 0   |     | 5   | 4   | 26  |     | 198 | 67  |
| Storage Bay Dist (ft) |     |     | 380 |     |     |     | 250 |     |     |
| Storage Blk Time (%)  |     | 63  | 12  |     |     |     |     | 73  |     |
| Queuing Penalty (veh) |     | 181 | 34  |     |     |     |     | 19  |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | EB  | EB  | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T   | R   | L   | T   | R   | UL  | T   | T   | R   | UL  | L   |
| Maximum Queue (ft)    | 115 | 53  | 100 | 127 | 43  | 229 | 194 | 566 | 556 | 255 | 310 | 395 |
| Average Queue (ft)    | 52  | 7   | 56  | 64  | 6   | 121 | 63  | 427 | 492 | 96  | 298 | 369 |
| 95th Queue (ft)       | 100 | 32  | 91  | 110 | 24  | 198 | 167 | 643 | 632 | 282 | 349 | 487 |
| Link Distance (ft)    |     | 578 | 578 |     | 355 | 355 |     | 528 | 528 |     |     |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     | 3   | 8   |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 26  | 75  |     |     |     |
| Storage Bay Dist (ft) | 130 |     |     | 130 |     |     | 100 |     |     | 105 | 225 | 225 |
| Storage Blk Time (%)  | 0   |     |     | 0   |     |     | 2   | 30  | 45  |     | 88  | 50  |
| Queuing Penalty (veh) | 0   |     |     | 0   |     |     | 16  | 21  | 50  |     | 335 | 189 |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | SB  | SB  |
|-----------------------|-----|-----|
| Directions Served     | T   | TR  |
| Maximum Queue (ft)    | 560 | 538 |
| Average Queue (ft)    | 499 | 165 |
| 95th Queue (ft)       | 701 | 360 |
| Link Distance (ft)    | 545 | 545 |
| Upstream Blk Time (%) | 56  | 0   |
| Queuing Penalty (veh) | 341 | 0   |
| Storage Bay Dist (ft) |     |     |
| Storage Blk Time (%)  | 5   |     |
| Queuing Penalty (veh) | 24  |     |

Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|
| Directions Served     | ULTR | LTR | LTR | LTR |
| Maximum Queue (ft)    | 134  | 31  | 55  | 32  |
| Average Queue (ft)    | 35   | 9   | 6   | 3   |
| 95th Queue (ft)       | 103  | 32  | 31  | 18  |
| Link Distance (ft)    | 70   | 230 | 784 | 335 |
| Upstream Blk Time (%) | 2    |     |     |     |
| Queuing Penalty (veh) | 12   |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | TR  | L   | T   | T   | R   |
| Maximum Queue (ft)    | 66  | 150  | 102  | 41   | 52  | 200 | 237 | 237 | 165 | 343 | 142 | 20  |
| Average Queue (ft)    | 31  | 82   | 58   | 6    | 10  | 50  | 109 | 120 | 144 | 141 | 28  | 7   |
| 95th Queue (ft)       | 61  | 137  | 99   | 24   | 30  | 112 | 206 | 225 | 181 | 301 | 73  | 21  |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 637 | 637 |     | 441 | 441 |     |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     | 105 |     |     | 130 |
| Storage Blk Time (%)  |     |      |      |      |     | 0   | 10  |     | 26  | 3   | 0   |     |
| Queuing Penalty (veh) |     |      |      |      |     | 1   | 7   |     | 17  | 8   | 0   |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | SB  | SB   | SB   | SB |
|-----------------------|-----|------|------|----|
| Directions Served     | L   | T    | T    | R  |
| Maximum Queue (ft)    | 72  | 114  | 133  | 55 |
| Average Queue (ft)    | 22  | 44   | 27   | 30 |
| 95th Queue (ft)       | 57  | 95   | 77   | 57 |
| Link Distance (ft)    |     | 2411 | 2411 |    |
| Upstream Blk Time (%) |     |      |      |    |
| Queuing Penalty (veh) |     |      |      |    |
| Storage Bay Dist (ft) | 100 |      |      | 80 |
| Storage Blk Time (%)  |     | 4    | 3    |    |
| Queuing Penalty (veh) |     | 1    | 2    |    |



Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | NE  | SW   |
|-----------------------|-----|-----|------|
| Directions Served     | L   | R   | R    |
| Maximum Queue (ft)    | 42  | 45  | 38   |
| Average Queue (ft)    | 1   | 26  | 2    |
| 95th Queue (ft)       | 14  | 41  | 13   |
| Link Distance (ft)    |     | 775 | 1210 |
| Upstream Blk Time (%) |     |     |      |
| Queuing Penalty (veh) |     |     |      |
| Storage Bay Dist (ft) | 400 |     |      |
| Storage Blk Time (%)  |     |     |      |
| Queuing Penalty (veh) |     |     |      |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB   | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|------|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T    | R   | L   |
| Maximum Queue (ft)    | 264 | 315 | 193  | 130  | 84  | 45  | 46  | 177 | 187 | 1016 | 570 | 184 |
| Average Queue (ft)    | 124 | 157 | 74   | 84   | 33  | 13  | 19  | 132 | 130 | 835  | 533 | 86  |
| 95th Queue (ft)       | 243 | 259 | 139  | 131  | 70  | 34  | 45  | 174 | 187 | 1407 | 694 | 159 |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997  |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |      | 23  |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |      | 71  |     |
| Storage Bay Dist (ft) | 175 | 175 |      |      | 160 | 150 | 150 |     |     |      | 400 | 230 |
| Storage Blk Time (%)  | 0   | 28  | 0    |      |     |     |     | 4   |     |      | 72  |     |
| Queuing Penalty (veh) | 0   | 33  | 0    |      |     |     |     | 2   |     |      | 105 |     |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R   |
| Maximum Queue (ft)    | 400 | 2327 | 2315 | 240 | 134 | 174 | 262 | 242 | 266 |
| Average Queue (ft)    | 302 | 1392 | 1407 | 137 | 67  | 105 | 93  | 104 | 34  |
| 95th Queue (ft)       | 530 | 2445 | 2448 | 319 | 119 | 153 | 189 | 188 | 110 |
| Link Distance (ft)    |     | 2737 | 2737 |     |     |     | 528 | 528 |     |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     |     | 150 |
| Storage Blk Time (%)  |     | 44   | 74   |     |     | 1   | 2   | 3   |     |
| Queuing Penalty (veh) |     | 105  | 50   |     |     | 2   | 4   | 4   |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB  | WB  | WB  | WB  | WB  | WB  | B59 | B59 | NB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T   | T   | TR  | L   | T   | T   | T   | R   | T   | T   | LTR |
| Maximum Queue (ft)    | 158 | 146 | 147 | 59  | 49  | 131 | 114 | 400 | 220 | 648 | 660 | 200 |
| Average Queue (ft)    | 89  | 28  | 52  | 12  | 20  | 64  | 50  | 264 | 53  | 109 | 161 | 108 |
| 95th Queue (ft)       | 143 | 90  | 128 | 32  | 47  | 109 | 100 | 464 | 204 | 432 | 529 | 183 |
| Link Distance (ft)    |     | 997 | 997 | 997 |     | 286 | 286 | 286 |     | 644 | 644 | 355 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     | 35  |     | 0   | 1   |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 105 |     | 1   | 5   |     |
| Storage Bay Dist (ft) | 145 |     |     |     | 190 |     |     |     | 120 |     |     |     |
| Storage Blk Time (%)  | 0   | 0   |     |     |     |     |     | 54  |     |     |     |     |
| Queuing Penalty (veh) | 0   | 0   |     |     |     |     |     | 23  |     |     |     |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | SB | SB |
|-----------------------|----|----|
| Directions Served     | LT | R  |
| Maximum Queue (ft)    | 32 | 73 |
| Average Queue (ft)    | 15 | 31 |
| 95th Queue (ft)       | 38 | 74 |
| Link Distance (ft)    | 0  | 0  |
| Upstream Blk Time (%) | 1  | 5  |
| Queuing Penalty (veh) | 0  | 2  |
| Storage Bay Dist (ft) |    |    |
| Storage Blk Time (%)  |    |    |
| Queuing Penalty (veh) |    |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | T   | R   | L   | T   |
| Maximum Queue (ft)    | 52  | 53  | 72  | 50  |
| Average Queue (ft)    | 18  | 13  | 23  | 20  |
| 95th Queue (ft)       | 46  | 41  | 52  | 46  |
| Link Distance (ft)    | 784 |     |     | 364 |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) |     | 100 | 100 |     |
| Storage Blk Time (%)  |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | EB  | WB  | WB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | L   | T   | TR  | R   |
| Maximum Queue (ft)    | 28  | 31  | 54  | 31  |
| Average Queue (ft)    | 4   | 1   | 4   | 4   |
| 95th Queue (ft)       | 19  | 10  | 25  | 20  |
| Link Distance (ft)    |     | 488 | 488 | 903 |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) | 100 |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | EB  | WB  | NB   | NB  |
|-----------------------|-----|-----|------|-----|
| Directions Served     | R   | L   | L    | R   |
| Maximum Queue (ft)    | 22  | 51  | 198  | 21  |
| Average Queue (ft)    | 2   | 12  | 96   | 10  |
| 95th Queue (ft)       | 13  | 38  | 166  | 25  |
| Link Distance (ft)    |     |     | 5138 |     |
| Upstream Blk Time (%) |     |     |      |     |
| Queuing Penalty (veh) |     |     |      |     |
| Storage Bay Dist (ft) | 250 | 250 |      | 250 |
| Storage Blk Time (%)  |     |     |      |     |
| Queuing Penalty (veh) |     |     |      |     |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB  | SB  | SB   |
|-----------------------|-----|-----|------|
| Directions Served     | L   | L   | R    |
| Maximum Queue (ft)    | 44  | 24  | 80   |
| Average Queue (ft)    | 13  | 11  | 25   |
| 95th Queue (ft)       | 35  | 30  | 50   |
| Link Distance (ft)    |     |     | 2504 |
| Upstream Blk Time (%) |     |     |      |
| Queuing Penalty (veh) |     |     |      |
| Storage Bay Dist (ft) | 250 | 250 |      |
| Storage Blk Time (%)  |     |     |      |
| Queuing Penalty (veh) |     |     |      |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | EB  | EB  | WB   | NB   |
|-----------------------|-----|-----|------|------|
| Directions Served     | T   | R   | LT   | LR   |
| Maximum Queue (ft)    | 68  | 62  | 178  | 91   |
| Average Queue (ft)    | 38  | 30  | 86   | 44   |
| 95th Queue (ft)       | 57  | 46  | 142  | 72   |
| Link Distance (ft)    | 550 | 550 | 2682 | 5172 |
| Upstream Blk Time (%) |     |     |      |      |
| Queuing Penalty (veh) |     |     |      |      |
| Storage Bay Dist (ft) |     |     |      |      |
| Storage Blk Time (%)  |     |     |      |      |
| Queuing Penalty (veh) |     |     |      |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 55   |
| Average Queue (ft)    | 16   |
| 95th Queue (ft)       | 44   |
| Link Distance (ft)    | 2484 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 111  |
| Average Queue (ft)    | 64   |
| 95th Queue (ft)       | 94   |
| Link Distance (ft)    | 2410 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | WB   | NB   |
|-----------------------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 53   | 72   | 101  |
| Average Queue (ft)    | 24   | 21   | 8    |
| 95th Queue (ft)       | 42   | 49   | 44   |
| Link Distance (ft)    | 6447 | 2721 | 2320 |
| Upstream Blk Time (%) |      |      |      |
| Queuing Penalty (veh) |      |      |      |
| Storage Bay Dist (ft) |      |      |      |
| Storage Blk Time (%)  |      |      |      |
| Queuing Penalty (veh) |      |      |      |

Intersection: 19: Temperance Avenue & New Access Road

| Movement              | WB  | NB  | NB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|
| Directions Served     | R   | T   | TR  | T   | T   |
| Maximum Queue (ft)    | 225 | 580 | 558 | 538 | 537 |
| Average Queue (ft)    | 67  | 42  | 112 | 420 | 208 |
| 95th Queue (ft)       | 152 | 267 | 431 | 764 | 596 |
| Link Distance (ft)    | 487 | 545 | 545 | 510 | 510 |
| Upstream Blk Time (%) |     | 0   | 1   | 54  | 5   |
| Queuing Penalty (veh) |     | 4   | 6   | 329 | 29  |
| Storage Bay Dist (ft) |     |     |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |

Intersection: 20: Locan Avenue & Bullard Ave

| Movement              | EB  | EB   | EB   | WB  | WB   | NB  | NB   | SB   |
|-----------------------|-----|------|------|-----|------|-----|------|------|
| Directions Served     | L   | T    | R    | L   | TR   | L   | T    | LTR  |
| Maximum Queue (ft)    | 47  | 77   | 47   | 22  | 61   | 48  | 90   | 75   |
| Average Queue (ft)    | 21  | 35   | 26   | 5   | 28   | 19  | 37   | 40   |
| 95th Queue (ft)       | 42  | 57   | 40   | 18  | 49   | 39  | 70   | 69   |
| Link Distance (ft)    |     | 2664 | 2664 |     | 2564 |     | 2642 | 5138 |
| Upstream Blk Time (%) |     |      |      |     |      |     |      |      |
| Queuing Penalty (veh) |     |      |      |     |      |     |      |      |
| Storage Bay Dist (ft) | 270 |      |      | 260 |      | 125 |      |      |
| Storage Blk Time (%)  |     |      |      |     |      |     | 2    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     | 1    |      |

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Intersection: 21: De Wolf Ave & Bullard Ave

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| Movement              | EB   | WB   | NB   | SB   |
|-----------------------|------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 79   | 97   | 161  | 97   |
| Average Queue (ft)    | 50   | 55   | 65   | 49   |
| 95th Queue (ft)       | 80   | 82   | 110  | 79   |
| Link Distance (ft)    | 2564 | 2476 | 2636 | 5172 |
| Upstream Blk Time (%) |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |
| Storage Bay Dist (ft) |      |      |      |      |
| Storage Blk Time (%)  |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |

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Network Summary

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Network wide Queuing Penalty: 3557

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Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | EB   | EB  | EB  | WB   | WB  | WB  | NB   | NB  | NB  | NB   | SB  | SB  |
|-----------------------|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|
| Directions Served     | L    | T   | R   | L    | T   | R   | UL   | T   | T   | R    | L   | T   |
| Maximum Queue (ft)    | 167  | 140 | 161 | 169  | 336 | 105 | 344  | 702 | 697 | 230  | 96  | 184 |
| Average Queue (ft)    | 63   | 53  | 44  | 113  | 112 | 47  | 173  | 157 | 157 | 37   | 34  | 93  |
| 95th Queue (ft)       | 126  | 111 | 94  | 188  | 235 | 99  | 295  | 420 | 392 | 127  | 72  | 146 |
| Link Distance (ft)    | 1573 |     |     | 1457 |     |     | 2685 |     |     | 2685 |     |     |
| Upstream Blk Time (%) |      |     |     |      |     |     |      |     |     |      |     |     |
| Queuing Penalty (veh) |      |     |     |      |     |     |      |     |     |      |     |     |
| Storage Bay Dist (ft) | 240  |     | 80  | 100  |     | 25  | 240  |     |     | 120  | 250 |     |
| Storage Blk Time (%)  |      | 5   | 1   | 21   | 60  | 15  | 5    | 4   | 12  |      |     |     |
| Queuing Penalty (veh) |      | 12  | 1   | 38   | 171 | 39  | 17   | 10  | 24  |      |     |     |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | SB   | SB |
|-----------------------|------|----|
| Directions Served     | T    | R  |
| Maximum Queue (ft)    | 160  | 31 |
| Average Queue (ft)    | 83   | 20 |
| 95th Queue (ft)       | 143  | 41 |
| Link Distance (ft)    | 1298 |    |
| Upstream Blk Time (%) |      |    |
| Queuing Penalty (veh) |      |    |
| Storage Bay Dist (ft) |      | 95 |
| Storage Blk Time (%)  | 10   |    |
| Queuing Penalty (veh) | 6    |    |

Intersection: 3: Temperance Avenue & SR 168 WB Ramp

| Movement              | WB  | WB | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R  | T   | T   | T   | T   | R   |
| Maximum Queue (ft)    | 118 | 68 | 135 | 157 | 150 | 96  | 168 |
| Average Queue (ft)    | 50  | 29 | 37  | 53  | 27  | 30  | 42  |
| 95th Queue (ft)       | 96  | 53 | 105 | 136 | 99  | 84  | 118 |
| Link Distance (ft)    | 478 |    | 581 | 581 | 442 | 442 | 442 |
| Upstream Blk Time (%) |     |    |     |     |     |     |     |
| Queuing Penalty (veh) |     |    |     |     |     |     |     |
| Storage Bay Dist (ft) | 385 |    |     |     |     |     |     |
| Storage Blk Time (%)  |     |    |     |     |     |     |     |
| Queuing Penalty (veh) |     |    |     |     |     |     |     |

Intersection: 4: Temperance Avenue & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | NB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | R   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 628 | 628 | 252 | 234 | 307 | 385 | 91  | 235 | 238 |
| Average Queue (ft)    | 209 | 232 | 141 | 106 | 149 | 203 | 41  | 97  | 107 |
| 95th Queue (ft)       | 408 | 389 | 245 | 203 | 280 | 339 | 76  | 175 | 202 |
| Link Distance (ft)    | 613 | 613 |     | 517 | 517 | 517 |     | 581 | 581 |
| Upstream Blk Time (%) | 0   | 0   |     |     |     |     |     |     |     |
| Queuing Penalty (veh) | 0   | 0   |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     |     | 380 |     |     |     | 250 |     |     |
| Storage Blk Time (%)  |     | 0   |     |     |     |     |     | 0   |     |
| Queuing Penalty (veh) |     | 0   |     |     |     |     |     | 0   |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | EB  | EB  | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T   | R   | L   | T   | R   | UL  | T   | T   | R   | UL  | L   |
| Maximum Queue (ft)    | 196 | 228 | 98  | 174 | 254 | 248 | 194 | 528 | 531 | 255 | 196 | 395 |
| Average Queue (ft)    | 114 | 20  | 54  | 135 | 21  | 119 | 127 | 250 | 281 | 64  | 110 | 256 |
| 95th Queue (ft)       | 184 | 96  | 91  | 185 | 96  | 228 | 219 | 496 | 520 | 223 | 169 | 533 |
| Link Distance (ft)    |     | 549 | 549 |     | 355 | 355 |     | 528 | 528 |     |     |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     | 0   | 0   |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 2   | 2   |     |     |     |
| Storage Bay Dist (ft) | 130 |     |     | 130 |     |     | 100 |     |     | 105 | 225 | 225 |
| Storage Blk Time (%)  | 10  | 0   |     | 19  |     |     | 36  | 23  | 35  |     |     |     |
| Queuing Penalty (veh) | 1   | 0   |     | 4   |     |     | 156 | 27  | 18  |     |     |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | SB  | SB  |
|-----------------------|-----|-----|
| Directions Served     | T   | TR  |
| Maximum Queue (ft)    | 558 | 572 |
| Average Queue (ft)    | 434 | 453 |
| 95th Queue (ft)       | 658 | 650 |
| Link Distance (ft)    | 537 | 537 |
| Upstream Blk Time (%) | 6   | 8   |
| Queuing Penalty (veh) | 63  | 75  |
| Storage Bay Dist (ft) |     |     |
| Storage Blk Time (%)  | 33  |     |
| Queuing Penalty (veh) | 73  |     |



Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|
| Directions Served     | ULTR | LTR | LTR | LTR |
| Maximum Queue (ft)    | 125  | 31  | 92  | 58  |
| Average Queue (ft)    | 31   | 3   | 22  | 23  |
| 95th Queue (ft)       | 99   | 16  | 66  | 61  |
| Link Distance (ft)    | 70   | 230 | 785 | 335 |
| Upstream Blk Time (%) | 2    |     |     |     |
| Queuing Penalty (veh) | 5    |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | TR  | L   | T   | T   | R   |
| Maximum Queue (ft)    | 115 | 226  | 162  | 142  | 101 | 150 | 210 | 203 | 164 | 229 | 118 | 21  |
| Average Queue (ft)    | 36  | 111  | 94   | 31   | 32  | 81  | 102 | 98  | 115 | 99  | 34  | 3   |
| 95th Queue (ft)       | 78  | 186  | 154  | 98   | 71  | 130 | 174 | 164 | 164 | 197 | 78  | 15  |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 637 | 637 |     | 441 | 441 |     |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     | 105 |     |     | 130 |
| Storage Blk Time (%)  |     |      |      | 0    | 0   | 6   | 8   |     | 20  | 4   | 0   |     |
| Queuing Penalty (veh) |     |      |      | 1    | 0   | 19  | 8   |     | 15  | 5   | 0   |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | SB  | SB   | SB   | SB  |
|-----------------------|-----|------|------|-----|
| Directions Served     | L   | T    | T    | R   |
| Maximum Queue (ft)    | 53  | 177  | 155  | 135 |
| Average Queue (ft)    | 18  | 67   | 43   | 35  |
| 95th Queue (ft)       | 50  | 123  | 94   | 75  |
| Link Distance (ft)    |     | 2411 | 2411 |     |
| Upstream Blk Time (%) |     |      |      |     |
| Queuing Penalty (veh) |     |      |      |     |
| Storage Bay Dist (ft) | 100 |      |      | 80  |
| Storage Blk Time (%)  |     | 8    | 3    | 0   |
| Queuing Penalty (veh) |     | 2    | 2    | 0   |

Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | WB  | NE  | SW   |
|-----------------------|-----|-----|-----|------|
| Directions Served     | L   | U   | R   | R    |
| Maximum Queue (ft)    | 65  | 11  | 160 | 61   |
| Average Queue (ft)    | 17  | 1   | 63  | 7    |
| 95th Queue (ft)       | 55  | 7   | 126 | 32   |
| Link Distance (ft)    |     |     | 775 | 1210 |
| Upstream Blk Time (%) |     |     |     |      |
| Queuing Penalty (veh) |     |     |     |      |
| Storage Bay Dist (ft) | 400 | 120 |     |      |
| Storage Blk Time (%)  |     |     |     |      |
| Queuing Penalty (veh) |     |     |     |      |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 120 | 183 | 208  | 222  | 185 | 50  | 68  | 155 | 196 | 137 | 230 | 137 |
| Average Queue (ft)    | 46  | 66  | 82   | 108  | 77  | 11  | 17  | 91  | 92  | 52  | 80  | 62  |
| 95th Queue (ft)       | 90  | 127 | 151  | 188  | 156 | 35  | 48  | 147 | 150 | 117 | 170 | 109 |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 175 | 175 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  |     | 1   |      | 3    | 1   |     |     | 0   |     |     |     |     |
| Queuing Penalty (veh) |     | 1   |      | 6    | 2   |     |     | 0   |     |     |     |     |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R   |
| Maximum Queue (ft)    | 231 | 244  | 292  | 240 | 202 | 344 | 348 | 363 | 270 |
| Average Queue (ft)    | 94  | 146  | 175  | 51  | 84  | 119 | 158 | 174 | 62  |
| 95th Queue (ft)       | 166 | 237  | 282  | 159 | 156 | 207 | 278 | 306 | 184 |
| Link Distance (ft)    |     | 2737 | 2737 |     |     |     | 528 | 528 |     |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     |     | 150 |
| Storage Blk Time (%)  | 0   | 0    | 41   |     | 1   | 0   | 6   | 8   |     |
| Queuing Penalty (veh) | 0   | 1    | 22   |     | 3   | 2   | 23  | 21  |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB  | WB  | WB  | WB  | WB  | WB  | NB  | SB | SB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| Directions Served     | L   | T   | T   | TR  | L   | T   | T   | T   | R   | LTR | LT | R  |
| Maximum Queue (ft)    | 105 | 142 | 145 | 13  | 23  | 157 | 146 | 156 | 31  | 186 | 63 | 45 |
| Average Queue (ft)    | 51  | 25  | 33  | 2   | 2   | 50  | 47  | 85  | 7   | 82  | 46 | 36 |
| 95th Queue (ft)       | 98  | 82  | 109 | 8   | 13  | 99  | 99  | 144 | 28  | 160 | 73 | 61 |
| Link Distance (ft)    |     | 997 | 997 | 997 |     | 286 | 286 | 286 |     | 355 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |     |     | 52 | 8  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |     | 45 | 7  |
| Storage Bay Dist (ft) | 145 |     |     |     | 190 |     |     |     | 120 |     |    |    |
| Storage Blk Time (%)  |     | 0   |     |     |     |     |     | 2   |     |     |    |    |
| Queuing Penalty (veh) |     | 0   |     |     |     |     |     | 0   |     |     |    |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  | NB | NB |
|-----------------------|-----|-----|-----|-----|----|----|
| Directions Served     | T   | R   | L   | T   | L  | R  |
| Maximum Queue (ft)    | 55  | 100 | 114 | 56  | 54 | 45 |
| Average Queue (ft)    | 18  | 45  | 47  | 18  | 12 | 3  |
| 95th Queue (ft)       | 45  | 82  | 91  | 46  | 47 | 21 |
| Link Distance (ft)    | 785 |     |     | 364 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |     | 1  |    |
| Queuing Penalty (veh) |     |     |     |     | 0  |    |
| Storage Bay Dist (ft) |     | 100 | 100 |     |    |    |
| Storage Blk Time (%)  |     | 3   | 1   |     |    |    |
| Queuing Penalty (veh) |     | 1   | 0   |     |    |    |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | EB  | SB  |
|-----------------------|-----|-----|
| Directions Served     | L   | R   |
| Maximum Queue (ft)    | 27  | 29  |
| Average Queue (ft)    | 2   | 3   |
| 95th Queue (ft)       | 13  | 17  |
| Link Distance (ft)    |     | 903 |
| Upstream Blk Time (%) |     |     |
| Queuing Penalty (veh) |     |     |
| Storage Bay Dist (ft) | 100 |     |
| Storage Blk Time (%)  |     |     |
| Queuing Penalty (veh) |     |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | WB   | NB  | NB  |
|-----------------------|------|-----|-----|
| Directions Served     | L    | L   | R   |
| Maximum Queue (ft)    | 26   | 181 | 64  |
| Average Queue (ft)    | 5    | 56  | 16  |
| 95th Queue (ft)       | 21   | 122 | 41  |
| Link Distance (ft)    | 5192 |     |     |
| Upstream Blk Time (%) |      |     |     |
| Queuing Penalty (veh) |      |     |     |
| Storage Bay Dist (ft) | 250  |     | 250 |
| Storage Blk Time (%)  |      |     |     |
| Queuing Penalty (veh) |      |     |     |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB   | SB  | SB |
|-----------------------|------|-----|----|
| Directions Served     | L    | L   | R  |
| Maximum Queue (ft)    | 31   | 44  | 22 |
| Average Queue (ft)    | 8    | 12  | 13 |
| 95th Queue (ft)       | 27   | 32  | 26 |
| Link Distance (ft)    | 2504 |     |    |
| Upstream Blk Time (%) |      |     |    |
| Queuing Penalty (veh) |      |     |    |
| Storage Bay Dist (ft) | 250  | 250 |    |
| Storage Blk Time (%)  |      |     |    |
| Queuing Penalty (veh) |      |     |    |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | EB  | EB  | WB   | NB   |
|-----------------------|-----|-----|------|------|
| Directions Served     | T   | R   | LT   | LR   |
| Maximum Queue (ft)    | 182 | 73  | 91   | 69   |
| Average Queue (ft)    | 84  | 34  | 55   | 37   |
| 95th Queue (ft)       | 143 | 54  | 82   | 64   |
| Link Distance (ft)    | 550 | 550 | 2682 | 5219 |
| Upstream Blk Time (%) |     |     |      |      |
| Queuing Penalty (veh) |     |     |      |      |
| Storage Bay Dist (ft) |     |     |      |      |
| Storage Blk Time (%)  |     |     |      |      |
| Queuing Penalty (veh) |     |     |      |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 31   |
| Average Queue (ft)    | 13   |
| 95th Queue (ft)       | 37   |
| Link Distance (ft)    | 2484 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | NB   |
|-----------------------|------|
| Directions Served     | LR   |
| Maximum Queue (ft)    | 154  |
| Average Queue (ft)    | 54   |
| 95th Queue (ft)       | 99   |
| Link Distance (ft)    | 2410 |
| Upstream Blk Time (%) |      |
| Queuing Penalty (veh) |      |
| Storage Bay Dist (ft) |      |
| Storage Blk Time (%)  |      |
| Queuing Penalty (veh) |      |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | WB   | NB   |
|-----------------------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 99   | 53   | 53   |
| Average Queue (ft)    | 41   | 17   | 10   |
| 95th Queue (ft)       | 74   | 41   | 40   |
| Link Distance (ft)    | 6447 | 2721 | 2320 |
| Upstream Blk Time (%) |      |      |      |
| Queuing Penalty (veh) |      |      |      |
| Storage Bay Dist (ft) |      |      |      |
| Storage Blk Time (%)  |      |      |      |
| Queuing Penalty (veh) |      |      |      |

Intersection: 19: Temperance Avenue & New Access Road

| Movement              | WB  | SB  | SB  |
|-----------------------|-----|-----|-----|
| Directions Served     | R   | T   | T   |
| Maximum Queue (ft)    | 153 | 436 | 424 |
| Average Queue (ft)    | 65  | 96  | 94  |
| 95th Queue (ft)       | 123 | 310 | 301 |
| Link Distance (ft)    | 492 | 517 | 517 |
| Upstream Blk Time (%) |     |     |     |
| Queuing Penalty (veh) |     |     |     |
| Storage Bay Dist (ft) |     |     |     |
| Storage Blk Time (%)  |     |     |     |
| Queuing Penalty (veh) |     |     |     |

Intersection: 20: Locan Avenue & Bullard Avenue

| Movement              | EB  | EB   | EB   | WB  | WB   | NB  | NB   | NB | SB   |
|-----------------------|-----|------|------|-----|------|-----|------|----|------|
| Directions Served     | L   | T    | R    | L   | TR   | L   | T    | R  | LTR  |
| Maximum Queue (ft)    | 75  | 77   | 50   | 16  | 53   | 41  | 43   | 21 | 101  |
| Average Queue (ft)    | 14  | 41   | 19   | 2   | 21   | 18  | 23   | 7  | 48   |
| 95th Queue (ft)       | 41  | 68   | 40   | 11  | 39   | 38  | 37   | 21 | 79   |
| Link Distance (ft)    |     | 2614 | 2614 |     | 2615 |     | 2605 |    | 5192 |
| Upstream Blk Time (%) |     |      |      |     |      |     |      |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     |      |    |      |
| Storage Bay Dist (ft) | 270 |      |      | 260 |      | 125 |      | 50 |      |
| Storage Blk Time (%)  |     |      |      |     |      |     | 0    |    |      |
| Queuing Penalty (veh) |     |      |      |     |      |     | 0    |    |      |

Intersection: 21: De Wolf Ave & Bullard Avenue

| Movement              | EB   | WB   | NB   | SB   |
|-----------------------|------|------|------|------|
| Directions Served     | LTR  | LTR  | LTR  | LTR  |
| Maximum Queue (ft)    | 100  | 103  | 75   | 100  |
| Average Queue (ft)    | 62   | 45   | 47   | 63   |
| 95th Queue (ft)       | 92   | 79   | 70   | 89   |
| Link Distance (ft)    | 2615 | 2621 | 2617 | 5219 |
| Upstream Blk Time (%) |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |
| Storage Bay Dist (ft) |      |      |      |      |
| Storage Blk Time (%)  |      |      |      |      |
| Queuing Penalty (veh) |      |      |      |      |

Network Summary

Network wide Queuing Penalty: 1250

## Appendix H: LOS Worksheets, Cumulative Year 2035 No Project



**Traffic Engineering, Inc.**

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





















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# HCM Signalized Intersection Capacity Analysis

2035 No Proj AM Peak

## 1: Temperance Avenue & Nees Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph)                      | 100   | 67  | 145   | 182   | 67  | 25  | 32   | 240   | 346   | 152   | 100   | 656   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  | 0.98  |  | 1.00  | 1.00  | 0.97  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1534  |  | 1752  | 3505  | 1528  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1534  |  | 1752  | 3505  | 1528  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 109   | 73  | 158   | 198   | 73  | 27  | 35   | 261   | 376   | 165   | 109   | 713   |
| RTOR Reduction (vph)              | 0   | 0   | 139   | 0   | 0   | 23  | 0  | 0   | 0   | 90  | 0   | 0   |
| Lane Group Flow (vph)             | 109   | 73  | 19  | 198   | 73  | 4   | 0  | 296   | 376   | 75  | 109   | 713   |
| Confl. Peds. (#/hr)               |   |   | 1   |   |   | 9   |  |   |   | 3   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 16.4  | 14.3  | 14.3  | 20.3  | 17.8  | 17.8  |  | 26.4  | 54.2  | 54.2  | 12.2  | 40.0  |
| Effective Green, g (s)            | 16.4  | 14.3  | 14.3  | 20.3  | 17.8  | 17.8  |  | 26.4  | 54.2  | 54.2  | 12.2  | 40.0  |
| Actuated g/C Ratio                | 0.14  | 0.12  | 0.12  | 0.17  | 0.15  | 0.15  |  | 0.22  | 0.45  | 0.45  | 0.10  | 0.33  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 239   | 219   | 184   | 296   | 273   | 227   |  | 385   | 1583  | 690   | 178   | 1168  |
| v/s Ratio Prot                    | c0.06   | 0.04  |   | c0.11   | 0.04  |   |  | c0.17   | 0.11  |   | 0.06  | c0.20   |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | 0.00  |  |   |   | 0.05  |   |   |
| v/c Ratio                         | 0.46  | 0.33  | 0.10  | 0.67  | 0.27  | 0.02  |  | 0.77  | 0.24  | 0.11  | 0.61  | 0.61  |
| Uniform Delay, d1                 | 47.7  | 48.5  | 47.1  | 46.7  | 45.3  | 43.6  |  | 43.9  | 20.2  | 19.0  | 51.6  | 33.5  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 0.89  | 0.55  | 0.84  | 1.00  | 1.00  |
| Incremental Delay, d2             | 1.4   | 0.9   | 0.2   | 5.6   | 0.5   | 0.0   |  | 8.7   | 0.3   | 0.3   | 6.1   | 2.4   |
| Delay (s)                         | 49.1  | 49.4  | 47.4  | 52.3  | 45.8  | 43.7  |  | 47.7  | 11.5  | 16.2  | 57.7  | 35.9  |
| Level of Service                  | D   | D   | D   | D   | D   | D   |  | D   | B   | B   | E   | D   |
| Approach Delay (s)                |   | 48.3  |   |   | 50.0  |   |  |   | 25.3  |   |   | 36.9  |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | C   |   |   | D   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 36.1  |   |   |   | HCM 2000 Level of Service  |   | D   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.65  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 76.6%   |   |   |   | ICU Level of Service   |   | D   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

2035 No Proj AM Peak

3/28/2017

|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 254  |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.99 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1547 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1547 |
| Peak-hour factor, PHF  | 0.92 |
| Adj. Flow (vph)        | 276  |
| RTOR Reduction (vph)   | 120  |
| Lane Group Flow (vph)  | 156  |
| Confl. Peds. (#/hr)    | 1    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 40.0 |
| Effective Green, g (s) | 40.0 |
| Actuated g/C Ratio     | 0.33 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 515  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.10 |
| v/c Ratio              | 0.30 |
| Uniform Delay, d1      | 29.7 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 1.5  |
| Delay (s)              | 31.2 |
| Level of Service       | C    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# MOVEMENT SUMMARY



Site: 2035 No Project - AM Roundabout at Temperance and Owens Mt Parkway

New Site  
Roundabout

| Movement Performance - Vehicles |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
|---------------------------------|--------|--------------------------------|------------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID                          | OD Mov | Demand Flows<br>Total<br>veh/h | Flows<br>HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>ft | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>mph |
| South: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 3                               | L2     | 165                            | 3.0              | 0.775            | 14.6                 | LOS B            | 6.7                                  | 172.0                   | 0.79         | 1.00                           | 32.0                 |
| 8                               | T1     | 496                            | 3.0              | 0.775            | 8.5                  | LOS A            | 6.7                                  | 172.0                   | 0.79         | 1.00                           | 31.1                 |
| 18                              | R2     | 856                            | 3.0              | 0.928            | 14.6                 | LOS B            | 14.2                                 | 363.6                   | 0.96         | 1.32                           | 24.9                 |
| Approach                        |        | 1517                           | 3.0              | 0.928            | 12.6                 | LOS B            | 14.2                                 | 363.6                   | 0.89         | 1.18                           | 28.2                 |
| East: Owens Mt Parkway          |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 1                               | L2     | 377                            | 3.0              | 0.407            | 11.5                 | LOS B            | 2.7                                  | 70.1                    | 0.76         | 0.83                           | 25.9                 |
| 6                               | T1     | 101                            | 3.0              | 0.162            | 5.8                  | LOS A            | 0.8                                  | 20.0                    | 0.64         | 0.61                           | 33.3                 |
| 16                              | R2     | 84                             | 3.0              | 0.077            | 4.5                  | LOS A            | 0.4                                  | 9.5                     | 0.50         | 0.55                           | 32.6                 |
| Approach                        |        | 561                            | 3.0              | 0.407            | 9.4                  | LOS A            | 2.7                                  | 70.1                    | 0.70         | 0.75                           | 29.0                 |
| North: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 7                               | L2     | 276                            | 3.0              | 0.613            | 11.7                 | LOS B            | 3.5                                  | 90.4                    | 0.65         | 0.80                           | 32.5                 |
| 4                               | T1     | 789                            | 3.0              | 0.613            | 5.6                  | LOS A            | 3.6                                  | 91.1                    | 0.64         | 0.70                           | 32.1                 |
| 14                              | R2     | 45                             | 3.0              | 0.613            | 6.1                  | LOS A            | 3.6                                  | 91.1                    | 0.64         | 0.65                           | 32.9                 |
| Approach                        |        | 1109                           | 3.0              | 0.613            | 7.1                  | LOS A            | 3.6                                  | 91.1                    | 0.64         | 0.72                           | 32.3                 |
| West: Alluvial Avenue           |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 5                               | L2     | 23                             | 3.0              | 0.487            | 16.0                 | LOS C            | 2.5                                  | 65.2                    | 0.79         | 0.92                           | 32.9                 |
| 2                               | T1     | 306                            | 3.0              | 0.487            | 9.7                  | LOS A            | 2.7                                  | 69.1                    | 0.79         | 0.93                           | 32.2                 |
| 12                              | R2     | 194                            | 3.0              | 0.487            | 9.6                  | LOS A            | 2.7                                  | 69.1                    | 0.80         | 0.94                           | 30.7                 |
| Approach                        |        | 523                            | 3.0              | 0.487            | 9.9                  | LOS A            | 2.7                                  | 69.1                    | 0.79         | 0.93                           | 31.8                 |
| All Vehicles                    |        | 3711                           | 3.0              | 0.928            | 10.1                 | LOS B            | 14.2                                 | 363.6                   | 0.77         | 0.94                           | 30.3                 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com**

Organisation: JLB TRAFFIC ENGINEERING, INC. | Processed: Wednesday, November 08, 2017 8:57:17 AM

Project: Z:\01 Projects\006 Clovis\006-009 CCMC Phase 2 TIA\Background\Alluvial at Temperance Roundabout\Temperance Alluvial.sip6

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Avenue & SR 168 WB Ramp

2035 No Proj AM Peak

3/28/2017


















| Movement                     | EBL | EBT  | EBR | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|------------------------------|-----|------|-----|------|------|------|------|------|------|------|------|------|
| Lane Configurations          |     |      |     |      |      |      |      |      |      |      |      |      |
| Volume (veh/h)               | 0   | 0    | 0   | 251  | 0    | 116  | 0    | 1371 | 977  | 0    | 587  | 725  |
| Number                       |     |      |     | 3    | 8    | 18   | 5    | 2    | 12   | 1    | 6    | 16   |
| Initial Q (Qb), veh          |     |      |     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)          |     |      |     | 1.00 |      | 1.00 | 1.00 |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj             |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln       |     |      |     | 1845 | 0    | 1845 | 0    | 1845 | 1845 | 0    | 1845 | 1845 |
| Adj Flow Rate, veh/h         |     |      |     | 273  | 0    | 126  | 0    | 1490 | 0    | 0    | 638  | 788  |
| Adj No. of Lanes             |     |      |     | 1    | 0    | 1    | 0    | 2    | 1    | 0    | 2    | 1    |
| Peak Hour Factor             |     |      |     | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %         |     |      |     | 3    | 0    | 3    | 0    | 3    | 3    | 0    | 3    | 3    |
| Cap, veh/h                   |     |      |     | 318  | 0    | 289  | 0    | 2637 | 1163 | 0    | 2637 | 1180 |
| Arrive On Green              |     |      |     | 0.18 | 0.00 | 0.18 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| Sat Flow, veh/h              |     |      |     | 1757 | 0    | 1568 | 0    | 3597 | 1568 | 0    | 3597 | 1568 |
| Grp Volume(v), veh/h         |     |      |     | 273  | 0    | 126  | 0    | 1490 | 0    | 0    | 638  | 788  |
| Grp Sat Flow(s),veh/h/ln     |     |      |     | 1757 | 0    | 1568 | 0    | 1752 | 1568 | 0    | 1752 | 1568 |
| Q Serve(g_s), s              |     |      |     | 18.1 | 0.0  | 8.6  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Cycle Q Clear(g_c), s        |     |      |     | 18.1 | 0.0  | 8.6  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Prop In Lane                 |     |      |     | 1.00 |      | 1.00 | 0.00 |      | 1.00 | 0.00 |      | 1.00 |
| Lane Grp Cap(c), veh/h       |     |      |     | 318  | 0    | 289  | 0    | 2637 | 1163 | 0    | 2637 | 1180 |
| V/C Ratio(X)                 |     |      |     | 0.86 | 0.00 | 0.44 | 0.00 | 0.56 | 0.00 | 0.00 | 0.24 | 0.67 |
| Avail Cap(c_a), veh/h        |     |      |     | 512  | 0    | 463  | 0    | 2637 | 1163 | 0    | 2637 | 1180 |
| HCM Platoon Ratio            |     |      |     | 1.00 | 1.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.00 | 1.67 | 1.67 |
| Upstream Filter(I)           |     |      |     | 1.00 | 0.00 | 1.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.45 | 0.45 |
| Uniform Delay (d), s/veh     |     |      |     | 47.7 | 0.0  | 43.4 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Incr Delay (d2), s/veh       |     |      |     | 8.2  | 0.0  | 1.0  | 0.0  | 0.1  | 0.0  | 0.0  | 0.1  | 1.4  |
| Initial Q Delay(d3),s/veh    |     |      |     | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln     |     |      |     | 9.5  | 0.0  | 3.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.4  |
| LnGrp Delay(d),s/veh         |     |      |     | 55.9 | 0.0  | 44.5 | 0.0  | 0.1  | 0.0  | 0.0  | 0.1  | 1.4  |
| LnGrp LOS                    |     |      |     | E    |      | D    |      | A    |      |      | A    | A    |
| Approach Vol, veh/h          |     |      |     |      | 399  |      |      | 1490 |      |      | 1426 |      |
| Approach Delay, s/veh        |     |      |     |      | 52.3 |      |      | 0.1  |      |      | 0.8  |      |
| Approach LOS                 |     |      |     |      | D    |      |      | A    |      |      | A    |      |
| Timer                        | 1   | 2    | 3   | 4    | 5    | 6    | 7    | 8    |      |      |      |      |
| Assigned Phs                 |     | 2    |     |      |      | 6    |      | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s     |     | 94.3 |     |      |      | 94.3 |      | 25.7 |      |      |      |      |
| Change Period (Y+Rc), s      |     | 5.3  |     |      |      | 5.3  |      | 4.2  |      |      |      |      |
| Max Green Setting (Gmax), s  |     | 75.7 |     |      |      | 75.7 |      | 34.8 |      |      |      |      |
| Max Q Clear Time (g_c+I1), s |     | 2.0  |     |      |      | 2.0  |      | 20.1 |      |      |      |      |
| Green Ext Time (p_c), s      |     | 32.1 |     |      |      | 32.1 |      | 1.4  |      |      |      |      |
| <b>Intersection Summary</b>  |     |      |     |      |      |      |      |      |      |      |      |      |
| HCM 2010 Ctrl Delay          |     |      |     | 6.7  |      |      |      |      |      |      |      |      |
| HCM 2010 LOS                 |     |      |     | A    |      |      |      |      |      |      |      |      |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

2035 No Proj AM Peak

3/28/2017















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 616   | 0   | 437   | 0   | 0   | 0   | 0  | 1732  | 46  | 101   | 737   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 662   | 0   | 470   |   |   |   | 0  | 1862  | 49  | 109   | 792   | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 600   | 0   | 541   |   |   |   | 0  | 1745  | 46  | 473   | 2846  | 0   |
| Arrive On Green              | 0.34  | 0.00  | 0.34  |   |   |   | 0.00   | 1.00  | 0.98  | 0.54  | 1.00  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0  | 3582  | 91  | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 662   | 0   | 470   |   |   |   | 0  | 931   | 980   | 109   | 792   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0  | 1752  | 1829  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 41.0  | 0.0   | 33.6  |   |   |   | 0.0  | 0.0   | 60.0  | 3.9   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        | 41.0  | 0.0   | 33.6  |   |   |   | 0.0  | 0.0   | 60.0  | 3.9   | 0.0   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.05  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 600   | 0   | 541   |   |   |   | 0  | 876   | 914   | 473   | 2846  | 0   |
| V/C Ratio(X)                 | 1.10  | 0.00  | 0.87  |   |   |   | 0.00   | 1.06  | 1.07  | 0.23  | 0.28  | 0.00  |
| Avail Cap(c_a), veh/h        | 600   | 0   | 541   |   |   |   | 0  | 876   | 914   | 473   | 2846  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 0.63  | 0.63  | 0.92  | 0.92  | 0.00  |
| Uniform Delay (d), s/veh     | 39.5  | 0.0   | 36.8  |   |   |   | 0.0  | 0.0   | 0.1   | 21.1  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       | 68.1  | 0.0   | 14.1  |   |   |   | 0.0  | 42.7  | 45.4  | 0.2   | 0.2   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 31.2  | 0.0   | 16.6  |   |   |   | 0.0  | 10.4  | 11.6  | 1.9   | 0.1   | 0.0   |
| LnGrp Delay(d),s/veh         | 107.6   | 0.0   | 50.9  |   |   |   | 0.0  | 42.7  | 45.4  | 21.3  | 0.2   | 0.0   |
| LnGrp LOS                    | F   |   | D   |   |   |   |  | F   | F   | C   | A   |   |
| Approach Vol, veh/h          | 1132  |   |   |   |   |   | 1911   |   |   | 901   |   |   |
| Approach Delay, s/veh        | 84.1  |   |   |   |   |   | 44.1   |   |   | 2.8   |   |   |
| Approach LOS                 | F   |   |   |   |   |   | D  |   |   | A   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 37.5  | 64.0  |   | 45.0  |   | 101.5   |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 6.8   | * 59  |   | * 41  |   | 69.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 5.9   | 62.0  |   | 43.0  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 0.0   |   | 0.0   |   | 4.4   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 46.1  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

2035 No Proj AM Peak

3/28/2017
























|                                   |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBU   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |
| Volume (vph)                      | 47  | 149   | 1   | 1629  | 86  | 265   | 909   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 0.95  | 1.00  | 0.97  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1568  | 1752  | 3505  | 1546  | 3400  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1568  | 1752  | 3505  | 1546  | 3400  | 3505  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 51  | 162   | 1   | 1771  | 93  | 288   | 988   |
| RTOR Reduction (vph)              | 0   | 150   | 0   | 0   | 13  | 0   | 0   |
| Lane Group Flow (vph)             | 51  | 12  | 1   | 1771  | 80  | 288   | 988   |
| Confl. Peds. (#/hr)               |   |   |   |   | 1   |   |   |
| Turn Type                         | Prot  | Perm  | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 3   |   | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   | 8   |   |   | 2   |   |   |
| Actuated Green, G (s)             | 9.0   | 9.0   | 6.8   | 82.2  | 82.2  | 15.1  | 90.5  |
| Effective Green, g (s)            | 9.2   | 9.2   | 7.0   | 83.5  | 83.5  | 15.3  | 91.8  |
| Actuated g/C Ratio                | 0.08  | 0.08  | 0.06  | 0.70  | 0.70  | 0.13  | 0.76  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 5.3   | 5.3   | 4.2   | 5.3   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 134   | 120   | 102   | 2438  | 1075  | 433   | 2681  |
| v/s Ratio Prot                    | c0.03   |   | 0.00  | c0.51   |   | c0.08   | 0.28  |
| v/s Ratio Perm                    |   | 0.01  |   |   | 0.05  |   |   |
| v/c Ratio                         | 0.38  | 0.10  | 0.01  | 0.73  | 0.07  | 0.67  | 0.37  |
| Uniform Delay, d1                 | 52.7  | 51.6  | 53.2  | 11.2  | 5.9   | 49.9  | 4.6   |
| Progression Factor                | 1.00  | 1.00  | 1.02  | 0.73  | 0.67  | 0.95  | 1.07  |
| Incremental Delay, d2             | 1.8   | 0.4   | 0.0   | 1.1   | 0.1   | 3.4   | 0.3   |
| Delay (s)                         | 54.5  | 51.9  | 54.5  | 9.3   | 4.0   | 50.9  | 5.3   |
| Level of Service                  | D   | D   | D   | A   | A   | D   | A   |
| Approach Delay (s)                | 52.6  |   |   | 9.0   |   |   | 15.6  |
| Approach LOS                      | D   |   |   | A   |   |   | B   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 14.3  |   | HCM 2000 Level of Service   |   | B   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.69  |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   | Sum of lost time (s)  |   | 12.2  |
| Intersection Capacity Utilization |   |   | 65.9%   |   | ICU Level of Service  |   | C   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |   |

| Intersection                |       |       |       |       |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh   | 6.1   |       |       |       |
| Intersection LOS            | A     |       |       |       |
| Approach                    | EB    | WB    | NB    | SB    |
| Entry Lanes                 | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes    | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h    | 376   | 34    | 49    | 108   |
| Demand Flow Rate, veh/h     | 388   | 34    | 50    | 111   |
| Vehicles Circulating, veh/h | 8     | 310   | 322   | 51    |
| Vehicles Exiting, veh/h     | 154   | 62    | 74    | 293   |
| Follow-Up Headway, s        | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h   | 0     | 0     | 0     | 0     |
| Ped Cap Adj                 | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh       | 6.8   | 4.8   | 5.1   | 4.4   |
| Approach LOS                | A     | A     | A     | A     |
| Lane                        | Left  | Left  | Left  | Left  |
| Designated Moves            | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves               | LTR   | LTR   | LTR   | LTR   |
| RT Channelized              |       |       |       |       |
| Lane Util                   | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s         | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h           | 388   | 34    | 50    | 111   |
| Cap Entry Lane, veh/h       | 1121  | 829   | 819   | 1074  |
| Entry HV Adj Factor         | 0.970 | 0.986 | 0.971 | 0.972 |
| Flow Entry, veh/h           | 376   | 34    | 49    | 108   |
| Cap Entry, veh/h            | 1087  | 817   | 795   | 1044  |
| V/C Ratio                   | 0.346 | 0.041 | 0.061 | 0.103 |
| Control Delay, s/veh        | 6.8   | 4.8   | 5.1   | 4.4   |
| LOS                         | A     | A     | A     | A     |
| 95th %tile Queue, veh       | 2     | 0     | 0     | 0     |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

2035 No Proj AM Peak  
3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |   |   |  |  |  |  |
| Volume (veh/h)  | 71  | 550   | 134   | 170   | 1027  | 172   | 321  | 318   | 34  | 82  | 227   | 96  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 76  | 591   | 144   | 183   | 1104  | 185   | 345  | 342   | 37  | 88  | 244   | 103   |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 357   | 2210  | 688   | 216   | 1050  | 175   | 334  | 842   | 377   | 114   | 371   | 166   |
| Arrive On Green   | 0.20  | 0.44  | 0.44  | 0.12  | 0.35  | 0.34  | 0.19   | 0.24  | 0.24  | 0.06  | 0.11  | 0.11  |
| Sat Flow, veh/h   | 1757  | 5036  | 1568  | 1757  | 3006  | 502   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 76  | 591   | 144   | 183   | 642   | 647   | 345  | 342   | 37  | 88  | 244   | 103   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1568  | 1757  | 1752  | 1756  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 4.3   | 9.0   | 3.3   | 12.2  | 41.9  | 41.9  | 22.8   | 9.9   | 2.2   | 5.9   | 8.0   | 7.5   |
| Cycle Q Clear(g_c), s   | 4.3   | 9.0   | 3.3   | 12.2  | 41.9  | 41.9  | 22.8   | 9.9   | 2.2   | 5.9   | 8.0   | 7.5   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.29  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 357   | 2210  | 688   | 216   | 612   | 613   | 334  | 842   | 377   | 114   | 371   | 166   |
| V/C Ratio(X)  | 0.21  | 0.27  | 0.21  | 0.85  | 1.05  | 1.06  | 1.03   | 0.41  | 0.10  | 0.77  | 0.66  | 0.62  |
| Avail Cap(c_a), veh/h   | 357   | 2210  | 688   | 319   | 612   | 613   | 334  | 1271  | 568   | 184   | 973   | 435   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 39.8  | 21.4  | 4.9   | 51.5  | 39.1  | 39.2  | 48.6   | 38.4  | 35.5  | 55.2  | 51.6  | 51.4  |
| Incr Delay (d2), s/veh  | 0.3   | 0.3   | 0.7   | 13.0  | 50.1  | 51.7  | 58.2   | 0.3   | 0.1   | 10.6  | 2.0   | 3.8   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.1   | 4.2   | 1.6   | 6.7   | 28.7  | 29.1  | 16.4   | 4.8   | 1.0   | 3.2   | 4.0   | 3.4   |
| LnGrp Delay(d),s/veh  | 40.1  | 21.7  | 5.6   | 64.5  | 89.1  | 91.0  | 106.8  | 38.7  | 35.6  | 65.8  | 53.6  | 55.1  |
| LnGrp LOS   | D   | C   | A   | E   | F   | F   | F  | D   | D   | E   | D   | E   |
| Approach Vol, veh/h   |   | 811   |   |   | 1472  |   |  | 724   |   |   | 435   |   |
| Approach Delay, s/veh   |   | 20.6  |   |   | 86.9  |   |  | 71.0  |   |   | 56.4  |   |
| Approach LOS  |   | C   |   |   | F   |   |  | E   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 11.8  | 32.8  | 18.7  | 56.7  | 27.9  | 16.7  | 29.5   | 45.9  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3   | * 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 12  | 42.2  | * 22  | 24.8  | 22.6  | * 32  | 5.8  | * 41  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 7.9   | 11.9  | 14.2  | 11.0  | 24.8  | 10.0  | 6.3  | 43.9  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.1   | 3.1   | 0.3   | 3.1   | 0.0   | 1.4   | 0.0  | 0.0   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 64.1  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | E   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

| Intersection     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 0.8 |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 19   | 580  | 0    | 11   | 0    | 1352 | 27   | 0    | 0    | 80   | 0    | 0    | 17   |
| Conflicting Peds, #/hr   | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 400  | -    | -    | -    | 120  | -    | 85   | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | -    | 0    | -    | -    | 1    | -    | -    | 1    | -    |
| Grade, %                 | -    | 0    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 20   | 624  | 0    | 12   | 0    | 1454 | 29   | 0    | 0    | 86   | 0    | 0    | 18   |

| Major/Minor          | Major1 |   |   | Major2 |      |   | Minor1 |      |      | Minor2 |      |      |      |
|----------------------|--------|---|---|--------|------|---|--------|------|------|--------|------|------|------|
| Conflicting Flow All | 1454   | 0 | 0 | 541    | 625  | 0 | 0      | 1417 | 2143 | 313    | 1768 | 2143 | 728  |
| Stage 1              | -      | - | - | -      | -    | - | -      | 666  | 666  | -      | 1477 | 1477 | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 751  | 1477 | -      | 291  | 666  | -    |
| Critical Hdwy        | 4.16   | - | - | 5.66   | 5.36 | - | -      | 7.01 | 6.56 | 7.16   | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1  | -      | - | - | -      | -    | - | -      | 7.36 | 5.56 | -      | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2  | -      | - | - | -      | -    | - | -      | 6.56 | 5.56 | -      | 6.76 | 5.56 | -    |
| Follow-up Hdwy       | 2.23   | - | - | 2.33   | 3.13 | - | -      | 3.68 | 4.03 | 3.93   | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver   | 456    | - | - | 782    | 588  | - | -      | 117  | 47   | 580    | 68   | 47   | 364  |
| Stage 1              | -      | - | - | -      | -    | - | -      | 346  | 453  | -      | 129  | 187  | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 357  | 187  | -      | 655  | 453  | -    |
| Platoon blocked, %   |        | - | - |        |      | - | -      |      |      |        |      |      |      |
| Mov Cap-1 Maneuver   | 456    | - | - | 674    | 588  | - | -      | 107  | 45   | 580    | 56   | 45   | 364  |
| Mov Cap-2 Maneuver   | -      | - | - | -      | -    | - | -      | 197  | 126  | -      | 105  | 135  | -    |
| Stage 1              | -      | - | - | -      | -    | - | -      | 331  | 433  | -      | 123  | 187  | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 339  | 187  | -      | 533  | 433  | -    |

| Approach             | EB  | WB  | NE   | SW   |
|----------------------|-----|-----|------|------|
| HCM Control Delay, s | 0.4 | 0.1 | 12.3 | 15.4 |
| HCM LOS              |     |     | B    | C    |

| Minor Lane/Major Mvmt | NELn1 | EBL   | EBT | EBR | WBU   | WBL | WBT | WBR | SWLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 580   | 456   | -   | -   | 674   | 588 | -   | -   | 364   |
| HCM Lane V/C Ratio    | 0.148 | 0.045 | -   | -   | 0.018 | -   | -   | -   | 0.05  |
| HCM Control Delay (s) | 12.3  | 13.3  | -   | -   | 10.4  | -   | -   | -   | 15.4  |
| HCM Lane LOS          | B     | B     | -   | -   | B     | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 0.5   | 0.1   | -   | -   | 0.1   | 0   | -   | -   | 0.2   |



























# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

2035 No Proj AM Peak

3/28/2017





















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)               | 171   | 436   | 149   | 64  | 1121  | 557   | 238  | 988   | 27  | 436   | 410   | 111   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 182   | 464   | 159   | 68  | 1193  | 593   | 253  | 1051  | 29  | 464   | 436   | 118   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94   | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 242   | 1117  | 498   | 117   | 1375  | 428   | 1136   | 1257  | 562   | 528   | 588   | 263   |
| Arrive On Green              | 0.07  | 0.32  | 0.32  | 0.02  | 0.18  | 0.18  | 0.33   | 0.36  | 0.36  | 0.15  | 0.17  | 0.17  |
| Sat Flow, veh/h              | 3408  | 3505  | 1562  | 3408  | 5036  | 1568  | 3408   | 3505  | 1567  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 182   | 464   | 159   | 68  | 1193  | 593   | 253  | 1051  | 29  | 464   | 436   | 118   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1562  | 1704  | 1679  | 1568  | 1704   | 1752  | 1567  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 6.3   | 12.5  | 3.4   | 2.4   | 27.6  | 21.8  | 6.4  | 33.0  | 1.5   | 16.0  | 14.2  | 8.1   |
| Cycle Q Clear(g_c), s        | 6.3   | 12.5  | 3.4   | 2.4   | 27.6  | 21.8  | 6.4  | 33.0  | 1.5   | 16.0  | 14.2  | 8.1   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 242   | 1117  | 498   | 117   | 1375  | 428   | 1136   | 1257  | 562   | 528   | 588   | 263   |
| V/C Ratio(X)                 | 0.75  | 0.42  | 0.32  | 0.58  | 0.87  | 1.39  | 0.22   | 0.84  | 0.05  | 0.88  | 0.74  | 0.45  |
| Avail Cap(c_a), veh/h        | 256   | 1117  | 498   | 168   | 1397  | 435   | 1136   | 1257  | 562   | 568   | 1361  | 609   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 0.67  | 0.67  | 0.67  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.82  | 0.82  | 0.82  | 1.00   | 1.00  | 1.00  | 0.94  | 0.94  | 0.94  |
| Uniform Delay (d), s/veh     | 54.7  | 32.1  | 4.1   | 57.8  | 46.9  | 21.7  | 28.8   | 35.3  | 25.2  | 49.6  | 47.5  | 45.0  |
| Incr Delay (d2), s/veh       | 11.3  | 0.2   | 0.4   | 3.6   | 5.0   | 185.0   | 0.1  | 6.7   | 0.2   | 13.3  | 7.8   | 5.2   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.3   | 6.1   | 1.5   | 1.2   | 13.4  | 31.4  | 3.0  | 17.1  | 0.7   | 8.5   | 7.5   | 3.9   |
| LnGrp Delay(d),s/veh         | 66.0  | 32.3  | 4.4   | 61.4  | 51.9  | 206.7   | 28.9   | 42.0  | 25.3  | 62.9  | 55.3  | 50.1  |
| LnGrp LOS                    | E   | C   | A   | E   | D   | F   | C  | D   | C   | E   | E   | D   |
| Approach Vol, veh/h          | 805   |   |   | 1854  |   |   |  | 1333  |   |   | 1018  |   |
| Approach Delay, s/veh        | 34.4  |   |   | 101.8   |   |   |  | 39.1  |   |   | 58.2  |   |
| Approach LOS                 | C   |   |   | F   |   |   |  | D   |   |   | E   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 22.6  | 47.0  | 8.1   | 42.2  | 45.5  | 24.1  | 13.6   | 36.8  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.7   | * 4.2   | 5.3   | 5.7   | * 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 20  | 40.0  | * 5.7   | 35.1  | 14.9  | * 45  | 8.8  | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 18.0  | 35.0  | 4.4   | 14.5  | 8.4   | 16.2  | 8.3  | 29.6  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.4   | 2.8   | 0.0   | 3.4   | 3.3   | 2.4   | 0.0  | 1.8   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 65.4  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | E   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 10: Coventry Avenue & Herndon Avenue

2035 No Proj AM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |   |  |  |  |  |  |   |   |  |  |
| Volume (veh/h)  | 61  | 677   | 116   | 23  | 1548  | 29  | 154  | 9   | 21  | 15  | 2   | 40  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1900  | 1845  | 1845  | 1845  | 1900   | 1845  | 1900  | 1900  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 66  | 736   | 126   | 25  | 1683  | 32  | 167  | 10  | 23  | 16  | 2   | 43  |
| Adj No. of Lanes  | 1   | 3   | 0   | 1   | 3   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Peak Hour Factor  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 87  | 916   | 155   | 828   | 3235  | 1007  | 195  | 12  | 27  | 64  | 8   | 64  |
| Arrive On Green   | 0.10  | 0.42  | 0.40  | 0.47  | 0.64  | 0.64  | 0.13   | 0.13  | 0.13  | 0.04  | 0.04  | 0.04  |
| Sat Flow, veh/h   | 1757  | 4335  | 735   | 1757  | 5036  | 1568  | 1450   | 87  | 200   | 1570  | 196   | 1568  |
| Grp Volume(v), veh/h  | 66  | 568   | 294   | 25  | 1683  | 32  | 200  | 0   | 0   | 18  | 0   | 43  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1713  | 1757  | 1679  | 1568  | 1737   | 0   | 0   | 1766  | 0   | 1568  |
| Q Serve(g_s), s   | 4.4   | 17.7  | 18.1  | 0.9   | 21.5  | 0.9   | 13.5   | 0.0   | 0.0   | 1.2   | 0.0   | 3.2   |
| Cycle Q Clear(g_c), s   | 4.4   | 17.7  | 18.1  | 0.9   | 21.5  | 0.9   | 13.5   | 0.0   | 0.0   | 1.2   | 0.0   | 3.2   |
| Prop In Lane  | 1.00  |   | 0.43  | 1.00  |   | 1.00  | 0.83   |   | 0.11  | 0.89  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 87  | 710   | 362   | 828   | 3235  | 1007  | 233  | 0   | 0   | 72  | 0   | 64  |
| V/C Ratio(X)  | 0.76  | 0.80  | 0.81  | 0.03  | 0.52  | 0.03  | 0.86   | 0.00  | 0.00  | 0.25  | 0.00  | 0.68  |
| Avail Cap(c_a), veh/h   | 149   | 1589  | 811   | 828   | 3235  | 1007  | 333  | 0   | 0   | 268   | 0   | 238   |
| HCM Platoon Ratio   | 2.00  | 2.00  | 2.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 0.74  | 0.74  | 0.74  | 1.00  | 1.00  | 1.00  | 1.00   | 0.00  | 0.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh  | 53.4  | 32.4  | 33.1  | 17.0  | 11.5  | 7.8   | 50.8   | 0.0   | 0.0   | 55.8  | 0.0   | 56.8  |
| Incr Delay (d2), s/veh  | 9.7   | 7.0   | 13.6  | 0.0   | 0.6   | 0.1   | 14.2   | 0.0   | 0.0   | 1.8   | 0.0   | 11.8  |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.4   | 8.7   | 9.9   | 0.4   | 10.2  | 0.4   | 7.4  | 0.0   | 0.0   | 0.6   | 0.0   | 1.6   |
| LnGrp Delay(d),s/veh  | 63.1  | 39.4  | 46.7  | 17.0  | 12.1  | 7.9   | 65.0   | 0.0   | 0.0   | 57.6  | 0.0   | 68.6  |
| LnGrp LOS   | E   | D   | D   | B   | B   | A   | E  |   |   | E   |   | E   |
| Approach Vol, veh/h   |   | 928   |   |   | 1740  |   |  | 200   |   |   | 61  |   |
| Approach Delay, s/veh   |   | 43.4  |   |   | 12.1  |   |  | 65.0  |   |   | 65.4  |   |
| Approach LOS  |   | D   |   |   | B   |   |  | E   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  |   | 2   | 3   | 4   |   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  |   | 20.1  | 61.6  | 29.4  |   | 8.9   | 9.9  | 81.1  |   |   |   |   |
| Change Period (Y+Rc), s   |   | * 4.2   | 5.3   | * 5.3   |   | 4.2   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   |   | * 23  | 5.8   | * 56  |   | 18.0  | * 10   | 51.3  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  |   | 15.5  | 2.9   | 20.1  |   | 5.2   | 6.4  | 23.5  |   |   |   |   |
| Green Ext Time (p_c), s   |   | 0.4   | 2.1   | 3.9   |   | 0.1   | 0.0  | 10.4  |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 26.8  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | C   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

2035 No Proj AM Peak

3/28/2017

|                                   | →    | ↘    | ↙     | ←                    | ↖    | ↗    |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Movement                          | EBT  | EBR  | WBL   | WBT                  | NBL  | NBR  |
| Lane Configurations               | ↑    | ↑    | ↑     | ↑                    | ↑    | ↑    |
| Volume (veh/h)                    | 45   | 13   | 44    | 31                   | 38   | 58   |
| Sign Control                      | Stop |      |       | Stop                 | Free |      |
| Grade                             | 0%   |      |       | 0%                   | 0%   |      |
| Peak Hour Factor                  | 0.92 | 0.92 | 0.92  | 0.92                 | 0.92 | 0.92 |
| Hourly flow rate (vph)            | 49   | 14   | 48    | 34                   | 41   | 63   |
| Pedestrians                       |      |      |       |                      |      |      |
| Lane Width (ft)                   |      |      |       |                      |      |      |
| Walking Speed (ft/s)              |      |      |       |                      |      |      |
| Percent Blockage                  |      |      |       |                      |      |      |
| Right turn flare (veh)            |      | 4    |       |                      |      |      |
| Median type                       |      |      |       |                      | None |      |
| Median storage (veh)              |      |      |       |                      |      |      |
| Upstream signal (ft)              |      |      |       |                      | 110  |      |
| pX, platoon unblocked             |      |      |       |                      |      |      |
| vC, conflicting volume            | 146  | 0    | 107   | 83                   | 0    |      |
| vC1, stage 1 conf vol             |      |      |       |                      |      |      |
| vC2, stage 2 conf vol             |      |      |       |                      |      |      |
| vCu, unblocked vol                | 146  | 0    | 107   | 83                   | 0    |      |
| tC, single (s)                    | 6.5  | 6.2  | 7.1   | 6.5                  | 4.1  |      |
| tC, 2 stage (s)                   |      |      |       |                      |      |      |
| tF (s)                            | 4.0  | 3.3  | 3.5   | 4.0                  | 2.2  |      |
| p0 queue free %                   | 93   | 99   | 94    | 96                   | 97   |      |
| cM capacity (veh/h)               | 725  | 1082 | 798   | 785                  | 1617 |      |
| Direction, Lane #                 | EB 1 | WB 1 | WB 2  | NB 1                 | NB 2 |      |
| Volume Total                      | 63   | 48   | 34    | 41                   | 63   |      |
| Volume Left                       | 0    | 48   | 0     | 41                   | 0    |      |
| Volume Right                      | 14   | 0    | 0     | 0                    | 63   |      |
| cSH                               | 934  | 798  | 785   | 1617                 | 1700 |      |
| Volume to Capacity                | 0.07 | 0.06 | 0.04  | 0.03                 | 0.04 |      |
| Queue Length 95th (ft)            | 5    | 5    | 3     | 2                    | 0    |      |
| Control Delay (s)                 | 9.9  | 9.8  | 9.8   | 7.3                  | 0.0  |      |
| Lane LOS                          | A    | A    | A     | A                    |      |      |
| Approach Delay (s)                | 9.9  | 9.8  |       | 2.9                  |      |      |
| Approach LOS                      | A    | A    |       |                      |      |      |
| <b>Intersection Summary</b>       |      |      |       |                      |      |      |
| Average Delay                     |      |      | 6.9   |                      |      |      |
| Intersection Capacity Utilization |      |      | 19.1% | ICU Level of Service |      | A    |
| Analysis Period (min)             |      |      | 15    |                      |      |      |

| Intersection     |   |
|------------------|---|
| Int Delay, s/veh | 0 |

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 3    | 710  | 1595 | 27   | 0    | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 3    | 755  | 1697 | 29   | 0    | 2    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 1726   | 0      | 2095   |
| Stage 1              | -      | -      | 1711   |
| Stage 2              | -      | -      | 384    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 358    | -      | 44     |
| Stage 1              | -      | -      | 130    |
| Stage 2              | -      | -      | 655    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 358    | -      | 44     |
| Mov Cap-2 Maneuver   | -      | -      | 44     |
| Stage 1              | -      | -      | 130    |
| Stage 2              | -      | -      | 650    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.1 | 0  | 17.3 |
| HCM LOS              |     |    | C    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 358   | -   | -   | -   | 296   |
| HCM Lane V/C Ratio    | 0.009 | -   | -   | -   | 0.007 |
| HCM Control Delay (s) | 15.1  | -   | -   | -   | 17.3  |
| HCM Lane LOS          | C     | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0     |

Intersection

Int Delay, s/veh 490.1

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 555  | 159  | 66   | 931  | 682  | 65   |
| Conflicting Peds, #/hr   | 0    | 3    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 250  | 250  | -    | 0    | 250  |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 597  | 171  | 71   | 1001 | 733  | 70   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 597    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | 4.16   |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | 2.23   |
| Pot Cap-1 Maneuver   | -      | -      | 969    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | 969    |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB  | NB      |
|----------------------|----|-----|---------|
| HCM Control Delay, s | 0  | 0.6 | \$ 1612 |
| HCM LOS              |    |     | F       |

| Minor Lane/Major Mvmt | NBLn1     | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-----------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 153       | 695   | -   | -   | 969   | -   |
| HCM Lane V/C Ratio    | 4.793     | 0.101 | -   | -   | 0.073 | -   |
| HCM Control Delay (s) | \$ 1764.6 | 10.8  | -   | -   | 9     | -   |
| HCM Lane LOS          | F         | B     | -   | -   | A     | -   |
| HCM 95th %tile Q(veh) | 76.2      | 0.3   | -   | -   | 0.2   | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection

Int Delay, s/veh 1.5

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 75   | 535  | 927  | 44   | 17   | 70   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 3    | 0    | 3    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 250  | -    | -    | 250  | 250  | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 80   | 569  | 986  | 47   | 18   | 74   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 989    | 0      | 1433   |
| Stage 1              | -      | -      | 989    |
| Stage 2              | -      | -      | 444    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 689    | -      | 124    |
| Stage 1              | -      | -      | 318    |
| Stage 2              | -      | -      | 611    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 689    | -      | 109    |
| Mov Cap-2 Maneuver   | -      | -      | 109    |
| Stage 1              | -      | -      | 317    |
| Stage 2              | -      | -      | 539    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 1.3 | 0  | 19.3 |
| HCM LOS              |     |    | C    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 | SBLn2 |
|-----------------------|-------|-----|-----|-----|-------|-------|
| Capacity (veh/h)      | 689   | -   | -   | -   | 109   | 516   |
| HCM Lane V/C Ratio    | 0.116 | -   | -   | -   | 0.166 | 0.144 |
| HCM Control Delay (s) | 10.9  | -   | -   | -   | 44.5  | 13.2  |
| HCM Lane LOS          | B     | -   | -   | -   | E     | B     |
| HCM 95th %tile Q(veh) | 0.4   | -   | -   | -   | 0.6   | 0.5   |

Intersection

Int Delay, s/veh 71.7

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 363  | 179  | 5    | 615  | 340  | 12   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 395  | 195  | 5    | 668  | 370  | 13   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 395    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | 4.13   |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | 2.227  |
| Pot Cap-1 Maneuver   | -      | -      | 1158   |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | 1158   |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB  | NB       |
|----------------------|----|-----|----------|
| HCM Control Delay, s | 0  | 0.1 | \$ 308.2 |
| HCM LOS              |    |     | F        |

| Minor Lane/Major Mvmt | NBLn1    | EBT | EBR | WBL   | WBT |
|-----------------------|----------|-----|-----|-------|-----|
| Capacity (veh/h)      | 245      | -   | -   | 1158  | -   |
| HCM Lane V/C Ratio    | 1.562    | -   | -   | 0.005 | -   |
| HCM Control Delay (s) | \$ 308.2 | -   | -   | 8.1   | 0   |
| HCM Lane LOS          | F        | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 23.3     | -   | -   | 0     | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection

Int Delay, s/veh 17.2

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 346  | 9    | 1    | 488  | 241  | 36   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 376  | 10   | 1    | 530  | 262  | 39   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 386    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | 4.13   |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | 2.227  |
| Pot Cap-1 Maneuver   | -      | -      | 1167   |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | 1167   |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 69.5 |
| HCM LOS              |    |    | F    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 325   | -   | -   | 1167  | -   |
| HCM Lane V/C Ratio    | 0.926 | -   | -   | 0.001 | -   |
| HCM Control Delay (s) | 69.5  | -   | -   | 8.1   | 0   |
| HCM Lane LOS          | F     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 9.2   | -   | -   | 0     | -   |



| Intersection     |       |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-------|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 140.2 |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 22   | 113  | 81   | 32   | 355  | 20   | 238  | 101  | 19   | 24   | 182  | 36   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 97   | 97   | 97   | 97   | 92   | 97   | 92   | 97   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 24   | 116  | 84   | 33   | 366  | 22   | 245  | 110  | 20   | 26   | 198  | 39   |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor1 |       |       | Minor2 |       |       |
|----------------------|--------|---|---|--------|---|---|--------|-------|-------|--------|-------|-------|
| Conflicting Flow All | 388    | 0 | 0 | 200    | 0 | 0 | 767    | 660   | 158   | 714    | 691   | 377   |
| Stage 1              | -      | - | - | -      | - | - | 206    | 206   | -     | 443    | 443   | -     |
| Stage 2              | -      | - | - | -      | - | - | 561    | 454   | -     | 271    | 248   | -     |
| Critical Hdwy        | 4.13   | - | - | 4.13   | - | - | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     |
| Follow-up Hdwy       | 2.227  | - | - | 2.227  | - | - | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 |
| Pot Cap-1 Maneuver   | 1165   | - | - | 1366   | - | - | 318    | 382   | 885   | 345    | 366   | 667   |
| Stage 1              | -      | - | - | -      | - | - | 794    | 729   | -     | 592    | 574   | -     |
| Stage 2              | -      | - | - | -      | - | - | 510    | 568   | -     | 733    | 699   | -     |
| Platoon blocked, %   | -      | - | - | -      | - | - | -      | -     | -     | -      | -     | -     |
| Mov Cap-1 Maneuver   | 1165   | - | - | 1366   | - | - | ~ 158  | 362   | 885   | 248    | 346   | 667   |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | ~ 158  | 362   | -     | 248    | 346   | -     |
| Stage 1              | -      | - | - | -      | - | - | 776    | 712   | -     | 578    | 556   | -     |
| Stage 2              | -      | - | - | -      | - | - | 300    | 550   | -     | 592    | 683   | -     |

| Approach             | EB  | WB  | NB       | SB   |
|----------------------|-----|-----|----------|------|
| HCM Control Delay, s | 0.9 | 0.6 | \$ 451.6 | 38.4 |
| HCM LOS              |     |     | F        | E    |

| Minor Lane/Major Mvmt | NBLn1    | EBL   | EBT | EBR | WBL   | WBT | WBR | SBLn1 |
|-----------------------|----------|-------|-----|-----|-------|-----|-----|-------|
| Capacity (veh/h)      | 200      | 1165  | -   | -   | 1366  | -   | -   | 358   |
| HCM Lane V/C Ratio    | 1.874    | 0.021 | -   | -   | 0.024 | -   | -   | 0.735 |
| HCM Control Delay (s) | \$ 451.6 | 8.2   | 0   | -   | 7.7   | 0   | -   | 38.4  |
| HCM Lane LOS          | F        | A     | A   | -   | A     | A   | -   | E     |
| HCM 95th %tile Q(veh) | 27       | 0.1   | -   | -   | 0.1   | -   | -   | 5.6   |

| Notes  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|
| ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon |  |  |  |  |  |  |  |  |  |  |  |  |

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 5.7    |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 1      | 5     | 153   | 24     | 17    | 1     | 176    | 177  | 8    | 1      | 196  | 4    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 92     | 92    | 92    | 92     | 92    | 92    | 92     | 92   | 92   | 92     | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 1      | 5     | 166   | 26     | 18    | 1     | 191    | 192  | 9    | 1      | 213  | 4    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 806    | 801   | 215   | 882    | 799   | 197   | 217    | 0    | 0    | 201    | 0    | 0    |
| Stage 1                  | 217    | 217   | -     | 579    | 579   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 589    | 584   | -     | 303    | 220   | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 299    | 317   | 822   | 266    | 317   | 842   | 1347   | -    | -    | 1365   | -    | -    |
| Stage 1                  | 783    | 721   | -     | 499    | 499   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 493    | 496   | -     | 704    | 719   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 248    | 266   | 822   | 183    | 266   | 842   | 1347   | -    | -    | 1365   | -    | -    |
| Mov Cap-2 Maneuver       | 248    | 266   | -     | 183    | 266   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 658    | 720   | -     | 419    | 419   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 395    | 417   | -     | 557    | 718   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 11.1   |       |       | 26.3   |       |       | 4      |      |      | 0      |      |      |
| HCM LOS                  | B      |       |       | D      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1347   | -     | -     | 761    | 214   | 1365  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.142  | -     | -     | 0.227  | 0.213 | 0.001 | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 8.1    | 0     | -     | 11.1   | 26.3  | 7.6   | 0      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | B      | D     | A     | A      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.5    | -     | -     | 0.9    | 0.8   | 0     | -      | -    |      |        |      |      |

| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 64.1 |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | F    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 59   | 231  | 63   | 0    | 18   | 726  | 162  | 0    | 102  | 308  | 6    |
| Peak Hour Factor          | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 64   | 251  | 68   | 0    | 20   | 789  | 176  | 0    | 111  | 335  | 7    |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB   | NB   |
|----------------------------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   |
| Opposing Lanes             | 2    | 3    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   |
| Conflicting Lanes Left     | 1    | 3    | 3    |
| Conflicting Approach Right | NB   | SB   | WB   |
| Conflicting Lanes Right    | 3    | 1    | 2    |
| HCM Control Delay          | 27.4 | 77.5 | 40.5 |
| HCM LOS                    | D    | F    | E    |

| Lane                   | NBLn1 | NBLn2 | NBLn3 | EBLn1  | EBLn2  | EBLn3 | WBLn1  | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|--------|--------|-------|--------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 0%    | 100%   | 0%     | 0%    | 100%   | 0%    | 37%   |
| Vol Thru, %            | 0%    | 100%  | 0%    | 0%     | 100%   | 0%    | 0%     | 82%   | 48%   |
| Vol Right, %           | 0%    | 0%    | 100%  | 0%     | 0%     | 100%  | 0%     | 18%   | 15%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop   | Stop   | Stop  | Stop   | Stop  | Stop  |
| Traffic Vol by Lane    | 102   | 308   | 6     | 59     | 231    | 63    | 18     | 888   | 695   |
| LT Vol                 | 102   | 0     | 0     | 59     | 0      | 0     | 18     | 0     | 257   |
| Through Vol            | 0     | 308   | 0     | 0      | 231    | 0     | 0      | 726   | 335   |
| RT Vol                 | 0     | 0     | 6     | 0      | 0      | 63    | 0      | 162   | 103   |
| Lane Flow Rate         | 111   | 335   | 7     | 64     | 251    | 68    | 20     | 965   | 755   |
| Geometry Grp           | 7     | 7     | 7     | 8      | 8      | 8     | 8      | 8     | 8     |
| Degree of Util (X)     | 0.301 | 0.864 | 0.016 | 0.189  | 0.707  | 0.179 | 0.056  | 1     | 1     |
| Departure Headway (Hd) | 9.788 | 9.289 | 8.592 | 10.632 | 10.134 | 9.436 | 10.306 | 9.685 | 9.811 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes    | Yes    | Yes   | Yes    | Yes   | Yes   |
| Cap                    | 368   | 392   | 417   | 338    | 357    | 381   | 347    | 386   | 378   |
| Service Time           | 7.522 | 7.023 | 6.326 | 8.376  | 7.878  | 7.181 | 8.087  | 7.466 | 7.591 |
| HCM Lane V/C Ratio     | 0.302 | 0.855 | 0.017 | 0.189  | 0.703  | 0.178 | 0.058  | 2.5   | 1.997 |
| HCM Control Delay      | 16.7  | 49    | 11.5  | 15.8   | 34     | 14.2  | 13.7   | 78.8  | 79.3  |
| HCM Lane LOS           | C     | E     | B     | C      | D      | B     | B      | F     | F     |
| HCM 95th-tile Q        | 1.2   | 8.4   | 0     | 0.7    | 5.2    | 0.6   | 0.2    | 11.8  | 11.7  |

Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 257  | 335  | 103  |
| Peak Hour Factor  | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 279  | 364  | 112  |
| Number of Lanes   | 0    | 0    | 1    | 0    |

| Approach                   | SB   |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 79.3 |
| HCM LOS                    | F    |

Lane

Intersection

Intersection Delay, s/veh68.7

Intersection LOS F

| Movement          | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h        | 0    | 77   | 191  | 319  | 0    | 26   | 560  | 72   | 0    | 149  | 537  | 6    | 0    | 25   | 119  | 64   |
| Peak Hour Factor  | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 84   | 208  | 347  | 0    | 28   | 609  | 78   | 0    | 162  | 584  | 7    | 0    | 27   | 129  | 70   |
| Number of Lanes   | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB | SB   |
|----------------------------|------|------|----|------|
| Opposing Approach          | WB   | EB   | SB | NB   |
| Opposing Lanes             | 1    | 1    | 1  | 1    |
| Conflicting Approach Left  | SB   | NB   | EB | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1  | 1    |
| Conflicting Approach Right | NB   | SB   | WB | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1  | 1    |
| HCM Control Delay          | 72.4 | 73.5 | 74 | 25.5 |
| HCM LOS                    | F    | F    | F  | D    |
























| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 22%   | 13%   | 4%    | 12%   |
| Vol Thru, %            | 78%   | 33%   | 85%   | 57%   |
| Vol Right, %           | 1%    | 54%   | 11%   | 31%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 692   | 587   | 658   | 208   |
| LT Vol                 | 149   | 77    | 26    | 25    |
| Through Vol            | 537   | 191   | 560   | 119   |
| RT Vol                 | 6     | 319   | 72    | 64    |
| Lane Flow Rate         | 752   | 638   | 715   | 226   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 1     | 1     | 1     | 0.596 |
| Departure Headway (Hd) | 8.636 | 8.298 | 8.54  | 9.488 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 429   | 440   | 429   | 382   |
| Service Time           | 6.636 | 6.298 | 6.54  | 7.488 |
| HCM Lane V/C Ratio     | 1.753 | 1.45  | 1.667 | 0.592 |
| HCM Control Delay      | 74    | 72.4  | 73.5  | 25.5  |
| HCM Lane LOS           | F     | F     | F     | D     |
| HCM 95th-tile Q        | 12.5  | 12.8  | 12.6  | 3.7   |

# HCM Signalized Intersection Capacity Analysis

2035 No Proj PM Peak

## 1: Temperance Avenue & Nees Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU   | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |   |  |  |  |  |  |
| Volume (vph)                      | 172   | 79  | 249   | 180   | 82  | 103   | 13  | 201   | 663   | 197   | 39  | 372   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |   | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 1.00  | 0.98  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |   | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |   | 1752  | 3505  | 1535  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |   | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |   | 1752  | 3505  | 1535  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.92  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Adj. Flow (vph)                   | 185   | 85  | 268   | 194   | 88  | 111   | 14  | 216   | 713   | 212   | 42  | 400   |
| RTOR Reduction (vph)              | 0   | 0   | 224   | 0   | 0   | 93  | 0   | 0   | 0   | 115   | 0   | 0   |
| Lane Group Flow (vph)             | 185   | 85  | 44  | 194   | 88  | 18  | 0   | 230   | 713   | 97  | 42  | 400   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |   |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot  | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5   | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |   |   |   | 2   |   |   |
| Actuated Green, G (s)             | 11.8  | 11.9  | 11.9  | 11.9  | 11.6  | 11.6  |   | 10.3  | 25.8  | 25.8  | 3.8   | 19.3  |
| Effective Green, g (s)            | 11.8  | 11.9  | 11.9  | 11.9  | 11.6  | 11.6  |   | 10.3  | 25.8  | 25.8  | 3.8   | 19.3  |
| Actuated g/C Ratio                | 0.16  | 0.16  | 0.16  | 0.16  | 0.16  | 0.16  |   | 0.14  | 0.36  | 0.36  | 0.05  | 0.27  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |   | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 285   | 303   | 257   | 287   | 295   | 251   |   | 249   | 1249  | 547   | 91  | 934   |
| v/s Ratio Prot                    | c0.11   | 0.05  |   | c0.11   | 0.05  |   |   | c0.13   | c0.20   |   | 0.02  | c0.11   |
| v/s Ratio Perm                    |   |   | 0.03  |   |   | 0.01  |   |   |   | 0.06  |   |   |
| v/c Ratio                         | 0.65  | 0.28  | 0.17  | 0.68  | 0.30  | 0.07  |   | 0.92  | 0.57  | 0.18  | 0.46  | 0.43  |
| Uniform Delay, d1                 | 28.4  | 26.5  | 26.0  | 28.4  | 26.8  | 25.8  |   | 30.7  | 18.8  | 16.0  | 33.3  | 22.0  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Incremental Delay, d2             | 5.0   | 0.5   | 0.3   | 6.2   | 0.6   | 0.1   |   | 36.8  | 0.6   | 0.2   | 3.7   | 0.3   |
| Delay (s)                         | 33.4  | 27.0  | 26.3  | 34.6  | 27.4  | 25.9  |   | 67.5  | 19.5  | 16.2  | 37.0  | 22.3  |
| Level of Service                  | C   | C   | C   | C   | C   | C   |   | E   | B   | B   | D   | C   |
| Approach Delay (s)                |   | 28.9  |   |   | 30.5  |   |   |   | 28.4  |   |   | 23.0  |
| Approach LOS                      |   | C   |   |   | C   |   |   |   | C   |   |   | C   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 27.7  |   |   | HCM 2000 Level of Service   |   |   | C   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.66  |   |   |   |   |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 72.4  |   |   | Sum of lost time (s)  |   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 65.7%   |   |   | ICU Level of Service  |   |   | C   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

2035 No Proj PM Peak

3/28/2017

|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 90   |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.98 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1544 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1544 |
| Peak-hour factor, PHF  | 0.93 |
| Adj. Flow (vph)        | 97   |
| RTOR Reduction (vph)   | 71   |
| Lane Group Flow (vph)  | 26   |
| Confl. Peds. (#/hr)    | 5    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 19.3 |
| Effective Green, g (s) | 19.3 |
| Actuated g/C Ratio     | 0.27 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 411  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.02 |
| v/c Ratio              | 0.06 |
| Uniform Delay, d1      | 19.8 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.1  |
| Delay (s)              | 19.9 |
| Level of Service       | B    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# MOVEMENT SUMMARY



Site: 2035 No Project - PM Roundabout at Temperance and Owens Mt Parkway

New Site  
Roundabout

| Movement Performance - Vehicles |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
|---------------------------------|--------|--------------------------------|------------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID                          | OD Mov | Demand Flows<br>Total<br>veh/h | Flows<br>HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>ft | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>mph |
| South: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 3                               | L2     | 129                            | 3.0              | 0.588            | 10.0                 | LOS A            | 3.3                                  | 85.3                    | 0.46         | 0.48                           | 33.6                 |
| 8                               | T1     | 793                            | 3.0              | 0.588            | 3.9                  | LOS A            | 3.3                                  | 85.3                    | 0.46         | 0.49                           | 33.0                 |
| 18                              | R2     | 376                            | 3.0              | 0.588            | 4.4                  | LOS A            | 3.3                                  | 85.3                    | 0.46         | 0.49                           | 30.6                 |
| Approach                        |        | 1297                           | 3.0              | 0.588            | 4.6                  | LOS A            | 3.3                                  | 85.3                    | 0.46         | 0.49                           | 32.6                 |
| East: Owens Mt Parkway          |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 1                               | L2     | 834                            | 3.0              | 0.845            | 17.3                 | LOS C            | 9.7                                  | 248.7                   | 0.89         | 1.22                           | 23.8                 |
| 6                               | T1     | 295                            | 3.0              | 0.416            | 6.6                  | LOS A            | 2.0                                  | 51.4                    | 0.67         | 0.73                           | 33.3                 |
| 16                              | R2     | 259                            | 3.0              | 0.243            | 4.9                  | LOS A            | 1.0                                  | 26.5                    | 0.55         | 0.61                           | 32.5                 |
| Approach                        |        | 1388                           | 3.0              | 0.845            | 12.7                 | LOS B            | 9.7                                  | 248.7                   | 0.78         | 1.00                           | 28.3                 |
| North: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 7                               | L2     | 103                            | 3.0              | 0.702            | 17.7                 | LOS C            | 4.7                                  | 120.9                   | 0.87         | 1.05                           | 31.0                 |
| 4                               | T1     | 605                            | 3.0              | 0.702            | 11.1                 | LOS B            | 5.0                                  | 127.6                   | 0.88         | 1.05                           | 30.1                 |
| 14                              | R2     | 43                             | 3.0              | 0.702            | 11.3                 | LOS B            | 5.0                                  | 127.6                   | 0.88         | 1.04                           | 31.8                 |
| Approach                        |        | 751                            | 3.0              | 0.702            | 12.0                 | LOS B            | 5.0                                  | 127.6                   | 0.88         | 1.05                           | 30.4                 |
| West: Alluvial Avenue           |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 5                               | L2     | 83                             | 3.0              | 0.385            | 18.9                 | LOS C            | 2.0                                  | 50.4                    | 0.82         | 0.96                           | 31.3                 |
| 2                               | T1     | 60                             | 3.0              | 0.385            | 12.8                 | LOS B            | 2.0                                  | 50.4                    | 0.82         | 0.96                           | 30.3                 |
| 12                              | R2     | 233                            | 3.0              | 0.501            | 13.6                 | LOS B            | 3.1                                  | 80.2                    | 0.87         | 1.01                           | 29.0                 |
| Approach                        |        | 376                            | 3.0              | 0.501            | 14.6                 | LOS B            | 3.1                                  | 80.2                    | 0.85         | 0.99                           | 29.9                 |
| All Vehicles                    |        | 3811                           | 3.0              | 0.845            | 10.0                 | LOS B            | 9.7                                  | 248.7                   | 0.70         | 0.83                           | 30.2                 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com**

Organisation: JLB TRAFFIC ENGINEERING, INC. | Processed: Wednesday, November 08, 2017 8:57:18 AM





















Project: Z:\01 Projects\006 Clovis\006-009 CCMC Phase 2 TIA\Background\Alluvial at Temperance Roundabout\Temperance Alluvial.sip6



HCM 2010 Signalized Intersection Summary  
3: Temperance Avenue & SR 168 WB Ramp /SR 168 WB Ramp

2035 No Proj PM Peak

3/28/2017




















|                              |  |  |  |  |  |  |  |   |  |  |   |  |
|------------------------------|---|---|---|---|---|---|--|--|---|---|--|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT  | NBR   | SBL   | SBT  | SBR   |
| Lane Configurations          |   |   |   |  |   |  |  | <br> |  |   | <br> |  |
| Volume (veh/h)               | 0   | 0   | 0   | 148   | 0   | 64  | 0  | 1207   | 428   | 0   | 882  | 730   |
| Number                       |   |   |   | 3   | 8   | 18  | 5  | 2  | 12  | 1   | 6  | 16  |
| Initial Q (Qb), veh          |   |   |   | 0   | 0   | 0   | 0  | 0  | 0   | 0   | 0  | 0   |
| Ped-Bike Adj(A_pbT)          |   |   |   | 1.00  |   | 1.00  | 1.00   |  | 1.00  | 1.00  |  | 1.00  |
| Parking Bus, Adj             |   |   |   | 1.00  | 1.00  | 1.00  | 1.00   | 1.00   | 1.00  | 1.00  | 1.00   | 1.00  |
| Adj Sat Flow, veh/h/ln       |   |   |   | 1845  | 0   | 1845  | 0  | 1845   | 1845  | 0   | 1845   | 1845  |
| Adj Flow Rate, veh/h         |   |   |   | 157   | 0   | 68  | 0  | 1284   | 0   | 0   | 938  | 777   |
| Adj No. of Lanes             |   |   |   | 1   | 0   | 1   | 0  | 2  | 1   | 0   | 2  | 1   |
| Peak Hour Factor             |   |   |   | 0.94  | 0.94  | 0.94  | 0.94   | 0.94   | 0.94  | 0.94  | 0.94   | 0.94  |
| Percent Heavy Veh, %         |   |   |   | 3   | 0   | 3   | 0  | 3  | 3   | 0   | 3  | 3   |
| Cap, veh/h                   |   |   |   | 209   | 0   | 194   | 0  | 2738   | 1199  | 0   | 2738   | 1224  |
| Arrive On Green              |   |   |   | 0.12  | 0.00  | 0.12  | 0.00   | 1.00   | 0.00  | 0.00  | 0.78   | 0.78  |
| Sat Flow, veh/h              |   |   |   | 1757  | 0   | 1568  | 0  | 3597   | 1568  | 0   | 3597   | 1567  |
| Grp Volume(v), veh/h         |   |   |   | 157   | 0   | 68  | 0  | 1284   | 0   | 0   | 938  | 777   |
| Grp Sat Flow(s),veh/h/ln     |   |   |   | 1757  | 0   | 1568  | 0  | 1752   | 1568  | 0   | 1752   | 1567  |
| Q Serve(g_s), s              |   |   |   | 6.9   | 0.0   | 3.2   | 0.0  | 0.0  | 0.0   | 0.0   | 6.4  | 17.2  |
| Cycle Q Clear(g_c), s        |   |   |   | 6.9   | 0.0   | 3.2   | 0.0  | 0.0  | 0.0   | 0.0   | 6.4  | 17.2  |
| Prop In Lane                 |   |   |   | 1.00  |   | 1.00  | 0.00   |  | 1.00  | 0.00  |  | 1.00  |
| Lane Grp Cap(c), veh/h       |   |   |   | 209   | 0   | 194   | 0  | 2738   | 1199  | 0   | 2738   | 1224  |
| V/C Ratio(X)                 |   |   |   | 0.75  | 0.00  | 0.35  | 0.00   | 0.47   | 0.00  | 0.00  | 0.34   | 0.63  |
| Avail Cap(c_a), veh/h        |   |   |   | 351   | 0   | 321   | 0  | 2738   | 1199  | 0   | 2738   | 1224  |
| HCM Platoon Ratio            |   |   |   | 1.00  | 1.00  | 1.00  | 1.00   | 1.33   | 1.33  | 1.00  | 1.00   | 1.00  |
| Upstream Filter(I)           |   |   |   | 1.00  | 0.00  | 1.00  | 0.00   | 0.29   | 0.00  | 0.00  | 0.12   | 0.12  |
| Uniform Delay (d), s/veh     |   |   |   | 34.1  | 0.0   | 32.1  | 0.0  | 0.0  | 0.0   | 0.0   | 2.6  | 3.8   |
| Incr Delay (d2), s/veh       |   |   |   | 5.4   | 0.0   | 1.1   | 0.0  | 0.2  | 0.0   | 0.0   | 0.0  | 0.3   |
| Initial Q Delay(d3),s/veh    |   |   |   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   |
| %ile BackOfQ(50%),veh/ln     |   |   |   | 3.7   | 0.0   | 1.4   | 0.0  | 0.1  | 0.0   | 0.0   | 3.0  | 7.2   |
| LnGrp Delay(d),s/veh         |   |   |   | 39.5  | 0.0   | 33.2  | 0.0  | 0.2  | 0.0   | 0.0   | 2.7  | 4.1   |
| LnGrp LOS                    |   |   |   | D   |   | C   |  | A  |   |   | A  | A   |
| Approach Vol, veh/h          |   |   |   |   | 225   |   |  | 1284   |   |   | 1715   |   |
| Approach Delay, s/veh        |   |   |   |   | 37.6  |   |  | 0.2  |   |   | 3.3  |   |
| Approach LOS                 |   |   |   |   | D   |   |  | A  |   |   | A  |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8  |   |   |  |   |
| Assigned Phs                 |   | 2   |   |   |   | 6   |  | 8  |   |   |  |   |
| Phs Duration (G+Y+Rc), s     |   | 66.5  |   |   |   | 66.5  |  | 13.5   |   |   |  |   |
| Change Period (Y+Rc), s      |   | 5.3   |   |   |   | 5.3   |  | 4.2  |   |   |  |   |
| Max Green Setting (Gmax), s  |   | 54.7  |   |   |   | 54.7  |  | 15.8   |   |   |  |   |
| Max Q Clear Time (g_c+I1), s |   | 2.0   |   |   |   | 19.2  |  | 8.9  |   |   |  |   |
| Green Ext Time (p_c), s      |   | 28.5  |   |   |   | 22.8  |  | 0.5  |   |   |  |   |
| Intersection Summary         |   |   |   |   |   |   |  |  |   |   |  |   |
| HCM 2010 Ctrl Delay          |   |   | 4.5   |   |   |   |  |  |   |   |  |   |
| HCM 2010 LOS                 |   |   | A   |   |   |   |  |  |   |   |  |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

2035 No Proj PM Peak

3/28/2017















|                              |  |  |  |  |  |  |  |   |  |  |   |  |
|------------------------------|---|---|---|---|---|---|--|--|---|---|--|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT  | NBR   | SBL   | SBT  | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  | <br> |   |  | <br> |   |
| Volume (veh/h)               | 545   | 0   | 763   | 0   | 0   | 0   | 0  | 1090   | 192   | 76  | 954  | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2  | 12  | 1   | 6  | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0  | 0   | 0   | 0  | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |  | 1.00  | 1.00  |  | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00   | 1.00  | 1.00  | 1.00   | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845   | 1900  | 1845  | 1845   | 0   |
| Adj Flow Rate, veh/h         | 556   | 0   | 779   |   |   |   | 0  | 1112   | 196   | 78  | 973  | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0  | 2  | 0   | 1   | 2  | 0   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98   | 0.98  | 0.98  | 0.98   | 0.98  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3  | 3   | 3   | 3  | 0   |
| Cap, veh/h                   | 760   | 0   | 686   |   |   |   | 0  | 1072   | 188   | 101   | 1639   | 0   |
| Arrive On Green              | 0.43  | 0.00  | 0.44  |   |   |   | 0.00   | 0.72   | 0.69  | 0.06  | 0.47   | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0  | 3071   | 523   | 1757  | 3597   | 0   |
| Grp Volume(v), veh/h         | 556   | 0   | 779   |   |   |   | 0  | 653  | 655   | 78  | 973  | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0  | 1752   | 1750  | 1757  | 1752   | 0   |
| Q Serve(g_s), s              | 21.0  | 0.0   | 35.0  |   |   |   | 0.0  | 28.8   | 28.8  | 3.5   | 16.4   | 0.0   |
| Cycle Q Clear(g_c), s        | 21.0  | 0.0   | 35.0  |   |   |   | 0.0  | 28.8   | 28.8  | 3.5   | 16.4   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |  | 0.30  | 1.00  |  | 0.00  |
| Lane Grp Cap(c), veh/h       | 760   | 0   | 686   |   |   |   | 0  | 631  | 630   | 101   | 1639   | 0   |
| V/C Ratio(X)                 | 0.73  | 0.00  | 1.14  |   |   |   | 0.00   | 1.03   | 1.04  | 0.77  | 0.59   | 0.00  |
| Avail Cap(c_a), veh/h        | 760   | 0   | 686   |   |   |   | 0  | 631  | 630   | 101   | 1639   | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00   | 2.00  | 1.00  | 1.00   | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00   | 1.00  | 0.93  | 0.93   | 0.00  |
| Uniform Delay (d), s/veh     | 18.8  | 0.0   | 22.5  |   |   |   | 0.0  | 11.2   | 11.6  | 37.2  | 15.7   | 0.0   |
| Incr Delay (d2), s/veh       | 3.6   | 0.0   | 78.2  |   |   |   | 0.0  | 45.0   | 46.9  | 28.2  | 1.5  | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 10.8  | 0.0   | 29.9  |   |   |   | 0.0  | 20.8   | 21.2  | 2.5   | 8.2  | 0.0   |
| LnGrp Delay(d),s/veh         | 22.5  | 0.0   | 100.7   |   |   |   | 0.0  | 56.2   | 58.4  | 65.4  | 17.2   | 0.0   |
| LnGrp LOS                    | C   |   | F   |   |   |   |  | F  | F   | E   | B  |   |
| Approach Vol, veh/h          | 1335  |   |   |   |   |   | 1308   |  |   | 1051  |  |   |
| Approach Delay, s/veh        | 68.1  |   |   |   |   |   | 57.3   |  |   | 20.8  |  |   |
| Approach LOS                 | E   |   |   |   |   |   | E  |  |   | C   |  |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8  |   |   |  |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |  |   |   |  |   |
| Phs Duration (G+Y+Rc), s     | 8.6   | 32.8  |   | 38.6  |   | 41.4  |  |  |   |   |  |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   |   | * 4.2   |   | 5.3   |  |  |   |   |  |   |
| Max Green Setting (Gmax), s  | * 4.4   | 27.5  |   | * 34  |   | 36.1  |  |  |   |   |  |   |
| Max Q Clear Time (g_c+l1), s | 5.5   | 30.8  |   | 37.0  |   | 18.4  |  |  |   |   |  |   |
| Green Ext Time (p_c), s      | 0.0   | 0.0   |   | 0.0   |   | 10.4  |  |  |   |   |  |   |
| Intersection Summary         |   |   |   |   |   |   |  |  |   |   |  |   |
| HCM 2010 Ctrl Delay          | 50.8  |   |   |   |   |   |  |  |   |   |  |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |  |   |   |  |   |
| Notes                        |   |   |   |   |   |   |  |  |   |   |  |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

2035 No Proj PM Peak
























3/28/2017

|                                   |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|
| Movement                          | WBL   | WBR   | NBU   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |
| Volume (vph)                      | 85  | 218   | 2   | 1064  | 38  | 107   | 1610  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 0.95  | 1.00  | 0.97  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1568  | 1752  | 3505  | 1547  | 3400  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1568  | 1752  | 3505  | 1547  | 3400  | 3505  |
| Peak-hour factor, PHF             | 0.96  | 0.96  | 0.96  | 0.96  | 0.96  | 0.96  | 0.96  |
| Adj. Flow (vph)                   | 89  | 227   | 2   | 1108  | 40  | 111   | 1677  |
| RTOR Reduction (vph)              | 0   | 168   | 0   | 0   | 16  | 0   | 0   |
| Lane Group Flow (vph)             | 89  | 59  | 2   | 1108  | 25  | 111   | 1677  |
| Confl. Peds. (#/hr)               |   |   |   |   | 1   |   |   |
| Turn Type                         | Prot  | Perm  | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 3   |   | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   | 8   |   |   | 2   |   |   |
| Actuated Green, G (s)             | 9.6   | 9.6   | 0.8   | 47.7  | 47.7  | 9.0   | 55.9  |
| Effective Green, g (s)            | 9.8   | 9.8   | 1.0   | 49.0  | 49.0  | 9.2   | 57.2  |
| Actuated g/C Ratio                | 0.12  | 0.12  | 0.01  | 0.61  | 0.61  | 0.11  | 0.72  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 5.3   | 5.3   | 4.2   | 5.3   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 214   | 192   | 21  | 2146  | 947   | 391   | 2506  |
| v/s Ratio Prot                    | c0.05   |   | 0.00  | c0.32   |   | 0.03  | c0.48   |
| v/s Ratio Perm                    |   | 0.04  |   |   | 0.02  |   |   |
| v/c Ratio                         | 0.42  | 0.30  | 0.10  | 0.52  | 0.03  | 0.28  | 0.67  |
| Uniform Delay, d1                 | 32.5  | 32.0  | 39.1  | 8.8   | 6.1   | 32.4  | 6.2   |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 0.81  | 0.66  |
| Incremental Delay, d2             | 1.3   | 0.9   | 2.0   | 0.9   | 0.1   | 0.2   | 0.9   |
| Delay (s)                         | 33.8  | 32.9  | 41.0  | 9.7   | 6.2   | 26.5  | 4.9   |
| Level of Service                  | C   | C   | D   | A   | A   | C   | A   |
| Approach Delay (s)                | 33.1  |   |   | 9.6   |   |   | 6.3   |
| Approach LOS                      | C   |   |   | A   |   |   | A   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 10.1  |   | HCM 2000 Level of Service   |   | B   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.64  |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 80.0  |   | Sum of lost time (s)  |   | 12.2  |
| Intersection Capacity Utilization |   |   | 57.2%   |   | ICU Level of Service  |   | B   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |   |

| Intersection                |       |       |       |       |
|-----------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh   | 5.6   |       |       |       |
| Intersection LOS            | A     |       |       |       |
| Approach                    | EB    | WB    | NB    | SB    |
| Entry Lanes                 | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes    | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h    | 177   | 62    | 55    | 275   |
| Demand Flow Rate, veh/h     | 182   | 64    | 56    | 283   |
| Vehicles Circulating, veh/h | 42    | 153   | 162   | 113   |
| Vehicles Exiting, veh/h     | 354   | 65    | 62    | 104   |
| Follow-Up Headway, s        | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h   | 0     | 0     | 0     | 0     |
| Ped Cap Adj                 | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh       | 4.9   | 4.4   | 4.4   | 6.5   |
| Approach LOS                | A     | A     | A     | A     |
| Lane                        | Left  | Left  | Left  | Left  |
| Designated Moves            | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves               | LTR   | LTR   | LTR   | LTR   |
| RT Channelized              |       |       |       |       |
| Lane Util                   | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s         | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h           | 182   | 64    | 56    | 283   |
| Cap Entry Lane, veh/h       | 1083  | 970   | 961   | 1009  |
| Entry HV Adj Factor         | 0.973 | 0.967 | 0.980 | 0.973 |
| Flow Entry, veh/h           | 177   | 62    | 55    | 275   |
| Cap Entry, veh/h            | 1055  | 938   | 942   | 982   |
| V/C Ratio                   | 0.168 | 0.066 | 0.058 | 0.280 |
| Control Delay, s/veh        | 4.9   | 4.4   | 4.4   | 6.5   |
| LOS                         | A     | A     | A     | A     |
| 95th %tile Queue, veh       | 1     | 0     | 0     | 1     |

HCM 2010 Signalized Intersection Summary  
7: Armstrong Avenue & Herndon Avenue

2035 No Proj PM Peak  
3/28/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)               | 66  | 984   | 235   | 120   | 818   | 364   | 184  | 497   | 52  | 118   | 286   | 88  |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 69  | 1036  | 247   | 126   | 861   | 383   | 194  | 523   | 55  | 124   | 301   | 93  |
| Adj No. of Lanes             | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor             | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95   | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 93  | 1975  | 614   | 163   | 991   | 438   | 235  | 796   | 356   | 161   | 647   | 290   |
| Arrive On Green              | 0.05  | 0.39  | 0.39  | 0.09  | 0.42  | 0.40  | 0.13   | 0.23  | 0.23  | 0.09  | 0.18  | 0.18  |
| Sat Flow, veh/h              | 1757  | 5036  | 1567  | 1757  | 2366  | 1046  | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 69  | 1036  | 247   | 126   | 636   | 608   | 194  | 523   | 55  | 124   | 301   | 93  |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1679  | 1567  | 1757  | 1752  | 1660  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s              | 3.2   | 12.8  | 9.3   | 5.7   | 27.0  | 27.4  | 8.8  | 11.0  | 2.3   | 5.6   | 6.2   | 3.2   |
| Cycle Q Clear(g_c), s        | 3.2   | 12.8  | 9.3   | 5.7   | 27.0  | 27.4  | 8.8  | 11.0  | 2.3   | 5.6   | 6.2   | 3.2   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 0.63  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 93  | 1975  | 614   | 163   | 734   | 695   | 235  | 796   | 356   | 161   | 647   | 290   |
| V/C Ratio(X)                 | 0.74  | 0.52  | 0.40  | 0.77  | 0.87  | 0.87  | 0.82   | 0.66  | 0.15  | 0.77  | 0.46  | 0.32  |
| Avail Cap(c_a), veh/h        | 116   | 1984  | 617   | 246   | 820   | 776   | 263  | 1476  | 660   | 242   | 1433  | 641   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh     | 38.0  | 18.9  | 17.9  | 36.1  | 21.6  | 22.1  | 34.4   | 28.6  | 25.2  | 36.2  | 29.6  | 16.6  |
| Incr Delay (d2), s/veh       | 17.7  | 0.3   | 0.4   | 8.2   | 9.0   | 10.1  | 17.4   | 0.9   | 0.2   | 8.3   | 0.5   | 0.6   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 2.0   | 6.0   | 4.1   | 3.1   | 14.7  | 14.5  | 5.4  | 5.4   | 1.0   | 3.1   | 3.1   | 1.7   |
| LnGrp Delay(d),s/veh         | 55.8  | 19.2  | 18.3  | 44.3  | 30.6  | 32.2  | 51.7   | 29.5  | 25.4  | 44.5  | 30.1  | 17.2  |
| LnGrp LOS                    | E   | B   | B   | D   | C   | C   | D  | C   | C   | D   | C   | B   |
| Approach Vol, veh/h          | 1352  |   |   |   | 1370  |   |  | 772   |   |   | 518   |   |
| Approach Delay, s/veh        | 20.9  |   |   |   | 32.6  |   |  | 34.8  |   |   | 31.2  |   |
| Approach LOS                 | C   |   |   |   | C   |   |  | C   |   |   | C   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 11.5  | 22.5  | 11.6  | 35.9  | 14.9  | 19.0  | 9.4  | 38.1  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 11  | 33.0  | * 11  | 30.8  | * 12  | 32.0  | 5.2  | * 37  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 7.6   | 13.0  | 7.7   | 14.8  | 10.8  | 8.2   | 5.2  | 29.4  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.1   | 4.2   | 0.1   | 5.8   | 0.1   | 4.3   | 0.0  | 3.4   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 28.9  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | C   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

| Intersection     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 1.9 |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NEL  | NET  | NER  | SWL  | SWT  | SWR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 55   | 1172 | 0    | 38   | 0    | 1264 | 6    | 0    | 0    | 136  | 0    | 0    | 38   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | 400  | -    | -    | -    | 120  | -    | 85   | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | -    | 0    | -    | -    | 1    | -    | -    | 1    | -    |
| Grade, %                 | -    | 0    | -    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 60   | 1274 | 0    | 41   | 0    | 1374 | 7    | 0    | 0    | 148  | 0    | 0    | 41   |

| Major/Minor          | Major1 |   |   | Major2 |      |   | Minor1 |      |      | Minor2 |      |      |      |
|----------------------|--------|---|---|--------|------|---|--------|------|------|--------|------|------|------|
| Conflicting Flow All | 1374   | 0 | 0 | 1078   | 1274 | 0 | 0      | 2163 | 2850 | 637    | 2086 | 2850 | 687  |
| Stage 1              | -      | - | - | -      | -    | - | -      | 1393 | 1393 | -      | 1457 | 1457 | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 770  | 1457 | -      | 629  | 1393 | -    |
| Critical Hdwy        | 4.16   | - | - | 5.66   | 5.36 | - | -      | 7.01 | 6.56 | 7.16   | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1  | -      | - | - | -      | -    | - | -      | 7.36 | 5.56 | -      | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2  | -      | - | - | -      | -    | - | -      | 6.56 | 5.56 | -      | 6.76 | 5.56 | -    |
| Follow-up Hdwy       | 2.23   | - | - | 2.33   | 3.13 | - | -      | 3.68 | 4.03 | 3.93   | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver   | 490    | - | - | 394    | 285  | - | -      | 36   | 17   | 358    | 41   | 17   | 387  |
| Stage 1              | -      | - | - | -      | -    | - | -      | 106  | 205  | -      | 132  | 191  | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 347  | 191  | -      | 407  | 205  | -    |
| Platoon blocked, %   |        | - | - |        |      | - | -      |      |      |        |      |      |      |
| Mov Cap-1 Maneuver   | 490    | - | - | 244    | 285  | - | -      | 29   | 15   | 358    | 22   | 15   | 387  |
| Mov Cap-2 Maneuver   | -      | - | - | -      | -    | - | -      | 72   | 76   | -      | 72   | 80   | -    |
| Stage 1              | -      | - | - | -      | -    | - | -      | 93   | 180  | -      | 116  | 191  | -    |
| Stage 2              | -      | - | - | -      | -    | - | -      | 310  | 191  | -      | 210  | 180  | -    |

























| Approach             | EB  | WB  | NE   | SW   |
|----------------------|-----|-----|------|------|
| HCM Control Delay, s | 0.6 | 0.7 | 21.9 | 15.4 |
| HCM LOS              |     |     | C    | C    |

| Minor Lane/Major Mvmt | NELn1 | EBL   | EBT | EBR | WBU   | WBL | WBT | WBR | SWLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 358   | 490   | -   | -   | 244   | 285 | -   | -   | 387   |
| HCM Lane V/C Ratio    | 0.413 | 0.122 | -   | -   | 0.169 | -   | -   | -   | 0.107 |
| HCM Control Delay (s) | 21.9  | 13.4  | -   | -   | 22.7  | -   | -   | -   | 15.4  |
| HCM Lane LOS          | C     | B     | -   | -   | C     | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 2     | 0.4   | -   | -   | 0.6   | 0   | -   | -   | 0.4   |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

2035 No Proj PM Peak  
3/28/2017





















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)               | 126   | 1001  | 317   | 39  | 794   | 490   | 254  | 488   | 44  | 506   | 981   | 210   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 129   | 1021  | 323   | 40  | 810   | 500   | 259  | 498   | 45  | 516   | 1001  | 214   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 163   | 1285  | 570   | 105   | 1759  | 547   | 272  | 698   | 312   | 712   | 1195  | 534   |
| Arrive On Green              | 0.05  | 0.37  | 0.37  | 0.03  | 0.35  | 0.35  | 0.08   | 0.20  | 0.20  | 0.21  | 0.34  | 0.34  |
| Sat Flow, veh/h              | 3408  | 3505  | 1556  | 3408  | 5036  | 1565  | 3408   | 3505  | 1566  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 129   | 1021  | 323   | 40  | 810   | 500   | 259  | 498   | 45  | 516   | 1001  | 214   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1556  | 1704  | 1679  | 1565  | 1704   | 1752  | 1566  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 3.3   | 22.9  | 14.6  | 1.0   | 10.9  | 12.7  | 6.6  | 11.6  | 1.7   | 12.4  | 23.1  | 9.1   |
| Cycle Q Clear(g_c), s        | 3.3   | 22.9  | 14.6  | 1.0   | 10.9  | 12.7  | 6.6  | 11.6  | 1.7   | 12.4  | 23.1  | 9.1   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 163   | 1285  | 570   | 105   | 1759  | 547   | 272  | 698   | 312   | 712   | 1195  | 534   |
| V/C Ratio(X)                 | 0.79  | 0.79  | 0.57  | 0.38  | 0.46  | 0.91  | 0.95   | 0.71  | 0.14  | 0.72  | 0.84  | 0.40  |
| Avail Cap(c_a), veh/h        | 163   | 1329  | 590   | 163   | 1910  | 594   | 272  | 1218  | 544   | 712   | 1377  | 616   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh     | 41.4  | 24.9  | 22.2  | 41.7  | 22.1  | 6.1   | 40.2   | 32.8  | 18.5  | 32.4  | 26.7  | 22.1  |
| Incr Delay (d2), s/veh       | 22.7  | 3.3   | 1.2   | 2.3   | 0.2   | 18.0  | 41.8   | 1.4   | 0.2   | 3.7   | 4.2   | 0.5   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 2.1   | 11.7  | 6.4   | 0.5   | 5.1   | 10.5  | 4.7  | 5.7   | 0.9   | 6.2   | 11.8  | 4.0   |
| LnGrp Delay(d),s/veh         | 64.0  | 28.2  | 23.4  | 44.0  | 22.3  | 24.2  | 82.0   | 34.2  | 18.7  | 36.0  | 30.9  | 22.6  |
| LnGrp LOS                    | E   | C   | C   | D   | C   | C   | F  | C   | B   | D   | C   | C   |
| Approach Vol, veh/h          | 1473  |   |   |   | 1350  |   |  |   | 802   |   |   |   |
| Approach Delay, s/veh        | 30.3  |   |   |   | 23.7  |   |  |   | 48.8  |   |   |   |
| Approach LOS                 | C   |   |   |   | C   |   |  |   | D   |   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 23.4  | 21.5  | 6.7   | 36.2  | 11.0  | 33.9  | 8.2  | 34.7  |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.7   | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 10.8  | * 29  | * 4   | 32.0  | * 6.8   | 33.2  | * 4  | 32.0  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 14.4  | 13.6  | 3.0   | 24.9  | 8.6   | 25.1  | 5.3  | 14.7  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 2.0   | 0.0   | 5.8   | 0.0   | 3.5   | 0.0  | 12.0  |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 31.7  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | C   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 10: Coventry Avenue & Herndon Avenue

2035 No Proj PM Peak

3/28/2017













|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |   |  |  |  |  |  |   |   |  |  |
| Volume (veh/h)  | 32  | 1470  | 89  | 5   | 1145  | 14  | 105  | 0   | 31  | 39  | 5   | 73  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1900  | 1845  | 1845  | 1845  | 1900   | 1845  | 1900  | 1900  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 32  | 1485  | 90  | 5   | 1157  | 14  | 106  | 0   | 31  | 39  | 5   | 74  |
| Adj No. of Lanes  | 1   | 3   | 0   | 1   | 3   | 1   | 0  | 1   | 0   | 0   | 1   | 1   |
| Peak Hour Factor  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99   | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 58  | 2222  | 135   | 17  | 2299  | 716   | 140  | 0   | 41  | 123   | 16  | 123   |
| Arrive On Green   | 0.03  | 0.46  | 0.43  | 0.01  | 0.46  | 0.46  | 0.11   | 0.00  | 0.10  | 0.08  | 0.08  | 0.08  |
| Sat Flow, veh/h   | 1757  | 4856  | 294   | 1757  | 5036  | 1568  | 1323   | 0   | 387   | 1566  | 201   | 1568  |
| Grp Volume(v), veh/h  | 32  | 1027  | 548   | 5   | 1157  | 14  | 137  | 0   | 0   | 44  | 0   | 74  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1793  | 1757  | 1679  | 1568  | 1710   | 0   | 0   | 1766  | 0   | 1568  |
| Q Serve(g_s), s   | 0.9   | 11.7  | 11.8  | 0.1   | 7.9   | 0.2   | 3.8  | 0.0   | 0.0   | 1.2   | 0.0   | 2.2   |
| Cycle Q Clear(g_c), s   | 0.9   | 11.7  | 11.8  | 0.1   | 7.9   | 0.2   | 3.8  | 0.0   | 0.0   | 1.2   | 0.0   | 2.2   |
| Prop In Lane  | 1.00  |   | 0.16  | 1.00  |   | 1.00  | 0.77   |   | 0.23  | 0.89  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 58  | 1536  | 820   | 17  | 2299  | 716   | 180  | 0   | 0   | 139   | 0   | 123   |
| V/C Ratio(X)  | 0.55  | 0.67  | 0.67  | 0.30  | 0.50  | 0.02  | 0.76   | 0.00  | 0.00  | 0.32  | 0.00  | 0.60  |
| Avail Cap(c_a), veh/h   | 208   | 2344  | 1251  | 151   | 3351  | 1043  | 258  | 0   | 0   | 656   | 0   | 582   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 0.00  | 0.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh  | 23.3  | 10.4  | 10.5  | 24.1  | 9.4   | 7.3   | 21.3   | 0.0   | 0.0   | 21.3  | 0.0   | 21.8  |
| Incr Delay (d2), s/veh  | 8.0   | 0.5   | 1.0   | 9.8   | 0.2   | 0.0   | 7.8  | 0.0   | 0.0   | 1.3   | 0.0   | 4.6   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.6   | 5.4   | 5.9   | 0.1   | 3.7   | 0.1   | 2.2  | 0.0   | 0.0   | 0.6   | 0.0   | 1.1   |
| LnGrp Delay(d),s/veh  | 31.4  | 10.9  | 11.4  | 33.9  | 9.6   | 7.3   | 29.1   | 0.0   | 0.0   | 22.6  | 0.0   | 26.5  |
| LnGrp LOS   | C   | B   | B   | C   | A   | A   | C  |   |   | C   |   | C   |
| Approach Vol, veh/h   |   | 1607  |   |   | 1176  |   |  | 137   |   |   | 118   |   |
| Approach Delay, s/veh   |   | 11.5  |   |   | 9.6   |   |  | 29.1  |   |   | 25.0  |   |
| Approach LOS  |   | B   |   |   | A   |   |  | C   |   |   | C   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  |   | 2   | 3   | 4   |   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  |   | 9.2   | 5.6   | 26.4  |   | 7.8   | 5.6  | 26.4  |   |   |   |   |
| Change Period (Y+Rc), s   |   | * 4.2   | 5.3   | * 5.3   |   | 4.2   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   |   | * 7.2   | 4.0   | * 33  |   | 18.0  | * 5.6  | 31.3  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  |   | 5.8   | 2.1   | 13.8  |   | 4.2   | 2.9  | 9.9   |   |   |   |   |
| Green Ext Time (p_c), s   |   | 0.1   | 1.1   | 7.4   |   | 0.3   | 0.0  | 5.8   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 12.1  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | B   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

2035 No Proj PM Peak  
3/28/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |  |
| Volume (veh/h)                    | 24  | 31  | 94  | 27  | 10  | 28  |
| Sign Control                      | Stop  |   |   | Stop  | Free  |   |
| Grade                             | 0%  |   |   | 0%  | 0%  |   |
| Peak Hour Factor                  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Hourly flow rate (vph)            | 26  | 34  | 102   | 29  | 11  | 30  |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (ft)                   |   |   |   |   |   |   |
| Walking Speed (ft/s)              |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   | 4   |   |   |   |   |
| Median type                       |   |   |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   | 110   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 52  | 0   | 35  | 22  | 0   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 52  | 0   | 35  | 22  | 0   |   |
| tC, single (s)                    | 6.5   | 6.2   | 7.1   | 6.5   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.0   | 3.3   | 3.5   | 4.0   | 2.2   |   |
| p0 queue free %                   | 97  | 97  | 89  | 97  | 99  |   |
| cM capacity (veh/h)               | 832   | 1082  | 912   | 864   | 1617  |   |
| Direction, Lane #                 | EB 1  | WB 1  | WB 2  | NB 1  | NB 2  |   |
| Volume Total                      | 60  | 102   | 29  | 11  | 30  |   |
| Volume Left                       | 0   | 102   | 0   | 11  | 0   |   |
| Volume Right                      | 34  | 0   | 0   | 0   | 30  |   |
| cSH                               | 1906  | 912   | 864   | 1617  | 1700  |   |
| Volume to Capacity                | 0.03  | 0.11  | 0.03  | 0.01  | 0.02  |   |
| Queue Length 95th (ft)            | 2   | 9   | 3   | 1   | 0   |   |
| Control Delay (s)                 | 8.9   | 9.4   | 9.3   | 7.2   | 0.0   |   |
| Lane LOS                          | A   | A   | A   | A   |   |   |
| Approach Delay (s)                | 8.9   | 9.4   |   | 1.9   |   |   |
| Approach LOS                      | A   | A   |   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| Average Delay                     |   |   | 7.9   |   |   |   |
| Intersection Capacity Utilization |   |   | 21.9%   |   | ICU Level of Service  | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |

Intersection

Int Delay, s/veh 0

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 5    | 1535 | 1162 | 4    | 0    | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 5    | 1616 | 1223 | 4    | 0    | 2    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 1227   | 0      | 2043   |
| Stage 1              | -      | -      | 1225   |
| Stage 2              | -      | -      | 818    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 558    | -      | 48     |
| Stage 1              | -      | -      | 239    |
| Stage 2              | -      | -      | 392    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 558    | -      | 48     |
| Mov Cap-2 Maneuver   | -      | -      | 48     |
| Stage 1              | -      | -      | 239    |
| Stage 2              | -      | -      | 388    |

| Approach             | EB | WB | SB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 13.4 |
| HCM LOS              |    |    | B    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h)      | 558   | -   | -   | -   | 432   |
| HCM Lane V/C Ratio    | 0.009 | -   | -   | -   | 0.005 |
| HCM Control Delay (s) | 11.5  | -   | -   | -   | 13.4  |
| HCM Lane LOS          | B     | -   | -   | -   | B     |
| HCM 95th %tile Q(veh) | 0     | -   | -   | -   | 0     |

Intersection

Int Delay, s/veh 320.5

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 1216 | 349  | 27   | 722  | 444  | 171  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 250  | 250  | -    | 0    | 250  |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 98   | 98   | 98   | 98   | 98   | 98   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 1241 | 356  | 28   | 737  | 453  | 174  |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |      |
|----------------------|--------|---|--------|---|--------|------|
| Conflicting Flow All | 0      | 0 | 1241   | 0 | 1664   | 620  |
| Stage 1              | -      | - | -      | - | 1241   | -    |
| Stage 2              | -      | - | -      | - | 423    | -    |
| Critical Hdwy        | -      | - | 4.16   | - | 6.86   | 6.96 |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.86   | -    |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.86   | -    |
| Follow-up Hdwy       | -      | - | 2.23   | - | 3.53   | 3.33 |
| Pot Cap-1 Maneuver   | -      | - | 551    | - | ~ 87   | 428  |
| Stage 1              | -      | - | -      | - | ~ 234  | -    |
| Stage 2              | -      | - | -      | - | 626    | -    |
| Platoon blocked, %   | -      | - |        | - |        |      |
| Mov Cap-1 Maneuver   | -      | - | 551    | - | ~ 83   | 428  |
| Mov Cap-2 Maneuver   | -      | - | -      | - | ~ 83   | -    |
| Stage 1              | -      | - | -      | - | ~ 234  | -    |
| Stage 2              | -      | - | -      | - | 594    | -    |

| Approach             | EB | WB  | NB        |
|----------------------|----|-----|-----------|
| HCM Control Delay, s | 0  | 0.4 | \$ 1526.1 |
| HCM LOS              |    |     | F         |

| Minor Lane/Major Mvmt | NBLn1     | NBLn2 | EBT | EBR | WBL  | WBT |
|-----------------------|-----------|-------|-----|-----|------|-----|
| Capacity (veh/h)      | 83        | 428   | -   | -   | 551  | -   |
| HCM Lane V/C Ratio    | 5.459     | 0.408 | -   | -   | 0.05 | -   |
| HCM Control Delay (s) | \$ 2106.5 | 19.1  | -   | -   | 11.9 | -   |
| HCM Lane LOS          | F         | C     | -   | -   | B    | -   |
| HCM 95th %tile Q(veh) | 49.7      | 1.9   | -   | -   | 0.2  | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection

Int Delay, s/veh 1.6

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 90   | 1287 | 706  | 24   | 29   | 43   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 250  | -    | -    | 250  | 250  | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 97   | 1384 | 759  | 26   | 31   | 46   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 759    | 0      | 1644   |
| Stage 1              | -      | -      | 759    |
| Stage 2              | -      | -      | 885    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 842    | -      | 90     |
| Stage 1              | -      | -      | 420    |
| Stage 2              | -      | -      | 361    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 842    | -      | 80     |
| Mov Cap-2 Maneuver   | -      | -      | 80     |
| Stage 1              | -      | -      | 420    |
| Stage 2              | -      | -      | 319    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.6 | 0  | 37.4 |
| HCM LOS              |     |    | E    |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 | SBLn2 |
|-----------------------|-------|-----|-----|-----|-------|-------|
| Capacity (veh/h)      | 842   | -   | -   | -   | 80    | 615   |
| HCM Lane V/C Ratio    | 0.115 | -   | -   | -   | 0.39  | 0.075 |
| HCM Control Delay (s) | 9.8   | -   | -   | -   | 76.2  | 11.3  |
| HCM Lane LOS          | A     | -   | -   | -   | F     | B     |
| HCM 95th %tile Q(veh) | 0.4   | -   | -   | -   | 1.5   | 0.2   |

Intersection

Int Delay, s/veh 64.5

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 809  | 496  | 10   | 471  | 271  | 20   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 852  | 522  | 11   | 496  | 285  | 21   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 852    |
| Stage 1              | -      | -      | 852    |
| Stage 2              | -      | -      | 517    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 783    | ~ 161  |
| Stage 1              | -      | -      | 416    |
| Stage 2              | -      | -      | 596    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 783    | ~ 158  |
| Mov Cap-2 Maneuver   | -      | -      | ~ 158  |
| Stage 1              | -      | -      | 416    |
| Stage 2              | -      | -      | 585    |

| Approach             | EB | WB  | NB       |
|----------------------|----|-----|----------|
| HCM Control Delay, s | 0  | 0.2 | \$ 460.1 |
| HCM LOS              |    |     | F        |

| Minor Lane/Major Mvmt | NBLn1    | EBT | EBR | WBL   | WBT |
|-----------------------|----------|-----|-----|-------|-----|
| Capacity (veh/h)      | 164      | -   | -   | 783   | -   |
| HCM Lane V/C Ratio    | 1.868    | -   | -   | 0.013 | -   |
| HCM Control Delay (s) | \$ 460.1 | -   | -   | 9.7   | 0   |
| HCM Lane LOS          | F        | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 22.8     | -   | -   | 0     | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection

Int Delay, s/veh 27.8

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 789  | 20   | 2    | 408  | 190  | 10   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 858  | 22   | 2    | 443  | 207  | 11   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 879    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | 4.13   |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | 2.227  |
| Pot Cap-1 Maneuver   | -      | -      | 764    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | 764    |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB | NB    |
|----------------------|----|----|-------|
| HCM Control Delay, s | 0  | 0  | 197.4 |
| HCM LOS              |    |    | F     |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 176   | -   | -   | 764   | -   |
| HCM Lane V/C Ratio    | 1.235 | -   | -   | 0.003 | -   |
| HCM Control Delay (s) | 197.4 | -   | -   | 9.7   | 0   |
| HCM Lane LOS          | F     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 12    | -   | -   | 0     | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

| Intersection     |     |  |  |  |  |  |  |  |  |  |  |  |
|------------------|-----|--|--|--|--|--|--|--|--|--|--|--|
| Int Delay, s/veh | 0.4 |  |  |  |  |  |  |  |  |  |  |  |

| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 60   | 280  | 261  | 26   | 339  | 16   | 169  | 259  | 45   | 29   | 218  | 44   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 65   | 304  | 284  | 28   | 368  | 17   | 184  | 282  | 49   | 32   | 237  | 48   |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor1  |       |       | Minor2  |       |       |
|----------------------|--------|---|---|--------|---|---|---------|-------|-------|---------|-------|-------|
| Conflicting Flow All | 386    | 0 | 0 | 588    | 0 | 0 | 1153    | 1019  | 446   | 1176    | 1152  | 377   |
| Stage 1              | -      | - | - | -      | - | - | 577     | 577   | -     | 434     | 434   | -     |
| Stage 2              | -      | - | - | -      | - | - | 576     | 442   | -     | 742     | 718   | -     |
| Critical Hdwy        | 4.13   | - | - | 4.13   | - | - | 7.13    | 6.53  | 6.23  | 7.13    | 6.53  | 6.23  |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 6.13    | 5.53  | -     | 6.13    | 5.53  | -     |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 6.13    | 5.53  | -     | 6.13    | 5.53  | -     |
| Follow-up Hdwy       | 2.227  | - | - | 2.227  | - | - | 3.527   | 4.027 | 3.327 | 3.527   | 4.027 | 3.327 |
| Pot Cap-1 Maneuver   | 1167   | - | - | 982    | - | - | ~ 174   | ~ 236 | 610   | 167     | ~ 197 | 667   |
| Stage 1              | -      | - | - | -      | - | - | 500     | 500   | -     | 598     | 579   | -     |
| Stage 2              | -      | - | - | -      | - | - | 501     | 575   | -     | 406     | 432   | -     |
| Platoon blocked, %   | -      | - | - | -      | - | - | -       | -     | -     | -       | -     | -     |
| Mov Cap-1 Maneuver   | 1167   | - | - | 982    | - | - | - ~ 208 | 610   | -     | - ~ 173 | 667   | -     |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | - ~ 208 | -     | -     | - ~ 173 | -     | -     |
| Stage 1              | -      | - | - | -      | - | - | 457     | 457   | -     | 546     | 558   | -     |
| Stage 2              | -      | - | - | -      | - | - | 258     | 554   | -     | 131     | 394   | -     |

| Approach             | EB  | WB  | NB | SB |
|----------------------|-----|-----|----|----|
| HCM Control Delay, s | 0.8 | 0.6 | -  | -  |
| HCM LOS              | -   | -   | -  | -  |

| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL   | WBT | WBR | SBLn1 |
|-----------------------|-------|-------|-----|-----|-------|-----|-----|-------|
| Capacity (veh/h)      | -     | 1167  | -   | -   | 982   | -   | -   | -     |
| HCM Lane V/C Ratio    | -     | 0.056 | -   | -   | 0.029 | -   | -   | -     |
| HCM Control Delay (s) | -     | 8.3   | 0   | -   | 8.8   | 0   | -   | -     |
| HCM Lane LOS          | -     | A     | A   | -   | A     | A   | -   | -     |
| HCM 95th %tile Q(veh) | -     | 0.2   | -   | -   | 0.1   | -   | -   | -     |

| Notes  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|
| ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon |  |  |  |  |  |  |  |  |  |  |  |  |

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 11.4   |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 8      | 23    | 302   | 16     | 10    | 1     | 305    | 259  | 21   | 2      | 199  | 6    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 92     | 92    | 92    | 92     | 92    | 92    | 92     | 92   | 92   | 92     | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 9      | 25    | 328   | 17     | 11    | 1     | 332    | 282  | 23   | 2      | 216  | 7    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 1186   | 1191  | 220   | 1357   | 1183  | 293   | 223    | 0    | 0    | 304    | 0    | 0    |
| Stage 1                  | 224    | 224   | -     | 956    | 956   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 962    | 967   | -     | 401    | 227   | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 165    | 187   | 817   | 126    | 189   | 744   | 1340   | -    | -    | 1251   | -    | -    |
| Stage 1                  | 776    | 716   | -     | 309    | 335   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 306    | 331   | -     | 624    | 714   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 119    | 131   | 817   | 50     | 132   | 744   | 1340   | -    | -    | 1251   | -    | -    |
| Mov Cap-2 Maneuver       | 119    | 131   | -     | 50     | 132   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 544    | 715   | -     | 217    | 235   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 204    | 232   | -     | 360    | 713   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 23.8   |       |       | 93.3   |       |       | 4.5    |      |      | 0.1    |      |      |
| HCM LOS                  | C      |       |       | F      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1340   | -     | -     | 544    | 68    | 1251  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.247  | -     | -     | 0.665  | 0.432 | 0.002 | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 8.6    | 0     | -     | 23.8   | 93.3  | 7.9   | 0      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | C      | F     | A     | A      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 1      | -     | -     | 4.9    | 1.7   | 0     | -      | -    |      |        |      |      |



| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 67.4 |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | F    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 68   | 690  | 85   | 0    | 47   | 732  | 31   | 0    | 72   | 105  | 52   |
| Peak Hour Factor          | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 74   | 750  | 92   | 0    | 51   | 796  | 34   | 0    | 78   | 114  | 57   |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB   | NB   |
|----------------------------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   |
| Opposing Lanes             | 2    | 3    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   |
| Conflicting Lanes Left     | 1    | 3    | 3    |
| Conflicting Approach Right | NB   | SB   | WB   |
| Conflicting Lanes Right    | 3    | 1    | 2    |
| HCM Control Delay          | 65.7 | 74.2 | 15.7 |
| HCM LOS                    | F    | F    | C    |

| Lane                   | NBLn1  | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1  | WBLn2 | SBLn1 |
|------------------------|--------|-------|-------|-------|-------|-------|--------|-------|-------|
| Vol Left, %            | 100%   | 0%    | 0%    | 100%  | 0%    | 0%    | 100%   | 0%    | 13%   |
| Vol Thru, %            | 0%     | 100%  | 0%    | 0%    | 100%  | 0%    | 0%     | 96%   | 63%   |
| Vol Right, %           | 0%     | 0%    | 100%  | 0%    | 0%    | 100%  | 0%     | 4%    | 24%   |
| Sign Control           | Stop   | Stop  | Stop  | Stop  | Stop  | Stop  | Stop   | Stop  | Stop  |
| Traffic Vol by Lane    | 72     | 105   | 52    | 68    | 690   | 85    | 47     | 763   | 750   |
| LT Vol                 | 72     | 0     | 0     | 68    | 0     | 0     | 47     | 0     | 98    |
| Through Vol            | 0      | 105   | 0     | 0     | 690   | 0     | 0      | 732   | 470   |
| RT Vol                 | 0      | 0     | 52    | 0     | 0     | 85    | 0      | 31    | 182   |
| Lane Flow Rate         | 78     | 114   | 57    | 74    | 750   | 92    | 51     | 829   | 815   |
| Geometry Grp           | 7      | 7     | 7     | 8     | 8     | 8     | 8      | 8     | 8     |
| Degree of Util (X)     | 0.223  | 0.309 | 0.142 | 0.203 | 1     | 0.223 | 0.143  | 1     | 1     |
| Departure Headway (Hd) | 10.251 | 9.752 | 9.054 | 9.898 | 9.399 | 8.701 | 10.085 | 9.559 | 9.539 |
| Convergence, Y/N       | Yes    | Yes   | Yes   | Yes   | Yes   | Yes   | Yes    | Yes   | Yes   |
| Cap                    | 352    | 371   | 398   | 364   | 398   | 415   | 358    | 390   | 391   |
| Service Time           | 7.964  | 7.465 | 6.767 | 7.6   | 7.101 | 6.403 | 7.79   | 7.265 | 7.247 |
| HCM Lane V/C Ratio     | 0.222  | 0.307 | 0.143 | 0.203 | 1.884 | 0.222 | 0.142  | 2.126 | 2.084 |
| HCM Control Delay      | 15.9   | 16.8  | 13.3  | 15.1  | 77.1  | 13.9  | 14.5   | 77.9  | 77.8  |
| HCM Lane LOS           | C      | C     | B     | C     | F     | B     | B      | F     | F     |
| HCM 95th-tile Q        | 0.8    | 1.3   | 0.5   | 0.7   | 12    | 0.8   | 0.5    | 11.9  | 11.9  |

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**Intersection**

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 98   | 470  | 182  |
| Peak Hour Factor  | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 107  | 511  | 198  |
| Number of Lanes   | 0    | 0    | 1    | 0    |

**Approach** SB

|                            |      |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 77.8 |
| HCM LOS                    | F    |

**Lane**

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| Intersection                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh78.1 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS F            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                      | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                    | 0    | 64   | 512  | 283  | 0    | 45   | 490  | 20   | 0    | 165  | 317  | 71   | 0    | 44   | 272  | 89   |
| Peak Hour Factor              | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %             | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                     | 0    | 70   | 557  | 308  | 0    | 49   | 533  | 22   | 0    | 179  | 345  | 77   | 0    | 48   | 296  | 97   |
| Number of Lanes               | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 77.7 | 78.5 | 78.5 | 78.1 |
| HCM LOS                    | F    | F    | F    | F    |


















| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 30%   | 7%    | 8%    | 11%   |
| Vol Thru, %            | 57%   | 60%   | 88%   | 67%   |
| Vol Right, %           | 13%   | 33%   | 4%    | 22%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 553   | 859   | 555   | 405   |
| LT Vol                 | 165   | 64    | 45    | 44    |
| Through Vol            | 317   | 512   | 490   | 272   |
| RT Vol                 | 71    | 283   | 20    | 89    |
| Lane Flow Rate         | 601   | 934   | 603   | 440   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 1     | 1     | 1     | 1     |
| Departure Headway (Hd) | 9.631 | 9.465 | 9.643 | 9.538 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 385   | 392   | 380   | 383   |
| Service Time           | 7.631 | 7.465 | 7.643 | 7.538 |
| HCM Lane V/C Ratio     | 1.561 | 2.383 | 1.587 | 1.149 |
| HCM Control Delay      | 78.5  | 77.7  | 78.5  | 78.1  |
| HCM Lane LOS           | F     | F     | F     | F     |
| HCM 95th-tile Q        | 11.8  | 11.9  | 11.8  | 11.9  |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

2035 No Proj AM Peak
























4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 616   | 0   | 437   | 0   | 0   | 0   | 0  | 1732  | 46  | 101   | 737   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 662   | 0   | 470   |   |   |   | 0  | 1862  | 49  | 109   | 792   | 0   |
| Adj No. of Lanes             | 2   | 0   | 2   |   |   |   | 0  | 3   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 837   | 0   | 687   |   |   |   | 0  | 2011  | 53  | 433   | 2410  | 0   |
| Arrive On Green              | 0.25  | 0.00  | 0.25  |   |   |   | 0.00   | 0.80  | 0.78  | 0.49  | 1.00  | 0.00  |
| Sat Flow, veh/h              | 3408  | 0   | 2760  |   |   |   | 0  | 5212  | 133   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 662   | 0   | 470   |   |   |   | 0  | 1238  | 673   | 109   | 792   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 0   | 1380  |   |   |   | 0  | 1679  | 1821  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 21.8  | 0.0   | 18.5  |   |   |   | 0.0  | 34.2  | 34.5  | 4.3   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        | 21.8  | 0.0   | 18.5  |   |   |   | 0.0  | 34.2  | 34.5  | 4.3   | 0.0   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.07  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 837   | 0   | 687   |   |   |   | 0  | 1338  | 726   | 433   | 2410  | 0   |
| V/C Ratio(X)                 | 0.79  | 0.00  | 0.68  |   |   |   | 0.00   | 0.93  | 0.93  | 0.25  | 0.33  | 0.00  |
| Avail Cap(c_a), veh/h        | 1164  | 0   | 952   |   |   |   | 0  | 1679  | 911   | 433   | 2410  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 0.63  | 0.63  | 0.92  | 0.92  | 0.00  |
| Uniform Delay (d), s/veh     | 42.4  | 0.0   | 40.8  |   |   |   | 0.0  | 10.8  | 10.9  | 24.0  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       | 2.6   | 0.0   | 1.2   |   |   |   | 0.0  | 8.4   | 13.9  | 0.3   | 0.3   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 10.6  | 0.0   | 7.2   |   |   |   | 0.0  | 16.3  | 18.9  | 2.1   | 0.1   | 0.0   |
| LnGrp Delay(d),s/veh         | 44.9  | 0.0   | 42.0  |   |   |   | 0.0  | 19.2  | 24.7  | 24.3  | 0.3   | 0.0   |
| LnGrp LOS                    | D   |   | D   |   |   |   |  | B   | C   | C   | A   |   |
| Approach Vol, veh/h          | 1132  |   |   |   |   |   | 1911   |   |   | 901   |   |   |
| Approach Delay, s/veh        | 43.7  |   |   |   |   |   | 21.1   |   |   | 3.2   |   |   |
| Approach LOS                 | D   |   |   |   |   |   | C  |   |   | A   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 34.7  | 51.8  |   | 33.5  |   | 86.5  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 6.8   | * 59  |   | * 41  |   | 69.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+l1), s | 6.3   | 36.5  |   | 23.8  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.2   | 10.1  |   | 5.5   |   | 4.4   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 23.5  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | C   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

























2035 No Proj AM Peak  
4/3/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 71  | 550   | 134   | 170   | 1027  | 172   | 321  | 318   | 34  | 82  | 227   | 96  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 76  | 591   | 144   | 183   | 1104  | 185   | 345  | 342   | 37  | 88  | 244   | 103   |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 3   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 426   | 2080  | 648   | 213   | 1228  | 206   | 382  | 938   | 419   | 114   | 371   | 166   |
| Arrive On Green   | 0.24  | 0.41  | 0.41  | 0.12  | 0.28  | 0.27  | 0.22   | 0.27  | 0.27  | 0.06  | 0.11  | 0.11  |
| Sat Flow, veh/h   | 1757  | 5036  | 1568  | 1757  | 4345  | 728   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 76  | 591   | 144   | 183   | 853   | 436   | 345  | 342   | 37  | 88  | 244   | 103   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1568  | 1757  | 1679  | 1715  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 4.1   | 9.4   | 3.3   | 12.3  | 29.3  | 29.4  | 22.9   | 9.5   | 2.1   | 5.9   | 8.0   | 7.5   |
| Cycle Q Clear(g_c), s   | 4.1   | 9.4   | 3.3   | 12.3  | 29.3  | 29.4  | 22.9   | 9.5   | 2.1   | 5.9   | 8.0   | 7.5   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.42  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 426   | 2080  | 648   | 213   | 948   | 485   | 382  | 938   | 419   | 114   | 371   | 166   |
| V/C Ratio(X)  | 0.18  | 0.28  | 0.22  | 0.86  | 0.90  | 0.90  | 0.90   | 0.36  | 0.09  | 0.77  | 0.66  | 0.62  |
| Avail Cap(c_a), veh/h   | 426   | 2080  | 648   | 247   | 971   | 496   | 410  | 1422  | 636   | 184   | 973   | 435   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 36.0  | 23.4  | 4.9   | 51.7  | 41.4  | 41.7  | 45.7   | 35.7  | 33.0  | 55.2  | 51.6  | 51.4  |
| Incr Delay (d2), s/veh  | 0.2   | 0.3   | 0.8   | 22.4  | 13.1  | 22.3  | 22.0   | 0.2   | 0.1   | 10.6  | 2.0   | 3.8   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.0   | 4.4   | 1.6   | 7.3   | 15.4  | 17.0  | 13.4   | 4.6   | 0.9   | 3.2   | 4.0   | 3.4   |
| LnGrp Delay(d),s/veh  | 36.2  | 23.8  | 5.7   | 74.1  | 54.5  | 64.0  | 67.7   | 35.9  | 33.1  | 65.8  | 53.6  | 55.1  |
| LnGrp LOS   | D   | C   | A   | E   | D   | E   | E  | D   | C   | E   | D   | E   |
| Approach Vol, veh/h   |   | 811   |   |   | 1472  |   |  | 724   |   |   | 435   |   |
| Approach Delay, s/veh   |   | 21.7  |   |   | 59.8  |   |  | 50.9  |   |   | 56.4  |   |
| Approach LOS  |   | C   |   |   | E   |   |  | D   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 11.8  | 36.1  | 18.6  | 53.6  | 31.2  | 16.7  | 34.2   | 37.9  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3   | * 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 12  | 47.4  | * 17  | 24.5  | 27.8  | * 32  | 7.8  | * 33  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 7.9   | 11.5  | 14.3  | 11.4  | 24.9  | 10.0  | 6.1  | 31.4  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.1   | 3.1   | 0.1   | 3.0   | 0.9   | 1.4   | 0.1  | 1.2   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 48.5  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue







2035 No Proj AM Peak  
4/3/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)  | 171   | 436   | 149   | 64  | 1121  | 557   | 238  | 988   | 27  | 436   | 410   | 111   |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 182   | 464   | 159   | 68  | 1193  | 593   | 253  | 1051  | 29  | 464   | 436   | 118   |
| Adj No. of Lanes  | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94   | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 242   | 632   | 281   | 561   | 1380  | 731   | 321  | 1155  | 516   | 624   | 1499  | 670   |
| Arrive On Green   | 0.07  | 0.18  | 0.18  | 0.05  | 0.09  | 0.09  | 0.09   | 0.33  | 0.33  | 0.06  | 0.14  | 0.14  |
| Sat Flow, veh/h   | 3408  | 3505  | 1558  | 3408  | 5036  | 1568  | 3408   | 3505  | 1567  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 182   | 464   | 159   | 68  | 1193  | 593   | 253  | 1051  | 29  | 464   | 436   | 118   |
| Grp Sat Flow(s),veh/h/ln  | 1704  | 1752  | 1558  | 1704  | 1679  | 1568  | 1704   | 1752  | 1567  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s   | 6.3   | 15.0  | 8.7   | 2.3   | 28.1  | 20.8  | 8.7  | 34.5  | 1.5   | 16.1  | 13.4  | 5.7   |
| Cycle Q Clear(g_c), s   | 6.3   | 15.0  | 8.7   | 2.3   | 28.1  | 20.8  | 8.7  | 34.5  | 1.5   | 16.1  | 13.4  | 5.7   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 242   | 632   | 281   | 561   | 1380  | 731   | 321  | 1155  | 516   | 624   | 1499  | 670   |
| V/C Ratio(X)  | 0.75  | 0.73  | 0.57  | 0.12  | 0.86  | 0.81  | 0.79   | 0.91  | 0.06  | 0.74  | 0.29  | 0.18  |
| Avail Cap(c_a), veh/h   | 258   | 1066  | 474   | 561   | 1397  | 737   | 429  | 1192  | 533   | 624   | 1499  | 670   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  | 1.00   | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 0.82  | 0.82  | 0.82  | 1.00   | 1.00  | 1.00  | 0.94  | 0.94  | 0.94  |
| Uniform Delay (d), s/veh  | 54.7  | 46.5  | 27.1  | 48.5  | 52.4  | 37.9  | 53.2   | 38.5  | 27.5  | 53.6  | 35.2  | 17.1  |
| Incr Delay (d2), s/veh  | 11.0  | 1.7   | 1.8   | 0.1   | 4.8   | 5.6   | 7.0  | 12.2  | 0.2   | 4.5   | 0.5   | 0.5   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 3.3   | 7.4   | 3.9   | 1.1   | 13.7  | 10.2  | 4.4  | 18.6  | 0.7   | 8.0   | 6.6   | 2.6   |
| LnGrp Delay(d),s/veh  | 65.7  | 48.1  | 28.9  | 48.6  | 57.2  | 43.5  | 60.2   | 50.7  | 27.7  | 58.1  | 35.7  | 17.7  |
| LnGrp LOS   | E   | D   | C   | D   | E   | D   | E  | D   | C   | E   | D   | B   |
| Approach Vol, veh/h   |   | 805   |   |   | 1854  |   |  | 1333  |   |   | 1018  |   |
| Approach Delay, s/veh   |   | 48.3  |   |   | 52.5  |   |  | 52.0  |   |   | 43.8  |   |
| Approach LOS  |   | D   |   |   | D   |   |  | D   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 27.1  | 43.5  | 23.8  | 25.6  | 15.3  | 55.3  | 12.5   | 36.9  |   |   |   |   |
| Change Period (Y+Rc), s   | 5.3   | * 5.7   | 4.2   | * 5.3   | * 4.2   | 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | 20.6  | * 39  | 5.7   | * 35  | * 15  | 45.2  | 8.9  | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 18.1  | 36.5  | 4.3   | 17.0  | 10.7  | 15.4  | 8.3  | 30.1  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.6   | 1.4   | 0.1   | 2.5   | 0.4   | 4.8   | 0.0  | 1.5   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 49.9  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary













## 13: Locan Avenue & Herndon Avenue

2035 No Proj AM Peak  
4/3/2017

|                              |   |   |   |   |   |   |   |      |
|------------------------------|---|---|---|---|---|---|---|------|
|                              |  |  |  |  |  |  |   |      |
| Movement                     | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |   |      |
| Lane Configurations          | ↑↑  | ↑   | ↑   | ↑↑  | ↑   | ↑   |   |      |
| Volume (veh/h)               | 555   | 159   | 66  | 931   | 682   | 65  |   |      |
| Number                       | 2   | 12  | 1   | 6   | 3   | 18  |   |      |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   |   |      |
| Ped-Bike Adj(A_pbT)          |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |      |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |      |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |   |      |
| Adj Flow Rate, veh/h         | 597   | 171   | 71  | 1001  | 733   | 70  |   |      |
| Adj No. of Lanes             | 2   | 1   | 1   | 2   | 1   | 1   |   |      |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |   |      |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   |   |      |
| Cap, veh/h                   | 1403  | 625   | 93  | 1726  | 791   | 689   |   |      |
| Arrive On Green              | 0.40  | 0.40  | 0.11  | 0.98  | 0.45  | 0.44  |   |      |
| Sat Flow, veh/h              | 3597  | 1562  | 1757  | 3597  | 1757  | 1568  |   |      |
| Grp Volume(v), veh/h         | 597   | 171   | 71  | 1001  | 733   | 70  |   |      |
| Grp Sat Flow(s),veh/h/ln     | 1752  | 1562  | 1757  | 1752  | 1757  | 1568  |   |      |
| Q Serve(g_s), s              | 14.8  | 8.8   | 4.7   | 1.2   | 47.2  | 3.1   |   |      |
| Cycle Q Clear(g_c), s        | 14.8  | 8.8   | 4.7   | 1.2   | 47.2  | 3.1   |   |      |
| Prop In Lane                 |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |      |
| Lane Grp Cap(c), veh/h       | 1403  | 625   | 93  | 1726  | 791   | 689   |   |      |
| V/C Ratio(X)                 | 0.43  | 0.27  | 0.77  | 0.58  | 0.93  | 0.10  |   |      |
| Avail Cap(c_a), veh/h        | 1403  | 625   | 161   | 1726  | 997   | 873   |   |      |
| HCM Platoon Ratio            | 1.00  | 1.00  | 2.00  | 2.00  | 1.00  | 1.00  |   |      |
| Upstream Filter(I)           | 1.00  | 1.00  | 0.90  | 0.90  | 0.43  | 0.43  |   |      |
| Uniform Delay (d), s/veh     | 26.0  | 24.2  | 52.9  | 0.5   | 31.1  | 19.7  |   |      |
| Incr Delay (d2), s/veh       | 0.9   | 1.1   | 11.2  | 1.3   | 6.1   | 0.0   |   |      |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |      |
| %ile BackOfQ(50%),veh/ln     | 7.3   | 4.0   | 2.6   | 0.6   | 24.1  | 1.4   |   |      |
| LnGrp Delay(d),s/veh         | 26.9  | 25.3  | 64.2  | 1.8   | 37.2  | 19.8  |   |      |
| LnGrp LOS                    | C   | C   | E   | A   | D   | B   |   |      |
| Approach Vol, veh/h          | 768   |   |   | 1072  | 803   |   |   |      |
| Approach Delay, s/veh        | 26.6  |   |   | 5.9   | 35.7  |   |   |      |
| Approach LOS                 | C   |   |   | A   | D   |   |   |      |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7 | 8    |
| Assigned Phs                 | 1   | 2   |   |   |   | 6   |   | 8    |
| Phs Duration (G+Y+Rc), s     | 10.3  | 52.7  |   |   |   | 63.1  |   | 56.9 |
| Change Period (Y+Rc), s      | * 4.2   | * 6   |   |   |   | 6.0   |   | 4.2  |
| Max Green Setting (Gmax), s  | * 11  | * 30  |   |   |   | 43.0  |   | 66.8 |
| Max Q Clear Time (g_c+I1), s | 6.7   | 16.8  |   |   |   | 3.2   |   | 49.2 |
| Green Ext Time (p_c), s      | 0.0   | 6.7   |   |   |   | 10.3  |   | 3.5  |
| Intersection Summary         |   |   |   |   |   |   |   |      |
| HCM 2010 Ctrl Delay          |   |   | 21.0  |   |   |   |   |      |
| HCM 2010 LOS                 |   |   | C   |   |   |   |   |      |
| Notes                        |   |   |   |   |   |   |   |      |

HCM 2010 Signalized Intersection Summary  
14: Herndon Avenue & De Wolf Avenue (NL)

2035 No Proj AM Peak  
4/3/2017













|   |  |  |  |  |  |  |   |   |
|---|---|---|---|---|---|---|---|---|
| Movement  | EBL   | EBT   | WBT   | WBR   | SBL   | SBR   |   |   |
| Lane Configurations   |  |  |  |  |  |  |   |   |
| Volume (veh/h)  | 75  | 535   | 927   | 44  | 17  | 70  |   |   |
| Number  | 5   | 2   | 6   | 16  | 7   | 14  |   |   |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   |   |   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   |   | 1.00  | 1.00  | 1.00  |   |   |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |   |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |   |   |
| Adj Flow Rate, veh/h  | 80  | 569   | 986   | 47  | 18  | 74  |   |   |
| Adj No. of Lanes  | 1   | 2   | 2   | 1   | 1   | 1   |   |   |
| Peak Hour Factor  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |   |   |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   |   |   |
| Cap, veh/h  | 106   | 2795  | 2350  | 997   | 142   | 103   |   |   |
| Arrive On Green   | 0.12  | 1.00  | 1.00  | 1.00  | 0.08  | 0.07  |   |   |
| Sat Flow, veh/h   | 1757  | 3597  | 3597  | 1564  | 1757  | 1568  |   |   |
| Grp Volume(v), veh/h  | 80  | 569   | 986   | 47  | 18  | 74  |   |   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1752  | 1752  | 1564  | 1757  | 1568  |   |   |
| Q Serve(g_s), s   | 2.6   | 0.0   | 0.0   | 0.0   | 0.6   | 2.8   |   |   |
| Cycle Q Clear(g_c), s   | 2.6   | 0.0   | 0.0   | 0.0   | 0.6   | 2.8   |   |   |
| Prop In Lane  | 1.00  |   |   | 1.00  | 1.00  | 1.00  |   |   |
| Lane Grp Cap(c), veh/h  | 106   | 2795  | 2350  | 997   | 142   | 103   |   |   |
| V/C Ratio(X)  | 0.75  | 0.20  | 0.42  | 0.05  | 0.13  | 0.72  |   |   |
| Avail Cap(c_a), veh/h   | 141   | 2795  | 2350  | 997   | 700   | 601   |   |   |
| HCM Platoon Ratio   | 2.00  | 2.00  | 2.00  | 2.00  | 1.00  | 1.00  |   |   |
| Upstream Filter(I)  | 0.90  | 0.90  | 0.65  | 0.65  | 1.00  | 1.00  |   |   |
| Uniform Delay (d), s/veh  | 26.0  | 0.0   | 0.0   | 0.0   | 25.6  | 27.5  |   |   |
| Incr Delay (d2), s/veh  | 13.6  | 0.1   | 0.4   | 0.1   | 0.4   | 8.9   |   |   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |   |
| %ile BackOfQ(50%),veh/ln  | 1.6   | 0.1   | 0.1   | 0.8   | 0.3   | 2.6   |   |   |
| LnGrp Delay(d),s/veh  | 39.5  | 0.1   | 0.4   | 0.1   | 26.0  | 36.4  |   |   |
| LnGrp LOS   | D   | A   | A   | A   | C   | D   |   |   |
| Approach Vol, veh/h   |   | 649   | 1033  |   | 92  |   |   |   |
| Approach Delay, s/veh   |   | 5.0   | 0.3   |   | 34.4  |   |   |   |
| Approach LOS  |   | A   | A   |   | C   |   |   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7 | 8 |
| Assigned Phs  |   | 2   |   | 4   | 5   | 6   |   |   |
| Phs Duration (G+Y+Rc), s  |   | 51.9  |   | 8.1   | 7.6   | 44.2  |   |   |
| Change Period (Y+Rc), s   |   | 6.0   |   | * 4.2   | * 4.2   | 6.0   |   |   |
| Max Green Setting (Gmax), s   |   | 26.8  |   | * 23  | * 4.6   | 18.0  |   |   |
| Max Q Clear Time (g_c+I1), s  |   | 2.0   |   | 4.8   | 4.6   | 2.0   |   |   |
| Green Ext Time (p_c), s   |   | 7.9   |   | 0.3   | 0.0   | 6.7   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 3.8   |   |   |   |   |   |
| HCM 2010 LOS  |   |   | A   |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |   |   |



# HCM Signalized Intersection Capacity Analysis

## 15: De Wolf Ave & Herndon Avenue











2035 No Proj AM Peak  
4/3/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |  |
| Volume (vph)                      | 363   | 179   | 5   | 615   | 340   | 12  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 6.0   | 6.0   | 4.2   | 6.0   | 4.2   |   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |
| Frt                               | 1.00  | 0.85  | 1.00  | 1.00  | 1.00  |   |
| Flt Protected                     | 1.00  | 1.00  | 0.95  | 1.00  | 0.95  |   |
| Satd. Flow (prot)                 | 1845  | 1568  | 1752  | 1845  | 1752  |   |
| Flt Permitted                     | 1.00  | 1.00  | 0.95  | 1.00  | 0.95  |   |
| Satd. Flow (perm)                 | 1845  | 1568  | 1752  | 1845  | 1752  |   |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 395   | 195   | 5   | 668   | 370   | 13  |
| RTOR Reduction (vph)              | 0   | 104   | 0   | 0   | 2   | 0   |
| Lane Group Flow (vph)             | 395   | 91  | 5   | 668   | 381   | 0   |
| Turn Type                         | NA  | Perm  | Prot  | NA  | Prot  |   |
| Protected Phases                  | 2   |   | 1   | 6   | 3   |   |
| Permitted Phases                  |   | 2   |   |   |   |   |
| Actuated Green, G (s)             | 28.1  | 28.1  | 0.8   | 33.1  | 16.7  |   |
| Effective Green, g (s)            | 28.1  | 28.1  | 0.8   | 33.1  | 16.7  |   |
| Actuated g/C Ratio                | 0.47  | 0.47  | 0.01  | 0.55  | 0.28  |   |
| Clearance Time (s)                | 6.0   | 6.0   | 4.2   | 6.0   | 4.2   |   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)                | 864   | 734   | 23  | 1017  | 487   |   |
| v/s Ratio Prot                    | 0.21  |   | 0.00  | c0.36   | c0.22   |   |
| v/s Ratio Perm                    |   | 0.06  |   |   |   |   |
| v/c Ratio                         | 0.46  | 0.12  | 0.22  | 0.66  | 0.78  |   |
| Uniform Delay, d1                 | 10.8  | 9.0   | 29.3  | 9.5   | 20.0  |   |
| Progression Factor                | 1.79  | 4.46  | 1.09  | 1.13  | 1.00  |   |
| Incremental Delay, d2             | 1.7   | 0.3   | 4.1   | 2.9   | 8.0   |   |
| Delay (s)                         | 21.0  | 40.5  | 36.0  | 13.6  | 28.0  |   |
| Level of Service                  | C   | D   | D   | B   | C   |   |
| Approach Delay (s)                | 27.5  |   |   | 13.8  | 28.0  |   |
| Approach LOS                      | C   |   |   | B   | C   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 22.0  |   | HCM 2000 Level of Service   | C   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.76  |   |   |   |
| Actuated Cycle Length (s)         |   |   | 60.0  |   | Sum of lost time (s)  | 14.4  |
| Intersection Capacity Utilization |   |   | 60.4%   |   | ICU Level of Service  | B   |
| Analysis Period (min)             |   |   | 15  |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis





















## 16: Leonard Ave & Herndon Avenue

2035 No Proj AM Peak  
4/3/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |   |  |  |  |   |
| Volume (vph)                      | 346   | 9   | 1   | 488   | 241   | 36  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.5   |   | 4.2   | 6.0   | 4.2   |   |
| Lane Util. Factor                 | 1.00  |   | 1.00  | 1.00  | 1.00  |   |
| Frt                               | 1.00  |   | 1.00  | 1.00  | 0.98  |   |
| Flt Protected                     | 1.00  |   | 0.95  | 1.00  | 0.96  |   |
| Satd. Flow (prot)                 | 1838  |   | 1752  | 1845  | 1737  |   |
| Flt Permitted                     | 1.00  |   | 0.95  | 1.00  | 0.96  |   |
| Satd. Flow (perm)                 | 1838  |   | 1752  | 1845  | 1737  |   |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 376   | 10  | 1   | 530   | 262   | 39  |
| RTOR Reduction (vph)              | 1   | 0   | 0   | 0   | 10  | 0   |
| Lane Group Flow (vph)             | 385   | 0   | 1   | 530   | 291   | 0   |
| Turn Type                         | NA  |   | Prot  | NA  | Prot  |   |
| Protected Phases                  | 2   |   | 1   | 6   | 3   |   |
| Permitted Phases                  |   |   |   |   |   |   |
| Actuated Green, G (s)             | 31.5  |   | 0.8   | 35.0  | 14.8  |   |
| Effective Green, g (s)            | 31.5  |   | 0.8   | 35.0  | 14.8  |   |
| Actuated g/C Ratio                | 0.52  |   | 0.01  | 0.58  | 0.25  |   |
| Clearance Time (s)                | 4.5   |   | 4.2   | 6.0   | 4.2   |   |
| Vehicle Extension (s)             | 3.0   |   | 3.0   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)                | 964   |   | 23  | 1076  | 428   |   |
| v/s Ratio Prot                    | 0.21  |   | 0.00  | c0.29   | c0.17   |   |
| v/s Ratio Perm                    |   |   |   |   |   |   |
| v/c Ratio                         | 0.40  |   | 0.04  | 0.49  | 0.68  |   |
| Uniform Delay, d1                 | 8.6   |   | 29.2  | 7.3   | 20.5  |   |
| Progression Factor                | 1.94  |   | 0.92  | 1.41  | 1.00  |   |
| Incremental Delay, d2             | 1.1   |   | 0.7   | 1.4   | 4.4   |   |
| Delay (s)                         | 17.7  |   | 27.7  | 11.7  | 24.9  |   |
| Level of Service                  | B   |   | C   | B   | C   |   |
| Approach Delay (s)                | 17.7  |   |   | 11.8  | 24.9  |   |
| Approach LOS                      | B   |   |   | B   | C   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 16.9  |   | HCM 2000 Level of Service   | B   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.58  |   |   |   |
| Actuated Cycle Length (s)         |   |   | 60.0  |   | Sum of lost time (s)  | 12.9  |
| Intersection Capacity Utilization |   |   | 49.7%   |   | ICU Level of Service  | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |

HCM 2010 Signalized Intersection Summary  
17: McCall Ave & Herndon Avenue

2035 No Proj AM Peak  
4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |      |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|------|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |      |
| Lane Configurations          |  |  |   |  |  |   |  |  |   |  |  |   |      |
| Volume (veh/h)               | 22  | 113   | 81  | 32  | 355   | 20  | 238  | 101   | 19  | 24  | 182   | 36  |      |
| Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |      |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |      |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |      |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |      |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1900  | 1845  | 1845  | 1900  | 1845   | 1845  | 1900  | 1845  | 1845  | 1900  |      |
| Adj Flow Rate, veh/h         | 24  | 116   | 84  | 33  | 366   | 22  | 245  | 110   | 20  | 26  | 198   | 39  |      |
| Adj No. of Lanes             | 1   | 1   | 0   | 1   | 1   | 0   | 1  | 1   | 0   | 1   | 1   | 0   |      |
| Peak Hour Factor             | 0.92  | 0.97  | 0.97  | 0.97  | 0.97  | 0.92  | 0.97   | 0.92  | 0.97  | 0.92  | 0.92  | 0.92  |      |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |      |
| Cap, veh/h                   | 59  | 486   | 352   | 62  | 844   | 51  | 276  | 424   | 77  | 59  | 233   | 46  |      |
| Arrive On Green              | 0.03  | 0.49  | 0.49  | 0.04  | 0.49  | 0.49  | 0.16   | 0.28  | 0.28  | 0.03  | 0.16  | 0.16  |      |
| Sat Flow, veh/h              | 1757  | 996   | 721   | 1757  | 1723  | 104   | 1757   | 1520  | 276   | 1757  | 1498  | 295   |      |
| Grp Volume(v), veh/h         | 24  | 0   | 200   | 33  | 0   | 388   | 245  | 0   | 130   | 26  | 0   | 237   |      |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1717  | 1757  | 0   | 1826  | 1757   | 0   | 1796  | 1757  | 0   | 1793  |      |
| Q Serve(g_s), s              | 1.6   | 0.0   | 8.1   | 2.2   | 0.0   | 16.5  | 16.4   | 0.0   | 6.7   | 1.7   | 0.0   | 15.4  |      |
| Cycle Q Clear(g_c), s        | 1.6   | 0.0   | 8.1   | 2.2   | 0.0   | 16.5  | 16.4   | 0.0   | 6.7   | 1.7   | 0.0   | 15.4  |      |
| Prop In Lane                 | 1.00  |   | 0.42  | 1.00  |   | 0.06  | 1.00   |   | 0.15  | 1.00  |   | 0.16  |      |
| Lane Grp Cap(c), veh/h       | 59  | 0   | 838   | 62  | 0   | 895   | 276  | 0   | 501   | 59  | 0   | 278   |      |
| V/C Ratio(X)                 | 0.41  | 0.00  | 0.24  | 0.53  | 0.00  | 0.43  | 0.89   | 0.00  | 0.26  | 0.44  | 0.00  | 0.85  |      |
| Avail Cap(c_a), veh/h        | 91  | 0   | 838   | 100   | 0   | 895   | 422  | 0   | 720   | 94  | 0   | 384   |      |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |      |
| Upstream Filter(I)           | 0.94  | 0.00  | 0.94  | 1.00  | 0.00  | 1.00  | 1.00   | 0.00  | 1.00  | 1.00  | 0.00  | 1.00  |      |
| Uniform Delay (d), s/veh     | 56.8  | 0.0   | 17.8  | 56.9  | 0.0   | 19.8  | 49.5   | 0.0   | 33.6  | 56.9  | 0.0   | 49.3  |      |
| Incr Delay (d2), s/veh       | 4.3   | 0.0   | 0.6   | 7.0   | 0.0   | 1.5   | 13.8   | 0.0   | 0.3   | 5.2   | 0.0   | 12.5  |      |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |      |
| %ile BackOfQ(50%),veh/ln     | 0.8   | 0.0   | 4.0   | 1.2   | 0.0   | 8.7   | 9.0  | 0.0   | 3.4   | 0.9   | 0.0   | 8.6   |      |
| LnGrp Delay(d),s/veh         | 61.1  | 0.0   | 18.4  | 63.9  | 0.0   | 21.3  | 63.3   | 0.0   | 33.9  | 62.1  | 0.0   | 61.8  |      |
| LnGrp LOS                    | E   |   | B   | E   |   | C   | E  |   | C   | E   |   | E   |      |
| Approach Vol, veh/h          | 224   |   |   |   | 421   |   |  |   | 375   |   |   |   | 263  |
| Approach Delay, s/veh        | 23.0  |   |   |   | 24.7  |   |  |   | 53.1  |   |   |   | 61.8 |
| Approach LOS                 | C   |   |   |   | C   |   |  |   | D   |   |   |   | E    |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |      |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |      |
| Phs Duration (G+Y+Rc), s     | 8.4   | 64.6  | 23.1  | 23.9  | 8.2   | 64.8  | 8.2  | 38.8  |   |   |   |   |      |
| Change Period (Y+Rc), s      | * 4.2   | 6.0   | * 4.2   | 5.3   | * 4.2   | 6.0   | * 4.2  | 5.3   |   |   |   |   |      |
| Max Green Setting (Gmax), s  | * 6.8   | 39.0  | * 29  | 25.7  | * 6.2   | 39.6  | * 6.4  | 48.1  |   |   |   |   |      |
| Max Q Clear Time (g_c+I1), s | 4.2   | 10.1  | 18.4  | 17.4  | 3.6   | 18.5  | 3.7  | 8.7   |   |   |   |   |      |
| Green Ext Time (p_c), s      | 0.0   | 3.2   | 0.5   | 1.2   | 0.0   | 3.0   | 0.0  | 2.1   |   |   |   |   |      |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |      |
| HCM 2010 Ctrl Delay          |   |   | 40.3  |   |   |   |  |   |   |   |   |   |      |
| HCM 2010 LOS                 |   |   | D   |   |   |   |  |   |   |   |   |   |      |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |      |
























| Intersection                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh10.9 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS B            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                      | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                    | 0    | 1    | 5    | 153  | 0    | 24   | 17   | 1    | 0    | 176  | 177  | 8    | 0    | 1    | 196  | 4    |
| Peak Hour Factor              | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %             | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                     | 0    | 1    | 5    | 166  | 0    | 26   | 18   | 1    | 0    | 191  | 192  | 9    | 0    | 1    | 213  | 4    |
| Number of Lanes               | 0    | 0    | 1    | 1    | 0    | 0    | 1    | 0    | 0    | 1    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 2    | 1    | 2    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 2    | 2    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 2    | 1    | 1    | 2    |
| HCM Control Delay          | 10.2 | 10.2 | 10.9 | 11.7 |
| HCM LOS                    | B    | B    | B    | B    |

| Lane                   | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 17%   | 0%    | 57%   | 0%    |
| Vol Thru, %            | 0%    | 96%   | 83%   | 0%    | 40%   | 98%   |
| Vol Right, %           | 0%    | 4%    | 0%    | 100%  | 2%    | 2%    |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 176   | 185   | 6     | 153   | 42    | 201   |
| LT Vol                 | 176   | 0     | 1     | 0     | 24    | 1     |
| Through Vol            | 0     | 177   | 5     | 0     | 17    | 196   |
| RT Vol                 | 0     | 8     | 0     | 153   | 1     | 4     |
| Lane Flow Rate         | 191   | 201   | 7     | 166   | 46    | 218   |
| Geometry Grp           | 7     | 7     | 7     | 7     | 6     | 6     |
| Degree of Util (X)     | 0.313 | 0.299 | 0.011 | 0.256 | 0.083 | 0.347 |
| Departure Headway (Hd) | 5.997 | 5.462 | 6.344 | 5.55  | 6.582 | 5.717 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 603   | 662   | 567   | 650   | 546   | 631   |
| Service Time           | 3.697 | 3.162 | 4.055 | 3.261 | 4.599 | 3.728 |
| HCM Lane V/C Ratio     | 0.317 | 0.304 | 0.012 | 0.255 | 0.084 | 0.345 |
| HCM Control Delay      | 11.4  | 10.5  | 9.1   | 10.2  | 10.2  | 11.7  |
| HCM Lane LOS           | B     | B     | A     | B     | B     | B     |
| HCM 95th-tile Q        | 1.3   | 1.3   | 0     | 1     | 0.3   | 1.5   |























HCM 2010 Signalized Intersection Summary  
20: Locan Avenue & Bullard Ave

2035 No Proj AM Peak  
4/6/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 59  | 231   | 63  | 18  | 726   | 162   | 102  | 308   | 6   | 257   | 335   | 103   |
| Number  | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h  | 64  | 251   | 68  | 20  | 789   | 176   | 111  | 335   | 7   | 279   | 364   | 112   |
| Adj No. of Lanes  | 1   | 2   | 1   | 1   | 2   | 0   | 1  | 1   | 1   | 1   | 1   | 0   |
| Peak Hour Factor  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 127   | 1328  | 594   | 31  | 866   | 193   | 140  | 381   | 324   | 313   | 397   | 122   |
| Arrive On Green   | 0.07  | 0.38  | 0.38  | 0.02  | 0.30  | 0.30  | 0.08   | 0.21  | 0.21  | 0.18  | 0.29  | 0.29  |
| Sat Flow, veh/h   | 1757  | 3505  | 1568  | 1757  | 2849  | 636   | 1757   | 1845  | 1568  | 1757  | 1354  | 417   |
| Grp Volume(v), veh/h  | 64  | 251   | 68  | 20  | 485   | 480   | 111  | 335   | 7   | 279   | 0   | 476   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1752  | 1568  | 1757  | 1752  | 1732  | 1757   | 1845  | 1568  | 1757  | 0   | 1771  |
| Q Serve(g_s), s   | 3.2   | 4.3   | 1.7   | 1.0   | 24.0  | 24.0  | 5.6  | 15.8  | 0.3   | 14.0  | 0.0   | 23.4  |
| Cycle Q Clear(g_c), s   | 3.2   | 4.3   | 1.7   | 1.0   | 24.0  | 24.0  | 5.6  | 15.8  | 0.3   | 14.0  | 0.0   | 23.4  |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.37  | 1.00   |   | 1.00  | 1.00  |   | 0.24  |
| Lane Grp Cap(c), veh/h  | 127   | 1328  | 594   | 31  | 533   | 527   | 140  | 381   | 324   | 313   | 0   | 519   |
| V/C Ratio(X)  | 0.50  | 0.19  | 0.11  | 0.65  | 0.91  | 0.91  | 0.79   | 0.88  | 0.02  | 0.89  | 0.00  | 0.92  |
| Avail Cap(c_a), veh/h   | 127   | 1328  | 594   | 107   | 557   | 551   | 152  | 412   | 350   | 328   | 0   | 573   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 0.95  | 0.00  | 0.95  |
| Uniform Delay (d), s/veh  | 40.2  | 18.7  | 8.1   | 43.9  | 30.2  | 30.2  | 40.7   | 34.6  | 28.5  | 36.1  | 0.0   | 30.8  |
| Incr Delay (d2), s/veh  | 3.1   | 0.3   | 0.4   | 20.8  | 22.3  | 22.4  | 22.9   | 18.2  | 0.0   | 23.3  | 0.0   | 18.2  |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 1.6   | 2.1   | 0.8   | 0.7   | 14.9  | 14.7  | 3.6  | 10.0  | 0.1   | 8.8   | 0.0   | 14.0  |
| LnGrp Delay(d),s/veh  | 43.3  | 19.0  | 8.5   | 64.8  | 52.4  | 52.6  | 63.6   | 52.8  | 28.5  | 59.5  | 0.0   | 48.9  |
| LnGrp LOS   | D   | B   | A   | E   | D   | D   | E  | D   | C   | E   |   | D   |
| Approach Vol, veh/h   |   | 383   |   |   | 985   |   |  | 453   |   |   | 755   |   |
| Approach Delay, s/veh   |   | 21.2  |   |   | 52.8  |   |  | 55.1  |   |   | 52.8  |   |
| Approach LOS  |   | C   |   |   | D   |   |  | E   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 5.8   | 40.1  | 12.5  | 31.7  | 12.5  | 33.4  | 20.2   | 23.9  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 6.0   | 5.3   | * 5.3   | 6.0   | * 6   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 5.5   | 27.9  | 7.8   | * 29  | 4.8   | * 29  | * 17   | 20.1  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 3.0   | 6.3   | 7.6   | 25.4  | 5.2   | 26.0  | 16.0   | 17.8  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 1.6   | 0.1   | 1.0   | 0.0   | 1.4   | 0.1  | 0.5   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 48.5  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

HCM 2010 Signalized Intersection Summary  
21: De Wolf Ave & Bullard Ave























2035 No Proj AM Peak  
4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |   |  |  |   |  |  |  |
| Volume (veh/h)               | 77  | 191   | 319   | 26  | 560   | 72  | 149  | 537   | 6   | 25  | 119   | 64  |
| Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1900  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h         | 84  | 208   | 347   | 28  | 609   | 78  | 162  | 584   | 7   | 27  | 129   | 70  |
| Adj No. of Lanes             | 1   | 1   | 1   | 1   | 1   | 0   | 1  | 1   | 0   | 1   | 1   | 0   |
| Peak Hour Factor             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 105   | 831   | 706   | 38  | 660   | 85  | 195  | 577   | 7   | 37  | 255   | 139   |
| Arrive On Green              | 0.06  | 0.45  | 0.45  | 0.02  | 0.41  | 0.41  | 0.11   | 0.32  | 0.32  | 0.02  | 0.23  | 0.23  |
| Sat Flow, veh/h              | 1757  | 1845  | 1568  | 1757  | 1603  | 205   | 1757   | 1819  | 22  | 1757  | 1126  | 611   |
| Grp Volume(v), veh/h         | 84  | 208   | 347   | 28  | 0   | 687   | 162  | 0   | 591   | 27  | 0   | 199   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1845  | 1568  | 1757  | 0   | 1808  | 1757   | 0   | 1841  | 1757  | 0   | 1737  |
| Q Serve(g_s), s              | 4.7   | 7.0   | 15.6  | 1.6   | 0.0   | 36.0  | 9.0  | 0.0   | 31.7  | 1.5   | 0.0   | 10.0  |
| Cycle Q Clear(g_c), s        | 4.7   | 7.0   | 15.6  | 1.6   | 0.0   | 36.0  | 9.0  | 0.0   | 31.7  | 1.5   | 0.0   | 10.0  |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 0.11  | 1.00   |   | 0.01  | 1.00  |   | 0.35  |
| Lane Grp Cap(c), veh/h       | 105   | 831   | 706   | 38  | 0   | 745   | 195  | 0   | 584   | 37  | 0   | 394   |
| V/C Ratio(X)                 | 0.80  | 0.25  | 0.49  | 0.74  | 0.00  | 0.92  | 0.83   | 0.00  | 1.01  | 0.73  | 0.00  | 0.51  |
| Avail Cap(c_a), veh/h        | 105   | 831   | 706   | 107   | 0   | 745   | 241  | 0   | 584   | 72  | 0   | 394   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 0.00  | 1.00  | 1.00   | 0.00  | 1.00  | 0.99  | 0.00  | 0.99  |
| Uniform Delay (d), s/veh     | 46.4  | 17.0  | 19.4  | 48.6  | 0.0   | 27.9  | 43.5   | 0.0   | 34.2  | 48.7  | 0.0   | 33.8  |
| Incr Delay (d2), s/veh       | 33.4  | 0.7   | 2.4   | 23.9  | 0.0   | 18.7  | 17.7   | 0.0   | 40.5  | 23.3  | 0.0   | 1.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.3   | 3.7   | 7.2   | 1.0   | 0.0   | 21.8  | 5.3  | 0.0   | 22.6  | 1.0   | 0.0   | 4.9   |
| LnGrp Delay(d),s/veh         | 79.8  | 17.8  | 21.8  | 72.5  | 0.0   | 46.6  | 61.2   | 0.0   | 74.6  | 71.9  | 0.0   | 34.8  |
| LnGrp LOS                    | E   | B   | C   | E   |   | D   | E  |   | F   | E   |   | C   |
| Approach Vol, veh/h          | 639   |   |   |   | 715   |   |  | 753   |   |   | 226   |   |
| Approach Delay, s/veh        | 28.1  |   |   |   | 47.6  |   |  | 71.7  |   |   | 39.2  |   |
| Approach LOS                 | C   |   |   |   | D   |   |  | E   |   |   | D   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 6.4   | 50.3  | 15.3  | 28.0  | 10.2  | 46.5  | 6.3  | 37.0  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 6.1   | 39.1  | * 14  | 22.1  | * 6   | 39.2  | * 4.1  | 31.7  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 3.6   | 17.6  | 11.0  | 12.0  | 6.7   | 38.0  | 3.5  | 33.7  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 6.5   | 0.1   | 3.3   | 0.0   | 0.8   | 0.0  | 0.0   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 49.2  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

2035 No Proj PM Peak  
4/3/2017
























|                              |    |  |    |  |  |  |  |    |  |  |    |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |   |   |   |   |   |   |  |    |   |  |   |   |
| Volume (veh/h)               | 545   | 0   | 763   | 0   | 0   | 0   | 0  | 1090  | 192   | 76  | 954   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 556   | 0   | 779   |   |   |   | 0  | 1112  | 196   | 78  | 973   | 0   |
| Adj No. of Lanes             | 2   | 0   | 2   |   |   |   | 0  | 3   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 1080  | 0   | 884   |   |   |   | 0  | 1348  | 238   | 459   | 2160  | 0   |
| Arrive On Green              | 0.32  | 0.00  | 0.32  |   |   |   | 0.00   | 0.42  | 0.40  | 0.52  | 1.00  | 0.00  |
| Sat Flow, veh/h              | 3408  | 0   | 2760  |   |   |   | 0  | 4475  | 759   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 556   | 0   | 779   |   |   |   | 0  | 866   | 442   | 78  | 973   | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 0   | 1380  |   |   |   | 0  | 1679  | 1711  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 16.0  | 0.0   | 32.1  |   |   |   | 0.0  | 27.5  | 27.6  | 2.8   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        | 16.0  | 0.0   | 32.1  |   |   |   | 0.0  | 27.5  | 27.6  | 2.8   | 0.0   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.44  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 1080  | 0   | 884   |   |   |   | 0  | 1050  | 535   | 459   | 2160  | 0   |
| V/C Ratio(X)                 | 0.51  | 0.00  | 0.88  |   |   |   | 0.00   | 0.82  | 0.83  | 0.17  | 0.45  | 0.00  |
| Avail Cap(c_a), veh/h        | 1164  | 0   | 952   |   |   |   | 0  | 1679  | 855   | 459   | 2160  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.33  | 1.33  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 0.88  | 0.88  | 0.93  | 0.93  | 0.00  |
| Uniform Delay (d), s/veh     | 33.5  | 0.0   | 38.6  |   |   |   | 0.0  | 32.1  | 32.5  | 21.9  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       | 0.4   | 0.0   | 9.2   |   |   |   | 0.0  | 6.5   | 12.1  | 0.2   | 0.6   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 7.5   | 0.0   | 13.4  |   |   |   | 0.0  | 13.6  | 14.8  | 1.4   | 0.2   | 0.0   |
| LnGrp Delay(d),s/veh         | 33.8  | 0.0   | 47.9  |   |   |   | 0.0  | 38.6  | 44.6  | 22.0  | 0.6   | 0.0   |
| LnGrp LOS                    | C   |   | D   |   |   |   |  | D   | D   | C   | A   |   |
| Approach Vol, veh/h          | 1335  |   |   |   |   |   | 1308   |   |   | 1051  |   |   |
| Approach Delay, s/veh        | 42.0  |   |   |   |   |   | 40.7   |   |   | 2.2   |   |   |
| Approach LOS                 | D   |   |   |   |   |   | D  |   |   | A   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 36.4  | 41.5  |   | 42.0  |   | 78.0  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 6.8   | * 59  |   | * 41  |   | 69.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 4.8   | 29.6  |   | 34.1  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 1.0   | 6.6   |   | 3.7   |   | 5.5   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 30.2  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | C   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

2035 No Proj PM Peak

4/3/2017

























|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)               | 66  | 984   | 235   | 120   | 818   | 364   | 184  | 497   | 52  | 118   | 286   | 88  |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 69  | 1036  | 247   | 126   | 861   | 383   | 194  | 523   | 55  | 124   | 301   | 93  |
| Adj No. of Lanes             | 1   | 3   | 1   | 1   | 3   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor             | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95   | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 514   | 2491  | 775   | 156   | 963   | 427   | 266  | 688   | 308   | 153   | 430   | 192   |
| Arrive On Green              | 0.29  | 0.49  | 0.49  | 0.09  | 0.28  | 0.27  | 0.15   | 0.20  | 0.20  | 0.09  | 0.12  | 0.12  |
| Sat Flow, veh/h              | 1757  | 5036  | 1568  | 1757  | 3417  | 1515  | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 69  | 1036  | 247   | 126   | 846   | 398   | 194  | 523   | 55  | 124   | 301   | 93  |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1679  | 1568  | 1757  | 1679  | 1575  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s              | 3.5   | 15.7  | 5.8   | 8.4   | 29.0  | 29.2  | 12.6   | 16.9  | 3.5   | 8.3   | 9.9   | 6.6   |
| Cycle Q Clear(g_c), s        | 3.5   | 15.7  | 5.8   | 8.4   | 29.0  | 29.2  | 12.6   | 16.9  | 3.5   | 8.3   | 9.9   | 6.6   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 0.96  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 514   | 2491  | 775   | 156   | 946   | 444   | 266  | 688   | 308   | 153   | 430   | 192   |
| V/C Ratio(X)                 | 0.13  | 0.42  | 0.32  | 0.81  | 0.89  | 0.90  | 0.73   | 0.76  | 0.18  | 0.81  | 0.70  | 0.48  |
| Avail Cap(c_a), veh/h        | 514   | 2491  | 775   | 247   | 971   | 456   | 410  | 1422  | 636   | 184   | 973   | 435   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh     | 31.3  | 19.3  | 4.7   | 53.7  | 41.4  | 42.0  | 48.6   | 45.5  | 40.2  | 53.8  | 50.5  | 49.1  |
| Incr Delay (d2), s/veh       | 0.1   | 0.5   | 1.1   | 10.0  | 12.7  | 23.5  | 3.8  | 1.8   | 0.3   | 20.1  | 2.1   | 1.9   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 1.7   | 7.4   | 2.7   | 4.5   | 15.1  | 15.6  | 6.4  | 8.4   | 1.5   | 4.9   | 4.9   | 3.0   |
| LnGrp Delay(d),s/veh         | 31.4  | 19.8  | 5.8   | 63.6  | 54.1  | 65.5  | 52.4   | 47.3  | 40.4  | 73.9  | 52.6  | 51.0  |
| LnGrp LOS                    | C   | B   | A   | E   | D   | E   | D  | D   | D   | E   | D   | D   |
| Approach Vol, veh/h          | 1352  |   |   | 1370  |   |   | 772  |   |   | 518   |   |   |
| Approach Delay, s/veh        | 17.8  |   |   | 58.3  |   |   | 48.1   |   |   | 57.4  |   |   |
| Approach LOS                 | B   |   |   | E   |   |   | D  |   |   | E   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 14.4  | 27.6  | 14.7  | 63.3  | 23.3  | 18.7  | 40.2   | 37.8  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3   | * 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 12  | 47.4  | * 17  | 24.5  | 27.8  | * 32  | 7.8  | * 33  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 10.3  | 18.9  | 10.4  | 17.7  | 14.6  | 11.9  | 5.5  | 31.2  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.1   | 3.4   | 0.2   | 3.5   | 2.8   | 1.5   | 0.1  | 1.3   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 42.6  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue







2035 No Proj PM Peak  
4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |   |  |  |  |  |  |
| Volume (veh/h)               | 126   | 1001  | 317   | 39  | 794   | 490   | 254  | 488   | 44  | 506   | 981   | 210   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 129   | 1021  | 323   | 40  | 810   | 500   | 259  | 498   | 45  | 516   | 1001  | 214   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 347   | 1066  | 475   | 87  | 1147  | 909   | 326  | 648   | 289   | 1169  | 1547  | 692   |
| Arrive On Green              | 0.10  | 0.30  | 0.30  | 0.01  | 0.08  | 0.08  | 0.10   | 0.18  | 0.18  | 0.11  | 0.15  | 0.15  |
| Sat Flow, veh/h              | 3408  | 3505  | 1562  | 3408  | 5036  | 1568  | 3408   | 3505  | 1565  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 129   | 1021  | 323   | 40  | 810   | 500   | 259  | 498   | 45  | 516   | 1001  | 214   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1562  | 1704  | 1679  | 1568  | 1704   | 1752  | 1565  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 4.2   | 34.3  | 16.0  | 1.4   | 18.9  | 0.0   | 8.9  | 16.2  | 2.9   | 17.0  | 32.3  | 9.7   |
| Cycle Q Clear(g_c), s        | 4.2   | 34.3  | 16.0  | 1.4   | 18.9  | 0.0   | 8.9  | 16.2  | 2.9   | 17.0  | 32.3  | 9.7   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 347   | 1066  | 475   | 87  | 1147  | 909   | 326  | 648   | 289   | 1169  | 1547  | 692   |
| V/C Ratio(X)                 | 0.37  | 0.96  | 0.68  | 0.46  | 0.71  | 0.55  | 0.79   | 0.77  | 0.16  | 0.44  | 0.65  | 0.31  |
| Avail Cap(c_a), veh/h        | 347   | 1066  | 475   | 168   | 1397  | 987   | 429  | 1192  | 532   | 1169  | 1547  | 692   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  | 1.00   | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.96  | 0.96  | 0.96  | 1.00   | 1.00  | 1.00  | 0.79  | 0.79  | 0.79  |
| Uniform Delay (d), s/veh     | 50.3  | 41.0  | 19.8  | 58.7  | 51.6  | 20.5  | 53.1   | 46.5  | 41.0  | 42.5  | 42.4  | 15.2  |
| Incr Delay (d2), s/veh       | 0.7   | 18.2  | 3.9   | 3.6   | 1.2   | 0.5   | 7.4  | 8.5   | 1.1   | 0.2   | 1.7   | 0.9   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 2.0   | 19.3  | 7.4   | 0.7   | 8.9   | 13.4  | 4.5  | 8.6   | 1.3   | 8.0   | 16.1  | 4.4   |
| LnGrp Delay(d),s/veh         | 51.0  | 59.2  | 23.7  | 62.3  | 52.8  | 21.0  | 60.5   | 55.0  | 42.2  | 42.7  | 44.1  | 16.1  |
| LnGrp LOS                    | D   | E   | C   | E   | D   | C   | E  | D   | D   | D   | D   | B   |
| Approach Vol, veh/h          | 1473  |   |   |   | 1350  |   |  |   | 802   |   |   |   |
| Approach Delay, s/veh        | 50.7  |   |   |   | 41.3  |   |  |   | 56.1  |   |   |   |
| Approach LOS                 | D   |   |   |   | D   |   |  |   | E   |   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 46.3  | 26.2  | 7.0   | 40.5  | 15.5  | 57.0  | 16.2   | 31.3  |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.7   | 4.2   | * 5.3   | * 4.2   | 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 20.6  | * 39  | 5.7   | * 35  | * 15  | 45.2  | 8.9  | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 19.0  | 18.2  | 3.4   | 36.3  | 10.9  | 34.3  | 6.2  | 20.9  |   |   |   |   |
| Green Ext Time (p_c), s      | 1.2   | 2.2   | 0.0   | 0.0   | 0.4   | 6.0   | 0.1  | 4.8   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 45.8  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary













## 13: Locan Avenue & Herndon Avenue

2035 No Proj PM Peak  
4/3/2017

|                              |   |   |   |   |   |   |   |      |
|------------------------------|---|---|---|---|---|---|---|------|
|                              |  |  |  |  |  |  |   |      |
| Movement                     | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |   |      |
| Lane Configurations          | ↑↑  | ↑   | ↑   | ↑↑  | ↑   | ↑   |   |      |
| Volume (veh/h)               | 1216  | 349   | 27  | 722   | 444   | 171   |   |      |
| Number                       | 2   | 12  | 1   | 6   | 3   | 18  |   |      |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   |   |      |
| Ped-Bike Adj(A_pbT)          |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |      |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |      |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |   |      |
| Adj Flow Rate, veh/h         | 1241  | 356   | 28  | 737   | 453   | 174   |   |      |
| Adj No. of Lanes             | 2   | 1   | 1   | 2   | 1   | 1   |   |      |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |   |      |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   |   |      |
| Cap, veh/h                   | 2056  | 917   | 38  | 2270  | 518   | 445   |   |      |
| Arrive On Green              | 0.59  | 0.59  | 0.04  | 1.00  | 0.29  | 0.28  |   |      |
| Sat Flow, veh/h              | 3597  | 1564  | 1757  | 3597  | 1757  | 1568  |   |      |
| Grp Volume(v), veh/h         | 1241  | 356   | 28  | 737   | 453   | 174   |   |      |
| Grp Sat Flow(s),veh/h/ln     | 1752  | 1564  | 1757  | 1752  | 1757  | 1568  |   |      |
| Q Serve(g_s), s              | 27.2  | 14.6  | 1.9   | 0.0   | 29.4  | 10.7  |   |      |
| Cycle Q Clear(g_c), s        | 27.2  | 14.6  | 1.9   | 0.0   | 29.4  | 10.7  |   |      |
| Prop In Lane                 |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |      |
| Lane Grp Cap(c), veh/h       | 2056  | 917   | 38  | 2270  | 518   | 445   |   |      |
| V/C Ratio(X)                 | 0.60  | 0.39  | 0.73  | 0.32  | 0.87  | 0.39  |   |      |
| Avail Cap(c_a), veh/h        | 2056  | 917   | 161   | 2270  | 997   | 873   |   |      |
| HCM Platoon Ratio            | 1.00  | 1.00  | 2.00  | 2.00  | 1.00  | 1.00  |   |      |
| Upstream Filter(I)           | 1.00  | 1.00  | 0.95  | 0.95  | 0.92  | 0.92  |   |      |
| Uniform Delay (d), s/veh     | 15.9  | 13.3  | 57.0  | 0.0   | 40.2  | 34.6  |   |      |
| Incr Delay (d2), s/veh       | 1.3   | 1.2   | 21.8  | 0.4   | 4.4   | 0.5   |   |      |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |      |
| %ile BackOfQ(50%),veh/ln     | 13.5  | 6.6   | 1.2   | 0.1   | 14.9  | 4.7   |   |      |
| LnGrp Delay(d),s/veh         | 17.2  | 14.5  | 78.8  | 0.4   | 44.6  | 35.1  |   |      |
| LnGrp LOS                    | B   | B   | E   | A   | D   | D   |   |      |
| Approach Vol, veh/h          | 1597  |   |   | 765   | 627   |   |   |      |
| Approach Delay, s/veh        | 16.6  |   |   | 3.2   | 42.0  |   |   |      |
| Approach LOS                 | B   |   |   | A   | D   |   |   |      |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7 | 8    |
| Assigned Phs                 | 1   | 2   |   |   |   | 6   |   | 8    |
| Phs Duration (G+Y+Rc), s     | 6.6   | 75.1  |   |   |   | 81.7  |   | 38.3 |
| Change Period (Y+Rc), s      | * 4.2   | * 6   |   |   |   | 6.0   |   | 4.2  |
| Max Green Setting (Gmax), s  | * 11  | * 30  |   |   |   | 43.0  |   | 66.8 |
| Max Q Clear Time (g_c+I1), s | 3.9   | 29.2  |   |   |   | 2.0   |   | 31.4 |
| Green Ext Time (p_c), s      | 0.0   | 0.5   |   |   |   | 16.4  |   | 2.7  |
| Intersection Summary         |   |   |   |   |   |   |   |      |
| HCM 2010 Ctrl Delay          |   |   | 18.5  |   |   |   |   |      |
| HCM 2010 LOS                 |   |   | B   |   |   |   |   |      |
| Notes                        |   |   |   |   |   |   |   |      |

HCM 2010 Signalized Intersection Summary  
14: Herndon Avenue & De Wolf Avenue (NL)












2035 No Proj PM Peak  
4/3/2017

|   |  |  |  |  |  |  |   |   |
|---|---|---|---|---|---|---|---|---|
| Movement  | EBL   | EBT   | WBT   | WBR   | SBL   | SBR   |   |   |
| Lane Configurations   |  |  |  |  |  |  |   |   |
| Volume (veh/h)  | 90  | 1287  | 706   | 24  | 29  | 43  |   |   |
| Number  | 5   | 2   | 6   | 16  | 7   | 14  |   |   |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   |   |   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   |   | 1.00  | 1.00  | 1.00  |   |   |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |   |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |   |   |
| Adj Flow Rate, veh/h  | 97  | 1384  | 759   | 26  | 31  | 46  |   |   |
| Adj No. of Lanes  | 1   | 2   | 2   | 1   | 1   | 1   |   |   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |   |   |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   |   |   |
| Cap, veh/h  | 127   | 2857  | 2369  | 1005  | 111   | 76  |   |   |
| Arrive On Green   | 0.15  | 1.00  | 1.00  | 1.00  | 0.06  | 0.05  |   |   |
| Sat Flow, veh/h   | 1757  | 3597  | 3597  | 1564  | 1757  | 1568  |   |   |
| Grp Volume(v), veh/h  | 97  | 1384  | 759   | 26  | 31  | 46  |   |   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1752  | 1752  | 1564  | 1757  | 1568  |   |   |
| Q Serve(g_s), s   | 3.2   | 0.0   | 0.0   | 0.0   | 1.0   | 1.7   |   |   |
| Cycle Q Clear(g_c), s   | 3.2   | 0.0   | 0.0   | 0.0   | 1.0   | 1.7   |   |   |
| Prop In Lane  | 1.00  |   |   | 1.00  | 1.00  | 1.00  |   |   |
| Lane Grp Cap(c), veh/h  | 127   | 2857  | 2369  | 1005  | 111   | 76  |   |   |
| V/C Ratio(X)  | 0.76  | 0.48  | 0.32  | 0.03  | 0.28  | 0.61  |   |   |
| Avail Cap(c_a), veh/h   | 141   | 2857  | 2369  | 1005  | 700   | 601   |   |   |
| HCM Platoon Ratio   | 2.00  | 2.00  | 2.00  | 2.00  | 1.00  | 1.00  |   |   |
| Upstream Filter(I)  | 0.77  | 0.77  | 0.81  | 0.81  | 1.00  | 1.00  |   |   |
| Uniform Delay (d), s/veh  | 25.1  | 0.0   | 0.0   | 0.0   | 26.8  | 28.0  |   |   |
| Incr Delay (d2), s/veh  | 15.5  | 0.5   | 0.3   | 0.0   | 1.4   | 7.7   |   |   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |   |
| %ile BackOfQ(50%),veh/ln  | 2.1   | 0.2   | 0.1   | 0.4   | 0.5   | 1.6   |   |   |
| LnGrp Delay(d),s/veh  | 40.6  | 0.5   | 0.3   | 0.0   | 28.2  | 35.7  |   |   |
| LnGrp LOS   | D   | A   | A   | A   | C   | D   |   |   |
| Approach Vol, veh/h   |   | 1481  | 785   |   | 77  |   |   |   |
| Approach Delay, s/veh   |   | 3.1   | 0.3   |   | 32.6  |   |   |   |
| Approach LOS  |   | A   | A   |   | C   |   |   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7 | 8 |
| Assigned Phs  |   | 2   |   | 4   | 5   | 6   |   |   |
| Phs Duration (G+Y+Rc), s  |   | 52.9  |   | 7.1   | 8.4   | 44.6  |   |   |
| Change Period (Y+Rc), s   |   | 6.0   |   | * 4.2   | * 4.2   | 6.0   |   |   |
| Max Green Setting (Gmax), s   |   | 26.8  |   | * 23  | * 4.6   | 18.0  |   |   |
| Max Q Clear Time (g_c+I1), s  |   | 2.0   |   | 3.7   | 5.2   | 2.0   |   |   |
| Green Ext Time (p_c), s   |   | 12.0  |   | 0.2   | 0.0   | 9.4   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 3.1   |   |   |   |   |   |
| HCM 2010 LOS  |   |   | A   |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 15: De Wolf Ave & Herndon Avenue

2035 No Proj PM Peak  
4/3/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |   |
| Volume (vph)                      | 809   | 496   | 10  | 471   | 271   | 20  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 6.0   | 6.0   | 4.2   | 6.0   | 4.2   |   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |
| Frt                               | 1.00  | 0.85  | 1.00  | 1.00  | 0.99  |   |
| Flt Protected                     | 1.00  | 1.00  | 0.95  | 1.00  | 0.96  |   |
| Satd. Flow (prot)                 | 1845  | 1568  | 1752  | 1845  | 1746  |   |
| Flt Permitted                     | 1.00  | 1.00  | 0.95  | 1.00  | 0.96  |   |
| Satd. Flow (perm)                 | 1845  | 1568  | 1752  | 1845  | 1746  |   |
| Peak-hour factor, PHF             | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Adj. Flow (vph)                   | 852   | 522   | 11  | 496   | 285   | 21  |
| RTOR Reduction (vph)              | 0   | 262   | 0   | 0   | 5   | 0   |
| Lane Group Flow (vph)             | 852   | 260   | 11  | 496   | 301   | 0   |
| Turn Type                         | NA  | Perm  | Prot  | NA  | Prot  |   |
| Protected Phases                  | 2   |   | 1   | 6   | 3   |   |
| Permitted Phases                  |   | 2   |   |   |   |   |
| Actuated Green, G (s)             | 29.9  | 29.9  | 0.8   | 34.9  | 14.9  |   |
| Effective Green, g (s)            | 29.9  | 29.9  | 0.8   | 34.9  | 14.9  |   |
| Actuated g/C Ratio                | 0.50  | 0.50  | 0.01  | 0.58  | 0.25  |   |
| Clearance Time (s)                | 6.0   | 6.0   | 4.2   | 6.0   | 4.2   |   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)                | 919   | 781   | 23  | 1073  | 433   |   |
| v/s Ratio Prot                    | c0.46   |   | 0.01  | c0.27   | c0.17   |   |
| v/s Ratio Perm                    |   | 0.17  |   |   |   |   |
| v/c Ratio                         | 0.93  | 0.33  | 0.48  | 0.46  | 0.70  |   |
| Uniform Delay, d1                 | 14.0  | 9.1   | 29.4  | 7.2   | 20.5  |   |
| Progression Factor                | 1.12  | 1.61  | 1.05  | 1.49  | 1.00  |   |
| Incremental Delay, d2             | 15.1  | 1.0   | 14.0  | 1.3   | 4.8   |   |
| Delay (s)                         | 30.9  | 15.6  | 44.7  | 12.0  | 25.3  |   |
| Level of Service                  | C   | B   | D   | B   | C   |   |
| Approach Delay (s)                | 25.1  |   |   | 12.8  | 25.3  |   |
| Approach LOS                      | C   |   |   | B   | C   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 22.3  |   | HCM 2000 Level of Service   | C   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.86  |   |   |   |
| Actuated Cycle Length (s)         |   |   | 60.0  |   | Sum of lost time (s)  | 14.4  |
| Intersection Capacity Utilization |   |   | 67.3%   |   | ICU Level of Service  | C   |
| Analysis Period (min)             |   |   | 15  |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis





















## 16: Leonard Ave & Herndon Avenue

2035 No Proj PM Peak  
4/3/2017

|                                   | →     | ↘    | ↙     | ←     | ↖                         | ↗    |
|-----------------------------------|-------|------|-------|-------|---------------------------|------|
| Movement                          | EBT   | EBR  | WBL   | WBT   | NBL                       | NBR  |
| Lane Configurations               | ↗     |      | ↘     | ↗     | ↘                         |      |
| Volume (vph)                      | 789   | 20   | 2     | 408   | 190                       | 10   |
| Ideal Flow (vphpl)                | 1900  | 1900 | 1900  | 1900  | 1900                      | 1900 |
| Total Lost time (s)               | 4.5   |      | 4.2   | 6.0   | 4.2                       |      |
| Lane Util. Factor                 | 1.00  |      | 1.00  | 1.00  | 1.00                      |      |
| Frt                               | 1.00  |      | 1.00  | 1.00  | 0.99                      |      |
| Flt Protected                     | 1.00  |      | 0.95  | 1.00  | 0.95                      |      |
| Satd. Flow (prot)                 | 1838  |      | 1752  | 1845  | 1749                      |      |
| Flt Permitted                     | 1.00  |      | 0.95  | 1.00  | 0.95                      |      |
| Satd. Flow (perm)                 | 1838  |      | 1752  | 1845  | 1749                      |      |
| Peak-hour factor, PHF             | 0.92  | 0.92 | 0.92  | 0.92  | 0.92                      | 0.92 |
| Adj. Flow (vph)                   | 858   | 22   | 2     | 443   | 207                       | 11   |
| RTOR Reduction (vph)              | 1     | 0    | 0     | 0     | 4                         | 0    |
| Lane Group Flow (vph)             | 879   | 0    | 2     | 443   | 214                       | 0    |
| Turn Type                         | NA    |      | Prot  | NA    | Prot                      |      |
| Protected Phases                  | 2     |      | 1     | 6     | 3                         |      |
| Permitted Phases                  |       |      |       |       |                           |      |
| Actuated Green, G (s)             | 33.5  |      | 1.1   | 37.3  | 12.5                      |      |
| Effective Green, g (s)            | 33.5  |      | 1.1   | 37.3  | 12.5                      |      |
| Actuated g/C Ratio                | 0.56  |      | 0.02  | 0.62  | 0.21                      |      |
| Clearance Time (s)                | 4.5   |      | 4.2   | 6.0   | 4.2                       |      |
| Vehicle Extension (s)             | 3.0   |      | 3.0   | 3.0   | 3.0                       |      |
| Lane Grp Cap (vph)                | 1026  |      | 32    | 1146  | 364                       |      |
| v/s Ratio Prot                    | c0.48 |      | 0.00  | c0.24 | c0.12                     |      |
| v/s Ratio Perm                    |       |      |       |       |                           |      |
| v/c Ratio                         | 0.86  |      | 0.06  | 0.39  | 0.59                      |      |
| Uniform Delay, d1                 | 11.2  |      | 28.9  | 5.7   | 21.4                      |      |
| Progression Factor                | 2.11  |      | 0.94  | 1.54  | 1.00                      |      |
| Incremental Delay, d2             | 5.3   |      | 0.7   | 0.9   | 2.4                       |      |
| Delay (s)                         | 29.0  |      | 27.9  | 9.6   | 23.9                      |      |
| Level of Service                  | C     |      | C     | A     | C                         |      |
| Approach Delay (s)                | 29.0  |      |       | 9.6   | 23.9                      |      |
| Approach LOS                      | C     |      |       | A     | C                         |      |
| <b>Intersection Summary</b>       |       |      |       |       |                           |      |
| HCM 2000 Control Delay            |       |      | 22.7  |       | HCM 2000 Level of Service | C    |
| HCM 2000 Volume to Capacity ratio |       |      | 0.79  |       |                           |      |
| Actuated Cycle Length (s)         |       |      | 60.0  |       | Sum of lost time (s)      | 12.9 |
| Intersection Capacity Utilization |       |      | 61.1% |       | ICU Level of Service      | B    |
| Analysis Period (min)             |       |      | 15    |       |                           |      |
| c Critical Lane Group             |       |      |       |       |                           |      |

HCM 2010 Signalized Intersection Summary  
17: McCall Ave & Herndon Avenue

2035 No Proj PM Peak  
4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |   |  |  |   |  |  |   |  |  |   |
| Volume (veh/h)               | 60  | 280   | 261   | 26  | 339   | 16  | 169  | 259   | 45  | 29  | 218   | 44  |
| Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1900  | 1845  | 1845  | 1900  | 1845   | 1845  | 1900  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h         | 65  | 304   | 284   | 28  | 368   | 17  | 184  | 282   | 49  | 32  | 237   | 48  |
| Adj No. of Lanes             | 1   | 1   | 0   | 1   | 1   | 0   | 1  | 1   | 0   | 1   | 1   | 0   |
| Peak Hour Factor             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 91  | 436   | 407   | 59  | 835   | 39  | 215  | 417   | 72  | 61  | 274   | 56  |
| Arrive On Green              | 0.05  | 0.50  | 0.50  | 0.03  | 0.48  | 0.48  | 0.12   | 0.27  | 0.27  | 0.03  | 0.18  | 0.18  |
| Sat Flow, veh/h              | 1757  | 879   | 821   | 1757  | 1750  | 81  | 1757   | 1532  | 266   | 1757  | 1490  | 302   |
| Grp Volume(v), veh/h         | 65  | 0   | 588   | 28  | 0   | 385   | 184  | 0   | 331   | 32  | 0   | 285   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1700  | 1757  | 0   | 1830  | 1757   | 0   | 1798  | 1757  | 0   | 1791  |
| Q Serve(g_s), s              | 4.4   | 0.0   | 32.0  | 1.9   | 0.0   | 16.7  | 12.3   | 0.0   | 19.7  | 2.1   | 0.0   | 18.5  |
| Cycle Q Clear(g_c), s        | 4.4   | 0.0   | 32.0  | 1.9   | 0.0   | 16.7  | 12.3   | 0.0   | 19.7  | 2.1   | 0.0   | 18.5  |
| Prop In Lane                 | 1.00  |   | 0.48  | 1.00  |   | 0.04  | 1.00   |   | 0.15  | 1.00  |   | 0.17  |
| Lane Grp Cap(c), veh/h       | 91  | 0   | 843   | 59  | 0   | 874   | 215  | 0   | 489   | 61  | 0   | 330   |
| V/C Ratio(X)                 | 0.72  | 0.00  | 0.70  | 0.48  | 0.00  | 0.44  | 0.85   | 0.00  | 0.68  | 0.53  | 0.00  | 0.86  |
| Avail Cap(c_a), veh/h        | 91  | 0   | 843   | 100   | 0   | 874   | 422  | 0   | 721   | 94  | 0   | 384   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 0.54  | 0.00  | 0.54  | 1.00  | 0.00  | 1.00  | 1.00   | 0.00  | 1.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh     | 56.0  | 0.0   | 23.3  | 57.0  | 0.0   | 20.7  | 51.6   | 0.0   | 39.0  | 57.0  | 0.0   | 47.5  |
| Incr Delay (d2), s/veh       | 13.4  | 0.0   | 2.6   | 5.9   | 0.0   | 1.6   | 9.3  | 0.0   | 1.6   | 6.9   | 0.0   | 16.3  |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 2.5   | 0.0   | 15.6  | 1.0   | 0.0   | 8.8   | 6.5  | 0.0   | 10.0  | 1.2   | 0.0   | 10.7  |
| LnGrp Delay(d),s/veh         | 69.5  | 0.0   | 25.9  | 62.9  | 0.0   | 22.4  | 60.9   | 0.0   | 40.6  | 63.8  | 0.0   | 63.8  |
| LnGrp LOS                    | E   |   | C   | E   |   | C   | E  |   | D   | E   |   | E   |
| Approach Vol, veh/h          | 653   |   |   | 413   |   |   | 515  |   |   | 317   |   |   |
| Approach Delay, s/veh        | 30.2  |   |   | 25.1  |   |   | 47.9   |   |   | 63.8  |   |   |
| Approach LOS                 | C   |   |   | C   |   |   | D  |   |   | E   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 8.2   | 65.5  | 18.9  | 27.4  | 10.4  | 63.3  | 8.4  | 38.0  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 6.0   | * 4.2   | 5.3   | * 4.2   | 6.0   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 6.8   | 39.0  | * 29  | 25.7  | * 6.2   | 39.6  | * 6.4  | 48.1  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 3.9   | 34.0  | 14.3  | 20.5  | 6.4   | 18.7  | 4.1  | 21.7  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 2.4   | 0.4   | 1.6   | 0.0   | 5.6   | 0.0  | 3.5   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 39.5  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

| Intersection                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh16.6 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS C            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                      | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                    | 0    | 8    | 23   | 302  | 0    | 16   | 10   | 1    | 0    | 305  | 259  | 21   | 0    | 2    | 199  | 6    |
| Peak Hour Factor              | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %             | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                     | 0    | 9    | 25   | 328  | 0    | 17   | 11   | 1    | 0    | 332  | 282  | 23   | 0    | 2    | 216  | 7    |
| Number of Lanes               | 0    | 0    | 1    | 1    | 0    | 0    | 1    | 0    | 0    | 1    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 2    | 1    | 2    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 2    | 2    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 2    | 1    | 1    | 2    |
| HCM Control Delay          | 16.3 | 11.4 | 17.7 | 14.5 |
| HCM LOS                    | C    | B    | C    | B    |

| Lane                   | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 26%   | 0%    | 59%   | 1%    |
| Vol Thru, %            | 0%    | 93%   | 74%   | 0%    | 37%   | 96%   |
| Vol Right, %           | 0%    | 7%    | 0%    | 100%  | 4%    | 3%    |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 305   | 280   | 31    | 302   | 27    | 207   |
| LT Vol                 | 305   | 0     | 8     | 0     | 16    | 2     |
| Through Vol            | 0     | 259   | 23    | 0     | 10    | 199   |
| RT Vol                 | 0     | 21    | 0     | 302   | 1     | 6     |
| Lane Flow Rate         | 332   | 304   | 34    | 328   | 29    | 225   |
| Geometry Grp           | 7     | 7     | 7     | 7     | 6     | 6     |
| Degree of Util (X)     | 0.618 | 0.52  | 0.066 | 0.567 | 0.064 | 0.418 |
| Departure Headway (Hd) | 6.71  | 6.15  | 7.058 | 6.214 | 7.872 | 6.687 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 537   | 584   | 505   | 578   | 458   | 536   |
| Service Time           | 4.473 | 3.912 | 4.828 | 3.983 | 5.872 | 4.758 |
| HCM Lane V/C Ratio     | 0.618 | 0.521 | 0.067 | 0.567 | 0.063 | 0.42  |
| HCM Control Delay      | 19.8  | 15.4  | 10.3  | 16.9  | 11.4  | 14.5  |
| HCM Lane LOS           | C     | C     | B     | C     | B     | B     |
| HCM 95th-tile Q        | 4.2   | 3     | 0.2   | 3.5   | 0.2   | 2     |

HCM 2010 Signalized Intersection Summary  
20: Locan Avenue & Bullard Ave























2035 No Proj PM Peak  
4/6/2017

| Movement  | EBL   | EBT  | EBR  | WBL   | WBT  | WBR  | NBL   | NBT  | NBR  | SBL  | SBT  | SBR  |
|---|-------|------|------|-------|------|------|-------|------|------|------|------|------|
| Lane Configurations   |       |      |      |       |      |      |       |      |      |      |      |      |
| Volume (veh/h)  | 68    | 690  | 85   | 47    | 732  | 31   | 72    | 105  | 52   | 98   | 470  | 182  |
| Number  | 5     | 2    | 12   | 1     | 6    | 16   | 3     | 8    | 18   | 7    | 4    | 14   |
| Initial Q (Qb), veh   | 0     | 0    | 0    | 0     | 0    | 0    | 0     | 0    | 0    | 0    | 0    | 0    |
| Ped-Bike Adj(A_pbT)   | 1.00  |      | 1.00 | 1.00  |      | 1.00 | 1.00  |      | 1.00 | 1.00 |      | 1.00 |
| Parking Bus, Adj  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845 | 1845 | 1845  | 1845 | 1900 | 1845  | 1845 | 1845 | 1845 | 1845 | 1900 |
| Adj Flow Rate, veh/h  | 74    | 750  | 92   | 51    | 796  | 34   | 78    | 114  | 57   | 107  | 511  | 198  |
| Adj No. of Lanes  | 1     | 2    | 1    | 1     | 2    | 0    | 1     | 1    | 1    | 1    | 1    | 0    |
| Peak Hour Factor  | 0.92  | 0.92 | 0.92 | 0.92  | 0.92 | 0.92 | 0.92  | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, %  | 3     | 3    | 3    | 3     | 3    | 3    | 3     | 3    | 3    | 3    | 3    | 3    |
| Cap, veh/h  | 581   | 1998 | 894  | 65    | 878  | 38   | 100   | 716  | 609  | 136  | 503  | 195  |
| Arrive On Green   | 0.33  | 0.57 | 0.57 | 0.04  | 0.26 | 0.26 | 0.06  | 0.39 | 0.39 | 0.08 | 0.40 | 0.40 |
| Sat Flow, veh/h   | 1757  | 3505 | 1568 | 1757  | 3425 | 146  | 1757  | 1845 | 1568 | 1757 | 1267 | 491  |
| Grp Volume(v), veh/h  | 74    | 750  | 92   | 51    | 407  | 423  | 78    | 114  | 57   | 107  | 0    | 709  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1752 | 1568 | 1757  | 1752 | 1819 | 1757  | 1845 | 1568 | 1757 | 0    | 1758 |
| Q Serve(g_s), s   | 2.6   | 10.5 | 3.0  | 2.6   | 20.3 | 20.3 | 3.9   | 3.6  | 2.1  | 5.4  | 0.0  | 35.7 |
| Cycle Q Clear(g_c), s   | 2.6   | 10.5 | 3.0  | 2.6   | 20.3 | 20.3 | 3.9   | 3.6  | 2.1  | 5.4  | 0.0  | 35.7 |
| Prop In Lane  | 1.00  |      | 1.00 | 1.00  |      | 0.08 | 1.00  |      | 1.00 | 1.00 |      | 0.28 |
| Lane Grp Cap(c), veh/h  | 581   | 1998 | 894  | 65    | 449  | 466  | 100   | 716  | 609  | 136  | 0    | 697  |
| V/C Ratio(X)  | 0.13  | 0.38 | 0.10 | 0.79  | 0.91 | 0.91 | 0.78  | 0.16 | 0.09 | 0.79 | 0.00 | 1.02 |
| Avail Cap(c_a), veh/h   | 581   | 1998 | 894  | 82    | 467  | 485  | 105   | 716  | 609  | 244  | 0    | 697  |
| HCM Platoon Ratio   | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I)  | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 0.94 | 0.00 | 0.94 |
| Uniform Delay (d), s/veh  | 21.1  | 10.6 | 13.9 | 43.0  | 32.4 | 32.4 | 41.9  | 18.0 | 17.5 | 40.8 | 0.0  | 27.2 |
| Incr Delay (d2), s/veh  | 0.1   | 0.5  | 0.2  | 31.9  | 24.5 | 23.9 | 29.7  | 0.1  | 0.1  | 9.1  | 0.0  | 37.2 |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0   | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| %ile BackOfQ(50%),veh/ln  | 1.3   | 5.1  | 1.3  | 1.8   | 12.8 | 13.2 | 2.7   | 1.9  | 0.9  | 3.0  | 0.0  | 24.5 |
| LnGrp Delay(d),s/veh  | 21.2  | 11.1 | 14.1 | 74.9  | 56.9 | 56.3 | 71.6  | 18.1 | 17.5 | 49.9 | 0.0  | 64.4 |
| LnGrp LOS   | C     | B    | B    | E     | E    | E    | E     | B    | B    | D    |      | F    |
| Approach Vol, veh/h   |       | 916  |      |       | 881  |      |       | 249  |      |      | 816  |      |
| Approach Delay, s/veh   |       | 12.2 |      |       | 57.7 |      |       | 34.7 |      |      | 62.5 |      |
| Approach LOS  |       | B    |      |       | E    |      |       | C    |      |      | E    |      |
| Timer   | 1     | 2    | 3    | 4     | 5    | 6    | 7     | 8    |      |      |      |      |
| Assigned Phs  | 1     | 2    | 3    | 4     | 5    | 6    | 7     | 8    |      |      |      |      |
| Phs Duration (G+Y+Rc), s  | 7.5   | 57.7 | 10.4 | 41.0  | 36.1 | 29.1 | 11.2  | 40.2 |      |      |      |      |
| Change Period (Y+Rc), s   | * 4.2 | 6.0  | 5.3  | * 5.3 | 6.0  | * 6  | * 4.2 | 5.3  |      |      |      |      |
| Max Green Setting (Gmax), s   | * 4.2 | 25.0 | 5.4  | * 36  | 5.2  | * 24 | * 13  | 28.6 |      |      |      |      |
| Max Q Clear Time (g_c+l1), s  | 4.6   | 12.5 | 5.9  | 37.7  | 4.6  | 22.3 | 7.4   | 5.6  |      |      |      |      |
| Green Ext Time (p_c), s   | 0.0   | 4.0  | 0.0  | 0.0   | 0.0  | 0.8  | 0.1   | 0.9  |      |      |      |      |
| <b>Intersection Summary</b>   |       |      |      |       |      |      |       |      |      |      |      |      |
| HCM 2010 Ctrl Delay   |       |      | 42.5 |       |      |      |       |      |      |      |      |      |
| HCM 2010 LOS  |       |      | D    |       |      |      |       |      |      |      |      |      |
| <b>Notes</b>  |       |      |      |       |      |      |       |      |      |      |      |      |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |       |      |      |       |      |      |       |      |      |      |      |      |



HCM 2010 Signalized Intersection Summary  
21: De Wolf Ave & Bullard Ave

2035 No Proj PM Peak  
4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |   |  |  |   |  |  |  |
| Volume (veh/h)               | 64  | 512   | 283   | 45  | 490   | 20  | 165  | 317   | 71  | 44  | 272   | 89  |
| Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1900  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h         | 70  | 557   | 308   | 49  | 533   | 22  | 179  | 345   | 77  | 48  | 296   | 97  |
| Adj No. of Lanes             | 1   | 1   | 1   | 1   | 1   | 0   | 1  | 1   | 0   | 1   | 1   | 0   |
| Peak Hour Factor             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 102   | 740   | 629   | 62  | 667   | 28  | 215  | 464   | 104   | 61  | 306   | 100   |
| Arrive On Green              | 0.06  | 0.40  | 0.40  | 0.04  | 0.38  | 0.38  | 0.12   | 0.32  | 0.32  | 0.03  | 0.23  | 0.23  |
| Sat Flow, veh/h              | 1757  | 1845  | 1568  | 1757  | 1759  | 73  | 1757   | 1461  | 326   | 1757  | 1331  | 436   |
| Grp Volume(v), veh/h         | 70  | 557   | 308   | 49  | 0   | 555   | 179  | 0   | 422   | 48  | 0   | 393   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1845  | 1568  | 1757  | 0   | 1832  | 1757   | 0   | 1787  | 1757  | 0   | 1768  |
| Q Serve(g_s), s              | 3.5   | 23.3  | 13.2  | 2.5   | 0.0   | 24.3  | 9.0  | 0.0   | 19.0  | 2.4   | 0.0   | 19.8  |
| Cycle Q Clear(g_c), s        | 3.5   | 23.3  | 13.2  | 2.5   | 0.0   | 24.3  | 9.0  | 0.0   | 19.0  | 2.4   | 0.0   | 19.8  |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 0.04  | 1.00   |   | 0.18  | 1.00  |   | 0.25  |
| Lane Grp Cap(c), veh/h       | 102   | 740   | 629   | 62  | 0   | 694   | 215  | 0   | 568   | 61  | 0   | 407   |
| V/C Ratio(X)                 | 0.69  | 0.75  | 0.49  | 0.79  | 0.00  | 0.80  | 0.83   | 0.00  | 0.74  | 0.79  | 0.00  | 0.97  |
| Avail Cap(c_a), veh/h        | 102   | 740   | 629   | 78  | 0   | 694   | 230  | 0   | 568   | 98  | 0   | 407   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 0.00  | 1.00  | 1.00   | 0.00  | 1.00  | 0.88  | 0.00  | 0.88  |
| Uniform Delay (d), s/veh     | 41.6  | 23.1  | 20.1  | 43.1  | 0.0   | 24.9  | 38.6   | 0.0   | 27.4  | 43.1  | 0.0   | 34.3  |
| Incr Delay (d2), s/veh       | 17.9  | 6.9   | 2.7   | 33.8  | 0.0   | 9.4   | 21.3   | 0.0   | 5.2   | 18.1  | 0.0   | 33.3  |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 2.2   | 13.2  | 6.1   | 1.8   | 0.0   | 14.0  | 5.6  | 0.0   | 10.2  | 1.5   | 0.0   | 13.4  |
| LnGrp Delay(d),s/veh         | 59.5  | 30.0  | 22.8  | 76.8  | 0.0   | 34.3  | 59.9   | 0.0   | 32.7  | 61.2  | 0.0   | 67.6  |
| LnGrp LOS                    | E   | C   | C   | E   |   | C   | E  |   | C   | E   |   | E   |
| Approach Vol, veh/h          | 935   |   |   |   | 604   |   |  | 601   |   |   | 441   |   |
| Approach Delay, s/veh        | 29.9  |   |   |   | 37.7  |   |  | 40.8  |   |   | 66.9  |   |
| Approach LOS                 | C   |   |   |   | D   |   |  | D   |   |   | E   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 7.4   | 41.4  | 15.2  | 26.0  | 9.4   | 39.4  | 7.3  | 33.9  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 4   | 34.5  | * 12  | 20.7  | * 5.2   | 33.3  | * 5  | 27.5  |   |   |   |   |
| Max Q Clear Time (g_c+l1), s | 4.5   | 25.3  | 11.0  | 21.8  | 5.5   | 26.3  | 4.4  | 21.0  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 4.8   | 0.0   | 0.0   | 0.0   | 4.0   | 0.0  | 2.5   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 40.6  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | EB   | EB  | EB  | WB   | WB  | WB | NB   | NB  | NB  | NB   | SB  | SB  |
|-----------------------|------|-----|-----|------|-----|----|------|-----|-----|------|-----|-----|
| Directions Served     | L    | T   | R   | L    | T   | R  | UL   | T   | T   | R    | L   | T   |
| Maximum Queue (ft)    | 178  | 102 | 108 | 169  | 319 | 43 | 344  | 486 | 110 | 63   | 140 | 226 |
| Average Queue (ft)    | 81   | 45  | 42  | 105  | 77  | 10 | 195  | 68  | 31  | 17   | 81  | 167 |
| 95th Queue (ft)       | 147  | 84  | 83  | 169  | 233 | 30 | 308  | 252 | 81  | 43   | 136 | 248 |
| Link Distance (ft)    | 1573 |     |     | 1457 |     |    | 2685 |     |     | 2685 |     |     |
| Upstream Blk Time (%) |      |     |     |      |     |    |      |     |     |      |     |     |
| Queuing Penalty (veh) |      |     |     |      |     |    |      |     |     |      |     |     |
| Storage Bay Dist (ft) | 240  |     | 80  | 100  |     | 25 | 240  |     |     | 120  | 250 |     |
| Storage Blk Time (%)  |      | 3   | 2   | 12   | 40  | 3  | 8    |     | 0   |      |     |     |
| Queuing Penalty (veh) |      | 8   | 3   | 11   | 82  | 8  | 14   |     | 0   |      |     |     |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | SB   | SB  |
|-----------------------|------|-----|
| Directions Served     | T    | R   |
| Maximum Queue (ft)    | 309  | 185 |
| Average Queue (ft)    | 174  | 114 |
| 95th Queue (ft)       | 260  | 220 |
| Link Distance (ft)    | 1298 |     |
| Upstream Blk Time (%) |      |     |
| Queuing Penalty (veh) |      |     |
| Storage Bay Dist (ft) |      | 95  |
| Storage Blk Time (%)  | 32   | 0   |
| Queuing Penalty (veh) | 81   | 2   |

Intersection: 3: Temperance Avenue & SR 168 WB Ramp

| Movement              | WB  | WB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | T   | T   |     |     | R   |
| Maximum Queue (ft)    | 403 | 141 | 134 | 319 | 220 | 114 | 263 |
| Average Queue (ft)    | 194 | 71  | 42  | 128 | 68  | 41  | 91  |
| 95th Queue (ft)       | 329 | 130 | 104 | 287 | 157 | 100 | 184 |
| Link Distance (ft)    | 478 |     | 584 | 584 | 430 | 430 | 430 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) |     | 385 |     |     |     |     |     |
| Storage Blk Time (%)  | 1   |     |     |     |     |     |     |
| Queuing Penalty (veh) | 1   |     |     |     |     |     |     |

Intersection: 4: Temperance Avenue & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | EB  | NB   | NB   | NB   | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|------|------|------|-----|-----|-----|
| Directions Served     | L   | L   | R   | R   | T    | T    | TR   | L   | T   | T   |
| Maximum Queue (ft)    | 456 | 530 | 256 | 196 | 376  | 444  | 475  | 369 | 376 | 166 |
| Average Queue (ft)    | 142 | 335 | 127 | 49  | 124  | 250  | 287  | 128 | 94  | 64  |
| 95th Queue (ft)       | 348 | 440 | 222 | 135 | 278  | 439  | 454  | 231 | 239 | 137 |
| Link Distance (ft)    |     | 605 | 605 |     | 1106 | 1106 | 1106 |     | 584 | 584 |
| Upstream Blk Time (%) |     |     |     |     |      |      |      |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |      |      |      |     |     |     |
| Storage Bay Dist (ft) | 380 |     |     | 380 |      |      |      | 250 |     |     |
| Storage Blk Time (%)  | 0   | 4   |     |     |      |      |      |     | 1   |     |
| Queuing Penalty (veh) | 0   | 11  |     |     |      |      |      |     | 1   |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | WB  | WB  | NB  | NB  | NB  | SB  | SB  | SB   | SB   |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|------|------|
| Directions Served     | L   | R   | T   | T   | R   | L   | L   | T    | T    |
| Maximum Queue (ft)    | 92  | 116 | 528 | 550 | 255 | 270 | 294 | 273  | 117  |
| Average Queue (ft)    | 39  | 61  | 313 | 400 | 93  | 134 | 84  | 54   | 27   |
| 95th Queue (ft)       | 77  | 97  | 601 | 650 | 281 | 213 | 182 | 148  | 82   |
| Link Distance (ft)    |     | 354 | 528 | 528 |     |     |     | 1106 | 1106 |
| Upstream Blk Time (%) |     |     | 0   | 2   |     |     |     |      |      |
| Queuing Penalty (veh) |     |     | 1   | 20  |     |     |     |      |      |
| Storage Bay Dist (ft) | 130 |     |     |     | 105 | 225 | 225 |      |      |
| Storage Blk Time (%)  |     | 0   | 14  | 25  |     | 0   | 0   |      |      |
| Queuing Penalty (veh) |     | 0   | 0   | 21  |     | 1   | 1   |      |      |

Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | B60 | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|-----|
| Directions Served     | ULTR | T   | LTR | LTR | LTR |
| Maximum Queue (ft)    | 143  | 26  | 32  | 31  | 32  |
| Average Queue (ft)    | 19   | 1   | 4   | 4   | 2   |
| 95th Queue (ft)       | 86   | 9   | 21  | 21  | 15  |
| Link Distance (ft)    | 71   | 354 | 230 | 784 | 335 |
| Upstream Blk Time (%) | 2    |     |     |     |     |
| Queuing Penalty (veh) | 7    |     |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | WB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 217 | 254  | 199  | 135  | 63  | 200 | 323 | 330 | 348 | 164 | 456 | 441 |
| Average Queue (ft)    | 72  | 115  | 99   | 37   | 27  | 137 | 164 | 179 | 200 | 147 | 229 | 115 |
| 95th Queue (ft)       | 160 | 202  | 175  | 105  | 53  | 214 | 302 | 309 | 335 | 192 | 413 | 309 |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 638 | 638 | 638 |     | 441 | 441 |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     | 3   | 0   |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     | 0   | 0   |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     |     | 105 |     |     |
| Storage Blk Time (%)  |     |      |      | 0    |     | 31  | 24  |     |     | 33  | 6   | 5   |
| Queuing Penalty (veh) |     |      |      | 0    |     | 104 | 41  |     |     | 52  | 21  | 2   |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | NB  | SB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | R   | L   | T    | T    | R   |
| Maximum Queue (ft)    | 40  | 164 | 203  | 184  | 140 |
| Average Queue (ft)    | 13  | 79  | 100  | 89   | 49  |
| 95th Queue (ft)       | 31  | 146 | 152  | 153  | 103 |
| Link Distance (ft)    |     |     | 2399 | 2399 |     |
| Upstream Blk Time (%) |     |     |      |      |     |
| Queuing Penalty (veh) |     |     |      |      |     |
| Storage Bay Dist (ft) | 130 | 100 |      |      | 80  |
| Storage Blk Time (%)  |     | 6   | 12   | 16   | 0   |
| Queuing Penalty (veh) |     | 7   | 10   | 15   | 0   |

Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | WB  | B26  | B26  | NE  | SW   |
|-----------------------|-----|-----|------|------|-----|------|
| Directions Served     | L   | U   | T    | T    | R   | R    |
| Maximum Queue (ft)    | 24  | 9   | 1155 | 1144 | 45  | 21   |
| Average Queue (ft)    | 1   | 0   | 38   | 38   | 21  | 1    |
| 95th Queue (ft)       | 11  | 3   | 381  | 377  | 37  | 10   |
| Link Distance (ft)    |     |     | 1182 | 1182 | 775 | 1211 |
| Upstream Blk Time (%) |     |     |      |      |     |      |
| Queuing Penalty (veh) |     |     |      |      |     |      |
| Storage Bay Dist (ft) | 400 | 120 |      |      |     |      |
| Storage Blk Time (%)  |     |     |      |      |     |      |
| Queuing Penalty (veh) |     |     |      |      |     |      |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 197 | 210 | 220  | 221  | 64  | 48  | 254 | 492 | 520 | 732 | 570 | 184 |
| Average Queue (ft)    | 57  | 78  | 105  | 130  | 27  | 19  | 80  | 310 | 315 | 301 | 299 | 89  |
| 95th Queue (ft)       | 126 | 149 | 181  | 216  | 55  | 46  | 241 | 445 | 463 | 526 | 490 | 153 |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 175 | 175 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  | 0   | 1   | 2    | 6    |     |     |     | 52  |     |     | 8   |     |
| Queuing Penalty (veh) | 0   | 2   | 3    | 10   |     |     |     | 33  |     |     | 29  |     |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R   |
| Maximum Queue (ft)    | 400 | 795  | 827  | 240 | 259 | 269 | 187 | 178 | 81  |
| Average Queue (ft)    | 244 | 488  | 530  | 69  | 161 | 192 | 68  | 75  | 20  |
| 95th Queue (ft)       | 477 | 762  | 769  | 239 | 254 | 273 | 144 | 137 | 52  |
| Link Distance (ft)    |     | 2737 | 2737 |     |     |     | 528 | 528 |     |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     |     | 150 |
| Storage Blk Time (%)  |     | 31   | 69   |     | 3   | 14  | 0   | 1   |     |
| Queuing Penalty (veh) |     | 74   | 19   |     | 6   | 30  | 1   | 1   |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB  | WB  | WB  | WB  | WB  | WB  | NB  | SB | SB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| Directions Served     | L   | T   | T   | TR  | L   | T   | T   | T   | R   | LTR | LT | R  |
| Maximum Queue (ft)    | 147 | 277 | 273 | 29  | 94  | 269 | 290 | 278 | 216 | 287 | 54 | 91 |
| Average Queue (ft)    | 62  | 47  | 60  | 4   | 20  | 121 | 127 | 132 | 15  | 121 | 11 | 36 |
| 95th Queue (ft)       | 125 | 183 | 209 | 16  | 56  | 242 | 248 | 254 | 80  | 228 | 37 | 80 |
| Link Distance (ft)    |     | 997 | 997 | 997 |     | 286 | 286 | 286 |     | 355 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |     |     | 0   | 0   | 0   |     |     | 1  | 1  |
| Queuing Penalty (veh) |     |     |     |     |     | 0   | 1   | 0   |     |     | 0  | 0  |
| Storage Bay Dist (ft) | 145 |     |     |     | 190 |     |     |     | 120 |     |    |    |
| Storage Blk Time (%)  | 2   | 3   |     |     |     | 2   |     | 8   |     |     |    |    |
| Queuing Penalty (veh) | 4   | 2   |     |     |     | 1   |     | 2   |     |     |    |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  | NB |
|-----------------------|-----|-----|-----|-----|----|
| Directions Served     | T   | R   | L   | T   | L  |
| Maximum Queue (ft)    | 54  | 32  | 68  | 31  | 31 |
| Average Queue (ft)    | 27  | 9   | 24  | 21  | 1  |
| 95th Queue (ft)       | 53  | 31  | 52  | 44  | 10 |
| Link Distance (ft)    | 784 |     |     | 364 | 0  |
| Upstream Blk Time (%) |     |     |     |     | 0  |
| Queuing Penalty (veh) |     |     |     |     | 0  |
| Storage Bay Dist (ft) |     | 100 | 100 |     |    |
| Storage Blk Time (%)  |     |     |     |     |    |
| Queuing Penalty (veh) |     |     |     |     |    |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | EB  | SB  |
|-----------------------|-----|-----|
| Directions Served     | L   | R   |
| Maximum Queue (ft)    | 26  | 31  |
| Average Queue (ft)    | 2   | 2   |
| 95th Queue (ft)       | 12  | 15  |
| Link Distance (ft)    |     | 903 |
| Upstream Blk Time (%) |     |     |
| Queuing Penalty (veh) |     |     |
| Storage Bay Dist (ft) | 100 |     |
| Storage Blk Time (%)  |     |     |
| Queuing Penalty (veh) |     |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | WB  | WB   | WB   | NB   | NB  |
|-----------------------|-----|-----|-----|-----|------|------|------|-----|
| Directions Served     | T   | T   | R   | L   | T    | T    | L    | R   |
| Maximum Queue (ft)    | 300 | 229 | 140 | 362 | 436  | 495  | 552  | 370 |
| Average Queue (ft)    | 94  | 81  | 32  | 64  | 176  | 208  | 384  | 65  |
| 95th Queue (ft)       | 227 | 201 | 87  | 170 | 341  | 380  | 518  | 263 |
| Link Distance (ft)    | 483 | 483 |     |     | 2004 | 2004 | 5128 |     |
| Upstream Blk Time (%) |     |     |     |     |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 250 | 250 |      |      |      | 250 |
| Storage Blk Time (%)  |     |     |     |     | 5    |      | 22   |     |
| Queuing Penalty (veh) |     |     |     |     | 3    |      | 14   |     |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB  | EB   | EB   | WB  | WB  | WB  | SB  | SB   |
|-----------------------|-----|------|------|-----|-----|-----|-----|------|
| Directions Served     | L   | T    | T    | T   | T   | R   | L   | R    |
| Maximum Queue (ft)    | 157 | 73   | 48   | 123 | 116 | 30  | 48  | 68   |
| Average Queue (ft)    | 52  | 17   | 5    | 44  | 48  | 5   | 9   | 29   |
| 95th Queue (ft)       | 110 | 56   | 24   | 97  | 110 | 22  | 33  | 56   |
| Link Distance (ft)    |     | 2004 | 2004 | 544 | 544 |     |     | 2509 |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |      |
| Storage Bay Dist (ft) | 250 |      |      |     |     | 250 | 250 |      |
| Storage Blk Time (%)  |     |      |      |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |      |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | EB  | EB  | WB  | WB   | NB   |
|-----------------------|-----|-----|-----|------|------|
| Directions Served     | T   | R   | L   | T    | LR   |
| Maximum Queue (ft)    | 220 | 87  | 31  | 295  | 308  |
| Average Queue (ft)    | 68  | 28  | 6   | 131  | 162  |
| 95th Queue (ft)       | 171 | 67  | 25  | 245  | 268  |
| Link Distance (ft)    | 544 | 544 |     | 2676 | 5162 |
| Upstream Blk Time (%) |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |      |      |
| Storage Bay Dist (ft) |     |     | 250 |      |      |
| Storage Blk Time (%)  |     |     |     | 1    |      |
| Queuing Penalty (veh) |     |     |     | 0    |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | EB   | WB   | NB   |
|-----------------------|------|------|------|
| Directions Served     | TR   | T    | LR   |
| Maximum Queue (ft)    | 159  | 235  | 202  |
| Average Queue (ft)    | 41   | 94   | 116  |
| 95th Queue (ft)       | 116  | 169  | 183  |
| Link Distance (ft)    | 2676 | 4500 | 2478 |
| Upstream Blk Time (%) |      |      |      |
| Queuing Penalty (veh) |      |      |      |
| Storage Bay Dist (ft) |      |      |      |
| Storage Blk Time (%)  |      | 0    |      |
| Queuing Penalty (veh) |      | 0    |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | EB  | EB   | WB  | WB   | NB  | NB   | SB  | SB   |
|-----------------------|-----|------|-----|------|-----|------|-----|------|
| Directions Served     | L   | TR   | L   | TR   | L   | TR   | L   | TR   |
| Maximum Queue (ft)    | 73  | 212  | 73  | 282  | 331 | 265  | 53  | 372  |
| Average Queue (ft)    | 26  | 78   | 34  | 153  | 162 | 71   | 18  | 192  |
| 95th Queue (ft)       | 59  | 167  | 64  | 252  | 266 | 173  | 50  | 309  |
| Link Distance (ft)    |     | 4500 |     | 6437 |     | 2404 |     | 2430 |
| Upstream Blk Time (%) |     |      |     |      |     |      |     |      |
| Queuing Penalty (veh) |     |      |     |      |     |      |     |      |
| Storage Bay Dist (ft) | 250 |      | 250 |      | 250 |      | 250 |      |
| Storage Blk Time (%)  |     |      |     | 2    | 1   | 0    |     | 3    |
| Queuing Penalty (veh) |     |      |     | 1    | 1   | 0    |     | 1    |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | EB  | WB   | NB  | NB   | SB   |
|-----------------------|------|-----|------|-----|------|------|
| Directions Served     | LT   | R   | LTR  | L   | TR   | LTR  |
| Maximum Queue (ft)    | 31   | 76  | 52   | 112 | 71   | 91   |
| Average Queue (ft)    | 6    | 39  | 23   | 45  | 41   | 55   |
| 95th Queue (ft)       | 24   | 64  | 44   | 79  | 70   | 78   |
| Link Distance (ft)    | 6437 |     | 2715 |     | 2302 | 2072 |
| Upstream Blk Time (%) |      |     |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |     |      |      |
| Storage Bay Dist (ft) |      | 250 |      | 250 |      |      |
| Storage Blk Time (%)  |      |     |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |     |      |      |

Intersection: 20: Locan Avenue & Bullard Ave

| Movement              | EB  | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB   | NB | SB  | SB   |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|------|----|-----|------|
| Directions Served     | L   | T    | T    | R   | L   | T   | TR  | L   | T    | R  | L   | TR   |
| Maximum Queue (ft)    | 116 | 180  | 123  | 53  | 87  | 260 | 368 | 174 | 310  | 20 | 369 | 459  |
| Average Queue (ft)    | 53  | 68   | 27   | 18  | 12  | 154 | 204 | 89  | 164  | 2  | 152 | 192  |
| 95th Queue (ft)       | 101 | 133  | 71   | 46  | 46  | 237 | 312 | 178 | 273  | 13 | 274 | 332  |
| Link Distance (ft)    |     | 2664 | 2664 |     |     | 983 | 983 |     | 2630 |    |     | 5128 |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |      |    |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |      |    |     |      |
| Storage Bay Dist (ft) | 270 |      |      | 250 | 260 |     |     | 125 |      | 50 | 250 |      |
| Storage Blk Time (%)  |     |      |      |     |     | 1   |     | 0   | 50   |    | 0   | 4    |
| Queuing Penalty (veh) |     |      |      |     |     | 0   |     | 1   | 54   |    | 0   | 11   |



Intersection: 21: De Wolf Ave & Bullard Ave

| Movement              | EB  | EB   | EB  | WB  | WB   | NB  | NB   | SB  | SB   |
|-----------------------|-----|------|-----|-----|------|-----|------|-----|------|
| Directions Served     | L   | T    | R   | L   | TR   | L   | TR   | L   | TR   |
| Maximum Queue (ft)    | 153 | 164  | 243 | 369 | 805  | 370 | 546  | 77  | 262  |
| Average Queue (ft)    | 75  | 83   | 75  | 72  | 405  | 137 | 268  | 26  | 102  |
| 95th Queue (ft)       | 131 | 143  | 150 | 267 | 718  | 300 | 458  | 63  | 193  |
| Link Distance (ft)    |     | 1529 |     |     | 2470 |     | 2618 |     | 5162 |
| Upstream Blk Time (%) |     |      |     |     |      |     |      |     |      |
| Queuing Penalty (veh) |     |      |     |     |      |     |      |     |      |
| Storage Bay Dist (ft) | 250 |      | 250 | 250 |      | 250 |      | 250 |      |
| Storage Blk Time (%)  |     |      | 0   |     | 31   |     | 17   |     | 0    |
| Queuing Penalty (veh) |     |      | 0   |     | 8    |     | 25   |     | 0    |

Network Summary

Network wide Queuing Penalty: 981

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | EB   | EB  | EB  | WB   | WB  | WB  | NB   | NB  | NB  | NB   | SB  | SB  |
|-----------------------|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|
| Directions Served     | L    | T   | R   | L    | T   | R   | UL   | T   | T   | R    | L   | T   |
| Maximum Queue (ft)    | 240  | 258 | 170 | 167  | 201 | 105 | 270  | 251 | 271 | 62   | 73  | 138 |
| Average Queue (ft)    | 116  | 55  | 56  | 100  | 63  | 34  | 163  | 71  | 83  | 21   | 35  | 82  |
| 95th Queue (ft)       | 199  | 133 | 104 | 162  | 161 | 66  | 253  | 167 | 176 | 50   | 70  | 140 |
| Link Distance (ft)    | 1573 |     |     | 1457 |     |     | 2685 |     |     | 2685 |     |     |
| Upstream Blk Time (%) |      |     |     |      |     |     |      |     |     |      |     |     |
| Queuing Penalty (veh) |      |     |     |      |     |     |      |     |     |      |     |     |
| Storage Bay Dist (ft) | 240  |     | 80  | 100  |     | 25  | 240  |     |     | 120  | 250 |     |
| Storage Blk Time (%)  | 0    | 7   | 1   | 16   | 33  | 17  | 3    | 0   | 3   |      |     |     |
| Queuing Penalty (veh) | 1    | 31  | 3   | 29   | 95  | 43  | 11   | 0   | 6   |      |     |     |

Intersection: 1: Temperance Avenue & Nees Ave

| Movement              | SB   | SB |
|-----------------------|------|----|
| Directions Served     | T    | R  |
| Maximum Queue (ft)    | 112  | 54 |
| Average Queue (ft)    | 64   | 28 |
| 95th Queue (ft)       | 108  | 53 |
| Link Distance (ft)    | 1298 |    |
| Upstream Blk Time (%) |      |    |
| Queuing Penalty (veh) |      |    |
| Storage Bay Dist (ft) |      | 95 |
| Storage Blk Time (%)  | 3    |    |
| Queuing Penalty (veh) | 2    |    |

Intersection: 3: Temperance Avenue & SR 168 WB Ramp

| Movement              | WB  | WB | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R  | T   | T   |     |     | R   |
| Maximum Queue (ft)    | 160 | 94 | 114 | 160 | 136 | 131 | 107 |
| Average Queue (ft)    | 102 | 30 | 38  | 63  | 51  | 45  | 40  |
| 95th Queue (ft)       | 152 | 61 | 100 | 132 | 120 | 105 | 90  |
| Link Distance (ft)    | 478 |    | 584 | 584 | 430 | 430 | 430 |
| Upstream Blk Time (%) |     |    |     |     |     |     |     |
| Queuing Penalty (veh) |     |    |     |     |     |     |     |
| Storage Bay Dist (ft) | 385 |    |     |     |     |     |     |
| Storage Blk Time (%)  |     |    |     |     |     |     |     |
| Queuing Penalty (veh) |     |    |     |     |     |     |     |

Intersection: 4: Temperance Avenue & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | EB  | NB   | NB   | NB   | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|------|------|------|-----|-----|-----|
| Directions Served     | L   | L   | R   | R   | T    | T    | TR   | L   | T   | T   |
| Maximum Queue (ft)    | 267 | 613 | 346 | 314 | 316  | 342  | 372  | 134 | 322 | 378 |
| Average Queue (ft)    | 109 | 222 | 227 | 169 | 147  | 182  | 214  | 56  | 141 | 154 |
| 95th Queue (ft)       | 239 | 394 | 335 | 287 | 282  | 320  | 381  | 108 | 256 | 274 |
| Link Distance (ft)    |     | 605 | 605 |     | 1106 | 1106 | 1106 |     | 584 | 584 |
| Upstream Blk Time (%) |     | 0   |     |     |      |      |      |     |     |     |
| Queuing Penalty (veh) |     | 0   |     |     |      |      |      |     |     |     |
| Storage Bay Dist (ft) | 380 |     |     | 380 |      |      |      | 250 |     |     |
| Storage Blk Time (%)  |     | 1   |     |     |      |      |      |     | 1   |     |
| Queuing Penalty (veh) |     | 2   |     |     |      |      |      |     | 1   |     |

Intersection: 5: Temperance Avenue & Fir Avenue

| Movement              | WB  | WB  | NB  | NB  | NB  | NB  | SB  | SB  | SB   | SB   |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| Directions Served     | L   | R   | U   | T   | T   | R   | L   | L   | T    | T    |
| Maximum Queue (ft)    | 175 | 226 | 31  | 364 | 356 | 55  | 110 | 394 | 446  | 389  |
| Average Queue (ft)    | 70  | 75  | 5   | 85  | 144 | 10  | 60  | 50  | 104  | 105  |
| 95th Queue (ft)       | 131 | 147 | 22  | 226 | 310 | 35  | 100 | 167 | 264  | 246  |
| Link Distance (ft)    |     | 354 |     | 528 | 528 |     |     |     | 1106 | 1106 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |      |      |
| Storage Bay Dist (ft) | 130 |     | 100 |     |     | 105 | 225 | 225 |      |      |
| Storage Blk Time (%)  | 1   | 2   |     | 3   | 8   |     |     |     | 1    |      |
| Queuing Penalty (veh) | 2   | 2   |     | 0   | 3   |     |     |     | 1    |      |

Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|
| Directions Served     | ULTR | LTR | LTR | LTR |
| Maximum Queue (ft)    | 57   | 31  | 31  | 79  |
| Average Queue (ft)    | 9    | 1   | 4   | 20  |
| 95th Queue (ft)       | 37   | 10  | 21  | 52  |
| Link Distance (ft)    | 71   | 230 | 784 | 335 |
| Upstream Blk Time (%) | 0    |     |     |     |
| Queuing Penalty (veh) | 0    |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | WB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 156 | 279  | 251  | 249  | 122 | 154 | 204 | 250 | 390 | 165 | 384 | 297 |
| Average Queue (ft)    | 52  | 162  | 170  | 136  | 44  | 73  | 105 | 126 | 187 | 134 | 202 | 149 |
| 95th Queue (ft)       | 100 | 248  | 234  | 240  | 84  | 132 | 182 | 219 | 318 | 197 | 310 | 246 |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 638 | 638 | 638 |     | 441 | 441 |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     |     | 105 |     |     |
| Storage Blk Time (%)  |     |      |      | 5    | 0   | 10  | 11  |     |     | 18  | 30  | 9   |
| Queuing Penalty (veh) |     |      |      | 13   | 1   | 28  | 14  |     |     | 45  | 56  | 5   |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | NB  | SB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | R   | L   | T    | T    | R   |
| Maximum Queue (ft)    | 44  | 164 | 201  | 179  | 140 |
| Average Queue (ft)    | 15  | 104 | 111  | 101  | 52  |
| 95th Queue (ft)       | 38  | 152 | 168  | 164  | 123 |
| Link Distance (ft)    |     |     | 2399 | 2399 |     |
| Upstream Blk Time (%) |     |     |      |      |     |
| Queuing Penalty (veh) |     |     |      |      |     |
| Storage Bay Dist (ft) | 130 | 100 |      |      | 80  |
| Storage Blk Time (%)  |     | 16  | 16   | 21   | 1   |
| Queuing Penalty (veh) |     | 23  | 18   | 18   | 1   |

Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | WB  | B26  | B26  | NE  | SW   |
|-----------------------|-----|-----|------|------|-----|------|
| Directions Served     | L   | U   | T    | T    | R   | R    |
| Maximum Queue (ft)    | 67  | 9   | 1156 | 1208 | 173 | 42   |
| Average Queue (ft)    | 17  | 1   | 39   | 40   | 52  | 5    |
| 95th Queue (ft)       | 55  | 5   | 381  | 398  | 117 | 23   |
| Link Distance (ft)    |     |     | 1182 | 1182 | 775 | 1211 |
| Upstream Blk Time (%) |     |     |      | 0    |     |      |
| Queuing Penalty (veh) |     |     |      | 1    |     |      |
| Storage Bay Dist (ft) | 400 | 120 |      |      |     |      |
| Storage Blk Time (%)  |     |     |      |      |     |      |
| Queuing Penalty (veh) |     |     |      |      |     |      |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 89  | 110 | 525  | 543  | 280 | 45  | 86  | 283 | 277 | 259 | 285 | 134 |
| Average Queue (ft)    | 31  | 54  | 238  | 257  | 168 | 11  | 17  | 183 | 199 | 158 | 152 | 80  |
| 95th Queue (ft)       | 69  | 96  | 381  | 410  | 326 | 35  | 52  | 262 | 279 | 254 | 259 | 134 |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 175 | 175 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  |     |     | 20   | 27   | 2   |     |     | 21  |     |     |     |     |
| Queuing Penalty (veh) |     |     | 25   | 85   | 8   |     |     | 8   |     |     |     |     |

Intersection: 9: Temperance Avenue & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R   |
| Maximum Queue (ft)    | 158 | 210  | 260  | 240 | 211 | 334 | 335 | 311 | 270 |
| Average Queue (ft)    | 101 | 125  | 163  | 37  | 112 | 155 | 183 | 195 | 76  |
| 95th Queue (ft)       | 146 | 218  | 248  | 128 | 195 | 236 | 274 | 285 | 223 |
| Link Distance (ft)    |     | 2737 | 2737 |     |     |     | 528 | 528 |     |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     |     | 150 |
| Storage Blk Time (%)  |     | 0    | 37   |     | 1   | 3   | 8   | 17  | 0   |
| Queuing Penalty (veh) |     | 0    | 16   |     | 6   | 15  | 39  | 36  | 1   |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB  | WB  | WB  | WB  | WB  | WB  | NB  | SB | SB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| Directions Served     | L   | T   | T   | TR  | L   | T   | T   | T   | R   | LTR | LT | R  |
| Maximum Queue (ft)    | 62  | 424 | 450 | 232 | 24  | 181 | 221 | 264 | 31  | 188 | 74 | 56 |
| Average Queue (ft)    | 22  | 41  | 54  | 9   | 1   | 53  | 68  | 80  | 4   | 89  | 27 | 45 |
| 95th Queue (ft)       | 53  | 181 | 209 | 77  | 8   | 133 | 168 | 190 | 20  | 155 | 56 | 76 |
| Link Distance (ft)    |     | 997 | 997 | 997 |     | 286 | 286 | 286 |     | 355 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |     |     | 12 | 1  |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |     | 7  | 1  |
| Storage Bay Dist (ft) | 145 |     |     |     | 190 |     |     |     | 120 |     |    |    |
| Storage Blk Time (%)  |     | 2   |     |     |     | 0   |     | 4   |     |     |    |    |
| Queuing Penalty (veh) |     | 1   |     |     |     | 0   |     | 1   |     |     |    |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | T   | R   | L   | T   |
| Maximum Queue (ft)    | 56  | 75  | 132 | 68  |
| Average Queue (ft)    | 18  | 26  | 44  | 21  |
| 95th Queue (ft)       | 47  | 55  | 87  | 54  |
| Link Distance (ft)    | 784 |     |     | 364 |
| Upstream Blk Time (%) |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |
| Storage Bay Dist (ft) |     | 100 | 100 |     |
| Storage Blk Time (%)  |     |     | 2   |     |
| Queuing Penalty (veh) |     |     | 1   |     |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | SB  |
|-----------------------|-----|
| Directions Served     | R   |
| Maximum Queue (ft)    | 31  |
| Average Queue (ft)    | 3   |
| 95th Queue (ft)       | 18  |
| Link Distance (ft)    | 903 |
| Upstream Blk Time (%) |     |
| Queuing Penalty (veh) |     |
| Storage Bay Dist (ft) |     |
| Storage Blk Time (%)  |     |
| Queuing Penalty (veh) |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | WB  | WB   | WB   | NB   | NB  |
|-----------------------|-----|-----|-----|-----|------|------|------|-----|
| Directions Served     | T   | T   | R   | L   | T    | T    | L    | R   |
| Maximum Queue (ft)    | 280 | 292 | 93  | 76  | 162  | 215  | 484  | 370 |
| Average Queue (ft)    | 91  | 89  | 38  | 17  | 83   | 99   | 286  | 92  |
| 95th Queue (ft)       | 204 | 206 | 79  | 48  | 158  | 186  | 411  | 275 |
| Link Distance (ft)    | 483 | 483 |     |     | 2004 | 2004 | 5128 |     |
| Upstream Blk Time (%) |     |     |     |     |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 250 | 250 |      |      |      | 250 |
| Storage Blk Time (%)  |     | 1   |     |     |      |      | 11   |     |
| Queuing Penalty (veh) |     | 2   |     |     |      |      | 18   |     |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB  | EB   | EB   | WB  | WB  | WB  | SB  | SB   |
|-----------------------|-----|------|------|-----|-----|-----|-----|------|
| Directions Served     | L   | T    | T    | T   | T   | R   | L   | R    |
| Maximum Queue (ft)    | 112 | 278  | 279  | 96  | 96  | 28  | 26  | 84   |
| Average Queue (ft)    | 54  | 56   | 38   | 30  | 36  | 2   | 14  | 23   |
| 95th Queue (ft)       | 96  | 178  | 137  | 73  | 87  | 12  | 32  | 54   |
| Link Distance (ft)    |     | 2004 | 2004 | 544 | 544 |     |     | 2509 |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |      |
| Storage Bay Dist (ft) | 250 |      |      |     |     | 250 | 250 |      |
| Storage Blk Time (%)  |     | 0    |      |     |     |     |     |      |
| Queuing Penalty (veh) |     | 0    |      |     |     |     |     |      |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | EB  | EB  | WB  | WB   | NB   |
|-----------------------|-----|-----|-----|------|------|
| Directions Served     | T   | R   | L   | T    | LR   |
| Maximum Queue (ft)    | 290 | 196 | 53  | 185  | 301  |
| Average Queue (ft)    | 125 | 47  | 8   | 71   | 143  |
| 95th Queue (ft)       | 270 | 104 | 34  | 147  | 242  |
| Link Distance (ft)    | 544 | 544 |     | 2676 | 5162 |
| Upstream Blk Time (%) |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |      |      |
| Storage Bay Dist (ft) |     |     | 250 |      |      |
| Storage Blk Time (%)  |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |      |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | EB   | WB  | WB   | NB   |
|-----------------------|------|-----|------|------|
| Directions Served     | TR   | L   | T    | LR   |
| Maximum Queue (ft)    | 244  | 25  | 135  | 154  |
| Average Queue (ft)    | 65   | 2   | 56   | 85   |
| 95th Queue (ft)       | 173  | 13  | 122  | 135  |
| Link Distance (ft)    | 2676 |     | 4500 | 2478 |
| Upstream Blk Time (%) |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |      |
| Storage Bay Dist (ft) |      | 250 |      |      |
| Storage Blk Time (%)  |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | EB  | EB   | WB  | WB   | NB  | NB   | SB  | SB   |
|-----------------------|-----|------|-----|------|-----|------|-----|------|
| Directions Served     | L   | TR   | L   | TR   | L   | TR   | L   | TR   |
| Maximum Queue (ft)    | 155 | 423  | 53  | 244  | 289 | 281  | 74  | 336  |
| Average Queue (ft)    | 48  | 199  | 22  | 137  | 127 | 156  | 19  | 207  |
| 95th Queue (ft)       | 97  | 371  | 45  | 223  | 231 | 265  | 58  | 309  |
| Link Distance (ft)    |     | 4500 |     | 6437 |     | 2404 |     | 2430 |
| Upstream Blk Time (%) |     |      |     |      |     |      |     |      |
| Queuing Penalty (veh) |     |      |     |      |     |      |     |      |
| Storage Bay Dist (ft) | 250 |      | 250 |      | 250 |      | 250 |      |
| Storage Blk Time (%)  |     | 8    |     | 0    | 2   | 1    |     | 4    |
| Queuing Penalty (veh) |     | 5    |     | 0    | 6   | 2    |     | 1    |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | EB  | WB   | NB  | NB   | SB   |
|-----------------------|------|-----|------|-----|------|------|
| Directions Served     | LT   | R   | LTR  | L   | TR   | LTR  |
| Maximum Queue (ft)    | 32   | 116 | 31   | 106 | 85   | 106  |
| Average Queue (ft)    | 15   | 60  | 17   | 59  | 51   | 57   |
| 95th Queue (ft)       | 39   | 100 | 37   | 91  | 73   | 87   |
| Link Distance (ft)    | 6437 |     | 2715 |     | 2302 | 2072 |
| Upstream Blk Time (%) |      |     |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |     |      |      |
| Storage Bay Dist (ft) |      | 250 |      | 250 |      |      |
| Storage Blk Time (%)  |      |     |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |     |      |      |

Intersection: 20: Locan Avenue & Bullard Ave

| Movement              | EB  | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB   | NB  | SB  | SB   |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|------|-----|-----|------|
| Directions Served     | L   | T    | T    | R   | L   | T   | TR  | L   | T    | R   | L   | TR   |
| Maximum Queue (ft)    | 116 | 267  | 255  | 54  | 88  | 285 | 301 | 170 | 104  | 42  | 370 | 618  |
| Average Queue (ft)    | 49  | 179  | 135  | 30  | 32  | 185 | 207 | 65  | 46   | 13  | 101 | 350  |
| 95th Queue (ft)       | 92  | 260  | 242  | 60  | 73  | 266 | 294 | 127 | 88   | 36  | 280 | 545  |
| Link Distance (ft)    |     | 2664 | 2664 |     |     | 983 | 983 |     | 2630 |     |     | 5128 |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |      |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |      |     |     |      |
| Storage Bay Dist (ft) | 270 |      |      | 250 | 260 |     |     | 125 |      | 250 | 250 |      |
| Storage Blk Time (%)  |     | 0    | 0    |     |     | 1   |     | 2   |      |     |     | 26   |
| Queuing Penalty (veh) |     | 0    | 0    |     |     | 0   |     | 3   |      |     |     | 25   |



Intersection: 21: De Wolf Ave & Bullard Ave

| Movement              | EB  | EB   | EB  | B19 | WB  | WB   | NB  | NB   | SB  | SB   |
|-----------------------|-----|------|-----|-----|-----|------|-----|------|-----|------|
| Directions Served     | L   | T    | R   | T   | L   | TR   | L   | TR   | L   | TR   |
| Maximum Queue (ft)    | 96  | 294  | 176 | 938 | 112 | 362  | 249 | 293  | 96  | 373  |
| Average Queue (ft)    | 49  | 186  | 64  | 31  | 42  | 202  | 111 | 153  | 32  | 178  |
| 95th Queue (ft)       | 97  | 291  | 121 | 309 | 87  | 314  | 199 | 256  | 73  | 297  |
| Link Distance (ft)    |     | 1529 |     | 996 |     | 2470 |     | 2618 |     | 5162 |
| Upstream Blk Time (%) |     |      |     |     |     |      |     |      |     |      |
| Queuing Penalty (veh) |     |      |     |     |     |      |     |      |     |      |
| Storage Bay Dist (ft) | 250 |      | 250 |     | 250 |      | 250 |      | 250 |      |
| Storage Blk Time (%)  |     | 3    |     |     |     | 4    | 0   | 1    |     | 4    |
| Queuing Penalty (veh) |     | 10   |     |     |     | 2    | 0   | 1    |     | 2    |

Network Summary

Network wide Queuing Penalty: 1037

## Appendix I: LOS Worksheets, Cumulative Year 2035 plus Project



**Traffic Engineering, Inc.**

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





















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# HCM Signalized Intersection Capacity Analysis

2035 + Proj AM Peak

## 1: Temperance Avenue & Nees Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph)                      | 100   | 67  | 189   | 185   | 67  | 25  | 32   | 257   | 374   | 152   | 100   | 760   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 0.99  | 1.00  | 1.00  | 0.98  |  | 1.00  | 1.00  | 0.97  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1534  |  | 1752  | 3505  | 1528  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1548  | 1752  | 1845  | 1534  |  | 1752  | 3505  | 1528  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 109   | 73  | 205   | 201   | 73  | 27  | 35   | 279   | 407   | 165   | 109   | 826   |
| RTOR Reduction (vph)              | 0   | 0   | 181   | 0   | 0   | 23  | 0  | 0   | 0   | 91  | 0   | 0   |
| Lane Group Flow (vph)             | 109   | 73  | 24  | 201   | 73  | 4   | 0  | 314   | 407   | 74  | 109   | 826   |
| Confl. Peds. (#/hr)               |   |   | 1   |   |   | 9   |  |   |   | 3   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 16.7  | 14.3  | 14.3  | 20.9  | 18.1  | 18.1  |  | 28.5  | 53.6  | 53.6  | 12.2  | 37.3  |
| Effective Green, g (s)            | 16.7  | 14.3  | 14.3  | 20.9  | 18.1  | 18.1  |  | 28.5  | 53.6  | 53.6  | 12.2  | 37.3  |
| Actuated g/C Ratio                | 0.14  | 0.12  | 0.12  | 0.17  | 0.15  | 0.15  |  | 0.24  | 0.45  | 0.45  | 0.10  | 0.31  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 243   | 219   | 184   | 305   | 278   | 231   |  | 416   | 1565  | 682   | 178   | 1089  |
| v/s Ratio Prot                    | c0.06   | 0.04  |   | c0.11   | 0.04  |   |  | c0.18   | 0.12  |   | 0.06  | c0.24   |
| v/s Ratio Perm                    |   |   | 0.02  |   |   | 0.00  |  |   |   | 0.05  |   |   |
| v/c Ratio                         | 0.45  | 0.33  | 0.13  | 0.66  | 0.26  | 0.02  |  | 0.75  | 0.26  | 0.11  | 0.61  | 0.76  |
| Uniform Delay, d1                 | 47.4  | 48.5  | 47.3  | 46.2  | 45.0  | 43.4  |  | 42.5  | 20.8  | 19.3  | 51.6  | 37.3  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 0.89  | 0.45  | 0.45  | 1.00  | 1.00  |
| Incremental Delay, d2             | 1.3   | 0.9   | 0.3   | 5.1   | 0.5   | 0.0   |  | 7.3   | 0.4   | 0.3   | 6.1   | 5.0   |
| Delay (s)                         | 48.7  | 49.4  | 47.6  | 51.3  | 45.6  | 43.4  |  | 45.2  | 9.7   | 9.1   | 57.7  | 42.3  |
| Level of Service                  | D   | D   | D   | D   | D   | D   |  | D   | A   | A   | E   | D   |
| Approach Delay (s)                |   | 48.3  |   |   | 49.2  |   |  |   | 22.2  |   |   | 41.6  |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | C   |   |   | D   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 37.2  |   |   |   | HCM 2000 Level of Service  |   | D   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.71  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 80.3%   |   |   |   | ICU Level of Service   |   | D   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Avenue & Nees Ave

2035 + Proj AM Peak

3/28/2017

|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 254  |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.99 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1547 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1547 |
| Peak-hour factor, PHF  | 0.92 |
| Adj. Flow (vph)        | 276  |
| RTOR Reduction (vph)   | 124  |
| Lane Group Flow (vph)  | 152  |
| Confl. Peds. (#/hr)    | 1    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 37.3 |
| Effective Green, g (s) | 37.3 |
| Actuated g/C Ratio     | 0.31 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 480  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.10 |
| v/c Ratio              | 0.32 |
| Uniform Delay, d1      | 31.6 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 1.7  |
| Delay (s)              | 33.3 |
| Level of Service       | C    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# MOVEMENT SUMMARY



## Site: 2035+Project - AM Roundabout at Temperance and Owens Mt Parkway

New Site  
Roundabout

| Movement Performance - Vehicles |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
|---------------------------------|--------|--------------------------------|------------------|------------------|----------------------|------------------|--------------------------------------|-------------------------|--------------|--------------------------------|----------------------|
| Mov ID                          | OD Mov | Demand Flows<br>Total<br>veh/h | Flows<br>HV<br>% | Deg. Satn<br>v/c | Average Delay<br>sec | Level of Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>ft | Prop. Queued | Effective Stop Rate<br>per veh | Average Speed<br>mph |
| South: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 3                               | L2     | 179                            | 3.0              | 0.840            | 16.2                 | LOS C            | 8.9                                  | 228.1                   | 0.86         | 1.10                           | 31.4                 |
| 8                               | T1     | 546                            | 3.0              | 0.840            | 10.1                 | LOS B            | 8.9                                  | 228.1                   | 0.86         | 1.10                           | 30.4                 |
| 18                              | R2     | 863                            | 3.0              | 0.946            | 16.6                 | LOS C            | 16.0                                 | 410.0                   | 1.00         | 1.40                           | 24.0                 |
| Approach                        |        | 1588                           | 3.0              | 0.946            | 14.3                 | LOS B            | 16.0                                 | 410.0                   | 0.94         | 1.26                           | 27.5                 |
| East: Owens Mt Parkway          |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 1                               | L2     | 391                            | 3.0              | 0.466            | 12.5                 | LOS B            | 3.6                                  | 92.3                    | 0.84         | 0.91                           | 25.7                 |
| 6                               | T1     | 101                            | 3.0              | 0.181            | 6.4                  | LOS A            | 0.9                                  | 23.8                    | 0.70         | 0.67                           | 33.2                 |
| 16                              | R2     | 84                             | 3.0              | 0.081            | 4.7                  | LOS A            | 0.4                                  | 10.8                    | 0.56         | 0.58                           | 32.5                 |
| Approach                        |        | 576                            | 3.0              | 0.466            | 10.3                 | LOS B            | 3.6                                  | 92.3                    | 0.78         | 0.82                           | 28.8                 |
| North: Temperance Avenue        |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 7                               | L2     | 276                            | 3.0              | 0.718            | 12.8                 | LOS B            | 5.0                                  | 128.3                   | 0.74         | 0.89                           | 32.3                 |
| 4                               | T1     | 945                            | 3.0              | 0.718            | 6.6                  | LOS A            | 5.1                                  | 129.5                   | 0.73         | 0.82                           | 31.8                 |
| 14                              | R2     | 45                             | 3.0              | 0.718            | 7.1                  | LOS A            | 5.1                                  | 129.5                   | 0.73         | 0.78                           | 32.7                 |
| Approach                        |        | 1265                           | 3.0              | 0.718            | 8.0                  | LOS A            | 5.1                                  | 129.5                   | 0.73         | 0.83                           | 32.0                 |
| West: Alluvial Avenue           |        |                                |                  |                  |                      |                  |                                      |                         |              |                                |                      |
| 5                               | L2     | 23                             | 3.0              | 0.609            | 19.7                 | LOS C            | 3.6                                  | 91.2                    | 0.86         | 1.02                           | 31.8                 |
| 2                               | T1     | 306                            | 3.0              | 0.609            | 13.2                 | LOS B            | 3.9                                  | 98.8                    | 0.86         | 1.02                           | 31.0                 |
| 12                              | R2     | 229                            | 3.0              | 0.609            | 12.8                 | LOS B            | 3.9                                  | 98.8                    | 0.87         | 1.03                           | 29.4                 |
| Approach                        |        | 558                            | 3.0              | 0.609            | 13.3                 | LOS B            | 3.9                                  | 98.8                    | 0.86         | 1.03                           | 30.5                 |
| All Vehicles                    |        | 3987                           | 3.0              | 0.946            | 11.6                 | LOS B            | 16.0                                 | 410.0                   | 0.84         | 1.03                           | 29.7                 |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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
















Project: Z:\01 Projects\006 Clovis\006-009 CCMC Phase 2 TIA\Background\Alluvial at Temperance Roundabout\Temperance Alluvial.sip6

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Avenue & SR 168 WB Ramp

2035 + Proj AM Peak

3/28/2017


















|                              |   |   |   |   |   |   |  |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
|                              |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |   |   |   |  |   |  |  |  |  |   |  |  |
| Volume (veh/h)               | 0   | 0   | 0   | 269   | 0   | 116   | 0  | 1440  | 1148  | 0   | 788   | 725   |
| Number                       |   |   |   | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          |   |   |   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          |   |   |   | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             |   |   |   | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       |   |   |   | 1845  | 0   | 1845  | 0  | 1845  | 1845  | 0   | 1845  | 1845  |
| Adj Flow Rate, veh/h         |   |   |   | 292   | 0   | 126   | 0  | 1565  | 0   | 0   | 857   | 788   |
| Adj No. of Lanes             |   |   |   | 1   | 0   | 1   | 0  | 2   | 1   | 0   | 2   | 1   |
| Peak Hour Factor             |   |   |   | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         |   |   |   | 3   | 0   | 3   | 0  | 3   | 3   | 0   | 3   | 3   |
| Cap, veh/h                   |   |   |   | 337   | 0   | 306   | 0  | 2599  | 1146  | 0   | 2599  | 1163  |
| Arrive On Green              |   |   |   | 0.19  | 0.00  | 0.20  | 0.00   | 1.00  | 0.00  | 0.00  | 1.00  | 1.00  |
| Sat Flow, veh/h              |   |   |   | 1757  | 0   | 1568  | 0  | 3597  | 1568  | 0   | 3597  | 1568  |
| Grp Volume(v), veh/h         |   |   |   | 292   | 0   | 126   | 0  | 1565  | 0   | 0   | 857   | 788   |
| Grp Sat Flow(s),veh/h/ln     |   |   |   | 1757  | 0   | 1568  | 0  | 1752  | 1568  | 0   | 1752  | 1568  |
| Q Serve(g_s), s              |   |   |   | 19.3  | 0.0   | 8.4   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        |   |   |   | 19.3  | 0.0   | 8.4   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Prop In Lane                 |   |   |   | 1.00  |   | 1.00  | 0.00   |   | 1.00  | 0.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       |   |   |   | 337   | 0   | 306   | 0  | 2599  | 1146  | 0   | 2599  | 1163  |
| V/C Ratio(X)                 |   |   |   | 0.87  | 0.00  | 0.41  | 0.00   | 0.60  | 0.00  | 0.00  | 0.33  | 0.68  |
| Avail Cap(c_a), veh/h        |   |   |   | 527   | 0   | 476   | 0  | 2599  | 1146  | 0   | 2599  | 1163  |
| HCM Platoon Ratio            |   |   |   | 1.00  | 1.00  | 1.00  | 1.00   | 2.00  | 2.00  | 1.00  | 2.00  | 2.00  |
| Upstream Filter(I)           |   |   |   | 1.00  | 0.00  | 1.00  | 0.00   | 0.09  | 0.00  | 0.00  | 0.40  | 0.40  |
| Uniform Delay (d), s/veh     |   |   |   | 47.0  | 0.0   | 42.3  | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       |   |   |   | 9.1   | 0.0   | 0.9   | 0.0  | 0.1   | 0.0   | 0.0   | 0.1   | 1.3   |
| Initial Q Delay(d3),s/veh    |   |   |   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     |   |   |   | 10.3  | 0.0   | 3.7   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.4   |
| LnGrp Delay(d),s/veh         |   |   |   | 56.1  | 0.0   | 43.2  | 0.0  | 0.1   | 0.0   | 0.0   | 0.1   | 1.3   |
| LnGrp LOS                    |   |   |   | E   |   | D   |  | A   |   |   | A   | A   |
| Approach Vol, veh/h          |   |   |   |   | 418   |   |  | 1565  |   |   | 1645  |   |
| Approach Delay, s/veh        |   |   |   |   | 52.2  |   |  | 0.1   |   |   | 0.7   |   |
| Approach LOS                 |   |   |   |   | D   |   |  | A   |   |   | A   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 |   | 2   |   |   |   | 6   |  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     |   | 93.0  |   |   |   | 93.0  |  | 27.0  |   |   |   |   |
| Change Period (Y+Rc), s      |   | 5.3   |   |   |   | 5.3   |  | 4.2   |   |   |   |   |
| Max Green Setting (Gmax), s  |   | 74.7  |   |   |   | 74.7  |  | 35.8  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s |   | 2.0   |   |   |   | 2.0   |  | 21.3  |   |   |   |   |
| Green Ext Time (p_c), s      |   | 38.1  |   |   |   | 38.1  |  | 1.5   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 6.4   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | A   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Avenue & SR 168 EB Ramp

2035 + Proj AM Peak

3/28/2017























|                              |   |   |   |   |   |   |  |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
|                              |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 616   | 0   | 822   | 0   | 0   | 0   | 0  | 1972  | 60  | 101   | 956   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 662   | 0   | 884   |   |   |   | 0  | 2120  | 65  | 109   | 1028  | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 644   | 0   | 580   |   |   |   | 0  | 1678  | 51  | 558   | 2956  | 0   |
| Arrive On Green              | 0.37  | 0.00  | 0.37  |   |   |   | 0.00   | 0.64  | 0.63  | 0.64  | 1.00  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0  | 3565  | 106   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 662   | 0   | 884   |   |   |   | 0  | 1064  | 1121  | 109   | 1028  | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0  | 1752  | 1826  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 44.0  | 0.0   | 44.4  |   |   |   | 0.0  | 58.0  | 58.0  | 3.1   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        | 44.0  | 0.0   | 44.4  |   |   |   | 0.0  | 58.0  | 58.0  | 3.1   | 0.0   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.06  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 644   | 0   | 580   |   |   |   | 0  | 847   | 883   | 558   | 2956  | 0   |
| V/C Ratio(X)                 | 1.03  | 0.00  | 1.52  |   |   |   | 0.00   | 1.26  | 1.27  | 0.20  | 0.35  | 0.00  |
| Avail Cap(c_a), veh/h        | 644   | 0   | 580   |   |   |   | 0  | 847   | 883   | 558   | 2956  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.33  | 1.33  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.89  | 0.89  | 0.00  |
| Uniform Delay (d), s/veh     | 38.0  | 0.0   | 37.8  |   |   |   | 0.0  | 21.4  | 21.5  | 15.5  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       | 42.7  | 0.0   | 244.4   |   |   |   | 0.0  | 125.1   | 130.3   | 0.2   | 0.3   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 28.9  | 0.0   | 58.6  |   |   |   | 0.0  | 57.1  | 60.7  | 1.5   | 0.1   | 0.0   |
| LnGrp Delay(d),s/veh         | 80.7  | 0.0   | 282.2   |   |   |   | 0.0  | 146.6   | 151.8   | 15.6  | 0.3   | 0.0   |
| LnGrp LOS                    | F   |   | F   |   |   |   |  | F   | F   | B   | A   |   |
| Approach Vol, veh/h          |   | 1546  |   |   |   |   |  | 2185  |   |   | 1137  |   |
| Approach Delay, s/veh        |   | 195.9   |   |   |   |   |  | 149.2   |   |   | 1.8   |   |
| Approach LOS                 |   | F   |   |   |   |   |  | F   |   |   | A   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 43.5  | 62.0  |   | 48.0  |   | 105.5   |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 5.8   | * 57  |   | * 44  |   | 66.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 5.1   | 60.0  |   | 46.4  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 0.0   |   | 0.0   |   | 6.1   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 129.6   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | F   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

2035 + Proj AM Peak

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBU   | SBL   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |   |  |
| Volume (vph)                      | 53  | 7   | 148   | 151   | 5   | 155   | 1  | 69  | 1673  | 150   | 51  | 727   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.2   | 4.2   | 4.0   | 4.2   | 4.0   |  | 4.2   | 4.0   | 4.0   |   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  |   | 0.97  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.99  |   | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  |   | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  |   | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1546  |   | 3400  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1546  |   | 3400  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 58  | 8   | 161   | 164   | 5   | 168   | 1  | 75  | 1818  | 163   | 55  | 790   |
| RTOR Reduction (vph)              | 0   | 0   | 140   | 0   | 0   | 154   | 0  | 0   | 0   | 63  | 0   | 0   |
| Lane Group Flow (vph)             | 58  | 8   | 21  | 164   | 5   | 14  | 0  | 76  | 1818  | 100   | 0   | 845   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | Prot  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 1   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 12.5  | 15.6  | 15.6  | 6.8   | 9.9   | 9.9   |  | 8.2   | 63.0  | 63.0  |   | 16.7  |
| Effective Green, g (s)            | 12.5  | 15.6  | 15.6  | 7.0   | 9.9   | 10.1  |  | 8.2   | 64.3  | 64.3  |   | 16.9  |
| Actuated g/C Ratio                | 0.10  | 0.13  | 0.13  | 0.06  | 0.08  | 0.08  |  | 0.07  | 0.54  | 0.54  |   | 0.14  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   |  | 4.2   | 5.3   | 5.3   |   | 4.2   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   |   | 3.0   |
| Lane Grp Cap (vph)                | 182   | 239   | 203   | 102   | 152   | 131   |  | 119   | 1878  | 828   |   | 478   |
| v/s Ratio Prot                    | c0.03   | 0.00  |   | c0.09   | 0.00  |   |  | 0.04  | c0.52   |   |   | c0.25   |
| v/s Ratio Perm                    |   |   | c0.01   |   |   | 0.01  |  |   |   | 0.06  |   |   |
| v/c Ratio                         | 0.32  | 0.03  | 0.10  | 1.61  | 0.03  | 0.11  |  | 0.64  | 0.97  | 0.12  |   | 1.77  |
| Uniform Delay, d1                 | 49.8  | 45.6  | 46.0  | 56.5  | 50.6  | 50.8  |  | 54.5  | 26.9  | 13.8  |   | 51.5  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.11  | 0.77  | 0.55  |   | 0.79  |
| Incremental Delay, d2             | 1.0   | 0.1   | 0.2   | 314.2   | 0.1   | 0.4   |  | 4.0   | 7.1   | 0.1   |   | 350.4   |
| Delay (s)                         | 50.8  | 45.7  | 46.3  | 370.7   | 50.7  | 51.2  |  | 64.7  | 27.6  | 7.7   |   | 391.1   |
| Level of Service                  | D   | D   | D   | F   | D   | D   |  | E   | C   | A   |   | F   |
| Approach Delay (s)                |   | 47.4  |   |   | 206.6   |   |  |   | 27.4  |   |   |   |
| Approach LOS                      |   | D   |   |   | F   |   |  |   | C   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 104.8   |   |   |   | HCM 2000 Level of Service  |   |   | F   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 1.04  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   |   | 16.6  |   |   |
| Intersection Capacity Utilization |   |   | 94.9%   |   |   |   | ICU Level of Service   |   |   | F   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |



# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Avenue & Fir Avenue

2035 + Proj AM Peak

3/28/2017



| Movement                 | SBT   | SBR  |
|--------------------------|-------|------|
| Left Lane Configurations | ↑↑    |      |
| Volume (vph)             | 931   | 69   |
| Ideal Flow (vphpl)       | 1900  | 1900 |
| Total Lost time (s)      | 4.0   |      |
| Lane Util. Factor        | 0.95  |      |
| Frpb, ped/bikes          | 1.00  |      |
| Flpb, ped/bikes          | 1.00  |      |
| Frt                      | 0.99  |      |
| Flt Protected            | 1.00  |      |
| Satd. Flow (prot)        | 3469  |      |
| Flt Permitted            | 1.00  |      |
| Satd. Flow (perm)        | 3469  |      |
| Peak-hour factor, PHF    | 0.92  | 0.92 |
| Adj. Flow (vph)          | 1012  | 75   |
| RTOR Reduction (vph)     | 3     | 0    |
| Lane Group Flow (vph)    | 1084  | 0    |
| Confl. Peds. (#/hr)      |       |      |
| Turn Type                | NA    |      |
| Protected Phases         | 6     |      |
| Permitted Phases         |       |      |
| Actuated Green, G (s)    | 71.5  |      |
| Effective Green, g (s)   | 72.8  |      |
| Actuated g/C Ratio       | 0.61  |      |
| Clearance Time (s)       | 5.3   |      |
| Vehicle Extension (s)    | 3.0   |      |
| Lane Grp Cap (vph)       | 2104  |      |
| v/s Ratio Prot           | 0.31  |      |
| v/s Ratio Perm           |       |      |
| v/c Ratio                | 0.52  |      |
| Uniform Delay, d1        | 13.5  |      |
| Progression Factor       | 0.62  |      |
| Incremental Delay, d2    | 0.5   |      |
| Delay (s)                | 8.9   |      |
| Level of Service         | A     |      |
| Approach Delay (s)       | 176.1 |      |
| Approach LOS             | F     |      |
| Intersection Summary     |       |      |
























| Intersection                   |       |       |       |       |
|--------------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh 21.9 |       |       |       |       |
| Intersection LOS C             |       |       |       |       |
| Approach                       | EB    | WB    | NB    | SB    |
| Entry Lanes                    | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes       | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h       | 956   | 34    | 141   | 248   |
| Demand Flow Rate, veh/h        | 985   | 34    | 145   | 256   |
| Vehicles Circulating, veh/h    | 24    | 1002  | 919   | 51    |
| Vehicles Exiting, veh/h        | 283   | 62    | 90    | 985   |
| Follow-Up Headway, s           | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h      | 0     | 0     | 0     | 0     |
| Ped Cap Adj                    | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh          | 27.7  | 10.0  | 13.7  | 5.7   |
| Approach LOS                   | D     | A     | B     | A     |
| Lane                           | Left  | Left  | Left  | Left  |
| Designated Moves               | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves                  | LTR   | LTR   | LTR   | LTR   |
| RT Channelized                 |       |       |       |       |
| Lane Util                      | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s            | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h              | 985   | 34    | 145   | 256   |
| Cap Entry Lane, veh/h          | 1103  | 415   | 451   | 1074  |
| Entry HV Adj Factor            | 0.971 | 0.986 | 0.971 | 0.971 |
| Flow Entry, veh/h              | 956   | 34    | 141   | 248   |
| Cap Entry, veh/h               | 1071  | 409   | 438   | 1042  |
| V/C Ratio                      | 0.893 | 0.082 | 0.322 | 0.238 |
| Control Delay, s/veh           | 27.7  | 10.0  | 13.7  | 5.7   |
| LOS                            | D     | A     | B     | A     |
| 95th %tile Queue, veh          | 13    | 0     | 1     | 1     |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

2035 + Proj AM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |   |   |  |  |  |  |
| Volume (veh/h)  | 71  | 606   | 134   | 212   | 1056  | 173   | 321  | 318   | 34  | 84  | 227   | 96  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 76  | 652   | 144   | 228   | 1135  | 186   | 345  | 342   | 37  | 90  | 244   | 103   |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 363   | 2130  | 663   | 259   | 1068  | 174   | 306  | 787   | 352   | 117   | 376   | 168   |
| Arrive On Green   | 0.21  | 0.42  | 0.42  | 0.15  | 0.35  | 0.34  | 0.17   | 0.22  | 0.22  | 0.07  | 0.11  | 0.11  |
| Sat Flow, veh/h   | 1757  | 5036  | 1568  | 1757  | 3017  | 493   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 76  | 652   | 144   | 228   | 658   | 663   | 345  | 342   | 37  | 90  | 244   | 103   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1568  | 1757  | 1752  | 1757  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 4.1   | 9.9   | 3.5   | 14.6  | 40.7  | 40.7  | 20.0   | 9.6   | 2.2   | 5.8   | 7.7   | 7.2   |
| Cycle Q Clear(g_c), s   | 4.1   | 9.9   | 3.5   | 14.6  | 40.7  | 40.7  | 20.0   | 9.6   | 2.2   | 5.8   | 7.7   | 7.2   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.28  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 363   | 2130  | 663   | 259   | 620   | 622   | 306  | 787   | 352   | 117   | 376   | 168   |
| V/C Ratio(X)  | 0.21  | 0.31  | 0.22  | 0.88  | 1.06  | 1.07  | 1.13   | 0.43  | 0.11  | 0.77  | 0.65  | 0.61  |
| Avail Cap(c_a), veh/h   | 363   | 2130  | 663   | 278   | 620   | 622   | 306  | 1243  | 556   | 191   | 1015  | 454   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 37.8  | 22.0  | 5.8   | 48.1  | 37.2  | 37.3  | 47.5   | 38.3  | 35.4  | 52.8  | 49.2  | 49.0  |
| Incr Delay (d2), s/veh  | 0.3   | 0.4   | 0.8   | 25.3  | 53.2  | 55.2  | 91.0   | 0.4   | 0.1   | 10.3  | 1.9   | 3.6   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.0   | 4.7   | 1.6   | 8.9   | 28.8  | 29.2  | 17.4   | 4.7   | 0.9   | 3.2   | 3.8   | 3.3   |
| LnGrp Delay(d),s/veh  | 38.1  | 22.4  | 6.5   | 73.3  | 90.3  | 92.5  | 138.5  | 38.7  | 35.6  | 63.1  | 51.1  | 52.6  |
| LnGrp LOS   | D   | C   | A   | E   | F   | F   | F  | D   | D   | E   | D   | D   |
| Approach Vol, veh/h   |   | 872   |   |   | 1549  |   |  | 724   |   |   | 437   |   |
| Approach Delay, s/veh   |   | 21.1  |   |   | 88.8  |   |  | 86.1  |   |   | 53.9  |   |
| Approach LOS  |   | C   |   |   | F   |   |  | F   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 11.6  | 29.8  | 20.9  | 52.6  | 25.1  | 16.3  | 28.9   | 44.7  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3   | * 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 12  | 39.5  | * 18  | 26.2  | 19.8  | * 32  | 4.8  | * 39  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 7.8   | 11.6  | 16.6  | 11.9  | 22.0  | 9.7   | 6.1  | 42.7  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.1   | 3.0   | 0.1   | 3.4   | 0.0   | 1.4   | 0.0  | 0.0   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 67.5  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | E   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

























| Intersection             |        |       |      |        |       |      |        |      |       |        |       |       |       |       |
|--------------------------|--------|-------|------|--------|-------|------|--------|------|-------|--------|-------|-------|-------|-------|
| Int Delay, s/veh         | 1.3    |       |      |        |       |      |        |      |       |        |       |       |       |       |
| Movement                 | EBL    | EBT   | EBR  | WBU    | WBL   | WBT  | WBR    | NEL  | NET   | NER    | SWL   | SWT   | SWR   |       |
| Vol, veh/h               | 19     | 638   | 0    | 11     | 0     | 1424 | 28     | 0    | 0     | 165    | 0     | 0     | 17    |       |
| Conflicting Peds, #/hr   | 0      | 0     | 1    | 0      | 0     | 0    | 0      | 0    | 0     | 1      | 0     | 0     | 0     |       |
| Sign Control             | Free   | Free  | Free | Free   | Free  | Free | Free   | Stop | Stop  | Stop   | Stop  | Stop  | Stop  |       |
| RT Channelized           | -      | -     | None | -      | -     | -    | None   | -    | -     | None   | -     | -     | None  |       |
| Storage Length           | 400    | -     | -    | -      | 120   | -    | 85     | -    | -     | 0      | -     | -     | 0     |       |
| Veh in Median Storage, # | -      | 0     | -    | -      | -     | 0    | -      | -    | 1     | -      | -     | 1     | -     |       |
| Grade, %                 | -      | 0     | -    | -      | -     | 0    | -      | -    | 0     | -      | -     | 0     | -     |       |
| Peak Hour Factor         | 93     | 93    | 93   | 93     | 93    | 93   | 93     | 93   | 93    | 93     | 93    | 93    | 93    |       |
| Heavy Vehicles, %        | 3      | 3     | 3    | 3      | 3     | 3    | 3      | 3    | 3     | 3      | 3     | 3     | 3     |       |
| Mvmt Flow                | 20     | 686   | 0    | 12     | 0     | 1531 | 30     | 0    | 0     | 177    | 0     | 0     | 18    |       |
| Major/Minor              | Major1 |       |      | Major2 |       |      | Minor1 |      |       | Minor2 |       |       |       |       |
| Conflicting Flow All     | 1531   | 0     | 0    | 678    | 687   | 0    | 0      | 1517 | 2283  | 344    | 1871  | 2283  | 767   |       |
| Stage 1                  | -      | -     | -    | -      | -     | -    | -      | 728  | 728   | -      | 1555  | 1555  | -     |       |
| Stage 2                  | -      | -     | -    | -      | -     | -    | -      | 789  | 1555  | -      | 316   | 728   | -     |       |
| Critical Hdwy            | 4.16   | -     | -    | 5.66   | 5.36  | -    | -      | 7.01 | 6.56  | 7.16   | 7.01  | 6.56  | 6.96  |       |
| Critical Hdwy Stg 1      | -      | -     | -    | -      | -     | -    | -      | 7.36 | 5.56  | -      | 6.56  | 5.56  | -     |       |
| Critical Hdwy Stg 2      | -      | -     | -    | -      | -     | -    | -      | 6.56 | 5.56  | -      | 6.76  | 5.56  | -     |       |
| Follow-up Hdwy           | 2.23   | -     | -    | 2.33   | 3.13  | -    | -      | 3.68 | 4.03  | 3.93   | 3.68  | 4.03  | 3.33  |       |
| Pot Cap-1 Maneuver       | 426    | -     | -    | 657    | 549   | -    | -      | 100  | 39    | 554    | 57    | 39    | 343   |       |
| Stage 1                  | -      | -     | -    | -      | -     | -    | -      | 313  | 424   | -      | 115   | 171   | -     |       |
| Stage 2                  | -      | -     | -    | -      | -     | -    | -      | 338  | 171   | -      | 632   | 424   | -     |       |
| Platoon blocked, %       | -      | -     | -    | -      | -     | -    | -      | -    | -     | -      | -     | -     | -     |       |
| Mov Cap-1 Maneuver       | 426    | -     | -    | 461    | 549   | -    | -      | 91   | 37    | 554    | 37    | 37    | 343   |       |
| Mov Cap-2 Maneuver       | -      | -     | -    | -      | -     | -    | -      | 178  | 113   | -      | 89    | 123   | -     |       |
| Stage 1                  | -      | -     | -    | -      | -     | -    | -      | 298  | 404   | -      | 110   | 171   | -     |       |
| Stage 2                  | -      | -     | -    | -      | -     | -    | -      | 320  | 171   | -      | 409   | 404   | -     |       |
| Approach                 | EB     |       |      | WB     |       |      | NE     |      |       | SW     |       |       |       |       |
| HCM Control Delay, s     | 0.4    |       |      | 0.1    |       |      | 14.5   |      |       | 16.1   |       |       |       |       |
| HCM LOS                  |        |       |      |        |       |      | B      |      |       | C      |       |       |       |       |
| Minor Lane/Major Mvmt    | NELn1  | EBL   | EBT  | EBR    | WBU   | WBL  | WBT    | WBR  | SWLn1 | SWLn2  | SWLn3 | SWLn4 | SWLn5 | SWLn6 |
| Capacity (veh/h)         | 554    | 426   | -    | -      | 461   | 549  | -      | -    | 343   | -      | -     | -     | -     | -     |
| HCM Lane V/C Ratio       | 0.32   | 0.048 | -    | -      | 0.026 | -    | -      | -    | 0.053 | -      | -     | -     | -     | -     |
| HCM Control Delay (s)    | 14.5   | 13.9  | -    | -      | 13    | -    | -      | -    | 16.1  | -      | -     | -     | -     | -     |
| HCM Lane LOS             | B      | B     | -    | -      | B     | -    | -      | -    | C     | -      | -     | -     | -     | -     |
| HCM 95th %tile Q(veh)    | 1.4    | 0.2   | -    | -      | 0.1   | 0    | -      | -    | 0.2   | -      | -     | -     | -     | -     |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Avenue & Herndon Avenue

2035 + Proj AM Peak

3/28/2017




















|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (veh/h)  | 245   | 520   | 149   | 68  | 1134  | 578   | 242  | 1070  | 142   | 461   | 476   | 173   |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 261   | 553   | 159   | 72  | 1206  | 615   | 257  | 1138  | 151   | 490   | 506   | 184   |
| Adj No. of Lanes  | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94   | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 298   | 1175  | 524   | 123   | 1384  | 431   | 326  | 1423  | 636   | 540   | 1632  | 730   |
| Arrive On Green   | 0.09  | 0.34  | 0.34  | 0.01  | 0.09  | 0.09  | 0.10   | 0.41  | 0.41  | 0.05  | 0.15  | 0.15  |
| Sat Flow, veh/h   | 3408  | 3505  | 1562  | 3408  | 5036  | 1568  | 3408   | 3505  | 1567  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 261   | 553   | 159   | 72  | 1206  | 615   | 257  | 1138  | 151   | 490   | 506   | 184   |
| Grp Sat Flow(s),veh/h/ln  | 1704  | 1752  | 1562  | 1704  | 1679  | 1568  | 1704   | 1752  | 1567  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s   | 9.1   | 14.9  | 9.0   | 2.5   | 28.4  | 24.9  | 8.9  | 34.3  | 7.6   | 17.2  | 15.4  | 9.6   |
| Cycle Q Clear(g_c), s   | 9.1   | 14.9  | 9.0   | 2.5   | 28.4  | 24.9  | 8.9  | 34.3  | 7.6   | 17.2  | 15.4  | 9.6   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 298   | 1175  | 524   | 123   | 1384  | 431   | 326  | 1423  | 636   | 540   | 1632  | 730   |
| V/C Ratio(X)  | 0.88  | 0.47  | 0.30  | 0.59  | 0.87  | 1.43  | 0.79   | 0.80  | 0.24  | 0.91  | 0.31  | 0.25  |
| Avail Cap(c_a), veh/h   | 298   | 1175  | 524   | 173   | 1397  | 435   | 443  | 1423  | 636   | 540   | 1632  | 730   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  | 1.00   | 1.00  | 1.00  | 0.33  | 0.33  | 0.33  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 0.63  | 0.63  | 0.63  | 1.00   | 1.00  | 1.00  | 0.74  | 0.74  | 0.74  |
| Uniform Delay (d), s/veh  | 54.1  | 31.5  | 29.5  | 58.4  | 52.5  | 31.1  | 53.1   | 31.3  | 23.4  | 56.0  | 33.7  | 19.6  |
| Incr Delay (d2), s/veh  | 23.9  | 0.3   | 0.3   | 2.8   | 4.1   | 200.8   | 6.6  | 4.8   | 0.9   | 15.2  | 0.4   | 0.6   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 5.3   | 7.3   | 3.9   | 1.2   | 13.7  | 34.8  | 4.5  | 17.5  | 3.4   | 9.3   | 7.6   | 4.3   |
| LnGrp Delay(d),s/veh  | 78.0  | 31.8  | 29.8  | 61.2  | 56.5  | 231.9   | 59.7   | 36.1  | 24.3  | 71.2  | 34.0  | 20.2  |
| LnGrp LOS   | E   | C   | C   | E   | E   | F   | E  | D   | C   | E   | C   | C   |
| Approach Vol, veh/h   |   | 973   |   |   | 1893  |   |  | 1546  |   |   | 1180  |   |
| Approach Delay, s/veh   |   | 43.8  |   |   | 113.7   |   |  | 38.9  |   |   | 47.3  |   |
| Approach LOS  |   | D   |   |   | F   |   |  | D   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 23.0  | 52.7  | 8.3   | 44.2  | 15.5  | 60.3  | 15.6   | 37.0  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.7   | * 4.2   | 5.3   | * 4.2   | * 5.7   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 19  | 39.5  | * 5.9   | 36.4  | * 15  | * 43  | 10.3   | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 19.2  | 36.3  | 4.5   | 16.9  | 10.9  | 17.4  | 11.1   | 30.4  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 2.5   | 0.0   | 4.2   | 0.4   | 10.8  | 0.0  | 1.3   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 66.8  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | E   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 10: Coventry Avenue & Herndon Avenue

2035 + Proj AM Peak

3/28/2017

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement                          | EBU   | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |   |  |  |   |  |  |  |   |  |   |   |  |
| Volume (vph)                      | 14  | 237   | 689   | 118   | 32  | 1559  | 99  | 166   | 13  | 21  | 51  | 4   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               |   | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   |   | 4.0   |   |   | 4.0   |
| Lane Util. Factor                 |   | 1.00  | 0.91  |   | 1.00  | 0.91  | 1.00  |   | 1.00  |   |   | 1.00  |
| Frpb, ped/bikes                   |   | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  |   | 1.00  |   |   | 1.00  |
| Flpb, ped/bikes                   |   | 1.00  | 1.00  |   | 1.00  | 1.00  | 1.00  |   | 1.00  |   |   | 1.00  |
| Frt                               |   | 1.00  | 0.98  |   | 1.00  | 1.00  | 0.85  |   | 0.99  |   |   | 1.00  |
| Flt Protected                     |   | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  |   | 0.96  |   |   | 0.96  |
| Satd. Flow (prot)                 |   | 1752  | 4909  |   | 1752  | 5036  | 1568  |   | 1746  |   |   | 1763  |
| Flt Permitted                     |   | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  |   | 0.96  |   |   | 0.96  |
| Satd. Flow (perm)                 |   | 1752  | 4909  |   | 1752  | 5036  | 1568  |   | 1746  |   |   | 1763  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 15  | 258   | 749   | 128   | 35  | 1695  | 108   | 180   | 14  | 23  | 55  | 4   |
| RTOR Reduction (vph)              | 0   | 0   | 22  | 0   | 0   | 0   | 47  | 0   | 3   | 0   | 0   | 0   |
| Lane Group Flow (vph)             | 0   | 273   | 855   | 0   | 35  | 1695  | 61  | 0   | 214   | 0   | 0   | 59  |
| Confl. Peds. (#/hr)               |   |   |   | 1   |   |   |   |   |   |   |   |   |
| Turn Type                         | Prot  | Prot  | NA  |   | Prot  | NA  | Perm  | Split   | NA  |   | Split   | NA  |
| Protected Phases                  | 7   | 7   | 4   |   | 3   | 8   |   | 2   | 2   |   | 6   | 6   |
| Permitted Phases                  |   |   |   |   |   |   | 8   |   |   |   |   |   |
| Actuated Green, G (s)             |   | 22.8  | 53.6  |   | 22.5  | 53.3  | 53.3  |   | 16.8  |   |   | 9.2   |
| Effective Green, g (s)            |   | 23.0  | 54.9  |   | 22.7  | 54.6  | 54.6  |   | 17.0  |   |   | 9.4   |
| Actuated g/C Ratio                |   | 0.19  | 0.46  |   | 0.19  | 0.46  | 0.46  |   | 0.14  |   |   | 0.08  |
| Clearance Time (s)                |   | 4.2   | 5.3   |   | 4.2   | 5.3   | 5.3   |   | 4.2   |   |   | 4.2   |
| Vehicle Extension (s)             |   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   |   | 3.0   |   |   | 3.0   |
| Lane Grp Cap (vph)                |   | 335   | 2245  |   | 331   | 2291  | 713   |   | 247   |   |   | 138   |
| v/s Ratio Prot                    |   | c0.16   | 0.17  |   | 0.02  | c0.34   |   |   | c0.12   |   |   | c0.03   |
| v/s Ratio Perm                    |   |   |   |   |   |   | 0.04  |   |   |   |   |   |
| v/c Ratio                         |   | 0.81  | 0.38  |   | 0.11  | 0.74  | 0.08  |   | 0.86  |   |   | 0.43  |
| Uniform Delay, d1                 |   | 46.5  | 21.4  |   | 40.3  | 26.9  | 18.5  |   | 50.4  |   |   | 52.7  |
| Progression Factor                |   | 0.63  | 0.54  |   | 1.00  | 1.00  | 1.00  |   | 1.00  |   |   | 1.00  |
| Incremental Delay, d2             |   | 11.1  | 0.4   |   | 0.1   | 2.2   | 0.2   |   | 25.5  |   |   | 2.1   |
| Delay (s)                         |   | 40.5  | 11.8  |   | 40.4  | 29.1  | 18.8  |   | 75.8  |   |   | 54.9  |
| Level of Service                  |   | D   | B   |   | D   | C   | B   |   | E   |   |   | D   |
| Approach Delay (s)                |   |   | 18.6  |   |   | 28.7  |   |   | 75.8  |   |   | 53.3  |
| Approach LOS                      |   |   | B   |   |   | C   |   |   | E   |   |   | D   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 29.1  |   |   |   |   |   |   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.75  |   |   |   |   |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   |   |   | 16.2  |   |   |   |
| Intersection Capacity Utilization |   |   | 71.9%   |   |   |   |   |   |   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 10: Coventry Avenue & Herndon Avenue

2035 + Proj AM Peak

3/28/2017













|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 41   |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 4.0  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 1.00 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1568 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1568 |
| Peak-hour factor, PHF  | 0.92 |
| Adj. Flow (vph)        | 45   |
| RTOR Reduction (vph)   | 41   |
| Lane Group Flow (vph)  | 4    |
| Confl. Peds. (#/hr)    |      |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 9.2  |
| Effective Green, g (s) | 9.4  |
| Actuated g/C Ratio     | 0.08 |
| Clearance Time (s)     | 4.2  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 122  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.00 |
| v/c Ratio              | 0.03 |
| Uniform Delay, d1      | 51.1 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.1  |
| Delay (s)              | 51.2 |
| Level of Service       | D    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

2035 + Proj AM Peak

3/28/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |  |
| Volume (veh/h)                    | 45  | 27  | 69  | 31  | 122   | 224   |
| Sign Control                      | Stop  |   |   | Stop  | Free  |   |
| Grade                             | 0%  |   |   | 0%  | 0%  |   |
| Peak Hour Factor                  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Hourly flow rate (vph)            | 49  | 29  | 75  | 34  | 133   | 243   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (ft)                   |   |   |   |   |   |   |
| Walking Speed (ft/s)              |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   | 4   |   |   |   |   |
| Median type                       |   |   |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   | 110   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 509   | 0   | 290   | 265   | 0   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 509   | 0   | 290   | 265   | 0   |   |
| tC, single (s)                    | 6.5   | 6.2   | 7.1   | 6.5   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.0   | 3.3   | 3.5   | 4.0   | 2.2   |   |
| p0 queue free %                   | 89  | 97  | 86  | 94  | 92  |   |
| cM capacity (veh/h)               | 428   | 1082  | 550   | 586   | 1617  |   |
| Direction, Lane #                 | EB 1  | WB 1  | WB 2  | NB 1  | NB 2  |   |
| Volume Total                      | 78  | 75  | 34  | 133   | 243   |   |
| Volume Left                       | 0   | 75  | 0   | 133   | 0   |   |
| Volume Right                      | 29  | 0   | 0   | 0   | 243   |   |
| cSH                               | 684   | 550   | 586   | 1617  | 1700  |   |
| Volume to Capacity                | 0.11  | 0.14  | 0.06  | 0.08  | 0.14  |   |
| Queue Length 95th (ft)            | 10  | 12  | 5   | 7   | 0   |   |
| Control Delay (s)                 | 12.2  | 12.6  | 11.5  | 7.4   | 0.0   |   |
| Lane LOS                          | B   | B   | B   | A   |   |   |
| Approach Delay (s)                | 12.2  | 12.2  |   | 2.6   |   |   |
| Approach LOS                      | B   | B   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   |   | 5.8   |   |   |   |
| Intersection Capacity Utilization |   |   | 23.9%   | ICU Level of Service  |   | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |



Intersection

Int Delay, s/veh 0.1

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 3    | 752  | 1683 | 82   | 0    | 4    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 3    | 800  | 1790 | 87   | 0    | 4    |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 1878   | 0      | 2240   |
| Stage 1              | -      | -      | 1834   |
| Stage 2              | -      | -      | 406    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 312    | -      | 35     |
| Stage 1              | -      | -      | 111    |
| Stage 2              | -      | -      | 638    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 312    | -      | 35     |
| Mov Cap-2 Maneuver   | -      | -      | 35     |
| Stage 1              | -      | -      | 111    |
| Stage 2              | -      | -      | 632    |

| Approach             | EB  | WB | SB   |
|----------------------|-----|----|------|
| HCM Control Delay, s | 0.1 | 0  | 18.9 |
| HCM LOS              |     |    | C    |

| Minor Lane/Major Mvmt | EBL  | EBT | WBT | WBR | SBLn1 |
|-----------------------|------|-----|-----|-----|-------|
| Capacity (veh/h)      | 312  | -   | -   | -   | 263   |
| HCM Lane V/C Ratio    | 0.01 | -   | -   | -   | 0.016 |
| HCM Control Delay (s) | 16.7 | -   | -   | -   | 18.9  |
| HCM Lane LOS          | C    | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 0    | -   | -   | -   | 0     |

Intersection

Int Delay, s/veh 626.4

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 565  | 190  | 66   | 997  | 759  | 65   |
| Conflicting Peds, #/hr   | 0    | 3    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 250  | 250  | -    | 0    | 250  |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 93   | 93   | 93   | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 608  | 204  | 71   | 1072 | 816  | 70   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 608    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | 4.16   |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | 2.23   |
| Pot Cap-1 Maneuver   | -      | -      | 960    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | 960    |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB  | NB        |
|----------------------|----|-----|-----------|
| HCM Control Delay, s | 0  | 0.6 | \$ 2007.5 |
| HCM LOS              |    |     | F         |

| Minor Lane/Major Mvmt | NBLn1     | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-----------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 143       | 689   | -   | -   | 960   | -   |
| HCM Lane V/C Ratio    | 5.707     | 0.101 | -   | -   | 0.074 | -   |
| HCM Control Delay (s) | \$ 2178.5 | 10.8  | -   | -   | 9     | -   |
| HCM Lane LOS          | F         | B     | -   | -   | A     | -   |
| HCM 95th %tile Q(veh) | 87.6      | 0.3   | -   | -   | 0.2   | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection

Int Delay, s/veh 1.5

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 75   | 545  | 993  | 44   | 17   | 70   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 3    | 0    | 3    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 250  | -    | -    | 250  | 250  | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 94   | 94   | 94   | 94   | 94   | 94   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 80   | 580  | 1056 | 47   | 18   | 74   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 1059   | 0      | 1508   |
| Stage 1              | -      | -      | 1059   |
| Stage 2              | -      | -      | 449    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 647    | -      | 110    |
| Stage 1              | -      | -      | 292    |
| Stage 2              | -      | -      | 607    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 647    | -      | 96     |
| Mov Cap-2 Maneuver   | -      | -      | 96     |
| Stage 1              | -      | -      | 291    |
| Stage 2              | -      | -      | 531    |

| Approach             | EB  | WB | SB |
|----------------------|-----|----|----|
| HCM Control Delay, s | 1.4 | 0  | 21 |
| HCM LOS              |     |    | C  |

| Minor Lane/Major Mvmt | EBL   | EBT | WBT | WBR | SBLn1 | SBLn2 |
|-----------------------|-------|-----|-----|-----|-------|-------|
| Capacity (veh/h)      | 647   | -   | -   | -   | 96    | 489   |
| HCM Lane V/C Ratio    | 0.123 | -   | -   | -   | 0.188 | 0.152 |
| HCM Control Delay (s) | 11.3  | -   | -   | -   | 51    | 13.7  |
| HCM Lane LOS          | B     | -   | -   | -   | F     | B     |
| HCM 95th %tile Q(veh) | 0.4   | -   | -   | -   | 0.7   | 0.5   |

Intersection

Int Delay, s/veh 96.3

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 371  | 181  | 5    | 658  | 363  | 12   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 403  | 197  | 5    | 715  | 395  | 13   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 403    |
| Stage 1              | -      | -      | 403    |
| Stage 2              | -      | -      | 726    |
| Critical Hdwy        | -      | 4.13   | 6.43   |
| Critical Hdwy Stg 1  | -      | -      | 5.43   |
| Critical Hdwy Stg 2  | -      | -      | 5.43   |
| Follow-up Hdwy       | -      | 2.227  | 3.527  |
| Pot Cap-1 Maneuver   | -      | 1150   | ~ 225  |
| Stage 1              | -      | -      | 673    |
| Stage 2              | -      | -      | 477    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 1150   | ~ 223  |
| Mov Cap-2 Maneuver   | -      | -      | ~ 223  |
| Stage 1              | -      | -      | 673    |
| Stage 2              | -      | -      | 474    |

| Approach             | EB | WB  | NB       |
|----------------------|----|-----|----------|
| HCM Control Delay, s | 0  | 0.1 | \$ 408.1 |
| HCM LOS              |    |     | F        |

| Minor Lane/Major Mvmt | NBLn1    | EBT | EBR | WBL   | WBT |
|-----------------------|----------|-----|-----|-------|-----|
| Capacity (veh/h)      | 228      | -   | -   | 1150  | -   |
| HCM Lane V/C Ratio    | 1.788    | -   | -   | 0.005 | -   |
| HCM Control Delay (s) | \$ 408.1 | -   | -   | 8.1   | 0   |
| HCM Lane LOS          | F        | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 27.9     | -   | -   | 0     | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection

Int Delay, s/veh 23.6

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 354  | 9    | 1    | 518  | 253  | 36   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 385  | 10   | 1    | 563  | 275  | 39   |

| Major/Minor          | Major1 |   | Major2 |   | Minor1 |       |
|----------------------|--------|---|--------|---|--------|-------|
| Conflicting Flow All | 0      | 0 | 395    | 0 | 955    | 390   |
| Stage 1              | -      | - | -      | - | 390    | -     |
| Stage 2              | -      | - | -      | - | 565    | -     |
| Critical Hdwy        | -      | - | 4.13   | - | 6.43   | 6.23  |
| Critical Hdwy Stg 1  | -      | - | -      | - | 5.43   | -     |
| Critical Hdwy Stg 2  | -      | - | -      | - | 5.43   | -     |
| Follow-up Hdwy       | -      | - | 2.227  | - | 3.527  | 3.327 |
| Pot Cap-1 Maneuver   | -      | - | 1158   | - | 285    | 656   |
| Stage 1              | -      | - | -      | - | 682    | -     |
| Stage 2              | -      | - | -      | - | 567    | -     |
| Platoon blocked, %   | -      | - | -      | - | -      | -     |
| Mov Cap-1 Maneuver   | -      | - | 1158   | - | 285    | 656   |
| Mov Cap-2 Maneuver   | -      | - | -      | - | 285    | -     |
| Stage 1              | -      | - | -      | - | 682    | -     |
| Stage 2              | -      | - | -      | - | 566    | -     |

| Approach             | EB | WB | NB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 95.6 |
| HCM LOS              |    |    | F    |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 307   | -   | -   | 1158  | -   |
| HCM Lane V/C Ratio    | 1.023 | -   | -   | 0.001 | -   |
| HCM Control Delay (s) | 95.6  | -   | -   | 8.1   | 0   |
| HCM Lane LOS          | F     | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 11.3  | -   | -   | 0     | -   |

Intersection

Int Delay, s/veh 167.3

| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 22   | 118  | 84   | 32   | 375  | 20   | 246  | 101  | 19   | 24   | 182  | 36   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 97   | 97   | 97   | 97   | 92   | 97   | 92   | 97   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 24   | 122  | 87   | 33   | 387  | 22   | 254  | 110  | 20   | 26   | 198  | 39   |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor1 |       |       | Minor2 |       |       |
|----------------------|--------|---|---|--------|---|---|--------|-------|-------|--------|-------|-------|
| Conflicting Flow All | 408    | 0 | 0 | 208    | 0 | 0 | 795    | 687   | 165   | 740    | 719   | 397   |
| Stage 1              | -      | - | - | -      | - | - | 213    | 213   | -     | 463    | 463   | -     |
| Stage 2              | -      | - | - | -      | - | - | 582    | 474   | -     | 277    | 256   | -     |
| Critical Hdwy        | 4.13   | - | - | 4.13   | - | - | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     |
| Follow-up Hdwy       | 2.227  | - | - | 2.227  | - | - | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 |
| Pot Cap-1 Maneuver   | 1145   | - | - | 1357   | - | - | 304    | 368   | 877   | 331    | 353   | 650   |
| Stage 1              | -      | - | - | -      | - | - | 787    | 724   | -     | 577    | 562   | -     |
| Stage 2              | -      | - | - | -      | - | - | 497    | 556   | -     | 727    | 694   | -     |
| Platoon blocked, %   | -      | - | - | -      | - | - | -      | -     | -     | -      | -     | -     |
| Mov Cap-1 Maneuver   | 1145   | - | - | 1357   | - | - | ~ 145  | 348   | 877   | 235    | 334   | 650   |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | ~ 145  | 348   | -     | 235    | 334   | -     |
| Stage 1              | -      | - | - | -      | - | - | 768    | 707   | -     | 563    | 544   | -     |
| Stage 2              | -      | - | - | -      | - | - | 288    | 538   | -     | 586    | 677   | -     |

| Approach             | EB  | WB  | NB       | SB   |
|----------------------|-----|-----|----------|------|
| HCM Control Delay, s | 0.8 | 0.6 | \$ 546.3 | 42.2 |
| HCM LOS              |     |     | F        | E    |

| Minor Lane/Major Mvmt | NBLn1    | EBL   | EBT | EBR | WBL   | WBT | WBR | SBLn1 |
|-----------------------|----------|-------|-----|-----|-------|-----|-----|-------|
| Capacity (veh/h)      | 184      | 1145  | -   | -   | 1357  | -   | -   | 345   |
| HCM Lane V/C Ratio    | 2.081    | 0.021 | -   | -   | 0.024 | -   | -   | 0.762 |
| HCM Control Delay (s) | \$ 546.3 | 8.2   | 0   | -   | 7.7   | 0   | -   | 42.2  |
| HCM Lane LOS          | F        | A     | A   | -   | A     | A   | -   | E     |
| HCM 95th %tile Q(veh) | 29.7     | 0.1   | -   | -   | 0.1   | -   | -   | 6.1   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 5.9    |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 1      | 7     | 154   | 24     | 17    | 1     | 192    | 177  | 8    | 1      | 196  | 4    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 92     | 92    | 92    | 92     | 92    | 92    | 92     | 92   | 92   | 92     | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 1      | 8     | 167   | 26     | 18    | 1     | 209    | 192  | 9    | 1      | 213  | 4    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 841    | 835   | 215   | 919    | 834   | 197   | 217    | 0    | 0    | 201    | 0    | 0    |
| Stage 1                  | 217    | 217   | -     | 614    | 614   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 624    | 618   | -     | 305    | 220   | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 283    | 302   | 822   | 251    | 303   | 842   | 1347   | -    | -    | 1365   | -    | -    |
| Stage 1                  | 783    | 721   | -     | 477    | 481   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 471    | 479   | -     | 702    | 719   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 231    | 249   | 822   | 169    | 250   | 842   | 1347   | -    | -    | 1365   | -    | -    |
| Mov Cap-2 Maneuver       | 231    | 249   | -     | 169    | 250   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 646    | 720   | -     | 394    | 397   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 370    | 395   | -     | 553    | 718   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 11.4   |       |       | 28.4   |       |       | 4.2    |      |      | 0      |      |      |
| HCM LOS                  | B      |       |       | D      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1347   | -     | -     | 737    | 199   | 1365  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.155  | -     | -     | 0.239  | 0.229 | 0.001 | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 8.2    | 0     | -     | 11.4   | 28.4  | 7.6   | 0      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | B      | D     | A     | A      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.5    | -     | -     | 0.9    | 0.9   | 0     | -      | -    |      |        |      |      |

| Intersection             |        |          |        |      |        |      |
|--------------------------|--------|----------|--------|------|--------|------|
| Int Delay, s/veh         | 4.2    |          |        |      |        |      |
|                          |        |          |        |      |        |      |
| Movement                 | WBL    | WBR      | NBT    | NBR  | SBL    | SBT  |
| Vol, veh/h               | 0      | 183      | 1860   | 83   | 0      | 1553 |
| Conflicting Peds, #/hr   | 0      | 0        | 0      | 0    | 0      | 0    |
| Sign Control             | Stop   | Stop     | Free   | Free | Free   | Free |
| RT Channelized           | -      | None     | -      | None | -      | None |
| Storage Length           | -      | 0        | -      | -    | -      | -    |
| Veh in Median Storage, # | 1      | -        | 0      | -    | -      | 0    |
| Grade, %                 | 0      | -        | 0      | -    | -      | 0    |
| Peak Hour Factor         | 92     | 92       | 92     | 92   | 92     | 92   |
| Heavy Vehicles, %        | 3      | 3        | 3      | 3    | 3      | 3    |
| Mvmt Flow                | 0      | 199      | 2022   | 90   | 0      | 1688 |
|                          |        |          |        |      |        |      |
| Major/Minor              | Minor1 |          | Major1 |      | Major2 |      |
| Conflicting Flow All     | 2911   | 1056     | 0      | 0    | 2112   | 0    |
| Stage 1                  | 2067   | -        | -      | -    | -      | -    |
| Stage 2                  | 844    | -        | -      | -    | -      | -    |
| Critical Hdwy            | 6.86   | 6.96     | -      | -    | 4.16   | -    |
| Critical Hdwy Stg 1      | 5.86   | -        | -      | -    | -      | -    |
| Critical Hdwy Stg 2      | 5.86   | -        | -      | -    | -      | -    |
| Follow-up Hdwy           | 3.53   | 3.33     | -      | -    | 2.23   | -    |
| Pot Cap-1 Maneuver       | 12     | 220      | -      | -    | 252    | -    |
| Stage 1                  | 82     | -        | -      | -    | -      | -    |
| Stage 2                  | 380    | -        | -      | -    | -      | -    |
| Platoon blocked, %       |        |          | -      | -    |        | -    |
| Mov Cap-1 Maneuver       | 12     | 220      | -      | -    | 252    | -    |
| Mov Cap-2 Maneuver       | 65     | -        | -      | -    | -      | -    |
| Stage 1                  | 82     | -        | -      | -    | -      | -    |
| Stage 2                  | 380    | -        | -      | -    | -      | -    |
|                          |        |          |        |      |        |      |
| Approach                 | WB     |          | NB     |      | SB     |      |
| HCM Control Delay, s     | 84.2   |          | 0      |      | 0      |      |
| HCM LOS                  | F      |          |        |      |        |      |
|                          |        |          |        |      |        |      |
| Minor Lane/Major Mvmt    | NBT    | NBRWBLn1 | SBL    | SBT  |        |      |
| Capacity (veh/h)         | -      | - 220    | 252    | -    |        |      |
| HCM Lane V/C Ratio       | -      | - 0.904  | -      | -    |        |      |
| HCM Control Delay (s)    | -      | - 84.2   | 0      | -    |        |      |
| HCM Lane LOS             | -      | - F      | A      | -    |        |      |
| HCM 95th %tile Q(veh)    | -      | - 7.4    | 0      | -    |        |      |



| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 67.3 |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | F    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 59   | 231  | 63   | 0    | 18   | 727  | 204  | 0    | 102  | 340  | 6    |
| Peak Hour Factor          | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 64   | 251  | 68   | 0    | 20   | 790  | 222  | 0    | 111  | 370  | 7    |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB   | WB   | NB   |
|----------------------------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   |
| Opposing Lanes             | 2    | 3    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   |
| Conflicting Lanes Left     | 1    | 3    | 3    |
| Conflicting Approach Right | NB   | SB   | WB   |
| Conflicting Lanes Right    | 3    | 1    | 2    |
| HCM Control Delay          | 28.4 | 78.2 | 54.1 |
| HCM LOS                    | D    | F    | F    |

| Lane                   | NBLn1 | NBLn2 | NBLn3 | EBLn1  | EBLn2  | EBLn3 | WBLn1  | WBLn2 | SBLn1 |
|------------------------|-------|-------|-------|--------|--------|-------|--------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 0%    | 100%   | 0%     | 0%    | 100%   | 0%    | 39%   |
| Vol Thru, %            | 0%    | 100%  | 0%    | 0%     | 100%   | 0%    | 0%     | 78%   | 47%   |
| Vol Right, %           | 0%    | 0%    | 100%  | 0%     | 0%     | 100%  | 0%     | 22%   | 14%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop   | Stop   | Stop  | Stop   | Stop  | Stop  |
| Traffic Vol by Lane    | 102   | 340   | 6     | 59     | 231    | 63    | 18     | 931   | 725   |
| LT Vol                 | 102   | 0     | 0     | 59     | 0      | 0     | 18     | 0     | 283   |
| Through Vol            | 0     | 340   | 0     | 0      | 231    | 0     | 0      | 727   | 339   |
| RT Vol                 | 0     | 0     | 6     | 0      | 0      | 63    | 0      | 204   | 103   |
| Lane Flow Rate         | 111   | 370   | 7     | 64     | 251    | 68    | 20     | 1012  | 788   |
| Geometry Grp           | 7     | 7     | 7     | 8      | 8      | 8     | 8      | 8     | 8     |
| Degree of Util (X)     | 0.302 | 0.955 | 0.016 | 0.192  | 0.717  | 0.182 | 0.057  | 1     | 1     |
| Departure Headway (Hd) | 9.805 | 9.307 | 8.609 | 10.782 | 10.284 | 9.587 | 10.469 | 9.822 | 9.982 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes    | Yes    | Yes   | Yes    | Yes   | Yes   |
| Cap                    | 368   | 392   | 417   | 333    | 352    | 375   | 342    | 374   | 370   |
| Service Time           | 7.539 | 7.04  | 6.343 | 8.526  | 8.028  | 7.331 | 8.249  | 7.603 | 7.763 |
| HCM Lane V/C Ratio     | 0.302 | 0.944 | 0.017 | 0.192  | 0.713  | 0.181 | 0.058  | 2.706 | 2.13  |
| HCM Control Delay      | 16.7  | 66.1  | 11.5  | 16.1   | 35.3   | 14.5  | 13.9   | 79.4  | 80.1  |
| HCM Lane LOS           | C     | F     | B     | C      | E      | B     | B      | F     | F     |
| HCM 95th-tile Q        | 1.2   | 10.7  | 0     | 0.7    | 5.3    | 0.7   | 0.2    | 11.7  | 11.6  |

Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 283  | 339  | 103  |
| Peak Hour Factor  | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 308  | 368  | 112  |
| Number of Lanes   | 0    | 0    | 1    | 0    |

| Approach                   | SB   |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 80.1 |
| HCM LOS                    | F    |

Lane

| Intersection                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh 69 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS F           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                     | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                   | 0    | 77   | 198  | 338  | 0    | 26   | 585  | 73   | 0    | 167  | 558  | 6    | 0    | 25   | 121  | 64   |
| Peak Hour Factor             | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %            | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                    | 0    | 84   | 215  | 367  | 0    | 28   | 636  | 79   | 0    | 182  | 607  | 7    | 0    | 27   | 132  | 70   |
| Number of Lanes              | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 72.5 | 73.6 | 74.1 | 25.8 |
| HCM LOS                    | F    | F    | F    | D    |
























| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 23%   | 13%   | 4%    | 12%   |
| Vol Thru, %            | 76%   | 32%   | 86%   | 58%   |
| Vol Right, %           | 1%    | 55%   | 11%   | 30%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 731   | 613   | 684   | 210   |
| LT Vol                 | 167   | 77    | 26    | 25    |
| Through Vol            | 558   | 198   | 585   | 121   |
| RT Vol                 | 6     | 338   | 73    | 64    |
| Lane Flow Rate         | 795   | 666   | 743   | 228   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 1     | 1     | 1     | 0.602 |
| Departure Headway (Hd) | 8.654 | 8.308 | 8.557 | 9.489 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 429   | 446   | 431   | 383   |
| Service Time           | 6.654 | 6.308 | 6.557 | 7.489 |
| HCM Lane V/C Ratio     | 1.853 | 1.493 | 1.724 | 0.595 |
| HCM Control Delay      | 74.1  | 72.5  | 73.6  | 25.8  |
| HCM Lane LOS           | F     | F     | F     | D     |
| HCM 95th-tile Q        | 12.5  | 12.7  | 12.6  | 3.8   |

# HCM Signalized Intersection Capacity Analysis

2035 + Proj PM Peak

## 1: Temperance Ave & Nees Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |  |  |
| Volume (vph)                      | 172   | 79  | 285   | 183   | 82  | 103   | 13   | 266   | 799   | 200   | 39  | 433   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  | 1.00  | 0.95  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.98  | 1.00  | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1534  | 1752  | 3505  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1534  | 1752  | 3505  |
| Peak-hour factor, PHF             | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.92   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Adj. Flow (vph)                   | 185   | 85  | 306   | 197   | 88  | 111   | 14   | 286   | 859   | 215   | 42  | 466   |
| RTOR Reduction (vph)              | 0   | 0   | 267   | 0   | 0   | 96  | 0  | 0   | 0   | 64  | 0   | 0   |
| Lane Group Flow (vph)             | 185   | 85  | 39  | 197   | 88  | 15  | 0  | 300   | 859   | 151   | 42  | 466   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | NA  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 6   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 16.1  | 15.1  | 15.1  | 17.3  | 15.9  | 15.9  |  | 27.6  | 62.2  | 62.2  | 6.4   | 41.0  |
| Effective Green, g (s)            | 16.1  | 15.1  | 15.1  | 17.3  | 15.9  | 15.9  |  | 27.6  | 62.2  | 62.2  | 6.4   | 41.0  |
| Actuated g/C Ratio                | 0.13  | 0.13  | 0.13  | 0.14  | 0.13  | 0.13  |  | 0.23  | 0.52  | 0.52  | 0.05  | 0.34  |
| Clearance Time (s)                | 4.2   | 4.9   | 4.9   | 4.2   | 5.3   | 5.3   |  | 4.2   | 5.7   | 5.7   | 4.2   | 5.7   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| Lane Grp Cap (vph)                | 235   | 232   | 197   | 252   | 244   | 207   |  | 402   | 1816  | 795   | 93  | 1197  |
| v/s Ratio Prot                    | 0.11  | 0.05  |   | c0.11   | c0.05   |   |  | c0.17   | c0.25   |   | 0.02  | c0.13   |
| v/s Ratio Perm                    |   |   | 0.02  |   |   | 0.01  |  |   |   | 0.10  |   |   |
| v/c Ratio                         | 0.79  | 0.37  | 0.20  | 0.78  | 0.36  | 0.07  |  | 0.75  | 0.47  | 0.19  | 0.45  | 0.39  |
| Uniform Delay, d1                 | 50.3  | 48.1  | 47.0  | 49.5  | 47.4  | 45.6  |  | 42.9  | 18.4  | 15.4  | 55.1  | 30.0  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 0.56  | 0.36  | 0.14  | 1.00  | 1.00  |
| Incremental Delay, d2             | 15.9  | 1.0   | 0.5   | 14.5  | 0.9   | 0.1   |  | 5.8   | 0.7   | 0.4   | 3.5   | 1.0   |
| Delay (s)                         | 66.1  | 49.0  | 47.5  | 64.1  | 48.3  | 45.7  |  | 30.0  | 7.3   | 2.5   | 58.6  | 30.9  |
| Level of Service                  | E   | D   | D   | E   | D   | D   |  | C   | A   | A   | E   | C   |
| Approach Delay (s)                |   | 53.7  |   |   | 55.4  |   |  |   | 11.5  |   |   | 32.2  |
| Approach LOS                      |   | D   |   |   | E   |   |  |   | B   |   |   | C   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 29.9  |   |   |   | HCM 2000 Level of Service  |   | C   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.58  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 19.4  |   |   |   |
| Intersection Capacity Utilization |   |   | 84.9%   |   |   |   | ICU Level of Service   |   | E   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 1: Temperance Ave & Nees Ave

2035 + Proj PM Peak

3/28/2017

|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 90   |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 5.7  |
| Lane Util. Factor      | 1.00 |
| Frpb, ped/bikes        | 0.98 |
| Flpb, ped/bikes        | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1540 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1540 |
| Peak-hour factor, PHF  | 0.93 |
| Adj. Flow (vph)        | 97   |
| RTOR Reduction (vph)   | 64   |
| Lane Group Flow (vph)  | 33   |
| Confl. Peds. (#/hr)    | 5    |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 41.0 |
| Effective Green, g (s) | 41.0 |
| Actuated g/C Ratio     | 0.34 |
| Clearance Time (s)     | 5.7  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 526  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.02 |
| v/c Ratio              | 0.06 |
| Uniform Delay, d1      | 26.6 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.2  |
| Delay (s)              | 26.8 |
| Level of Service       | C    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |

# MOVEMENT SUMMARY



Site: 2035+Project - PM Roundabout at Temperance and Owens Mt Parkway

New Site  
Roundabout

| Movement Performance - Vehicles |        |                                |         |                  |                         |                     |                                      |                         |                 |                                   |                         |
|---------------------------------|--------|--------------------------------|---------|------------------|-------------------------|---------------------|--------------------------------------|-------------------------|-----------------|-----------------------------------|-------------------------|
| Mov ID                          | OD Mov | Demand Flows<br>Total<br>veh/h | HV<br>% | Deg. Satn<br>v/c | Average<br>Delay<br>sec | Level of<br>Service | 95% Back of Queue<br>Vehicles<br>veh | Queue<br>Distance<br>ft | Prop.<br>Queued | Effective<br>Stop Rate<br>per veh | Average<br>Speed<br>mph |
| South: Temperance Avenue        |        |                                |         |                  |                         |                     |                                      |                         |                 |                                   |                         |
| 3                               | L2     | 167                            | 3.0     | 0.709            | 10.8                    | LOS B               | 5.5                                  | 141.4                   | 0.56            | 0.58                              | 33.2                    |
| 8                               | T1     | 1004                           | 3.0     | 0.709            | 4.7                     | LOS A               | 5.5                                  | 141.4                   | 0.56            | 0.58                              | 32.7                    |
| 18                              | R2     | 392                            | 3.0     | 0.709            | 5.2                     | LOS A               | 5.5                                  | 141.4                   | 0.56            | 0.58                              | 30.1                    |
| Approach                        |        | 1563                           | 3.0     | 0.709            | 5.4                     | LOS A               | 5.5                                  | 141.4                   | 0.56            | 0.58                              | 32.3                    |
| East: Owens Mt Parkway          |        |                                |         |                  |                         |                     |                                      |                         |                 |                                   |                         |
| 1                               | L2     | 849                            | 3.0     | 1.016            | 42.4                    | LOS F               | 25.2                                 | 645.6                   | 1.00            | 2.02                              | 16.6                    |
| 6                               | T1     | 295                            | 3.0     | 0.493            | 8.5                     | LOS A               | 2.7                                  | 69.7                    | 0.78            | 0.90                              | 32.8                    |
| 16                              | R2     | 259                            | 3.0     | 0.275            | 5.4                     | LOS A               | 1.3                                  | 33.2                    | 0.65            | 0.67                              | 32.3                    |
| Approach                        |        | 1403                           | 3.0     | 1.016            | 28.4                    | LOS D               | 25.2                                 | 645.6                   | 0.89            | 1.53                              | 23.0                    |
| North: Temperance Avenue        |        |                                |         |                  |                         |                     |                                      |                         |                 |                                   |                         |
| 7                               | L2     | 103                            | 3.0     | 0.856            | 23.6                    | LOS C               | 7.3                                  | 186.8                   | 0.94            | 1.21                              | 29.0                    |
| 4                               | T1     | 710                            | 3.0     | 0.856            | 16.8                    | LOS C               | 7.8                                  | 199.4                   | 0.94            | 1.21                              | 27.8                    |
| 14                              | R2     | 43                             | 3.0     | 0.856            | 16.8                    | LOS C               | 7.8                                  | 199.4                   | 0.95            | 1.22                              | 30.3                    |
| Approach                        |        | 856                            | 3.0     | 0.856            | 17.6                    | LOS C               | 7.8                                  | 199.4                   | 0.94            | 1.21                              | 28.2                    |
| West: Alluvial Avenue           |        |                                |         |                  |                         |                     |                                      |                         |                 |                                   |                         |
| 5                               | L2     | 83                             | 3.0     | 0.435            | 21.4                    | LOS C               | 2.3                                  | 58.5                    | 0.85            | 1.00                              | 30.6                    |
| 2                               | T1     | 60                             | 3.0     | 0.435            | 15.3                    | LOS C               | 2.3                                  | 58.5                    | 0.85            | 1.00                              | 29.5                    |
| 12                              | R2     | 259                            | 3.0     | 0.608            | 17.6                    | LOS C               | 4.2                                  | 108.3                   | 0.91            | 1.09                              | 27.6                    |
| Approach                        |        | 402                            | 3.0     | 0.608            | 18.0                    | LOS C               | 4.2                                  | 108.3                   | 0.89            | 1.06                              | 28.7                    |
| All Vehicles                    |        | 4224                           | 3.0     | 1.016            | 16.7                    | LOS C               | 25.2                                 | 645.6                   | 0.78            | 1.07                              | 27.5                    |

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: Z:\01 Projects\006 Clovis\006-009 CCMC Phase 2 TIA\Background\Alluvial at Temperance Roundabout\Temperance Alluvial.sip6

# HCM 2010 Signalized Intersection Summary

## 3: Temperance Ave & SR 168 WB Ramp

2035 + Proj PM Peak

3/28/2017


















|                              |  |       |     |   |      |   |      |   |   |      |   |   |
|------------------------------|--|-------|-----|---|------|---|------|---|---|------|---|---|
| Movement                     | EBL  | EBT   | EBR | WBL   | WBT  | WBR   | NBL  | NBT   | NBR   | SBL  | SBT   | SBR   |
| Lane Configurations          |  |       |     |  |      |  |      |  |  |      |  |  |
| Volume (veh/h)               | 0  | 0     | 0   | 164   | 0    | 64  | 0    | 1468  | 908   | 0    | 1026  | 730   |
| Number                       |  |       |     | 3   | 8    | 18  | 5    | 2   | 12  | 1    | 6   | 16  |
| Initial Q (Qb), veh          |  |       |     | 0   | 0    | 0   | 0    | 0   | 0   | 0    | 0   | 0   |
| Ped-Bike Adj(A_pbT)          |  |       |     | 1.00  |      | 1.00  | 1.00 |   | 1.00  | 1.00 |   | 1.00  |
| Parking Bus, Adj             |  |       |     | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       |  |       |     | 1845  | 0    | 1845  | 0    | 1845  | 1845  | 0    | 1845  | 1845  |
| Adj Flow Rate, veh/h         |  |       |     | 174   | 0    | 68  | 0    | 1562  | 0   | 0    | 1091  | 777   |
| Adj No. of Lanes             |  |       |     | 1   | 0    | 1   | 0    | 2   | 1   | 0    | 2   | 1   |
| Peak Hour Factor             |  |       |     | 0.94  | 0.94 | 0.94  | 0.94 | 0.94  | 0.94  | 0.94 | 0.94  | 0.94  |
| Percent Heavy Veh, %         |  |       |     | 3   | 0    | 3   | 0    | 3   | 3   | 0    | 3   | 3   |
| Cap, veh/h                   |  |       |     | 212   | 0    | 195   | 0    | 2848  | 1257  | 0    | 2848  | 1273  |
| Arrive On Green              |  |       |     | 0.12  | 0.00 | 0.12  | 0.00 | 0.81  | 0.00  | 0.00 | 1.00  | 1.00  |
| Sat Flow, veh/h              |  |       |     | 1757  | 0    | 1568  | 0    | 3597  | 1568  | 0    | 3597  | 1567  |
| Grp Volume(v), veh/h         |  |       |     | 174   | 0    | 68  | 0    | 1562  | 0   | 0    | 1091  | 777   |
| Grp Sat Flow(s),veh/h/ln     |  |       |     | 1757  | 0    | 1568  | 0    | 1752  | 1568  | 0    | 1752  | 1567  |
| Q Serve(g_s), s              |  |       |     | 11.6  | 0.0  | 4.8   | 0.0  | 18.1  | 0.0   | 0.0  | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        |  |       |     | 11.6  | 0.0  | 4.8   | 0.0  | 18.1  | 0.0   | 0.0  | 0.0   | 0.0   |
| Prop In Lane                 |  |       |     | 1.00  |      | 1.00  | 0.00 |   | 1.00  | 0.00 |   | 1.00  |
| Lane Grp Cap(c), veh/h       |  |       |     | 212   | 0    | 195   | 0    | 2848  | 1257  | 0    | 2848  | 1273  |
| V/C Ratio(X)                 |  |       |     | 0.82  | 0.00 | 0.35  | 0.00 | 0.55  | 0.00  | 0.00 | 0.38  | 0.61  |
| Avail Cap(c_a), veh/h        |  |       |     | 381   | 0    | 345   | 0    | 2848  | 1257  | 0    | 2848  | 1273  |
| HCM Platoon Ratio            |  |       |     | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 2.00  | 2.00  |
| Upstream Filter(I)           |  |       |     | 1.00  | 0.00 | 1.00  | 0.00 | 0.09  | 0.00  | 0.00 | 0.09  | 0.09  |
| Uniform Delay (d), s/veh     |  |       |     | 51.5  | 0.0  | 48.1  | 0.0  | 3.8   | 0.0   | 0.0  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       |  |       |     | 7.6   | 0.0  | 1.1   | 0.0  | 0.1   | 0.0   | 0.0  | 0.0   | 0.2   |
| Initial Q Delay(d3),s/veh    |  |       |     | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     |  |       |     | 6.1   | 0.0  | 2.1   | 0.0  | 8.5   | 0.0   | 0.0  | 0.0   | 0.1   |
| LnGrp Delay(d),s/veh         |  |       |     | 59.1  | 0.0  | 49.2  | 0.0  | 3.9   | 0.0   | 0.0  | 0.0   | 0.2   |
| LnGrp LOS                    |  |       |     | E   |      | D   |      | A   |   |      | A   | A   |
| Approach Vol, veh/h          |  |       |     |   | 242  |   |      | 1562  |   |      | 1868  |   |
| Approach Delay, s/veh        |  |       |     |   | 56.3 |   |      | 3.9   |   |      | 0.1   |   |
| Approach LOS                 |  |       |     |   | E    |   |      | A   |   |      | A   |   |
| Timer                        | 1  | 2     | 3   | 4   | 5    | 6   | 7    | 8   |   |      |   |   |
| Assigned Phs                 |  | 2     |     |   |      | 6   |      | 8   |   |      |   |   |
| Phs Duration (G+Y+Rc), s     |  | 101.5 |     |   |      | 101.5   |      | 18.5  |   |      |   |   |
| Change Period (Y+Rc), s      |  | 5.3   |     |   |      | 5.3   |      | 4.2   |   |      |   |   |
| Max Green Setting (Gmax), s  |  | 84.7  |     |   |      | 84.7  |      | 25.8  |   |      |   |   |
| Max Q Clear Time (g_c+I1), s |  | 20.1  |     |   |      | 2.0   |      | 13.6  |   |      |   |   |
| Green Ext Time (p_c), s      |  | 39.8  |     |   |      | 45.5  |      | 0.7   |   |      |   |   |
| <b>Intersection Summary</b>  |  |       |     |   |      |   |      |   |   |      |   |   |
| HCM 2010 Ctrl Delay          |  |       | 5.4 |   |      |   |      |   |   |      |   |   |
| HCM 2010 LOS                 |  |       | A   |   |      |   |      |   |   |      |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Ave & SR 168 EB Ramp

2035 + Proj PM Peak

3/28/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 545   | 0   | 1112  | 0   | 0   | 0   | 0  | 1831  | 232   | 76  | 1114  | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 556   | 0   | 1135  |   |   |   | 0  | 1868  | 237   | 78  | 1137  | 0   |
| Adj No. of Lanes             | 1   | 0   | 1   |   |   |   | 0  | 2   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 776   | 0   | 698   |   |   |   | 0  | 1307  | 162   | 73  | 1723  | 0   |
| Arrive On Green              | 0.44  | 0.00  | 0.44  |   |   |   | 0.00   | 0.55  | 0.54  | 0.03  | 0.33  | 0.00  |
| Sat Flow, veh/h              | 1757  | 0   | 1568  |   |   |   | 0  | 3229  | 390   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 556   | 0   | 1135  |   |   |   | 0  | 1026  | 1079  | 78  | 1137  | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1568  |   |   |   | 0  | 1752  | 1774  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 31.0  | 0.0   | 53.4  |   |   |   | 0.0  | 50.0  | 50.0  | 5.0   | 33.4  | 0.0   |
| Cycle Q Clear(g_c), s        | 31.0  | 0.0   | 53.4  |   |   |   | 0.0  | 50.0  | 50.0  | 5.0   | 33.4  | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.22  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 776   | 0   | 698   |   |   |   | 0  | 730   | 739   | 73  | 1723  | 0   |
| V/C Ratio(X)                 | 0.72  | 0.00  | 1.63  |   |   |   | 0.00   | 1.40  | 1.46  | 1.07  | 0.66  | 0.00  |
| Avail Cap(c_a), veh/h        | 776   | 0   | 698   |   |   |   | 0  | 730   | 739   | 73  | 1723  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.33  | 1.33  | 0.67  | 0.67  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.90  | 0.90  | 0.00  |
| Uniform Delay (d), s/veh     | 27.4  | 0.0   | 33.3  |   |   |   | 0.0  | 26.8  | 26.9  | 58.3  | 31.6  | 0.0   |
| Incr Delay (d2), s/veh       | 3.2   | 0.0   | 288.5   |   |   |   | 0.0  | 190.2   | 214.6   | 118.9   | 1.8   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 1.4   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 15.7  | 0.0   | 79.0  |   |   |   | 0.0  | 62.4  | 68.2  | 4.8   | 16.6  | 0.0   |
| LnGrp Delay(d),s/veh         | 30.5  | 0.0   | 321.8   |   |   |   | 0.0  | 217.0   | 241.5   | 178.7   | 33.4  | 0.0   |
| LnGrp LOS                    | C   |   | F   |   |   |   |  | F   | F   | F   | C   |   |
| Approach Vol, veh/h          | 1691  |   |   |   |   |   | 2105   |   |   | 1215  |   |   |
| Approach Delay, s/veh        | 226.1   |   |   |   |   |   | 229.5  |   |   | 42.8  |   |   |
| Approach LOS                 | F   |   |   |   |   |   | F  |   |   | D   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 9.0   | 54.0  |   | 57.0  |   | 63.0  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 4.8   | 48.7  |   | * 53  |   | 57.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 7.0   | 52.0  |   | 55.4  |   | 35.4  |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 0.0   |   | 0.0   |   | 18.0  |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 183.1   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | F   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

























# HCM Signalized Intersection Capacity Analysis

2035 + Proj PM Peak

## 5: Temperance Ave & Fir Ave

3/28/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBU   | SBL   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |   |  |
| Volume (vph)                      | 159   | 14  | 97  | 226   | 25  | 386   | 2  | 115   | 1141  | 75  | 27  | 359   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.2   | 4.2   | 4.0   | 4.2   | 4.0   |  | 4.2   | 4.0   | 4.0   |   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.95  | 1.00  |   | 0.97  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.99  |   | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  |   | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  |   | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1546  |   | 3400  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 3505  | 1546  |   | 3400  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.96  | 0.92  | 0.96  | 0.96   | 0.92  | 0.96  | 0.96  | 0.92  | 0.96  |
| Adj. Flow (vph)                   | 173   | 15  | 105   | 235   | 27  | 402   | 2  | 125   | 1189  | 78  | 29  | 374   |
| RTOR Reduction (vph)              | 0   | 0   | 94  | 0   | 0   | 148   | 0  | 0   | 0   | 47  | 0   | 0   |
| Lane Group Flow (vph)             | 173   | 15  | 11  | 235   | 27  | 254   | 0  | 127   | 1189  | 31  | 0   | 403   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | Prot  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 1   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 20.4  | 13.1  | 13.1  | 31.4  | 24.1  | 24.1  |  | 14.4  | 46.8  | 46.8  |   | 10.8  |
| Effective Green, g (s)            | 20.4  | 13.1  | 13.1  | 31.6  | 24.1  | 24.3  |  | 14.4  | 48.1  | 48.1  |   | 11.0  |
| Actuated g/C Ratio                | 0.17  | 0.11  | 0.11  | 0.26  | 0.20  | 0.20  |  | 0.12  | 0.40  | 0.40  |   | 0.09  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   |  | 4.2   | 5.3   | 5.3   |   | 4.2   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   |   | 3.0   |
| Lane Grp Cap (vph)                | 297   | 201   | 171   | 461   | 370   | 317   |  | 210   | 1404  | 619   |   | 311   |
| v/s Ratio Prot                    | c0.10   | 0.01  |   | 0.13  | 0.01  |   |  | 0.07  | c0.34   |   |   | 0.12  |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | c0.16   |  |   |   | 0.02  |   |   |
| v/c Ratio                         | 0.58  | 0.07  | 0.07  | 0.51  | 0.07  | 0.80  |  | 0.60  | 0.85  | 0.05  |   | 1.30  |
| Uniform Delay, d1                 | 45.9  | 48.0  | 48.0  | 37.6  | 38.9  | 45.5  |  | 50.1  | 32.6  | 22.0  |   | 54.5  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.12  | 0.44  | 0.01  |   | 0.79  |
| Incremental Delay, d2             | 2.9   | 0.2   | 0.2   | 0.9   | 0.1   | 13.5  |  | 3.8   | 5.1   | 0.1   |   | 135.4   |
| Delay (s)                         | 48.8  | 48.2  | 48.1  | 38.5  | 39.0  | 59.0  |  | 59.9  | 19.3  | 0.3   |   | 178.4   |
| Level of Service                  | D   | D   | D   | D   | D   | E   |  | E   | B   | A   |   | F   |
| Approach Delay (s)                |   | 48.5  |   |   | 50.9  |   |  |   | 21.9  |   |   |   |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | C   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 134.9   |   |   | HCM 2000 Level of Service   |  |   | F   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 1.08  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   | Sum of lost time (s)  |  |   | 16.6  |   |   |   |
| Intersection Capacity Utilization |   |   | 90.2%   |   |   | ICU Level of Service  |  |   | E   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Ave & Fir Ave

2035 + Proj PM Peak

3/28/2017



| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑    | ↘    |
| Volume (vph)           | 1664  | 175  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 4.0   |      |
| Lane Util. Factor      | 0.95  |      |
| Frpb, ped/bikes        | 1.00  |      |
| Flpb, ped/bikes        | 1.00  |      |
| Frt                    | 0.99  |      |
| Flt Protected          | 1.00  |      |
| Satd. Flow (prot)      | 3453  |      |
| Flt Permitted          | 1.00  |      |
| Satd. Flow (perm)      | 3453  |      |
| Peak-hour factor, PHF  | 0.96  | 0.92 |
| Adj. Flow (vph)        | 1733  | 190  |
| RTOR Reduction (vph)   | 7     | 0    |
| Lane Group Flow (vph)  | 1916  | 0    |
| Confl. Peds. (#/hr)    |       |      |
| Turn Type              | NA    |      |
| Protected Phases       | 6     |      |
| Permitted Phases       |       |      |
| Actuated Green, G (s)  | 43.2  |      |
| Effective Green, g (s) | 44.5  |      |
| Actuated g/C Ratio     | 0.37  |      |
| Clearance Time (s)     | 5.3   |      |
| Vehicle Extension (s)  | 3.0   |      |
| Lane Grp Cap (vph)     | 1280  |      |
| v/s Ratio Prot         | c0.55 |      |
| v/s Ratio Perm         |       |      |
| v/c Ratio              | 1.50  |      |
| Uniform Delay, d1      | 37.8  |      |
| Progression Factor     | 0.68  |      |
| Incremental Delay, d2  | 224.0 |      |
| Delay (s)              | 249.8 |      |
| Level of Service       | F     |      |
| Approach Delay (s)     | 237.4 |      |
| Approach LOS           | F     |      |
| Intersection Summary   |       |      |
























| Intersection                  |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|
| Intersection Delay, s/veh12.3 |       |       |       |       |
| Intersection LOS B            |       |       |       |       |
| Approach                      | EB    | WB    | NB    | SB    |
| Entry Lanes                   | 1     | 1     | 1     | 1     |
| Conflicting Circle Lanes      | 1     | 1     | 1     | 1     |
| Adj Approach Flow, veh/h      | 507   | 62    | 108   | 689   |
| Demand Flow Rate, veh/h       | 522   | 64    | 111   | 709   |
| Vehicles Circulating, veh/h   | 94    | 548   | 502   | 113   |
| Vehicles Exiting, veh/h       | 728   | 65    | 114   | 499   |
| Follow-Up Headway, s          | 3.186 | 3.186 | 3.186 | 3.186 |
| Ped Vol Crossing Leg, #/h     | 0     | 0     | 0     | 0     |
| Ped Cap Adj                   | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh         | 9.8   | 6.8   | 7.2   | 15.4  |
| Approach LOS                  | A     | A     | A     | C     |
| Lane                          | Left  | Left  | Left  | Left  |
| Designated Moves              | LTR   | LTR   | LTR   | LTR   |
| Assumed Moves                 | LTR   | LTR   | LTR   | LTR   |
| RT Channelized                |       |       |       |       |
| Lane Util                     | 1.000 | 1.000 | 1.000 | 1.000 |
| Critical Headway, s           | 5.193 | 5.193 | 5.193 | 5.193 |
| Entry Flow, veh/h             | 522   | 64    | 111   | 709   |
| Cap Entry Lane, veh/h         | 1029  | 653   | 684   | 1009  |
| Entry HV Adj Factor           | 0.972 | 0.967 | 0.976 | 0.972 |
| Flow Entry, veh/h             | 507   | 62    | 108   | 689   |
| Cap Entry, veh/h              | 999   | 632   | 667   | 981   |
| V/C Ratio                     | 0.508 | 0.098 | 0.162 | 0.703 |
| Control Delay, s/veh          | 9.8   | 6.8   | 7.2   | 15.4  |
| LOS                           | A     | A     | A     | C     |
| 95th %tile Queue, veh         | 3     | 0     | 1     | 6     |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

2035 + Proj PM Peak

3/28/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 66  | 1038  | 235   | 255   | 981   | 376   | 184  | 497   | 52  | 122   | 286   | 88  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 69  | 1093  | 247   | 268   | 1033  | 396   | 194  | 523   | 55  | 128   | 301   | 93  |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 2   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95   | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 255   | 2051  | 638   | 299   | 1054  | 398   | 205  | 659   | 295   | 161   | 604   | 270   |
| Arrive On Green   | 0.15  | 0.41  | 0.41  | 0.17  | 0.42  | 0.41  | 0.12   | 0.19  | 0.19  | 0.09  | 0.17  | 0.17  |
| Sat Flow, veh/h   | 1757  | 5036  | 1567  | 1757  | 2490  | 941   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 69  | 1093  | 247   | 268   | 723   | 706   | 194  | 523   | 55  | 128   | 301   | 93  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1567  | 1757  | 1752  | 1679  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 4.2   | 19.7  | 13.3  | 17.9  | 48.6  | 50.3  | 13.2   | 17.1  | 2.4   | 8.6   | 9.3   | 4.4   |
| Cycle Q Clear(g_c), s   | 4.2   | 19.7  | 13.3  | 17.9  | 48.6  | 50.3  | 13.2   | 17.1  | 2.4   | 8.6   | 9.3   | 4.4   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.56  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 255   | 2051  | 638   | 299   | 742   | 711   | 205  | 659   | 295   | 161   | 604   | 270   |
| V/C Ratio(X)  | 0.27  | 0.53  | 0.39  | 0.90  | 0.97  | 0.99  | 0.95   | 0.79  | 0.19  | 0.79  | 0.50  | 0.34  |
| Avail Cap(c_a), veh/h   | 255   | 2051  | 638   | 348   | 742   | 711   | 205  | 1019  | 456   | 182   | 973   | 435   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 45.6  | 26.9  | 25.0  | 48.7  | 34.0  | 34.8  | 52.6   | 46.5  | 19.0  | 53.4  | 45.0  | 21.8  |
| Incr Delay (d2), s/veh  | 0.6   | 1.0   | 1.8   | 22.2  | 27.3  | 32.3  | 47.7   | 2.4   | 0.3   | 19.2  | 0.6   | 0.8   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.1   | 9.3   | 6.1   | 10.6  | 29.1  | 29.5  | 9.1  | 8.5   | 1.1   | 5.0   | 4.6   | 2.0   |
| LnGrp Delay(d),s/veh  | 46.2  | 27.9  | 26.8  | 71.0  | 61.3  | 67.1  | 100.4  | 48.9  | 19.3  | 72.5  | 45.6  | 22.6  |
| LnGrp LOS   | D   | C   | C   | E   | E   | E   | F  | D   | B   | E   | D   | C   |
| Approach Vol, veh/h   |   | 1409  |   |   | 1697  |   |  | 772   |   |   | 522   |   |
| Approach Delay, s/veh   |   | 28.6  |   |   | 65.2  |   |  | 59.7  |   |   | 48.1  |   |
| Approach LOS  |   | C   |   |   | E   |   |  | E   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 16.1  | 26.6  | 24.5  | 52.9  | 18.0  | 24.7  | 22.5   | 54.8  |   |   |   |   |
| Change Period (Y+Rc), s   | 5.3   | * 5.3   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | 12.2  | * 34  | * 24  | 31.6  | * 14  | 32.0  | 5.7  | * 50  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 10.6  | 19.1  | 19.9  | 21.7  | 15.2  | 11.3  | 6.2  | 52.3  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.4   | 2.2   | 0.3   | 4.7   | 0.0   | 2.0   | 0.0  | 0.0   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 50.5  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

























| Intersection             |        |       |      |        |      |      |      |        |       |      |        |  |      |      |      |
|--------------------------|--------|-------|------|--------|------|------|------|--------|-------|------|--------|--|------|------|------|
| Int Delay, s/veh         | 3.7    |       |      |        |      |      |      |        |       |      |        |  |      |      |      |
|                          |        |       |      |        |      |      |      |        |       |      |        |  |      |      |      |
| Movement                 | EBL    | EBT   | EBR  | WBU    | WBL  | WBT  | WBR  |        | NEL   | NET  | NER    |  | SWL  | SWT  | SWR  |
| Vol, veh/h               | 55     | 1230  | 0    | 38     | 0    | 1574 | 7    |        | 0     | 0    | 220    |  | 0    | 0    | 38   |
| Conflicting Peds, #/hr   | 0      | 0     | 0    | 0      | 0    | 0    | 0    |        | 0     | 0    | 0      |  | 0    | 0    | 0    |
| Sign Control             | Free   | Free  | Free | Free   | Free | Free | Free |        | Stop  | Stop | Stop   |  | Stop | Stop | Stop |
| RT Channelized           | -      | -     | None | -      | -    | -    | None |        | -     | -    | None   |  | -    | -    | None |
| Storage Length           | 400    | -     | -    | -      | 120  | -    | 85   |        | -     | -    | 0      |  | -    | -    | 0    |
| Veh in Median Storage, # | -      | 0     | -    | -      | -    | 0    | -    |        | -     | 1    | -      |  | -    | 1    | -    |
| Grade, %                 | -      | 0     | -    | -      | -    | 0    | -    |        | -     | 0    | -      |  | -    | 0    | -    |
| Peak Hour Factor         | 92     | 92    | 92   | 92     | 92   | 92   | 92   |        | 92    | 92   | 92     |  | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3     | 3    | 3      | 3    | 3    | 3    |        | 3     | 3    | 3      |  | 3    | 3    | 3    |
| Mvmt Flow                | 60     | 1337  | 0    | 41     | 0    | 1711 | 8    |        | 0     | 0    | 239    |  | 0    | 0    | 41   |
|                          |        |       |      |        |      |      |      |        |       |      |        |  |      |      |      |
| Major/Minor              | Major1 |       |      | Major2 |      |      |      | Minor1 |       |      | Minor2 |  |      |      |      |
| Conflicting Flow All     | 1711   | 0     | 0    | 1215   | 1337 | 0    | 0    |        | 2395  | 3250 | 668    |  | 2447 | 3250 | 855  |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -    |        | 1457  | 1457 | -      |  | 1793 | 1793 | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -    |        | 938   | 1793 | -      |  | 654  | 1457 | -    |
| Critical Hdwy            | 4.16   | -     | -    | 5.66   | 5.36 | -    | -    |        | 7.01  | 6.56 | 7.16   |  | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1      | -      | -     | -    | -      | -    | -    | -    |        | 7.36  | 5.56 | -      |  | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2      | -      | -     | -    | -      | -    | -    | -    |        | 6.56  | 5.56 | -      |  | 6.76 | 5.56 | -    |
| Follow-up Hdwy           | 2.23   | -     | -    | 2.33   | 3.13 | -    | -    |        | 3.68  | 4.03 | 3.93   |  | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver       | 363    | -     | -    | 330    | 266  | -    | -    |        | 25    | 9    | 342    |  | 23   | 9    | 300  |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -    |        | 96    | 191  | -      |  | 81   | 130  | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -    |        | 275   | 130  | -      |  | 393  | 191  | -    |
| Platoon blocked, %       |        |       | -    | -      |      |      | -    |        |       |      |        |  |      |      |      |
| Mov Cap-1 Maneuver       | 363    | -     | -    | 118    | 266  | -    | -    |        | 19    | 8    | 342    |  | 6    | 8    | 300  |
| Mov Cap-2 Maneuver       | -      | -     | -    | -      | -    | -    | -    |        | 58    | 47   | -      |  | 31   | 60   | -    |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -    |        | 80    | 159  | -      |  | 68   | 130  | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -    |        | 237   | 130  | -      |  | 99   | 159  | -    |
|                          |        |       |      |        |      |      |      |        |       |      |        |  |      |      |      |
| Approach                 | EB     |       | WB   |        |      |      | NE   |        |       |      | SW     |  |      |      |      |
| HCM Control Delay, s     | 0.7    |       | 1.2  |        |      |      | 36.7 |        |       |      | 18.9   |  |      |      |      |
| HCM LOS                  |        |       |      |        |      |      | E    |        |       |      | C      |  |      |      |      |
|                          |        |       |      |        |      |      |      |        |       |      |        |  |      |      |      |
| Minor Lane/Major Mvmt    | NELn1  | EBL   | EBT  | EBR    | WBU  | WBL  | WBT  | WBR    | SWLn1 |      |        |  |      |      |      |
| Capacity (veh/h)         | 342    | 363   | -    | -      | 118  | 266  | -    | -      | 300   |      |        |  |      |      |      |
| HCM Lane V/C Ratio       | 0.699  | 0.165 | -    | -      | 0.35 | -    | -    | -      | 0.138 |      |        |  |      |      |      |
| HCM Control Delay (s)    | 36.7   | 16.9  | -    | -      | 51.1 | -    | -    | -      | 18.9  |      |        |  |      |      |      |
| HCM Lane LOS             | E      | C     | -    | -      | F    | -    | -    | -      | C     |      |        |  |      |      |      |
| HCM 95th %tile Q(veh)    | 5      | 0.6   | -    | -      | 1.4  | 0    | -    | -      | 0.5   |      |        |  |      |      |      |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Ave & Herndon Avenue

2035 + Proj PM Peak

3/28/2017




















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |   |  |  |  |  |  |
| Volume (veh/h)               | 199   | 1083  | 317   | 167   | 992   | 566   | 263  | 568   | 125   | 586   | 1129  | 295   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 203   | 1105  | 323   | 170   | 1012  | 578   | 268  | 580   | 128   | 598   | 1152  | 301   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 264   | 1203  | 534   | 227   | 1628  | 506   | 327  | 725   | 324   | 821   | 1264  | 566   |
| Arrive On Green              | 0.08  | 0.34  | 0.34  | 0.07  | 0.32  | 0.32  | 0.10   | 0.21  | 0.21  | 0.48  | 0.72  | 0.72  |
| Sat Flow, veh/h              | 3408  | 3505  | 1556  | 3408  | 5036  | 1565  | 3408   | 3505  | 1566  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 203   | 1105  | 323   | 170   | 1012  | 578   | 268  | 580   | 128   | 598   | 1152  | 301   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1556  | 1704  | 1679  | 1565  | 1704   | 1752  | 1566  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 7.0   | 36.3  | 20.7  | 5.9   | 20.4  | 38.8  | 9.3  | 18.9  | 6.7   | 16.8  | 32.1  | 7.6   |
| Cycle Q Clear(g_c), s        | 7.0   | 36.3  | 20.7  | 5.9   | 20.4  | 38.8  | 9.3  | 18.9  | 6.7   | 16.8  | 32.1  | 7.6   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 264   | 1203  | 534   | 227   | 1628  | 506   | 327  | 725   | 324   | 821   | 1264  | 566   |
| V/C Ratio(X)                 | 0.77  | 0.92  | 0.60  | 0.75  | 0.62  | 1.14  | 0.82   | 0.80  | 0.40  | 0.73  | 0.91  | 0.53  |
| Avail Cap(c_a), veh/h        | 290   | 1203  | 534   | 227   | 1628  | 506   | 341  | 935   | 418   | 821   | 1264  | 566   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 2.00  | 2.00  | 2.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.77  | 0.77  | 0.77  | 1.00   | 1.00  | 1.00  | 0.09  | 0.09  | 0.09  |
| Uniform Delay (d), s/veh     | 54.3  | 37.8  | 32.7  | 55.0  | 34.4  | 40.6  | 53.2   | 45.2  | 26.1  | 28.0  | 15.1  | 6.4   |
| Incr Delay (d2), s/veh       | 10.9  | 11.3  | 1.9   | 10.1  | 0.6   | 81.3  | 14.1   | 9.1   | 3.6   | 0.3   | 1.3   | 0.3   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.7   | 19.4  | 9.2   | 3.1   | 9.5   | 28.2  | 5.0  | 10.0  | 3.2   | 7.8   | 14.9  | 3.1   |
| LnGrp Delay(d),s/veh         | 65.2  | 49.1  | 34.6  | 65.1  | 34.9  | 121.9   | 67.3   | 54.3  | 29.7  | 28.3  | 16.4  | 6.7   |
| LnGrp LOS                    | E   | D   | C   | E   | C   | F   | E  | D   | C   | C   | B   | A   |
| Approach Vol, veh/h          | 1631  |   |   | 1760  |   |   |  | 976   |   |   | 2051  |   |
| Approach Delay, s/veh        | 48.2  |   |   | 66.4  |   |   |  | 54.6  |   |   | 18.4  |   |
| Approach LOS                 | D   |   |   | E   |   |   |  | D   |   |   | B   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 34.0  | 28.8  | 12.0  | 45.2  | 15.5  | 47.3  | 14.4   | 42.8  |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.7   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 22.8  | * 30  | * 7.8   | 39.7  | * 12  | 41.7  | 10.0   | * 38  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 18.8  | 20.9  | 7.9   | 38.3  | 11.3  | 34.1  | 9.0  | 40.8  |   |   |   |   |
| Green Ext Time (p_c), s      | 3.1   | 2.2   | 0.0   | 1.0   | 0.1   | 5.4   | 0.1  | 0.0   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 44.7  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 10: Coventry Avenue & Herndon Avenue

2035 + Proj PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |   |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement                          | EBU   | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations               |   |  |  |   |  |  |  |   |  |   |   |  |
| Volume (vph)                      | 77  | 136   | 1520  | 93  | 22  | 1252  | 47  | 155   | 5   | 31  | 192   | 17  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               |   | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   |   | 4.0   |   |   | 4.0   |
| Lane Util. Factor                 |   | 1.00  | 0.91  |   | 1.00  | 0.91  | 1.00  |   | 1.00  |   |   | 1.00  |
| Frt                               |   | 1.00  | 0.99  |   | 1.00  | 1.00  | 0.85  |   | 0.98  |   |   | 1.00  |
| Flt Protected                     |   | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  |   | 0.96  |   |   | 0.96  |
| Satd. Flow (prot)                 |   | 1752  | 4992  |   | 1752  | 5036  | 1568  |   | 1734  |   |   | 1764  |
| Flt Permitted                     |   | 0.95  | 1.00  |   | 0.95  | 1.00  | 1.00  |   | 0.96  |   |   | 0.96  |
| Satd. Flow (perm)                 |   | 1752  | 4992  |   | 1752  | 5036  | 1568  |   | 1734  |   |   | 1764  |
| Peak-hour factor, PHF             | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  | 0.99  |
| Adj. Flow (vph)                   | 78  | 137   | 1535  | 94  | 22  | 1265  | 47  | 157   | 5   | 31  | 194   | 17  |
| RTOR Reduction (vph)              | 0   | 0   | 5   | 0   | 0   | 0   | 28  | 0   | 6   | 0   | 0   | 0   |
| Lane Group Flow (vph)             | 0   | 215   | 1624  | 0   | 22  | 1265  | 19  | 0   | 187   | 0   | 0   | 211   |
| Turn Type                         | Prot  | Prot  | NA  |   | Prot  | NA  | Perm  | Split   | NA  |   | Split   | NA  |
| Protected Phases                  | 7   | 7   | 4   |   | 3   | 8   |   | 2   | 2   |   | 6   | 6   |
| Permitted Phases                  |   |   |   |   |   |   | 8   |   |   |   |   |   |
| Actuated Green, G (s)             |   | 20.3  | 63.4  |   | 3.6   | 46.7  | 46.7  |   | 16.6  |   |   | 18.5  |
| Effective Green, g (s)            |   | 20.5  | 64.7  |   | 3.8   | 48.0  | 48.0  |   | 16.8  |   |   | 18.7  |
| Actuated g/C Ratio                |   | 0.17  | 0.54  |   | 0.03  | 0.40  | 0.40  |   | 0.14  |   |   | 0.16  |
| Clearance Time (s)                |   | 4.2   | 5.3   |   | 4.2   | 5.3   | 5.3   |   | 4.2   |   |   | 4.2   |
| Vehicle Extension (s)             |   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   |   | 3.0   |   |   | 3.0   |
| Lane Grp Cap (vph)                |   | 299   | 2691  |   | 55  | 2014  | 627   |   | 242   |   |   | 274   |
| v/s Ratio Prot                    |   | c0.12   | 0.33  |   | 0.01  | c0.25   |   |   | c0.11   |   |   | c0.12   |
| v/s Ratio Perm                    |   |   |   |   |   |   | 0.01  |   |   |   |   |   |
| v/c Ratio                         |   | 0.72  | 0.60  |   | 0.40  | 0.63  | 0.03  |   | 0.77  |   |   | 0.77  |
| Uniform Delay, d1                 |   | 47.0  | 18.9  |   | 57.0  | 28.8  | 21.9  |   | 49.8  |   |   | 48.6  |
| Progression Factor                |   | 0.67  | 0.48  |   | 1.00  | 1.00  | 1.00  |   | 1.00  |   |   | 1.00  |
| Incremental Delay, d2             |   | 4.4   | 0.5   |   | 4.7   | 1.5   | 0.1   |   | 14.2  |   |   | 12.5  |
| Delay (s)                         |   | 35.9  | 9.6   |   | 61.7  | 30.3  | 22.0  |   | 63.9  |   |   | 61.1  |
| Level of Service                  |   | D   | A   |   | E   | C   | C   |   | E   |   |   | E   |
| Approach Delay (s)                |   |   | 12.7  |   |   | 30.6  |   |   | 63.9  |   |   | 52.0  |
| Approach LOS                      |   |   | B   |   |   | C   |   |   | E   |   |   | D   |
| Intersection Summary              |   |   |   |   |   |   |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 26.2  |   | HCM 2000 Level of Service   |   |   |   | C   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.70  |   |   |   |   |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   | Sum of lost time (s)  |   |   |   | 16.2  |   |   |   |
| Intersection Capacity Utilization |   |   | 75.0%   |   | ICU Level of Service  |   |   |   | D   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |   |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 10: Coventry Avenue & Herndon Avenue

2035 + Proj PM Peak

3/28/2017

|                        |      |
|------------------------|------|
| Movement               | SBR  |
| Lane Configurations    |      |
| Volume (vph)           | 241  |
| Ideal Flow (vphpl)     | 1900 |
| Total Lost time (s)    | 4.0  |
| Lane Util. Factor      | 1.00 |
| Frt                    | 0.85 |
| Flt Protected          | 1.00 |
| Satd. Flow (prot)      | 1568 |
| Flt Permitted          | 1.00 |
| Satd. Flow (perm)      | 1568 |
| Peak-hour factor, PHF  | 0.99 |
| Adj. Flow (vph)        | 243  |
| RTOR Reduction (vph)   | 205  |
| Lane Group Flow (vph)  | 38   |
| Turn Type              | Perm |
| Protected Phases       |      |
| Permitted Phases       | 6    |
| Actuated Green, G (s)  | 18.5 |
| Effective Green, g (s) | 18.7 |
| Actuated g/C Ratio     | 0.16 |
| Clearance Time (s)     | 4.2  |
| Vehicle Extension (s)  | 3.0  |
| Lane Grp Cap (vph)     | 244  |
| v/s Ratio Prot         |      |
| v/s Ratio Perm         | 0.02 |
| v/c Ratio              | 0.16 |
| Uniform Delay, d1      | 43.8 |
| Progression Factor     | 1.00 |
| Incremental Delay, d2  | 0.3  |
| Delay (s)              | 44.1 |
| Level of Service       | D    |
| Approach Delay (s)     |      |
| Approach LOS           |      |
| Intersection Summary   |      |















# HCM Unsignalized Intersection Capacity Analysis

## 11: Coventry Avenue & Medical Center Drive

2035 + Proj PM Peak

3/28/2017

|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |  |
| Volume (veh/h)                    | 24  | 79  | 379   | 27  | 58  | 122   |
| Sign Control                      | Stop  |   |   | Stop  | Free  |   |
| Grade                             | 0%  |   |   | 0%  | 0%  |   |
| Peak Hour Factor                  | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  |
| Hourly flow rate (vph)            | 28  | 91  | 436   | 31  | 67  | 140   |
| Pedestrians                       |   |   |   |   |   |   |
| Lane Width (ft)                   |   |   |   |   |   |   |
| Walking Speed (ft/s)              |   |   |   |   |   |   |
| Percent Blockage                  |   |   |   |   |   |   |
| Right turn flare (veh)            |   | 4   |   |   |   |   |
| Median type                       |   |   |   |   | None  |   |
| Median storage (veh)              |   |   |   |   |   |   |
| Upstream signal (ft)              |   |   |   |   | 110   |   |
| pX, platoon unblocked             |   |   |   |   |   |   |
| vC, conflicting volume            | 274   | 0   | 147   | 133   | 0   |   |
| vC1, stage 1 conf vol             |   |   |   |   |   |   |
| vC2, stage 2 conf vol             |   |   |   |   |   |   |
| vCu, unblocked vol                | 274   | 0   | 147   | 133   | 0   |   |
| tC, single (s)                    | 6.5   | 6.2   | 7.1   | 6.5   | 4.1   |   |
| tC, 2 stage (s)                   |   |   |   |   |   |   |
| tF (s)                            | 4.0   | 3.3   | 3.5   | 4.0   | 2.2   |   |
| p0 queue free %                   | 95  | 92  | 38  | 96  | 96  |   |
| cM capacity (veh/h)               | 606   | 1082  | 702   | 724   | 1617  |   |
| Direction, Lane #                 | EB 1  | WB 1  | WB 2  | NB 1  | NB 2  |   |
| Volume Total                      | 118   | 436   | 31  | 67  | 140   |   |
| Volume Left                       | 0   | 436   | 0   | 67  | 0   |   |
| Volume Right                      | 91  | 0   | 0   | 0   | 140   |   |
| cSH                               | 1411  | 702   | 724   | 1617  | 1700  |   |
| Volume to Capacity                | 0.08  | 0.62  | 0.04  | 0.04  | 0.08  |   |
| Queue Length 95th (ft)            | 7   | 109   | 3   | 3   | 0   |   |
| Control Delay (s)                 | 9.2   | 18.2  | 10.2  | 7.3   | 0.0   |   |
| Lane LOS                          | A   | C   | B   | A   |   |   |
| Approach Delay (s)                | 9.2   | 17.6  |   | 2.4   |   |   |
| Approach LOS                      | A   | C   |   |   |   |   |
| Intersection Summary              |   |   |   |   |   |   |
| Average Delay                     |   | 12.4  |   |   |   |   |
| Intersection Capacity Utilization |   | 37.7%   |   | ICU Level of Service  | A   |   |
| Analysis Period (min)             |   | 15  |   |   |   |   |

Intersection

Int Delay, s/veh 0.5

| Movement                 | EBL  | EBT  | WBT  | WBR  | SBL  | SBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 5    | 1731 | 1229 | 31   | 0    | 92   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 100  | -    | -    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | 0    | -    | 0    | -    |
| Grade, %                 | -    | 0    | 0    | -    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 5    | 1822 | 1294 | 33   | 0    | 97   |

| Major/Minor          | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 1326   | 0      | 2232   |
| Stage 1              | -      | -      | 1310   |
| Stage 2              | -      | -      | 922    |
| Critical Hdwy        | 4.16   | -      | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | 2.23   | -      | 3.53   |
| Pot Cap-1 Maneuver   | 511    | -      | 36     |
| Stage 1              | -      | -      | 215    |
| Stage 2              | -      | -      | 345    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 511    | -      | 36     |
| Mov Cap-2 Maneuver   | -      | -      | 36     |
| Stage 1              | -      | -      | 215    |
| Stage 2              | -      | -      | 342    |

| Approach             | EB | WB | SB   |
|----------------------|----|----|------|
| HCM Control Delay, s | 0  | 0  | 16.8 |
| HCM LOS              |    |    | C    |

| Minor Lane/Major Mvmt | EBL  | EBT | WBT | WBR | SBLn1 |
|-----------------------|------|-----|-----|-----|-------|
| Capacity (veh/h)      | 511  | -   | -   | -   | 401   |
| HCM Lane V/C Ratio    | 0.01 | -   | -   | -   | 0.242 |
| HCM Control Delay (s) | 12.1 | -   | -   | -   | 16.8  |
| HCM Lane LOS          | B    | -   | -   | -   | C     |
| HCM 95th %tile Q(veh) | 0    | -   | -   | -   | 0.9   |

Intersection

Int Delay, s/veh 468.2

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 1305 | 456  | 27   | 759  | 501  | 171  |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 250  | 250  | -    | 0    | 250  |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 98   | 98   | 98   | 98   | 98   | 98   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 1332 | 465  | 28   | 774  | 511  | 174  |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 1332   |
| Stage 1              | -      | -      | 1332   |
| Stage 2              | -      | -      | 442    |
| Critical Hdwy        | -      | 4.16   | 6.86   |
| Critical Hdwy Stg 1  | -      | -      | 5.86   |
| Critical Hdwy Stg 2  | -      | -      | 5.86   |
| Follow-up Hdwy       | -      | 2.23   | 3.53   |
| Pot Cap-1 Maneuver   | -      | 509    | ~ 73   |
| Stage 1              | -      | -      | ~ 209  |
| Stage 2              | -      | -      | 612    |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | 509    | ~ 69   |
| Mov Cap-2 Maneuver   | -      | -      | ~ 69   |
| Stage 1              | -      | -      | ~ 209  |
| Stage 2              | -      | -      | 578    |

| Approach             | EB | WB  | NB        |
|----------------------|----|-----|-----------|
| HCM Control Delay, s | 0  | 0.4 | \$ 2242.2 |
| HCM LOS              |    |     | F         |

| Minor Lane/Major Mvmt | NBLn1     | NBLn2 | EBT | EBR | WBL   | WBT |
|-----------------------|-----------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 69        | 400   | -   | -   | 509   | -   |
| HCM Lane V/C Ratio    | 7.409     | 0.436 | -   | -   | 0.054 | -   |
| HCM Control Delay (s) | \$ 3000.4 | 20.8  | -   | -   | 12.5  | -   |
| HCM Lane LOS          | F         | C     | -   | -   | B     | -   |
| HCM 95th %tile Q(veh) | 58.6      | 2.2   | -   | -   | 0.2   | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

| Intersection             |        |      |        |      |        |       |
|--------------------------|--------|------|--------|------|--------|-------|
| Int Delay, s/veh         | 1.8    |      |        |      |        |       |
| Movement                 | EBL    | EBT  | WBT    | WBR  | SBL    | SBR   |
| Vol, veh/h               | 90     | 1376 | 742    | 24   | 29     | 43    |
| Conflicting Peds, #/hr   | 0      | 0    | 0      | 0    | 0      | 0     |
| Sign Control             | Free   | Free | Free   | Free | Stop   | Stop  |
| RT Channelized           | -      | None | -      | None | -      | None  |
| Storage Length           | 250    | -    | -      | 250  | 250    | 0     |
| Veh in Median Storage, # | -      | 0    | 0      | -    | 0      | -     |
| Grade, %                 | -      | 0    | 0      | -    | 0      | -     |
| Peak Hour Factor         | 93     | 93   | 93     | 93   | 93     | 93    |
| Heavy Vehicles, %        | 3      | 3    | 3      | 3    | 3      | 3     |
| Mvmt Flow                | 97     | 1480 | 798    | 26   | 31     | 46    |
| Major/Minor              | Major1 |      | Major2 |      | Minor2 |       |
| Conflicting Flow All     | 798    | 0    | -      | 0    | 1731   | 399   |
| Stage 1                  | -      | -    | -      | -    | 798    | -     |
| Stage 2                  | -      | -    | -      | -    | 933    | -     |
| Critical Hdwy            | 4.16   | -    | -      | -    | 6.86   | 6.96  |
| Critical Hdwy Stg 1      | -      | -    | -      | -    | 5.86   | -     |
| Critical Hdwy Stg 2      | -      | -    | -      | -    | 5.86   | -     |
| Follow-up Hdwy           | 2.23   | -    | -      | -    | 3.53   | 3.33  |
| Pot Cap-1 Maneuver       | 814    | -    | -      | -    | 78     | 598   |
| Stage 1                  | -      | -    | -      | -    | 401    | -     |
| Stage 2                  | -      | -    | -      | -    | 341    | -     |
| Platoon blocked, %       | -      | -    | -      | -    | -      | -     |
| Mov Cap-1 Maneuver       | 814    | -    | -      | -    | 69     | 598   |
| Mov Cap-2 Maneuver       | -      | -    | -      | -    | 69     | -     |
| Stage 1                  | -      | -    | -      | -    | 401    | -     |
| Stage 2                  | -      | -    | -      | -    | 300    | -     |
| Approach                 | EB     |      | WB     |      | SB     |       |
| HCM Control Delay, s     | 0.6    |      | 0      |      | 44.9   |       |
| HCM LOS                  |        |      |        |      | E      |       |
| Minor Lane/Major Mvmt    | EBL    | EBT  | WBT    | WBR  | SBLn1  | SBLn2 |
| Capacity (veh/h)         | 814    | -    | -      | -    | 69     | 598   |
| HCM Lane V/C Ratio       | 0.119  | -    | -      | -    | 0.452  | 0.077 |
| HCM Control Delay (s)    | 10     | -    | -      | -    | 94.5   | 11.5  |
| HCM Lane LOS             | B      | -    | -      | -    | F      | B     |
| HCM 95th %tile Q(veh)    | 0.4    | -    | -      | -    | 1.8    | 0.2   |

Intersection

Int Delay, s/veh 82.9

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 869  | 525  | 10   | 496  | 281  | 20   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 915  | 553  | 11   | 522  | 296  | 21   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 915    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | -      |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | -      |
| Pot Cap-1 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | -      |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB  | NB       |
|----------------------|----|-----|----------|
| HCM Control Delay, s | 0  | 0.2 | \$ 605.5 |
| HCM LOS              |    |     | F        |

| Minor Lane/Major Mvmt | NBLn1    | EBT | EBR | WBL   | WBT |
|-----------------------|----------|-----|-----|-------|-----|
| Capacity (veh/h)      | 145      | -   | -   | 741   | -   |
| HCM Lane V/C Ratio    | 2.185    | -   | -   | 0.014 | -   |
| HCM Control Delay (s) | \$ 605.5 | -   | -   | 9.9   | 0   |
| HCM Lane LOS          | F        | -   | -   | A     | A   |
| HCM 95th %tile Q(veh) | 26       | -   | -   | 0     | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection

Int Delay, s/veh 36.5

| Movement                 | EBT  | EBR  | WBL  | WBT  | NBL  | NBR  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 835  | 34   | 2    | 428  | 194  | 10   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Stop | Stop |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | -    | -    | -    | 0    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 908  | 37   | 2    | 465  | 211  | 11   |

| Major/Minor          | Major1 | Major2 | Minor1 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 0      | 0      | 945    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Critical Hdwy        | -      | -      | 4.13   |
| Critical Hdwy Stg 1  | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      |
| Follow-up Hdwy       | -      | -      | 2.227  |
| Pot Cap-1 Maneuver   | -      | -      | 722    |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | -      | -      | 722    |
| Mov Cap-2 Maneuver   | -      | -      | -      |
| Stage 1              | -      | -      | -      |
| Stage 2              | -      | -      | -      |

| Approach             | EB | WB | NB  |
|----------------------|----|----|-----|
| HCM Control Delay, s | 0  | 0  | 269 |
| HCM LOS              |    |    | F   |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL   | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h)      | 158   | -   | -   | 722   | -   |
| HCM Lane V/C Ratio    | 1.403 | -   | -   | 0.003 | -   |
| HCM Control Delay (s) | 269   | -   | -   | 10    | 0   |
| HCM Lane LOS          | F     | -   | -   | B     | A   |
| HCM 95th %tile Q(veh) | 13.9  | -   | -   | 0     | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection

Int Delay, s/veh 0.4

| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Vol, veh/h               | 60   | 311  | 272  | 26   | 353  | 16   | 175  | 259  | 45   | 29   | 218  | 44   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 65   | 338  | 296  | 28   | 384  | 17   | 190  | 282  | 49   | 32   | 237  | 48   |

| Major/Minor          | Major1 |   |   | Major2 |   |   | Minor1 |       |       | Minor2 |       |       |
|----------------------|--------|---|---|--------|---|---|--------|-------|-------|--------|-------|-------|
| Conflicting Flow All | 401    | 0 | 0 | 634    | 0 | 0 | 1207   | 1074  | 486   | 1231   | 1213  | 392   |
| Stage 1              | -      | - | - | -      | - | - | 616    | 616   | -     | 449    | 449   | -     |
| Stage 2              | -      | - | - | -      | - | - | 591    | 458   | -     | 782    | 764   | -     |
| Critical Hdwy        | 4.13   | - | - | 4.13   | - | - | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  |
| Critical Hdwy Stg 1  | -      | - | - | -      | - | - | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     |
| Critical Hdwy Stg 2  | -      | - | - | -      | - | - | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     |
| Follow-up Hdwy       | 2.227  | - | - | 2.227  | - | - | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 |
| Pot Cap-1 Maneuver   | 1152   | - | - | 944    | - | - | ~ 159  | ~ 219 | 579   | 153    | ~ 181 | 655   |
| Stage 1              | -      | - | - | -      | - | - | 476    | 480   | -     | 587    | 571   | -     |
| Stage 2              | -      | - | - | -      | - | - | 492    | 565   | -     | 386    | 411   | -     |
| Platoon blocked, %   |        | 0 | - |        | - | - |        |       |       |        |       |       |
| Mov Cap-1 Maneuver   | 1152   | - | - | 944    | - | - | -      | ~ 191 | 579   | -      | ~ 158 | 655   |
| Mov Cap-2 Maneuver   | -      | - | - | -      | - | - | -      | ~ 191 | -     | -      | ~ 158 | -     |
| Stage 1              | -      | - | - | -      | - | - | 432    | 436   | -     | 533    | 549   | -     |
| Stage 2              | -      | - | - | -      | - | - | 249    | 544   | -     | 114    | 373   | -     |

| Approach             | EB  | WB  | NB | SB |
|----------------------|-----|-----|----|----|
| HCM Control Delay, s | 0.8 | 0.6 | -  | -  |
| HCM LOS              | -   | -   | -  | -  |

| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBL  | WBT | WBR | SBLn1 |
|-----------------------|-------|-------|-----|-----|------|-----|-----|-------|
| Capacity (veh/h)      | -     | 1152  | -   | -   | 944  | -   | -   | -     |
| HCM Lane V/C Ratio    | -     | 0.057 | -   | -   | 0.03 | -   | -   | -     |
| HCM Control Delay (s) | -     | 8.3   | 0   | -   | 8.9  | 0   | -   | -     |
| HCM Lane LOS          | -     | A     | A   | -   | A    | A   | -   | -     |
| HCM 95th %tile Q(veh) | -     | 0.2   | -   | -   | 0.1  | -   | -   | -     |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

| Intersection             |        |       |       |        |       |       |        |      |      |        |      |      |
|--------------------------|--------|-------|-------|--------|-------|-------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 12.8   |       |       |        |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR   | WBL    | WBT   | WBR   | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Vol, veh/h               | 8      | 23    | 327   | 16     | 10    | 1     | 317    | 259  | 21   | 2      | 199  | 6    |
| Conflicting Peds, #/hr   | 0      | 0     | 0     | 0      | 0     | 0     | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Stop   | Stop  | Stop  | Stop   | Stop  | Stop  | Free   | Free | Free | Free   | Free | Free |
| RT Channelized           | -      | -     | None  | -      | -     | None  | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | -     | -      | -     | -     | -      | -    | -    | -      | -    | -    |
| Veh in Median Storage, # | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -     | -      | 0     | -     | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 92     | 92    | 92    | 92     | 92    | 92    | 92     | 92   | 92   | 92     | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3     | 3     | 3      | 3     | 3     | 3      | 3    | 3    | 3      | 3    | 3    |
| Mvmt Flow                | 9      | 25    | 355   | 17     | 11    | 1     | 345    | 282  | 23   | 2      | 216  | 7    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Major/Minor              | Minor2 |       |       | Minor1 |       |       | Major1 |      |      | Major2 |      |      |
| Conflicting Flow All     | 1212   | 1217  | 220   | 1396   | 1209  | 293   | 223    | 0    | 0    | 304    | 0    | 0    |
| Stage 1                  | 224    | 224   | -     | 982    | 982   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 988    | 993   | -     | 414    | 227   | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 7.13   | 6.53  | 6.23  | 7.13   | 6.53  | 6.23  | 4.13   | -    | -    | 4.13   | -    | -    |
| Critical Hdwy Stg 1      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | 6.13   | 5.53  | -     | 6.13   | 5.53  | -     | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 3.527  | 4.027 | 3.327 | 3.527  | 4.027 | 3.327 | 2.227  | -    | -    | 2.227  | -    | -    |
| Pot Cap-1 Maneuver       | 158    | 180   | 817   | 118    | 182   | 744   | 1340   | -    | -    | 1251   | -    | -    |
| Stage 1                  | 776    | 716   | -     | 299    | 326   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 296    | 322   | -     | 614    | 714   | -     | -      | -    | -    | -      | -    | -    |
| Platoon blocked, %       |        |       |       |        |       |       |        | -    | -    |        | -    | -    |
| Mov Cap-1 Maneuver       | 112    | 124   | 817   | 43     | 125   | 744   | 1340   | -    | -    | 1251   | -    | -    |
| Mov Cap-2 Maneuver       | 112    | 124   | -     | 43     | 125   | -     | -      | -    | -    | -      | -    | -    |
| Stage 1                  | 535    | 715   | -     | 206    | 225   | -     | -      | -    | -    | -      | -    | -    |
| Stage 2                  | 194    | 222   | -     | 334    | 713   | -     | -      | -    | -    | -      | -    | -    |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Approach                 | EB     |       |       | WB     |       |       | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 26.4   |       |       | 112.6  |       |       | 4.6    |      |      | 0.1    |      |      |
| HCM LOS                  | D      |       |       | F      |       |       |        |      |      |        |      |      |
|                          |        |       |       |        |       |       |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR   | EBLn1  | WBLn1 | SBL   | SBT    | SBR  |      |        |      |      |
| Capacity (veh/h)         | 1340   | -     | -     | 545    | 60    | 1251  | -      | -    |      |        |      |      |
| HCM Lane V/C Ratio       | 0.257  | -     | -     | 0.714  | 0.489 | 0.002 | -      | -    |      |        |      |      |
| HCM Control Delay (s)    | 8.6    | 0     | -     | 26.4   | 112.6 | 7.9   | 0      | -    |      |        |      |      |
| HCM Lane LOS             | A      | A     | -     | D      | F     | A     | A      | -    |      |        |      |      |
| HCM 95th %tile Q(veh)    | 1      | -     | -     | 5.8    | 1.9   | 0     | -      | -    |      |        |      |      |



Intersection

Int Delay, s/veh 19.6

| Movement                 | WBL  | WBR  | NBT  | NBR  | SBL  | SBT  |
|--------------------------|------|------|------|------|------|------|
| Vol, veh/h               | 0    | 396  | 1433 | 46   | 0    | 2158 |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Free | Free | Free | Free |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | -    | 0    | -    | -    | -    | -    |
| Veh in Median Storage, # | 1    | -    | 0    | -    | -    | 0    |
| Grade, %                 | 0    | -    | 0    | -    | -    | 0    |
| Peak Hour Factor         | 92   | 92   | 92   | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                | 0    | 430  | 1558 | 50   | 0    | 2346 |

| Major/Minor          | Minor1 | Major1 | Major2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 2756   | 804    | 0      |
| Stage 1              | 1583   | -      | -      |
| Stage 2              | 1173   | -      | -      |
| Critical Hdwy        | 6.86   | 6.96   | 4.16   |
| Critical Hdwy Stg 1  | 5.86   | -      | -      |
| Critical Hdwy Stg 2  | 5.86   | -      | -      |
| Follow-up Hdwy       | 3.53   | 3.33   | 2.23   |
| Pot Cap-1 Maneuver   | 15     | ~ 324  | 398    |
| Stage 1              | 153    | -      | -      |
| Stage 2              | 254    | -      | -      |
| Platoon blocked, %   |        | -      | -      |
| Mov Cap-1 Maneuver   | 15     | ~ 324  | 398    |
| Mov Cap-2 Maneuver   | 94     | -      | -      |
| Stage 1              | 153    | -      | -      |
| Stage 2              | 254    | -      | -      |

| Approach             | WB    | NB | SB |
|----------------------|-------|----|----|
| HCM Control Delay, s | 200.1 | 0  | 0  |
| HCM LOS              | F     |    |    |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT |
|-----------------------|-----|----------|-----|-----|
| Capacity (veh/h)      | -   | - 324    | 398 | -   |
| HCM Lane V/C Ratio    | -   | - 1.329  | -   | -   |
| HCM Control Delay (s) | -   | - 200.1  | 0   | -   |
| HCM Lane LOS          | -   | - F      | A   | -   |
| HCM 95th %tile Q(veh) | -   | - 21     | 0   | -   |

Notes

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

| Intersection              |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh | 68   |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS          | F    |      |      |      |      |      |      |      |      |      |      |      |
| Movement                  | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  |
| Vol, veh/h                | 0    | 68   | 690  | 85   | 0    | 47   | 735  | 73   | 0    | 72   | 118  | 52   |
| Peak Hour Factor          | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %         | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                 | 0    | 74   | 750  | 92   | 0    | 51   | 799  | 79   | 0    | 78   | 128  | 57   |
| Number of Lanes           | 0    | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    | 1    | 1    | 1    |

| Approach                   | EB | WB   | NB   |
|----------------------------|----|------|------|
| Opposing Approach          | WB | EB   | SB   |
| Opposing Lanes             | 2  | 3    | 1    |
| Conflicting Approach Left  | SB | NB   | EB   |
| Conflicting Lanes Left     | 1  | 3    | 3    |
| Conflicting Approach Right | NB | SB   | WB   |
| Conflicting Lanes Right    | 3  | 1    | 2    |
| HCM Control Delay          | 66 | 74.5 | 16.2 |
| HCM LOS                    | F  | F    | C    |

| Lane                   | NBLn1  | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | SBLn1 |
|------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%   | 0%    | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 20%   |
| Vol Thru, %            | 0%     | 100%  | 0%    | 0%    | 100%  | 0%    | 0%    | 91%   | 59%   |
| Vol Right, %           | 0%     | 0%    | 100%  | 0%    | 0%    | 100%  | 0%    | 9%    | 21%   |
| Sign Control           | Stop   | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 72     | 118   | 52    | 68    | 690   | 85    | 47    | 808   | 854   |
| LT Vol                 | 72     | 0     | 0     | 68    | 0     | 0     | 47    | 0     | 169   |
| Through Vol            | 0      | 118   | 0     | 0     | 690   | 0     | 0     | 735   | 503   |
| RT Vol                 | 0      | 0     | 52    | 0     | 0     | 85    | 0     | 73    | 182   |
| Lane Flow Rate         | 78     | 128   | 57    | 74    | 750   | 92    | 51    | 878   | 928   |
| Geometry Grp           | 7      | 7     | 7     | 8     | 8     | 8     | 8     | 8     | 8     |
| Degree of Util (X)     | 0.223  | 0.348 | 0.142 | 0.205 | 1     | 0.225 | 0.144 | 1     | 1     |
| Departure Headway (Hd) | 10.253 | 9.754 | 9.056 | 9.961 | 9.462 | 8.764 | 10.15 | 9.59  | 9.657 |
| Convergence, Y/N       | Yes    | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 352    | 371   | 398   | 362   | 390   | 412   | 355   | 386   | 390   |
| Service Time           | 7.965  | 7.466 | 6.767 | 7.663 | 7.165 | 6.466 | 7.856 | 7.296 | 7.366 |
| HCM Lane V/C Ratio     | 0.222  | 0.345 | 0.143 | 0.204 | 1.923 | 0.223 | 0.144 | 2.275 | 2.379 |
| HCM Control Delay      | 15.9   | 17.6  | 13.3  | 15.2  | 77.4  | 14    | 14.6  | 78    | 78.3  |
| HCM Lane LOS           | C      | C     | B     | C     | F     | B     | B     | F     | F     |
| HCM 95th-tile Q        | 0.8    | 1.5   | 0.5   | 0.8   | 11.9  | 0.9   | 0.5   | 11.9  | 11.8  |

Intersection

Intersection Delay, s/veh

Intersection LOS

| Movement          | SBU  | SBL  | SBT  | SBR  |
|-------------------|------|------|------|------|
| Vol, veh/h        | 0    | 169  | 503  | 182  |
| Peak Hour Factor  | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 3    | 3    | 3    | 3    |
| Mvmt Flow         | 0    | 184  | 547  | 198  |
| Number of Lanes   | 0    | 0    | 1    | 0    |

| Approach                   | SB   |
|----------------------------|------|
| Opposing Approach          | NB   |
| Opposing Lanes             | 3    |
| Conflicting Approach Left  | WB   |
| Conflicting Lanes Left     | 2    |
| Conflicting Approach Right | EB   |
| Conflicting Lanes Right    | 3    |
| HCM Control Delay          | 78.3 |
| HCM LOS                    | F    |

Lane

| Intersection                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh78.1 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS F            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                      | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                    | 0    | 64   | 553  | 313  | 0    | 45   | 512  | 22   | 0    | 188  | 325  | 71   | 0    | 48   | 297  | 89   |
| Peak Hour Factor              | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %             | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                     | 0    | 70   | 601  | 340  | 0    | 49   | 557  | 24   | 0    | 204  | 353  | 77   | 0    | 52   | 323  | 97   |
| Number of Lanes               | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 1    | 1    | 1    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1    | 1    |
| HCM Control Delay          | 77.7 | 78.5 | 78.5 | 78.1 |
| HCM LOS                    | F    | F    | F    | F    |


















| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 32%   | 7%    | 8%    | 11%   |
| Vol Thru, %            | 56%   | 59%   | 88%   | 68%   |
| Vol Right, %           | 12%   | 34%   | 4%    | 21%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 584   | 930   | 579   | 434   |
| LT Vol                 | 188   | 64    | 45    | 48    |
| Through Vol            | 325   | 553   | 512   | 297   |
| RT Vol                 | 71    | 313   | 22    | 89    |
| Lane Flow Rate         | 635   | 1011  | 629   | 472   |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 1     | 1     | 1     | 1     |
| Departure Headway (Hd) | 9.58  | 9.401 | 9.582 | 9.547 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 381   | 394   | 384   | 382   |
| Service Time           | 7.64  | 7.46  | 7.641 | 7.547 |
| HCM Lane V/C Ratio     | 1.667 | 2.566 | 1.638 | 1.236 |
| HCM Control Delay      | 78.5  | 77.7  | 78.5  | 78.1  |
| HCM Lane LOS           | F     | F     | F     | F     |
| HCM 95th-tile Q        | 11.8  | 11.9  | 11.8  | 11.9  |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Ave & SR 168 EB Ramp

2035 + Proj AM Peak

4/3/2017























|                              |   |   |   |   |   |   |  |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
|                              |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)               | 616   | 0   | 822   | 0   | 0   | 0   | 0  | 1972  | 60  | 101   | 956   | 0   |
| Number                       | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h         | 662   | 0   | 884   |   |   |   | 0  | 2120  | 65  | 109   | 1028  | 0   |
| Adj No. of Lanes             | 2   | 0   | 2   |   |   |   | 0  | 3   | 0   | 1   | 2   | 0   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  |   |   |   | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %         | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h                   | 1142  | 0   | 934   |   |   |   | 0  | 2335  | 71  | 159   | 2097  | 0   |
| Arrive On Green              | 0.34  | 0.00  | 0.34  |   |   |   | 0.00   | 0.47  | 0.45  | 0.18  | 1.00  | 0.00  |
| Sat Flow, veh/h              | 3408  | 0   | 2760  |   |   |   | 0  | 5187  | 154   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h         | 662   | 0   | 884   |   |   |   | 0  | 1416  | 769   | 109   | 1028  | 0   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 0   | 1380  |   |   |   | 0  | 1679  | 1817  | 1757  | 1752  | 0   |
| Q Serve(g_s), s              | 19.2  | 0.0   | 37.4  |   |   |   | 0.0  | 46.8  | 47.1  | 7.0   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s        | 19.2  | 0.0   | 37.4  |   |   |   | 0.0  | 46.8  | 47.1  | 7.0   | 0.0   | 0.0   |
| Prop In Lane                 | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.08  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h       | 1142  | 0   | 934   |   |   |   | 0  | 1561  | 845   | 159   | 2097  | 0   |
| V/C Ratio(X)                 | 0.58  | 0.00  | 0.95  |   |   |   | 0.00   | 0.91  | 0.91  | 0.68  | 0.49  | 0.00  |
| Avail Cap(c_a), veh/h        | 1147  | 0   | 938   |   |   |   | 0  | 1611  | 872   | 159   | 2097  | 0   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.89  | 0.89  | 0.00  |
| Uniform Delay (d), s/veh     | 32.9  | 0.0   | 38.6  |   |   |   | 0.0  | 29.7  | 29.8  | 47.5  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh       | 0.7   | 0.0   | 17.8  |   |   |   | 0.0  | 9.2   | 15.6  | 10.3  | 0.7   | 0.0   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 9.1   | 0.0   | 16.6  |   |   |   | 0.0  | 23.6  | 27.2  | 3.8   | 0.2   | 0.0   |
| LnGrp Delay(d),s/veh         | 33.6  | 0.0   | 56.4  |   |   |   | 0.0  | 38.9  | 45.4  | 57.8  | 0.7   | 0.0   |
| LnGrp LOS                    | C   |   | E   |   |   |   |  | D   | D   | E   | A   |   |
| Approach Vol, veh/h          |   | 1546  |   |   |   |   |  | 2185  |   |   | 1137  |   |
| Approach Delay, s/veh        |   | 46.7  |   |   |   |   |  | 41.2  |   |   | 6.2   |   |
| Approach LOS                 |   | D   |   |   |   |   |  | D   |   |   | A   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 16.0  | 59.8  |   | 44.2  |   | 75.8  |  |   |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s  | 9.8   | * 56  |   | * 40  |   | 70.3  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 9.0   | 49.1  |   | 39.4  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.5   | 5.4   |   | 0.6   |   | 6.1   |  |   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 34.8  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | C   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

2035 + Proj AM Peak

## 5: Temperance Ave & Fir Ave

4/3/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBU   | SBL   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |   |  |
| Volume (vph)                      | 53  | 7   | 148   | 151   | 5   | 155   | 1  | 69  | 1673  | 150   | 51  | 727   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.2   | 4.2   | 4.0   | 4.2   | 4.0   |  | 4.2   | 4.0   | 4.0   |   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.91  | 1.00  |   | 0.97  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.99  |   | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  |   | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  |   | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 5036  | 1546  |   | 3400  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 5036  | 1546  |   | 3400  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 58  | 8   | 161   | 164   | 5   | 168   | 1  | 75  | 1818  | 163   | 55  | 790   |
| RTOR Reduction (vph)              | 0   | 0   | 148   | 0   | 0   | 151   | 0  | 0   | 0   | 59  | 0   | 0   |
| Lane Group Flow (vph)             | 58  | 8   | 13  | 164   | 5   | 17  | 0  | 76  | 1818  | 104   | 0   | 845   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | Prot  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 1   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 15.8  | 9.7   | 9.7   | 18.1  | 12.0  | 12.0  |  | 8.7   | 45.6  | 45.6  |   | 28.7  |
| Effective Green, g (s)            | 15.8  | 9.7   | 9.7   | 18.3  | 12.0  | 12.2  |  | 8.7   | 46.9  | 46.9  |   | 28.9  |
| Actuated g/C Ratio                | 0.13  | 0.08  | 0.08  | 0.15  | 0.10  | 0.10  |  | 0.07  | 0.39  | 0.39  |   | 0.24  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   |  | 4.2   | 5.3   | 5.3   |   | 4.2   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   |   | 3.0   |
| Lane Grp Cap (vph)                | 230   | 149   | 126   | 267   | 184   | 159   |  | 127   | 1968  | 604   |   | 818   |
| v/s Ratio Prot                    | 0.03  | 0.00  |   | c0.09   | 0.00  |   |  | 0.04  | c0.36   |   |   | c0.25   |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | c0.01   |  |   |   | 0.07  |   |   |
| v/c Ratio                         | 0.25  | 0.05  | 0.10  | 0.61  | 0.03  | 0.11  |  | 0.60  | 0.92  | 0.17  |   | 1.03  |
| Uniform Delay, d1                 | 46.8  | 50.9  | 51.1  | 47.5  | 48.7  | 49.0  |  | 54.0  | 34.8  | 23.9  |   | 45.5  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.21  | 0.69  | 0.57  |   | 1.12  |
| Incremental Delay, d2             | 0.6   | 0.2   | 0.4   | 4.2   | 0.1   | 0.3   |  | 3.4   | 4.4   | 0.3   |   | 37.6  |
| Delay (s)                         | 47.4  | 51.1  | 51.5  | 51.7  | 48.8  | 49.3  |  | 68.9  | 28.3  | 13.8  |   | 88.6  |
| Level of Service                  | D   | D   | D   | D   | D   | D   |  | E   | C   | B   |   | F   |
| Approach Delay (s)                |   | 50.4  |   |   | 50.4  |   |  |   | 28.6  |   |   |   |
| Approach LOS                      |   | D   |   |   | D   |   |  |   | C   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 40.6  |   |   |   | HCM 2000 Level of Service  |   | D   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.83  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 16.6  |   |   |   |
| Intersection Capacity Utilization |   |   | 81.0%   |   |   |   | ICU Level of Service   |   | D   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Ave & Fir Ave

2035 + Proj AM Peak

4/3/2017


























| Movement               | SBT  | SBR  |
|------------------------|------|------|
| Lane Configurations    | ↑↑   | ↑    |
| Volume (vph)           | 931  | 69   |
| Ideal Flow (vphpl)     | 1900 | 1900 |
| Total Lost time (s)    | 4.0  | 5.3  |
| Lane Util. Factor      | 0.95 | 1.00 |
| Frpb, ped/bikes        | 1.00 | 1.00 |
| Flpb, ped/bikes        | 1.00 | 1.00 |
| Frt                    | 1.00 | 0.85 |
| Flt Protected          | 1.00 | 1.00 |
| Satd. Flow (prot)      | 3505 | 1568 |
| Flt Permitted          | 1.00 | 1.00 |
| Satd. Flow (perm)      | 3505 | 1568 |
| Peak-hour factor, PHF  | 0.92 | 0.92 |
| Adj. Flow (vph)        | 1012 | 75   |
| RTOR Reduction (vph)   | 0    | 34   |
| Lane Group Flow (vph)  | 1012 | 41   |
| Confl. Peds. (#/hr)    |      |      |
| Turn Type              | NA   | Perm |
| Protected Phases       | 6    |      |
| Permitted Phases       |      | 6    |
| Actuated Green, G (s)  | 65.6 | 65.6 |
| Effective Green, g (s) | 66.9 | 65.6 |
| Actuated g/C Ratio     | 0.56 | 0.55 |
| Clearance Time (s)     | 5.3  | 5.3  |
| Vehicle Extension (s)  | 3.0  | 3.0  |
| Lane Grp Cap (vph)     | 1954 | 857  |
| v/s Ratio Prot         | 0.29 |      |
| v/s Ratio Perm         |      | 0.03 |
| v/c Ratio              | 0.52 | 0.05 |
| Uniform Delay, d1      | 16.5 | 12.7 |
| Progression Factor     | 1.23 | 1.47 |
| Incremental Delay, d2  | 0.8  | 0.1  |
| Delay (s)              | 21.1 | 18.8 |
| Level of Service       | C    | B    |
| Approach Delay (s)     | 50.5 |      |
| Approach LOS           | D    |      |
| Intersection Summary   |      |      |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

2035 + Proj AM Peak

4/3/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 71  | 606   | 134   | 212   | 1056  | 173   | 321  | 318   | 34  | 84  | 227   | 96  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 76  | 652   | 144   | 228   | 1135  | 186   | 345  | 342   | 37  | 90  | 244   | 103   |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 3   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93   | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 411   | 1964  | 611   | 257   | 1279  | 210   | 378  | 926   | 414   | 116   | 371   | 166   |
| Arrive On Green   | 0.23  | 0.39  | 0.39  | 0.15  | 0.29  | 0.28  | 0.22   | 0.26  | 0.26  | 0.07  | 0.11  | 0.11  |
| Sat Flow, veh/h   | 1757  | 5036  | 1568  | 1757  | 4361  | 714   | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 76  | 652   | 144   | 228   | 874   | 447   | 345  | 342   | 37  | 90  | 244   | 103   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1568  | 1757  | 1679  | 1718  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 4.2   | 10.9  | 3.6   | 15.3  | 29.8  | 29.9  | 23.0   | 9.5   | 2.1   | 6.1   | 8.0   | 7.5   |
| Cycle Q Clear(g_c), s   | 4.2   | 10.9  | 3.6   | 15.3  | 29.8  | 29.9  | 23.0   | 9.5   | 2.1   | 6.1   | 8.0   | 7.5   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.42  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 411   | 1964  | 611   | 257   | 985   | 504   | 378  | 926   | 414   | 116   | 371   | 166   |
| V/C Ratio(X)  | 0.18  | 0.33  | 0.24  | 0.89  | 0.89  | 0.89  | 0.91   | 0.37  | 0.09  | 0.78  | 0.66  | 0.62  |
| Avail Cap(c_a), veh/h   | 411   | 1964  | 611   | 278   | 1027  | 525   | 395  | 1387  | 621   | 187   | 973   | 435   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 36.8  | 25.7  | 5.8   | 50.2  | 40.5  | 40.8  | 46.0   | 36.0  | 33.3  | 55.2  | 51.6  | 51.4  |
| Incr Delay (d2), s/veh  | 0.2   | 0.5   | 0.9   | 25.8  | 11.7  | 20.2  | 24.4   | 0.2   | 0.1   | 10.5  | 2.0   | 3.8   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.1   | 5.2   | 1.7   | 9.3   | 15.4  | 17.0  | 13.7   | 4.6   | 0.9   | 3.3   | 4.0   | 3.4   |
| LnGrp Delay(d),s/veh  | 37.0  | 26.1  | 6.7   | 76.0  | 52.2  | 60.9  | 70.4   | 36.2  | 33.4  | 65.7  | 53.6  | 55.1  |
| LnGrp LOS   | D   | C   | A   | E   | D   | E   | E  | D   | C   | E   | D   | E   |
| Approach Vol, veh/h   |   | 872   |   |   | 1549  |   |  | 724   |   |   | 437   |   |
| Approach Delay, s/veh   |   | 23.9  |   |   | 58.2  |   |  | 52.4  |   |   | 56.4  |   |
| Approach LOS  |   | C   |   |   | E   |   |  | D   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 11.9  | 35.7  | 21.6  | 50.8  | 30.9  | 16.7  | 33.2   | 39.2  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3   | * 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 13  | 46.2  | * 19  | 23.4  | 26.8  | * 32  | 6.8  | * 35  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 8.1   | 11.5  | 17.3  | 12.9  | 25.0  | 10.0  | 6.2  | 31.9  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.1   | 3.1   | 0.1   | 3.0   | 0.6   | 1.4   | 0.1  | 2.0   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 48.5  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |



























| Intersection             |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
|--------------------------|--------|-------|--------|------|-------|------|--------|-----|-------|------|--------|--|------|------|------|
| Int Delay, s/veh         | 1.3    |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
|                          |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
| Movement                 | EBL    | EBT   | EBR    | WBU  | WBL   | WBT  | WBR    |     | NEL   | NET  | NER    |  | SWL  | SWT  | SWR  |
| Vol, veh/h               | 19     | 638   | 0      | 11   | 0     | 1424 | 28     |     | 0     | 0    | 165    |  | 0    | 0    | 17   |
| Conflicting Peds, #/hr   | 0      | 0     | 0      | 0    | 0     | 0    | 0      |     | 0     | 0    | 0      |  | 0    | 0    | 0    |
| Sign Control             | Free   | Free  | Free   | Free | Free  | Free | Free   |     | Stop  | Stop | Stop   |  | Stop | Stop | Stop |
| RT Channelized           | -      | -     | None   | -    | -     | -    | None   |     | -     | -    | None   |  | -    | -    | None |
| Storage Length           | 400    | -     | -      | -    | 120   | -    | 85     |     | -     | -    | 0      |  | -    | -    | 0    |
| Veh in Median Storage, # | -      | 0     | -      | -    | -     | 0    | -      |     | -     | 1    | -      |  | -    | 1    | -    |
| Grade, %                 | -      | 0     | -      | -    | -     | 0    | -      |     | -     | 0    | -      |  | -    | 0    | -    |
| Peak Hour Factor         | 93     | 93    | 93     | 93   | 93    | 93   | 93     |     | 93    | 93   | 96     |  | 93   | 93   | 93   |
| Heavy Vehicles, %        | 3      | 3     | 3      | 3    | 3     | 3    | 3      |     | 3     | 3    | 3      |  | 3    | 3    | 3    |
| Mvmt Flow                | 20     | 686   | 0      | 12   | 0     | 1531 | 30     |     | 0     | 0    | 172    |  | 0    | 0    | 18   |
|                          |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
| Major/Minor              | Major1 |       | Major2 |      |       |      | Minor1 |     |       |      | Minor2 |  |      |      |      |
| Conflicting Flow All     | 1531   | 0     | 0      | 673  | 686   | 0    | 0      |     | 1516  | 2282 | 343    |  | 1870 | 2282 | 766  |
| Stage 1                  | -      | -     | -      | -    | -     | -    | -      |     | 727   | 727  | -      |  | 1555 | 1555 | -    |
| Stage 2                  | -      | -     | -      | -    | -     | -    | -      |     | 789   | 1555 | -      |  | 315  | 727  | -    |
| Critical Hdwy            | 4.16   | -     | -      | 5.66 | 5.36  | -    | -      |     | 7.01  | 6.56 | 7.16   |  | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1      | -      | -     | -      | -    | -     | -    | -      |     | 7.36  | 5.56 | -      |  | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2      | -      | -     | -      | -    | -     | -    | -      |     | 6.56  | 5.56 | -      |  | 6.76 | 5.56 | -    |
| Follow-up Hdwy           | 2.23   | -     | -      | 2.33 | 3.13  | -    | -      |     | 3.68  | 4.03 | 3.93   |  | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver       | 426    | -     | -      | 662  | 550   | -    | -      |     | 101   | 39   | 555    |  | 58   | 39   | 343  |
| Stage 1                  | -      | -     | -      | -    | -     | -    | -      |     | 314   | 425  | -      |  | 115  | 171  | -    |
| Stage 2                  | -      | -     | -      | -    | -     | -    | -      |     | 338   | 171  | -      |  | 633  | 425  | -    |
| Platoon blocked, %       |        |       | -      | -    |       |      | -      |     |       |      |        |  |      |      |      |
| Mov Cap-1 Maneuver       | 426    | -     | -      | 465  | 550   | -    | -      |     | 92    | 37   | 555    |  | 39   | 37   | 343  |
| Mov Cap-2 Maneuver       | -      | -     | -      | -    | -     | -    | -      |     | 179   | 113  | -      |  | 90   | 123  | -    |
| Stage 1                  | -      | -     | -      | -    | -     | -    | -      |     | 299   | 405  | -      |  | 110  | 171  | -    |
| Stage 2                  | -      | -     | -      | -    | -     | -    | -      |     | 320   | 171  | -      |  | 416  | 405  | -    |
|                          |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
| Approach                 | EB     |       | WB     |      |       |      | NE     |     |       |      | SW     |  |      |      |      |
| HCM Control Delay, s     | 0.4    |       | 0.1    |      |       |      | 14.4   |     |       |      | 16.1   |  |      |      |      |
| HCM LOS                  |        |       |        |      |       |      | B      |     |       |      | C      |  |      |      |      |
|                          |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
| Minor Lane/Major Mvmt    | NELn1  | EBL   | EBT    | EBR  | WBU   | WBL  | WBT    | WBR | SWLn1 |      |        |  |      |      |      |
| Capacity (veh/h)         | 555    | 426   | -      | -    | 465   | 550  | -      | -   | 343   |      |        |  |      |      |      |
| HCM Lane V/C Ratio       | 0.31   | 0.048 | -      | -    | 0.025 | -    | -      | -   | 0.053 |      |        |  |      |      |      |
| HCM Control Delay (s)    | 14.4   | 13.9  | -      | -    | 12.9  | -    | -      | -   | 16.1  |      |        |  |      |      |      |
| HCM Lane LOS             | B      | B     | -      | -    | B     | -    | -      | -   | C     |      |        |  |      |      |      |
| HCM 95th %tile Q(veh)    | 1.3    | 0.2   | -      | -    | 0.1   | 0    | -      | -   | 0.2   |      |        |  |      |      |      |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Ave & Herndon Avenue

2035 + Proj AM Peak

4/3/2017







|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |   |  |  |  |  |  |
| Volume (veh/h)               | 245   | 520   | 149   | 68  | 1134  | 578   | 242  | 1070  | 142   | 461   | 476   | 173   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 261   | 553   | 159   | 72  | 1206  | 615   | 257  | 1138  | 151   | 490   | 506   | 184   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94   | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 295   | 744   | 329   | 488   | 1353  | 685   | 326  | 1200  | 537   | 544   | 1457  | 652   |
| Arrive On Green              | 0.09  | 0.21  | 0.21  | 0.29  | 0.54  | 0.54  | 0.10   | 0.34  | 0.34  | 0.21  | 0.55  | 0.55  |
| Sat Flow, veh/h              | 3408  | 3505  | 1548  | 3408  | 5036  | 1564  | 3408   | 3505  | 1567  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 261   | 553   | 159   | 72  | 1206  | 615   | 257  | 1138  | 151   | 490   | 506   | 184   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1548  | 1704  | 1679  | 1564  | 1704   | 1752  | 1567  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 9.1   | 17.7  | 8.3   | 1.9   | 25.5  | 7.1   | 8.9  | 37.9  | 8.4   | 16.8  | 9.6   | 5.2   |
| Cycle Q Clear(g_c), s        | 9.1   | 17.7  | 8.3   | 1.9   | 25.5  | 7.1   | 8.9  | 37.9  | 8.4   | 16.8  | 9.6   | 5.2   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 295   | 744   | 329   | 488   | 1353  | 685   | 326  | 1200  | 537   | 544   | 1457  | 652   |
| V/C Ratio(X)                 | 0.88  | 0.74  | 0.48  | 0.15  | 0.89  | 0.90  | 0.79   | 0.95  | 0.28  | 0.90  | 0.35  | 0.28  |
| Avail Cap(c_a), veh/h        | 295   | 1098  | 485   | 488   | 1397  | 699   | 443  | 1200  | 537   | 545   | 1457  | 652   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 2.00  | 2.00  | 2.00  | 1.00   | 1.00  | 1.00  | 1.33  | 1.33  | 1.33  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.65  | 0.65  | 0.65  | 1.00   | 1.00  | 1.00  | 0.83  | 0.83  | 0.83  |
| Uniform Delay (d), s/veh     | 54.2  | 44.2  | 24.4  | 37.4  | 26.2  | 16.1  | 53.1   | 38.4  | 28.7  | 46.3  | 17.8  | 8.5   |
| Incr Delay (d2), s/veh       | 25.5  | 1.5   | 1.1   | 0.1   | 5.0   | 10.0  | 6.6  | 16.2  | 1.3   | 15.6  | 0.5   | 0.9   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 5.3   | 8.8   | 3.7   | 0.9   | 12.2  | 3.6   | 4.5  | 21.0  | 3.8   | 9.1   | 4.7   | 2.4   |
| LnGrp Delay(d),s/veh         | 79.7  | 45.7  | 25.5  | 37.5  | 31.2  | 26.0  | 59.7   | 54.6  | 30.0  | 62.0  | 18.4  | 9.4   |
| LnGrp LOS                    | E   | D   | C   | D   | C   | C   | E  | D   | C   | E   | B   | A   |
| Approach Vol, veh/h          | 973   |   |   | 1893  |   |   | 1546   |   |   | 1180  |   |   |
| Approach Delay, s/veh        | 51.5  |   |   | 29.8  |   |   | 53.0   |   |   | 35.1  |   |   |
| Approach LOS                 | D   |   |   | C   |   |   | D  |   |   | D   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 24.2  | 45.1  | 21.2  | 29.5  | 15.5  | 53.9  | 14.4   | 36.3  |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.7   | 4.2   | * 5.3   | * 4.2   | 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 19.0  | * 39  | 5.9   | * 36  | * 15  | 43.4  | 10.2   | * 32  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 18.8  | 39.9  | 3.9   | 19.7  | 10.9  | 11.6  | 11.1   | 27.5  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.1   | 0.0   | 0.3   | 2.9   | 0.4   | 5.9   | 0.0  | 3.2   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 41.1  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 13: Locan Avenue & Herndon Avenue

2035 + Proj AM Peak

4/3/2017













|                              |   |   |   |   |   |   |   |      |
|------------------------------|---|---|---|---|---|---|---|------|
|                              |  |  |  |  |  |  |   |      |
| Movement                     | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |   |      |
| Lane Configurations          | ↑↑  | ↑   | ↑   | ↑↑  | ↑   | ↑   |   |      |
| Volume (veh/h)               | 565   | 190   | 66  | 997   | 759   | 65  |   |      |
| Number                       | 2   | 12  | 1   | 6   | 3   | 18  |   |      |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   |   |      |
| Ped-Bike Adj(A_pbT)          |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |      |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |      |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |   |      |
| Adj Flow Rate, veh/h         | 608   | 204   | 71  | 1072  | 816   | 70  |   |      |
| Adj No. of Lanes             | 2   | 1   | 1   | 2   | 1   | 1   |   |      |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |   |      |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   |   |      |
| Cap, veh/h                   | 1247  | 558   | 93  | 1570  | 869   | 759   |   |      |
| Arrive On Green              | 0.36  | 0.36  | 0.11  | 0.90  | 0.49  | 0.48  |   |      |
| Sat Flow, veh/h              | 3597  | 1568  | 1757  | 3597  | 1757  | 1568  |   |      |
| Grp Volume(v), veh/h         | 608   | 204   | 71  | 1072  | 816   | 70  |   |      |
| Grp Sat Flow(s),veh/h/ln     | 1752  | 1568  | 1757  | 1752  | 1757  | 1568  |   |      |
| Q Serve(g_s), s              | 16.2  | 11.6  | 4.7   | 9.9   | 52.6  | 2.9   |   |      |
| Cycle Q Clear(g_c), s        | 16.2  | 11.6  | 4.7   | 9.9   | 52.6  | 2.9   |   |      |
| Prop In Lane                 |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |      |
| Lane Grp Cap(c), veh/h       | 1247  | 558   | 93  | 1570  | 869   | 759   |   |      |
| V/C Ratio(X)                 | 0.49  | 0.37  | 0.77  | 0.68  | 0.94  | 0.09  |   |      |
| Avail Cap(c_a), veh/h        | 1247  | 558   | 154   | 1570  | 997   | 873   |   |      |
| HCM Platoon Ratio            | 1.00  | 1.00  | 2.00  | 2.00  | 1.00  | 1.00  |   |      |
| Upstream Filter(I)           | 1.00  | 1.00  | 0.88  | 0.88  | 0.32  | 0.32  |   |      |
| Uniform Delay (d), s/veh     | 30.1  | 28.6  | 53.0  | 4.0   | 28.6  | 16.7  |   |      |
| Incr Delay (d2), s/veh       | 1.4   | 1.8   | 11.0  | 2.2   | 5.9   | 0.0   |   |      |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |      |
| %ile BackOfQ(50%),veh/ln     | 8.1   | 5.3   | 2.6   | 4.6   | 26.8  | 1.2   |   |      |
| LnGrp Delay(d),s/veh         | 31.5  | 30.5  | 64.0  | 6.1   | 34.5  | 16.7  |   |      |
| LnGrp LOS                    | C   | C   | E   | A   | C   | B   |   |      |
| Approach Vol, veh/h          | 812   |   |   | 1143  | 886   |   |   |      |
| Approach Delay, s/veh        | 31.2  |   |   | 9.7   | 33.1  |   |   |      |
| Approach LOS                 | C   |   |   | A   | C   |   |   |      |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7 | 8    |
| Assigned Phs                 | 1   | 2   |   |   |   | 6   |   | 8    |
| Phs Duration (G+Y+Rc), s     | 10.3  | 47.4  |   |   |   | 57.7  |   | 62.3 |
| Change Period (Y+Rc), s      | * 4.2   | * 6   |   |   |   | 6.0   |   | 4.2  |
| Max Green Setting (Gmax), s  | * 10  | * 30  |   |   |   | 43.0  |   | 66.8 |
| Max Q Clear Time (g_c+I1), s | 6.7   | 18.2  |   |   |   | 11.9  |   | 54.6 |
| Green Ext Time (p_c), s      | 0.0   | 6.8   |   |   |   | 10.7  |   | 3.5  |
| Intersection Summary         |   |   |   |   |   |   |   |      |
| HCM 2010 Ctrl Delay          |   |   | 23.2  |   |   |   |   |      |
| HCM 2010 LOS                 |   |   | C   |   |   |   |   |      |
| Notes                        |   |   |   |   |   |   |   |      |

# HCM 2010 Signalized Intersection Summary

## 14: Herndon Avenue & De Wolf Avenue (NL)

2035 + Proj AM Peak

4/3/2017












|                              |   |   |   |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|---|---|
|                              |  |  |  |  |  |  |   |   |
| Movement                     | EBL   | EBT   | WBT   | WBR   | SBL   | SBR   |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Volume (veh/h)               | 75  | 545   | 993   | 44  | 17  | 70  |   |   |
| Number                       | 5   | 2   | 6   | 16  | 7   | 14  |   |   |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   |   | 1.00  | 1.00  | 1.00  |   |   |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |   |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |   |   |
| Adj Flow Rate, veh/h         | 80  | 580   | 1056  | 47  | 18  | 74  |   |   |
| Adj No. of Lanes             | 1   | 2   | 2   | 1   | 1   | 1   |   |   |
| Peak Hour Factor             | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  | 0.94  |   |   |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   |   |   |
| Cap, veh/h                   | 106   | 2795  | 2350  | 999   | 142   | 103   |   |   |
| Arrive On Green              | 0.12  | 1.00  | 1.00  | 1.00  | 0.08  | 0.07  |   |   |
| Sat Flow, veh/h              | 1757  | 3597  | 3597  | 1568  | 1757  | 1568  |   |   |
| Grp Volume(v), veh/h         | 80  | 580   | 1056  | 47  | 18  | 74  |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1752  | 1752  | 1568  | 1757  | 1568  |   |   |
| Q Serve(g_s), s              | 2.6   | 0.0   | 0.0   | 0.0   | 0.6   | 2.8   |   |   |
| Cycle Q Clear(g_c), s        | 2.6   | 0.0   | 0.0   | 0.0   | 0.6   | 2.8   |   |   |
| Prop In Lane                 | 1.00  |   |   | 1.00  | 1.00  | 1.00  |   |   |
| Lane Grp Cap(c), veh/h       | 106   | 2795  | 2350  | 999   | 142   | 103   |   |   |
| V/C Ratio(X)                 | 0.75  | 0.21  | 0.45  | 0.05  | 0.13  | 0.72  |   |   |
| Avail Cap(c_a), veh/h        | 123   | 2795  | 2350  | 999   | 700   | 601   |   |   |
| HCM Platoon Ratio            | 2.00  | 2.00  | 2.00  | 2.00  | 1.00  | 1.00  |   |   |
| Upstream Filter(I)           | 0.87  | 0.87  | 0.58  | 0.58  | 1.00  | 1.00  |   |   |
| Uniform Delay (d), s/veh     | 26.0  | 0.0   | 0.0   | 0.0   | 25.6  | 27.5  |   |   |
| Incr Delay (d2), s/veh       | 17.7  | 0.1   | 0.4   | 0.1   | 0.4   | 8.9   |   |   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |   |
| %ile BackOfQ(50%),veh/ln     | 1.8   | 0.1   | 0.1   | 0.8   | 0.3   | 2.6   |   |   |
| LnGrp Delay(d),s/veh         | 43.6  | 0.1   | 0.4   | 0.1   | 26.0  | 36.4  |   |   |
| LnGrp LOS                    | D   | A   | A   | A   | C   | D   |   |   |
| Approach Vol, veh/h          |   | 660   | 1103  |   | 92  |   |   |   |
| Approach Delay, s/veh        |   | 5.4   | 0.3   |   | 34.4  |   |   |   |
| Approach LOS                 |   | A   | A   |   | C   |   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7 | 8 |
| Assigned Phs                 |   | 2   |   | 4   | 5   | 6   |   |   |
| Phs Duration (G+Y+Rc), s     |   | 51.9  |   | 8.1   | 7.6   | 44.2  |   |   |
| Change Period (Y+Rc), s      |   | 6.0   |   | * 4.2   | * 4.2   | 6.0   |   |   |
| Max Green Setting (Gmax), s  |   | 26.8  |   | * 23  | * 4   | 18.6  |   |   |
| Max Q Clear Time (g_c+I1), s |   | 2.0   |   | 4.8   | 4.6   | 2.0   |   |   |
| Green Ext Time (p_c), s      |   | 8.5   |   | 0.3   | 0.0   | 7.2   |   |   |
| Intersection Summary         |   |   |   |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 3.8   |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | A   |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 15: De Wolf Ave & Herndon Avenue

2035 + Proj AM Peak

4/3/2017











|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |   |
| Volume (vph)                      | 371   | 181   | 5   | 658   | 363   | 12  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 6.0   | 6.0   | 4.2   | 6.0   | 4.2   |   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |
| Frt                               | 1.00  | 0.85  | 1.00  | 1.00  | 1.00  |   |
| Flt Protected                     | 1.00  | 1.00  | 0.95  | 1.00  | 0.95  |   |
| Satd. Flow (prot)                 | 1845  | 1568  | 1752  | 1845  | 1752  |   |
| Flt Permitted                     | 1.00  | 1.00  | 0.95  | 1.00  | 0.95  |   |
| Satd. Flow (perm)                 | 1845  | 1568  | 1752  | 1845  | 1752  |   |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 403   | 197   | 5   | 715   | 395   | 13  |
| RTOR Reduction (vph)              | 0   | 106   | 0   | 0   | 2   | 0   |
| Lane Group Flow (vph)             | 403   | 91  | 5   | 715   | 406   | 0   |
| Turn Type                         | NA  | Perm  | Prot  | NA  | Prot  |   |
| Protected Phases                  | 2   |   | 1   | 6   | 3   |   |
| Permitted Phases                  |   | 2   |   |   |   |   |
| Actuated Green, G (s)             | 27.6  | 27.6  | 0.8   | 32.6  | 17.2  |   |
| Effective Green, g (s)            | 27.6  | 27.6  | 0.8   | 32.6  | 17.2  |   |
| Actuated g/C Ratio                | 0.46  | 0.46  | 0.01  | 0.54  | 0.29  |   |
| Clearance Time (s)                | 6.0   | 6.0   | 4.2   | 6.0   | 4.2   |   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)                | 848   | 721   | 23  | 1002  | 502   |   |
| v/s Ratio Prot                    | 0.22  |   | 0.00  | c0.39   | c0.23   |   |
| v/s Ratio Perm                    |   | 0.06  |   |   |   |   |
| v/c Ratio                         | 0.48  | 0.13  | 0.22  | 0.71  | 0.81  |   |
| Uniform Delay, d1                 | 11.2  | 9.3   | 29.3  | 10.2  | 19.9  |   |
| Progression Factor                | 1.74  | 3.85  | 1.08  | 1.13  | 1.00  |   |
| Incremental Delay, d2             | 1.9   | 0.4   | 4.0   | 3.7   | 9.3   |   |
| Delay (s)                         | 21.3  | 36.1  | 35.5  | 15.3  | 29.2  |   |
| Level of Service                  | C   | D   | D   | B   | C   |   |
| Approach Delay (s)                | 26.2  |   |   | 15.4  | 29.2  |   |
| Approach LOS                      | C   |   |   | B   | C   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 22.4  |   | HCM 2000 Level of Service   | C   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.81  |   |   |   |
| Actuated Cycle Length (s)         |   |   | 60.0  |   | Sum of lost time (s)  | 14.4  |
| Intersection Capacity Utilization |   |   | 64.0%   |   | ICU Level of Service  | B   |
| Analysis Period (min)             |   |   | 15  |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 16: Leonard Ave & Herndon Avenue

2035 + Proj AM Peak

4/3/2017






















|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |   |  |  |  |   |
| Volume (vph)                      | 354   | 9   | 1   | 518   | 253   | 36  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.5   |   | 4.2   | 6.0   | 4.2   |   |
| Lane Util. Factor                 | 1.00  |   | 1.00  | 1.00  | 1.00  |   |
| Frt                               | 1.00  |   | 1.00  | 1.00  | 0.98  |   |
| Flt Protected                     | 1.00  |   | 0.95  | 1.00  | 0.96  |   |
| Satd. Flow (prot)                 | 1838  |   | 1752  | 1845  | 1738  |   |
| Flt Permitted                     | 1.00  |   | 0.95  | 1.00  | 0.96  |   |
| Satd. Flow (perm)                 | 1838  |   | 1752  | 1845  | 1738  |   |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 385   | 10  | 1   | 563   | 275   | 39  |
| RTOR Reduction (vph)              | 1   | 0   | 0   | 0   | 9   | 0   |
| Lane Group Flow (vph)             | 394   | 0   | 1   | 563   | 305   | 0   |
| Turn Type                         | NA  |   | Prot  | NA  | Prot  |   |
| Protected Phases                  | 2   |   | 1   | 6   | 3   |   |
| Permitted Phases                  |   |   |   |   |   |   |
| Actuated Green, G (s)             | 31.2  |   | 0.8   | 34.7  | 15.1  |   |
| Effective Green, g (s)            | 31.2  |   | 0.8   | 34.7  | 15.1  |   |
| Actuated g/C Ratio                | 0.52  |   | 0.01  | 0.58  | 0.25  |   |
| Clearance Time (s)                | 4.5   |   | 4.2   | 6.0   | 4.2   |   |
| Vehicle Extension (s)             | 3.0   |   | 3.0   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)                | 955   |   | 23  | 1067  | 437   |   |
| v/s Ratio Prot                    | 0.21  |   | 0.00  | c0.31   | c0.18   |   |
| v/s Ratio Perm                    |   |   |   |   |   |   |
| v/c Ratio                         | 0.41  |   | 0.04  | 0.53  | 0.70  |   |
| Uniform Delay, d1                 | 8.8   |   | 29.2  | 7.7   | 20.4  |   |
| Progression Factor                | 2.00  |   | 0.96  | 1.43  | 1.00  |   |
| Incremental Delay, d2             | 1.2   |   | 0.7   | 1.6   | 4.8   |   |
| Delay (s)                         | 18.8  |   | 28.7  | 12.6  | 25.2  |   |
| Level of Service                  | B   |   | C   | B   | C   |   |
| Approach Delay (s)                | 18.8  |   |   | 12.6  | 25.2  |   |
| Approach LOS                      | B   |   |   | B   | C   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 17.6  |   | HCM 2000 Level of Service   | B   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.61  |   |   |   |
| Actuated Cycle Length (s)         |   |   | 60.0  |   | Sum of lost time (s)  | 12.9  |
| Intersection Capacity Utilization |   |   | 52.0%   |   | ICU Level of Service  | A   |
| Analysis Period (min)             |   |   | 15  |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 17: McCall Ave & Herndon Avenue

2035 + Proj AM Peak

4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |   |  |  |   |  |  |   |  |  |  |
| Volume (veh/h)               | 22  | 118   | 84  | 32  | 375   | 20  | 246  | 101   | 19  | 24  | 182   | 36  |
| Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1900  | 1845  | 1845  | 1900  | 1845   | 1845  | 1900  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h         | 24  | 122   | 87  | 35  | 387   | 22  | 254  | 110   | 20  | 26  | 198   | 39  |
| Adj No. of Lanes             | 1   | 1   | 0   | 1   | 1   | 0   | 1  | 1   | 0   | 1   | 1   | 0   |
| Peak Hour Factor             | 0.92  | 0.97  | 0.97  | 0.92  | 0.97  | 0.92  | 0.97   | 0.92  | 0.97  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 59  | 482   | 344   | 64  | 837   | 48  | 285  | 434   | 79  | 59  | 234   | 46  |
| Arrive On Green              | 0.03  | 0.48  | 0.48  | 0.04  | 0.48  | 0.48  | 0.16   | 0.29  | 0.29  | 0.03  | 0.16  | 0.16  |
| Sat Flow, veh/h              | 1757  | 1003  | 715   | 1757  | 1729  | 98  | 1757   | 1520  | 276   | 1757  | 1498  | 295   |
| Grp Volume(v), veh/h         | 24  | 0   | 209   | 35  | 0   | 409   | 254  | 0   | 130   | 26  | 0   | 237   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 0   | 1718  | 1757  | 0   | 1827  | 1757   | 0   | 1796  | 1757  | 0   | 1793  |
| Q Serve(g_s), s              | 1.6   | 0.0   | 8.6   | 2.4   | 0.0   | 17.9  | 17.0   | 0.0   | 6.7   | 1.7   | 0.0   | 15.4  |
| Cycle Q Clear(g_c), s        | 1.6   | 0.0   | 8.6   | 2.4   | 0.0   | 17.9  | 17.0   | 0.0   | 6.7   | 1.7   | 0.0   | 15.4  |
| Prop In Lane                 | 1.00  |   | 0.42  | 1.00  |   | 0.05  | 1.00   |   | 0.15  | 1.00  |   | 0.16  |
| Lane Grp Cap(c), veh/h       | 59  | 0   | 826   | 64  | 0   | 884   | 285  | 0   | 512   | 59  | 0   | 280   |
| V/C Ratio(X)                 | 0.41  | 0.00  | 0.25  | 0.55  | 0.00  | 0.46  | 0.89   | 0.00  | 0.25  | 0.44  | 0.00  | 0.85  |
| Avail Cap(c_a), veh/h        | 88  | 0   | 826   | 100   | 0   | 884   | 413  | 0   | 714   | 91  | 0   | 384   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 0.94  | 0.00  | 0.94  | 1.00  | 0.00  | 1.00  | 1.00   | 0.00  | 1.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh     | 56.8  | 0.0   | 18.4  | 56.9  | 0.0   | 20.6  | 49.2   | 0.0   | 33.0  | 56.9  | 0.0   | 49.2  |
| Incr Delay (d2), s/veh       | 4.2   | 0.0   | 0.7   | 7.2   | 0.0   | 1.7   | 15.5   | 0.0   | 0.3   | 5.2   | 0.0   | 12.0  |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 0.8   | 0.0   | 4.2   | 1.3   | 0.0   | 9.4   | 9.5  | 0.0   | 3.4   | 0.9   | 0.0   | 8.6   |
| LnGrp Delay(d),s/veh         | 61.1  | 0.0   | 19.1  | 64.0  | 0.0   | 22.3  | 64.7   | 0.0   | 33.3  | 62.1  | 0.0   | 61.2  |
| LnGrp LOS                    | E   |   | B   | E   |   | C   | E  |   | C   | E   |   | E   |
| Approach Vol, veh/h          | 233   |   |   | 444   |   |   | 384  |   |   | 263   |   |   |
| Approach Delay, s/veh        | 23.4  |   |   | 25.6  |   |   | 54.0   |   |   | 61.3  |   |   |
| Approach LOS                 | C   |   |   | C   |   |   | D  |   |   | E   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 8.6   | 63.7  | 23.7  | 24.1  | 8.2   | 64.1  | 8.2  | 39.5  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 6.0   | * 4.2   | 5.3   | * 4.2   | 6.0   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 6.8   | 39.6  | * 28  | 25.7  | * 6   | 40.4  | * 6.2  | 47.7  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 4.4   | 10.6  | 19.0  | 17.4  | 3.6   | 19.9  | 3.7  | 8.7   |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 3.4   | 0.5   | 1.3   | 0.0   | 3.1   | 0.0  | 2.4   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 40.6  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

| Intersection                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh11.1 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS B            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                      | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                    | 0    | 1    | 7    | 154  | 0    | 24   | 17   | 1    | 0    | 192  | 177  | 8    | 0    | 1    | 196  | 4    |
| Peak Hour Factor              | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %             | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                     | 0    | 1    | 8    | 167  | 0    | 26   | 18   | 1    | 0    | 209  | 192  | 9    | 0    | 1    | 213  | 4    |
| Number of Lanes               | 0    | 0    | 1    | 1    | 0    | 0    | 1    | 0    | 0    | 1    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 2    | 1    | 2    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 2    | 2    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 2    | 1    | 1    | 2    |
| HCM Control Delay          | 10.2 | 10.3 | 11.2 | 11.8 |
| HCM LOS                    | B    | B    | B    | B    |

| Lane                   | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 12%   | 0%    | 57%   | 0%    |
| Vol Thru, %            | 0%    | 96%   | 88%   | 0%    | 40%   | 98%   |
| Vol Right, %           | 0%    | 4%    | 0%    | 100%  | 2%    | 2%    |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 192   | 185   | 8     | 154   | 42    | 201   |
| LT Vol                 | 192   | 0     | 1     | 0     | 24    | 1     |
| Through Vol            | 0     | 177   | 7     | 0     | 17    | 196   |
| RT Vol                 | 0     | 8     | 0     | 154   | 1     | 4     |
| Lane Flow Rate         | 209   | 201   | 9     | 167   | 46    | 218   |
| Geometry Grp           | 7     | 7     | 7     | 7     | 6     | 6     |
| Degree of Util (X)     | 0.342 | 0.3   | 0.015 | 0.26  | 0.084 | 0.349 |
| Departure Headway (Hd) | 6.017 | 5.481 | 6.368 | 5.595 | 6.635 | 5.751 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 601   | 660   | 564   | 644   | 542   | 627   |
| Service Time           | 3.717 | 3.181 | 4.081 | 3.307 | 4.653 | 3.766 |
| HCM Lane V/C Ratio     | 0.348 | 0.305 | 0.016 | 0.259 | 0.085 | 0.348 |
| HCM Control Delay      | 11.8  | 10.5  | 9.2   | 10.3  | 10.3  | 11.8  |
| HCM Lane LOS           | B     | B     | A     | B     | B     | B     |
| HCM 95th-tile Q        | 1.5   | 1.3   | 0     | 1     | 0.3   | 1.6   |


























# HCM 2010 Signalized Intersection Summary

## 20: Locan Avenue & Bullard Avenue

2035 + Proj AM Peak

4/6/2017























|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 59  | 231   | 63  | 18  | 727   | 204   | 102  | 340   | 6   | 283   | 339   | 103   |
| Number  | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h  | 64  | 251   | 68  | 20  | 790   | 222   | 111  | 370   | 7   | 308   | 368   | 112   |
| Adj No. of Lanes  | 1   | 2   | 1   | 1   | 2   | 0   | 1  | 1   | 1   | 1   | 1   | 0   |
| Peak Hour Factor  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 205   | 1484  | 664   | 31  | 823   | 231   | 182  | 405   | 344   | 341   | 404   | 123   |
| Arrive On Green   | 0.12  | 0.42  | 0.42  | 0.02  | 0.30  | 0.30  | 0.10   | 0.22  | 0.22  | 0.19  | 0.30  | 0.30  |
| Sat Flow, veh/h   | 1757  | 3505  | 1568  | 1757  | 2703  | 760   | 1757   | 1845  | 1568  | 1757  | 1358  | 413   |
| Grp Volume(v), veh/h  | 64  | 251   | 68  | 20  | 512   | 500   | 111  | 370   | 7   | 308   | 0   | 480   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1752  | 1568  | 1757  | 1752  | 1711  | 1757   | 1845  | 1568  | 1757  | 0   | 1772  |
| Q Serve(g_s), s   | 3.0   | 4.0   | 1.7   | 1.0   | 25.8  | 25.8  | 5.4  | 17.6  | 0.3   | 15.4  | 0.0   | 23.5  |
| Cycle Q Clear(g_c), s   | 3.0   | 4.0   | 1.7   | 1.0   | 25.8  | 25.8  | 5.4  | 17.6  | 0.3   | 15.4  | 0.0   | 23.5  |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.44  | 1.00   |   | 1.00  | 1.00  |   | 0.23  |
| Lane Grp Cap(c), veh/h  | 205   | 1484  | 664   | 31  | 534   | 521   | 182  | 405   | 344   | 341   | 0   | 528   |
| V/C Ratio(X)  | 0.31  | 0.17  | 0.10  | 0.65  | 0.96  | 0.96  | 0.61   | 0.91  | 0.02  | 0.90  | 0.00  | 0.91  |
| Avail Cap(c_a), veh/h   | 205   | 1484  | 664   | 107   | 534   | 521   | 182  | 416   | 354   | 347   | 0   | 608   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 0.94  | 0.00  | 0.94  |
| Uniform Delay (d), s/veh  | 36.5  | 16.1  | 8.3   | 43.9  | 30.8  | 30.8  | 38.6   | 34.3  | 27.5  | 35.5  | 0.0   | 30.4  |
| Incr Delay (d2), s/veh  | 0.9   | 0.2   | 0.3   | 20.8  | 30.2  | 30.7  | 5.8  | 24.0  | 0.0   | 24.5  | 0.0   | 15.6  |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 1.5   | 2.0   | 0.8   | 0.7   | 17.0  | 16.7  | 2.9  | 11.6  | 0.1   | 9.8   | 0.0   | 13.8  |
| LnGrp Delay(d),s/veh  | 37.3  | 16.4  | 8.6   | 64.8  | 60.9  | 61.4  | 44.4   | 58.2  | 27.6  | 59.9  | 0.0   | 46.0  |
| LnGrp LOS   | D   | B   | A   | E   | E   | E   | D  | E   | C   | E   |   | D   |
| Approach Vol, veh/h   |   | 383   |   |   | 1032  |   |  | 488   |   |   | 788   |   |
| Approach Delay, s/veh   |   | 18.5  |   |   | 61.3  |   |  | 54.7  |   |   | 51.5  |   |
| Approach LOS  |   | B   |   |   | E   |   |  | D   |   |   | D   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 5.8   | 44.2  | 14.6  | 32.1  | 16.6  | 33.4  | 21.7   | 25.1  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 6.0   | 5.3   | * 5.3   | 6.0   | * 6   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 5.5   | 26.7  | 7.2   | * 31  | 4.8   | * 27  | * 18   | 20.3  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 3.0   | 6.0   | 7.4   | 25.5  | 5.0   | 27.8  | 17.4   | 19.6  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 1.6   | 0.0   | 1.3   | 0.0   | 0.0   | 0.0  | 0.1   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 51.1  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 21: De Wolf Ave & Bullard Avenue

2035 + Proj AM Peak

4/3/2017


















|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |   |  |  |   |  |  |  |
| Volume (veh/h)               | 77  | 198   | 338   | 26  | 585   | 73  | 167  | 558   | 6   | 25  | 121   | 64  |
| Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1900  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h         | 84  | 215   | 367   | 28  | 636   | 79  | 182  | 607   | 7   | 27  | 132   | 70  |
| Adj No. of Lanes             | 1   | 1   | 1   | 1   | 1   | 0   | 1  | 1   | 0   | 1   | 1   | 0   |
| Peak Hour Factor             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 102   | 834   | 709   | 37  | 668   | 83  | 212  | 607   | 7   | 36  | 265   | 141   |
| Arrive On Green              | 0.06  | 0.45  | 0.45  | 0.02  | 0.42  | 0.42  | 0.12   | 0.33  | 0.33  | 0.02  | 0.23  | 0.23  |
| Sat Flow, veh/h              | 1757  | 1845  | 1568  | 1757  | 1609  | 200   | 1757   | 1820  | 21  | 1757  | 1136  | 602   |
| Grp Volume(v), veh/h         | 84  | 215   | 367   | 28  | 0   | 715   | 182  | 0   | 614   | 27  | 0   | 202   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1845  | 1568  | 1757  | 0   | 1809  | 1757   | 0   | 1841  | 1757  | 0   | 1738  |
| Q Serve(g_s), s              | 5.2   | 7.9   | 18.4  | 1.7   | 0.0   | 42.0  | 11.2   | 0.0   | 36.7  | 1.7   | 0.0   | 11.1  |
| Cycle Q Clear(g_c), s        | 5.2   | 7.9   | 18.4  | 1.7   | 0.0   | 42.0  | 11.2   | 0.0   | 36.7  | 1.7   | 0.0   | 11.1  |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 0.11  | 1.00   |   | 0.01  | 1.00  |   | 0.35  |
| Lane Grp Cap(c), veh/h       | 102   | 834   | 709   | 37  | 0   | 751   | 212  | 0   | 614   | 36  | 0   | 406   |
| V/C Ratio(X)                 | 0.82  | 0.26  | 0.52  | 0.76  | 0.00  | 0.95  | 0.86   | 0.00  | 1.00  | 0.75  | 0.00  | 0.50  |
| Avail Cap(c_a), veh/h        | 102   | 834   | 709   | 99  | 0   | 751   | 259  | 0   | 614   | 64  | 0   | 406   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 0.00  | 1.00  | 1.00   | 0.00  | 1.00  | 0.99  | 0.00  | 0.99  |
| Uniform Delay (d), s/veh     | 51.2  | 18.7  | 21.5  | 53.6  | 0.0   | 31.1  | 47.5   | 0.0   | 36.6  | 53.6  | 0.0   | 36.6  |
| Incr Delay (d2), s/veh       | 39.3  | 0.7   | 2.7   | 27.1  | 0.0   | 23.0  | 20.9   | 0.0   | 36.2  | 26.3  | 0.0   | 0.9   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.6   | 4.2   | 8.5   | 1.1   | 0.0   | 25.7  | 6.6  | 0.0   | 24.8  | 1.1   | 0.0   | 5.4   |
| LnGrp Delay(d),s/veh         | 90.5  | 19.4  | 24.2  | 80.7  | 0.0   | 54.2  | 68.4   | 0.0   | 72.9  | 79.9  | 0.0   | 37.5  |
| LnGrp LOS                    | F   | B   | C   | F   |   | D   | E  |   | E   | E   |   | D   |
| Approach Vol, veh/h          | 666   |   |   | 743   |   |   | 796  |   |   | 229   |   |   |
| Approach Delay, s/veh        | 31.0  |   |   | 55.2  |   |   | 71.8   |   |   | 42.5  |   |   |
| Approach LOS                 | C   |   |   | E   |   |   | E  |   |   | D   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 6.5   | 55.1  | 17.5  | 31.0  | 10.6  | 51.0  | 6.4  | 42.0  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 6.2   | 44.1  | * 16  | 24.5  | * 6.4   | 43.9  | * 4  | 36.7  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 3.7   | 20.4  | 13.2  | 13.1  | 7.2   | 44.0  | 3.7  | 38.7  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 7.1   | 0.1   | 3.7   | 0.0   | 0.0   | 0.0  | 0.0   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 52.8  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 4: Temperance Ave & SR 168 EB Ramp

2035 + Proj PM Peak

4/3/2017























|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |   |  |   |   |   |  |  |   |  |  |   |
| Volume (veh/h)  | 545   | 0   | 1112  | 0   | 0   | 0   | 0  | 1831  | 232   | 76  | 1114  | 0   |
| Number  | 7   | 4   | 14  |   |   |   | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   |   |   |   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  |   |   |   | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 0   | 1845  |   |   |   | 0  | 1845  | 1900  | 1845  | 1845  | 0   |
| Adj Flow Rate, veh/h  | 556   | 0   | 1135  |   |   |   | 0  | 1868  | 237   | 78  | 1137  | 0   |
| Adj No. of Lanes  | 2   | 0   | 2   |   |   |   | 0  | 3   | 0   | 1   | 2   | 0   |
| Peak Hour Factor  | 0.98  | 0.98  | 0.98  |   |   |   | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %  | 3   | 0   | 3   |   |   |   | 0  | 3   | 3   | 3   | 3   | 0   |
| Cap, veh/h  | 1335  | 0   | 1090  |   |   |   | 0  | 1952  | 246   | 120   | 1898  | 0   |
| Arrive On Green   | 0.39  | 0.00  | 0.40  |   |   |   | 0.00   | 0.86  | 0.84  | 0.14  | 1.00  | 0.00  |
| Sat Flow, veh/h   | 3408  | 0   | 2760  |   |   |   | 0  | 4695  | 570   | 1757  | 3597  | 0   |
| Grp Volume(v), veh/h  | 556   | 0   | 1135  |   |   |   | 0  | 1381  | 724   | 78  | 1137  | 0   |
| Grp Sat Flow(s),veh/h/ln  | 1704  | 0   | 1380  |   |   |   | 0  | 1679  | 1742  | 1757  | 1752  | 0   |
| Q Serve(g_s), s   | 14.2  | 0.0   | 47.4  |   |   |   | 0.0  | 38.4  | 41.4  | 5.0   | 0.0   | 0.0   |
| Cycle Q Clear(g_c), s   | 14.2  | 0.0   | 47.4  |   |   |   | 0.0  | 38.4  | 41.4  | 5.0   | 0.0   | 0.0   |
| Prop In Lane  | 1.00  |   | 1.00  |   |   |   | 0.00   |   | 0.33  | 1.00  |   | 0.00  |
| Lane Grp Cap(c), veh/h  | 1335  | 0   | 1090  |   |   |   | 0  | 1447  | 750   | 120   | 1898  | 0   |
| V/C Ratio(X)  | 0.42  | 0.00  | 1.04  |   |   |   | 0.00   | 0.95  | 0.97  | 0.65  | 0.60  | 0.00  |
| Avail Cap(c_a), veh/h   | 1335  | 0   | 1090  |   |   |   | 0  | 1539  | 798   | 120   | 1898  | 0   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  |   |   |   | 1.00   | 2.00  | 2.00  | 2.00  | 2.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 0.00  | 1.00  |   |   |   | 0.00   | 1.00  | 1.00  | 0.90  | 0.90  | 0.00  |
| Uniform Delay (d), s/veh  | 26.5  | 0.0   | 36.3  |   |   |   | 0.0  | 7.4   | 8.0   | 50.4  | 0.0   | 0.0   |
| Incr Delay (d2), s/veh  | 0.2   | 0.0   | 38.6  |   |   |   | 0.0  | 15.0  | 25.3  | 10.7  | 1.3   | 0.0   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   |   |   |   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 6.8   | 0.0   | 23.9  |   |   |   | 0.0  | 19.1  | 23.0  | 2.8   | 0.3   | 0.0   |
| LnGrp Delay(d),s/veh  | 26.7  | 0.0   | 74.9  |   |   |   | 0.0  | 22.4  | 33.3  | 61.1  | 1.3   | 0.0   |
| LnGrp LOS   | C   |   | F   |   |   |   |  | C   | C   | E   | A   |   |
| Approach Vol, veh/h   |   | 1691  |   |   |   |   |  | 2105  |   |   | 1215  |   |
| Approach Delay, s/veh   |   | 59.1  |   |   |   |   |  | 26.2  |   |   | 5.1   |   |
| Approach LOS  |   | E   |   |   |   |   |  | C   |   |   | A   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   |   | 4   |   | 6   |  |   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 13.3  | 55.7  |   | 51.0  |   | 69.0  |  |   |   |   |   |   |
| Change Period (Y+Rc), s   | 5.3   | * 5.3   |   | * 4.2   |   | 5.3   |  |   |   |   |   |   |
| Max Green Setting (Gmax), s   | 5.8   | * 54  |   | * 47  |   | 63.7  |  |   |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 7.0   | 43.4  |   | 49.4  |   | 2.0   |  |   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 7.0   |   | 0.0   |   | 6.8   |  |   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 32.2  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | C   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

2035 + Proj PM Peak

## 5: Temperance Ave & Fir Ave

4/3/2017

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                          | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBU  | NBL   | NBT   | NBR   | SBU   | SBL   |
| Lane Configurations               |  |  |  |  |  |  |  |  |  |  |   |  |
| Volume (vph)                      | 159   | 14  | 97  | 226   | 25  | 386   | 2  | 115   | 1141  | 75  | 27  | 359   |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  | 1900   | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.2   | 4.2   | 4.2   | 4.0   | 4.2   | 4.0   |  | 4.2   | 4.0   | 4.0   |   | 4.0   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 0.91  | 1.00  |   | 0.97  |
| Frpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 0.99  |   | 1.00  |
| Flpb, ped/bikes                   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.00  | 1.00  | 1.00  |   | 1.00  |
| Frt                               | 1.00  | 1.00  | 0.85  | 1.00  | 1.00  | 0.85  |  | 1.00  | 1.00  | 0.85  |   | 1.00  |
| Flt Protected                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (prot)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 5036  | 1546  |   | 3400  |
| Flt Permitted                     | 0.95  | 1.00  | 1.00  | 0.95  | 1.00  | 1.00  |  | 0.95  | 1.00  | 1.00  |   | 0.95  |
| Satd. Flow (perm)                 | 1752  | 1845  | 1568  | 1752  | 1845  | 1568  |  | 1752  | 5036  | 1546  |   | 3400  |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.96  | 0.92  | 0.96  | 0.96   | 0.92  | 0.96  | 0.96  | 0.92  | 0.96  |
| Adj. Flow (vph)                   | 173   | 15  | 105   | 235   | 27  | 402   | 2  | 125   | 1189  | 78  | 29  | 374   |
| RTOR Reduction (vph)              | 0   | 0   | 97  | 0   | 0   | 249   | 0  | 0   | 0   | 51  | 0   | 0   |
| Lane Group Flow (vph)             | 173   | 15  | 8   | 235   | 27  | 153   | 0  | 127   | 1189  | 27  | 0   | 403   |
| Confl. Peds. (#/hr)               |   |   |   |   |   |   |  |   |   | 1   |   |   |
| Turn Type                         | Prot  | NA  | Perm  | Prot  | NA  | Perm  | Prot   | Prot  | NA  | Perm  | Prot  | Prot  |
| Protected Phases                  | 7   | 4   |   | 3   | 8   |   | 5  | 5   | 2   |   | 1   | 1   |
| Permitted Phases                  |   |   | 4   |   |   | 8   |  |   |   | 2   |   |   |
| Actuated Green, G (s)             | 18.3  | 9.5   | 9.5   | 24.4  | 15.6  | 15.6  |  | 12.0  | 39.6  | 39.6  |   | 28.6  |
| Effective Green, g (s)            | 18.3  | 9.5   | 9.5   | 24.6  | 15.6  | 15.8  |  | 12.0  | 40.9  | 40.9  |   | 28.8  |
| Actuated g/C Ratio                | 0.15  | 0.08  | 0.08  | 0.21  | 0.13  | 0.13  |  | 0.10  | 0.34  | 0.34  |   | 0.24  |
| Clearance Time (s)                | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   | 4.2   |  | 4.2   | 5.3   | 5.3   |   | 4.2   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |  | 3.0   | 3.0   | 3.0   |   | 3.0   |
| Lane Grp Cap (vph)                | 267   | 146   | 124   | 359   | 239   | 206   |  | 175   | 1716  | 526   |   | 816   |
| v/s Ratio Prot                    | 0.10  | 0.01  |   | c0.13   | 0.01  |   |  | 0.07  | c0.24   |   |   | 0.12  |
| v/s Ratio Perm                    |   |   | 0.01  |   |   | c0.10   |  |   |   | 0.02  |   |   |
| v/c Ratio                         | 0.65  | 0.10  | 0.07  | 0.65  | 0.11  | 0.74  |  | 0.73  | 0.69  | 0.05  |   | 0.49  |
| Uniform Delay, d1                 | 47.8  | 51.3  | 51.1  | 43.8  | 46.1  | 50.1  |  | 52.4  | 34.1  | 26.5  |   | 39.3  |
| Progression Factor                | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |  | 1.11  | 0.74  | 0.22  |   | 0.94  |
| Incremental Delay, d2             | 5.3   | 0.3   | 0.2   | 4.3   | 0.2   | 13.4  |  | 11.3  | 1.9   | 0.1   |   | 0.3   |
| Delay (s)                         | 53.2  | 51.6  | 51.4  | 48.1  | 46.3  | 63.5  |  | 69.6  | 27.3  | 5.9   |   | 37.4  |
| Level of Service                  | D   | D   | D   | D   | D   | E   |  | E   | C   | A   |   | D   |
| Approach Delay (s)                |   | 52.4  |   |   | 57.4  |   |  |   | 29.9  |   |   |   |
| Approach LOS                      |   | D   |   |   | E   |   |  |   | C   |   |   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 44.7  |   |   |   | HCM 2000 Level of Service  |   | D   |   |   |   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.91  |   |   |   |  |   |   |   |   |   |
| Actuated Cycle Length (s)         |   |   | 120.0   |   |   |   | Sum of lost time (s)   |   | 16.6  |   |   |   |
| Intersection Capacity Utilization |   |   | 84.7%   |   |   |   | ICU Level of Service   |   | E   |   |   |   |
| Analysis Period (min)             |   |   | 15  |   |   |   |  |   |   |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 5: Temperance Ave & Fir Ave

2035 + Proj PM Peak

4/3/2017


























| Movement               | SBT   | SBR  |
|------------------------|-------|------|
| Lane Configurations    | ↑↑    | ↑    |
| Volume (vph)           | 1664  | 175  |
| Ideal Flow (vphpl)     | 1900  | 1900 |
| Total Lost time (s)    | 4.0   | 5.3  |
| Lane Util. Factor      | 0.95  | 1.00 |
| Frpb, ped/bikes        | 1.00  | 1.00 |
| Flpb, ped/bikes        | 1.00  | 1.00 |
| Frt                    | 1.00  | 0.85 |
| Flt Protected          | 1.00  | 1.00 |
| Satd. Flow (prot)      | 3505  | 1568 |
| Flt Permitted          | 1.00  | 1.00 |
| Satd. Flow (perm)      | 3505  | 1568 |
| Peak-hour factor, PHF  | 0.96  | 0.92 |
| Adj. Flow (vph)        | 1733  | 190  |
| RTOR Reduction (vph)   | 0     | 68   |
| Lane Group Flow (vph)  | 1733  | 122  |
| Confl. Peds. (#/hr)    |       |      |
| Turn Type              | NA    | Perm |
| Protected Phases       | 6     |      |
| Permitted Phases       |       | 6    |
| Actuated Green, G (s)  | 56.2  | 56.2 |
| Effective Green, g (s) | 57.5  | 56.2 |
| Actuated g/C Ratio     | 0.48  | 0.47 |
| Clearance Time (s)     | 5.3   | 5.3  |
| Vehicle Extension (s)  | 3.0   | 3.0  |
| Lane Grp Cap (vph)     | 1679  | 734  |
| v/s Ratio Prot         | c0.49 |      |
| v/s Ratio Perm         |       | 0.08 |
| v/c Ratio              | 1.03  | 0.17 |
| Uniform Delay, d1      | 31.2  | 18.4 |
| Progression Factor     | 0.93  | 0.86 |
| Incremental Delay, d2  | 26.3  | 0.3  |
| Delay (s)              | 55.3  | 16.2 |
| Level of Service       | E     | B    |
| Approach Delay (s)     | 49.0  |      |
| Approach LOS           | D     |      |
| Intersection Summary   |       |      |

# HCM 2010 Signalized Intersection Summary

## 7: Armstrong Avenue & Herndon Avenue

2035 + Proj PM Peak

4/3/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 66  | 1038  | 235   | 255   | 981   | 376   | 184  | 497   | 52  | 122   | 286   | 88  |
| Number  | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h  | 69  | 1093  | 247   | 268   | 1033  | 396   | 194  | 523   | 55  | 128   | 301   | 93  |
| Adj No. of Lanes  | 1   | 3   | 1   | 1   | 3   | 0   | 1  | 2   | 1   | 1   | 2   | 1   |
| Peak Hour Factor  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95   | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 421   | 2091  | 651   | 299   | 1208  | 463   | 262  | 669   | 299   | 158   | 430   | 192   |
| Arrive On Green   | 0.24  | 0.42  | 0.42  | 0.17  | 0.34  | 0.33  | 0.15   | 0.19  | 0.19  | 0.09  | 0.12  | 0.12  |
| Sat Flow, veh/h   | 1757  | 5036  | 1568  | 1757  | 3584  | 1374  | 1757   | 3505  | 1568  | 1757  | 3505  | 1568  |
| Grp Volume(v), veh/h  | 69  | 1093  | 247   | 268   | 968   | 461   | 194  | 523   | 55  | 128   | 301   | 93  |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1679  | 1568  | 1757  | 1679  | 1601  | 1757   | 1752  | 1568  | 1757  | 1752  | 1568  |
| Q Serve(g_s), s   | 3.7   | 19.4  | 7.6   | 17.9  | 32.2  | 32.3  | 12.7   | 17.0  | 3.5   | 8.6   | 9.9   | 6.6   |
| Cycle Q Clear(g_c), s   | 3.7   | 19.4  | 7.6   | 17.9  | 32.2  | 32.3  | 12.7   | 17.0  | 3.5   | 8.6   | 9.9   | 6.6   |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.86  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h  | 421   | 2091  | 651   | 299   | 1132  | 540   | 262  | 669   | 299   | 158   | 430   | 192   |
| V/C Ratio(X)  | 0.16  | 0.52  | 0.38  | 0.90  | 0.85  | 0.85  | 0.74   | 0.78  | 0.18  | 0.81  | 0.70  | 0.48  |
| Avail Cap(c_a), veh/h   | 421   | 2091  | 651   | 348   | 1279  | 610   | 262  | 999   | 447   | 239   | 973   | 435   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Uniform Delay (d), s/veh  | 36.1  | 26.2  | 8.1   | 48.7  | 37.0  | 37.6  | 48.8   | 46.2  | 40.7  | 53.6  | 50.5  | 49.1  |
| Incr Delay (d2), s/veh  | 0.2   | 0.9   | 1.7   | 22.2  | 8.3   | 15.8  | 10.7   | 2.4   | 0.3   | 11.7  | 2.1   | 1.9   |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 1.8   | 9.2   | 3.6   | 10.6  | 16.2  | 16.6  | 6.9  | 8.4   | 1.6   | 4.7   | 4.9   | 3.0   |
| LnGrp Delay(d),s/veh  | 36.3  | 27.1  | 9.8   | 71.0  | 45.3  | 53.4  | 59.5   | 48.5  | 41.0  | 65.3  | 52.6  | 51.0  |
| LnGrp LOS   | D   | C   | A   | E   | D   | D   | E  | D   | D   | E   | D   | D   |
| Approach Vol, veh/h   |   | 1409  |   |   | 1697  |   |  | 772   |   |   | 522   |   |
| Approach Delay, s/veh   |   | 24.6  |   |   | 51.6  |   |  | 50.8  |   |   | 55.4  |   |
| Approach LOS  |   | C   |   |   | D   |   |  | D   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 14.8  | 26.9  | 24.5  | 53.8  | 23.0  | 18.7  | 33.8   | 44.5  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 5.3   | * 4.2   | 5.3   | 5.3   | * 5.3   | 5.3  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 16  | 32.9  | * 24  | 28.4  | 17.0  | * 32  | 7.6  | * 44  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 10.6  | 19.0  | 19.9  | 21.4  | 14.7  | 11.9  | 5.7  | 34.3  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.2   | 2.6   | 0.3   | 3.7   | 0.9   | 1.5   | 1.2  | 4.9   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 43.2  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

























| Intersection             |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
|--------------------------|--------|-------|--------|------|-------|------|--------|-----|-------|------|--------|--|------|------|------|
| Int Delay, s/veh         | 3.4    |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
|                          |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
| Movement                 | EBL    | EBT   | EBR    | WBU  | WBL   | WBT  | WBR    |     | NEL   | NET  | NER    |  | SWL  | SWT  | SWR  |
| Vol, veh/h               | 55     | 1230  | 0      | 38   | 0     | 1574 | 7      |     | 0     | 0    | 220    |  | 0    | 0    | 38   |
| Conflicting Peds, #/hr   | 0      | 0     | 0      | 0    | 0     | 0    | 0      |     | 0     | 0    | 0      |  | 0    | 0    | 0    |
| Sign Control             | Free   | Free  | Free   | Free | Free  | Free | Free   |     | Stop  | Stop | Stop   |  | Stop | Stop | Stop |
| RT Channelized           | -      | -     | None   | -    | -     | -    | None   |     | -     | -    | None   |  | -    | -    | None |
| Storage Length           | 400    | -     | -      | -    | 120   | -    | 85     |     | -     | -    | 0      |  | -    | -    | 0    |
| Veh in Median Storage, # | -      | 0     | -      | -    | -     | 0    | -      |     | -     | 1    | -      |  | -    | 1    | -    |
| Grade, %                 | -      | 0     | -      | -    | -     | 0    | -      |     | -     | 0    | -      |  | -    | 0    | -    |
| Peak Hour Factor         | 92     | 92    | 92     | 92   | 92    | 92   | 92     |     | 92    | 92   | 96     |  | 92   | 92   | 92   |
| Heavy Vehicles, %        | 3      | 3     | 3      | 3    | 3     | 3    | 3      |     | 3     | 3    | 3      |  | 3    | 3    | 3    |
| Mvmt Flow                | 60     | 1337  | 0      | 41   | 0     | 1711 | 8      |     | 0     | 0    | 229    |  | 0    | 0    | 41   |
|                          |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
| Major/Minor              | Major1 |       | Major2 |      |       |      | Minor1 |     |       |      | Minor2 |  |      |      |      |
| Conflicting Flow All     | 1711   | 0     | 0      | 1205 | 1337  | 0    | 0      |     | 2395  | 3250 | 668    |  | 2447 | 3250 | 855  |
| Stage 1                  | -      | -     | -      | -    | -     | -    | -      |     | 1457  | 1457 | -      |  | 1793 | 1793 | -    |
| Stage 2                  | -      | -     | -      | -    | -     | -    | -      |     | 938   | 1793 | -      |  | 654  | 1457 | -    |
| Critical Hdwy            | 4.16   | -     | -      | 5.66 | 5.36  | -    | -      |     | 7.01  | 6.56 | 7.16   |  | 7.01 | 6.56 | 6.96 |
| Critical Hdwy Stg 1      | -      | -     | -      | -    | -     | -    | -      |     | 7.36  | 5.56 | -      |  | 6.56 | 5.56 | -    |
| Critical Hdwy Stg 2      | -      | -     | -      | -    | -     | -    | -      |     | 6.56  | 5.56 | -      |  | 6.76 | 5.56 | -    |
| Follow-up Hdwy           | 2.23   | -     | -      | 2.33 | 3.13  | -    | -      |     | 3.68  | 4.03 | 3.93   |  | 3.68 | 4.03 | 3.33 |
| Pot Cap-1 Maneuver       | 363    | -     | -      | 335  | 266   | -    | -      |     | 25    | 9    | 342    |  | 23   | 9    | 300  |
| Stage 1                  | -      | -     | -      | -    | -     | -    | -      |     | 96    | 191  | -      |  | 81   | 130  | -    |
| Stage 2                  | -      | -     | -      | -    | -     | -    | -      |     | 275   | 130  | -      |  | 393  | 191  | -    |
| Platoon blocked, %       |        |       | -      | -    |       | -    | -      |     |       |      |        |  |      |      |      |
| Mov Cap-1 Maneuver       | 363    | -     | -      | 120  | 266   | -    | -      |     | 19    | 8    | 342    |  | 7    | 8    | 300  |
| Mov Cap-2 Maneuver       | -      | -     | -      | -    | -     | -    | -      |     | 58    | 47   | -      |  | 34   | 60   | -    |
| Stage 1                  | -      | -     | -      | -    | -     | -    | -      |     | 80    | 159  | -      |  | 68   | 130  | -    |
| Stage 2                  | -      | -     | -      | -    | -     | -    | -      |     | 237   | 130  | -      |  | 108  | 159  | -    |
|                          |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
| Approach                 | EB     |       | WB     |      |       |      | NE     |     |       |      | SW     |  |      |      |      |
| HCM Control Delay, s     | 0.7    |       | 1.2    |      |       |      | 34.5   |     |       |      | 18.9   |  |      |      |      |
| HCM LOS                  |        |       |        |      |       |      | D      |     |       |      | C      |  |      |      |      |
|                          |        |       |        |      |       |      |        |     |       |      |        |  |      |      |      |
| Minor Lane/Major Mvmt    | NELn1  | EBL   | EBT    | EBR  | WBU   | WBL  | WBT    | WBR | SWLn1 |      |        |  |      |      |      |
| Capacity (veh/h)         | 342    | 363   | -      | -    | 120   | 266  | -      | -   | 300   |      |        |  |      |      |      |
| HCM Lane V/C Ratio       | 0.67   | 0.165 | -      | -    | 0.344 | -    | -      | -   | 0.138 |      |        |  |      |      |      |
| HCM Control Delay (s)    | 34.5   | 16.9  | -      | -    | 50    | -    | -      | -   | 18.9  |      |        |  |      |      |      |
| HCM Lane LOS             | D      | C     | -      | -    | E     | -    | -      | -   | C     |      |        |  |      |      |      |
| HCM 95th %tile Q(veh)    | 4.6    | 0.6   | -      | -    | 1.4   | 0    | -      | -   | 0.5   |      |        |  |      |      |      |

# HCM 2010 Signalized Intersection Summary

## 9: Temperance Ave & Herndon Avenue

2035 + Proj PM Peak

4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |  |   |  |  |  |  |  |
| Volume (veh/h)               | 199   | 1083  | 317   | 167   | 992   | 566   | 263  | 568   | 125   | 586   | 1129  | 295   |
| Number                       | 7   | 4   | 14  | 3   | 8   | 18  | 5  | 2   | 12  | 1   | 6   | 16  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 0.99  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  | 1845   | 1845  | 1845  | 1845  | 1845  | 1845  |
| Adj Flow Rate, veh/h         | 203   | 1105  | 323   | 170   | 1012  | 578   | 268  | 580   | 128   | 598   | 1152  | 301   |
| Adj No. of Lanes             | 2   | 2   | 1   | 2   | 3   | 1   | 2  | 2   | 1   | 2   | 2   | 1   |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98   | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 521   | 1187  | 527   | 226   | 1268  | 794   | 327  | 725   | 324   | 838   | 1282  | 574   |
| Arrive On Green              | 0.15  | 0.34  | 0.34  | 0.13  | 0.50  | 0.50  | 0.10   | 0.21  | 0.21  | 0.33  | 0.49  | 0.49  |
| Sat Flow, veh/h              | 3408  | 3505  | 1555  | 3408  | 5036  | 1564  | 3408   | 3505  | 1566  | 3408  | 3505  | 1568  |
| Grp Volume(v), veh/h         | 203   | 1105  | 323   | 170   | 1012  | 578   | 268  | 580   | 128   | 598   | 1152  | 301   |
| Grp Sat Flow(s),veh/h/ln     | 1704  | 1752  | 1555  | 1704  | 1679  | 1564  | 1704   | 1752  | 1566  | 1704  | 1752  | 1568  |
| Q Serve(g_s), s              | 6.4   | 36.5  | 15.0  | 5.8   | 20.0  | 0.0   | 9.3  | 18.9  | 8.5   | 18.5  | 36.0  | 9.8   |
| Cycle Q Clear(g_c), s        | 6.4   | 36.5  | 15.0  | 5.8   | 20.0  | 0.0   | 9.3  | 18.9  | 8.5   | 18.5  | 36.0  | 9.8   |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Lane Grp Cap(c), veh/h       | 521   | 1187  | 527   | 226   | 1268  | 794   | 327  | 725   | 324   | 838   | 1282  | 574   |
| V/C Ratio(X)                 | 0.39  | 0.93  | 0.61  | 0.75  | 0.80  | 0.73  | 0.82   | 0.80  | 0.40  | 0.71  | 0.90  | 0.52  |
| Avail Cap(c_a), veh/h        | 521   | 1197  | 531   | 227   | 1511  | 869   | 341  | 940   | 420   | 838   | 1282  | 574   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 2.00  | 2.00  | 2.00  | 1.00   | 1.00  | 1.00  | 1.33  | 1.33  | 1.33  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 0.77  | 0.77  | 0.77  | 1.00   | 1.00  | 1.00  | 0.19  | 0.19  | 0.19  |
| Uniform Delay (d), s/veh     | 45.8  | 38.3  | 17.2  | 51.1  | 27.2  | 12.8  | 53.2   | 45.2  | 41.1  | 36.7  | 28.8  | 9.1   |
| Incr Delay (d2), s/veh       | 0.5   | 12.7  | 2.1   | 10.4  | 2.0   | 2.2   | 14.1   | 9.0   | 3.6   | 0.6   | 2.2   | 0.6   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 3.1   | 19.7  | 6.7   | 3.0   | 9.4   | 8.7   | 5.0  | 10.0  | 4.0   | 8.7   | 17.7  | 4.3   |
| LnGrp Delay(d),s/veh         | 46.2  | 51.1  | 19.3  | 61.5  | 29.3  | 15.0  | 67.3   | 54.2  | 44.7  | 37.2  | 31.0  | 9.7   |
| LnGrp LOS                    | D   | D   | B   | E   | C   | B   | E  | D   | D   | D   | C   | A   |
| Approach Vol, veh/h          | 1631  |   |   | 1760  |   |   | 976  |   |   | 2051  |   |   |
| Approach Delay, s/veh        | 44.2  |   |   | 27.7  |   |   | 56.6   |   |   | 29.7  |   |   |
| Approach LOS                 | D   |   |   | C   |   |   | E  |   |   | C   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 34.6  | 28.8  | 11.9  | 44.6  | 15.5  | 47.9  | 22.4   | 34.2  |   |   |   |   |
| Change Period (Y+Rc), s      | 5.3   | * 5.7   | 4.2   | * 5.3   | * 4.2   | 5.3   | 4.2  | * 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | 22.6  | * 31  | 7.8   | * 40  | * 12  | 41.7  | 12.8   | * 35  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 20.5  | 20.9  | 7.8   | 38.5  | 11.3  | 38.0  | 8.4  | 22.0  |   |   |   |   |
| Green Ext Time (p_c), s      | 1.7   | 2.2   | 0.0   | 0.8   | 0.1   | 2.9   | 0.6  | 6.3   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 36.9  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |









# HCM 2010 Signalized Intersection Summary

## 13: Locan Avenue & Herndon Avenue

2035 + Proj PM Peak

4/3/2017













|                              |   |   |   |   |   |   |   |      |
|------------------------------|---|---|---|---|---|---|---|------|
|                              |  |  |  |  |  |  |   |      |
| Movement                     | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |   |      |
| Lane Configurations          | ↑↑  | ↑   | ↑   | ↑↑  | ↑   | ↑   |   |      |
| Volume (veh/h)               | 1305  | 456   | 27  | 759   | 501   | 171   |   |      |
| Number                       | 2   | 12  | 1   | 6   | 3   | 18  |   |      |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   |   |      |
| Ped-Bike Adj(A_pbT)          |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |      |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |      |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |   |      |
| Adj Flow Rate, veh/h         | 1332  | 465   | 28  | 774   | 511   | 174   |   |      |
| Adj No. of Lanes             | 2   | 1   | 1   | 2   | 1   | 1   |   |      |
| Peak Hour Factor             | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  | 0.98  |   |      |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   |   |      |
| Cap, veh/h                   | 1956  | 875   | 38  | 2170  | 568   | 490   |   |      |
| Arrive On Green              | 0.56  | 0.56  | 0.04  | 1.00  | 0.32  | 0.31  |   |      |
| Sat Flow, veh/h              | 3597  | 1568  | 1757  | 3597  | 1757  | 1568  |   |      |
| Grp Volume(v), veh/h         | 1332  | 465   | 28  | 774   | 511   | 174   |   |      |
| Grp Sat Flow(s),veh/h/ln     | 1752  | 1568  | 1757  | 1752  | 1757  | 1568  |   |      |
| Q Serve(g_s), s              | 32.5  | 22.4  | 1.9   | 0.0   | 33.3  | 10.3  |   |      |
| Cycle Q Clear(g_c), s        | 32.5  | 22.4  | 1.9   | 0.0   | 33.3  | 10.3  |   |      |
| Prop In Lane                 |   | 1.00  | 1.00  |   | 1.00  | 1.00  |   |      |
| Lane Grp Cap(c), veh/h       | 1956  | 875   | 38  | 2170  | 568   | 490   |   |      |
| V/C Ratio(X)                 | 0.68  | 0.53  | 0.73  | 0.36  | 0.90  | 0.36  |   |      |
| Avail Cap(c_a), veh/h        | 1956  | 875   | 73  | 2170  | 690   | 598   |   |      |
| HCM Platoon Ratio            | 1.00  | 1.00  | 2.00  | 2.00  | 1.00  | 1.00  |   |      |
| Upstream Filter(I)           | 1.00  | 1.00  | 0.94  | 0.94  | 0.89  | 0.89  |   |      |
| Uniform Delay (d), s/veh     | 18.9  | 16.7  | 57.0  | 0.0   | 38.7  | 31.9  |   |      |
| Incr Delay (d2), s/veh       | 1.9   | 2.3   | 21.7  | 0.4   | 11.9  | 0.4   |   |      |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |      |
| %ile BackOfQ(50%),veh/ln     | 16.3  | 10.1  | 1.1   | 0.1   | 18.1  | 4.5   |   |      |
| LnGrp Delay(d),s/veh         | 20.8  | 19.0  | 78.7  | 0.4   | 50.6  | 32.3  |   |      |
| LnGrp LOS                    | C   | B   | E   | A   | D   | C   |   |      |
| Approach Vol, veh/h          | 1797  |   |   | 802   | 685   |   |   |      |
| Approach Delay, s/veh        | 20.4  |   |   | 3.2   | 45.9  |   |   |      |
| Approach LOS                 | C   |   |   | A   | D   |   |   |      |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7 | 8    |
| Assigned Phs                 | 1   | 2   |   |   |   | 6   |   | 8    |
| Phs Duration (G+Y+Rc), s     | 6.6   | 71.7  |   |   |   | 78.3  |   | 41.7 |
| Change Period (Y+Rc), s      | * 4.2   | * 6   |   |   |   | 6.0   |   | 4.2  |
| Max Green Setting (Gmax), s  | * 4.8   | * 57  |   |   |   | 64.0  |   | 45.8 |
| Max Q Clear Time (g_c+I1), s | 3.9   | 34.5  |   |   |   | 2.0   |   | 35.3 |
| Green Ext Time (p_c), s      | 0.0   | 13.9  |   |   |   | 22.1  |   | 2.2  |
| Intersection Summary         |   |   |   |   |   |   |   |      |
| HCM 2010 Ctrl Delay          |   |   | 21.5  |   |   |   |   |      |
| HCM 2010 LOS                 |   |   | C   |   |   |   |   |      |
| Notes                        |   |   |   |   |   |   |   |      |

# HCM 2010 Signalized Intersection Summary

## 14: Herndon Avenue & De Wolf Avenue (NL)

2035 + Proj PM Peak

4/3/2017












|                              |   |   |   |   |   |   |   |   |
|------------------------------|---|---|---|---|---|---|---|---|
|                              |  |  |  |  |  |  |   |   |
| Movement                     | EBL   | EBT   | WBT   | WBR   | SBL   | SBR   |   |   |
| Lane Configurations          |  |  |  |  |  |  |   |   |
| Volume (veh/h)               | 90  | 1376  | 742   | 24  | 29  | 43  |   |   |
| Number                       | 5   | 2   | 6   | 16  | 7   | 14  |   |   |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   |   |   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   |   | 1.00  | 1.00  | 1.00  |   |   |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |   |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1845  |   |   |
| Adj Flow Rate, veh/h         | 97  | 1480  | 798   | 26  | 31  | 46  |   |   |
| Adj No. of Lanes             | 1   | 2   | 2   | 1   | 1   | 1   |   |   |
| Peak Hour Factor             | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  |   |   |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   |   |   |
| Cap, veh/h                   | 128   | 2857  | 2368  | 1007  | 111   | 76  |   |   |
| Arrive On Green              | 0.15  | 1.00  | 0.90  | 0.85  | 0.06  | 0.05  |   |   |
| Sat Flow, veh/h              | 1757  | 3597  | 3597  | 1568  | 1757  | 1568  |   |   |
| Grp Volume(v), veh/h         | 97  | 1480  | 798   | 26  | 31  | 46  |   |   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1752  | 1752  | 1568  | 1757  | 1568  |   |   |
| Q Serve(g_s), s              | 3.2   | 0.0   | 2.0   | 0.1   | 1.0   | 1.7   |   |   |
| Cycle Q Clear(g_c), s        | 3.2   | 0.0   | 2.0   | 0.1   | 1.0   | 1.7   |   |   |
| Prop In Lane                 | 1.00  |   |   | 1.00  | 1.00  | 1.00  |   |   |
| Lane Grp Cap(c), veh/h       | 128   | 2857  | 2368  | 1007  | 111   | 76  |   |   |
| V/C Ratio(X)                 | 0.76  | 0.52  | 0.34  | 0.03  | 0.28  | 0.61  |   |   |
| Avail Cap(c_a), veh/h        | 182   | 2857  | 2368  | 1007  | 700   | 601   |   |   |
| HCM Platoon Ratio            | 2.00  | 2.00  | 1.33  | 1.33  | 1.00  | 1.00  |   |   |
| Upstream Filter(I)           | 0.73  | 0.73  | 0.79  | 0.79  | 1.00  | 1.00  |   |   |
| Uniform Delay (d), s/veh     | 25.1  | 0.0   | 1.1   | 1.6   | 26.8  | 28.0  |   |   |
| Incr Delay (d2), s/veh       | 8.1   | 0.5   | 0.3   | 0.0   | 1.4   | 7.7   |   |   |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |   |   |
| %ile BackOfQ(50%),veh/ln     | 1.8   | 0.2   | 1.0   | 0.5   | 0.5   | 1.6   |   |   |
| LnGrp Delay(d),s/veh         | 33.2  | 0.5   | 1.4   | 1.6   | 28.2  | 35.7  |   |   |
| LnGrp LOS                    | C   | A   | A   | A   | C   | D   |   |   |
| Approach Vol, veh/h          |   | 1577  | 824   |   | 77  |   |   |   |
| Approach Delay, s/veh        |   | 2.5   | 1.4   |   | 32.6  |   |   |   |
| Approach LOS                 |   | A   | A   |   | C   |   |   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7 | 8 |
| Assigned Phs                 |   | 2   |   | 4   | 5   | 6   |   |   |
| Phs Duration (G+Y+Rc), s     |   | 52.9  |   | 7.1   | 8.4   | 44.5  |   |   |
| Change Period (Y+Rc), s      |   | 6.0   |   | * 4.2   | * 4.2   | 6.0   |   |   |
| Max Green Setting (Gmax), s  |   | 26.8  |   | * 23  | * 6   | 16.6  |   |   |
| Max Q Clear Time (g_c+I1), s |   | 2.0   |   | 3.7   | 5.2   | 4.0   |   |   |
| Green Ext Time (p_c), s      |   | 13.1  |   | 0.2   | 0.0   | 8.5   |   |   |
| Intersection Summary         |   |   |   |   |   |   |   |   |
| HCM 2010 Ctrl Delay          |   |   | 3.1   |   |   |   |   |   |
| HCM 2010 LOS                 |   |   | A   |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 15: De Wolf Ave & Herndon Avenue

2035 + Proj PM Peak

4/3/2017











|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |  |  |  |  |   |
| Volume (vph)                      | 869   | 525   | 10  | 496   | 281   | 20  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 6.0   | 6.0   | 4.2   | 6.0   | 4.2   |   |
| Lane Util. Factor                 | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |   |
| Frt                               | 1.00  | 0.85  | 1.00  | 1.00  | 0.99  |   |
| Flt Protected                     | 1.00  | 1.00  | 0.95  | 1.00  | 0.96  |   |
| Satd. Flow (prot)                 | 1845  | 1568  | 1752  | 1845  | 1747  |   |
| Flt Permitted                     | 1.00  | 1.00  | 0.95  | 1.00  | 0.96  |   |
| Satd. Flow (perm)                 | 1845  | 1568  | 1752  | 1845  | 1747  |   |
| Peak-hour factor, PHF             | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  | 0.95  |
| Adj. Flow (vph)                   | 915   | 553   | 11  | 522   | 296   | 21  |
| RTOR Reduction (vph)              | 0   | 278   | 0   | 0   | 5   | 0   |
| Lane Group Flow (vph)             | 915   | 275   | 11  | 522   | 313   | 0   |
| Turn Type                         | NA  | Perm  | Prot  | NA  | Prot  |   |
| Protected Phases                  | 2   |   | 1   | 6   | 3   |   |
| Permitted Phases                  |   | 2   |   |   |   |   |
| Actuated Green, G (s)             | 29.8  | 29.8  | 0.8   | 34.8  | 15.0  |   |
| Effective Green, g (s)            | 29.8  | 29.8  | 0.8   | 34.8  | 15.0  |   |
| Actuated g/C Ratio                | 0.50  | 0.50  | 0.01  | 0.58  | 0.25  |   |
| Clearance Time (s)                | 6.0   | 6.0   | 4.2   | 6.0   | 4.2   |   |
| Vehicle Extension (s)             | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)                | 916   | 778   | 23  | 1070  | 436   |   |
| v/s Ratio Prot                    | c0.50   |   | 0.01  | c0.28   | c0.18   |   |
| v/s Ratio Perm                    |   | 0.18  |   |   |   |   |
| v/c Ratio                         | 1.00  | 0.35  | 0.48  | 0.49  | 0.72  |   |
| Uniform Delay, d1                 | 15.1  | 9.2   | 29.4  | 7.4   | 20.6  |   |
| Progression Factor                | 1.36  | 2.57  | 1.02  | 1.48  | 1.00  |   |
| Incremental Delay, d2             | 27.4  | 1.1   | 13.8  | 1.5   | 5.5   |   |
| Delay (s)                         | 47.8  | 24.8  | 43.9  | 12.4  | 26.1  |   |
| Level of Service                  | D   | C   | D   | B   | C   |   |
| Approach Delay (s)                | 39.1  |   |   | 13.1  | 26.1  |   |
| Approach LOS                      | D   |   |   | B   | C   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 31.4  |   | HCM 2000 Level of Service   | C   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.91  |   |   |   |
| Actuated Cycle Length (s)         |   |   | 60.0  |   | Sum of lost time (s)  | 14.4  |
| Intersection Capacity Utilization |   |   | 71.0%   |   | ICU Level of Service  | C   |
| Analysis Period (min)             |   |   | 15  |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |

# HCM Signalized Intersection Capacity Analysis

## 16: Leonard Ave & Herndon Avenue

2035 + Proj PM Peak

4/3/2017





















|                                   |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement                          | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations               |  |   |  |  |  |   |
| Volume (vph)                      | 835   | 34  | 2   | 428   | 194   | 10  |
| Ideal Flow (vphpl)                | 1900  | 1900  | 1900  | 1900  | 1900  | 1900  |
| Total Lost time (s)               | 4.5   |   | 4.2   | 6.0   | 4.2   |   |
| Lane Util. Factor                 | 1.00  |   | 1.00  | 1.00  | 1.00  |   |
| Frt                               | 0.99  |   | 1.00  | 1.00  | 0.99  |   |
| Flt Protected                     | 1.00  |   | 0.95  | 1.00  | 0.95  |   |
| Satd. Flow (prot)                 | 1835  |   | 1752  | 1845  | 1749  |   |
| Flt Permitted                     | 1.00  |   | 0.95  | 1.00  | 0.95  |   |
| Satd. Flow (perm)                 | 1835  |   | 1752  | 1845  | 1749  |   |
| Peak-hour factor, PHF             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Adj. Flow (vph)                   | 908   | 37  | 2   | 465   | 211   | 11  |
| RTOR Reduction (vph)              | 2   | 0   | 0   | 0   | 3   | 0   |
| Lane Group Flow (vph)             | 943   | 0   | 2   | 465   | 219   | 0   |
| Turn Type                         | NA  |   | Prot  | NA  | Prot  |   |
| Protected Phases                  | 2   |   | 1   | 6   | 3   |   |
| Permitted Phases                  |   |   |   |   |   |   |
| Actuated Green, G (s)             | 33.7  |   | 0.8   | 37.2  | 12.6  |   |
| Effective Green, g (s)            | 33.7  |   | 0.8   | 37.2  | 12.6  |   |
| Actuated g/C Ratio                | 0.56  |   | 0.01  | 0.62  | 0.21  |   |
| Clearance Time (s)                | 4.5   |   | 4.2   | 6.0   | 4.2   |   |
| Vehicle Extension (s)             | 3.0   |   | 3.0   | 3.0   | 3.0   |   |
| Lane Grp Cap (vph)                | 1030  |   | 23  | 1143  | 367   |   |
| v/s Ratio Prot                    | c0.51   |   | 0.00  | c0.25   | c0.13   |   |
| v/s Ratio Perm                    |   |   |   |   |   |   |
| v/c Ratio                         | 0.92  |   | 0.09  | 0.41  | 0.60  |   |
| Uniform Delay, d1                 | 11.9  |   | 29.2  | 5.8   | 21.4  |   |
| Progression Factor                | 2.09  |   | 0.80  | 1.66  | 1.00  |   |
| Incremental Delay, d2             | 7.1   |   | 1.4   | 0.9   | 2.6   |   |
| Delay (s)                         | 31.9  |   | 24.9  | 10.5  | 24.0  |   |
| Level of Service                  | C   |   | C   | B   | C   |   |
| Approach Delay (s)                | 31.9  |   |   | 10.6  | 24.0  |   |
| Approach LOS                      | C   |   |   | B   | C   |   |
| <b>Intersection Summary</b>       |   |   |   |   |   |   |
| HCM 2000 Control Delay            |   |   | 24.7  |   | HCM 2000 Level of Service   | C   |
| HCM 2000 Volume to Capacity ratio |   |   | 0.84  |   |   |   |
| Actuated Cycle Length (s)         |   |   | 60.0  |   | Sum of lost time (s)  | 12.9  |
| Intersection Capacity Utilization |   |   | 64.6%   |   | ICU Level of Service  | C   |
| Analysis Period (min)             |   |   | 15  |   |   |   |
| c Critical Lane Group             |   |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 17: McCall Ave & Herndon Avenue

2035 + Proj PM Peak

4/3/2017

|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |   |  |  |   |  |  |   |  |  |   |
| Volume (veh/h)  | 60  | 311   | 272   | 26  | 353   | 16  | 175  | 259   | 45  | 29  | 218   | 44  |
| Number  | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1900  | 1845  | 1845  | 1900  | 1845   | 1845  | 1900  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h  | 65  | 338   | 296   | 28  | 384   | 17  | 190  | 282   | 49  | 32  | 237   | 48  |
| Adj No. of Lanes  | 1   | 1   | 0   | 1   | 1   | 0   | 1  | 1   | 0   | 1   | 1   | 0   |
| Peak Hour Factor  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 94  | 452   | 396   | 59  | 837   | 37  | 218  | 414   | 72  | 61  | 270   | 55  |
| Arrive On Green   | 0.05  | 0.50  | 0.50  | 0.03  | 0.48  | 0.48  | 0.12   | 0.27  | 0.27  | 0.03  | 0.18  | 0.18  |
| Sat Flow, veh/h   | 1757  | 909   | 796   | 1757  | 1753  | 78  | 1757   | 1532  | 266   | 1757  | 1490  | 302   |
| Grp Volume(v), veh/h  | 65  | 0   | 634   | 28  | 0   | 401   | 190  | 0   | 331   | 32  | 0   | 285   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 0   | 1704  | 1757  | 0   | 1831  | 1757   | 0   | 1798  | 1757  | 0   | 1791  |
| Q Serve(g_s), s   | 4.4   | 0.0   | 35.7  | 1.9   | 0.0   | 17.6  | 12.7   | 0.0   | 19.8  | 2.1   | 0.0   | 18.6  |
| Cycle Q Clear(g_c), s   | 4.4   | 0.0   | 35.7  | 1.9   | 0.0   | 17.6  | 12.7   | 0.0   | 19.8  | 2.1   | 0.0   | 18.6  |
| Prop In Lane  | 1.00  |   | 0.47  | 1.00  |   | 0.04  | 1.00   |   | 0.15  | 1.00  |   | 0.17  |
| Lane Grp Cap(c), veh/h  | 94  | 0   | 847   | 59  | 0   | 874   | 218  | 0   | 486   | 61  | 0   | 324   |
| V/C Ratio(X)  | 0.69  | 0.00  | 0.75  | 0.48  | 0.00  | 0.46  | 0.87   | 0.00  | 0.68  | 0.53  | 0.00  | 0.88  |
| Avail Cap(c_a), veh/h   | 149   | 0   | 847   | 66  | 0   | 874   | 262  | 0   | 524   | 97  | 0   | 354   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 0.44  | 0.00  | 0.44  | 1.00  | 0.00  | 1.00  | 1.00   | 0.00  | 1.00  | 1.00  | 0.00  | 1.00  |
| Uniform Delay (d), s/veh  | 55.8  | 0.0   | 24.1  | 57.0  | 0.0   | 21.0  | 51.6   | 0.0   | 39.1  | 57.0  | 0.0   | 47.8  |
| Incr Delay (d2), s/veh  | 4.1   | 0.0   | 2.7   | 5.9   | 0.0   | 1.7   | 22.8   | 0.0   | 3.3   | 6.9   | 0.0   | 20.3  |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 2.2   | 0.0   | 17.4  | 1.0   | 0.0   | 9.3   | 7.6  | 0.0   | 10.3  | 1.2   | 0.0   | 11.0  |
| LnGrp Delay(d),s/veh  | 59.9  | 0.0   | 26.9  | 62.9  | 0.0   | 22.7  | 74.4   | 0.0   | 42.4  | 63.8  | 0.0   | 68.2  |
| LnGrp LOS   | E   |   | C   | E   |   | C   | E  |   | D   | E   |   | E   |
| Approach Vol, veh/h   |   | 699   |   |   | 429   |   |  | 521   |   |   | 317   |   |
| Approach Delay, s/veh   |   | 29.9  |   |   | 25.3  |   |  | 54.1  |   |   | 67.7  |   |
| Approach LOS  |   | C   |   |   | C   |   |  | D   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 8.2   | 65.7  | 19.1  | 27.0  | 10.6  | 63.3  | 8.4  | 37.8  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 6.0   | * 4.2   | 5.3   | * 4.2   | 6.0   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 4.5   | 54.2  | * 18  | 23.7  | * 10  | 48.5  | * 6.6  | 35.0  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 3.9   | 37.7  | 14.7  | 20.6  | 6.4   | 19.6  | 4.1  | 21.8  |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 5.5   | 0.2   | 1.1   | 0.0   | 6.7   | 0.0  | 3.2   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 41.4  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

| Intersection                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Intersection Delay, s/veh17.8 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Intersection LOS C            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Movement                      | EBU  | EBL  | EBT  | EBR  | WBU  | WBL  | WBT  | WBR  | NBU  | NBL  | NBT  | NBR  | SBU  | SBL  | SBT  | SBR  |
| Vol, veh/h                    | 0    | 8    | 23   | 327  | 0    | 16   | 10   | 1    | 0    | 317  | 259  | 21   | 0    | 2    | 199  | 6    |
| Peak Hour Factor              | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, %             | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
| Mvmt Flow                     | 0    | 9    | 25   | 355  | 0    | 17   | 11   | 1    | 0    | 345  | 282  | 23   | 0    | 2    | 216  | 7    |
| Number of Lanes               | 0    | 0    | 1    | 1    | 0    | 0    | 1    | 0    | 0    | 1    | 1    | 0    | 0    | 0    | 1    | 0    |

| Approach                   | EB   | WB   | NB   | SB   |
|----------------------------|------|------|------|------|
| Opposing Approach          | WB   | EB   | SB   | NB   |
| Opposing Lanes             | 1    | 2    | 1    | 2    |
| Conflicting Approach Left  | SB   | NB   | EB   | WB   |
| Conflicting Lanes Left     | 1    | 2    | 2    | 1    |
| Conflicting Approach Right | NB   | SB   | WB   | EB   |
| Conflicting Lanes Right    | 2    | 1    | 1    | 2    |
| HCM Control Delay          | 18.1 | 11.6 | 18.9 | 14.9 |
| HCM LOS                    | C    | B    | C    | B    |
























| Lane                   | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|-------|-------|
| Vol Left, %            | 100%  | 0%    | 26%   | 0%    | 59%   | 1%    |
| Vol Thru, %            | 0%    | 93%   | 74%   | 0%    | 37%   | 96%   |
| Vol Right, %           | 0%    | 7%    | 0%    | 100%  | 4%    | 3%    |
| Sign Control           | Stop  | Stop  | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 317   | 280   | 31    | 327   | 27    | 207   |
| LT Vol                 | 317   | 0     | 8     | 0     | 16    | 2     |
| Through Vol            | 0     | 259   | 23    | 0     | 10    | 199   |
| RT Vol                 | 0     | 21    | 0     | 327   | 1     | 6     |
| Lane Flow Rate         | 345   | 304   | 34    | 355   | 29    | 225   |
| Geometry Grp           | 7     | 7     | 7     | 7     | 6     | 6     |
| Degree of Util (X)     | 0.653 | 0.529 | 0.067 | 0.619 | 0.065 | 0.426 |
| Departure Headway (Hd) | 6.825 | 6.263 | 7.113 | 6.268 | 8.019 | 6.821 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 527   | 572   | 501   | 572   | 449   | 524   |
| Service Time           | 4.595 | 4.033 | 4.886 | 4.041 | 6.019 | 4.899 |
| HCM Lane V/C Ratio     | 0.655 | 0.531 | 0.068 | 0.621 | 0.065 | 0.429 |
| HCM Control Delay      | 21.6  | 15.9  | 10.4  | 18.8  | 11.6  | 14.9  |
| HCM Lane LOS           | C     | C     | B     | C     | B     | B     |
| HCM 95th-tile Q        | 4.7   | 3.1   | 0.2   | 4.2   | 0.2   | 2.1   |

# HCM 2010 Signalized Intersection Summary

## 20: Locan Avenue & Bullard Avenue

2035 + Proj PM Peak

4/6/2017























|   |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement  | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations   |  |  |  |  |  |   |  |  |  |  |  |  |
| Volume (veh/h)  | 68  | 690   | 85  | 47  | 735   | 73  | 72   | 118   | 52  | 169   | 503   | 182   |
| Number  | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh   | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)   | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln  | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1845  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h  | 74  | 750   | 92  | 51  | 799   | 79  | 78   | 128   | 57  | 184   | 547   | 198   |
| Adj No. of Lanes  | 1   | 2   | 1   | 1   | 2   | 0   | 1  | 1   | 1   | 1   | 1   | 0   |
| Peak Hour Factor  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %  | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h  | 1070  | 2988  | 1337  | 65  | 838   | 83  | 100  | 647   | 550   | 221   | 528   | 191   |
| Arrive On Green   | 0.61  | 0.85  | 0.85  | 0.04  | 0.26  | 0.26  | 0.06   | 0.35  | 0.35  | 0.13  | 0.41  | 0.41  |
| Sat Flow, veh/h   | 1757  | 3505  | 1568  | 1757  | 3222  | 319   | 1757   | 1845  | 1568  | 1757  | 1294  | 468   |
| Grp Volume(v), veh/h  | 74  | 750   | 92  | 51  | 434   | 444   | 78   | 128   | 57  | 184   | 0   | 745   |
| Grp Sat Flow(s),veh/h/ln  | 1757  | 1752  | 1568  | 1757  | 1752  | 1788  | 1757   | 1845  | 1568  | 1757  | 0   | 1762  |
| Q Serve(g_s), s   | 1.5   | 3.6   | 3.1   | 2.6   | 22.0  | 22.0  | 3.9  | 4.4   | 2.2   | 9.2   | 0.0   | 36.7  |
| Cycle Q Clear(g_c), s   | 1.5   | 3.6   | 3.1   | 2.6   | 22.0  | 22.0  | 3.9  | 4.4   | 2.2   | 9.2   | 0.0   | 36.7  |
| Prop In Lane  | 1.00  |   | 1.00  | 1.00  |   | 0.18  | 1.00   |   | 1.00  | 1.00  |   | 0.27  |
| Lane Grp Cap(c), veh/h  | 1070  | 2988  | 1337  | 65  | 456   | 465   | 100  | 647   | 550   | 221   | 0   | 719   |
| V/C Ratio(X)  | 0.07  | 0.25  | 0.07  | 0.79  | 0.95  | 0.95  | 0.78   | 0.20  | 0.10  | 0.83  | 0.00  | 1.04  |
| Avail Cap(c_a), veh/h   | 1070  | 2988  | 1337  | 80  | 456   | 465   | 102  | 647   | 550   | 355   | 0   | 719   |
| HCM Platoon Ratio   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 0.91  | 0.00  | 0.91  |
| Uniform Delay (d), s/veh  | 7.2   | 1.2   | 14.5  | 43.0  | 32.8  | 32.8  | 41.9   | 20.4  | 19.7  | 38.4  | 0.0   | 26.7  |
| Incr Delay (d2), s/veh  | 0.0   | 0.2   | 0.1   | 33.4  | 32.0  | 31.7  | 31.5   | 0.1   | 0.1   | 8.0   | 0.0   | 41.9  |
| Initial Q Delay(d3),s/veh   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln  | 0.7   | 1.8   | 1.4   | 1.9   | 14.7  | 14.9  | 2.8  | 2.2   | 1.0   | 4.9   | 0.0   | 26.1  |
| LnGrp Delay(d),s/veh  | 7.2   | 1.4   | 14.6  | 76.4  | 64.8  | 64.4  | 73.4   | 20.5  | 19.8  | 46.4  | 0.0   | 68.5  |
| LnGrp LOS   | A   | A   | B   | E   | E   | E   | E  | C   | B   | D   |   | F   |
| Approach Vol, veh/h   |   | 916   |   |   | 929   |   |  | 263   |   |   | 929   |   |
| Approach Delay, s/veh   |   | 3.2   |   |   | 65.3  |   |  | 36.1  |   |   | 64.1  |   |
| Approach LOS  |   | A   |   |   | E   |   |  | D   |   |   | E   |   |
| Timer   | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs  | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s  | 7.5   | 83.4  | 10.4  | 42.0  | 61.6  | 29.4  | 15.5   | 36.9  |   |   |   |   |
| Change Period (Y+Rc), s   | * 4.2   | 6.0   | 5.3   | * 5.3   | 6.0   | * 6   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s   | * 4.1   | 24.3  | 5.2   | * 37  | 5.0   | * 23  | * 18   | 23.7  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s  | 4.6   | 5.6   | 5.9   | 38.7  | 3.5   | 24.0  | 11.2   | 6.4   |   |   |   |   |
| Green Ext Time (p_c), s   | 0.0   | 4.7   | 0.0   | 0.0   | 0.1   | 0.0   | 0.3  | 0.9   |   |   |   |   |
| <b>Intersection Summary</b>   |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay   |   |   | 43.7  |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS  |   |   | D   |   |   |   |  |   |   |   |   |   |
| <b>Notes</b>  |   |   |   |   |   |   |  |   |   |   |   |   |
| * HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier. |   |   |   |   |   |   |  |   |   |   |   |   |

# HCM 2010 Signalized Intersection Summary

## 21: De Wolf Ave & Bullard Avenue

2035 + Proj PM Peak

4/3/2017

|                              |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement                     | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations          |  |  |  |  |  |   |  |  |   |  |  |  |
| Volume (veh/h)               | 64  | 553   | 313   | 45  | 512   | 22  | 188  | 325   | 71  | 48  | 297   | 89  |
| Number                       | 5   | 2   | 12  | 1   | 6   | 16  | 3  | 8   | 18  | 7   | 4   | 14  |
| Initial Q (Qb), veh          | 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   |
| Ped-Bike Adj(A_pbT)          | 1.00  |   | 1.00  | 1.00  |   | 1.00  | 1.00   |   | 1.00  | 1.00  |   | 1.00  |
| Parking Bus, Adj             | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Adj Sat Flow, veh/h/ln       | 1845  | 1845  | 1845  | 1845  | 1845  | 1900  | 1845   | 1845  | 1900  | 1845  | 1845  | 1900  |
| Adj Flow Rate, veh/h         | 70  | 601   | 340   | 49  | 557   | 24  | 204  | 353   | 77  | 52  | 323   | 97  |
| Adj No. of Lanes             | 1   | 1   | 1   | 1   | 1   | 0   | 1  | 1   | 0   | 1   | 1   | 0   |
| Peak Hour Factor             | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Percent Heavy Veh, %         | 3   | 3   | 3   | 3   | 3   | 3   | 3  | 3   | 3   | 3   | 3   | 3   |
| Cap, veh/h                   | 89  | 704   | 598   | 62  | 642   | 28  | 230  | 491   | 107   | 66  | 329   | 99  |
| Arrive On Green              | 0.05  | 0.38  | 0.38  | 0.04  | 0.37  | 0.37  | 0.13   | 0.33  | 0.33  | 0.04  | 0.24  | 0.24  |
| Sat Flow, veh/h              | 1757  | 1845  | 1568  | 1757  | 1756  | 76  | 1757   | 1468  | 320   | 1757  | 1363  | 409   |
| Grp Volume(v), veh/h         | 70  | 601   | 340   | 49  | 0   | 581   | 204  | 0   | 430   | 52  | 0   | 420   |
| Grp Sat Flow(s),veh/h/ln     | 1757  | 1845  | 1568  | 1757  | 0   | 1831  | 1757   | 0   | 1788  | 1757  | 0   | 1772  |
| Q Serve(g_s), s              | 3.5   | 26.9  | 15.4  | 2.5   | 0.0   | 26.5  | 10.3   | 0.0   | 19.0  | 2.6   | 0.0   | 21.2  |
| Cycle Q Clear(g_c), s        | 3.5   | 26.9  | 15.4  | 2.5   | 0.0   | 26.5  | 10.3   | 0.0   | 19.0  | 2.6   | 0.0   | 21.2  |
| Prop In Lane                 | 1.00  |   | 1.00  | 1.00  |   | 0.04  | 1.00   |   | 0.18  | 1.00  |   | 0.23  |
| Lane Grp Cap(c), veh/h       | 89  | 704   | 598   | 62  | 0   | 670   | 230  | 0   | 598   | 66  | 0   | 427   |
| V/C Ratio(X)                 | 0.78  | 0.85  | 0.57  | 0.79  | 0.00  | 0.87  | 0.89   | 0.00  | 0.72  | 0.79  | 0.00  | 0.98  |
| Avail Cap(c_a), veh/h        | 98  | 704   | 598   | 78  | 0   | 670   | 230  | 0   | 598   | 102   | 0   | 427   |
| HCM Platoon Ratio            | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00   | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| Upstream Filter(I)           | 1.00  | 1.00  | 1.00  | 1.00  | 0.00  | 1.00  | 1.00   | 0.00  | 1.00  | 0.87  | 0.00  | 0.87  |
| Uniform Delay (d), s/veh     | 42.2  | 25.5  | 22.0  | 43.1  | 0.0   | 26.5  | 38.4   | 0.0   | 26.2  | 43.0  | 0.0   | 34.0  |
| Incr Delay (d2), s/veh       | 30.7  | 12.6  | 3.9   | 33.8  | 0.0   | 14.2  | 31.0   | 0.0   | 4.2   | 17.5  | 0.0   | 35.9  |
| Initial Q Delay(d3),s/veh    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| %ile BackOfQ(50%),veh/ln     | 2.5   | 16.1  | 7.3   | 1.8   | 0.0   | 16.0  | 7.0  | 0.0   | 10.0  | 1.6   | 0.0   | 14.7  |
| LnGrp Delay(d),s/veh         | 72.9  | 38.1  | 25.9  | 76.8  | 0.0   | 40.7  | 69.4   | 0.0   | 30.4  | 60.5  | 0.0   | 69.9  |
| LnGrp LOS                    | E   | D   | C   | E   |   | D   | E  |   | C   | E   |   | E   |
| Approach Vol, veh/h          | 1011  |   |   |   | 630   |   |  | 634   |   |   | 472   |   |
| Approach Delay, s/veh        | 36.4  |   |   |   | 43.5  |   |  | 42.9  |   |   | 68.9  |   |
| Approach LOS                 | D   |   |   |   | D   |   |  | D   |   |   | E   |   |
| Timer                        | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Assigned Phs                 | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   |   |   |   |   |
| Phs Duration (G+Y+Rc), s     | 7.4   | 39.6  | 16.0  | 27.0  | 8.8   | 38.2  | 7.6  | 35.4  |   |   |   |   |
| Change Period (Y+Rc), s      | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2   | 5.3   | * 4.2  | 5.3   |   |   |   |   |
| Max Green Setting (Gmax), s  | * 4   | 33.5  | * 12  | 21.7  | * 5   | 32.5  | * 5.2  | 28.3  |   |   |   |   |
| Max Q Clear Time (g_c+I1), s | 4.5   | 28.9  | 12.3  | 23.2  | 5.5   | 28.5  | 4.6  | 21.0  |   |   |   |   |
| Green Ext Time (p_c), s      | 0.0   | 3.0   | 0.0   | 0.0   | 0.0   | 2.7   | 0.0  | 2.9   |   |   |   |   |
| Intersection Summary         |   |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 Ctrl Delay          | 45.1  |   |   |   |   |   |  |   |   |   |   |   |
| HCM 2010 LOS                 | D   |   |   |   |   |   |  |   |   |   |   |   |
| Notes                        |   |   |   |   |   |   |  |   |   |   |   |   |



Intersection: 1: Temperance Ave & Nees Ave

| Movement              | EB   | EB  | EB  | WB   | WB  | WB  | NB   | NB | NB | NB   | SB  | SB  |
|-----------------------|------|-----|-----|------|-----|-----|------|----|----|------|-----|-----|
| Directions Served     | L    | T   | R   | L    | T   | R   | UL   | T  | T  | R    | L   | T   |
| Maximum Queue (ft)    | 127  | 174 | 165 | 169  | 280 | 105 | 269  | 62 | 81 | 43   | 370 | 879 |
| Average Queue (ft)    | 61   | 45  | 73  | 111  | 84  | 14  | 155  | 27 | 13 | 9    | 127 | 299 |
| 95th Queue (ft)       | 113  | 112 | 132 | 174  | 191 | 46  | 259  | 56 | 46 | 28   | 307 | 694 |
| Link Distance (ft)    | 1573 |     |     | 1457 |     |     | 2685 |    |    | 2685 |     |     |
| Upstream Blk Time (%) |      |     |     |      |     |     |      |    |    |      |     |     |
| Queuing Penalty (veh) |      |     |     |      |     |     |      |    |    |      |     |     |
| Storage Bay Dist (ft) | 240  |     | 80  | 100  |     | 25  | 240  |    |    | 120  | 250 |     |
| Storage Blk Time (%)  |      | 2   | 11  | 23   | 53  | 2   | 1    |    |    |      |     | 17  |
| Queuing Penalty (veh) |      | 6   | 19  | 22   | 111 | 6   | 1    |    |    |      |     | 17  |

Intersection: 1: Temperance Ave & Nees Ave

| Movement              | SB   | SB  |
|-----------------------|------|-----|
| Directions Served     | T    | R   |
| Maximum Queue (ft)    | 960  | 185 |
| Average Queue (ft)    | 311  | 120 |
| 95th Queue (ft)       | 715  | 229 |
| Link Distance (ft)    | 1298 |     |
| Upstream Blk Time (%) |      |     |
| Queuing Penalty (veh) |      |     |
| Storage Bay Dist (ft) |      | 95  |
| Storage Blk Time (%)  | 43   | 1   |
| Queuing Penalty (veh) | 109  | 3   |

Intersection: 3: Temperance Ave & SR 168 WB Ramp

| Movement              | WB  | WB  | NB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R   | T   | T   | R   | T   | T   | R   |
| Maximum Queue (ft)    | 493 | 478 | 353 | 577 | 533 | 462 | 448 | 78  |
| Average Queue (ft)    | 290 | 105 | 160 | 366 | 36  | 372 | 319 | 27  |
| 95th Queue (ft)       | 480 | 316 | 304 | 571 | 255 | 614 | 588 | 70  |
| Link Distance (ft)    | 478 |     | 587 | 587 | 587 | 430 | 430 | 430 |
| Upstream Blk Time (%) | 4   | 0   |     | 0   |     | 56  | 18  |     |
| Queuing Penalty (veh) | 0   | 0   |     | 0   |     | 286 | 91  |     |
| Storage Bay Dist (ft) |     | 385 |     |     |     |     |     |     |
| Storage Blk Time (%)  | 14  |     |     |     |     |     |     |     |
| Queuing Penalty (veh) | 16  |     |     |     |     |     |     |     |

Intersection: 4: Temperance Ave & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | EB  | NB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | R   | R   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 500 | 644 | 644 | 500 | 535 | 549 | 540 | 370 | 618 | 652 |
| Average Queue (ft)    | 66  | 572 | 598 | 460 | 246 | 431 | 442 | 174 | 556 | 440 |
| 95th Queue (ft)       | 285 | 805 | 755 | 635 | 558 | 627 | 635 | 440 | 790 | 795 |
| Link Distance (ft)    |     | 610 | 610 |     | 510 | 510 | 510 |     | 587 | 587 |
| Upstream Blk Time (%) |     | 52  | 80  |     | 0   | 8   | 15  |     | 58  | 21  |
| Queuing Penalty (veh) |     | 0   | 0   |     | 0   | 52  | 104 |     | 308 | 110 |
| Storage Bay Dist (ft) | 380 |     |     | 380 |     |     |     | 250 |     |     |
| Storage Blk Time (%)  |     |     | 90  | 11  |     |     |     |     | 75  |     |
| Queuing Penalty (veh) |     |     | 370 | 44  |     |     |     |     | 75  |     |

Intersection: 5: Temperance Ave & Fir Ave

| Movement              | EB  | EB  | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  | NB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T   | R   | L   | T   | R   | UL  | T   | T   | T   | R   | UL  |
| Maximum Queue (ft)    | 110 | 43  | 85  | 174 | 281 | 132 | 194 | 542 | 544 | 563 | 255 | 310 |
| Average Queue (ft)    | 37  | 9   | 39  | 108 | 28  | 61  | 80  | 221 | 267 | 292 | 115 | 309 |
| 95th Queue (ft)       | 80  | 28  | 65  | 173 | 148 | 109 | 171 | 464 | 482 | 514 | 279 | 311 |
| Link Distance (ft)    |     | 537 | 537 |     | 343 | 343 |     | 528 | 528 | 528 |     |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     | 5   | 5   | 5   |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     | 33  | 31  | 29  |     |     |
| Storage Bay Dist (ft) | 130 |     |     | 130 |     |     | 100 |     |     |     | 105 | 225 |
| Storage Blk Time (%)  | 0   |     |     | 13  |     |     | 5   | 29  |     | 45  | 0   | 94  |
| Queuing Penalty (veh) | 0   |     |     | 1   |     |     | 29  | 21  |     | 67  | 0   | 437 |

Intersection: 5: Temperance Ave & Fir Ave

| Movement              | SB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | L   | T   | T   | R   |
| Maximum Queue (ft)    | 395 | 557 | 281 | 77  |
| Average Queue (ft)    | 394 | 544 | 75  | 11  |
| 95th Queue (ft)       | 397 | 566 | 212 | 44  |
| Link Distance (ft)    |     | 537 | 537 | 537 |
| Upstream Blk Time (%) |     | 57  |     |     |
| Queuing Penalty (veh) |     | 293 |     |     |
| Storage Bay Dist (ft) | 225 |     |     |     |
| Storage Blk Time (%)  | 67  | 7   |     |     |
| Queuing Penalty (veh) | 311 | 51  |     |     |

Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | B60 | B60 | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|-----|-----|
| Directions Served     | ULTR | T   |     | LTR | LTR | LTR |
| Maximum Queue (ft)    | 161  | 383 | 365 | 31  | 55  | 31  |
| Average Queue (ft)    | 96   | 86  | 24  | 6   | 16  | 1   |
| 95th Queue (ft)       | 194  | 322 | 172 | 27  | 45  | 10  |
| Link Distance (ft)    | 70   | 343 | 343 | 230 | 785 | 335 |
| Upstream Blk Time (%) | 16   | 1   | 0   |     |     |     |
| Queuing Penalty (veh) | 145  | 5   | 1   |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | WB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 131 | 219  | 206  | 178  | 67  | 200 | 331 | 341 | 410 | 164 | 425 | 340 |
| Average Queue (ft)    | 70  | 142  | 120  | 63   | 28  | 122 | 140 | 159 | 184 | 146 | 184 | 105 |
| 95th Queue (ft)       | 116 | 206  | 187  | 163  | 56  | 201 | 251 | 272 | 324 | 186 | 350 | 255 |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 640 | 640 | 640 |     | 441 | 441 |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     | 0   |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     | 0   |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     |     | 105 |     |     |
| Storage Blk Time (%)  |     |      |      | 1    |     | 28  | 19  |     |     | 32  | 6   | 0   |
| Queuing Penalty (veh) |     |      |      | 1    |     | 98  | 40  |     |     | 51  | 20  | 0   |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | NB  | SB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | R   | L   | T    | T    | R   |
| Maximum Queue (ft)    | 39  | 164 | 182  | 182  | 140 |
| Average Queue (ft)    | 9   | 74  | 107  | 95   | 45  |
| 95th Queue (ft)       | 28  | 135 | 160  | 166  | 97  |
| Link Distance (ft)    |     |     | 2399 | 2399 |     |
| Upstream Blk Time (%) |     |     |      |      |     |
| Queuing Penalty (veh) |     |     |      |      |     |
| Storage Bay Dist (ft) | 130 | 100 |      |      | 80  |
| Storage Blk Time (%)  |     | 3   | 16   | 15   | 0   |
| Queuing Penalty (veh) |     | 4   | 13   | 15   | 0   |

Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | NE |
|-----------------------|-----|----|
| Directions Served     | L   | R  |
| Maximum Queue (ft)    | 22  | 65 |
| Average Queue (ft)    | 1   | 34 |
| 95th Queue (ft)       | 7   | 56 |
| Link Distance (ft)    | 777 |    |
| Upstream Blk Time (%) |     |    |
| Queuing Penalty (veh) |     |    |
| Storage Bay Dist (ft) | 400 |    |
| Storage Blk Time (%)  |     |    |
| Queuing Penalty (veh) |     |    |

Intersection: 9: Temperance Ave & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 264 | 354 | 567  | 400  | 280 | 55  | 255 | 534 | 691 | 725 | 570 | 162 |
| Average Queue (ft)    | 144 | 210 | 195  | 159  | 42  | 17  | 91  | 317 | 352 | 309 | 253 | 92  |
| 95th Queue (ft)       | 276 | 346 | 393  | 300  | 125 | 48  | 249 | 476 | 538 | 565 | 519 | 165 |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 175 | 175 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  | 7   | 37  | 10   | 9    |     |     |     | 37  |     | 0   | 7   |     |
| Queuing Penalty (veh) | 17  | 96  | 24   | 13   |     |     |     | 25  |     | 1   | 28  |     |

Intersection: 9: Temperance Ave & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB   | SB  | SB  | SB  | SB  | SB |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|----|
| Directions Served     | L   | T    | T    | R    | L   | L   | T   | T   | R  |
| Maximum Queue (ft)    | 400 | 2789 | 2789 | 240  | 259 | 329 | 109 | 145 | 84 |
| Average Queue (ft)    | 305 | 1963 | 2016 | 173  | 148 | 164 | 44  | 55  | 24 |
| 95th Queue (ft)       | 530 | 3335 | 3338 | 321  | 240 | 261 | 93  | 104 | 57 |
| Link Distance (ft)    |     |      | 2737 | 2737 |     |     | 528 | 528 |    |
| Upstream Blk Time (%) |     |      | 26   | 27   |     |     |     |     |    |
| Queuing Penalty (veh) |     |      | 0    | 0    |     |     |     |     |    |
| Storage Bay Dist (ft) | 230 |      |      | 100  | 175 | 175 |     |     |    |
| Storage Blk Time (%)  | 0   | 28   | 67   | 2    | 3   | 5   |     |     |    |
| Queuing Penalty (veh) | 0   | 69   | 95   | 13   | 6   | 12  |     |     |    |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB  | WB  | WB  | WB  | WB  | WB  | B59 | NB  | SB |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| Directions Served     | UL  | T   | T   | TR  | L   | T   | T   | T   | R   | T   | LTR | LT |
| Maximum Queue (ft)    | 227 | 257 | 268 | 40  | 284 | 298 | 288 | 358 | 220 | 50  | 245 | 78 |
| Average Queue (ft)    | 140 | 70  | 99  | 13  | 29  | 185 | 191 | 215 | 47  | 3   | 136 | 30 |
| 95th Queue (ft)       | 223 | 180 | 233 | 37  | 116 | 291 | 288 | 329 | 147 | 20  | 224 | 67 |
| Link Distance (ft)    |     | 997 | 997 | 997 |     | 286 | 286 | 286 |     | 644 | 355 | 0  |
| Upstream Blk Time (%) |     |     |     |     | 0   | 1   | 1   | 2   |     |     |     | 40 |
| Queuing Penalty (veh) |     |     |     |     | 0   | 3   | 4   | 10  |     |     |     | 19 |
| Storage Bay Dist (ft) | 145 |     |     |     | 190 |     |     |     | 120 |     |     |    |
| Storage Blk Time (%)  | 15  | 2   |     |     |     | 6   |     | 23  |     |     |     |    |
| Queuing Penalty (veh) | 34  | 4   |     |     |     | 2   |     | 23  |     |     |     |    |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | SB |
|-----------------------|----|
| Directions Served     | R  |
| Maximum Queue (ft)    | 82 |
| Average Queue (ft)    | 23 |
| 95th Queue (ft)       | 54 |
| Link Distance (ft)    | 0  |
| Upstream Blk Time (%) | 11 |
| Queuing Penalty (veh) | 5  |
| Storage Bay Dist (ft) |    |
| Storage Blk Time (%)  |    |
| Queuing Penalty (veh) |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  | NB | NB |
|-----------------------|-----|-----|-----|-----|----|----|
| Directions Served     | T   | R   | L   | T   | L  | R  |
| Maximum Queue (ft)    | 55  | 74  | 69  | 32  | 73 | 82 |
| Average Queue (ft)    | 20  | 20  | 34  | 22  | 22 | 27 |
| 95th Queue (ft)       | 47  | 59  | 59  | 45  | 68 | 66 |
| Link Distance (ft)    | 785 |     |     | 364 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     |     | 0  | 0  |
| Queuing Penalty (veh) |     |     |     |     | 0  | 0  |
| Storage Bay Dist (ft) |     | 100 | 100 |     |    |    |
| Storage Blk Time (%)  |     |     |     |     |    |    |
| Queuing Penalty (veh) |     |     |     |     |    |    |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | EB  | WB  | SB  |
|-----------------------|-----|-----|-----|
| Directions Served     | L   | TR  | R   |
| Maximum Queue (ft)    | 26  | 38  | 31  |
| Average Queue (ft)    | 3   | 1   | 5   |
| 95th Queue (ft)       | 15  | 13  | 24  |
| Link Distance (ft)    |     | 482 | 903 |
| Upstream Blk Time (%) |     |     |     |
| Queuing Penalty (veh) |     |     |     |
| Storage Bay Dist (ft) | 100 |     |     |
| Storage Blk Time (%)  |     |     |     |
| Queuing Penalty (veh) |     |     |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | WB  | WB   | WB   | NB   | NB  |
|-----------------------|-----|-----|-----|-----|------|------|------|-----|
| Directions Served     | T   | T   | R   | L   | T    | T    | L    | R   |
| Maximum Queue (ft)    | 322 | 312 | 95  | 369 | 498  | 506  | 1041 | 370 |
| Average Queue (ft)    | 119 | 110 | 43  | 64  | 232  | 259  | 419  | 65  |
| 95th Queue (ft)       | 261 | 250 | 86  | 177 | 433  | 454  | 726  | 263 |
| Link Distance (ft)    | 482 | 482 |     |     | 2004 | 2004 | 5181 |     |
| Upstream Blk Time (%) |     |     |     |     |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 250 | 250 |      |      |      | 250 |
| Storage Blk Time (%)  |     | 1   |     |     | 9    |      | 21   |     |
| Queuing Penalty (veh) |     | 1   |     |     | 6    |      | 13   |     |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB  | EB   | EB   | WB  | WB  | WB  | SB  | SB   |
|-----------------------|-----|------|------|-----|-----|-----|-----|------|
| Directions Served     | L   | T    | T    | T   | T   | R   | L   | R    |
| Maximum Queue (ft)    | 119 | 158  | 174  | 292 | 292 | 31  | 90  | 93   |
| Average Queue (ft)    | 45  | 17   | 16   | 48  | 58  | 6   | 16  | 27   |
| 95th Queue (ft)       | 100 | 70   | 72   | 152 | 170 | 24  | 51  | 62   |
| Link Distance (ft)    |     | 2004 | 2004 | 544 | 544 |     |     | 2509 |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |      |
| Storage Bay Dist (ft) | 250 |      |      |     |     | 250 | 250 |      |
| Storage Blk Time (%)  |     |      |      |     | 1   |     |     |      |
| Queuing Penalty (veh) |     |      |      |     | 0   |     |     |      |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | EB  | EB  | WB  | WB   | NB   |
|-----------------------|-----|-----|-----|------|------|
| Directions Served     | T   | R   | L   | T    | LR   |
| Maximum Queue (ft)    | 200 | 75  | 31  | 276  | 319  |
| Average Queue (ft)    | 54  | 26  | 5   | 145  | 204  |
| 95th Queue (ft)       | 137 | 59  | 22  | 256  | 315  |
| Link Distance (ft)    | 544 | 544 |     | 2676 | 5209 |
| Upstream Blk Time (%) |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |      |      |
| Storage Bay Dist (ft) |     |     | 250 |      |      |
| Storage Blk Time (%)  |     |     |     | 1    |      |
| Queuing Penalty (veh) |     |     |     | 0    |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | EB   | WB  | WB   | NB   |
|-----------------------|------|-----|------|------|
| Directions Served     | TR   | L   | T    | LR   |
| Maximum Queue (ft)    | 142  | 29  | 274  | 226  |
| Average Queue (ft)    | 42   | 1   | 95   | 111  |
| 95th Queue (ft)       | 114  | 10  | 183  | 185  |
| Link Distance (ft)    | 2676 |     | 4507 | 2478 |
| Upstream Blk Time (%) |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |      |
| Storage Bay Dist (ft) |      | 250 |      |      |
| Storage Blk Time (%)  |      |     | 0    |      |
| Queuing Penalty (veh) |      |     | 0    |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | EB  | EB   | WB  | WB   | NB  | NB   | SB  | SB   |
|-----------------------|-----|------|-----|------|-----|------|-----|------|
| Directions Served     | L   | TR   | L   | TR   | L   | TR   | L   | TR   |
| Maximum Queue (ft)    | 95  | 265  | 94  | 295  | 320 | 140  | 113 | 283  |
| Average Queue (ft)    | 22  | 62   | 36  | 140  | 146 | 66   | 27  | 179  |
| 95th Queue (ft)       | 63  | 157  | 72  | 252  | 240 | 123  | 69  | 259  |
| Link Distance (ft)    |     | 4507 |     | 6429 |     | 2404 |     | 2046 |
| Upstream Blk Time (%) |     |      |     |      |     |      |     |      |
| Queuing Penalty (veh) |     |      |     |      |     |      |     |      |
| Storage Bay Dist (ft) | 250 |      | 250 |      | 250 |      | 250 |      |
| Storage Blk Time (%)  |     | 0    |     | 2    | 1   |      |     | 2    |
| Queuing Penalty (veh) |     | 0    |     | 1    | 1   |      |     | 0    |

Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | EB  | WB   | NB  | NB   | SB   |
|-----------------------|------|-----|------|-----|------|------|
| Directions Served     | LT   | R   | LTR  | L   | TR   | LTR  |
| Maximum Queue (ft)    | 56   | 75  | 52   | 91  | 61   | 98   |
| Average Queue (ft)    | 7    | 44  | 23   | 41  | 38   | 56   |
| 95th Queue (ft)       | 30   | 73  | 44   | 67  | 56   | 85   |
| Link Distance (ft)    | 6429 |     | 2715 |     | 2301 | 2072 |
| Upstream Blk Time (%) |      |     |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |     |      |      |
| Storage Bay Dist (ft) |      | 250 |      | 250 |      |      |
| Storage Blk Time (%)  |      |     |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |     |      |      |

Intersection: 19: Temperance Ave & New Access Road

| Movement              | WB  | NB  | NB  | NB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Directions Served     | R   | T   | T   | TR  | T   | T   |
| Maximum Queue (ft)    | 508 | 248 | 484 | 483 | 535 | 523 |
| Average Queue (ft)    | 252 | 12  | 80  | 98  | 501 | 195 |
| 95th Queue (ft)       | 536 | 88  | 285 | 326 | 668 | 539 |
| Link Distance (ft)    | 493 | 537 | 537 | 537 | 510 | 510 |
| Upstream Blk Time (%) | 7   |     |     |     | 54  | 1   |
| Queuing Penalty (veh) | 0   |     |     |     | 477 | 13  |
| Storage Bay Dist (ft) |     |     |     |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |

Intersection: 20: Locan Avenue & Bullard Avenue

| Movement              | EB  | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB   | NB  | SB  | SB   |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|------|-----|-----|------|
| Directions Served     | L   | T    | T    | R   | L   | T   | TR  | L   | T    | R   | L   | TR   |
| Maximum Queue (ft)    | 75  | 159  | 74   | 89  | 47  | 272 | 308 | 175 | 301  | 20  | 290 | 338  |
| Average Queue (ft)    | 41  | 79   | 27   | 27  | 18  | 174 | 209 | 91  | 177  | 3   | 163 | 184  |
| 95th Queue (ft)       | 73  | 127  | 61   | 64  | 44  | 265 | 307 | 180 | 271  | 14  | 257 | 300  |
| Link Distance (ft)    |     | 2614 | 2614 |     |     | 916 | 916 |     | 2593 |     |     | 5181 |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |      |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |      |     |     |      |
| Storage Bay Dist (ft) | 270 |      |      | 250 | 260 |     |     | 125 |      | 250 | 250 |      |
| Storage Blk Time (%)  |     |      |      |     |     | 0   |     | 2   | 20   |     | 3   | 3    |
| Queuing Penalty (veh) |     |      |      |     |     | 0   |     | 6   | 22   |     | 12  | 8    |



Intersection: 21: De Wolf Ave & Bullard Avenue

| Movement              | EB  | EB   | EB  | WB  | WB   | NB  | NB   | SB  | SB   |
|-----------------------|-----|------|-----|-----|------|-----|------|-----|------|
| Directions Served     | L   | T    | R   | L   | TR   | L   | TR   | L   | TR   |
| Maximum Queue (ft)    | 131 | 180  | 123 | 370 | 1231 | 370 | 985  | 72  | 204  |
| Average Queue (ft)    | 64  | 73   | 72  | 65  | 628  | 211 | 464  | 19  | 106  |
| 95th Queue (ft)       | 118 | 146  | 119 | 264 | 1034 | 417 | 842  | 56  | 204  |
| Link Distance (ft)    |     | 1646 |     |     | 2616 |     | 2599 |     | 5209 |
| Upstream Blk Time (%) |     |      |     |     |      |     |      |     |      |
| Queuing Penalty (veh) |     |      |     |     |      |     |      |     |      |
| Storage Bay Dist (ft) | 250 |      | 250 | 250 |      | 250 |      | 250 |      |
| Storage Blk Time (%)  |     |      |     |     | 49   |     | 35   |     |      |
| Queuing Penalty (veh) |     |      |     |     | 13   |     | 58   |     |      |

Network Summary

Network wide Queuing Penalty: 5268

Intersection: 1: Temperance Ave & Nees Ave

| Movement              | EB   | EB  | EB  | WB   | WB  | WB  | NB   | NB  | NB  | NB   | SB  | SB  |      |
|-----------------------|------|-----|-----|------|-----|-----|------|-----|-----|------|-----|-----|------|
| Directions Served     | L    | T   | R   | L    | T   | R   | UL   | T   | T   | R    | L   | T   |      |
| Maximum Queue (ft)    | 276  | 206 | 158 | 170  | 512 | 105 | 304  | 326 | 304 | 229  | 96  | 237 |      |
| Average Queue (ft)    | 132  | 44  | 66  | 126  | 127 | 37  | 151  | 77  | 76  | 32   | 36  | 129 |      |
| 95th Queue (ft)       | 222  | 120 | 114 | 186  | 323 | 86  | 264  | 206 | 180 | 119  | 78  | 212 |      |
| Link Distance (ft)    | 1573 |     |     | 1457 |     |     | 2685 |     |     | 2685 |     |     | 1298 |
| Upstream Blk Time (%) |      |     |     |      |     |     |      |     |     |      |     |     |      |
| Queuing Penalty (veh) |      |     |     |      |     |     |      |     |     |      |     |     |      |
| Storage Bay Dist (ft) | 240  |     | 80  | 100  |     | 25  | 240  |     |     | 120  | 250 |     |      |
| Storage Blk Time (%)  | 1    | 4   | 4   | 30   | 53  | 13  | 3    | 0   | 3   |      |     | 0   |      |
| Queuing Penalty (veh) | 3    | 20  | 11  | 56   | 152 | 34  | 13   | 1   | 5   |      |     | 0   |      |

Intersection: 1: Temperance Ave & Nees Ave

| Movement              | SB   | SB  |
|-----------------------|------|-----|
| Directions Served     | T    | R   |
| Maximum Queue (ft)    | 250  | 185 |
| Average Queue (ft)    | 124  | 46  |
| 95th Queue (ft)       | 225  | 139 |
| Link Distance (ft)    | 1298 |     |
| Upstream Blk Time (%) |      |     |
| Queuing Penalty (veh) |      |     |
| Storage Bay Dist (ft) | 95   |     |
| Storage Blk Time (%)  | 18   |     |
| Queuing Penalty (veh) | 16   |     |

Intersection: 3: Temperance Ave & SR 168 WB Ramp

| Movement              | WB  | WB | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|----|-----|-----|-----|-----|-----|
| Directions Served     | L   | R  | T   | T   |     |     | R   |
| Maximum Queue (ft)    | 244 | 75 | 281 | 337 | 183 | 160 | 217 |
| Average Queue (ft)    | 139 | 38 | 101 | 117 | 59  | 54  | 53  |
| 95th Queue (ft)       | 223 | 62 | 236 | 276 | 153 | 134 | 124 |
| Link Distance (ft)    | 478 |    | 587 | 587 | 430 | 430 | 430 |
| Upstream Blk Time (%) |     |    |     |     |     |     |     |
| Queuing Penalty (veh) |     |    |     |     |     |     |     |
| Storage Bay Dist (ft) | 385 |    |     |     |     |     |     |
| Storage Blk Time (%)  |     |    |     |     |     |     |     |
| Queuing Penalty (veh) |     |    |     |     |     |     |     |

Intersection: 4: Temperance Ave & SR 168 EB Ramp

| Movement              | EB  | EB  | EB  | EB  | NB  | NB  | NB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | R   | R   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 472 | 640 | 625 | 500 | 574 | 545 | 540 | 281 | 346 | 428 |
| Average Queue (ft)    | 142 | 287 | 414 | 335 | 267 | 431 | 497 | 93  | 197 | 202 |
| 95th Queue (ft)       | 357 | 540 | 642 | 518 | 507 | 614 | 566 | 188 | 294 | 317 |
| Link Distance (ft)    |     | 610 | 610 |     | 510 | 510 | 510 |     | 587 | 587 |
| Upstream Blk Time (%) |     | 1   | 3   |     | 0   | 5   | 19  |     |     |     |
| Queuing Penalty (veh) |     | 0   | 0   |     | 2   | 29  | 115 |     |     |     |
| Storage Bay Dist (ft) | 380 |     |     | 380 |     |     |     | 250 |     |     |
| Storage Blk Time (%)  |     | 3   | 10  | 1   |     |     |     |     | 2   |     |
| Queuing Penalty (veh) |     | 7   | 56  | 7   |     |     |     |     | 2   |     |

Intersection: 5: Temperance Ave & Fir Ave

| Movement              | EB  | EB  | EB  | WB  | WB  | WB  | NB  | NB  | NB  | NB  | NB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T   | R   | L   | T   | R   | UL  | T   | T   | T   | R   | UL  |
| Maximum Queue (ft)    | 217 | 22  | 127 | 174 | 283 | 319 | 175 | 363 | 400 | 400 | 255 | 271 |
| Average Queue (ft)    | 121 | 8   | 53  | 128 | 41  | 163 | 98  | 170 | 193 | 210 | 79  | 152 |
| 95th Queue (ft)       | 200 | 24  | 105 | 194 | 153 | 285 | 167 | 281 | 314 | 334 | 240 | 230 |
| Link Distance (ft)    |     | 537 | 537 |     | 343 | 343 |     | 528 | 528 | 528 |     |     |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 130 |     |     | 130 |     |     | 100 |     |     |     | 105 | 225 |
| Storage Blk Time (%)  | 8   |     |     | 16  |     |     | 23  | 30  |     | 38  |     | 1   |
| Queuing Penalty (veh) | 1   |     |     | 4   |     |     | 87  | 35  |     | 28  |     | 5   |

Intersection: 5: Temperance Ave & Fir Ave

| Movement              | SB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | L   | T   | T   | R   |
| Maximum Queue (ft)    | 395 | 554 | 551 | 70  |
| Average Queue (ft)    | 267 | 442 | 427 | 35  |
| 95th Queue (ft)       | 543 | 624 | 591 | 66  |
| Link Distance (ft)    |     | 537 | 537 | 537 |
| Upstream Blk Time (%) |     | 6   | 2   |     |
| Queuing Penalty (veh) |     | 41  | 17  |     |
| Storage Bay Dist (ft) | 225 |     |     |     |
| Storage Blk Time (%)  |     | 35  |     |     |
| Queuing Penalty (veh) |     | 135 |     |     |

Intersection: 6: Medical Center Drive & Fir Avenue

| Movement              | EB   | B60 | WB  | NB  | SB  |
|-----------------------|------|-----|-----|-----|-----|
| Directions Served     | ULTR | T   | LTR | LTR | LTR |
| Maximum Queue (ft)    | 142  | 368 | 77  | 50  | 153 |
| Average Queue (ft)    | 62   | 14  | 13  | 13  | 36  |
| 95th Queue (ft)       | 132  | 123 | 44  | 39  | 102 |
| Link Distance (ft)    | 70   | 343 | 230 | 785 | 335 |
| Upstream Blk Time (%) | 6    | 0   |     |     |     |
| Queuing Penalty (veh) | 26   | 0   |     |     |     |
| Storage Bay Dist (ft) |      |     |     |     |     |
| Storage Blk Time (%)  |      |     |     |     |     |
| Queuing Penalty (veh) |      |     |     |     |     |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | EB  | EB   | EB   | EB   | EB  | WB  | WB  | WB  | WB  | NB  | NB  | NB  |
|-----------------------|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | T    | R   | L   | T   | T   | TR  | L   | T   | T   |
| Maximum Queue (ft)    | 133 | 282  | 278  | 266  | 195 | 200 | 353 | 368 | 535 | 165 | 275 | 244 |
| Average Queue (ft)    | 53  | 213  | 204  | 179  | 58  | 159 | 167 | 170 | 231 | 130 | 184 | 136 |
| 95th Queue (ft)       | 111 | 286  | 276  | 252  | 138 | 216 | 316 | 307 | 385 | 193 | 265 | 227 |
| Link Distance (ft)    |     | 2595 | 2595 | 2595 |     |     | 640 | 640 | 640 |     | 441 | 441 |
| Upstream Blk Time (%) |     |      |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |      |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 400 |      |      |      | 100 | 105 |     |     |     | 105 |     |     |
| Storage Blk Time (%)  |     |      |      | 13   | 0   | 46  | 16  |     |     | 17  | 30  | 6   |
| Queuing Penalty (veh) |     |      |      | 30   | 1   | 151 | 40  |     |     | 42  | 56  | 3   |

Intersection: 7: Armstrong Avenue & Herndon Avenue

| Movement              | NB  | SB  | SB   | SB   | SB  |
|-----------------------|-----|-----|------|------|-----|
| Directions Served     | R   | L   | T    | T    | R   |
| Maximum Queue (ft)    | 43  | 165 | 238  | 184  | 140 |
| Average Queue (ft)    | 15  | 100 | 127  | 109  | 46  |
| 95th Queue (ft)       | 39  | 163 | 193  | 172  | 111 |
| Link Distance (ft)    |     |     | 2399 | 2399 |     |
| Upstream Blk Time (%) |     |     |      |      |     |
| Queuing Penalty (veh) |     |     |      |      |     |
| Storage Bay Dist (ft) | 130 | 100 |      |      | 80  |
| Storage Blk Time (%)  |     | 13  | 19   | 21   | 0   |
| Queuing Penalty (veh) |     | 18  | 23   | 18   | 0   |

Intersection: 8: Tollhouse Road & Herndon Avenue

| Movement              | EB  | WB  | NE  | SW   |
|-----------------------|-----|-----|-----|------|
| Directions Served     | L   | U   | R   | R    |
| Maximum Queue (ft)    | 87  | 33  | 172 | 43   |
| Average Queue (ft)    | 19  | 4   | 82  | 7    |
| 95th Queue (ft)       | 56  | 21  | 155 | 29   |
| Link Distance (ft)    |     |     | 777 | 1212 |
| Upstream Blk Time (%) |     |     |     |      |
| Queuing Penalty (veh) |     |     |     |      |
| Storage Bay Dist (ft) | 400 | 120 |     |      |
| Storage Blk Time (%)  |     |     |     |      |
| Queuing Penalty (veh) |     |     |     |      |

Intersection: 9: Temperance Ave & Herndon Avenue

| Movement              | EB  | EB  | EB   | EB   | EB  | WB  | WB  | WB  | WB  | WB  | WB  | NB  |
|-----------------------|-----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | L   | T    | T    | R   | L   | L   | T   | T   | T   | R   | L   |
| Maximum Queue (ft)    | 118 | 355 | 609  | 641  | 280 | 140 | 139 | 221 | 272 | 179 | 370 | 225 |
| Average Queue (ft)    | 60  | 126 | 282  | 310  | 178 | 68  | 81  | 124 | 135 | 93  | 157 | 107 |
| 95th Queue (ft)       | 112 | 305 | 496  | 531  | 350 | 121 | 130 | 191 | 221 | 160 | 308 | 182 |
| Link Distance (ft)    |     |     | 1182 | 1182 |     |     |     | 997 | 997 | 997 |     |     |
| Upstream Blk Time (%) |     |     |      |      |     |     |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |      |      |     |     |     |     |     |     |     |     |
| Storage Bay Dist (ft) | 175 | 175 |      |      | 160 | 150 | 150 |     |     |     | 400 | 230 |
| Storage Blk Time (%)  |     | 0   | 29   | 36   |     | 0   | 0   | 4   |     |     |     | 0   |
| Queuing Penalty (veh) |     | 0   | 57   | 114  |     | 0   | 0   | 6   |     |     |     | 1   |

Intersection: 9: Temperance Ave & Herndon Avenue

| Movement              | NB  | NB   | NB   | NB  | SB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|-----|
| Directions Served     | L   | T    | T    | R   | L   | L   | T   | T   | R   |
| Maximum Queue (ft)    | 206 | 295  | 336  | 240 | 260 | 344 | 489 | 519 | 270 |
| Average Queue (ft)    | 134 | 167  | 203  | 102 | 143 | 208 | 273 | 271 | 158 |
| 95th Queue (ft)       | 202 | 269  | 301  | 251 | 237 | 338 | 445 | 422 | 332 |
| Link Distance (ft)    |     | 2737 | 2737 |     |     |     | 528 | 528 |     |
| Upstream Blk Time (%) |     |      |      |     |     |     |     | 0   |     |
| Queuing Penalty (veh) |     |      |      |     |     |     |     | 0   |     |
| Storage Bay Dist (ft) | 230 |      |      | 100 | 175 | 175 |     |     | 150 |
| Storage Blk Time (%)  |     | 0    | 47   | 0   | 3   | 6   | 25  | 37  |     |
| Queuing Penalty (veh) |     | 1    | 59   | 0   | 15  | 35  | 148 | 109 |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | EB  | WB  | WB  | WB  | WB  | WB  | B59 | B59 | NB  |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Directions Served     | UL  | T   | T   | TR  | L   | T   | T   | T   | R   | T   | T   | LTR |
| Maximum Queue (ft)    | 230 | 503 | 517 | 351 | 286 | 357 | 356 | 358 | 220 | 105 | 196 | 252 |
| Average Queue (ft)    | 156 | 280 | 299 | 120 | 33  | 271 | 255 | 286 | 91  | 10  | 22  | 144 |
| 95th Queue (ft)       | 266 | 409 | 422 | 319 | 147 | 394 | 353 | 377 | 253 | 53  | 109 | 226 |
| Link Distance (ft)    |     | 997 | 997 | 997 |     | 286 | 286 | 286 |     | 644 | 644 | 355 |
| Upstream Blk Time (%) |     |     |     |     | 0   | 6   | 3   | 7   |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     | 0   | 27  | 12  | 33  |     |     |     |     |
| Storage Bay Dist (ft) | 145 |     |     |     | 190 |     |     |     | 120 |     |     |     |
| Storage Blk Time (%)  | 20  | 36  |     |     |     | 22  |     | 40  |     |     |     |     |
| Queuing Penalty (veh) | 102 | 76  |     |     |     | 5   |     | 19  |     |     |     |     |

Intersection: 10: Coventry Avenue & Herndon Avenue

| Movement              | SB  | SB |
|-----------------------|-----|----|
| Directions Served     | LT  | R  |
| Maximum Queue (ft)    | 73  | 74 |
| Average Queue (ft)    | 41  | 39 |
| 95th Queue (ft)       | 71  | 66 |
| Link Distance (ft)    | 0   | 0  |
| Upstream Blk Time (%) | 61  | 31 |
| Queuing Penalty (veh) | 140 | 71 |
| Storage Bay Dist (ft) |     |    |
| Storage Blk Time (%)  |     |    |
| Queuing Penalty (veh) |     |    |

Intersection: 11: Coventry Avenue & Medical Center Drive

| Movement              | EB  | EB  | WB  | WB  | NB | NB |
|-----------------------|-----|-----|-----|-----|----|----|
| Directions Served     | T   | R   | L   | T   | L  | R  |
| Maximum Queue (ft)    | 174 | 145 | 145 | 427 | 73 | 45 |
| Average Queue (ft)    | 31  | 60  | 144 | 370 | 21 | 16 |
| 95th Queue (ft)       | 112 | 126 | 148 | 497 | 66 | 52 |
| Link Distance (ft)    | 785 |     |     | 364 | 0  | 0  |
| Upstream Blk Time (%) |     |     |     | 91  |    | 0  |
| Queuing Penalty (veh) |     |     |     | 0   |    | 0  |
| Storage Bay Dist (ft) |     | 100 | 100 |     |    |    |
| Storage Blk Time (%)  |     | 10  | 97  | 0   |    |    |
| Queuing Penalty (veh) |     | 2   | 26  | 1   |    |    |

Intersection: 12: Herndon Avenue & CCMC Access Rd

| Movement              | EB  | WB  | SB  |
|-----------------------|-----|-----|-----|
| Directions Served     | L   | TR  | R   |
| Maximum Queue (ft)    | 28  | 28  | 114 |
| Average Queue (ft)    | 1   | 1   | 47  |
| 95th Queue (ft)       | 9   | 9   | 86  |
| Link Distance (ft)    |     | 482 | 903 |
| Upstream Blk Time (%) |     |     |     |
| Queuing Penalty (veh) |     |     |     |
| Storage Bay Dist (ft) | 100 |     |     |
| Storage Blk Time (%)  |     |     |     |
| Queuing Penalty (veh) |     |     |     |

Intersection: 13: Locan Avenue & Herndon Avenue

| Movement              | EB  | EB  | EB  | WB  | WB   | WB   | NB   | NB  |
|-----------------------|-----|-----|-----|-----|------|------|------|-----|
| Directions Served     | T   | T   | R   | L   | T    | T    | L    | R   |
| Maximum Queue (ft)    | 356 | 358 | 358 | 93  | 274  | 287  | 513  | 370 |
| Average Queue (ft)    | 139 | 116 | 46  | 35  | 115  | 132  | 313  | 93  |
| 95th Queue (ft)       | 290 | 264 | 146 | 77  | 226  | 242  | 470  | 276 |
| Link Distance (ft)    | 482 | 482 |     |     | 2004 | 2004 | 5181 |     |
| Upstream Blk Time (%) |     |     |     |     |      |      |      |     |
| Queuing Penalty (veh) |     |     |     |     |      |      |      |     |
| Storage Bay Dist (ft) |     |     | 250 | 250 |      |      |      | 250 |
| Storage Blk Time (%)  |     | 2   |     |     | 0    |      | 13   |     |
| Queuing Penalty (veh) |     | 7   |     |     | 0    |      | 23   |     |

Intersection: 14: Herndon Avenue & De Wolf Avenue (NL)

| Movement              | EB  | EB   | EB   | WB  | WB  | WB  | SB  | SB   |
|-----------------------|-----|------|------|-----|-----|-----|-----|------|
| Directions Served     | L   | T    | T    | T   | T   | R   | L   | R    |
| Maximum Queue (ft)    | 115 | 361  | 242  | 187 | 118 | 29  | 70  | 50   |
| Average Queue (ft)    | 45  | 70   | 50   | 53  | 51  | 4   | 23  | 20   |
| 95th Queue (ft)       | 89  | 190  | 146  | 120 | 109 | 20  | 56  | 38   |
| Link Distance (ft)    |     | 2004 | 2004 | 544 | 544 |     |     | 2509 |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |      |
| Storage Bay Dist (ft) | 250 |      |      |     |     | 250 | 250 |      |
| Storage Blk Time (%)  |     | 1    |      |     |     |     |     |      |
| Queuing Penalty (veh) |     | 1    |      |     |     |     |     |      |

Intersection: 15: De Wolf Ave & Herndon Avenue

| Movement              | EB  | EB  | WB  | WB   | NB   |
|-----------------------|-----|-----|-----|------|------|
| Directions Served     | T   | R   | L   | T    | LR   |
| Maximum Queue (ft)    | 362 | 154 | 53  | 205  | 268  |
| Average Queue (ft)    | 171 | 76  | 4   | 85   | 149  |
| 95th Queue (ft)       | 334 | 131 | 24  | 161  | 256  |
| Link Distance (ft)    | 544 | 544 |     | 2676 | 5209 |
| Upstream Blk Time (%) |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |      |      |
| Storage Bay Dist (ft) |     |     | 250 |      |      |
| Storage Blk Time (%)  |     |     |     |      |      |
| Queuing Penalty (veh) |     |     |     |      |      |

Intersection: 16: Leonard Ave & Herndon Avenue

| Movement              | EB   | WB  | WB   | NB   |
|-----------------------|------|-----|------|------|
| Directions Served     | TR   | L   | T    | LR   |
| Maximum Queue (ft)    | 294  | 28  | 97   | 220  |
| Average Queue (ft)    | 77   | 2   | 48   | 97   |
| 95th Queue (ft)       | 187  | 15  | 103  | 179  |
| Link Distance (ft)    | 2676 |     | 4507 | 2478 |
| Upstream Blk Time (%) |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |      |
| Storage Bay Dist (ft) |      | 250 |      |      |
| Storage Blk Time (%)  |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |      |

Intersection: 17: McCall Ave & Herndon Avenue

| Movement              | EB  | EB   | WB  | WB   | NB  | NB   | SB  | SB   |
|-----------------------|-----|------|-----|------|-----|------|-----|------|
| Directions Served     | L   | TR   | L   | TR   | L   | TR   | L   | TR   |
| Maximum Queue (ft)    | 369 | 507  | 72  | 396  | 320 | 335  | 96  | 376  |
| Average Queue (ft)    | 56  | 247  | 24  | 164  | 152 | 175  | 32  | 221  |
| 95th Queue (ft)       | 160 | 429  | 55  | 279  | 249 | 296  | 75  | 331  |
| Link Distance (ft)    |     | 4507 |     | 6429 |     | 2404 |     | 2046 |
| Upstream Blk Time (%) |     |      |     |      |     |      |     |      |
| Queuing Penalty (veh) |     |      |     |      |     |      |     |      |
| Storage Bay Dist (ft) | 250 |      | 250 |      | 250 |      | 250 |      |
| Storage Blk Time (%)  |     | 11   |     | 2    | 2   | 2    |     | 9    |
| Queuing Penalty (veh) |     | 7    |     | 1    | 6   | 4    |     | 3    |



Intersection: 18: Academy Ave & Herndon Avenue

| Movement              | EB   | EB  | WB   | NB  | NB   | SB   |
|-----------------------|------|-----|------|-----|------|------|
| Directions Served     | LT   | R   | LTR  | L   | TR   | LTR  |
| Maximum Queue (ft)    | 66   | 189 | 51   | 119 | 101  | 98   |
| Average Queue (ft)    | 17   | 82  | 18   | 63  | 54   | 53   |
| 95th Queue (ft)       | 47   | 154 | 41   | 95  | 81   | 88   |
| Link Distance (ft)    | 6429 |     | 2715 |     | 2301 | 2072 |
| Upstream Blk Time (%) |      |     |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |     |      |      |
| Storage Bay Dist (ft) |      | 250 |      | 250 |      |      |
| Storage Blk Time (%)  |      |     |      |     |      |      |
| Queuing Penalty (veh) |      |     |      |     |      |      |

Intersection: 19: Temperance Ave & New Access Road

| Movement              | WB  | NB  | NB  | NB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Directions Served     | R   | T   | T   | TR  | T   | T   |
| Maximum Queue (ft)    | 556 | 208 | 351 | 453 | 450 | 278 |
| Average Queue (ft)    | 442 | 13  | 62  | 132 | 80  | 35  |
| 95th Queue (ft)       | 656 | 82  | 241 | 369 | 302 | 160 |
| Link Distance (ft)    | 493 | 537 | 537 | 537 | 510 | 510 |
| Upstream Blk Time (%) | 73  |     |     |     |     |     |
| Queuing Penalty (veh) | 0   |     |     |     |     |     |
| Storage Bay Dist (ft) |     |     |     |     |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |

Intersection: 20: Locan Avenue & Bullard Avenue

| Movement              | EB  | EB   | EB   | EB  | WB  | WB  | WB  | NB  | NB   | NB  | SB  | SB   |
|-----------------------|-----|------|------|-----|-----|-----|-----|-----|------|-----|-----|------|
| Directions Served     | L   | T    | T    | R   | L   | T   | TR  | L   | T    | R   | L   | TR   |
| Maximum Queue (ft)    | 162 | 374  | 361  | 112 | 47  | 272 | 313 | 172 | 148  | 52  | 370 | 1598 |
| Average Queue (ft)    | 68  | 207  | 155  | 33  | 21  | 185 | 216 | 62  | 65   | 15  | 275 | 1115 |
| 95th Queue (ft)       | 143 | 322  | 293  | 78  | 49  | 248 | 285 | 136 | 123  | 36  | 497 | 1728 |
| Link Distance (ft)    |     | 2614 | 2614 |     |     | 958 | 958 |     | 2593 |     |     | 5181 |
| Upstream Blk Time (%) |     |      |      |     |     |     |     |     |      |     |     |      |
| Queuing Penalty (veh) |     |      |      |     |     |     |     |     |      |     |     |      |
| Storage Bay Dist (ft) | 270 |      |      | 250 | 260 |     |     | 125 |      | 250 | 250 |      |
| Storage Blk Time (%)  |     | 3    | 0    |     |     | 0   |     | 7   | 2    |     |     | 57   |
| Queuing Penalty (veh) |     | 2    | 0    |     |     | 0   |     | 11  | 2    |     |     | 96   |

Intersection: 21: De Wolf Ave & Bullard Avenue

| Movement              | EB  | EB   | EB  | B41 | WB  | WB   | NB  | NB   | SB  | SB   |
|-----------------------|-----|------|-----|-----|-----|------|-----|------|-----|------|
| Directions Served     | L   | T    | R   | T   | L   | TR   | L   | TR   | L   | TR   |
| Maximum Queue (ft)    | 113 | 317  | 149 | 943 | 80  | 386  | 176 | 269  | 357 | 352  |
| Average Queue (ft)    | 52  | 189  | 76  | 31  | 31  | 237  | 106 | 167  | 52  | 205  |
| 95th Queue (ft)       | 102 | 285  | 140 | 311 | 70  | 344  | 163 | 267  | 151 | 322  |
| Link Distance (ft)    |     | 1604 |     | 970 |     | 2616 |     | 2599 |     | 5209 |
| Upstream Blk Time (%) |     |      |     |     |     |      |     |      |     |      |
| Queuing Penalty (veh) |     |      |     |     |     |      |     |      |     |      |
| Storage Bay Dist (ft) | 250 |      | 250 |     | 250 |      | 250 |      | 250 |      |
| Storage Blk Time (%)  |     | 2    |     |     |     | 7    |     | 2    |     | 5    |
| Queuing Penalty (veh) |     | 6    |     |     |     | 3    |     | 4    |     | 3    |

Network Summary

Network wide Queuing Penalty: 2968

## Appendix J: Signal Warrants



**Traffic Engineering, Inc.**

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*(559) 570-8991*

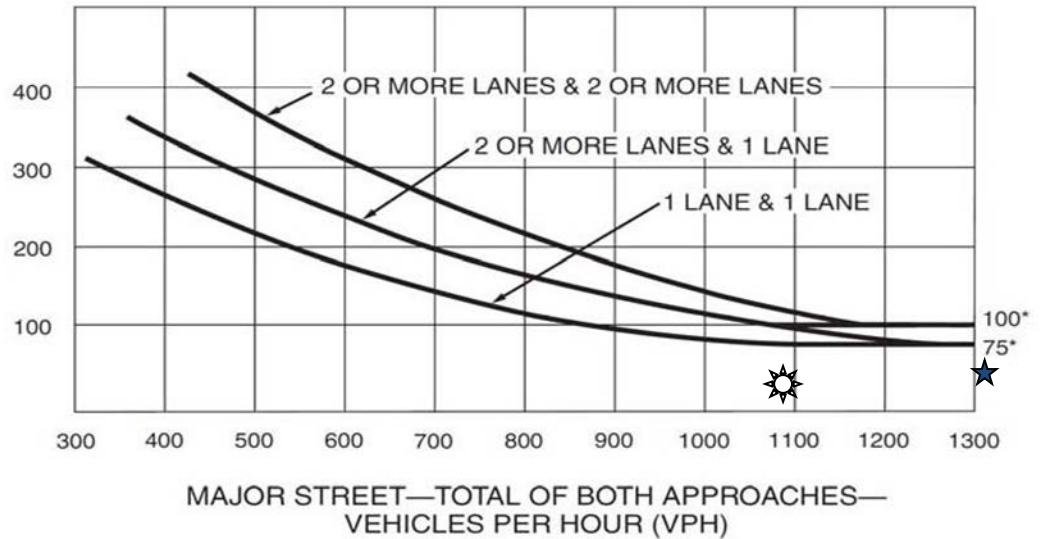
*Page | J*

## Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour  
Intersection: Tollhouse Road at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Tollhouse Rd  
Highest Approach  
Volume = 37 (53) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1090 (1341) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

Source: *California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)*  
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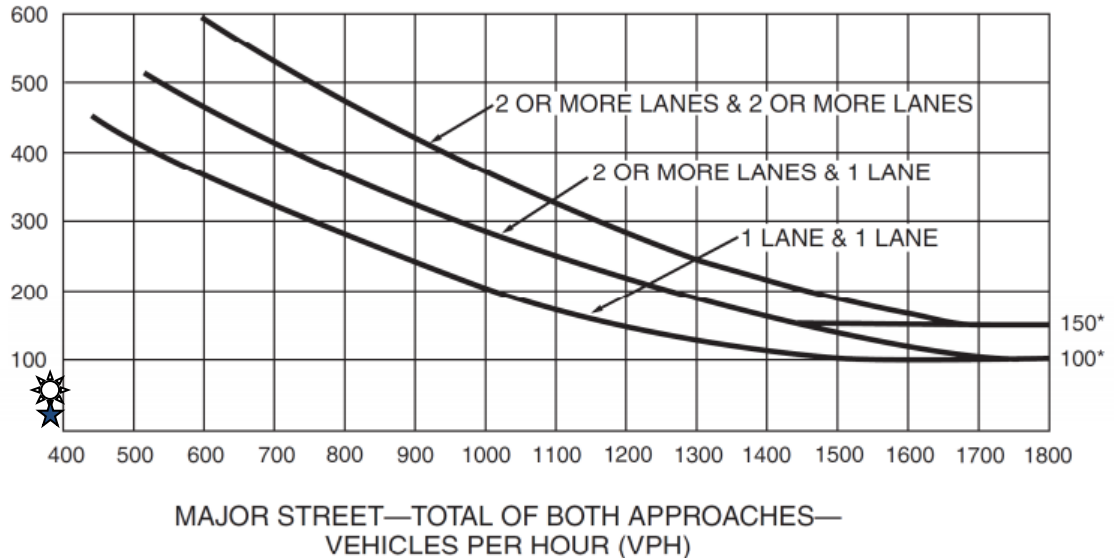
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## Peak Hour Warrant (Urban Areas)

Existing– AM (PM) Peak Hour

Intersection: Medical Center Drive at Coventry Avenue

**Figure 4C-3. Warrant 3, Peak Hour**



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Medical Center Dr Volume = 131(160) VPH**

- ☀ **AM Peak Hour Volume – Signal Warrant is Not Met**
- ★ **PM Peak Hour Volume – Signal Warrant is Not Met**

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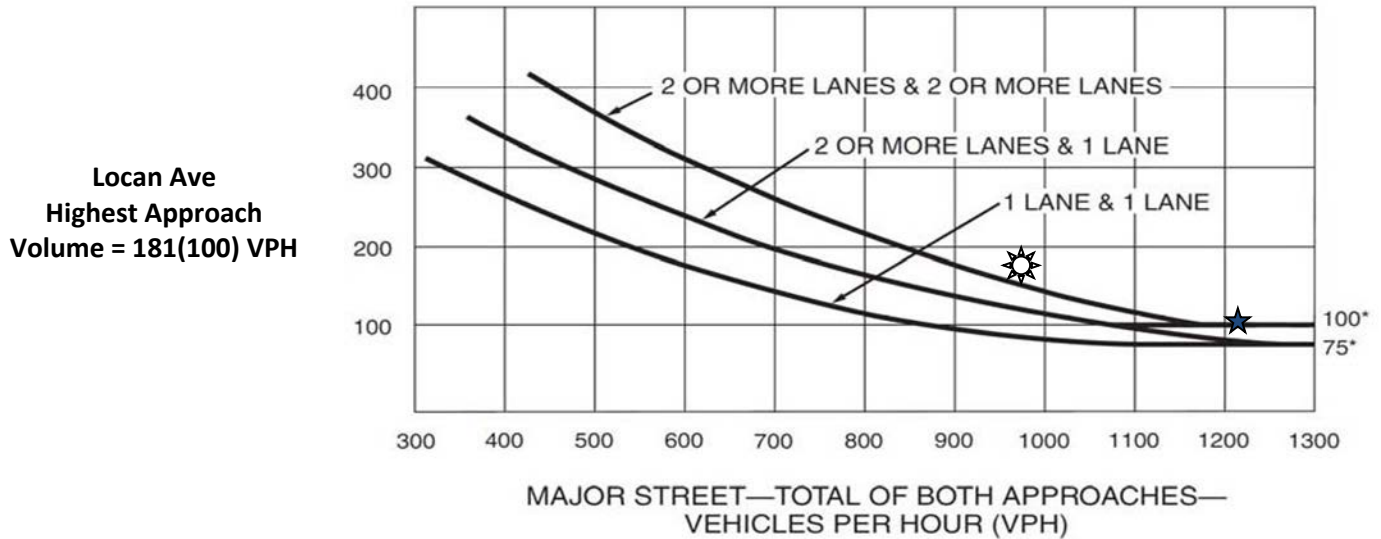
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## Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour  
Intersection: Locan Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 988(1209) VPH**

☀ **AM Peak Hour Volume – Signal Warrant is Met**

★ **PM Peak Hour Volume – Signal Warrant is Met**

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## Peak Hour Warrant (Rural Areas)

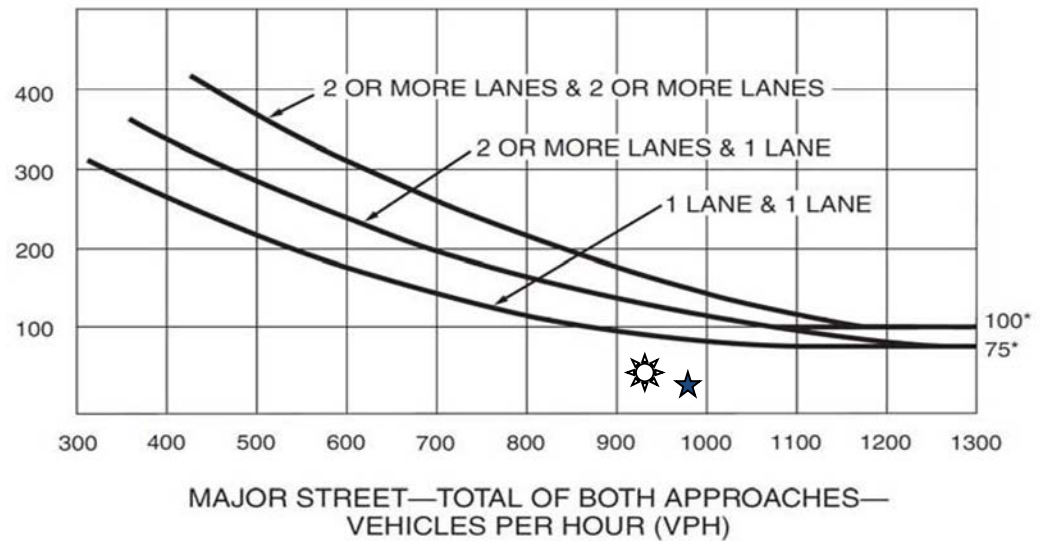
Existing - AM (PM) Peak Hour

Intersection: De Wolf Avenue (NL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

De Wolf Ave (NL)  
Highest Approach  
Volume = 44(33) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 934(980) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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## Peak Hour Warrant (Rural Areas)

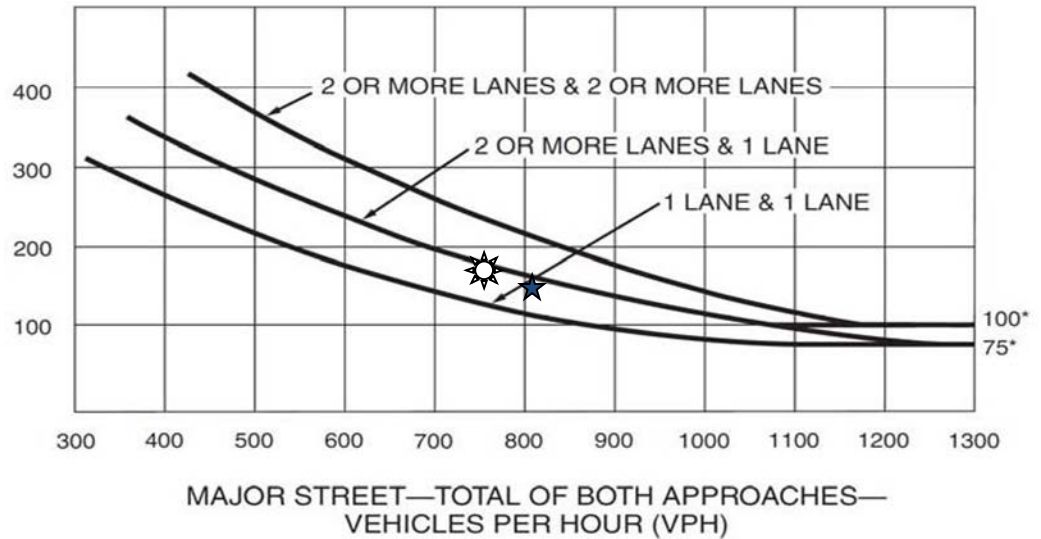
Existing - AM (PM) Peak Hour

Intersection: De Wolf Avenue (SL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

De Wolf Ave (SL)  
Highest Approach  
Volume = 162(137) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 765(807) VPH**

☼ **AM Peak Hour Volume – Signal Warrant is Met**

★ **PM Peak Hour Volume – Signal Warrant is Met**

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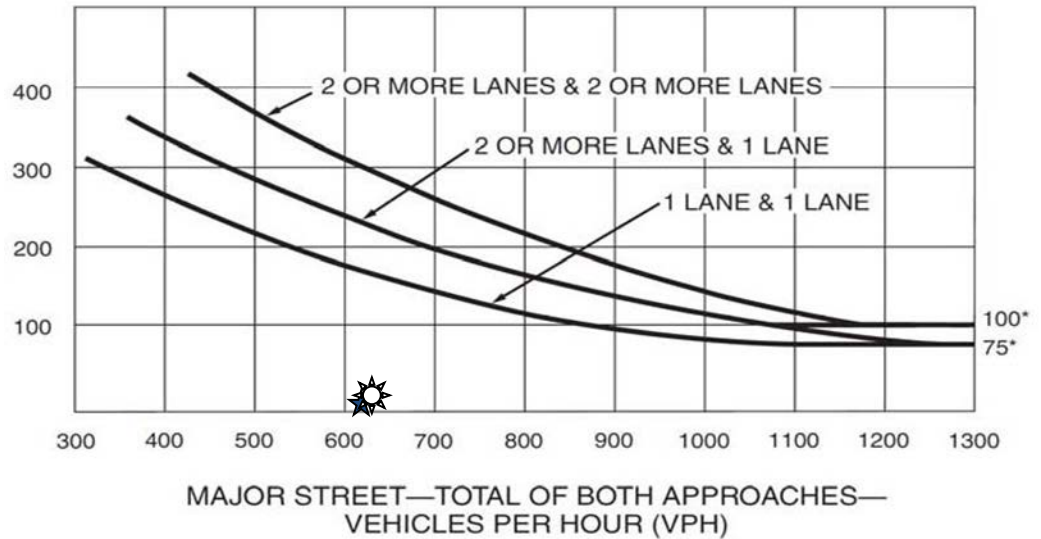


## Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour  
Intersection: Leonard Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Leonard Ave  
Highest Approach  
Volume = 15(10) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 633(632) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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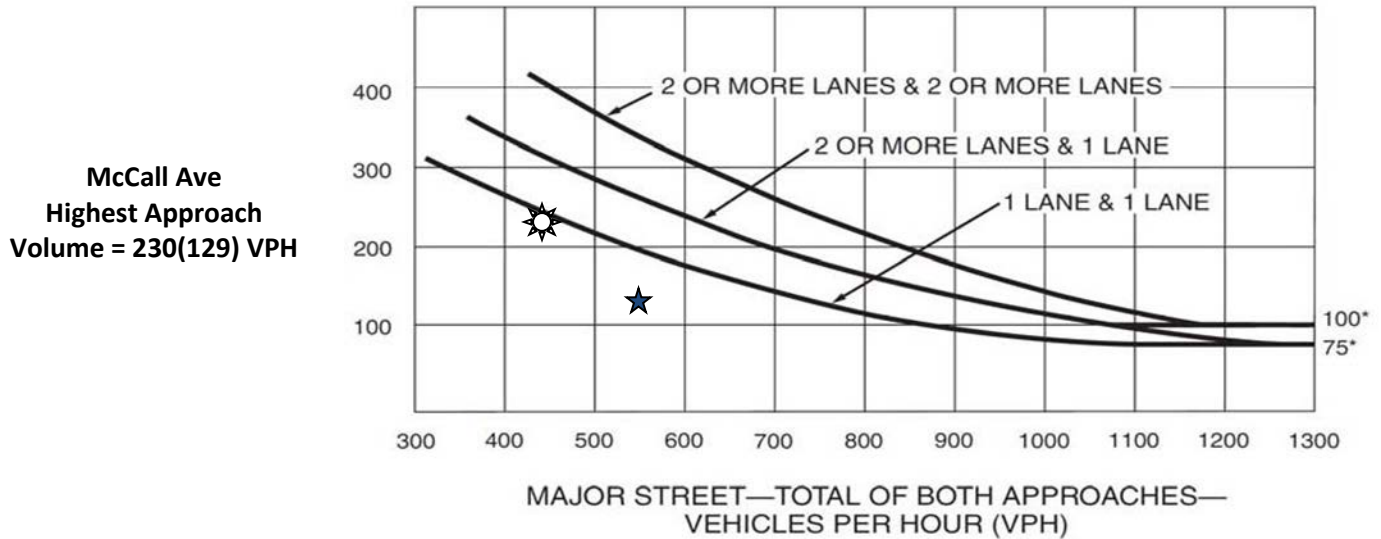
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## Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour  
Intersection: McCall Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 448(552) VPH**

☀ **AM Peak Hour Volume – Signal Warrant is Not Met**

★ **PM Peak Hour Volume – Signal Warrant is Not Met**

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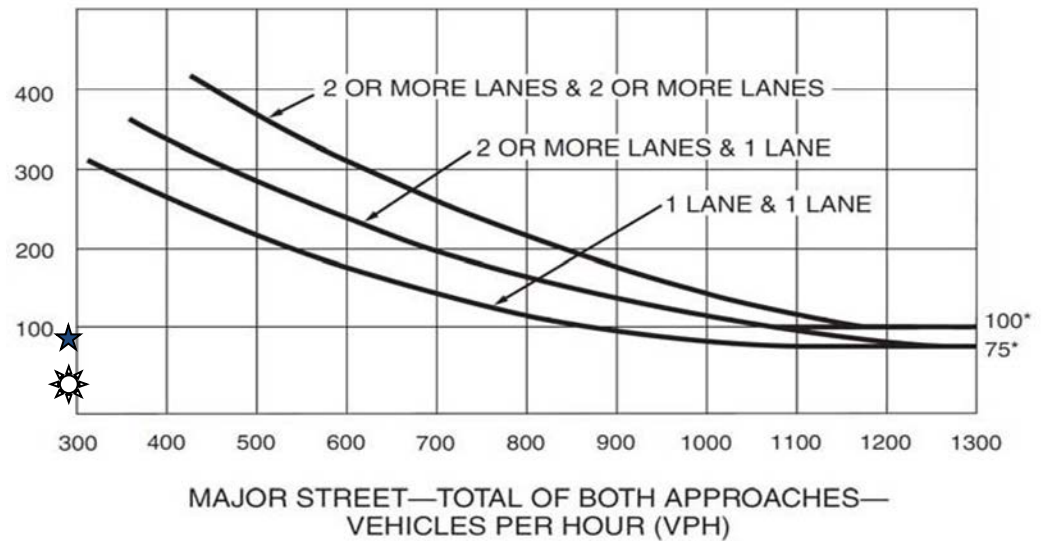
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## Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour  
Intersection: Academy Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Herndon Ave  
Highest Approach  
Volume = 41(83) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Academy Ave Total Volume = 233(260) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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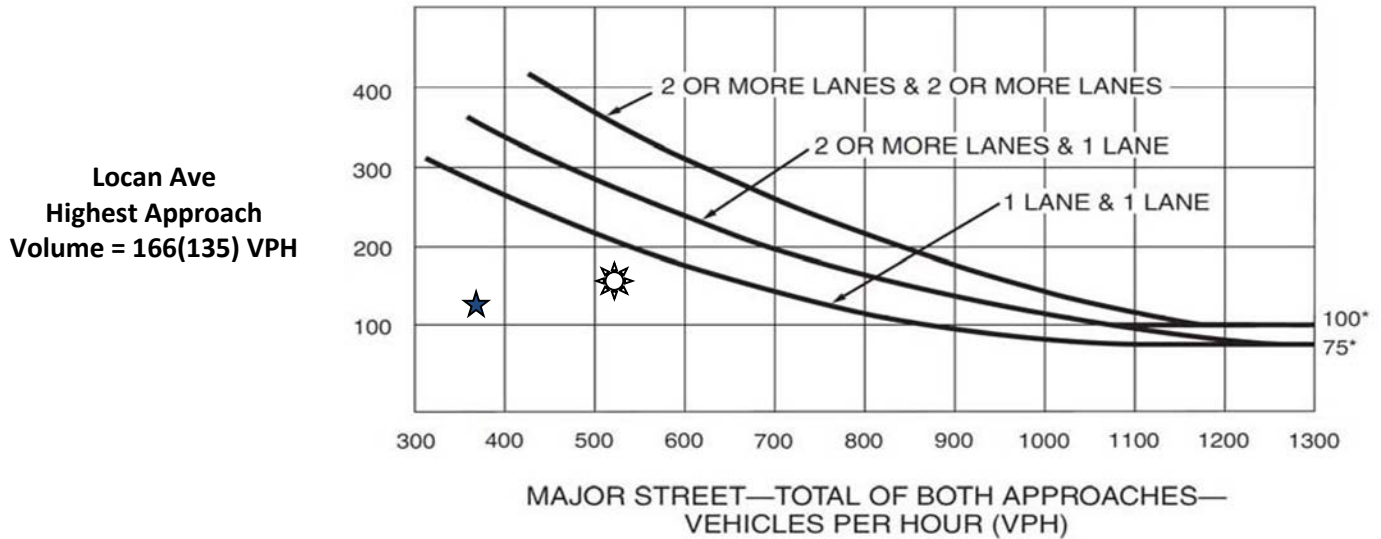
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## Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour  
Intersection: Locan Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Bullard Ave Total Volume = 520(369) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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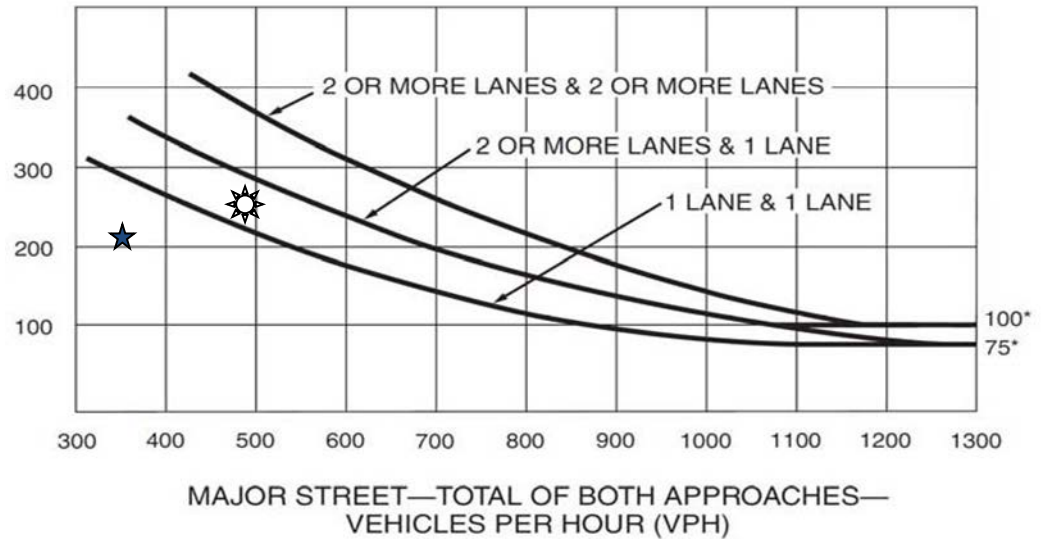
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## Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour  
Intersection: DeWolf Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

DeWolf Ave  
Highest Approach  
Volume = 258(210) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Bullard Ave Total Volume = 494(351) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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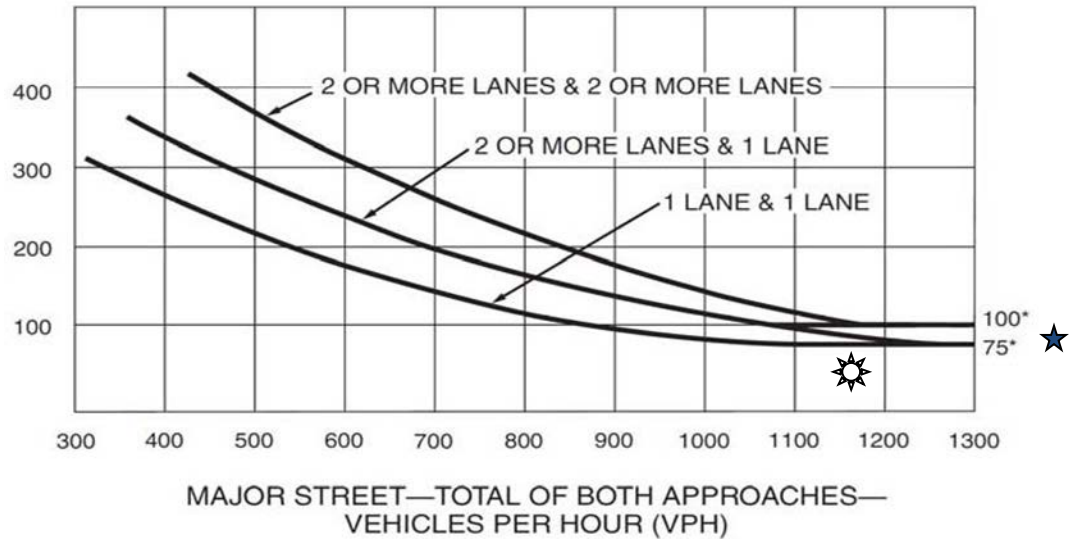
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## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Tollhouse Road at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Tollhouse Rd  
Highest Approach  
Volume = 55 (76) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1159 (1491) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Met

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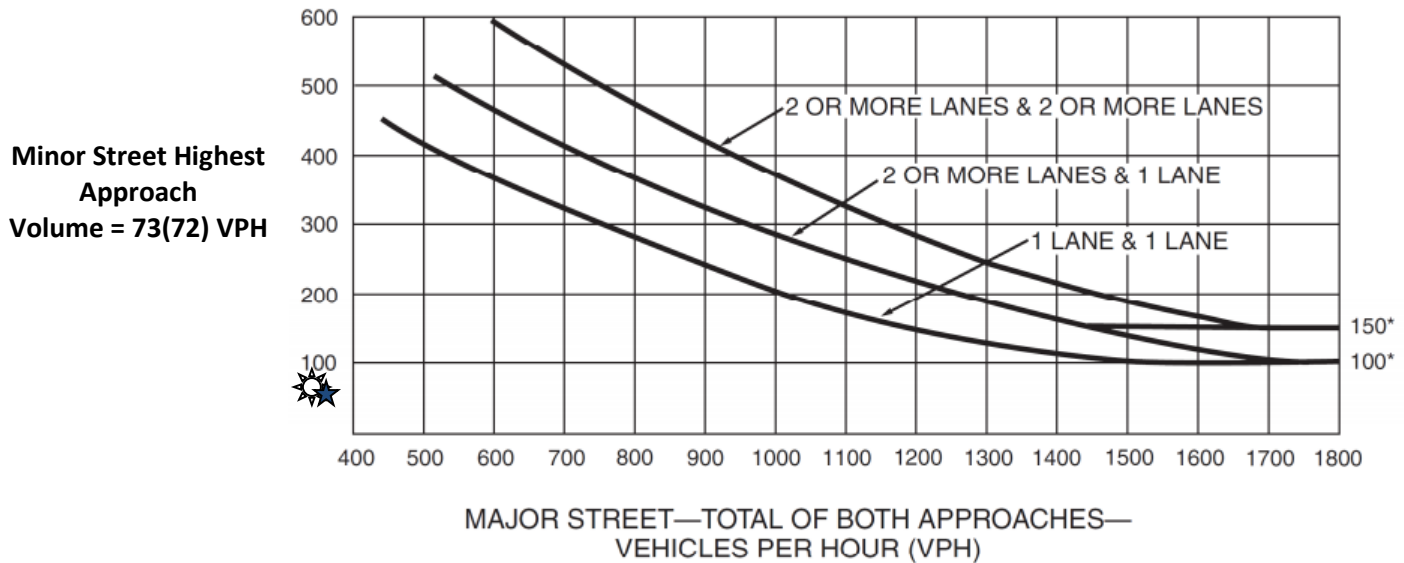
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## Peak Hour Warrant (Urban Areas)

Existing + Project Phase 1 – AM (PM) Peak Hour  
Intersection: Medical Center Drive at Coventry Avenue

**Figure 4C-3. Warrant 3, Peak Hour**



**Major Street Volume = 180(222) VPH**

- ☀ AM Peak Hour Volume – Signal Warrant is Not Met
- ★ PM Peak Hour Volume – Signal Warrant is Not Met

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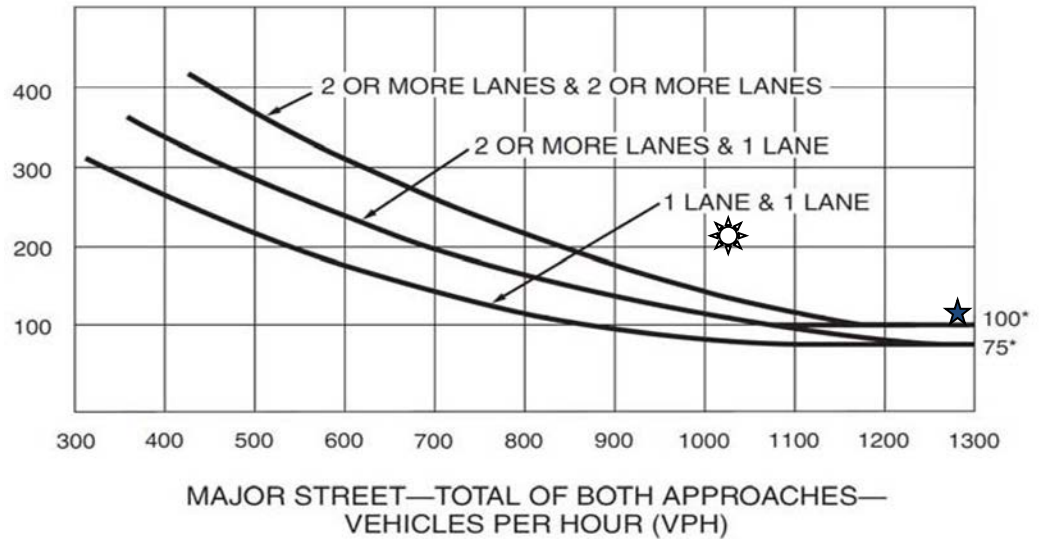
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## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Locan Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Locan Ave  
Highest Approach  
Volume = 210(124) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1025(1290) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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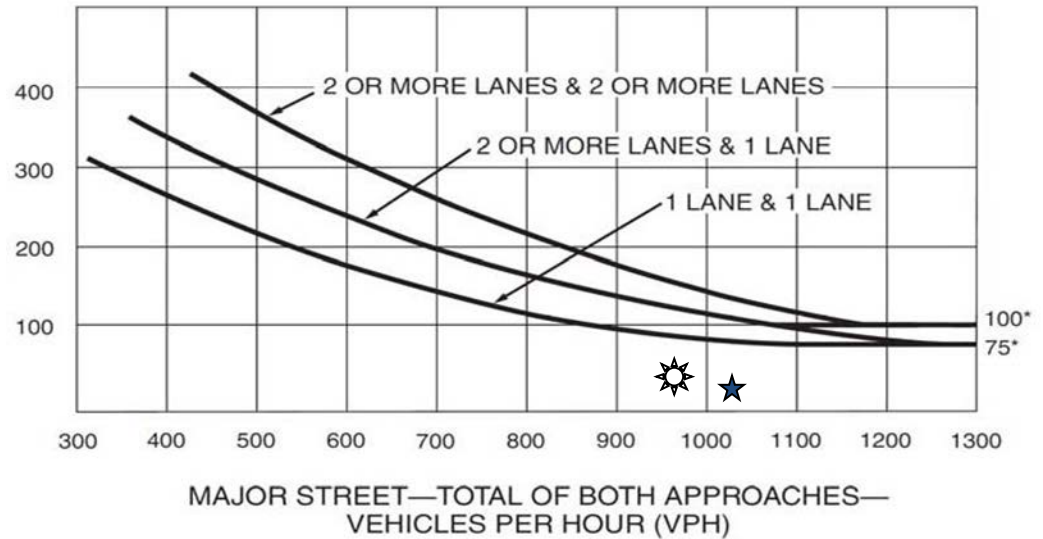


## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: De Wolf Avenue (NL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

De Wolf Ave (NL)  
Highest Approach  
Volume = 44(33) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 961(1024) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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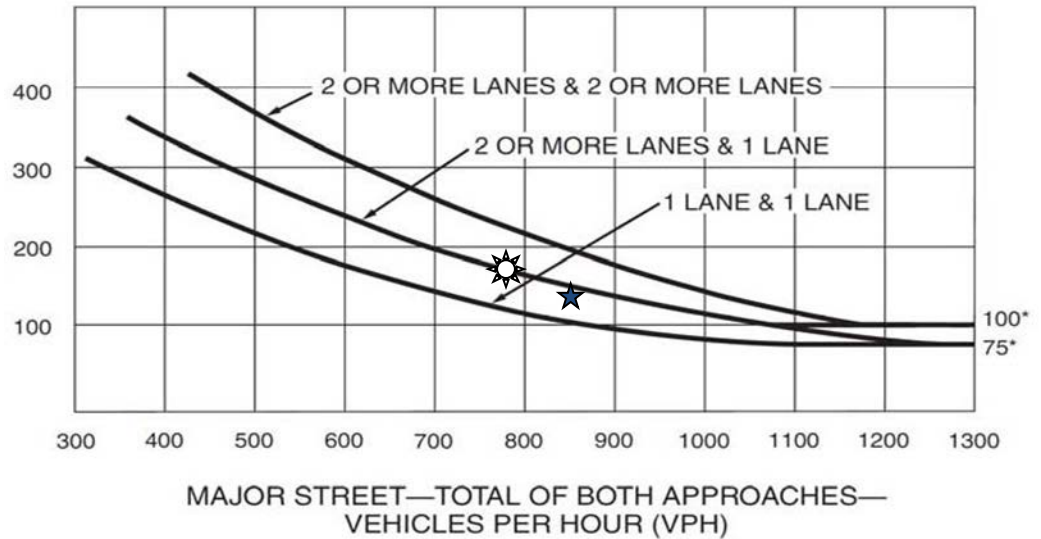
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## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: De Wolf Avenue (SL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

De Wolf Ave (SL)  
Highest Approach  
Volume = 166(137) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 788(851) VPH**

☀ **AM Peak Hour Volume – Signal Warrant is Met**

★ **PM Peak Hour Volume – Signal Warrant is Not Met**

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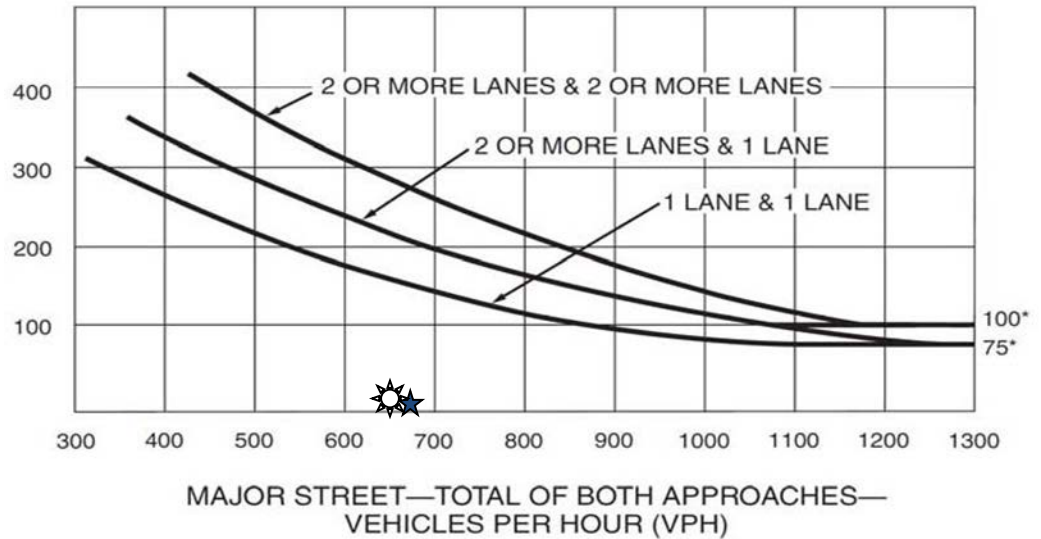
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## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Leonard Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Leonard Ave  
Highest Approach  
Volume = 15(10) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 656(670) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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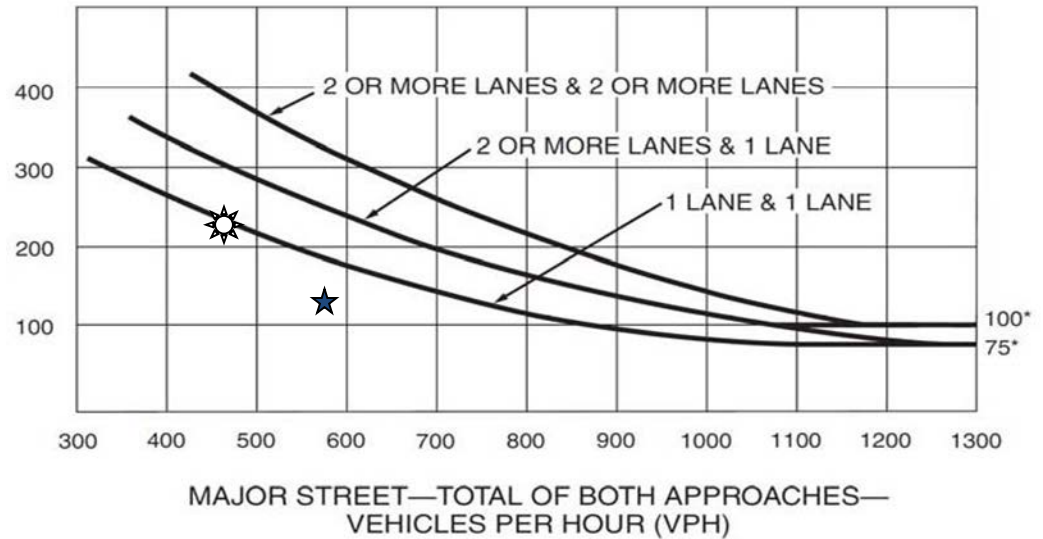
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## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: McCall Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

McCall Ave  
Highest Approach  
Volume = 238(135) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 462(582) VPH

☼ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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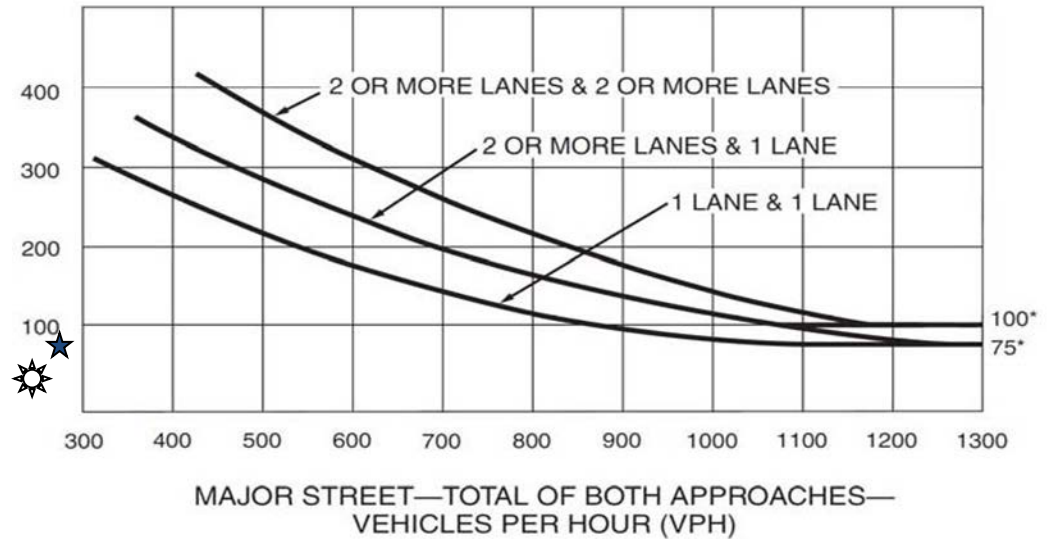
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## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Academy Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Herndon Ave  
Highest Approach  
Volume = 42(88) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Academy Ave Total Volume = 239(266) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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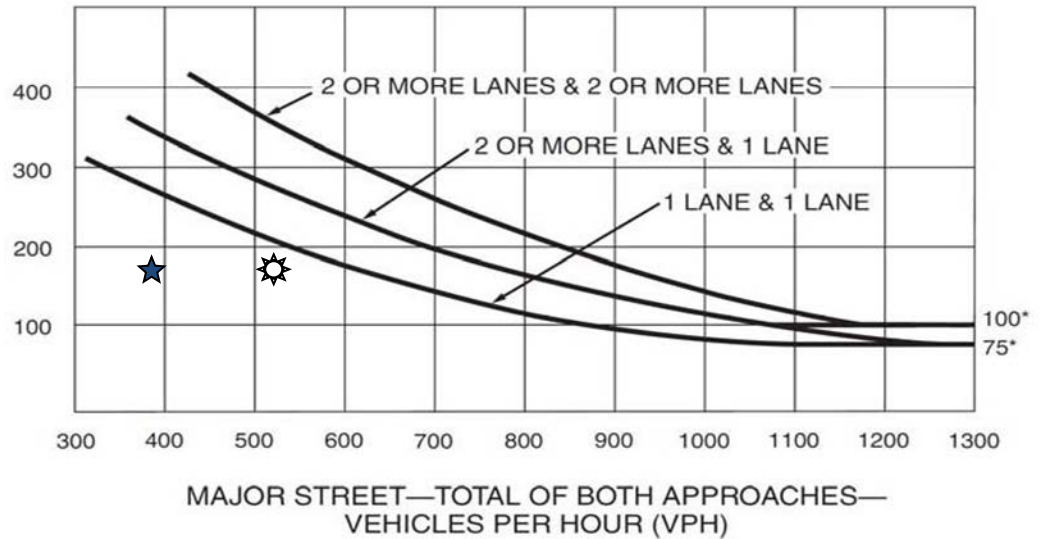
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## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Locan Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Locan Ave  
Highest Approach  
Volume = 177(172) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Bullard Ave Total Volume = 537(390) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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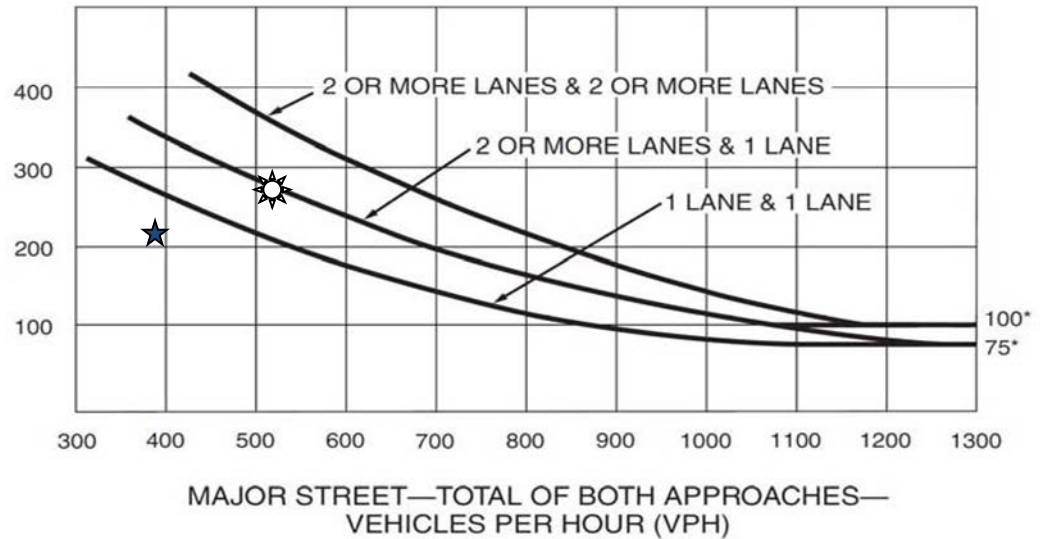


## Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour  
Intersection: DeWolf Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

DeWolf Ave  
Highest Approach  
Volume = 268(215) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Bullard Ave Total Volume = 512(390) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

Source: *California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)*  
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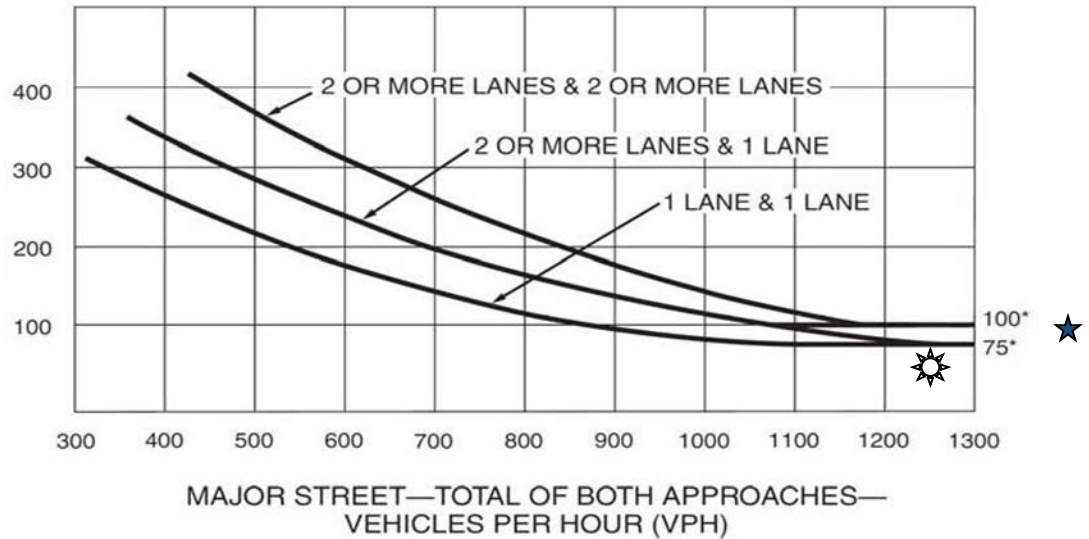
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## Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Tollhouse Road at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Tollhouse Rd  
Highest Approach  
Volume = 58 (80) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1265 (2116) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Met

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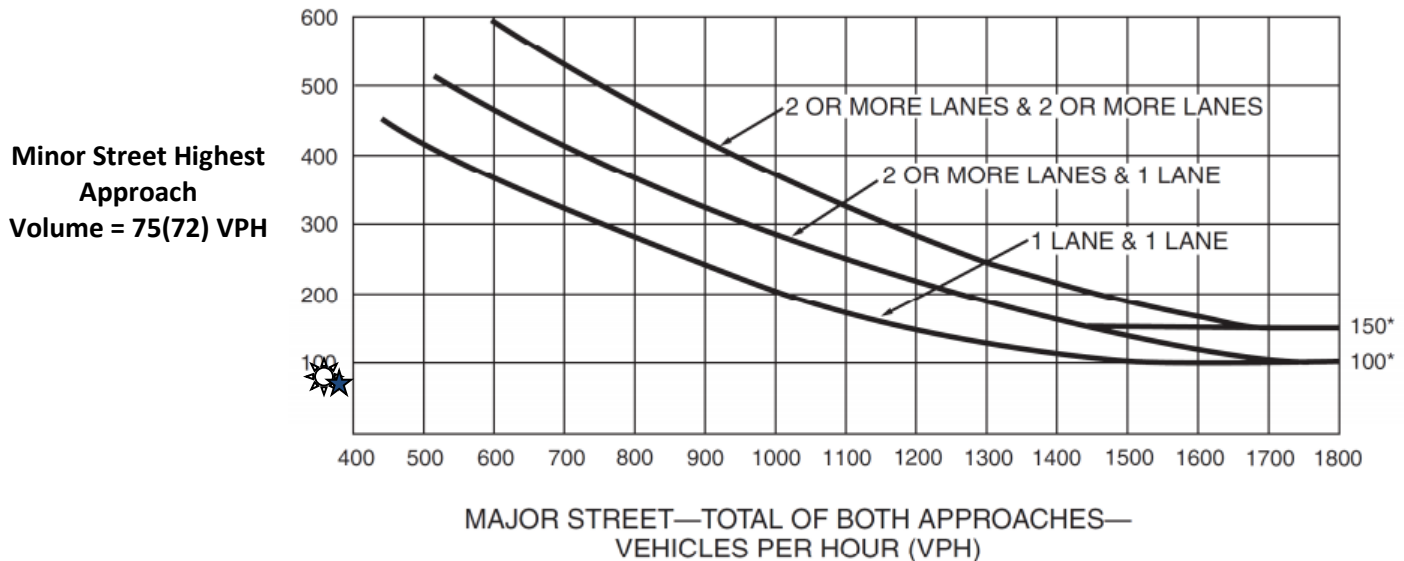
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## Peak Hour Warrant (Urban Areas)



NT + Project Phase 1 – AM (PM) Peak Hour  
Intersection: Medical Center Drive at Coventry Avenue

**Figure 4C-3. Warrant 3, Peak Hour**



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Major Street Volume = 180(222) VPH**

-  **AM Peak Hour Volume – Signal Warrant is Not Met**
-  **PM Peak Hour Volume – Signal Warrant is Not Met**

**Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)  
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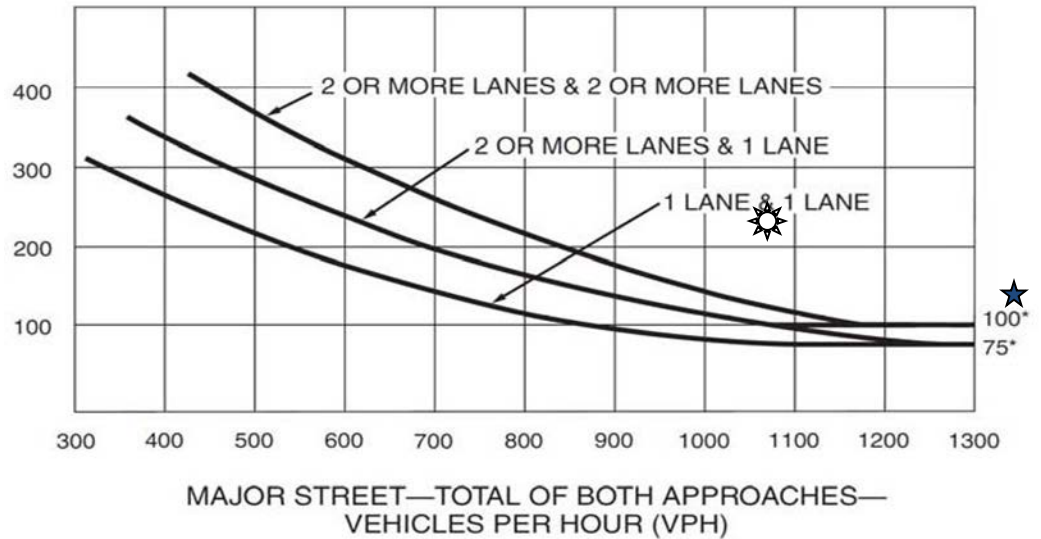
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## Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Locan Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Locan Ave  
Highest Approach  
Volume = 216(131) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1067(1344) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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## Peak Hour Warrant (Rural Areas)

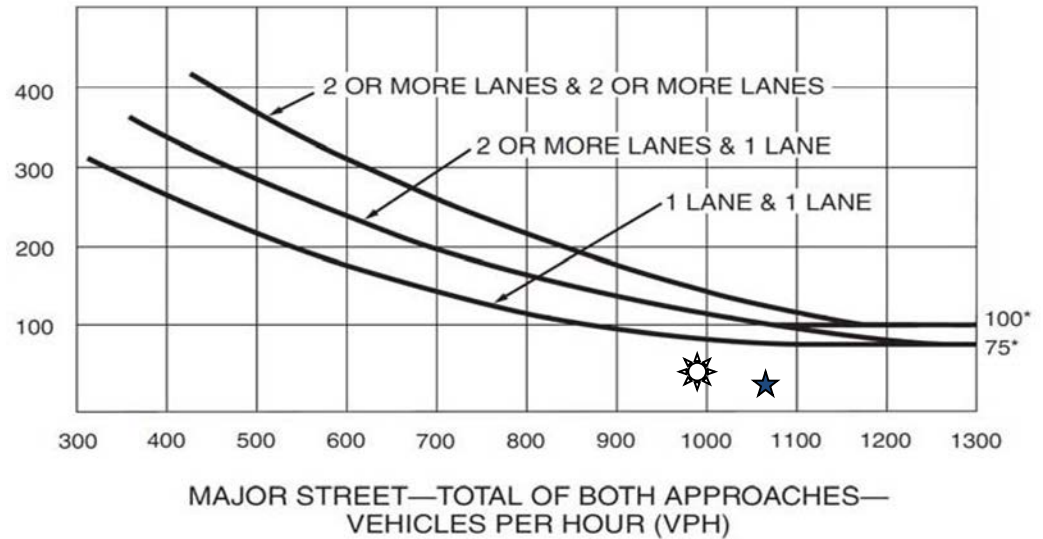
NT + Project Phase 1 - AM (PM) Peak Hour

Intersection: De Wolf Avenue (NL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

De Wolf Ave (NL)  
Highest Approach  
Volume = 47(39) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 993(1065) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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## Peak Hour Warrant (Rural Areas)

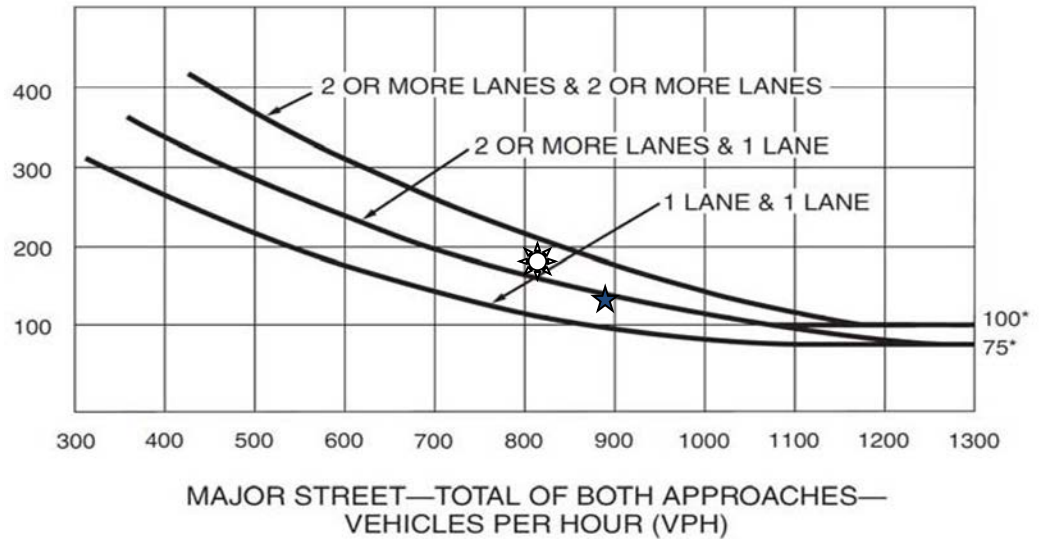
NT + Project Phase 1 - AM (PM) Peak Hour

Intersection: De Wolf Avenue (SL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

De Wolf Ave (SL)  
Highest Approach  
Volume = 170(141) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 814(891) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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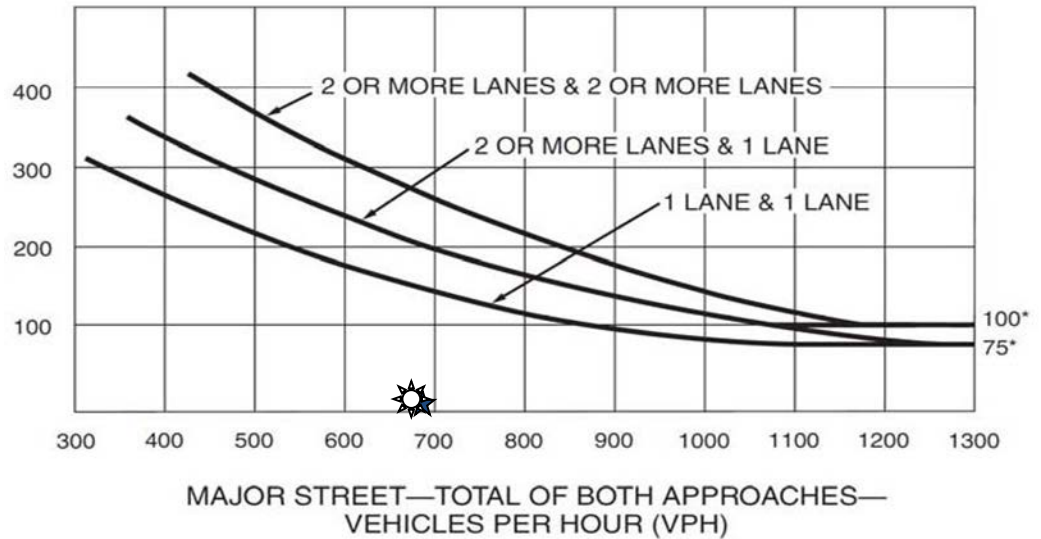
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## Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Leonard Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Leonard Ave  
Highest Approach  
Volume = 17(11) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 674(695) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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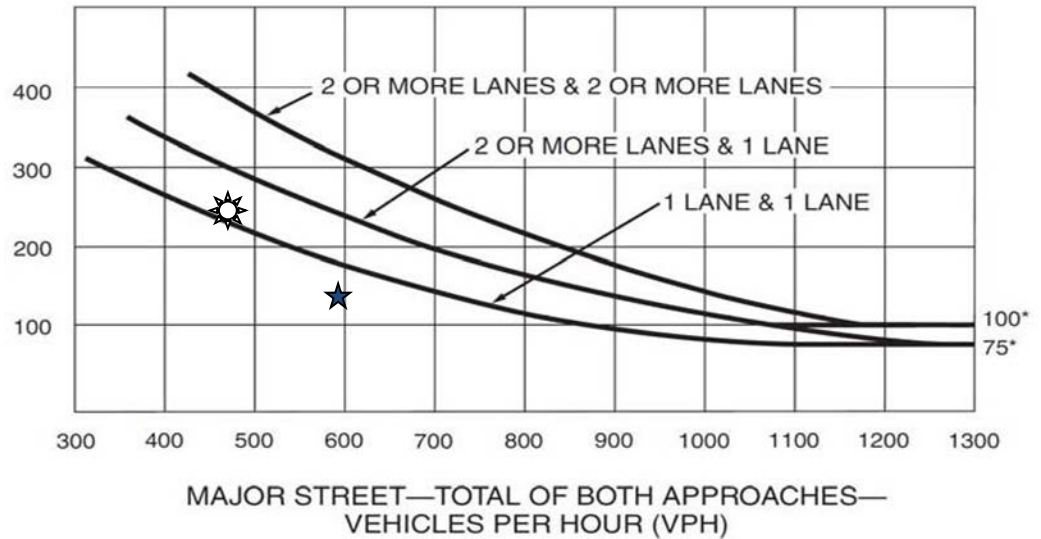
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## Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour  
Intersection: McCall Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

McCall Ave  
Highest Approach  
Volume = 239(136) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 468(595) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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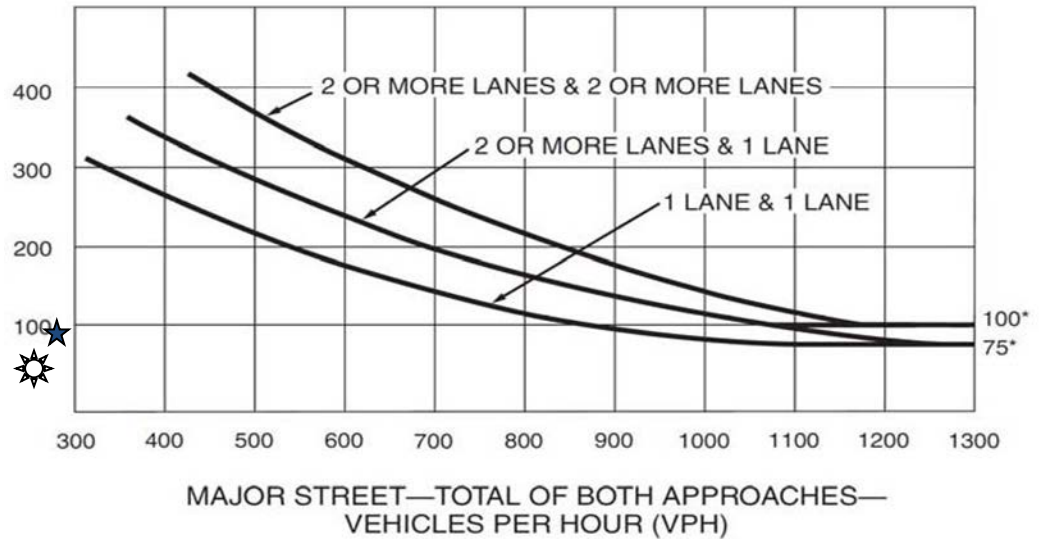


## Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Academy Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Herndon Ave  
Highest Approach  
Volume = 42(91) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Academy Ave Total Volume = 242(268) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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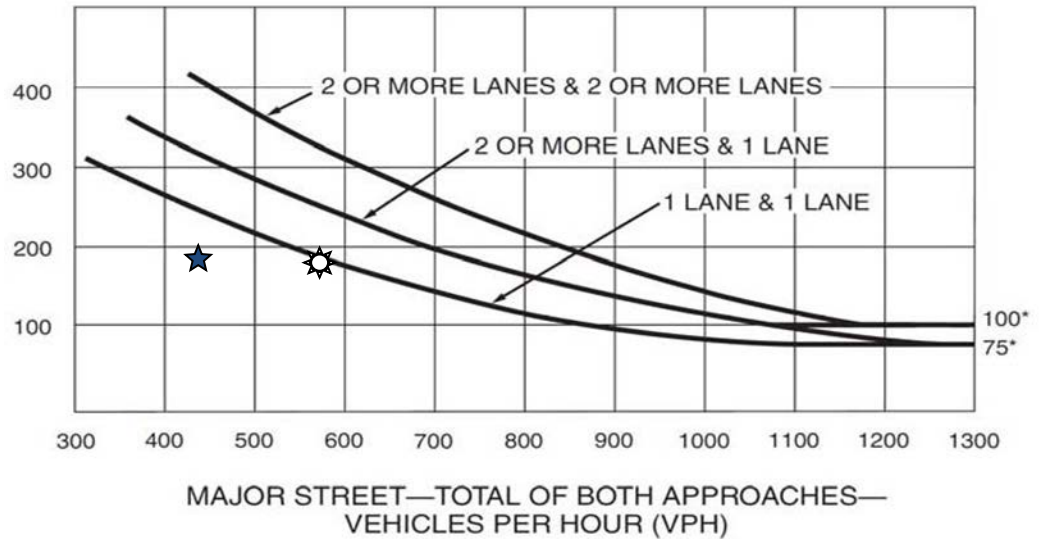
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## Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour  
Intersection: Locan Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Locan Ave  
Highest Approach  
Volume = 181(180) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Bullard Ave Total Volume = 570(433) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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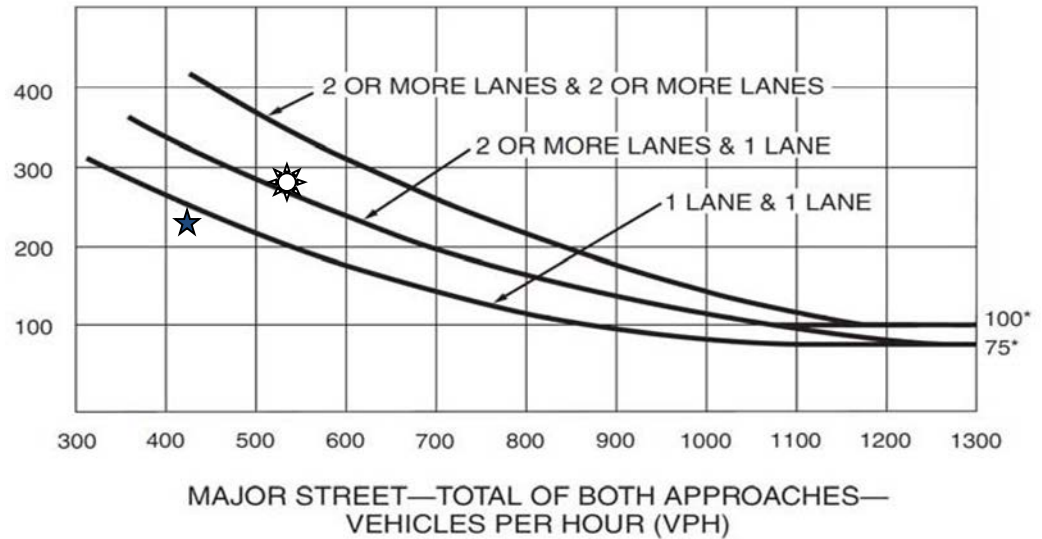


## Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour  
Intersection: DeWolf Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

DeWolf Ave  
Highest Approach  
Volume = 271(225) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Bullard Ave Total Volume = 537(421) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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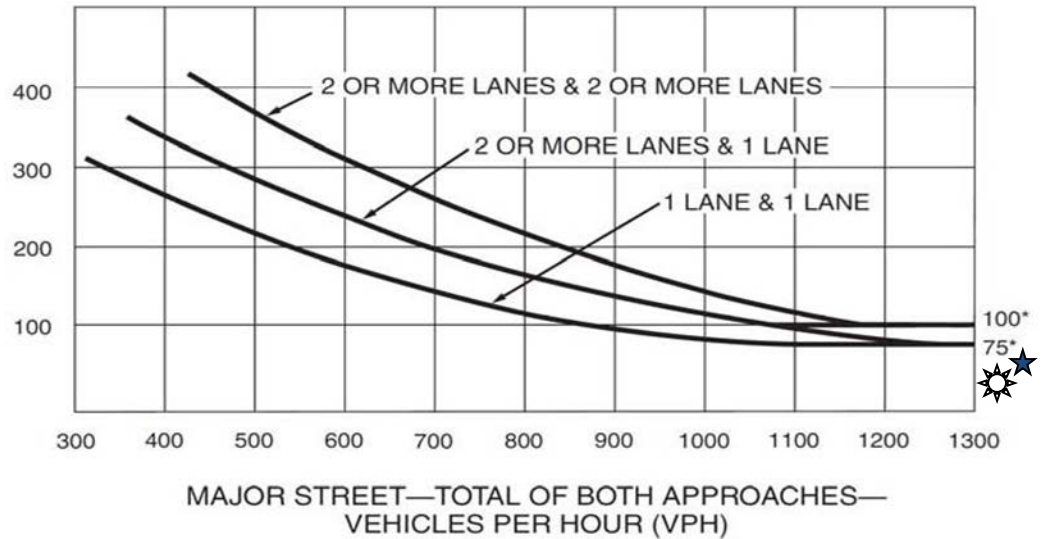
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## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: Tollhouse Road at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Tollhouse Rd  
Highest Approach  
Volume = 40 (68) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1989 (2535) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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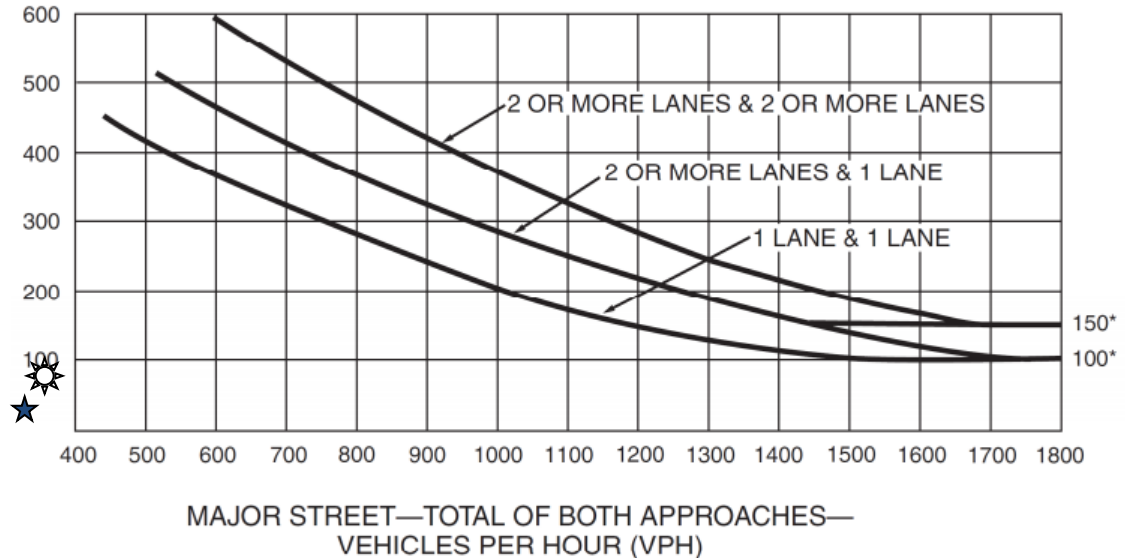
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## Peak Hour Warrant (Urban Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: Medical Center Drive at Coventry Avenue

**Figure 4C-3. Warrant 3, Peak Hour**

Coventry Ave  
Highest Approach  
Volume = 67(24) VPH



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Medical Center Dr Volume = 133(176) VPH

- ☀ AM Peak Hour Volume – Signal Warrant is Not Met
- ★ PM Peak Hour Volume – Signal Warrant is Not Met

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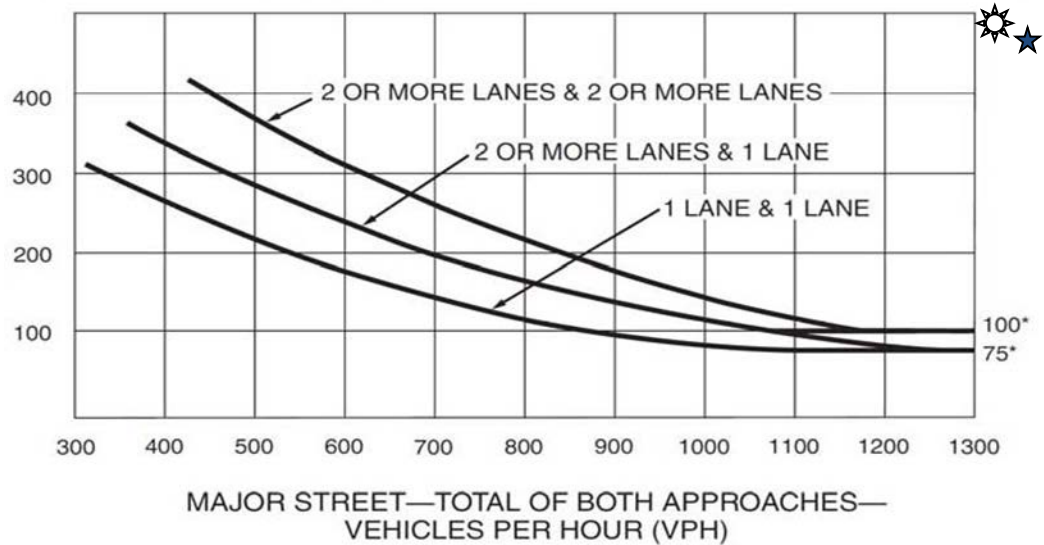
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## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: Locan Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Locan Ave  
Highest Approach  
Volume = 715(530) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1711(2314) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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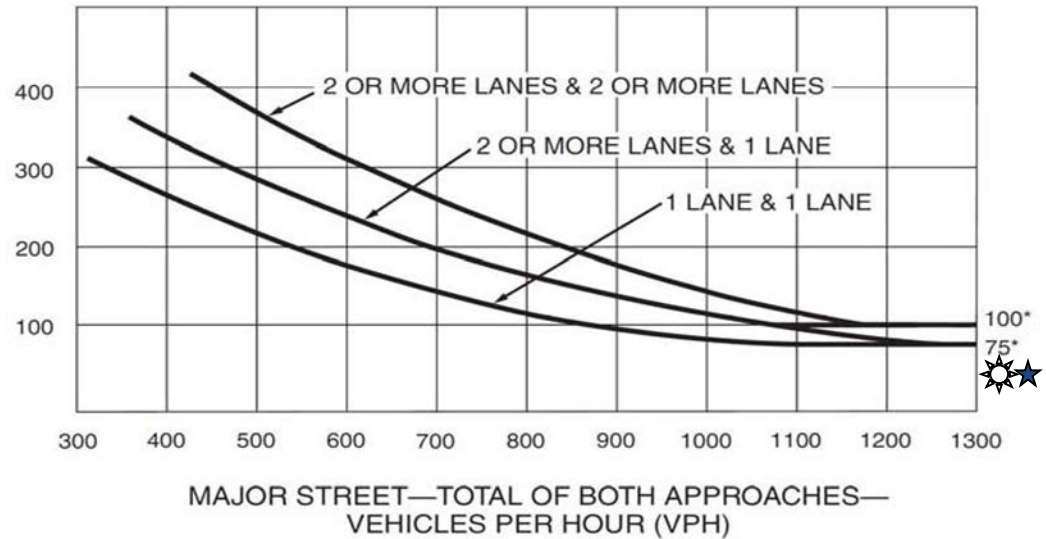
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## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: De Wolf Avenue (NL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

De Wolf Ave (NL)  
Highest Approach  
Volume = 52(51) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1581(2107) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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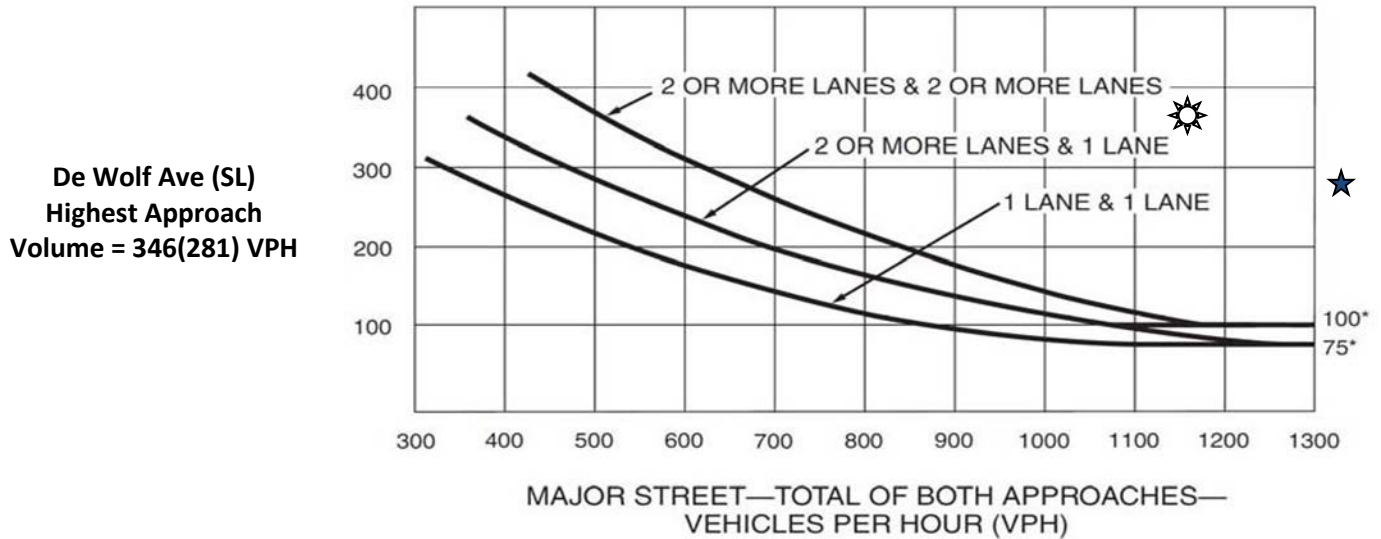
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## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: De Wolf Avenue (SL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 1162(1786) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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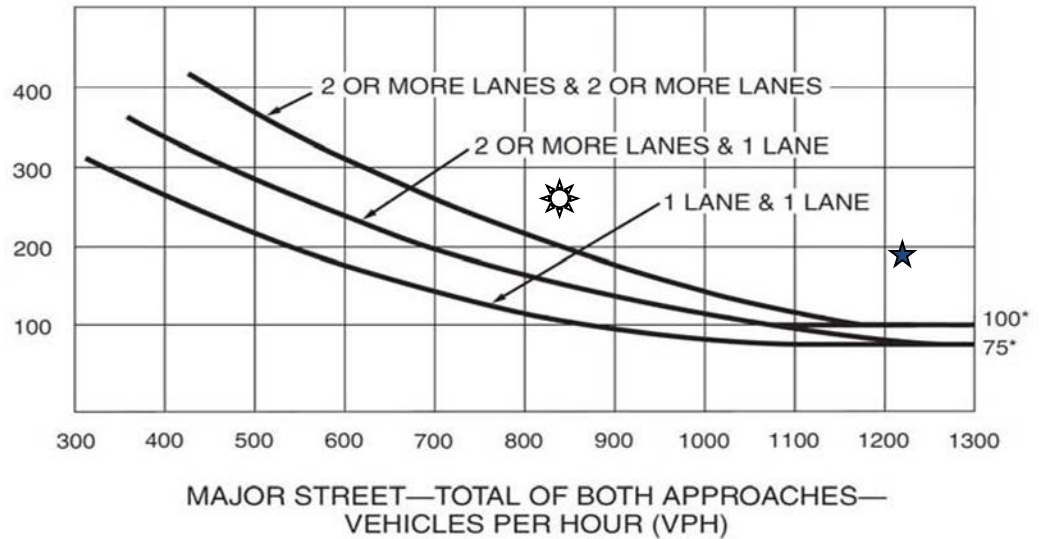


## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: Leonard Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Leonard Ave  
Highest Approach  
Volume = 259(195) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 844(1219) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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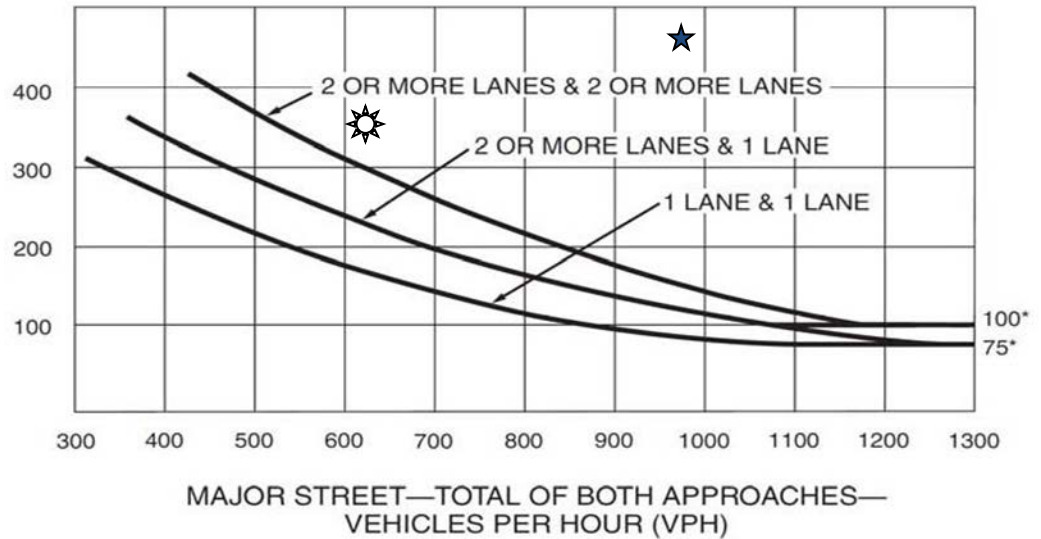
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## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: McCall Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

McCall Ave  
Highest Approach  
Volume = 349(451) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 623(982) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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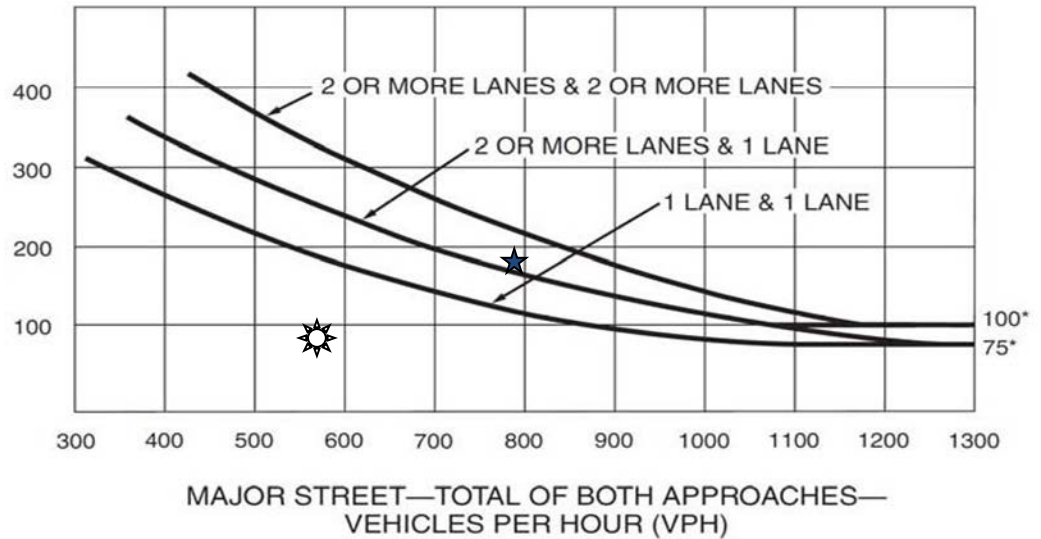


## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: Academy Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Herndon Ave  
Highest Approach  
Volume = 83(182) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Academy Ave Total Volume = 562(792) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Met

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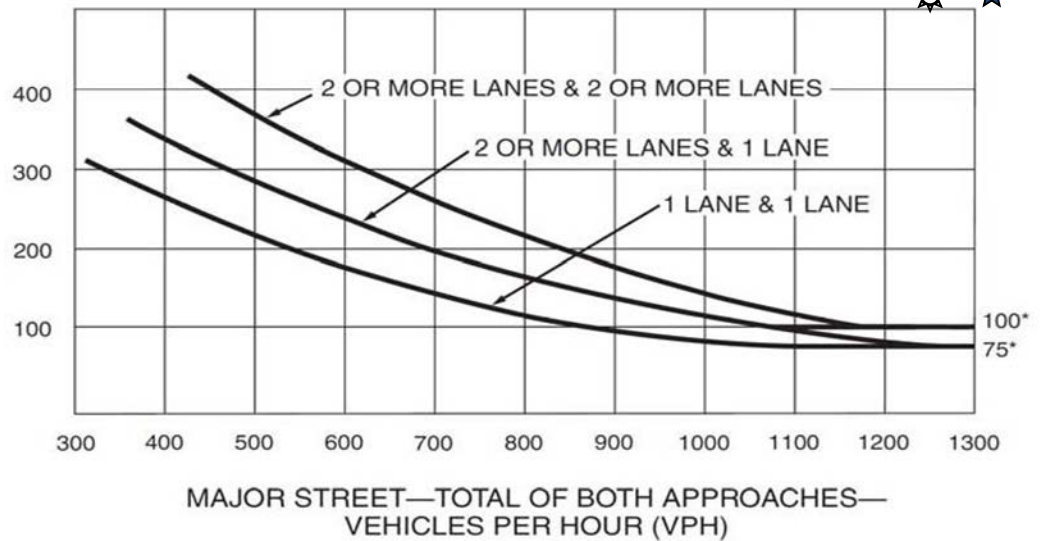
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## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: Locan Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Locan Ave  
Highest Approach  
Volume = 643(659) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Bullard Ave Total Volume = 1260(1654) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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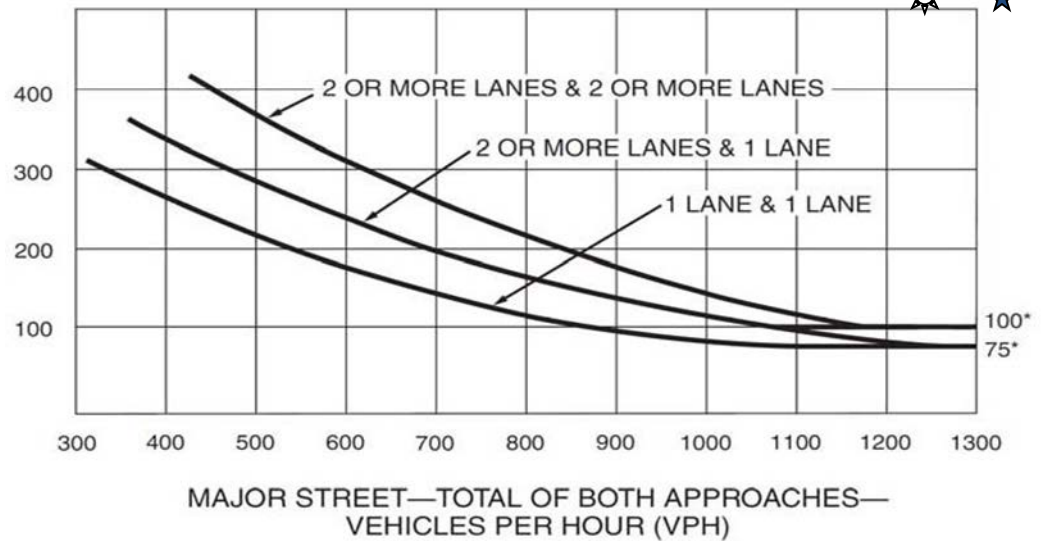
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## Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour  
Intersection: DeWolf Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

DeWolf Ave  
Highest Approach  
Volume = 689(518) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Bullard Ave Total Volume = 1245(1413) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

Source: *California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)*  
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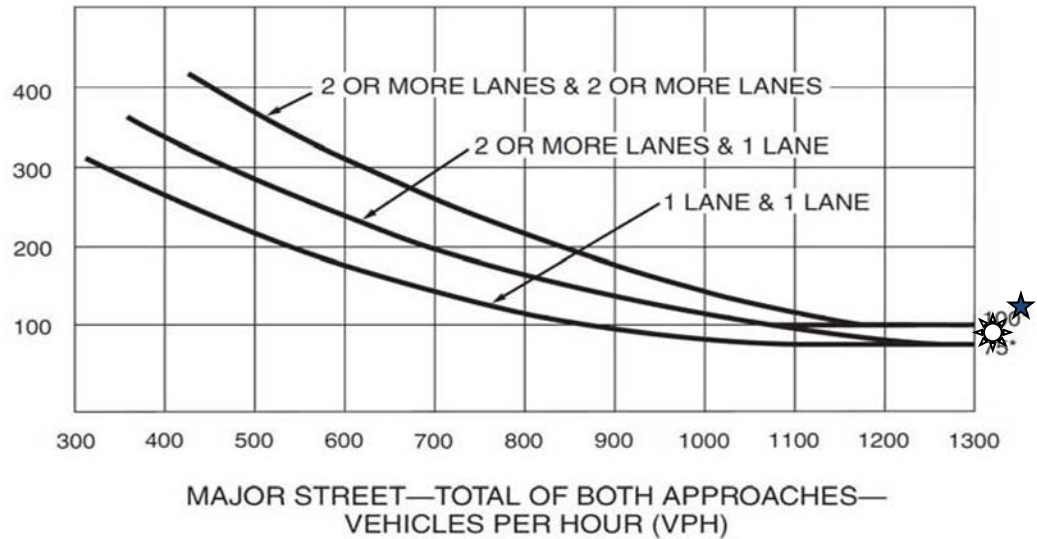
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## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour  
Intersection: Tollhouse Road at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 2120 (2904) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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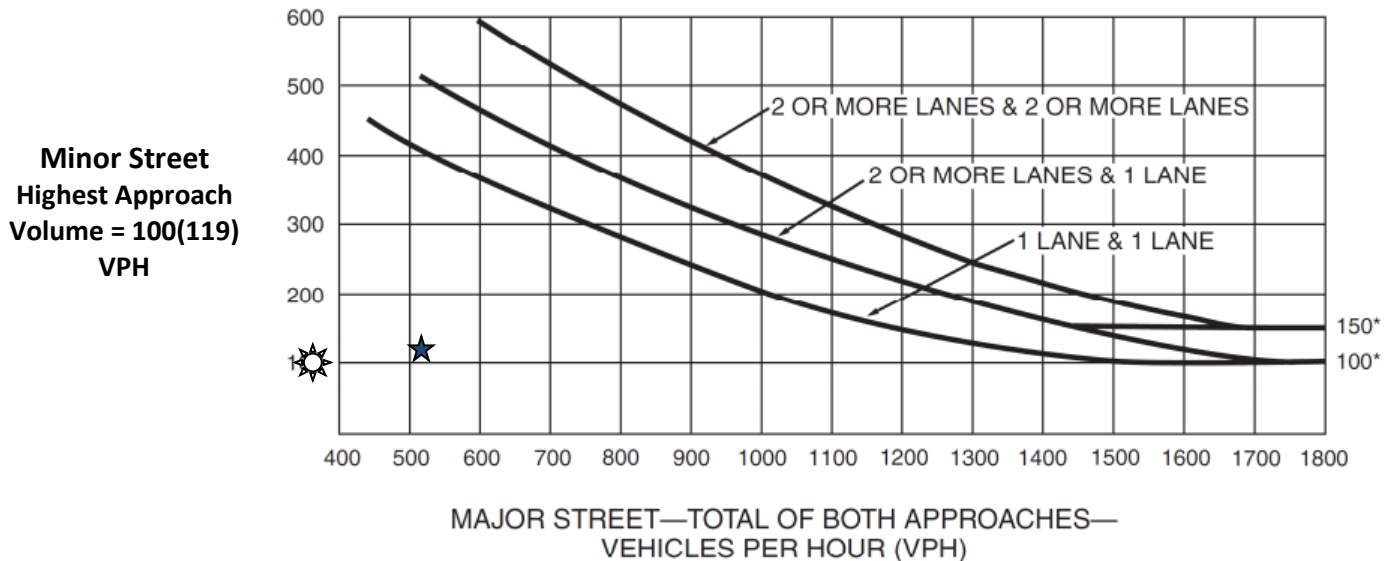
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## Peak Hour Warrant (Urban Areas)



2035 + Project – AM (PM) Peak Hour  
Intersection: Medical Center Drive at Coventry Avenue

**Figure 4C-3. Warrant 3, Peak Hour**



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Major Street Volume = 346(509) VPH**

-  **AM Peak Hour Volume – Signal Warrant is Not Met**
-  **PM Peak Hour Volume – Signal Warrant is Not Met**

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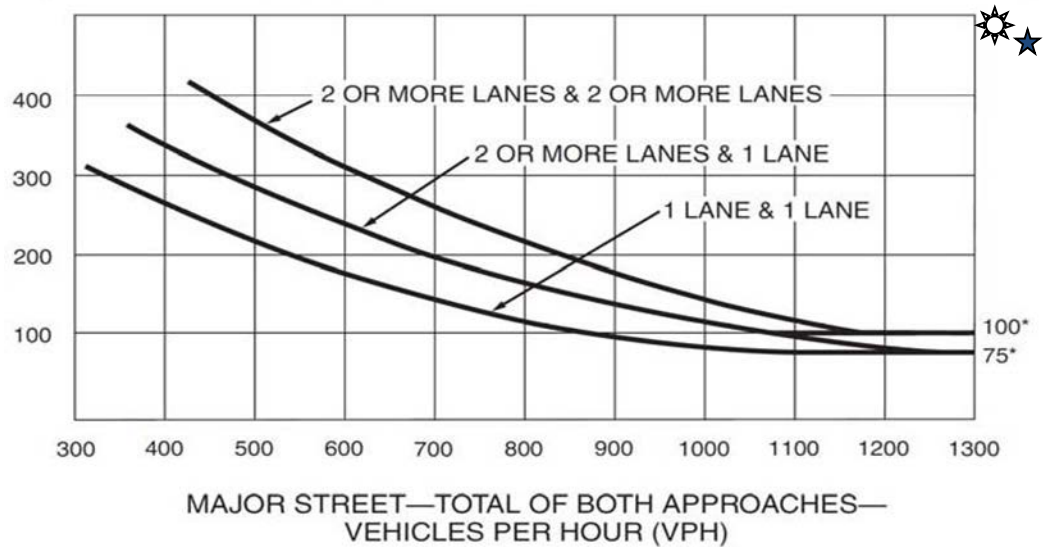
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## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour  
Intersection: Locan Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Locan Ave  
Highest Approach  
Volume = 792(587) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1818(2547) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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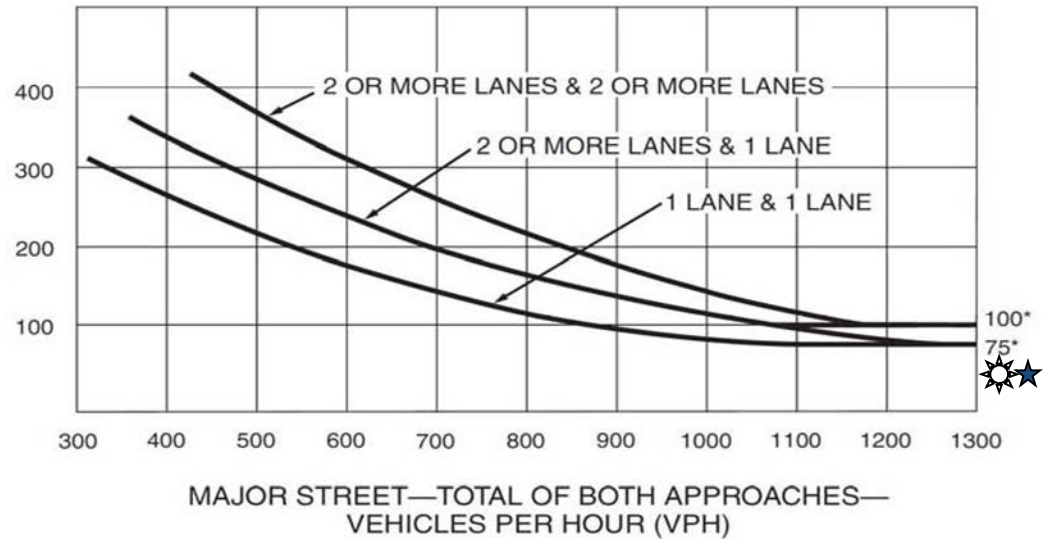


## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour  
Intersection: De Wolf Avenue (NL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

De Wolf Ave (NL)  
Highest Approach  
Volume = 52(51) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 1657(2232) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Not Met

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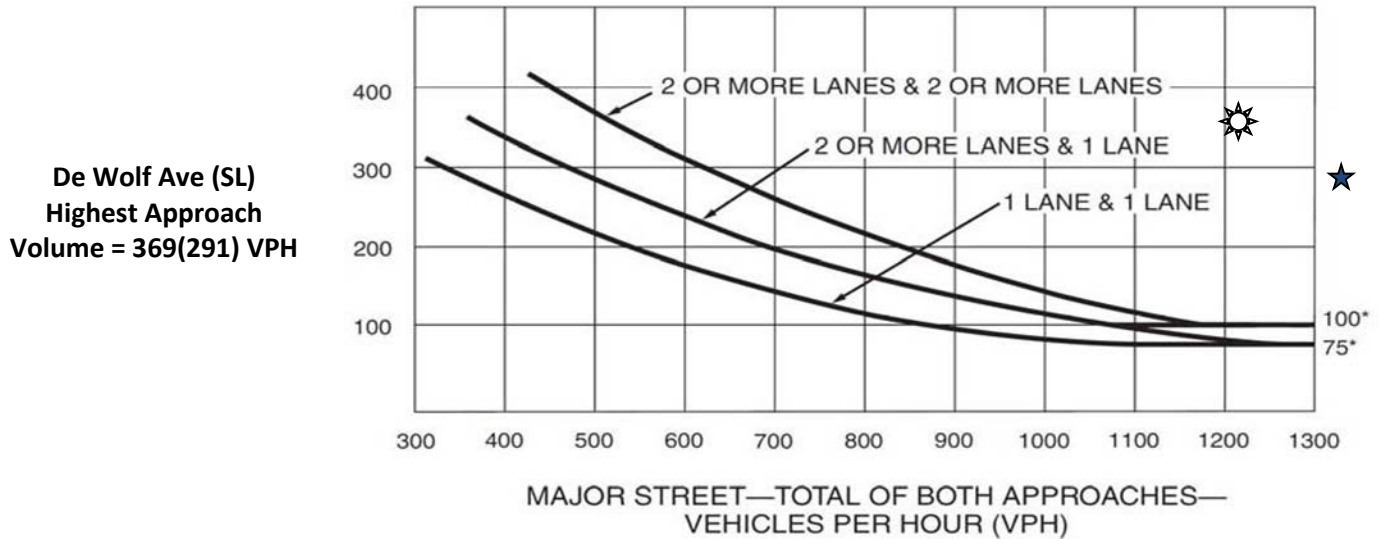
## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour

Intersection: De Wolf Avenue (SL) at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



**Herndon Ave Total Volume = 1215(1900) VPH**

☀ **AM Peak Hour Volume – Signal Warrant is Met**

★ **PM Peak Hour Volume – Signal Warrant is Met**

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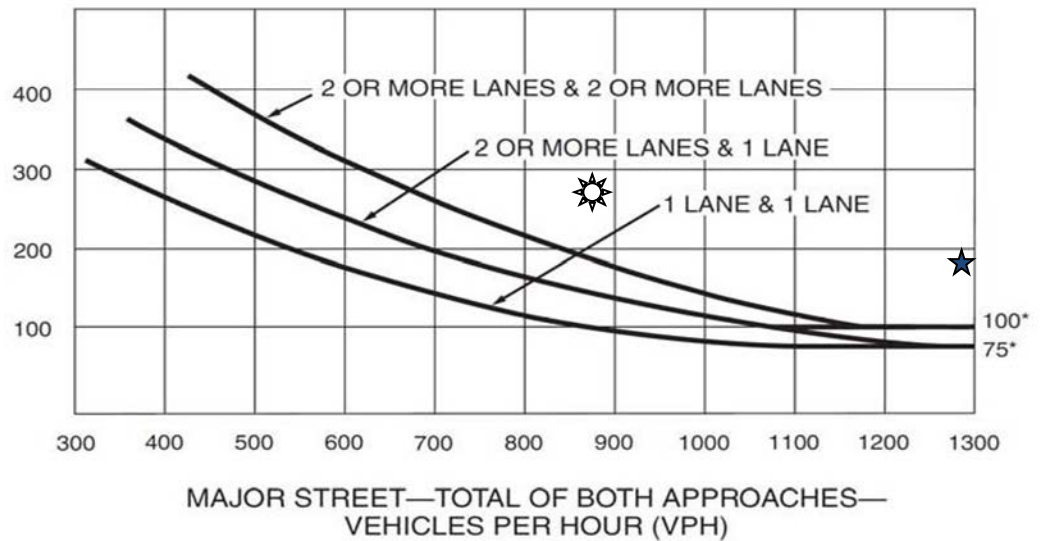


## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour  
Intersection: Leonard Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Leonard Ave  
Highest Approach  
Volume = 271(199) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Herndon Ave Total Volume = 882(1299) VPH**

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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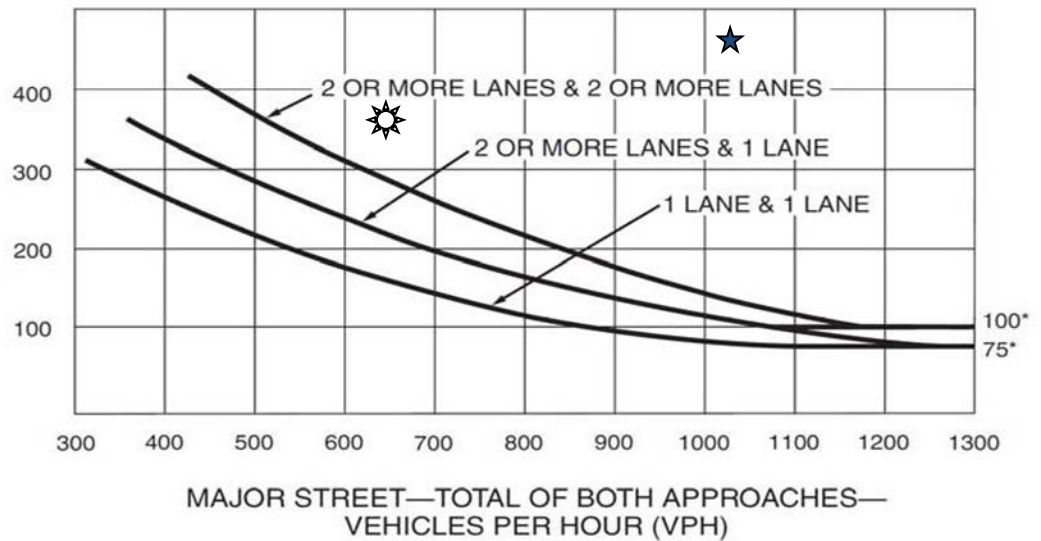
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## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour  
Intersection: McCall Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

McCall Ave  
Highest Approach  
Volume = 357(457) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Herndon Ave Total Volume = 651(1038) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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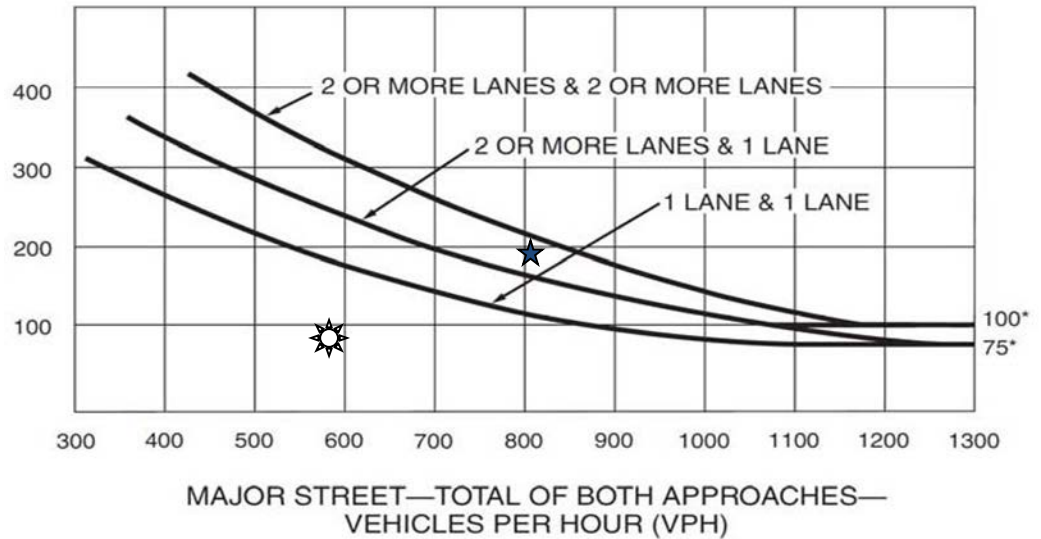
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## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour  
Intersection: Academy Avenue at Herndon Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Herndon Ave  
Highest Approach  
Volume = 85(195) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Academy Ave Total Volume = 578(804) VPH

☀ AM Peak Hour Volume – Signal Warrant is Not Met

★ PM Peak Hour Volume – Signal Warrant is Met

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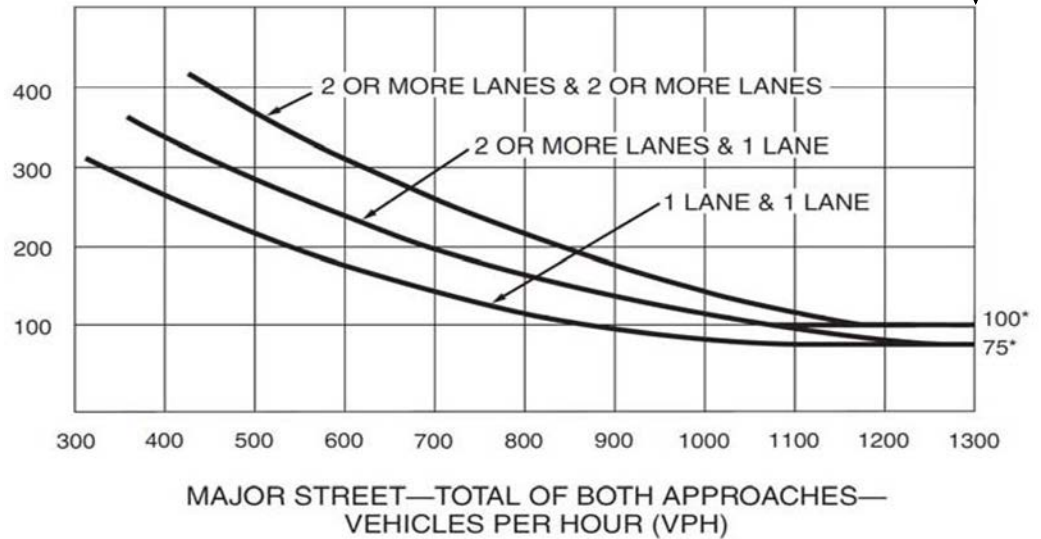
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## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour  
Intersection: Locan Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)  

Locan Ave  
Highest Approach  
Volume = 673(763) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Bullard Ave Total Volume = 1303(1699) VPH**

 **AM Peak Hour Volume – Signal Warrant is Met**

 **PM Peak Hour Volume – Signal Warrant is Met**

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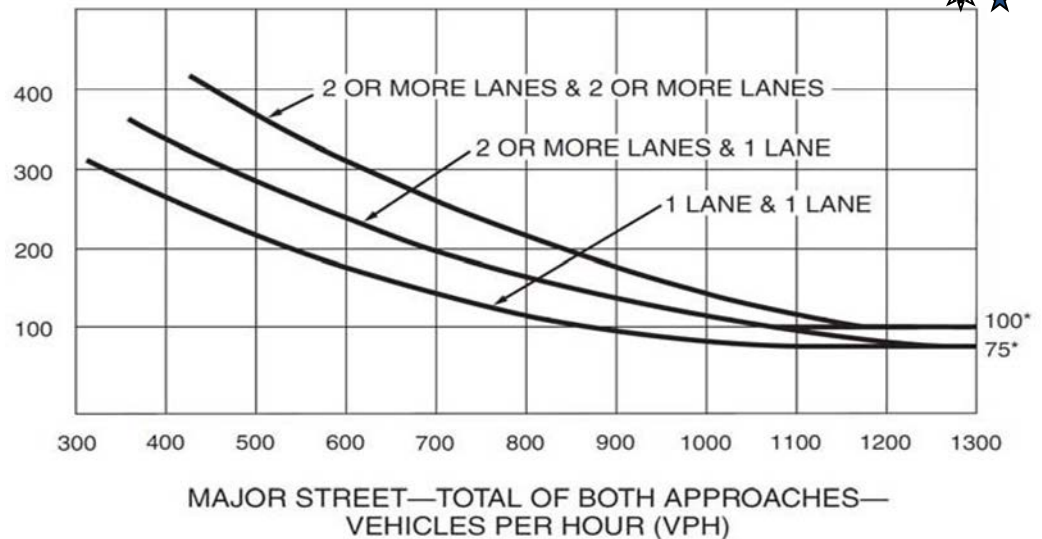
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## Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour  
Intersection: DeWolf Avenue at Bullard Avenue

**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

DeWolf Ave  
Highest Approach  
Volume = 728(549) VPH



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Bullard Ave Total Volume = 1297(1508) VPH

☀ AM Peak Hour Volume – Signal Warrant is Met

★ PM Peak Hour Volume – Signal Warrant is Met

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## **Appendix 21**

### **Water Supply Assessment**

---

City of Clovis

# Water Supply Assessment

Clovis Community Medical Center Expansion Project

Clovis

December 2017

DRAFT

Prepared for:  
City of Clovis

Prepared by:  
Provost & Pritchard Consulting Group  
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# Table of Contents

|   |      |
|---|------|
| Executive Summary .....   | ES-1 |
| 1 Introduction .....  | 1-1  |
| 1.1 Purpose and Need for the Water Supply Assessment .....                                  | 1-1  |
| 1.2 Reliance on a Related Urban Water Management Plan .....                                 | 1-1  |
| 1.3 Document Organization .....   | 1-1  |
| 2 Project Description .....   | 2-1  |
| 2.1 Project Location and Setting .....  | 2-1  |
| 2.2 Project Description .....   | 2-1  |
| 2.3 Water Supply/Treatment Infrastructure .....   | 2-4  |
| 3 Water Demands .....   | 3-1  |
| 3.1 Project Demands .....   | 3-1  |
| 3.1.1 Regulatory Requirements .....   | 3-1  |
| 3.1.2 Potable and Non-Potable Water Demand .....  | 3-2  |
| 3.2 Demands of Other Existing and Planned Development .....                                 | 3-2  |
| 4 Overview of Water Supplies .....  | 4-1  |
| 4.1 Surface Water .....   | 4-1  |
| 4.2 Supply from Storage .....   | 4-6  |
| 4.3 Groundwater .....   | 4-6  |
| 4.4 Recycled Water .....  | 4-8  |
| 4.5 Exchanges .....   | 4-8  |
| 4.6 Water Supply Summary .....  | 4-9  |
| 5 Normal Year Water Operations .....  | 5-1  |
| 6 Single-Dry and Multiple-Dry Year Water Supplies .....                                     | 6-1  |
| 6.1 Water Year Effects on Water Sources .....   | 6-1  |
| 6.1.1 Kings River Surface Water: .....  | 6-1  |
| 6.1.2 Friant CVP Surface Water: .....   | 6-1  |
| 6.1.3 Supply from Storage .....   | 6-2  |
| 6.1.4 Groundwater .....   | 6-2  |
| 6.1.5 Recycled Water .....  | 6-3  |
| 6.2 Changes in Water Source Reliability Over the Planning Horizon .....                     | 6-4  |
| 6.3 Summary of Single-Dry and Multiple-Dry Year Reliability Over the Planning Horizon ..... | 6-4  |
| 6.4 Climate-Based Reliability Factors .....   | 6-5  |

|   |                              |     |
|---|------------------------------|-----|
| 7 | Operational Reliability..... | 7-1 |
| 8 | Conclusions.....             | 8-1 |
| 9 | References .....             | 9-1 |

## List of Figures

|   |     |
|---|-----|
| Figure 2-1. Location Map.....                             | 2-3 |
| Figure 2-1. Water Infrastructure at Buildout.....         | 2-5 |
| Figure 3-1. Land Use Plan in Project Area .....           | 3-4 |
| Figure 4-1. Major Existing Infrastructure.....            | 4-3 |
| Figure 4-2. Irrigation and Water Districts.....           | 4-5 |
| Figure 6-1. City Groundwater Production (1984-2014) ..... | 6-3 |
| Figure 6-2. Mix of Water Supplies Over Time .....         | 6-6 |

## List of Tables

|   |      |
|---|------|
| Table ES-1. Overall City Water Supplies at Buildout .....                       | ES-2 |
| Table 2-1. Project Area Proportion of UWMP Demand Estimates .....               | 2-2  |
| Table 2-2. Existing and Projected Water Use .....                               | 2-2  |
| Table 3-1. Water Demands in 5-Year Increments (AFY) .....                       | 3-2  |
| Table 4-1. Projected Water Supplies (Restated).....                             | 4-8  |
| Table 5-1. Projected Water Supplies (Restated).....                             | 5-1  |
| Table 5-2. Comparison of Normal Year Project Supplies and Demands .....         | 5-2  |
| Table 6-1. Single-Dry and Multiple-Dry Year Water Supplies Available, 2035..... | 6-5  |
| Table 8-1. Summary of Project Water Supplies and Demands .....                  | 8-1  |

# Abbreviations

|                  |   |
|------------------|---|
| AF.....          | acre-feet   |
| AFY.....         | acre-feet per year  |
| CEQA.....        | California Environmental Quality Act                      |
| County.....      | Fresno County   |
| CVP.....         | Central Valley Project                                    |
| DWR.....         | California Department of Water Resources                  |
| gpd/du.....      | gallons per day per dwelling unit                         |
| gpm.....         | gallon(s) per minute                                      |
| KRWA.....        | Kings River Water Association                             |
| LAFCO.....       | Fresno County Local Agency Formation Commission           |
| Reclamation..... | US Bureau of Reclamation                                  |
| SWTP.....        | City of Clovis Surface Water Treatment Plant              |
| UWMP.....        | City of Clovis Urban Water Management Plan                |
| WMP.....         | City of Clovis, Draft Water Master Plan Update, Phase III |
| WRF.....         | City of Clovis Water Reclamation Facility                 |
| WSA.....         | Water Supply Assessment                                   |

# Executive Summary

This Water Supply Assessment (WSA) has been prepared for the City of Clovis, a California General Law city, which will exercise its independent judgment in evaluating the adequacy of available water supplies for the proposed Clovis Community Medical Center Expansion Project (Project), located in the City of Clovis.

California Water Code §10910 requires the water provider, in this case the City of Clovis, to prepare a WSA for projects that propose to construct projects that meet one or more of three trigger levels for planned water consumption, each of which is set forth in the Water Code. This Project includes more than 250,000 SF of office space, and therefore meets one of the trigger levels. This WSA evaluates whether the total projected water supplies available during normal, dry, and multi-dry water years over a 20-year planning horizon will meet the projected water demand of the Project in addition to the existing and planned future uses within the City of Clovis.

Clovis Community Medical Center (CCMC) is proposing to expand its healthcare facilities on its campus located east of Temperance Avenue between Herndon Avenue and State Route 168. In addition, commercial uses and a hotel are proposed on land owned by CCMC west of Temperance Avenue and commercial uses and an assisted living facility are proposed on land south of Herndon Avenue.

The existing medical center comprises 719,548 square feet of building area, including the main hospital building (223,521 square feet), a bed tower (138,726 square feet), the outpatient care center (70,300 square feet), a conference center (21,814 square feet), a central plant (17,354 square feet), a parking garage (659 spaces), and administrative, corporate, and medical office buildings (247,833 square feet total). The existing medical center includes 208 licensed beds. The proposed expansion is divided into two major phases: a 2-10 year expansion plan and a 20 year expansion plan. The components of the 2-10 year expansion plan are listed in **Table 2-2** and shown in Figure 2.3. Construction of these components will increase the building square footage of the medical center by approximately 410,172 square feet to a total of 1,129,720 square feet. The number of licensed beds will increase from 208 to 358. The 2-10 year expansion plan also includes the addition of up to 150,000 square feet of commercial space west of Temperance Avenue, as well as a 150-room hotel.

## Annual Supplies

The City of Clovis has four primary sources of water:

- *Surface Water from the San Joaquin and Kings rivers, via contract with Fresno Irrigation District (FID).*
- *Supply from Storage, which is water withdrawn from underground storage facilities operated by FID.*
- *Groundwater pumped directly from beneath the City*
- *Recycled Water from the City's Water Reuse Facility*

These sources will cumulatively be adequate to meet all Project demands during normal, dry and multiple dry water years. Each source is evaluated individually in this WSA.

The water supplies available to the Project are summarized in **Table ES-1**, along with the status of the agreement or permit that authorize their use. As shown, water from San Joaquin and Kings rivers, which is available under agreement with Fresno Irrigation District, and Supply from Storage are the primary supplies. Groundwater pumped within the City of Clovis city limits is available up to the sustainable yield of the underlying aquifer, though the City's Draft Water Master Plan Update, Phase III shows that the City intends

to not pump non-banked groundwater after 2016. Recycled water will be used to meet a portion of the Project's landscape water demand.

**Table ES-1. Overall City Water Supplies at Buildout**

| Overall City Water Supplies at Buildout |                    |                       |
|---|--------------------|-----------------------|
| Water Supply                            | Quantity (AFY)     | Type                  |
| Groundwater                             | 9,400 <sup>1</sup> | Potable               |
| Surface Water                           | 34,512             | Potable annual supply |
| Exchanges                               | 1,018              | Potable               |
| Supply from Storage                     | 13,500             | Potable               |

## Operational Procedures

The WSA evaluates the availability of water on an annual basis, as required by California Water Code §10910.

The City relies on the four supplies mentioned above to meet water demands. No single supply is adequate to meet all demands throughout the year. Surface water available through the FID agreement will not be adequate to meet the daily demands of the City together with the Project. This will be addressed by pumping banked water from the City's well field. Recycled water from the City's plant is sourced from wastewater, which is an extremely reliable water source and will allow the City to meet certain non-potable demands without placing a drain on the two other primary supplies. The combination of these three supplies is expected to be adequate to meet overall demand within the City under most circumstances, throughout the 20-year planning horizon; the City does not plan to use groundwater as a supply during normal years but it is available as a supplement in dry years.

---

<sup>1</sup> The safe yield of the aquifer, which is expected to be the pumping limit after 2020.

# 1 Introduction

## 1.1 Purpose and Need for the Water Supply Assessment

This Water Supply Assessment (WSA) evaluates the adequacy of available water supplies for the proposed Clovis Community Medical Center Expansion Project (Project), located in the City of Clovis, Fresno County, California. California Water Code §10912(a) requires preparation of a WSA meeting the requirements of Water Code §10910 et seq for projects within cities and counties that meet one of several water demand triggers, or the equivalent. These triggers include: construction of 500 or more residential units, construction of a shopping center or business establishment having 500,000 square feet of floor space, construction of a commercial office building having more than 250,000 square feet, a proposed hotel or motel having more than 500 rooms, or another project having a water demand equivalent to or greater than the 500-unit development.

The Project's proposed hospital expansion, additional ancillary buildings and new medical office buildings more than meet the 250,000 SF office space trigger and so a WSA is required. The City of Clovis operates the water system to which the Project proposes to connect. This water system meets the standards for a "Public Water System" as set forth in Water Code §10912(c); the City is therefore responsible for preparation of the required WSA in accordance with Water Code §10910(b).

## 1.2 Reliance on a Related Urban Water Management Plan

If the Project falls within the boundaries of a current Urban Water Management Plan (UWMP) prepared by the water purveyor, Water Code §10910(c)(1) requires that the WSA determine whether projected water demand associated with the Project included as part of that duly-adopted UWMP. This Project is within the boundaries of the 2015 Clovis UWMP, which was adopted by the City of Clovis by resolution of the City Council on July 5, 2016. The Project area was included in the calculations prepared for the UWMP. Thus, in accordance with the Water Code, the preparers have relied on information from the UWMP, and from the Draft Water Master Plan Update, Phase III (WMP, Provost & Pritchard, 2017), wherever possible in preparing the various elements of this Assessment.

## 1.3 Document Organization

This WSA is organized as follows:

- *Section 2 describes the Project and its location.*
- *Section 3 provides an overview of the City's primary water supplies.*
- *Section 4 describes the Project's potable and non-potable water demands in addition to those of other existing and planned uses, and how these vary from the numbers used in the UWMP.*
- *Section 5 discusses the adequacy of water supplies during normal years.*
- *Section 6 discusses the adequacy of water supplies during single-dry and multiple-dry years.*
- *Section 7 discusses operational reliability on a daily basis.*
- *Section 8 concludes whether supplies would be adequate during normal, dry-year, and multiple-dry years during a 20-year projection.*
- *Section 9 lists references cited in this WSA.*

## 2 Project Description

### 2.1 Project Location and Setting

The Project evaluated in this WSA is the proposed Clovis Community Medical Center (CCMC) Expansion Project (Project), which is planned as phased development to be fully built out over the next 20 years. The CCMC expansion plan includes construction of new inpatient bed towers, medical office buildings, a general support building, a cancer center, a central plant and a parking garage, as well as expansion of the emergency department, surgical facilities, materials management and the outpatient community center. In addition, the CCMC project includes the potential development of areas adjacent to the main campus, primarily with retail commercial buildings, as well as a hotel and an assisted living center.

The project site comprises approximately 148 acres located on the north and south sides of Herndon Avenue, east and west of North Temperance Avenue. The Enterprise Canal forms the eastern boundary of the project site. A description of the project site location and key locational characteristics is provided in **Table 2-1**.

**Figure 2-1** identifies the location of the project in relation to surrounding Clovis/Fresno region. **Figure 2-2** identifies the boundaries of the project site.

The City Limits currently encompasses 23.3 square miles. The City's Sphere of Influence (SOI) covers 31.6 square miles, while the City's General Plan encompasses approximately 73 square miles. Located at the current eastern edge of the City of Clovis, the area around the Project is developing to urban and residential uses; however, residual rural residential uses and vacant parcels remain in the vicinity. Adjacent land uses include urban residential development and an elementary school to the south, the Enterprise Canal and rural residential to the east, State Route 168, agricultural land and commercial development to the north, and rural residential to the west.

The Project site is designated in the City of Clovis General Plan as Office and Mixed Use/ Business Campus. The project site is a part of a large area planned as a Mixed Use/Business Campus, which extends to the north and west. Residential and Public Facilities are designated land uses to the south and Rural Residential to east (Fresno County designation outside of Clovis City Limit). The entire Project site is included in the 2015 Clovis Urban Water Management Plan.

### 2.2 Project Description

Clovis Community Medical Center is proposing to expand its healthcare facilities on its campus located east of Temperance Avenue between Herndon Avenue and State Route 168. In addition, commercial uses and a hotel are proposed on land owned by CCMC west of Temperance Avenue and commercial uses and an assisted living facility are proposed on land south of Herndon Avenue. See **Figure 2-1**.

The existing medical center comprises 719,548 square feet of building area, including the main hospital building (223,521 square feet), a bed tower (138,726 square feet), the outpatient care center (70,300 square feet), a conference center (21,814 square feet), a central plant (17,354 square feet), a parking garage (659 spaces), and administrative, corporate, and medical office buildings (247,833 square feet total). The existing medical center includes 208 licensed beds.

The proposed expansion is divided into two major phases: a 2-10 year expansion plan and a 20 year expansion plan. The components of the 2-10 year expansion plan are listed in **Table 2-2**. Construction of

these components will increase the building square footage of the medical center by approximately 410,172 square feet to a total of 1,129,720 square feet. The number of licensed beds will increase from 208 to 358. The 2-10 year expansion plan also includes the addition of up to 150,000 square feet of commercial space west of Temperance Avenue, as well as a 150-room hotel.

The Project area is designated as Commercial and Mixed-Use in the City's current land use plan. Based on the UWMP land uses and water demand projections, the UWMP planned for the Project Area to have the water demands shown in **Table 2-1**.

**Table 2-1. Project Area Proportion of UWMP Demand Estimates**

| Project Area Proportion of UWMP Demand Estimates |      |      |      |      |      |
|--|------|------|------|------|------|
|  | 2015 | 2020 | 2025 | 2030 | 2035 |
| Project Area                                     | 135  | 173  | 195  | 220  | 249  |

The applicant's projections of Project water use are summarized in **Table 2-2**. See Appendix A for the applicant's actual water demand projections. These projections use building specific demand calculations where those are known, and the water demand factors used in the UWMP for the balance of the Project area, so the estimates are comparable to the work the City has already done. The UWMP accounts for development on the Project lands, but planned for slightly less intensive water use. The UWMP made its water use projections based on planned land uses, since no specific development plans for the area were known at the time the document was prepared.

**Table 2-2. Existing and Projected Water Use**

| Existing and Projected Water Use |                 |           |            |
|----------------------------------|-----------------|-----------|------------|
|                                  | Water Use (AFY) |           |            |
| Land Use                         | Existing        | 2-10 Year | 10-20 Year |
| Hospital                         | 122             | 181       | 262        |
| MOBs                             | 2               | 11        | 13         |
| On-Site Recycled Water           | 2               | 3         | 2          |
| Mixed Use/ Business              | 0               | 85        | 85         |
| Office                           | 0               | 0         | 32         |
| Total:                           | 126             | 280       | 394        |

There is a nearly 60-percent increase from the UWMP demand assumptions to the applicant's project-specific projections. In fact, the difference the change makes to the overall City water budget is less than one-half of a percent, which is well within the margin of error of the original projections. Accordingly, this WSA does not make any adjustments to the UWMP demand projections.






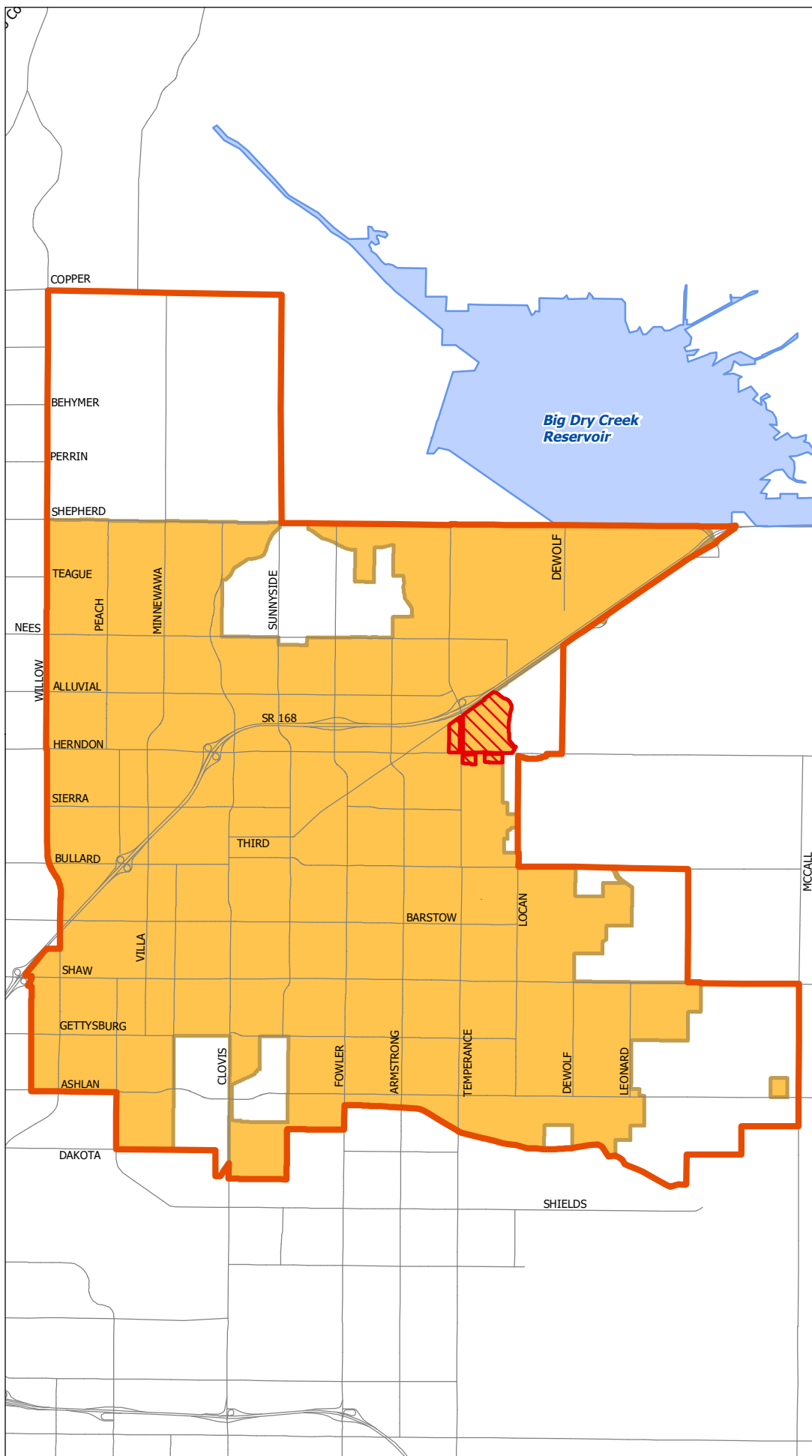
## Legend

— Major Streets

 Project Area

 City Boundary

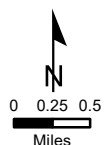
 Clovis S.O.I.



**Figure 2-1  
Project Location**

## Clovis Community Medical Center Water Supply Assessment

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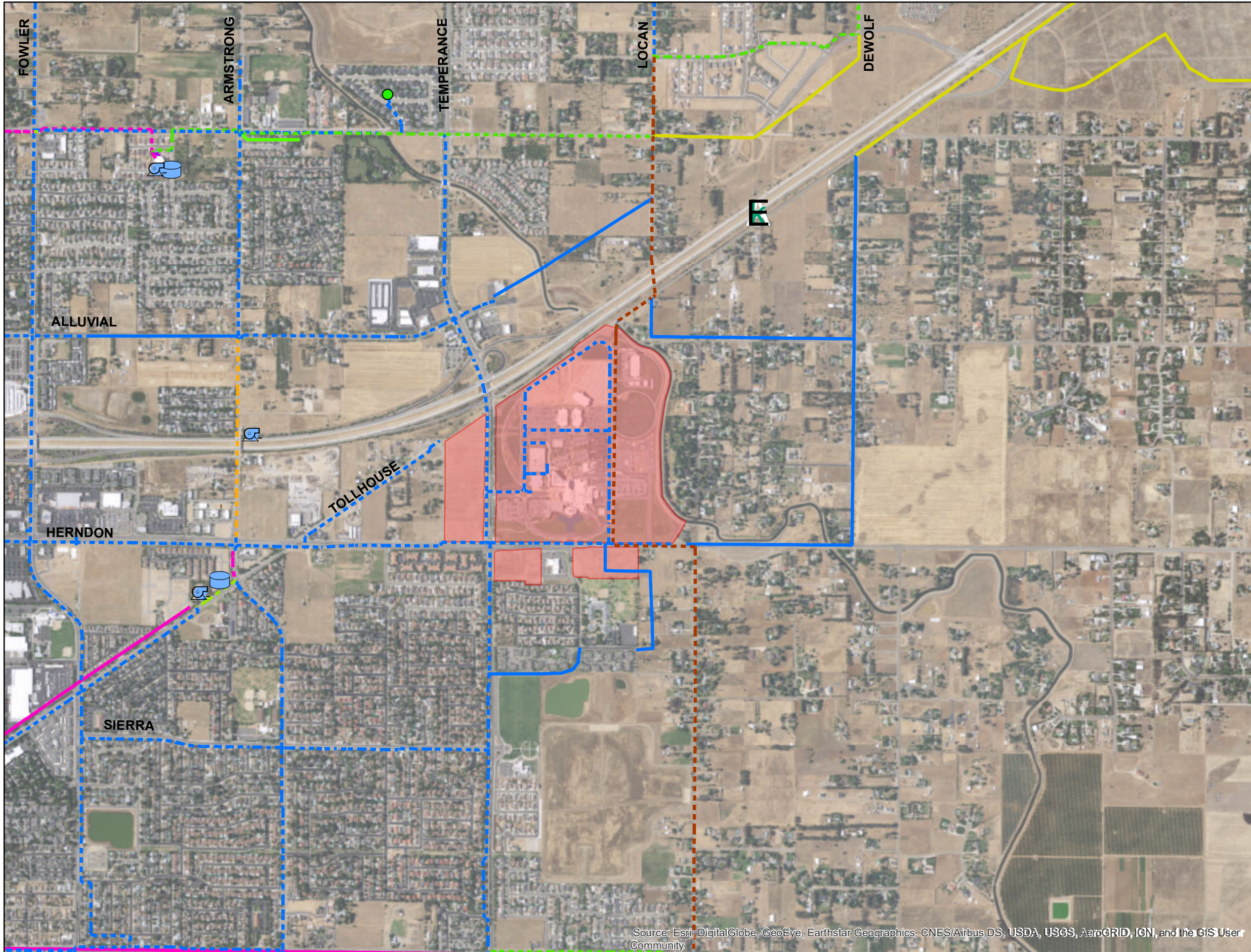
## 2.3 Water Supply/Treatment Infrastructure

Surface water is diverted from the Friant-Kern Canal via a pipeline to the City's Surface Water Treatment Plant (SWTP) located at Bullard and Leonard Avenues. Built in 2004, the SWTP has a current treatment capacity of 22.5 million gallons per day (mgd). Expansion to 45 mgd is planned for the future.

Water will be delivered to the Project via the City's existing and planned distribution system. The water distribution system is shown in full in the WMP, and in detail on **Figure 2-2**. Other than full construction of the loop of 12-inch water lines around the Project Area, no new distribution infrastructure will be required to serve the Project.

Project wastewater will be collected by the City's existing sewer system and will be conveyed either to the Fresno-Clovis Regional Water Reclamation Facility (RWRF) in southwest Fresno, or to the City's Water Recycling Facility WRF. No new wastewater treatment or disposal facilities will be required as a result of the Project.





### Legend

- Well
- Booster Station
- Tank

Major Streets

Project Area

### Existing Water Mains

Size (inches)

- 12"
- 14
- 18"
- 20"
- 24"
- 25
- 30"
- 36"
- 42"

### Future Water Mains

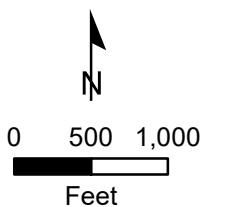
Size (inches)

- 12"
- 16"
- 18"
- 24"

**Figure 2-2**  
**Water Infrastructure At Buildout**

**Clovis Community  
Medical Center  
Water Supply Assessment**

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## 3 Water Demands

This section summarizes Project water demands over a 20-year planning horizon, assuming full buildout in 2035, together with existing and planned future development within the Project site. Project potable and non-potable water demands have been estimated by the applicant. Demands of existing and anticipated development of the project area were included in the UWMP and in the CWMP, and were based on reviews of onsite land uses. This section compares the applicant's projections with the City's earlier plans.

### 3.1 Project Demands

#### 3.1.1 Regulatory Requirements

Indoor water demands are to be calculated based on the California Green Building Standards Code, commonly referred to as the CALGreen Code, and outdoor potable water demands must comply with California's Model Water Efficient Landscape Ordinance (MWELO) requirements.

The CALGreen Code is set forth in California Code of Regulations (CCR) Title 24, Part 11. Among other issues, it establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development and water conservation. Under the CALGreen Code, all flush toilets are limited to 1.28 gallons per flush, and urinals to 0.5 gallon per flush. In addition, maximum flow rates for faucets are established as follows: 2.0 gpm at 80 pounds per square inch (psi) for showerheads; 1.5 gpm at 60 psi for residential lavatory faucets; and 1.8 gpm at 60 psi for kitchen faucets.

In response to California's severe ongoing drought, the governor released Executive Order B-29-15 on April 1, 2015, which included revisions to the MWELO to increase water efficiency standards through more efficient irrigation systems, graywater use, onsite storm water capture, and by limiting the portion of landscapes that can be planted in turf. Per this executive order, the Department of Water Resources (DWR) updated the 2009 MWELO, which promotes efficient landscapes in new developments and retrofitted landscapes. The revised ordinance was adopted by the California Water Commission on July 15, 2015, and it took effect on December 1, 2015. Any new commercial or residential landscaping over 500 square feet is subject to the updated ordinance.

The MWELO requires a project applicant to prepare a landscape documentation package and submit it to the local agency for approval. Specific plans and reports that must be provided include a water efficient landscape worksheet, soil management report, landscape design plan, irrigation design plan, and grading design plan. A certificate of completion is also required to confirm that the landscape project has been installed per the approved landscape design package. The MWELO also includes provisions for irrigation scheduling and maintenance, as well as irrigation audits. The use of reclaimed water and graywater systems also are addressed.

The following measures are among the 2015 changes to the MWELO:

- *Landscape water meters are required for residential landscape areas over 5,000 square feet and non-residential areas over 1,000 square feet.*
- *Pressure regulators and master valves are required for all new irrigation systems.*
- *Irrigation systems must be designed so that a precipitation rate of 1.0 inch per hour is not exceeded over any portion of the landscape.*
- *Flow sensors that detect and report high flow conditions due to broken pipes and or popped sprinkler heads are required.*

- *Minimum width of turf that can be irrigated with sprinklers increased from 8 to 10 feet. Areas of turf below this threshold must be irrigated with subsurface drip or other technology that produces no over spray or runoff.*

The ordinance also contains prescriptive requirements that may be used as a compliance option. Compliance with certain items is mandatory if this option is followed; these include incorporating compost at a specified rate, using certain types of plants in residential and non-residential areas, and limiting turf to not exceed 25 percent of the landscape in residential areas (no turf is allowed in non-residential areas). Turf is not allowed on areas that exceed a slope of 1:4 (25 percent), and is prohibited in parkways less than 10 feet wide, unless the parkway is adjacent to a parking strip and used for vehicles to enter and exit. Any turf in parkways must be irrigated by subsurface irrigation or by other technology that creates no overspray or runoff.

### 3.1.2 Potable and Non-Potable Water Demand

A water usage projection for the Project was received from the applicant. It had been calculated based on standard water use factors for the buildings and areas proposed, assuming use of CALGreen-compliant water fixtures. Outdoor water demand was calculated using the methodology described in MWEL. Maximum day demand was determined by applying a peaking factor of 2.0 to the Average Day Demand (ADD). Similarly, a peaking factor of 3.3 was applied to the ADD to determine the peak hour demand. These are the peaking factors from the WMP and are consistent with accepted industry standards. **Table 2-2** summarizes demands of the Project currently, at the end of the 2 to 10-year expansion, and at buildout, which would require an average of 394 AF/year.

Water demands were calculated in 5-year increments, as shown in **Table 3-1**. This table is based upon the growth milestones submitted by the applicant for use in the Project EIR.

**Table 3-1. Water Demands in 5-Year Increments (AFY)**

| Water Demands in 5-Year Increments |                  |                  |                   |                   |                   |
|------------------------------------|------------------|------------------|-------------------|-------------------|-------------------|
|                                    | Year 1<br>(2015) | Year 5<br>(2020) | Year 10<br>(2025) | Year 15<br>(2030) | Year 30<br>(2035) |
| Total Demand                       | 126              | 203              | 280               | 337               | 394               |

## 3.2 Demands of Other Existing and Planned Development

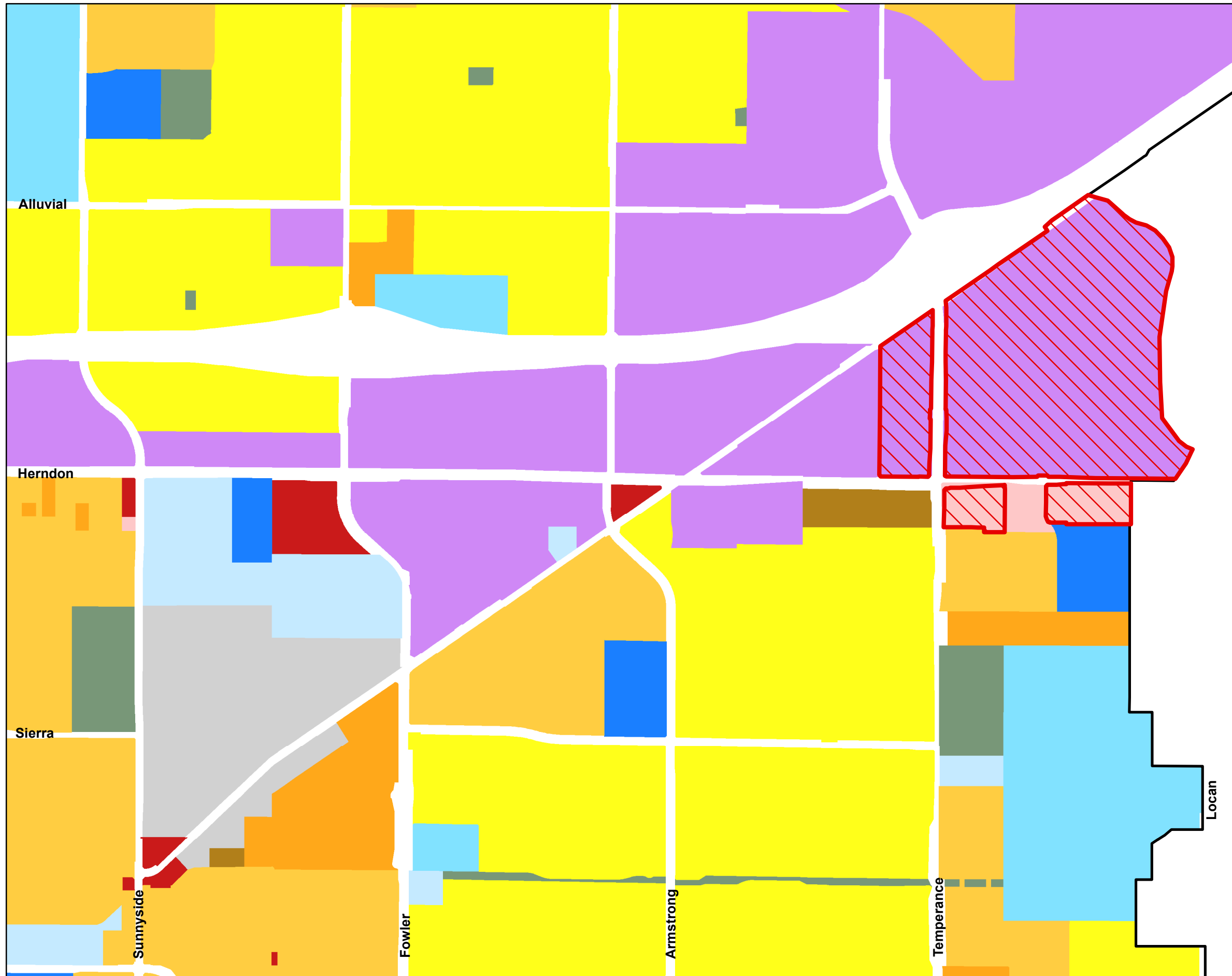
The UWMP reports the existing and planned demands for raw, potable and recycled water within the City over the same 20-year planning horizon. These demands are summarized in UWMP Table 4.4, which is reproduced below.

**Table 4.4 Total Water Demands (Guidebook Table 4.3)**















| Demand Use                 | 2015          | 2020          | 2025          | 2030          | 2035          |
|----------------------------|---------------|---------------|---------------|---------------|---------------|
| Potable and Raw Water      | 21,590        | 36,300        | 39,945        | 43,950        | 48,482        |
| Recycled Water             | 382           | 2,913         | 3,137         | 5,498         | 6,274         |
| <b>Total Water Demands</b> | <b>21,972</b> | <b>39,213</b> | <b>43,082</b> | <b>49,448</b> | <b>54,755</b> |

Comparing the total Project water demand in **Table 3-1** with the total water demand analyzed in the UWMP, the Project makes up a very small portion of the overall water being delivered by the City, with the Project's portion increasing from 0.6 to 0.7 percent of the total water delivered annually over the 20-year planning horizon.

The WMP shows the land use designations for the entire City water service area, which were used to plan demand in undeveloped areas. A portion of that plan, including the Project area, is shown on **Figure 3-1**.



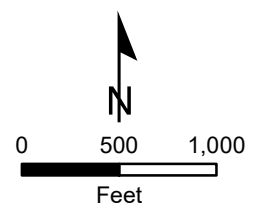
### Legend

-  Project Area
-  Clovis City Limits
- City of Clovis General Plan Existing Land Use**
-  LOW
-  MEDIUM
-  MEDIUM HIGH
-  HIGH
-  MIXED USE
-  OFFICE
-  INDUSTRIAL EMPLOYMENT CENTER
-  COMMERCIAL
-  PUBLIC FACILITIES
-  PARKS
-  SCHOOLS
-  WATER BASIN

**Figure 3-1**  
**Land Use Plan in Project Area**

**Clovis Community Medical Center**  
**Water Supply Assessment**

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## 4 Overview of Water Supplies

Water Code §10910(c)(2) allows reliance on the City's UWMP to determine overall water supply reliability if the Project's planned water demand was included in the UWMP. While the currently-planned demand is slightly greater than was included in the calculations for the UWMP, the project area itself was included and the overall difference in demand is small in comparison with the overall City demand. This WSA relies in large part on the UWMP, with adjustments to the planned water use numbers to account for the most current Project plans.

§10910(d) requires that a WSA identify any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, including any such existing entitlements, rights, or contracts held by the public water system or city or county preparing the WSA. These descriptions appear in detail in Chapter 6 of the UWMP and are summarized below. The City's major water infrastructure facilities are shown on **Figure 4-1**.

### 4.1 Surface Water

The City's surface water supply is provided through an agreement with Fresno Irrigation District (FID), which allows the City to receive a share of FID's Kings River and Friant CVP entitlements. Garfield Water District (GWD) and International Water District (IWD) are located within the City's General Plan boundaries. As the districts' service areas are urbanized, surface supplies available to the two districts will be added to the City's surface water supply. At this time, all surface water available to the City comes from the FID contract. The boundaries of each of the districts are shown on **Figure 4-2**.

Kings River entitlement accrues as a result of Sierra snowmelt so the overall quantity varies greatly from year to year. Clovis receives a proportionate share of FID's entitlement based on its acreage within FID compared with the total area of FID, which is currently 5.9%. FID's Kings River entitlement is not directly proportional to the overall runoff quantity. FID was the first agency to establish a diversionary right on the Kings River, in the late 1800s. When the rights of the 27 Kings River water agencies were quantified and tabulated following construction of Pine Flat Dam in 1953, priority for low water flows was given to those agencies with the oldest (or most senior) rights. As a result, FID gets a larger percentage of the overall flow on days when the river flow is low, making its rights in dry water years more reliable than average, and making their wet-year, high flow rights somewhat lower than they otherwise might be. The entitlement rights for each agency are set forth in the Kings River Water Association's "Blue Book," which specifies the entitlement for each agency on each day of the year, based on the calculated actual river flow on the Kings River at the Piedra gauging station below Pine Flat.

Over time, Clovis has received on average 23,609 AF per year from FID, though this has varied from 6,978 AF in the severe drought of 2015 to over 43,000 AF in the wettest year of record. Because of anticipated growth of the City within the FID service area boundary, the City's share of FID Kings River allocation is expected to increase over time. The UWMP projects that the average delivery to the City will climb from the current 23,609 AF per year to 31,670 AF per year by 2030.

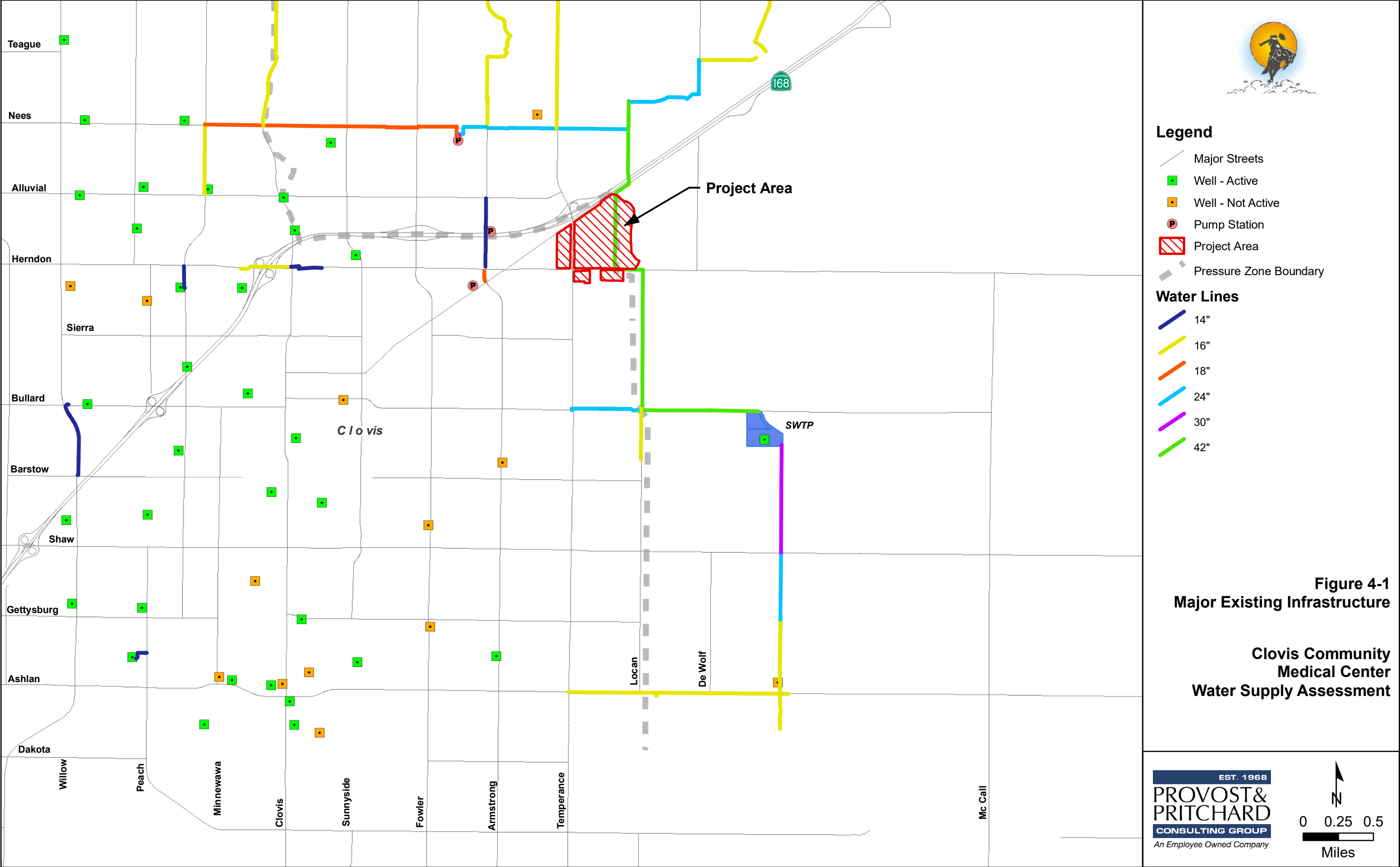
Similarly, Clovis is entitled to a proportion, by area, of FID's Friant CVP Class II entitlement. Class II supplies are driven by the snowmelt in the San Joaquin River basin, but are not directly proportional to runoff. Water behind Friant Dam is managed by the US Bureau of Reclamation (USBR) and falls into several categories or classes. FID's contract is for Class II supplies, which are less dependable than CVP's Class I water contracts. FID contracts with USBR for 75,000 AF of Class II supply, and has received an average of



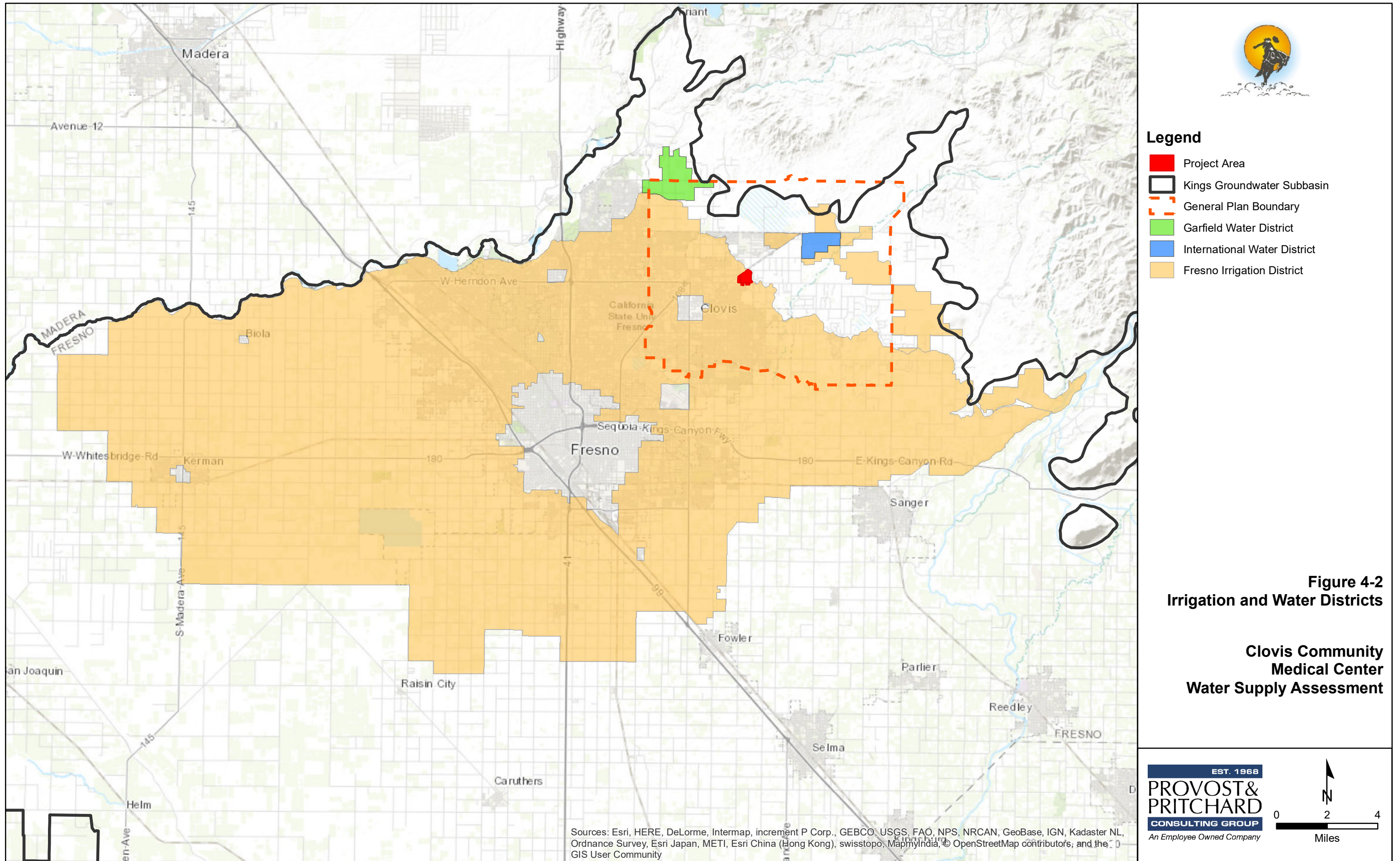
Section Four: Overview of Water Supplies  
Water Supply Assessment  
Clovis Community Medical Center Expansion Project

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13,577 AF per year, with the actual number ranging from zero to the full 75,000 AF depending upon the nature of each water year over that period. Clovis has received an average of 798 AF per year for its proportionate share.



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The City's overall water use in 2015 was 21,972 AF (UWMP, Table 4.4). While the average yield from the FID contract could appear to be adequate to meet the demand, two factors require the City to have other available supplies. First, the FID supply contract is not reliable year to year. The combined delivery of San Joaquin and Kings river water per year has ranged from 32 percent of the total demand to over 215 percent of demand. Second, the timing of the surface water deliveries do not meet the City's needs for potable water. Surface water is available from January through September in the wettest years, and may be available for only a 60 to 90-day period in a very dry year. That is not acceptable for a municipal water system with demands every day of the year. The other supplies discussed below are available throughout the year and are used to firm up the surface water supply.

Garfield Water District (GWD) is located north of the City, with a portion of the district in the City's Sphere of Influence (SOI). GWD holds a Class I CVP contract for 3,500 AFY. Friant CVP Class I supplies are relatively reliable, with USBR delivering 100 percent of the contract amount in nearly every water year that is 85 percent of normal or greater. With approximately half of GWD within the City's SOI, an estimated 1,170 AFY is expected to be added to the City's supply as this area develops.

International Water District (IWD) is located east of the City's SOI, within the general plan's boundary. IWD holds a Class I CVP contract for 1,200 AFY, with the same reliability characteristics as discussed above. The City's General Plan designates a portion of the Districts area as industrial and residential use. At build-out of that area, approximately 600 AFY will be added to the City's surface water resources.

## 4.2 Supply from Storage

Since 2004, the City has been storing water in the aquifer in order to create a stable source of supply over the years. Using the City's contracted shares of capacity in FID's Waldron Banking Facility and Boswell Groundwater Banking Facility, the City has been working with FID to recharge surface water, building up credit in the aquifer which allows for annual withdrawals. The surface water banked will include portions of FID's Kings and CVP supplies, as well as potential other surface water supplies that FID is able to secure on the spot market. Recharged water is purchased under separate agreements with FID and is not included in the surface water totals in the previous section, so this is truly a separate and additional water supply. This process is fully explained in the UWMP.

In 2015, 11,222 AF were withdrawn from storage during the worst drought on record. The City has created a recharge plan accounting for historic variations in surface water supplies that will allow it to withdraw an annual 13,500 AF, the maximum withdrawal allowed under the City's agreements with FID. This is considered a firm supply. The 13,500 AF maximum annual withdrawal is built into the water supply projections in the UWMP for each year over the planning horizon.

## 4.3 Groundwater

Until 2004, the City relied totally on pumped groundwater to meet its water demands. With the advent of the SWTP that year and subsequent construction of the banked water facilities and Water Reclamation Plant described in the following sections, the City now intends to rely exclusively on those three supplies and not pump groundwater to meet its normal water demands. The CWMP shows how this will be done, starting in 2017. Despite that operational plan, groundwater from the basin underlying much of the City remains a viable water resource the City will be able to tap if needed, and so is included in this WSA.

The City is located within the Kings Groundwater sub-basin, a part of the Tulare Lake Hydrogeologic Basin as described in the Department of Water Resources Bulletin 118. The groundwater basin is in overdraft and has been for many years. However, it has not been adjudicated.

## Section Four: Overview of Water Supplies

### Water Supply Assessment

#### Clovis Community Medical Center Expansion Project

Tables 6.12 and 6.13 of UWMP provide a great deal of additional information and analysis, and project an annual groundwater budget for the City that varies from 9,964 AF to 13,994 AF depending on the other water resources available at various milestone years. UWMP Tables 6.12 and 6.13 are reproduced below.

Table 6.12 Water Supplies – Actual (Guidebook Table 6.8)

| Water Supply        | Additional Details on Water Supply  | 2015               |                |
|---------------------|-------------------------------------|--------------------|----------------|
|                     |                                     | Actual Volume (AF) | Water Quality  |
| Groundwater         | Tulare Lake Basin 5-22.08           | 12,190             | Raw Water      |
| Surface Water       | Kings River and CVP                 | 6,989              | Raw Water      |
| Exchanges           | Clovis Share of RWRf exchange water | 868                | Raw Water      |
| Supply from Storage | Waldron & Boswell banked Supplies   | 11,222             | Raw Water      |
| Recycled Water      |                                     | 1,870              | Recycled Water |
| <b>Total</b>        |                                     | <b>33,139</b>      |                |

Table 6.13 Water Supplies – Projected (Guidebook Table 6-9)

| Water Supply        | Additional Details on Water Supply  | Projected Water Supply (AF) |               |               |               |
|---------------------|-------------------------------------|-----------------------------|---------------|---------------|---------------|
|                     |                                     | 2020                        | 2025          | 2030          | 2035          |
| Groundwater         | Tulare Lake Basin 5-22.08           | 11,153                      | 13,994        | 9,964         | 12,649        |
| Surface Water       | Kings River and CVP                 | 27,314                      | 31,283        | 34,392        | 34,512        |
| Exchanges           | Clovis Share of RWRf exchange water | 1,216                       | 1,281         | 1,001         | 1,018         |
| Supply from Storage | Waldron & Boswell banked Supplies   | 13,500                      | 13,500        | 13,500        | 13,500        |
| Recycled Water      |                                     | 2,913                       | 3,137         | 5,498         | 6,273         |
| <b>Total</b>        |                                     | <b>56,095</b>               | <b>63,194</b> | <b>64,354</b> | <b>67,952</b> |

Chapter 9 of the CWMP calculates a safe groundwater yield for the service area and concludes the safe yield to be 9,400 AF per year for normal, single-dry and multiple-dry years. While final rules have not been set, it is likely that when SGMA regulations go into effect in 2020 groundwater withdrawals will be limited to the safe aquifer yield either annually or on some sort of rolling average basis. **Table 4-1** restates UWMP Table 6.13 with groundwater withdrawals limited to 9,400 AF per year. The totals from **Table 4-1** will be used to complete the analysis in this report.

Table 4-1. Projected Water Supplies (Restated)

| Projected Water Supplies (Restated) |                    |               |               |               |               |
|-------------------------------------|--------------------|---------------|---------------|---------------|---------------|
|                                     | Water Supply (AFY) |               |               |               |               |
| Water Source                        | 2015               | 2020          | 2025          | 2030          | 2035          |
| Groundwater                         | 12,190             | 9,400         | 9,400         | 9,400         | 9,400         |
| Surface Water                       | 6,989              | 27,314        | 31,283        | 34,392        | 34,512        |
| Exchanges                           | 868                | 1,216         | 1,281         | 1,001         | 1,018         |
| Supply from Storage                 | 11,222             | 13,500        | 13,500        | 13,500        | 13,500        |
| Recycled Water                      | 1,870              | 2,913         | 3,137         | 5,498         | 6,273         |
| <b>Total:</b>                       | <b>33,139</b>      | <b>54,343</b> | <b>58,601</b> | <b>63,791</b> | <b>64,703</b> |

## 4.4 Recycled Water

The majority of the City's current 6.7 (mgd) wastewater flow is treated at the RWRF, located southwest of the City of Fresno on Jensen Avenue. In 2009, the City of Clovis completed a new WRF. In 2015, the WRF produced an average of just less than 1.9 mg. Of that total, 18 percent was recycled with the remainder being discharged to FID's Fancher Creek for agricultural irrigation.

Ultimately the WRF will be expanded to be able to treat 8.4 mgd, or 9,400 AF per year, and will make a substantial contribution to the City's overall water resources. As of the 2015 UWMP, recycled water is used for irrigation of public and private landscape within the service area. Areas receiving recycled water include the Freeway 168 corridor between Shepherd Avenue and Armstrong Avenue, the existing Clovis Community Medical Center campus, and multiple City parks and landscape areas.

Landscape irrigation will continue to be the main use of recycled water in the future. All public landscape areas within three-quarters of a mile of the distribution system are considered potential recycled water use areas. Clovis Unified School District is evaluating the use of recycled water for its landscape areas. Caltrans has undertaken a project to expand their use of recycled water along Freeway 168 from Armstrong Avenue west to Sierra Avenue. By the year 2020, the use of recycled water is expected to increase in volume and expand its beneficial uses.

In order to effect that increase in use, the City now requires all new development of public landscape near recycled water transmission lines to use recycled water. Additional actions include extending the recycled water distribution system to discharge at groundwater recharge facilities and lowering the cost of recycled water. The UWMP concludes that recycled water use will increase to 6,273 AF per year by 2035<sup>2</sup>.

## 4.5 Exchanges

Water exchanges, transfers, and water banking allow purveyors to manage demand and supply variability by ensuring water will be available for the near future. The majority of the City's wastewater is treated at the RWRF. Under an agreement with FID, the City of Fresno receives approximately one AF of Kings River surface water in exchange for each two AF of reclaimed water produced by the RWRF. Clovis is entitled to receive a percentage of that exchange, in proportion to its prorate share of the RWRF flow, which amounted

<sup>2</sup> UWMP, Table 6.13, page 6-27

to approximately 868 AF in 2015. This water is limited by agreement to being used for groundwater recharge activities.

## 4.6 Water Supply Summary

The five sources discussed above make up all of the City's water resources. These are all tabulated overall for 2015 and for each subsequent 5-year period through 2035 in **Table 4-1** above.

The City's overall water resources are projected to increase from 33,139 AF per year in 2015 to 64,703 AF per year in 2035. Nearly all of this increase will come from increasing surface water resources from 6,989 AF per year in 2015 to 34,512 AF per year in 2035. The mix of water supplies the City plans to use to meet these demands is changing over time, and is illustrated on **Figure 6-2**.



## 5 Normal Year Water Operations

This section evaluates the ability of the City to meet the overall water demands during normal water years during a 20-year projection. A normal year is a year, or averaged range of years, that most closely represents the average water supply available to the City. In this case, the normal year reflects the overall water supply summary discussed in Section 4.

This Chapter relies on information taken from Section 6 of the UWMP and Section 9 of the CWMP, except that groundwater supply is limited to 9,400 AF/year as discussed in Section 4 above. **Table 5-1** repeats **Table 4-1** and shows the supplies available to the City in normal years in 5-year increments.

**Table 5-1. Projected Water Supplies (Restated)**

| Projected Water Supplies (Restated) |                    |               |               |               |               |
|-------------------------------------|--------------------|---------------|---------------|---------------|---------------|
|                                     | Water Supply (AFY) |               |               |               |               |
| Water Source                        | 2015               | 2020          | 2025          | 2030          | 2035          |
| Groundwater                         | 12,190             | 9,400         | 9,400         | 9,400         | 9,400         |
| Surface Water                       | 6,989              | 27,314        | 31,283        | 34,392        | 34,512        |
| Exchanges                           | 868                | 1,216         | 1,281         | 1,001         | 1,018         |
| Supply from Storage                 | 11,222             | 13,500        | 13,500        | 13,500        | 13,500        |
| Recycled Water                      | 1,870              | 2,913         | 3,137         | 5,498         | 6,273         |
| <b>Total:</b>                       | <b>33,139</b>      | <b>54,343</b> | <b>58,601</b> | <b>63,791</b> | <b>64,703</b> |

**Table 5-2** compares the City's potable and non-potable demands in 5-year increments, and compares them with the normal year water supplies. As shown, total supplies would exceed total demands in all years. Potable supplies would exceed potable demands. Non-potable demands would equal or exceed the available quantity of recycled water in all except 2015, where there is an apparent 1-AF shortfall of non-potable water, likely due to a rounding error in the original calculation. It is clear that in 2030 and 2035 (and likely in later years) the City will limit the supply of non-potable (recycled water) to the available supply and any shortfall will be made up by potable water. Adequate supplies are available to serve the City and its water customers in normal rainfall years such as these modeled in this section.

## Section Five: Normal Year Water Operations

### Water Supply Assessment

#### Clovis Community Medical Center Expansion Project

Table 5-2. Comparison of Normal Year Project Supplies and Demands

| Comparison of Normal Year Project Supplies and Demands (AFY) |                    |               |               |               |               |
|--|--------------------|---------------|---------------|---------------|---------------|
|  | Water Supply (AFY) |               |               |               |               |
| Water Demand/Supply  | Year 1             | Year 5        | Year 10       | Year 15       | Year 20       |
| Potable demand   | 21,590             | 36,300        | 39,945        | 43,950        | 48,482        |
| Non-potable demand   | 382                | 2,913         | 3,137         | 5,498         | 6,274         |
| <b>Total demand</b>  | <b>21,972</b>      | <b>39,213</b> | <b>43,082</b> | <b>49,448</b> | <b>54,756</b> |
| Potable supply   | 31,269             | 51,430        | 55,464        | 58,293        | 58,430        |
| Non-potable supply   | 1,870              | 2,913         | 3,137         | 5,498         | 6,273         |
| <b>Total supply</b>  | <b>33,139</b>      | <b>54,343</b> | <b>58,601</b> | <b>63,791</b> | <b>64,703</b> |
| <b>Difference between supply and demand</b>                  | <b>11,167</b>      | <b>15,130</b> | <b>15,519</b> | <b>14,343</b> | <b>9,948</b>  |

## 6 Single-Dry and Multiple-Dry Year Water Supplies

This section evaluates the availability of City water supplies during single-dry and multiple-dry water years over the 20-year planning horizon, based on Project buildout in 2035. Intermediate year demand projections are made in the same manner as with the normal year analysis. Numerous factors will work to change the relative quantities of water the City receives from its several water sources. Since each of these has a different reliability in dry years, the overall water supply reliability will change over time. The following sections discuss how this will occur.

A single-dry year is the year that represents the lowest water supply available to the Project, and is referred to as a “critical dry” water year in the CWMP. To define the single-dry year, this WSA uses the hydrologic conditions existing during 2015, the driest single year of record in terms of Kings River entitlement, and during 2014 when there was a zero allocation of both Class I and Class II Friant CVP water.

A multiple-dry year period represents the lowest average supply available to the Project for a consecutive three-year period. This analysis is referred to as a “multi-dry” condition in the CWMP. The WSA analysis is based on the three consecutive driest years of record for the Project’s surface water supplies, which were water years 2012/13 through 2014/15.

### 6.1 Water Year Effects on Water Sources

#### 6.1.1 Kings River Surface Water:

Both the single-dry and multiple-dry analyses are most affected by the variations in Kings River entitlement in dry years. Because FID was the first of the 27 Kings River Water Association members to begin river diversions (in the late 19<sup>th</sup> century), FID’s entitlement does not vary directly in proportion to overall annual runoff; rather it favors FID versus all of the other Kings River diverters. When river flows are low due to slow runoff, low annual precipitation or both, FID’s share of the daily river flow increases.

The effect of this is that FID’s entitlement is higher than the overall water year percentage flow, for virtually any below-normal water year. In the driest year on record, the City received 6,978 AF of Kings River Water, against an average (normal year) delivery of 23,609 AF, or 30 percent. Applying this percentage to the City’s larger 2035 share of FID’s Kings River water, which is expected to average 31,670 AF/year, the estimated dry year delivery would be 9,360 AF.

For the multiple-dry years of 2013, 2014, and 2015, FID’s overall Kings River entitlements were 100 percent, 58 percent, and 30 percent of normal entitlement, respectively, or 31,670, 18,369 and 9,360 AF/ year. This represents exceptionally-strong reliability for a runoff-based water supply.

#### 6.1.2 Friant CVP Surface Water:

Over the period of 1986 through 2016, the average Class II allocation has been 38 percent of contracted amount. However, Class II supplies are particularly subject to the water year type. Over the 49-year period

mentioned, Class II allocation was zero in 15 of those years, with one 5-year and one 6-year period with no Class II allocations at all. For the selected multiple-dry year period of 2013 through 2015, no Class II water was allocated at all.

While Class I entitlements don't currently affect the City's FID supplies, they will affect the future-year Garfield Water District and International Water District entitlements. Class I allocations in the three multiple-dry years were 62 percent, 0 percent and 0 percent of the contracted amount, respectively.

### 6.1.3 Supply from Storage

The quantity of water available for withdrawal from the City's storage facilities is not reduced in drier water years. Because of the shortage of surface supplies, withdrawals from storage will have to be maximized in order to meet demands. The contract for the Waldron facility allows annual withdrawals of up to approximately 9,000 AF per year, while the Boswell Facility allows up to 90 percent of the safe yield, expected to be near 3,600 AF per year. According to the City, the combined withdrawal limit from the two facilities is considered to be 13,500 AF/year. In any year where surface water deliveries are substantially limited, the City would want to use these resources to the limit.

A related matter is how contributions are made to supply storage. Whereas in normal years the City is making deposits to both of these facilities, in a drier year those contributions would be reduced or halted since the surface supplies necessary for the deposits would no be available. Since the deposits come from surface water resources not counted in the City's water balance, being acquired under separate FID agreements, the curtailment of deposits doesn't reduce the City's water demand.

### 6.1.4 Groundwater

The City of Clovis operates 34 municipal water well, located throughout the service area. All are connected to the distribution system. Their total production over the period 1984 through 2014 is shown in **Figure 6-1** below, which is taken from the WMP.

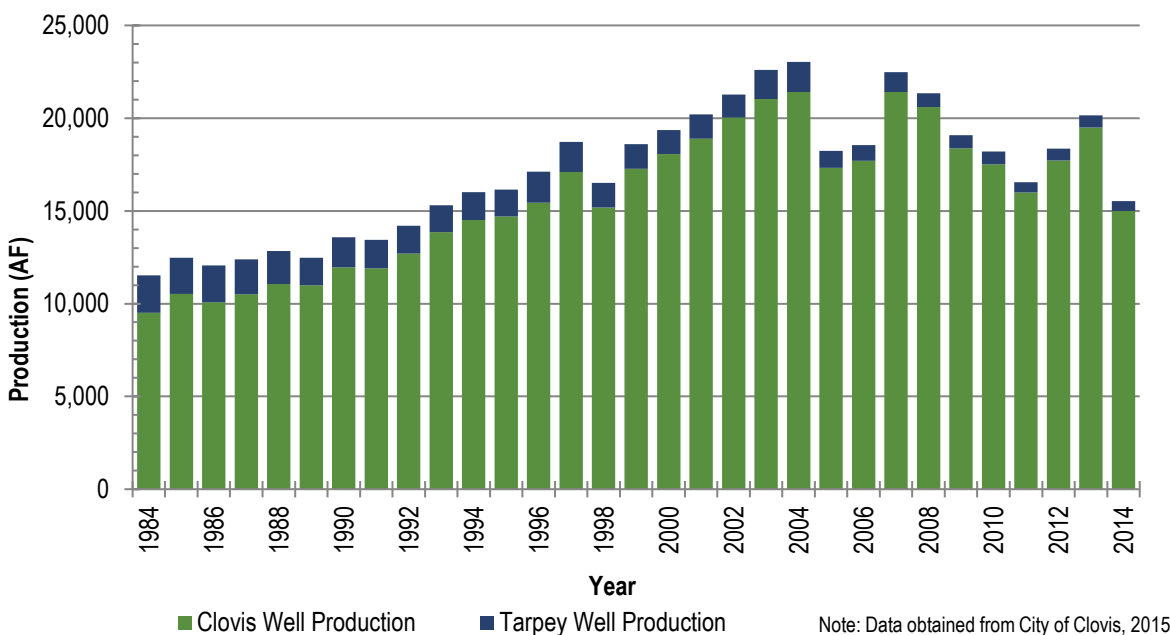


Figure 6-1. City Groundwater Production (1984-2014)

According to the UWMP, the City aims to eliminate its direct groundwater consumption whenever possible. All of the City's water demands will be met by a combination of surface water and supplies from storage, in water years when those two resources are sufficient to meet demands. In drier years, when surface water supplies are limited, the City will pump groundwater to make up the shortfall.

Planning to make that objective possible is very important, as Chapter 9 of the WMP states that the sustainable groundwater supply in the City service area is 9,400 AF per year, for normal, dry and multi-dry years. The UWMP shows greater groundwater use than that for every year through 2035, and includes a calculated groundwater overdraft. For the time being, there is no restriction against pumping groundwater above the sustainable aquifer yield and in fact that has been a common way to plan to meet dry-year water shortfalls, however, it is likely that upcoming SGMA regulations (which will be effective by 2020) will limit pumpers to withdrawing not more than the safe yield of the aquifer. It is not clear whether that requirement will have to be met every single year, or whether pumpers will be allowed to meet the sustainable-yield limitation on some sort of a rolling average basis.

This WSA uses 9,400 AF per year as the maximum groundwater pumping amount, as being more conservative than the UWMP values, and in an effort to anticipate the mandatory SGMA pumping limits. Due to the very large size of the aquifer underlying the City, available groundwater is not quickly affected by the type of water year. Anticipating a mix of wet and dry years similar to what has been historically seen, this WSA does not reduce available groundwater in dry or multiple-dry years.

### 6.1.5 Recycled Water

Recycled water production, being tied directly to indoor water use, does not vary significantly with the water year type and is not adjusted from normal for this analysis.

## 6.2 Changes in Water Source Reliability Over the Planning Horizon

In 2015, surface water made up 21 percent of the City's direct water supply, and was the source of the water used to create another 34 percent in the form of Supply from Storage. In 2035, the surface water supply will have risen to 53 percent of the total while the Supply from Storage will have declined to 21 percent. **Figure 6-2** illustrates the City's historical and planned mix of water supplies over time.

This means the City's reliance on surface water supplies, to one degree or another, will have increased from 55 percent to 74 percent of the total. While there is a margin of normal year supply available over planned demand over the entire planning horizon, some provision may have to be made for additional reliable storage to account for the majority of the water being subject to water year variability. See the reliability analysis in Section 6.3 following.

## 6.3 Summary of Single-Dry and Multiple-Dry Year Reliability Over the Planning Horizon

Supply for multiple dry years would be drawn from a combination of Kings River surface water, supply from storage, groundwater, and recycled water. No CVP Class I (San Joaquin river) supplies were available in the dry year, nor in two of the three multiple dry years. No CVP Class II supplies were available in any of the dry years. Project demand was assumed to be constant across all water years.

The supplies that would be available during single-dry and multiple-dry years at buildout are summarized in **Table 6-1**. As shown, adequate supplies would be available to supply the City and along with it the Project under all studied conditions. No additional conservation measures are required, although the Section 8 of the UWMP contains a water shortage contingency plan that could be partially or fully implemented if needed or mandated.

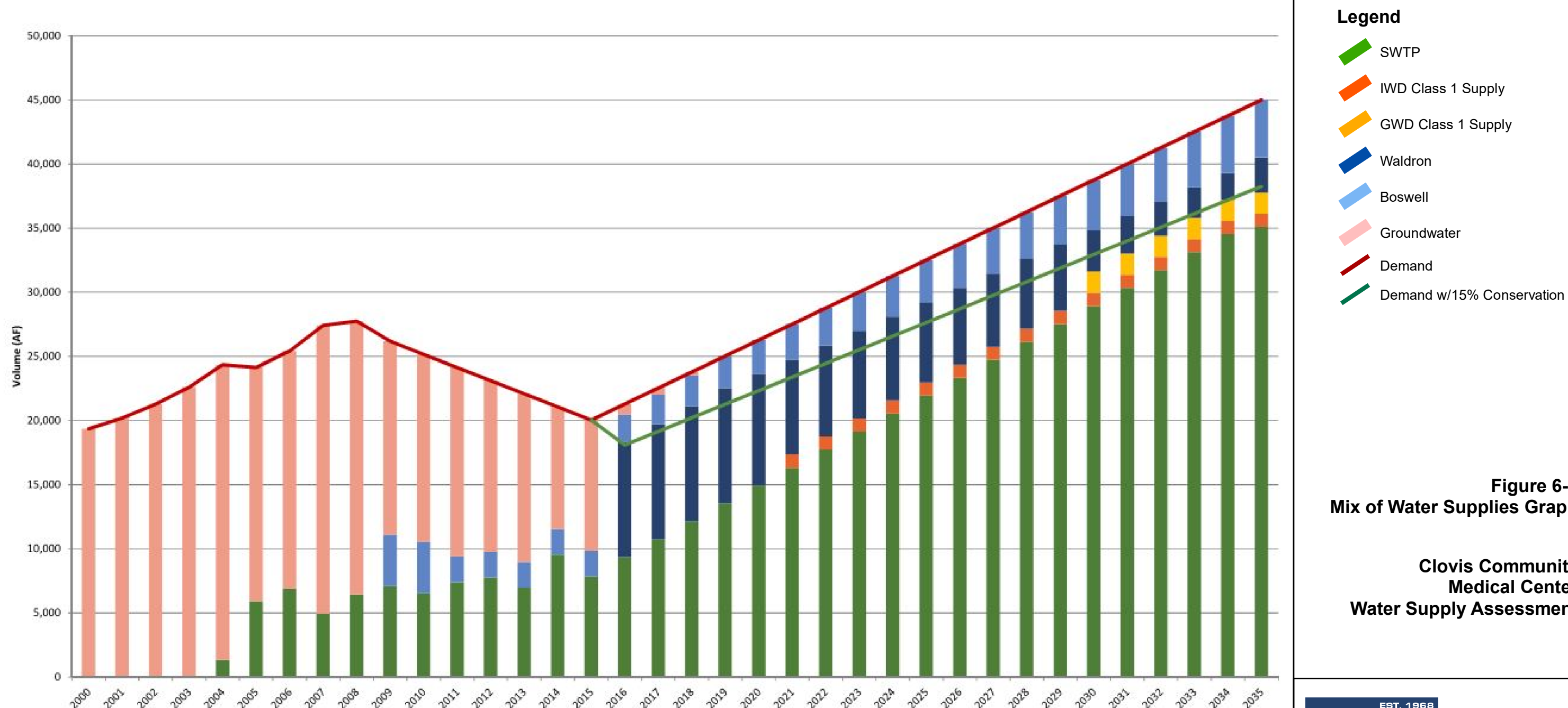
Section Six: Single-Dry and Multiple-Dry Year  
Water Supplies  
Water Supply Assessment  
Clovis Community Medical Center Expansion Project

Table 6-1. Single-Dry and Multiple-Dry Year Water Supplies Available, 2035

| Single-Dry and Multiple-Dry Year Water Supplies Available, 2035 (AFY) |                       |                   |                      |                       |
|---|-----------------------|-------------------|----------------------|-----------------------|
|   | Single-Dry Year       | Multiple-Dry Year |                      |                       |
| Demand  |                       | Year 1            | Year 2               | Year 3                |
| Potable demand  | 48,482                | 48,482            | 48,482               | 48,482                |
| Non-potable demand  | 6,274                 | 6,274             | 6,274                | 6,274                 |
| <b>Total demand</b>   | <b>54,756</b>         | <b>54,756</b>     | <b>54,756</b>        | <b>54,756</b>         |
| Water Supply  |                       |                   |                      |                       |
| Surface water   | 9,360                 | 32,767            | 18,369               | 9,360                 |
| Supply from Storage   | 13,500                | 13,500            | 13,500               | 13,500                |
| Groundwater   | 9,400                 | 9,400             | 9,400                | 9,400                 |
| Recycled Water  | 6,273                 | 6,273             | 6,273                | 6,273                 |
| Exchanges   | 1,018                 | 1,018             | 1,018                | 1,018                 |
| <b>Total Supply</b>   | <b>39,551</b>         | <b>62,958</b>     | <b>48,560</b>        | <b>39,551</b>         |
| <b>Excess/&lt;Deficit&gt; in Supply</b>                               | <b>&lt;15,205&gt;</b> | <b>8,202</b>      | <b>&lt;6,196&gt;</b> | <b>&lt;15,205&gt;</b> |
| <b>Percent Excess/&lt;Deficit&gt; versus Demand</b>                   | <b>&lt;27.8&gt;</b>   | <b>15.0</b>       | <b>&lt;11.3&gt;</b>  | <b>&lt;27.7&gt;</b>   |

## 6.4 Climate-Based Reliability Factors

This WSA defers to the UWMP for consideration of the overall effects of climate change upon supply reliability. See Section 3.3 of the UWMP.



**Figure 6-2**  
**Mix of Water Supplies Graph**

**Clovis Community  
Medical Center  
Water Supply Assessment**



## 7 Operational Reliability

Clovis' surface water entitlement does not accrue all at once during a given water year. Rather, the Kings River entitlement accrues daily throughout the year based on actual river runoff and the KRWA entitlement schedule. The daily nature of the Kings River supply is especially important early in the water year, which begins October 1. The very low river flows in October and November mean that supply is low and the City must rely on other water supplies during those months. The relatively-large supplies available from storage help mitigate the seasonal nature of the surface water supply, and these are further backed up by groundwater supplies equivalent to almost half the City's total annual demand.

The City has not had any issue with temporary water shortages to date. As demand grows and reliance on less-reliable surface supplies increases, temporary and eventually systemic supply shortages will appear if the City does not acquire additional reliable water supplies.

## 8 Conclusions

As summarized in **Table 8-1**, the City has adequate supplies to meet the needs of all the City's water customers including the Project, in normal water years, over the 20-year planning horizon.

In the buildout year, if demand is as projected, the City will be short of water to meet dry year demands, and would be short in the second and third years of a multiple-dry event. Conservation measures, detailed in the UWMP, have been developed that would mitigate these shortfalls by reducing demand approximately 15 percent. Evidence from the 2013 to 2015 drought suggests that those results are achievable. If projected demands are reduced 15 percent, there would be sufficient supplies to meet the demands in the dry year, and throughout the multi-dry event.

We conclude the City of Clovis has adequate water supplies to meet the needs of the City in normal, dry and multi-dry years.

**Table 8-1. Summary of Project Water Supplies and Demands**

| Summary of Project Water Supplies and Demands (AFY)      |               |               |               |               |               |                      |                   |                      |                      |
|--|---------------|---------------|---------------|---------------|---------------|----------------------|-------------------|----------------------|----------------------|
|  | Normal Year   |               |               |               |               | Dry Year             | Multiple-Dry Year |                      |                      |
| Demands  | Year 1        | Year 5        | Year 10       | Year 15       | Year 20       |                      | Year 1            | Year 2               | Year 3               |
| Potable demand   | 21,590        | 36,300        | 39,945        | 43,950        | 48,485        | 48,482               | 48,482            | 48,482               | 48,482               |
| Non-potable demand                                       | 382           | 2,913         | 3,137         | 5,498         | 6,274         | 6,274                | 6,274             | 6,274                | 6,274                |
| <b>Total demand</b>                                      | <b>21,972</b> | <b>39,213</b> | <b>43,082</b> | <b>49,448</b> | <b>54,756</b> | <b>54,756</b>        | <b>54,756</b>     | <b>54,756</b>        | <b>54,756</b>        |
| <b>Total Demand less GW Recharge</b>                     |               |               |               |               |               | 46,356               | 46,356            | 46,356               | 46,356               |
| <b>Water Conservation Savings</b>                        |               |               |               |               |               | 6,953                | 6,953             | 6,953                | 6,953                |
| <b>Total Adjusted Demand</b>                             |               |               |               |               |               | 39,403               | 39,403            | 39,403               | 39,403               |
| Total potable supply                                     | 31,269        | 51,430        | 55,464        | 58,293        | 58,430        | 33,278               | 56,685            | 42,287               | 33,278               |
| Total non-potable supply                                 | 1,870         | 2,913         | 3,137         | 5,498         | 6,273         | 6,273                | 6,273             | 6,273                | 6,273                |
| <b>Total supply</b>                                      | <b>33,139</b> | <b>54,343</b> | <b>58,601</b> | <b>63,791</b> | <b>64,703</b> | <b>39,551</b>        | <b>62,958</b>     | <b>48,560</b>        | <b>39,551</b>        |
| <b>Difference between Supply and Demand</b>              | <b>11,167</b> | <b>15,130</b> | <b>15,519</b> | <b>14,343</b> | <b>9,948</b>  | <b>(15,204)</b>      | <b>8,203</b>      | <b>(6,195)</b>       | <b>(15,204)</b>      |
| <b>Percent of excess/shortage versus Demand</b>          | <b>50.8%</b>  | <b>38.6%</b>  | <b>36.0%</b>  | <b>29.0%</b>  | <b>18.2%</b>  | <b>&lt;27.8%&gt;</b> | <b>15.0%</b>      | <b>&lt;11.3%&gt;</b> | <b>&lt;27.8%&gt;</b> |
| <b>Difference between Supply and Adjusted Demand</b>     |               |               |               |               |               | <b>148</b>           | <b>23,555</b>     | <b>9,157</b>         | <b>148</b>           |
| <b>Percent of excess/shortage versus Adjusted Demand</b> |               |               |               |               |               | <b>0.4%</b>          | <b>59.8%</b>      | <b>23.2%</b>         | <b>0.4%</b>          |

## 9 References

California Department of Water Resources. 2003, Bulletin 118 – California’s Groundwater

California Department of Water Resources, 2015, Title 23, Chapter 2.7: Model Water Efficient Landscape Ordinance

City of Clovis. May, 2016, 2015 Urban Water Master Plan

City of Clovis, April, 2017, Draft Water Master Plan Update, Phase III





## **Final Program Environmental Impact Report**

# **Clovis Community Medical Center Expansion and Herndon Avenue Widening Project**

**State Clearinghouse No. 2016101005**

*Lead Agency*

**City of Clovis  
Planning and Development Services Department**

**May 2018**



**Clovis Community Medical Center Expansion  
and Herndon Avenue Widening Project  
Final Program Environmental Impact Report**  
State Clearinghouse No. 2016101005

*Prepared for:*

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**May 2018**

# Table of Contents

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| <b><u>CHAPTER</u></b> |   | <b><u>PAGE</u></b> |
|-----------------------|---|--------------------|
| 1                     | Introduction                                | 1-1                |
| 2                     | Significant Impacts and Mitigation Measures | 2-1                |
| 3                     | Mitigation Monitoring and Reporting Program | 3-1                |
| 4                     | Responses to Draft EIR Comments             | 4-1                |
| 5                     | Revisions to Draft EIR                      | 5-1                |

# **CHAPTER 1**

## **Introduction**

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### **CEQA REQUIREMENTS FOR FINAL EIRS**

This Final Program Environmental Impact Report (Final EIR) for the Clovis Community Medical Center and Herndon Avenue Road Widening Project has been prepared in accordance with the requirements of the California Environmental Quality Act (CEQA) Statute and Guidelines. Specifically, CEQA Guidelines Section 15132 provides that a Final EIR shall consist of:

- (a) The Draft Environmental Impact Report (Draft EIR) or a revision of the Draft;
- (b) Comments and recommendations received on the Draft EIR either verbatim or in summary;
- (c) A list of persons, organizations, and public agencies commenting on the Draft EIR;
- (d) The responses of the Lead Agency to significant environmental points raised in the review and consultation process; and
- (e) Any other information added by the Lead Agency.

### **FINAL EIR ORGANIZATION**

This Final EIR is organized as follows:

- Chapter 1 is this introduction.
- Chapter 2 presents the significant impacts of the project and mitigation measures, along with a brief project description and the project objectives.
- Chapter 3 presents the Mitigation Monitoring and Reporting Program for the project.
- Chapter 4 presents the comments that were received on the Draft EIR and the City of Clovis' responses to the comments.
- Chapter 5 shows the revisions made to the Draft EIR.



# CHAPTER 2

## Significant Impacts and Mitigation Measures

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### INTRODUCTION

This chapter presents the significant impacts of the project and mitigation measures. A brief project description and the project objectives are also provided.

### PROJECT DESCRIPTION

The project evaluated in this EIR includes two components: the proposed Clovis Community Medical Center (CCMC) Expansion Project, and the proposed widening of Herndon Avenue between Temperance Avenue and DeWolf Avenue.

#### *CCMC Expansion*

The Clovis Community Medical Center Project consists of a 2-10 year expansion plan for additional facilities and improvements and a long-range site development master plan for 20 years in the future.

The project site comprises approximately 148 acres located on the north and south sides of Herndon Avenue, east and west of N. Temperance Avenue. Adjacent land uses include urban residential development and an elementary school to the south, the Enterprise Canal and rural residential to the east, Highway 168, agricultural land and commercial development to the north, and rural residential to the west.

The proposed expansion is divided into two major phases: a 2-10 year expansion plan and a 20 year expansion plan. Construction of these components will increase the building square footage of the medical center by approximately 410,172 square feet to a total of 1,129,720 square feet. The number of licensed beds will increase from 208 to 358. The 2-10 year expansion plan also includes the addition of up to 150,000 square feet of commercial space west of Temperance Avenue, as well as a 150 room hotel.

Implementation of the 20-year plan will result in a net increase of 413,769 square feet of medical center building area, taking into account that two of the existing medical office buildings will be replaced by future construction. The total square footage of the medical center upon implementation of the long-range plan will be approximately 1,543,489 square feet. The number of licensed beds will increase to a total of 508. The 20-year plan also includes up to 70,000 square feet of retail and/or office development and a 100-unit Assisted Living or Memory Care facility south of Herndon Avenue.

The existing medical center was authorized through the approval of a Conditional Use Permit. An amended Conditional Use Permit (CUP) must be processed and approved by the City to authorize the proposed expansion plan.

#### *Herndon Avenue Widening*

The proposed Herndon Avenue widening would extend from Temperance Avenue on the west to the southern leg of DeWolf Avenue on the east, encompassing a distance of one mile. This widening is necessary to implement the Clovis General Plan circulation element, which designates Herndon Avenue as an arterial street, and to accommodate traffic from planned land uses, including the CCMC project.

The project would widen the current five-lane section of Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the Enterprise Canal

Bridge from two lanes to a four-lane divided roadway. At the Enterprise Canal Bridge the roadway will have tapered to two lanes and the widening between the bridge and the southern leg of DeWolf Avenue will be minor. The project includes the installation of sidewalks, curb and gutter, street lights, median improvements and striping overlay. Existing overhead utilities on the south side of Herndon Avenue between Temperance and Locan Avenues will be placed underground. East of Locan Avenue, the overhead utilities will be relocated outside the roadway. The project will include traffic signals at Locan Avenue and at DeWolf Avenue.

## **PROJECT OBJECTIVES**

The City of Clovis is the lead agency for Clovis Community Medical Center Expansion and Herndon Avenue Widening Project. The lead agency is the public agency that has the principal responsibility for carrying out or approving a project.

The objectives of Clovis Community Medical Center in proposing the project are to:

- Develop a medical campus capable of meeting the growing health care needs of Clovis and the surrounding area;
- Provide a coordinated long-term expansion plan for the medical campus that provides for the modernization and upgrading of existing facilities in concert with the provision of necessary new facilities;
- Provide an efficient vehicular and pedestrian campus circulation system in conjunction with adequate and well-located parking facilities for patients, visitors and staff;
- Continue to provide a well-designed medical campus that is inviting and remains attractive over time, being harmonious with the existing context of the hospital and keeping with the desired aesthetic character of Clovis;
- Provide medical office buildings at locations that will be conducive to the related functions to be provided at the hospital; and
- Provide for future development on land adjacent to the CCMC campus that is compatible and complimentary to the function of CCMC and consistent with the goals and policies of the Clovis General Plan.

The objectives of the City of Clovis in proposing the Herndon Avenue widening project are to:

- Widen and improve Herndon Avenue as an important component of the City's planned circulation system (Herndon Avenue is designated as an arterial street in the Circulation Element of the Clovis General Plan).
- Provide for a street that can accommodate projected traffic from the CCMC expansion and other planned land uses such that the Level of Service is D or less for the City of Clovis portion of Herndon Avenue and Level of Service C or less within the Fresno County portion of the project.
- Provide traffic signals at Locan Avenue and at both legs of DeWolf Avenue to improve access and safety for rural residential areas to the north and south of Herndon Avenue and improved safety for through traffic on Herndon Avenue.
- Minimize or avoid any encroachment or impact to the Enterprise Canal.

## SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Listed in this section are the significant environmental effects of the proposed project. These include the significant impacts of the project that cannot be avoided (significant unavoidable impacts) and those that are potentially significant and can be avoided or mitigated through the implementation of mitigation measures. Impacts that were determined to be less than significant without mitigation are not listed but are discussed in the chapters of this EIR addressing specific resources and conditions.

The project would have significant impacts in relation to a number of resources and conditions. Implementation of the mitigation measures presented in this EIR would either prevent the impacts or render them insignificant, with three exceptions involving impacts from greenhouse gas emissions and noise. Tables 1.1 and 1.2 summarizes the significant impacts and lists the mitigation measures associated with each. Additions to the text in comparison to the Draft EIR are underlined. Text deletions are shown in ~~strikethrough~~ type.

### Significant Unavoidable Impacts

The following significant environmental impacts cannot be avoided if the proposed project is implemented, even with the implementation of listed mitigation measures.

**Table 1.1**  
**Significant Unavoidable Impacts**

| EIR Section  | Impact/Mitigation Measure/Significance  |
|--|---|
| <b>GH-1</b><br><br><b>Greenhouse Gas Emissions</b> | <p><b>Impact:</b> The project would increase the generation of greenhouse gas emissions.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b><i>GH-1:</i></b> During construction and operation of the project, the following measures shall be implemented to reduce greenhouse gas (GHG) emissions:</p> <ul style="list-style-type: none"> <li>(a) Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.</li> <li>(b) Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50 percent tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.</li> <li>(c) Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.</li> <li>(d) Incorporate outdoor electrical outlets to encourage the use of electric landscape maintenance equipment.</li> <li>(e) Install high-efficiency heating and cooling systems.</li> <li>(f) Utilize high-efficiency gas or solar water heaters.</li> <li>(g) Utilize built-in energy-efficient appliances (i.e., Energy Star rated).</li> <li>(h) Utilize double- or triple-paned windows.</li> <li>(i) Utilize low energy street lights (i.e., sodium, light-emitting diode [LED]).</li> <li>(j) Utilize energy-efficient interior lighting.</li> <li>(k) Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.</li> <li>(l) Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.</li> </ul> |

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|   | <p>(m) Provide a minimum of one designated parking space for alternatively fueled vehicles.</p> <p>(n) Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.</p> <p>(o) Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.</p> <p>(p) Provide on-site bicycle parking beyond those required by California Green Building Standards Code and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).</p> <p>(q) Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)</p> <p><b>Level of Significance with Mitigation:</b> Implementation of the above mitigation measures would reduce emissions associated with motor vehicle use, energy use, waste generation, and area sources. In addition, Mitigation Measure AQ-1.2 (see Table 1.2, Below) would require the project proponent to enter into a Developer Mitigation Contract (DMC) with the SJVAPCD, which would reduce operational criteria air pollutants (i.e., ROG, NOX, PM10) through various means, including implementation of additional on-site or off-site mitigation and/or the funding of off-site mitigation. These additional measures have not yet been identified, but would likely have the added benefit of reducing project-generated GHG emissions. However, because the GHG emission reductions to be achieved through implementation of the DMC and other mitigation measures cannot be quantified at this time, increased GHG emissions associated with the proposed project would be considered to have a significant impact. This impact is thus considered significant and unavoidable.</p> |
| <p><b>GH-2</b></p> <p><b>Greenhouse Gas Emissions</b></p> | <p><b>Impact:</b> The project may conflict with an applicable greenhouse gas reduction plan, policy or regulation.</p> <p><b>Level of Significance:</b> Potentially Significant</p> <p><b>Mitigation Measures:</b></p> <p>Implement Mitigation Measure GH-1.</p> <p><b>Level of Significance with Mitigation:</b> The recommended mitigation measures for the project would require the project proponent to enter into a Developer Mitigation Contract (DMC) with SJVAPCD and additionally incorporate a number of design and operational elements to curb and reduce generation of GHG emissions. While a DMC would function to reduce operational air pollutants to a specified level, it does not include a directly mandate a specific level. Consequently, the project could conflict with GHG-reduction planning efforts because the emission reductions to be achieved cannot be quantified at this time, and increased GHG emissions associated with the proposed project would be considered to have a significant impact. This impact is therefore considered significant and unavoidable.</p>   |
| <p><b>NO-2</b></p> <p><b>Noise</b></p>                    | <p><b>Impact:</b> The project would result in an increase in long-term ambient noise levels from traffic sources.</p> <p><b>Level of Significance:</b> Potentially Significant</p> <p><b>Mitigation Measures:</b></p> <p><b>NO-2:</b> Once detailed plans for lane configurations and alignments for the widening of Herndon Avenue are prepared, the City of Clovis shall have an acoustical analysis prepared. The acoustical analysis shall evaluate changes in traffic noise levels that would result from the proposed widening in comparison to the City of Clovis General Plan noise standards. Noise-reduction measures (e.g., sound walls) shall be evaluated and implemented, where feasible, to reduce traffic noise levels to below applicable noise standards.</p> <p><b>Level of Significance with Mitigation:</b> The acoustical analysis would be required to evaluate changes in traffic noise levels in comparison to the City of Clovis General Plan noise standards and noise-reduction measures (e.g., sound walls) will be evaluated and implemented, where feasible. However, in some instances, the use of noise-reduction measures, such as sound walls, may not be feasible due to the need to preserve access to noise sensitive properties. Therefore, the impact is considered significant and unavoidable.</p>  |

### Significant Impacts That Can Be Mitigated

The following significant environmental impacts can be avoided or reduced to a less than significant level with the implementation of the mitigation measures listed with each impact.

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

| EIR Section                               | Impact/Mitigation Measure/Significance  |
|---|---|
| <p><b>AE-1</b><br/><b>Aesthetics</b></p>  | <p><b>Impact:</b> Clearing and construction activity would temporarily degrade the visual quality of the project site.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><i>AE-1.1:</i> During the project clearing, grading, and construction phases, a chain-link fence six feet in height shall be maintained around the project sites and a solid fence or wall at least six feet in height shall be maintained around the construction staging area. A chain-link fence draped with heavy plastic is suitable for this purpose.</p> <p><i>AE-1.2:</i> The project contractor shall store construction materials that may be on the site for more than 48 hours within the construction staging area, and the project contractor shall park or store construction equipment within the construction staging area. Construction materials or equipment shall not be stored on public streets, and the project contractor shall remove construction materials and equipment from the site when no further need exists for materials or equipment.</p> <p><i>AE-1.3:</i> The project contractor shall keep properties and streets surrounding the project site free from project-related rubbish and debris by removing any rubbish or debris the day it appears.</p> <p><i>AE-1.4:</i> Any excess excavated material shall be removed from the site immediately following completion of the excavation activity that resulted in the material.</p> <p><i>AE-1.5:</i> The project contractor shall remove any graffiti on the project sites within 48 hours of the time it appears.</p> <p><i>AE-1.6:</i> The project contractor shall place all portable restrooms within the construction staging area.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <p><b>AE-2</b><br/><b>Aesthetics</b></p>  | <p><b>Issue and Threshold of Significance:</b> The project would increase in illumination and glare due to project lighting, building surfaces and parking areas.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><i>AE-2.1:</i> Parking lot lighting shall employ full cut-off type fixtures. A full cut-off type fixture is a luminaire or light fixture that, by design of the housing, does not allow light dispersion or direct glare to shine above a 90-degree horizontal plane from the base of the fixture. Full cut-off type fixtures must be installed in a horizontal position as designed.</p> <p><i>AE-2.2:</i> The design of external signs and lighting shall prevent direct glare on adjoining properties.</p> <p><i>AE-2.3:</i> The design for the buildings east of Medical Center Drive East shall incorporate exterior materials designed to minimize reflective glare from the exterior surfaces.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>AQ-1</b><br/><b>Air Quality</b></p> | <p><b>Impact:</b> The project would increase long-term operational emissions of particulate matter and ozone precursor emissions.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><i>AQ-1.1:</i> Operation of the proposed project shall comply with SJVAPCD's ISR rule (Rule 9510). Accordingly, an Air Impact Assessment (AIA) shall be prepared for the proposed Project. The AIA shall be submitted to and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The AIA shall include: an estimate of operational emissions prior to the implementation of mitigation measures; a list of the mitigation measures to be applied to the project; an estimate of emissions for each applicable pollutant for the project, or each phase thereof, following the implementation of mitigation; and a calculation of the applicable off-site fee, if required by Rule 9510. Measures that may be implemented to reduce operational emissions may include, but are not limited to, the following:</p>   |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|  | <p>(a) Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.</p> <p>(b) Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50% tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.</p> <p>(c) Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.</p> <p>(d) Incorporate outdoor electrical outlets to encourage the use of electric landscape maintenance equipment.</p> <p>(e) Install high-efficiency heating and cooling systems.</p> <p>(f) Utilize high-efficiency gas or solar water heaters.</p> <p>(g) Utilize built-in energy-efficient appliances (i.e., Energy Star rated).</p> <p>(h) Utilize double- or triple-paned windows.</p> <p>(i) Utilize low energy street lights (i.e., sodium, light-emitting diode [LED]).</p> <p>(j) Utilize energy-efficient interior lighting.</p> <p>(k) Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.</p> <p>(l) Provide a minimum of one designated parking space for alternatively fueled vehicles.</p> <p>(m) Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.</p> <p>(n) Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.</p> <p>(o) Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.</p> <p>(p) Provide on-site bicycle parking beyond those required by California Green Building Standards Code and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).</p> <p>(q) Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)</p> <p><u><b>AQ-1.2: A Developer Mitigation Contract (DMC) Voluntary Emission Reduction Agreement (VERA)</b></u> shall be entered into with the SJVAPCD to reduce operational emissions of ROG and NOX to less than 10 tons/year and emissions of PM10 to below 15 tons/year. Operational emissions of ROG, NOX and PM10 (inclusive of PM2.5) shall be reduced in excess of the reductions required per compliance with SJVAPCD's ISR Rule (Refer to Mitigation Measure AQ-1). Emission reductions may be achieved by use of newer, low-emission equipment, implementation of on-site or off-site mitigation, and/or the funding of off-site mitigation, through participation in the SJVAPCD's off-site mitigation program. <u>The project development plans are long term and conceptual in nature and subject to change in uses and extent otherwise allowed by City zoning that have lesser or equal impacts to those assessed in the EIR. VERA emission estimates shall be based on project-specific modeling assumptions where available (e.g., truck trip generation). Modeling performed shall account for declining emissions during the 10-year mitigation period due to vehicle turnover projected by the latest State approved emission models. VERA emission estimates may be revised to reflect actual development plans proposed for the site at the time each building or phase is finalized. VERA mitigation fee payments for a building or phase may be deferred until no later than 30 days prior to commencing construction activities for the building or phase. The DMC VERA shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming compliance with entering into the DMC VERA prior to issuance of final discretionary approval (e.g., approval of the grading permit for the first construction project relying on this EIR). Development and implementation of the DMC VERA shall be fully funded by the project</u></p> |
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**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|   | <p>proponent/owner <u>as development progresses</u>. With approval by SJVAPCD, the <del>DMC</del> <u>VERA</u> may also be used to demonstrate compliance with emission reductions required by SJVAPCD's ISR Rule (Rule 9510).</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>   |
| <p><b>AQ-2</b><br/><b>Air Quality</b></p> | <p><b>Impact:</b> Impacts to sensitive receptors may occur due to localized PM concentrations from construction activities and air emissions from stationary sources.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>AQ-2:</b> Implement Measures to Reduce Localized Pollutant Concentrations</p> <p>(a) Potential health risks associated with permitted stationary sources (e.g., emergency generators) shall be evaluated prior to installation and operation, once more detailed equipment specifications have been identified and in accordance with SJVAPCD's permitting requirements. Emissions control measures and/or operational limitations shall be incorporated, to the extent deemed necessary, to ensure that operational emissions would not exceed applicable SJVAPCD's significance thresholds for cancer risk of 20 in one million or an acute/chronic hazard index of one.</p> <p>(b) The following measures shall be implemented to reduce potential expose of sensitive receptors to localized concentrations of construction-generated PM at nearby sensitive receptors and land uses during project construction:</p> <ol style="list-style-type: none"> <li>On-road diesel vehicles shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles: <ul style="list-style-type: none"> <li>Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location, except as noted in Subsection (d) of the regulation; and,</li> <li>Shall not operate a diesel-fueled auxiliary power system to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation.</li> </ul> </li> <li>Off-road diesel equipment shall comply with the 5-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use Off-road Diesel regulation. The specific requirements and exceptions in the regulations can be reviewed at the following web sites: <a href="http://www.arb.ca.gov/msprog/truck-idling/2485.pdf">www.arb.ca.gov/msprog/truck-idling/2485.pdf</a> and <a href="http://www.arb.ca.gov/regact/2007/ordiesl07/froal.pdf">www.arb.ca.gov/regact/2007/ordiesl07/froal.pdf</a>.</li> <li>Signs shall be posted at the project site construction entrance to remind drivers and operators of the state's five-minute idling limit.</li> <li>To the extent available, replace fossil-fueled equipment with alternatively-fueled (e.g., natural gas) or electrically-driven equivalents.</li> <li>Construction truck trips shall be scheduled, to the extent possible, to occur during non-peak hours.</li> <li>The burning of vegetative material shall be prohibited.</li> <li>The proposed project shall comply with SJVAPCD Regulation VIII for the control of fugitive dust emissions. Regulation VIII can be obtained on the SJVAPCD's website at website URL: <a href="https://www.valleyair.org/rules/1ruleslist.htm">https://www.valleyair.org/rules/1ruleslist.htm</a>. At a minimum, the following measures shall be implemented: <ul style="list-style-type: none"> <li>All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.</li> </ul> </li> </ol> |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|  | <ul style="list-style-type: none"> <li>• All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.</li> <li>• All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut &amp; fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.</li> <li>• When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.</li> <li>• Trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)</li> <li>• Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.</li> <li>• On-road vehicle speeds on unpaved surfaces of the project site shall be limited to 15 mph.</li> <li>• Sandbags or other erosion control measures shall be installed sufficient to prevent silt runoff to public roadways from sites with a slope greater than one percent.</li> <li>• Excavation and grading activities shall be suspended when winds exceed sustained speeds of 20 miles per hour (Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation).</li> </ul> <p>8. The above measures for the control of construction-generated emissions shall be included on site grading and construction plans.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <p><b>AQ-3</b><br/><b>Air Quality</b></p>          | <p><b>Impact:</b> The project may be inconsistent with the applicable air quality plan.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b><br/>Implement Measures AQ-1.1 through AQ-2.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>BR-1</b><br/><b>Biological Resources</b></p> | <p><b>Impact:</b> The project would potentially impact Special Status Species including Vernal Pool Fairy Shrimp (VPFS), Burrowing Owl, Swainson's Hawk and other bird species.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b><br/><b>BR-1.1:</b> The City of Clovis shall either:<br/><br/>(a) Conduct surveys for VPFS following USFWS survey guidelines (2015) to determine presence of the species within the project area [A complete survey includes at least one wet season survey and one dry season survey, completed within a 3-year period. If VPFS are not detected, and if approved by USFWS, the City may be exempt from further mitigation measures for VPFS. If VPFS are detected in the roadside depression, an Incidental Take Permit would be required, as detailed in VPFS-1]; or<br/><br/>(b) Elect to skip the surveys and immediately begin the consultation process for an Incidental Take Permit with USFWS and US Army Corps of Engineers (ACOE). A Biological Assessment to review the proposed action (the project) and its effects on the VPFS, in accordance with the legal requirements set forth in Section 7 of the Federal Endangered Species Act, would be required.</p> <p><b>BR-1.2:</b> An Incidental Take Permit for VPFS and shall be obtained from the USFWS prior to construction. All conditions of the permit required by USFWS shall be implemented. Appropriate mitigation credit ratios</p>   |



**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|  | <p>and other measures should be determined in consultation with USFWS and ACOE. At a minimum, the following conservation measures shall be implemented to minimize impacts to the federally listed VPFS and/or other non-listed vernal pool branchiopods including midvalley fairy shrimp and California linderiella:</p> <p>(a) Effects of permanent losses and degradation of VPFS habitat shall be minimized and, to the greatest extent practicable, habitat restored. Before discharge of fill material, creation and/or preservation credits (amount TBD with consultation with USFWS) will be obtained from a USFWS-approved mitigation bank for every acre of habitat directly or indirectly impacted.</p> <p>(b) Staging areas shall be located away from the seasonal wetlands and channels.</p> <p>(c) Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be used onsite or disposed of at a regional landfill or other appropriate facility.</p> <p>(d) A USFWS-approved biologist conduct habitat sensitivity training related to VPFS for all project contractors and personnel.</p> <p><b>BR-1.3: Avoidance.</b></p> <p>If feasible, any vegetation removal will take place between September 1 and February 1 to avoid impacts to nesting birds in compliance with the Migratory Bird Treaty Act. If vegetation removal must occur during the nesting season, project construction may be delayed due to actively nesting birds and their required protective buffers.</p> <p><b>BR-1.4: Pre-Construction Surveys.</b></p> <p>(a) If vegetation removal or ground disturbance will commence between February 1 and August 31, a qualified biologist will conduct a pre-construction survey for nesting birds within 14 days of the initiation of disturbance activities. This survey will cover:</p> <p>(1) Potential nest sites in trees, bushes, or grass within species-specific buffers of the project area (Swainson's hawk – 0.5 mile, other raptor species such as white-tailed kite – 500 ft, non-raptor species (loggerhead shrike, magpie etc. – 250 ft).</p> <p>(2) Survey protocol developed by the Swainson's Hawk Technical Advisory Committee (TAC) should be followed (CDFG 2000), which includes survey timing and requirements for repeated visits.</p> <p>(b) Surveys for burrowing owl will occur within 14 days prior to any ground disturbance, no matter the season. This survey will cover potential burrowing owl burrows in the project area and suitable habitat within 150 m (500 ft). Evaluation of use by owls shall be in accordance with California Department of Fish and Wildlife survey guidelines (CBOC 1993, CDFG 1995, CDFG 2012). Surveys will document if burrowing owls are nesting or using habitat in or directly adjacent to the project area. Survey results will be valid only for the season (breeding (Feb 1-Aug 31) or non-breeding (Sept 1-Jan 31) during which the survey is conducted.</p> <p>(c) If no active nests or burrows are detected during the pre-construction survey, then no further action is required. If an active nest or burrow is detected, then the minimization measures described in MM BR-5 shall be implemented.</p> <p><b>BR-1.5: Minimization/Establish Buffers.</b></p> <p>(a) Swainson's hawk, white-tailed kite, loggerhead shrike, yellow-billed magpie, Nuttall's woodpecker, oak titmouse, and MBTA-protected species:</p> <p>If any active nests are discovered (and if construction will occur during bird breeding season), the USFWS and/or CDFW will be contacted to determine protective measures required to avoid take. These measures could include fencing off an area where a nest occurs, or shifting construction work temporally or spatially away from the nesting birds. Biologists are required on site to monitor construction while protected migratory birds are nesting in the project area. If an active nest is found after the completion of the pre-construction surveys and after construction begins, all construction activities will stop until a qualified biologist has evaluated the nest and erected the appropriate buffer around the nest.</p> <p>(b) Burrowing owl:</p> |
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**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|  | <p>If burrowing owls are detected within the survey area, CDFW should be consulted to determine the suitable buffer. These buffers will take into account the level of disturbance of the project activity, existing disturbance of the site (vehicle traffic, humans, pets, etc.), and time of year (nesting vs. wintering). If avoidance is not feasible, the City will work with CDFW to determine appropriate mitigation, such as passive exclusion or translocation, and associated mitigation land offset (CDFG 2012).</p> <p>If avoidance is not feasible, as per the General Plan Update PEIR (City of Clovis 2014), “A qualified biologist will develop appropriate mitigations that will reduce project impacts to sensitive or protected biological resources to a less than significant level. The type and amount of mitigation will depend on the resources impacted, the extent of the impacts, and the quality of habitats to be impacted. Mitigations may include, but are not limited to: 1) Compensation for lost habitat or waters in the form of preservation or creation of in-kind habitat or waters, either onsite or offsite, protected by conservation easement; 2) Purchase of appropriate credits from an approved mitigation bank servicing the Clovis General Plan Update Area; 3) Payment of in-lieu fees.”</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>BR-2</b><br/><b>Biological Resources</b></p> | <p><b>Impact:</b> The widening of Herndon Avenue would impact 0.204 acres of wetlands.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>BR-2.1:</b> The City of Clovis shall obtain a Section 404 CWA Nationwide Permit (#14 for linear transportation projects) from the ACOE for impacts to wetlands and waters of the United States and comply with the mitigation measures identified in the permit to prevent discharge of pollutants to surface waters during construction. This shall include complying with the State’s National Pollution Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit) issued by the Central Valley Regional Water Quality Control Board (CVRWQCB). A Section 401 Water Quality Certification must be obtained from the RWQCB for all proposed impacts to Waters of the State. A Section 1602 Lake and Streambed Alteration Agreement, if required by CDFW, must be obtained prior to the placement of any fill within the seasonal swale in the Project Area. Though the Nationwide Permit process, the ACOE will also submit a Biological Assessment to USFWS to initiate formal consultation under Section 7 of FESA to determine if the action could result in the incidental take of a federal listed species (in this case VPFS).</p> <p><b>BR-2.2:</b> To mitigate for impacts to waters and/or wetlands, at least one of the following measures shall be incorporated:</p> <p>(a) credits will be purchased from an approved mitigation bank (typically at a 2:1 or 3:1 ratio; to be determined in consultation with ACOE and USFWS); or</p> <p>(b) a creation, restoration, or preservation project will be identified in the vicinity; or</p> <p>(c) mitigation performed as otherwise directed by regulatory agencies during permit preparation.</p> <p>Mitigation will be implemented prior to or concurrent with filling jurisdictional waters and/or wetlands. Since the waters to be impacted by the road widening overlap with potential VPFS habitat, VPFS mitigation may incorporate a portion of the required wetland/waters mitigation acreage.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <p><b>BR-3</b><br/><b>Biological Resources</b></p> | <p><b>Impact:</b> The widening of Herndon Avenue would impact a small wetland swale riparian habitat.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p>Implement Mitigation Measures BR-2.1 and BR-2.2.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>CR-1</b><br/><b>Cultural Resources</b></p>   | <p><b>Impact:</b> Potential disturbance of subsurface cultural and/or paleontological resources may result from project construction activities.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p>   |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|                       | <p><b>Mitigation Measures:</b></p> <p><b>CR-1.1:</b> All contractors and subcontractors for the project shall be informed, in writing, of the possibility that cultural or paleontological resources may be discovered during project activities. If any cultural or paleontological materials are uncovered during project activities, work in the area or any area reasonably suspected to overlie adjacent remains shall halt until a professional evaluation and/or data recovery excavation can be planned and implemented. Appropriate measures to protect remains from accidents, looting, and vandalism shall be implemented immediately.</p> <p><b>CR-1.2:</b> After they have been professionally recorded in their place of discovery, archaeological or paleontological materials shall be transferred to an appropriate regional repository for preservation, research, and/or use in interpretive exhibits.</p> <p><b>CR-1.3:</b> If human remains are discovered, the Fresno County Coroner must be notified immediately. The Coroner has two working days to examine the remains and 24 hours to notify the Native American Heritage Commission (NAHC) if the remains are Native American (Health and Safety Code Section 7050.5). Once the NAHC is notified, the procedures set forth in CEQA Guidelines Section 15064.5(d) and Public Resources Code Section 5097.98 shall be followed.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>   |
| <b>NO-1<br/>Noise</b> | <p><b>Impact:</b> Temporary or periodic increases in ambient noise levels would result from construction activities.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>NO-1:</b> The following measures shall be implemented to reduce construction-generated noise levels:</p> <p>(a) Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 7:00 p.m.</p> <p>(b) Construction equipment shall be properly maintained and equipped exhaust mufflers and engine shrouds in accordance with manufacturers' recommendations.</p> <p>(c) Construction equipment staging areas shall be located at the furthest distance possible from nearby noise-sensitive land uses.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <b>NO-3<br/>Noise</b> | <p><b>Impact:</b> An increase in long-term ambient noise levels from operational features would result from the project.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>NO-3:</b> The following measures shall be implemented to reduce operational noise levels:</p> <p>(a) An acoustical analysis shall be prepared for the proposed central plant prior to final design. The acoustical analysis shall identify building/equipment noise-reduction measures to be incorporated sufficient to achieve an exterior average-hourly noise-level of 50 dBA Leq, or less, at the property line of the nearest noise-sensitive land use. This average-hourly noise levels performance standard would equate to an average-daily noise level of approximately 58 dBA CNEL, which would ensure compliance with the City of Clovis exterior and interior noise level standards of 65 and 45 dBA CNEL, respectively. Noise-reduction measures to be incorporated may include, but are not limited to, the selection of alternative or quieter equipment, use of sound enclosures, and shielding building intake and exhaust vents from direct line of sight of nearby noise-sensitive land uses. The acoustical analysis shall be submitted to the City of Clovis Planning Department for review and approval prior to issuance of construction/grading permits for the construction of the central plant.</p> <p>(b) Emergency generators shall be enclosed and fitted with exhaust silencers.</p> <p>(c) Building air conditioning units for proposed structures shall be located on building rooftops and shielded from direct line-of-sight of adjacent noise-sensitive land uses. Building parapets shall be constructed, when necessary, to shield nearby land uses from direct line-of-sight of air conditioning units.</p> |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

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|  | <b>Level of Significance with Mitigation:</b> Less than significant   |
| <b>TT-1</b><br><b>Transportation and Traffic</b> | <p><b>Impact:</b> The “Existing Conditions plus Project” Scenario would result in unacceptable levels of service at the following intersection:</p> <ul style="list-style-type: none"> <li>SR 168 EB Ramps at Temperance Avenue</li> </ul> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><i>TT-1:</i> To improve the LOS at the intersection of SR 168 EB Ramps at Temperance Avenue, a second eastbound right-turn lane and third northbound through lane shall be added, and the existing traffic signal shall be modified to accommodate the added lane geometrics.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>   |
| <b>TT-2</b><br><b>Transportation and Traffic</b> | <p><b>Impact:</b> The “Near Term Projects plus Project” Scenario would result in unacceptable levels of service at the following intersections:</p> <ul style="list-style-type: none"> <li>SR 168 EB Ramps at Temperance Avenue</li> <li>Alluvial Avenue at Temperance Avenue</li> <li>Herndon Avenue at Temperance Avenue</li> <li>Herndon Avenue at De Wolf Avenue (South Leg)</li> </ul> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><i>TT-2:</i> The project shall participate on a pro rata basis in making improvements to the intersections of 1) Alluvial Avenue at Temperance Avenue, 2) Herndon Avenue at Temperance Avenue, and 3) Herndon Avenue at De Wolf Avenue (south leg) listed under the “Near Term Projects plus Project” scenario for any improvements that are not covered by local and regional impact fee programs. The fair share percentages are calculated in Table 19.14 [see Chapter 19, Transportation and Traffic].</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <b>TT-3</b><br><b>Transportation and Traffic</b> | <p><b>Impact:</b> The “Cumulative Year 2035 with Project” Scenario would result in unacceptable levels of service at the following intersections:</p> <ul style="list-style-type: none"> <li>SR 168 EB Ramps at Temperance Avenue</li> <li>Herndon Avenue at Armstrong Avenue</li> <li>Herndon Avenue at Temperance Avenue</li> <li>Herndon Avenue at Locan Avenue</li> <li>Herndon Avenue at DeWolf Avenue (north leg)</li> <li>Herndon Avenue at DeWolf Avenue (south leg)</li> <li>Herndon Avenue at Leonard Avenue</li> <li>Herndon Avenue at McCall Avenue</li> <li>Herndon Avenue at Academy Avenue</li> <li>Bullard Avenue at Locan Avenue</li> <li>Bullard Avenue at De Wolf Avenue</li> <li>Alluvial Avenue at Temperance Avenue</li> <li>Herndon Avenue at Tollhouse Road</li> <li>New Access Road/Temperance Avenue</li> </ul>   |

**Table 1.2**  
**Significant Impacts and Mitigation Measures**

|  |   |
|--|---|
|  | <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>TT-3:</b> The project shall participate on a pro-rata fair share basis in street improvements listed under the “Cumulative Year 2035 with Project Conditions” scenario for any improvements that are not covered by local and regional impact fee programs. The fair share percentages are calculated in Table 19.14 [see Chapter 19, Transportation and Traffic].</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>  |
| <p><b>TT-4</b><br/><b>Transportation and Traffic</b></p> | <p><b>Impact:</b> The “Cumulative Year 2035 With Project” Conditions Would Result in the Need for Additional Turn Lane Storage Capacity at the following intersections:</p> <ul style="list-style-type: none"> <li>• Nees Avenue/Temperance Avenue</li> <li>• Alluvial Avenue/Temperance Avenue</li> <li>• SR 168 EB Ramps/Temperance Avenue</li> <li>• Fir Avenue/Temperance Avenue</li> <li>• Herndon Avenue/Armstrong Avenue</li> <li>• Herndon Avenue/Temperance Avenue</li> <li>• Herndon Avenue/Coventry Avenue</li> <li>• Herndon Avenue/Locan Avenue</li> <li>• Herndon Avenue/DeWolf Avenue (north leg)</li> <li>• Herndon Avenue/DeWolf Avenue (south leg)</li> <li>• Herndon Avenue/Leonard Avenue</li> <li>• Herndon Avenue/McCall Avenue</li> <li>• Herndon Avenue/Academy Avenue</li> <li>• New Access Road/Temperance Avenue</li> <li>• Bullard Avenue/Locan Avenue</li> <li>• Bullard Avenue/DeWolf Avenue</li> </ul> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p><b>TT-4:</b> The project shall participate on a pro-rata fair share basis in the improvements identified in the Queuing Analysis of the Traffic Impact Analysis (Draft EIR Appendix 19).</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p> |
| <p><b>TR-1</b><br/><b>Tribal Cultural Resources</b></p>  | <p><b>Impact:</b> Disturbance of subsurface tribal cultural resources would potentially result from construction activities.</p> <p><b>Level of Significance without Mitigation:</b> Potentially significant</p> <p><b>Mitigation Measures:</b></p> <p>Incorporate Mitigation Measures CR-1.1 through 1.3.</p> <p><b>Level of Significance with Mitigation:</b> Less than significant</p>   |

## **AREAS OF CONTROVERSY**

CEQA Guidelines Section 15123 requires that the EIR identify any “areas of controversy known to the Lead Agency including issues raised by agencies and the public.”

Based on comments provided in response to the Notice of Availability published for the DEIR, the items listed below have been identified as potential areas of controversy. Each of these items is addressed in Chapter 4 of the Final EIR (see reference in parenthesis):

- Concerns from a neighboring property owner regarding noise and aesthetic impacts from development at the east side of the CCMC project area. (See Comment Letter 1 and Response in Chapter 4)
- Concerns from a neighboring property owner regarding air quality, noise, and traffic conditions resulting from the proposed Herndon Avenue widening. (See Comment Letter 3 and Response Chapter 4)
- Concerns from a neighboring propane gas business regarding compatibility of proposed development at the west side of the CCMC project area with nearby propane gas facilities. (See Comment Letter 6 and Response in Chapter 4)

The lead agency is not aware of any other areas of controversy.

# CHAPTER 3

## Mitigation Monitoring and Reporting Program

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This Mitigation Monitoring and Reporting Program (MMRP) has been prepared in accordance with State CEQA Guidelines Section 15091(d) and Section 15097. The purpose for the Mitigation Monitoring and Reporting Program is to ensure that the mitigation measures identified in this Final EIR are implemented.

The MMRP table to follow lists the mitigation measures that will be implemented as part of the project. These measures correspond to those listed in the Summary section of this Final EIR. To ensure that the mitigation measures are properly implemented, the table identifies the timing and responsibility for monitoring and reporting the implementation of the measures. CCMC and the City will have the responsibility for implementing the measures applicable to the CCMC expansion and Herndon Avenue widening, respectively, and various City of Clovis departments/divisions and other agencies will have the primary responsibility for monitoring and reporting the implementation of the mitigation measures.

**Mitigation Monitoring and Reporting Program for the  
Clovis Community Medical Center Expansion and Herndon Avenue Widening Project**

**AESTHETICS**

| <b>IMPACT</b>  | <b>MITIGATION MEASURES</b>   | <b>TIMING</b>   | <b>MONITORING AGENCY</b>  | <b>SIGN OFF</b> |
|--|--|---|---|-----------------|
| AE-1: Clearing and construction activity would temporarily degrade the visual quality of the project site.               | <p><b>AE-1.1:</b> During the project clearing, grading, and construction phases, a chain-link fence six feet in height shall be maintained around the project sites and a solid fence or wall at least six feet in height shall be maintained around the construction staging area. A chain-link fence draped with heavy plastic is suitable for this purpose.</p> <p><b>AE-1.2:</b> The project contractor shall store construction materials that may be on the site for more than 48 hours within the construction staging area, and the project contractor shall park or store construction equipment within the construction staging area. Construction materials or equipment shall not be stored on public streets, and the project contractor shall remove construction materials and equipment from the site when no further need exists for materials or equipment.</p> <p><b>AE-1.3:</b> The project contractor shall keep properties and streets surrounding the project site free from project-related rubbish and debris by removing any rubbish or debris the day it appears.</p> <p><b>AE-1.4:</b> Any excess excavated material shall be removed from the site immediately following completion of the excavation activity that resulted in the material.</p> <p><b>AE-1.5:</b> The project contractor shall remove any graffiti on the project sites within 48 hours of the time it appears.</p> <p><b>AE-1.6:</b> The project contractor shall place all portable restrooms within the construction staging area.</p> | Ongoing during grading and construction.  | City of Clovis Planning and Development Services Department – Building Division |                 |
| AE-2: The project would increase in illumination and glare due to project lighting, building surfaces and parking areas. | <p><b>AE-2.1:</b> Parking lot lighting shall employ full cut-off type fixtures. A full cut-off type fixture is a luminaire or light fixture that, by design of the housing, does not allow light dispersion or direct glare to shine above a 90-degree horizontal plane from the base of the fixture. Full cut-off type fixtures must be installed in a horizontal position as designed.</p> <p><b>AE-2.2:</b> The design of external signs and lighting shall prevent direct glare on adjoining properties.</p>   | At the time of plan review, and ongoing during construction and operation of the project. | City of Clovis Planning and Development Services Department – Building Division |                 |



|   | <b>AE-2.3:</b> The design for the buildings east of Medical Center Drive East shall incorporate exterior materials designed to minimize reflective glare from the exterior surfaces.   |  |   |                 |
|---|--|--|---|-----------------|
| <b>AIR QUALITY</b>  |  |  |   |                 |
| <b>IMPACT</b>   | <b>MITIGATION MEASURES</b>   | <b>TIMING</b>  | <b>MONITORING AGENCY</b>  | <b>SIGN OFF</b> |
| AQ-1: The project would increase long-term operational emissions of particulate matter and ozone precursor emissions. | <p><b>AQ-1.1:</b> Operation of the proposed project shall comply with SJVAPCD's ISR rule (Rule 9510). Accordingly, an Air Impact Assessment (AIA) shall be prepared for the proposed Project. The AIA shall be submitted to and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The AIA shall include: an estimate of operational emissions prior to the implementation of mitigation measures; a list of the mitigation measures to be applied to the project; an estimate of emissions for each applicable pollutant for the project, or each phase thereof, following the implementation of mitigation; and a calculation of the applicable off-site fee, if required by Rule 9510. Measures that may be implemented to reduce operational emissions may include, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>(a) Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.</li> <li>(b) Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50% tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.</li> <li>(c) Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.</li> <li>(d) Incorporate outdoor electrical outlets to encourage the use of electric landscape maintenance equipment.</li> <li>(e) Install high-efficiency heating and cooling systems.</li> <li>(f) Utilize high-efficiency gas or solar water heaters.</li> <li>(g) Utilize built-in energy-efficient appliances (i.e., Energy Star rated).</li> <li>(h) Utilize double- or triple-paned windows.</li> <li>(i) Utilize low energy street lights (i.e., sodium, light-emitting diode [LED]).</li> <li>(j) Utilize energy-efficient interior lighting.</li> </ul> | Prior to the commencement of grading activities and ongoing during grading and construction. | City of Clovis Planning and Development Services Department – Planning and Building Divisions |                 |

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|  | <p>(k) Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.</p> <p>(l) Provide a minimum of one designated parking space for alternatively fueled vehicles.</p> <p>(m) Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.</p> <p>(n) Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.</p> <p>(o) Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.</p> <p>(p) Provide on-site bicycle parking beyond those required by California Green Building Standards Code and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).</p> <p>(q) Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)</p> <p><b>AQ-1.2:</b> A Voluntary Emissions Reduction Agreement (VERA) shall be entered into with the SJVAPCD to reduce operational emissions of ROG and NOX to less than 10 tons/year and emissions of PM10 to below 15 tons/year. Operational emissions of ROG, NOX and PM10 (inclusive of PM2.5) shall be reduced in excess of the reductions required per compliance with SJVAPCD's ISR Rule (Refer to Mitigation Measure AQ-1). Emission reductions may be achieved by use of newer, low-emission equipment, implementation of on-site or off-site mitigation, and/or the funding of off-site mitigation, through participation in the SJVAPCD's off-site mitigation program. The project development plans are long term and conceptual in nature and subject to change in uses and extent otherwise allowed by City zoning that have lesser or equal impacts to those assessed in the EIR. VERA emission estimates shall be based on project-specific modeling assumptions where available (e.g., truck trip generation). Modeling performed shall account for declining emissions during the 10-year mitigation period due to vehicle turnover projected by the latest State approved emission models. VERA emission estimates may be revised to reflect actual development plans proposed for the site at the time each building or phase is finalized.</p> |  |  |  |
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|  | <p>VERA mitigation fee payments for a building or phase may be deferred until no later than 30 days prior to commencing construction activities for the building or phase. The VERA shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming entering into the VERA, prior to issuance of final discretionary approval (e.g., approval of the grading permit for the first construction project relying on this EIR). Development and implementation of the VERA shall be fully funded by the project proponent/owner as development progresses. With approval by SJVAPCD, the VERA may also be used to demonstrate compliance with emission reductions required by SJVAPCD's ISR Rule (Rule 9510).</p>  |   |   |  |
| <p>AQ-2: Impacts to sensitive receptors may occur due to localized PM concentrations from construction activities and air emissions from stationary sources.</p> | <p><b>AQ-2:</b> Implement Measures to Reduce Localized Pollutant Concentrations</p> <p>(a) Potential health risks associated with permitted stationary sources (e.g., emergency generators) shall be evaluated prior to installation and operation, once more detailed equipment specifications have been identified and in accordance with SJVAPCD's permitting requirements. Emissions control measures and/or operational limitations shall be incorporated, to the extent deemed necessary, to ensure that operational emissions would not exceed applicable SJVAPCD's significance thresholds for cancer risk of 20 in one million or an acute/chronic hazard index of one.</p> <p>(b) The following measures shall be implemented to reduce potential exposure of sensitive receptors to localized concentrations of construction-generated PM at nearby sensitive receptors and land uses during project construction:</p> <ol style="list-style-type: none"> <li>1. On-road diesel vehicles shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles: <ul style="list-style-type: none"> <li>• Shall not idle the vehicle's primary diesel engine for greater than 5 minutes at any location, except as noted in Subsection (d) of the regulation; and,</li> <li>• Shall not operate a diesel-fueled auxiliary power system to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation.</li> </ul> </li> <li>2. Off-road diesel equipment shall comply with the 5-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use Off-road Diesel regulation. The specific requirements and exceptions in the regulations can</li> </ol> | <p>Ongoing during grading, construction, and operation.</p> | <p>San Joaquin Valley Air Pollution Control District (SJVAPCD)</p> <p>City of Clovis Planning and Development Services Department – Building Division</p> |  |

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|  | <p>be reviewed at the following web sites: <a href="http://www.arb.ca.gov/msprog/truck-idling/2485.pdf">www.arb.ca.gov/msprog/truck-idling/2485.pdf</a> and <a href="http://www.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf">www.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf</a>.</p> <p>3. Signs shall be posted at the project site construction entrance to remind drivers and operators of the state's five-minute idling limit.</p> <p>4. To the extent available, replace fossil-fueled equipment with alternatively-fueled (e.g., natural gas) or electrically-driven equivalents.</p> <p>5. Construction truck trips shall be scheduled, to the extent possible, to occur during non-peak hours.</p> <p>6. The burning of vegetative material shall be prohibited.</p> <p>7. The proposed project shall comply with SJVAPCD Regulation VIII for the control of fugitive dust emissions. Regulation VIII can be obtained on the SJVAPCD's website at website URL: <a href="https://www.valleyair.org/rules/1ruleslist.htm">https://www.valleyair.org/rules/1ruleslist.htm</a>. At a minimum, the following measures shall be implemented:</p> <ul style="list-style-type: none"> <li>• All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.</li> <li>• All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.</li> <li>• All land clearing, grubbing, scraping, excavation, land leveling, grading, and cut &amp; fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.</li> <li>• When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.</li> <li>• Trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)</li> <li>• Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.</li> </ul> |  |  |  |
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|   | <ul style="list-style-type: none"> <li>On-road vehicle speeds on unpaved surfaces of the project site shall be limited to 15 mph.</li> <li>Sandbags or other erosion control measures shall be installed sufficient to prevent silt runoff to public roadways from sites with a slope greater than one percent.</li> <li>Excavation and grading activities shall be suspended when winds exceed sustained speeds of 20 miles per hour (Regardless of wind speed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation).</li> </ul> <p>8. The above measures for the control of construction-generated emissions shall be included on site grading and construction plans.</p>   |   |  |          |
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| AQ-3: The project may be inconsistent with the applicable air quality plan.   | Implement Measures AQ-1.1 through AQ-2.   | See AQ-1.1, AQ-1.2 and AQ-2   | See AQ-1.1, AQ-1.2 and AQ-2  |          |
| <b>BIOLOGICAL RESOURCES</b>   |   |   |  |          |
| IMPACT  | MITIGATION MEASURES   | TIMING  | MONITORING AGENCY  | SIGN OFF |
| BR-1: The project would potentially impact Special Status Species including Vernal Pool Fairy Shrimp (VPFS), Burrowing Owl, Swainson's Hawk and other bird species. | <p><b>BR-1.1:</b> The City of Clovis shall either:</p> <p>(a) Conduct surveys for VPFS following USFWS survey guidelines (2015) to determine presence of the species within the project area [A complete survey includes at least one wet season survey and one dry season survey, completed within a 3-year period. If VPFS are not detected, and if approved by USFWS, the City may be exempt from further mitigation measures for VPFS. If VPFS are detected in the roadside depression, an Incidental Take Permit would be required, as detailed in VPFS-1]; or</p> <p>(b) Elect to skip the surveys and immediately begin the consultation process for an Incidental Take Permit with USFWS and US Army Corps of Engineers (ACOE). A Biological Assessment to review the proposed action (the project) and its effects on the VPFS, in accordance with the legal requirements set forth in Section 7 of the Federal Endangered Species Act, would be required.</p> <p><b>BR-1.2:</b> An Incidental Take Permit for VPFS and shall be obtained from the USFWS prior to construction. All conditions of the permit required by USFWS shall be implemented. Appropriate mitigation credit ratios and other measures should be determined in consultation with USFWS and ACOE. At a minimum, the following conservation measures shall be implemented to minimize impacts to the federally</p> | Prior to the commencement of grading activities and ongoing during grading and construction | City of Clovis Planning and Development Services Department – Planning and Engineering Divisions |          |

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|  | <p>listed VPFS and/or other non-listed vernal pool branchiopods including midvalley fairy shrimp and California linderiella:</p> <p>(a) Effects of permanent losses and degradation of VPFS habitat shall be minimized and, to the greatest extent practicable, habitat restored. Before discharge of fill material, creation and/or preservation credits (amount TBD with consultation with USFWS) will be obtained from a USFWS-approved mitigation bank for every acre of habitat directly or indirectly impacted.</p> <p>(b) Staging areas shall be located away from the seasonal wetlands and channels.</p> <p>(c) Temporary stockpiling of excavated or imported material shall occur only in approved construction staging areas. Excess excavated soil shall be used onsite or disposed of at a regional landfill or other appropriate facility.</p> <p>(d) A USFWS-approved biologist conduct habitat sensitivity training related to VPFS for all project contractors and personnel.</p> <p><b>BR-1.3:</b> Avoidance.</p> <p>If feasible, any vegetation removal will take place between September 1 and February 1 to avoid impacts to nesting birds in compliance with the Migratory Bird Treaty Act. If vegetation removal must occur during the nesting season, project construction may be delayed due to actively nesting birds and their required protective buffers.</p> <p><b>BR-1.4:</b> Pre-Construction Surveys.</p> <p>(a) If vegetation removal or ground disturbance will commence between February 1 and August 31, a qualified biologist will conduct a pre-construction survey for nesting birds within 14 days of the initiation of disturbance activities. This survey will cover:</p> <p>(1) Potential nest sites in trees, bushes, or grass within species-specific buffers of the project area (Swainson's hawk – 0.5 mile, other raptor species such as white-tailed kite – 500 ft, non-raptor species (loggerhead shrike, magpie etc. – 250 ft).</p> <p>(2) Survey protocol developed by the Swainson's Hawk Technical Advisory Committee (TAC) should be followed (CDFG 2000), which includes survey timing and requirements for repeated visits.</p> <p>(b) Surveys for burrowing owl will occur within 14 days prior to any ground disturbance, no matter the season. This survey will cover potential burrowing owl burrows in the project area and suitable habitat within 150 m (500 ft). Evaluation of use by owls shall be in accordance with California Department of Fish and Wildlife survey guidelines (CBOC 1993, CDFG 1995, CDFG 2012). Surveys will document if burrowing owls are nesting or using habitat in or directly adjacent to the project area.</p> |  |  |  |
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|  | <p>Survey results will be valid only for the season (breeding (Feb 1-Aug 31) or non-breeding (Sept 1-Jan 31) during which the survey is conducted.</p> <p>(c) If no active nests or burrows are detected during the pre-construction survey, then no further action is required. If an active nest or burrow is detected, then the minimization measures described in MM BR-5 shall be implemented.</p> <p><b>BR-1.5:</b> Minimization/Establish Buffers.</p> <p>(a) Swainson’s hawk, white-tailed kite, loggerhead shrike, yellow-billed magpie, Nuttall’s woodpecker, oak titmouse, and MBTA-protected species:</p> <p>If any active nests are discovered (and if construction will occur during bird breeding season), the USFWS and/or CDFW will be contacted to determine protective measures required to avoid take. These measures could include fencing off an area where a nest occurs, or shifting construction work temporally or spatially away from the nesting birds. Biologists are required on site to monitor construction while protected migratory birds are nesting in the project area. If an active nest is found after the completion of the pre-construction surveys and after construction begins, all construction activities will stop until a qualified biologist has evaluated the nest and erected the appropriate buffer around the nest.</p> <p>(b) Burrowing owl:</p> <p>If burrowing owls are detected within the survey area, CDFW should be consulted to determine the suitable buffer. These buffers will take into account the level of disturbance of the project activity, existing disturbance of the site (vehicle traffic, humans, pets, etc.), and time of year (nesting vs. wintering). If avoidance is not feasible, the City will work with CDFW to determine appropriate mitigation, such as passive exclusion or translocation, and associated mitigation land offset (CDFG 2012).</p> <p>If avoidance is not feasible, as per the General Plan Update PEIR (City of Clovis 2014), “A qualified biologist will develop appropriate mitigations that will reduce project impacts to sensitive or protected biological resources to a less than significant level. The type and amount of mitigation will depend on the resources impacted, the extent of the impacts, and the quality of habitats to be impacted. Mitigations may include, but are not limited to: 1) Compensation for lost habitat or waters in the form of preservation or creation of in-kind habitat or waters, either onsite or offsite, protected by conservation easement; 2) Purchase of appropriate credits from an approved mitigation bank servicing the Clovis General Plan Update Area; 3) Payment of in-lieu fees.”</p> |  |  |  |
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|--|---|---|---|--|
| <p>BR-2: The widening of Herndon Avenue would impact 0.204 acres of wetlands.</p>                | <p><b>BR-2.1:</b> The City of Clovis shall obtain a Section 404 CWA Nationwide Permit (#14 for linear transportation projects) from the ACOE for impacts to wetlands and waters of the United States and comply with the mitigation measures identified in the permit to prevent discharge of pollutants to surface waters during construction. This shall include complying with the State's National Pollution Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit) issued by the Central Valley Regional Water Quality Control Board (CVRWQCB). A Section 401 Water Quality Certification must be obtained from the RWQCB for all proposed impacts to Waters of the State. A Section 1602 Lake and Streambed Alteration Agreement, if required by CDFW, must be obtained prior to the placement of any fill within the seasonal swale in the Project Area. Though the Nationwide Permit process, the ACOE will also submit a Biological Assessment to USFWS to initiate formal consultation under Section 7 of FESA to determine if the action could result in the incidental take of a federal listed species (in this case VPFS).</p> <p><b>BR-2.2:</b> To mitigate for impacts to waters and/or wetlands, at least one of the following measures shall be incorporated:</p> <p>(a) credits will be purchased from an approved mitigation bank (typically at a 2:1 or 3:1 ratio; to be determined in consultation with ACOE and USFWS); or</p> <p>(b) a creation, restoration, or preservation project will be identified in the vicinity; or</p> <p>(c) mitigation performed as otherwise directed by regulatory agencies during permit preparation.</p> <p>Mitigation will be implemented prior to or concurrent with filling jurisdictional waters and/or wetlands. Since the waters to be impacted by the road widening overlap with potential VPFS habitat, VPFS mitigation may incorporate a portion of the required wetland/waters mitigation acreage.</p> | <p>Prior to the commencement of grading activities and ongoing during grading, construction, and operation.</p> | <p>City of Clovis Planning and Development Services Department – Engineering Division</p> |  |
| <p>BR-3: The widening of Herndon Avenue would impact a small wetland swale riparian habitat.</p> | <p>Implement Mitigation Measures BR-2.1 and BR-2.2.</p>   | <p>See BR-2.1 and BR 2.2</p>  | <p>See BR-2.1 and BR 2.2</p>  |  |



| CULTURAL RESOURCES   |  |  |   |          |
|--|--|--|---|----------|
| IMPACT   | MITIGATION MEASURES  | TIMING   | MONITORING AGENCY   | SIGN OFF |
| CR-1: Potential disturbance of subsurface cultural and/or paleontological resources may result from project construction activities. | <p><b>CR-1.1:</b> All contractors and subcontractors for the project shall be informed, in writing, of the possibility that cultural or paleontological resources may be discovered during project activities. If any cultural or paleontological materials are uncovered during project activities, work in the area or any area reasonably suspected to overlie adjacent remains shall halt until a professional evaluation and/or data recovery excavation can be planned and implemented. Appropriate measures to protect remains from accidents, looting, and vandalism shall be implemented immediately.</p> <p><b>CR-1.2:</b> After they have been professionally recorded in their place of discovery, archaeological or paleontological materials shall be transferred to an appropriate regional repository for preservation, research, and/or use in interpretive exhibits.</p> <p><b>CR-1.3:</b> If human remains are discovered, the Fresno County Coroner must be notified immediately. The Coroner has two working days to examine the remains and 24 hours to notify the Native American Heritage Commission (NAHC) if the remains are Native American (Health and Safety Code Section 7050.5). Once the NAHC is notified, the procedures set forth in CEQA Guidelines Section 15064.5(d) and Public Resources Code Section 5097.98 shall be followed.</p> | Prior to and during grading and construction activities. | City of Clovis Planning and Development Services Department – Engineering Division  |          |
| GREENHOUSE GAS EMISSIONS   |  |  |   |          |
| IMPACT   | MITIGATION MEASURES  | TIMING   | MONITORING AGENCY   | SIGN OFF |
| GH-1: The project would increase the generation of greenhouse gas emissions.   | <p><b>GH-1:</b> During construction and operation of the project, the following measures shall be implemented to reduce greenhouse gas (GHG) emissions:</p> <p>(a) Utilize green building materials (materials which are resource efficient, recycled, and sustainable) available locally if possible.</p> <p>(b) Provide shade tree planting in parking lots to reduce evaporative emissions from parked vehicles. Design should provide 50 percent tree coverage within 10 years of construction using low ROG emitting, low maintenance native drought-resistant trees.</p> <p>(c) Plant drought tolerant native shade trees along southern exposures of buildings to reduce energy used to cool buildings in summer.</p> <p>(d) Incorporate outdoor electrical outlets to encourage the use of electric landscape maintenance equipment.</p>   | Ongoing during construction and operation.               | <p>City of Clovis Planning and Development Services Department – Planning and Building Divisions</p> <p>San Joaquin Valley Air Pollution Control District (SJVAPCD)</p> |          |

|  |  |  |   |  |
|--|--|--|---|--|
|  | <p>(e) Install high-efficiency heating and cooling systems.</p> <p>(f) Utilize high-efficiency gas or solar water heaters.</p> <p>(g) Utilize built-in energy-efficient appliances (i.e., Energy Star rated).</p> <p>(h) Utilize double- or triple-paned windows.</p> <p>(i) Utilize low energy street lights (i.e., sodium, light-emitting diode [LED]).</p> <p>(j) Utilize energy-efficient interior lighting.</p> <p>(k) Use low-VOC content paints during construction and long-term facility maintenance. To the extent possible construction materials that are prefinished or that do not require the application of architectural coatings should be used.</p> <p>(l) Install low water consumption landscape. Use native plants that do not require watering after they are well established or minimal watering during the summer months and are low ROG emitting.</p> <p>(m) Provide a minimum of one designated parking space for alternatively fueled vehicles.</p> <p>(n) Install energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern.</p> <p>(o) Provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site.</p> <p>(p) Provide on-site bicycle parking beyond those required by California Green Building Standards Code and related facilities to support long-term use (lockers, or a locked room with standard racks and access limited to bicyclists only).</p> <p>(q) Implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.)</p> |  |   |  |
| GH-2: The project may conflict with an applicable greenhouse gas reduction plan, policy or regulation. | Implement Mitigation Measure GH-1.   | Ongoing during construction and operation. | City of Clovis Planning and Development Services Department – Planning and Building Divisions |  |

|  |  |  | San Joaquin Valley Air Pollution Control District (SJVAPCD)                        |                 |
|--|--|--|--|-----------------|
| <b>NOISE</b>   |  |  |  |                 |
| <b>IMPACT</b>  | <b>MITIGATION MEASURES</b>   | <b>TIMING</b>  | <b>MONITORING AGENCY</b>   | <b>SIGN OFF</b> |
| NO-1: Temporary or periodic increases in ambient noise levels would result from construction activities.     | <p><b>NO-1:</b> The following measures shall be implemented to reduce construction-generated noise levels:</p> <p>(a) Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 7:00 a.m. and 7:00 p.m.</p> <p>(b) Construction equipment shall be properly maintained and equipped exhaust mufflers and engine shrouds in accordance with manufacturers' recommendations.</p> <p>(c) Construction equipment staging areas shall be located at the furthest distance possible from nearby noise-sensitive land uses.</p> | Ongoing during grading and construction.   | City of Clovis Planning and Development Services Department – Building Division    |                 |
| NO-2: The project would result in an increase in long-term ambient noise levels from traffic sources.        | <p><b>NO-2:</b> Once detailed plans for lane configurations and alignments for the widening of Herndon Avenue are prepared, the City of Clovis shall have an acoustical analysis prepared. The acoustical analysis shall evaluate changes in traffic noise levels that would result from the proposed widening in comparison to the City of Clovis General Plan noise standards. Noise-reduction measures (e.g., sound walls) shall be evaluated and implemented, where feasible, to reduce traffic noise levels to below applicable noise standards.</p>  | At the time plans for lane configurations and alignments on Herndon Avenue have been prepared.           | City of Clovis Planning and Development Services Department – Engineering Division |                 |
| NO-3: An increase in long-term ambient noise levels from operational features would result from the project. | <p><b>NO-3:</b> The following measures shall be implemented to reduce operational noise levels:</p> <p>(a) An acoustical analysis shall be prepared for the proposed central plant prior to final design. The acoustical analysis shall identify building/equipment noise-reduction measures to be incorporated sufficient to achieve an exterior average-hourly noise-level of 50 dBA Leq, or less, at the property line of the nearest noise-sensitive land use. This average-hourly noise levels performance standard would equate to an average-daily noise level of approximately 58 dBA CNEL, which would ensure</p>         | Prior to final design of the hospital project, and incorporated during construction and/or installation. | City of Clovis Planning and Development Services Department – Planning Division    |                 |

|   | <p>compliance with the City of Clovis exterior and interior noise level standards of 65 and 45 dBA CNEL, respectively. Noise-reduction measures to be incorporated may include, but are not limited to, the selection of alternative or quieter equipment, use of sound enclosures, and shielding building intake and exhaust vents from direct line of sight of nearby noise-sensitive land uses. The acoustical analysis shall be submitted to the City of Clovis Planning Department for review and approval prior to issuance of construction/grading permits for the construction of the central plant.</p> <p>(b) Emergency generators shall be enclosed and fitted with exhaust silencers.</p> <p>(c) Building air conditioning units for proposed structures shall be located on building rooftops and shielded from direct line-of-sight of adjacent noise-sensitive land uses. Building parapets shall be constructed, when necessary, to shield nearby land uses from direct line-of-site of air conditioning units.</p> |   |   |                 |
|---|---|---|---|-----------------|
| <b>TRANSPORTATION AND TRAFFIC</b>   |   |   |   |                 |
| <b>IMPACT</b>   | <b>MITIGATION MEASURES</b>  | <b>TIMING</b>   | <b>MONITORING AGENCY</b>  | <b>SIGN OFF</b> |
| <p>TT-1: The “Existing Conditions plus Project” Scenario would result in unacceptable levels of service at the following intersection:</p> <ul style="list-style-type: none"> <li>• SR 168 EB Ramps at Temperance Avenue</li> </ul>   | <p><b>TT-1:</b> To improve the LOS at the intersection of SR 168 EB Ramps at Temperance Avenue, a second eastbound right-turn lane and third northbound through lane shall be added, and the existing traffic signal shall be modified to accommodate the added lane geometrics.</p>  | <p>Prior to completion of first building in the 2-10 year phase of project</p>                                | <p>City of Clovis Planning and Development Services Department – Engineering Division</p> |                 |
| <p>TT-2: The “Near Term Projects plus Project” Scenario would result in unacceptable levels of service at the following intersections:</p> <ul style="list-style-type: none"> <li>• SR 168 EB Ramps at Temperance Avenue</li> <li>• Alluvial Avenue at Temperance Avenue</li> </ul> | <p><b>TT-2:</b> The project shall participate on a pro rata basis in making improvements to the intersections of 1) Alluvial Avenue at Temperance Avenue, 2) Herndon Avenue at Temperance Avenue, and 3) Herndon Avenue at De Wolf Avenue (south leg) listed under the “Near Term Projects plus Project” scenario for any improvements that are not covered by local and regional impact fee programs. The fair share percentages are calculated in Table 19.14 [see Chapter 19, Transportation and Traffic].</p>   | <p>Appropriate timing to be determined by Engineering Division during the 2-10 year phase of the project.</p> | <p>City of Clovis Planning and Development Services Department – Engineering Division</p> |                 |

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| <ul style="list-style-type: none"> <li>• Herndon Avenue at Temperance Avenue</li> <li>• Herndon Avenue at De Wolf Avenue (South Leg)</li> </ul>   |  |  |   |  |
| <p>TT-3: The “Cumulative Year 2035 with Project” Scenario would result in unacceptable levels of service at the following intersections:</p> <ul style="list-style-type: none"> <li>• SR 168 EB Ramps at Temperance Avenue</li> <li>• Herndon Avenue at Armstrong Avenue</li> <li>• Herndon Avenue at Temperance Avenue</li> <li>• Herndon Avenue at Locan Avenue</li> <li>• Herndon Avenue at DeWolf Avenue (north leg)</li> <li>• Herndon Avenue at DeWolf Avenue (south leg)</li> <li>• Herndon Avenue at Leonard Avenue</li> <li>• Herndon Avenue at McCall Avenue</li> <li>• Herndon Avenue at Academy Avenue</li> </ul> | <p><b>TT-3:</b> The project shall participate on a pro-rata fair share basis in street improvements listed under the “Cumulative Year 2035 with Project Conditions” scenario for any improvements that are not covered by local and regional impact fee programs. The fair share percentages are calculated in Table 19.14 [see Chapter 19, Transportation and Traffic].</p> | <p>Appropriate timing to be determined by Engineering Division</p> | <p>City of Clovis Planning and Development Services Department – Engineering Division</p> |  |

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| <ul style="list-style-type: none"> <li>• Bullard Avenue at Locan Avenue</li> <li>• Bullard Avenue at De Wolf Avenue</li> <li>• Alluvial Avenue at Temperance Avenue</li> <li>• Herndon Avenue at Tollhouse Road</li> <li>• New Access Road/Temperance Avenue</li> </ul>  |   |  |   |  |
| <p>TT-4: The “Cumulative Year 2035 With Project” Conditions Would Result in the Need for Additional Turn Lane Storage Capacity at the following intersections:</p> <ul style="list-style-type: none"> <li>• Nees Avenue/Temperance Avenue</li> <li>• Alluvial Avenue/Temperance Avenue</li> <li>• SR 168 EB Ramps/Temperance Avenue</li> <li>• Fir Avenue/Temperance Avenue</li> </ul> | <p><b>TT-4:</b> The project shall participate on a pro-rata fair share basis in the improvements identified in the Queuing Analysis of the Traffic Impact Analysis (Draft EIR Appendix 19).</p> | <p>Appropriate timing to be determined by Engineering Division</p> | <p>City of Clovis Planning and Development Services Department – Engineering Division</p> |  |

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|--|--|--|--|--|
| <ul style="list-style-type: none"> <li>• Herndon Avenue/Armstrong Avenue</li> <li>• Herndon Avenue/Temperance Avenue</li> <li>• Herndon Avenue/Coventry Avenue</li> <li>• Herndon Avenue/Locan Avenue</li> <li>• Herndon Avenue/DeWolf Avenue (north leg)</li> <li>• Herndon Avenue/DeWolf Avenue (south leg)</li> <li>• Herndon Avenue/Leonard Avenue</li> <li>• Herndon Avenue/McCall Avenue</li> <li>• Herndon Avenue/Academy Avenue</li> <li>• New Access Road/Temperance Avenue</li> <li>• Bullard Avenue/Locan Avenue</li> <li>• Bullard Avenue/DeWolf Avenue</li> </ul> |  |  |  |  |
|--|--|--|--|--|

| <b>TRIBAL CULTURAL RESOURCES</b>   |   |  |  |                 |
|--|---|--|--|-----------------|
| <b>IMPACT</b>  | <b>MITIGATION MEASURES</b>                          | <b>TIMING</b>  | <b>MONITORING AGENCY</b>   | <b>SIGN OFF</b> |
| TR-1: Disturbance of subsurface tribal cultural resources would potentially result from construction activities. | Incorporate Mitigation Measures CR-1.1 through 1.3. | Prior to and during grading and construction activities. | City of Clovis Planning and Development Services Department – Engineering Division |                 |



## CHAPTER 4

### Responses to Draft EIR Comments

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This section includes the comments received on the Draft EIR and the responses of the City of Clovis to the comments. Each comment within the letters has been assigned a reference number that corresponds to the number assigned to each response. For reference and as required by CEQA Guidelines Section 15132(c), a list of the persons, organizations and public agencies who submitted comment letters is presented below.

| <b>Comment No.</b> | <b>Agency or Person</b>   | <b>Comment Date</b> | <b>Page No.</b> |
|--------------------|---|---------------------|-----------------|
| 1                  | Jan Kedwards  | February 21, 2018   | 4-2             |
| 2                  | County of Fresno, Department of Public Health                   | March 21, 2018      | 4-8             |
| 3                  | George Leighton Allen   | April 2, 2018       | 4-11            |
| 4                  | Fresno Irrigation District                                      | April 4, 2018       | 4-15            |
| 5                  | State of California, Department of Transportation<br>(Caltrans) | April 5, 2018       | 4-31            |
| 6                  | Mitchell Chadwick/Suburban Propane                              | April 6, 2018       | 4-36            |
| 7                  | Fresno Metropolitan Flood Control District<br>(FMFCD)           | April 11, 2018      | 4-40            |
| 8                  | San Joaquin Valley Air Pollution Control District               | April 19, 2018      | 4-46            |

# Jan Kedwards Email Comments

[MESSAGE 1]

From: Jan Kedwards [<mailto:jankedwards@gmail.com>]

Sent: Wednesday, February 21, 2018 9:38 AM

To: Bryan Araki <BryanA@ci.clovis.ca.us>

Subject: Medical Center Expansion

Good morning,

Our home backs up to the Enterprise Canal directly behind the medical center. We received your notice yesterday and are very disheartened by it. This will have extremely negative effects on this area including everything mentioned in your "Potential Project Impacts". Even though you state that some of these significant effects "could be reduced to insignificance by mitigation measures", in reality there isn't anything they can do to mitigate the aesthetic effects when replacing the still somewhat rural feel with more concrete and asphalt no matter how nice they think their buildings are.

You are admitting that "greenhouse gas emissions and increased noise levels from traffic sources" can not be reduced to insignificant. These things will have a significant effect on the quality of life for the residences in the area and possibly a significant effect on the value of our properties.

Something you didn't mention is the significant noise levels from the continued construction. It's bad enough that we have to listen to it all day long within the noise ordinance allowances, but we have to start listening to it far, far sooner than 6:00 a.m. during the summer and 7:00 a.m. in the winter and 9:00 a.m. on the weekends. I have literally heard the beeping of a vehicle backing up in the equipment yard as early as 3:15 a.m. and a starting time of 4:00 a.m. for construction is not abnormal at all.

Why does the noise ordinance not apply to the medical center's contractors? The construction equipment yard backups to the Enterprise Canal at our property, so I am hyper aware of the lights and the noises from that area.

This whole issue is very concerning for us and the first thing we tried to do was to review the Draft EIR online as directed and we couldn't find it. Would you please email us instructions on how to get to it from [www.cityofclovis.com](http://www.cityofclovis.com).

Thank you,

Jan Kedwards

[MESSAGE 2]

On Feb 21, 2018, at 10:40 AM, Bryan Araki  
<BryanA@ci.clovis.ca.us> wrote:

Hi Ms. Kedwards,

Thank you for your comments. The EIR can be found at the following link:

<http://www.ci.clovis.ca.us/Departments-Services/Planning-and-Development/California-Environmental-Quality-Act>

Also, I will immediately address the construction start times.

Sincerely,

Bryan Araki  
City Planner

City of Clovis Planning Division  
1033 Fifth Street  
Clovis, California 93612  
Ph. (559) 324-2346  
[bryana@cityofclovis.com](mailto:bryana@cityofclovis.com)

1-2

[MESSAGE 3]

From: Jan Kedwards [<mailto:jankedwards@gmail.com>]  
Sent: Wednesday, February 21, 2018 1:38 PM  
To: Bryan Araki <BryanA@ci.clovis.ca.us>  
Subject: Re: Medical Center Expansion

Hi Bryan,

Thank you for the link and possibly doing something about the early construction start times.

After reviewing the plan, there is nothing but really bad news for us. On Figure 3.1 - CCMC Expansion Area Photos the #10 arrow lines up exactly with our property. One of our new views in the next couple of years is going to be the parking garage. I couldn't find anything as to how many stories the parking garage is going to be or whether or not it is going to be completely enclosed. If it's not enclosed we will be subject to the noises of car doors opening and closing and people conversing while walking to and from their vehicles, in addition to an ugly view. Please tell me how many stories the parking garage is going to be; whether or not it is going to be fully enclosed and confirm for me that the helistop is not going to be moved to the top of the garage.

Thank you,

Jan Kedwards

1-3

[MESSAGE 4]

On Feb 21, 2018, at 2:41 PM, Bryan Araki  
<BryanA@ci.clovis.ca.us> wrote:

Hi Jan:

The hospital campus has undergone several amendments to address growth within their campus since it moved to this location. The proposed parking garage was approved adjacent to the Enterprise Canal in 2008 . The new proposal moves the garage further from the neighborhood to the west side of the internal looped road. The issue of lights, visibility and height were all brought up at the time from some of your neighbors. The height will be the same as their existing garage.

Although there are new buildings proposed on the campus, most were approved in previous EIR's. Much of the current EIR addresses development on the west side of Temperance Avenue and south of Herndon Avenue.

The helistop is proposed to be moved. We went through significant discussion in the 2008 EIR and the result was that the hospital decided to leave it in its place.

Hope this clarifies.

Bryan

[MESSAGE 5]

From: Jan Kedwards <jankedwards@gmail.com>

Subject: Re: Medical Center Expansion

Date: February 21, 2018 at 4:24:46 PM PST

To: Bryan Araki [BryanA@ci.clovis.ca.us](mailto:BryanA@ci.clovis.ca.us)

Hi Bryan,

We purchased our home on Traverse in October, 2008. We went to subsequent meetings regarding the expansion. What I recall is the parking garage was going to be south of us. If it was going to line up with our property, I would certainly remember that. I know there was a map of the plan posted on the internet at the time but I'm not able to find it now. Would you please send me the link to that map to help refresh my memory.

You didn't address whether the garage is going to be a fully enclosed structure. Is it?

I do clearly recall the discussions about the helistop. It made a big impression on me because at some point it was proposed that it be between our property and the property directly to our south, where the equipment yard is now. That was going to be a temporary location until the parking garage was built and then the helistop was going to be on the top of the parking garage. There wasn't a single Traverse resident that agreed that it should be on the east side of the medical center's property but that didn't concern the City of Clovis or the medical center's owners. Where is the proposed new location of the helistop?

1-5

I also remember that the medical center committed to planting trees along the eastern border of their property. That hasn't happened except at the very northern end of the property. Had they planted the trees, the negative impact of the new structures going in would not be so substantial for residents along the eastern border.

I look forward to your response.

Jan

[MESSAGE 6]

From: Jan Kedwards [mailto:jankedwards@gmail.com]

Sent: Wednesday, February 21, 2018 5:47 PM

To: Bryan Araki

Subject: 2008 Plan Map

Bryan,

I don't need the link from you for the 2008 plan. I found a pdf of it. My recollection was 100% correct. The parking garage was going to be south of us, not at all in our view. The parking garage was also going to be operational in 2030, ten years later than what is being proposed now.

1-6

My husband and I have been married for fifty years. The last twenty-five years we've sacrificed doing fun things, going on vacations or relaxing, to instead work on our homes to build sweat equity. That hard work and those sacrifices are most likely going to be all for naught now because of Clovis Community Medical Center and the City of Clovis. I can't believe that having a three story garage with a helicopter pad on top of it, within yards of our property and in clear view, is not going to significantly diminish the value of our property. We'll be lucky now if we can even get out of this property what we have into it. The sweat equity that we've worked so hard for all those years, so that we could have a nice home in our golden years, is now probably gone. We're the little guys though, so there's nothing we can do about it.

Jan

## **Response to Jan Kedwards**

### **Response 1-1**

As a background note, this comment consists of a series of email messages between Jan Kedwards, a neighboring property owner, and Bryan Araki, City Planner for the City of Clovis.

In her initial email to the City of Clovis, Ms. Kedwards identifies the location of her residence and states concerns regarding aesthetic impacts and a conversion of the “still somewhat rural feel” of the area. The concerns regarding aesthetics are addressed in Response 1-3. The comment also notes, as concluded in the Draft EIR, that certain impacts related to Greenhouse Gas Emissions and Noise cannot be reduced to an insignificant level. While the significant and unavoidable impacts of the project are acknowledged, the environmental review process allows for such impacts to be weighed by decision-makers against the benefits of the proposed project.

### **Response 1-2**

This is the response that was provided by the City of Clovis to address Ms. Kedwards’ first email in which she expressed concerns about construction noise during early-morning hours and issues with accessing a copy of the Draft EIR. Mr. Araki’s reply included a link to an electronic copy of the Draft EIR and a statement indicating he would address the construction start times.

Regarding the concern about early-morning construction noise, Mr. Araki contacted Community Medical Providers to obtain information about past construction activities occurring outside of daytime hours. Staff from Community Medical Providers responded that the early-morning construction noises identified in Ms. Kedwards’ letter could have occurred during construction of CCMC’s Cancer Center building, which apparently involved a specific lengthy concrete pouring process that was required as part of the project’s design. Going forward, it is recommended that Community Medical Providers adopt and abide by a policy of notifying nearby property owners of any activities that are to occur outside of the normal range of construction hours (7:00 a.m. to 7:00 p.m.), in addition to adhering to Mitigation Measure NO-1, which limits construction to those hours except for activities that would result in a safety concern to the public or construction workers.

### **Response 1-3**

The comments here identify concerns about adverse aesthetic impacts of the parking structure and noise generated from operation of the parking structure. The parking structure will be three stories in height and will not be enclosed. However, the parking garage will be located a substantial distance from Ms. Kedwards’ property--approximately 1,000 feet west of her home and approximately 730 west of her rear property line. In addition, a planned medical office build will be constructed between the parking garage and Ms. Kedwards’ property. Regarding aesthetics, the parking structure would be sited within the horizon of CCMC’s existing development and would be consistent with the size and form of buildings currently present at the campus. Additionally, no changes are proposed regarding the hospital’s helistop; it will not be moving from its current location on the ground at the southern p.

Noise generated from operation and use of the parking structure is addressed under Impact NO-3 (Chapter 15, page 15-20 of the Draft EIR) and in the Noise Analysis prepared for the project. Predicted peak-hour noise levels at the nearest residential land use located to the east of the proposed parking



structure are estimated be approximately 30 dBA  $L_{eq}$ , and predicted average-daily noise levels at this nearest residence are estimated to be approximately 37 dBA CNEL or less. The predicted noise levels at nearby land uses would not exceed the City's exterior or interior noise standards of 65 and 45 dBA CNEL, respectively, and would be largely masked by ambient noise levels. (Also see Response 1-2, which addresses noise from construction activities and the timing of construction activities.)

#### **Response 1-4**

In this email, Mr. Araki provides clarification as to the relationship between the current proposed Project and a prior expansion of the CCMC campus which was approved in 2009 (note: the email references the year 2008 when the prior expansion project was submitted to the City of Clovis, but it was not actually approved until 2009). As noted in in the email, most of the planned development on the east side of the CCMC campus was encompassed in the 2009 CCMC expansion EIR.

Regarding the location of the parking structure, Mr. Araki clarifies that the prior expansion entailed locating a parking structure adjacent to the Enterprise Canal in the southeast portion of the campus (about 500 feet southwest of Ms. Kedwards' property), while the current project entails locating the parking structure further from the homes east of the Enterprise Canal and closer to existing CCMC buildings on the west side of the internal looped road (see Figure 2.3 of the Draft EIR for more detail).

The helistop location will not be moved from where it is now.

#### **Response 1-5**

This email primarily discusses the proposed project in comparison to the prior CCMC expansion which was approved in 2009.

Responses 1-3 and 1-4 address the parking structure's location and design and the fact that the helistop will not be moved from where it is now located.

The 2009 EIR included a mitigation measure requiring trees to be planted along the eastern boundary of the property if the citrus trees were removed. The City will require this to be implemented.

#### **Response 1-6**

The comments regarding the location of the parking structure is addressed in Responses 1-3 and 1-4. The 2009 expansion included a ten-year plan and a long range plan for up to 25-30 years in the future. This means that the long range improvements could be installed any time after ten years and up to 25-30 years. Thus, under the long range plan and counting from 2009, the parking garage could have been built any time between 2019 and 2039, and not specifically 25-30 years from approval of the prior expansion.

The remainder of the email primarily expresses concern about how the project may affect the value of the Kedwards' property. Without an appraisal to indicate current value as compared to prior value, this contention is speculative and unsupported. It is noted that a project's potential impact on the value of a neighboring property is an economic impact that does not require evaluation under CEQA.



# County of Fresno

## DEPARTMENT OF PUBLIC HEALTH

David Pomaville, Director  
Dr. Ken Bird, Health Officer

### Comment Letter 2

March 21, 2018

LU0019360  
2604

Bryan Araki, City Planner  
City of Clovis  
Planning and Development Services Department  
1033 Fifth Street  
Clovis, CA 93612

Dear Mr. Araki:

SUBJECT: **Notice of Availability of Draft Environmental Impact Report (DEIR)-  
Clovis Community Medical Center Expansion & Herndon Avenue Widening Project**  
PROJECT: **SCH#2016101005**  
LOCATION: **Clovis Community Medical Center (Herndon Avenue between Temperance &  
Dewolf Avenues)**

The Fresno County Department of Public Health, Environmental Health Division has reviewed the Draft Environmental Impact Report (DEIR) documentation for the proposed Clovis Community Medical Center expansion and Herndon Avenue widening project on approximately 148 acres located on the north and south sides of Herndon Avenue, east and west of N. Temperance Avenue and offers the following comments for consideration for the DEIR project:

### Hazards and Hazardous Materials Section

2-1

The hazardous materials section should address potential hazards and hazardous materials during construction and grading activities, there is potential for discovering abandoned underground petroleum storage tank(s). If this occurs, the applicant shall apply for and secure an Underground Storage Tank Removal Permit from the Fresno County Department of Public Health, Environmental Health System. Contact the Certified Unified Program Agency at (559) 600-3271 for more information.

2-2

Similarly, abandoned sewage disposal systems may be discovered during construction and grading activities. All abandoned sewage disposal systems within the unincorporated County shall be properly destroyed under permit and inspection from the Department of Public Works and Planning, Building and Safety Section.

### Hydrology and Water Quality Section

2-3

The Hydrology and Water Quality Section should address the manner in which existing water wells, both domestic and agricultural, will be handled in areas of the proposed project. Areas served by individual domestic and agricultural wells may provide a conduit to groundwater if not properly protected or destroyed. Improper abandonment of such wells presents a significant risk of contaminating groundwater. For this reason, when development occurs, it is extremely important to ensure the safe and proper destruction of all abandoned water wells.

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REVIEWED BY:

Kevin  
Tsuda

Digitally signed by Kevin Tsuda  
DN: cn=Kevin Tsuda, o=Environmental  
Health Division, ou=Fresno County  
Department of Public Health,  
email=Ktsuda@co.fresno.ca.us, c=US  
Date: 2018.03.21 14:21:56 -0700

Kevin Tsuda, R.E.H.S.  
Environmental Health Specialist II

(559) 600-3271

---

cc: Steven Rhodes- Environmental Health Division (CT. 59.07)  
Ryan Burnett- Management Analyst ([RyanB@ci.clovis.ca.us](mailto:RyanB@ci.clovis.ca.us))  
Scott B. Odell- Consultant ([scott@odellplanning.com](mailto:scott@odellplanning.com))

**Response to County of Fresno, Department of Public Health**

**Response 2-1**

Review of existing federal and state databases and the land use history of the site did not reveal any hazardous materials issues. However, the City acknowledges that in the unlikely event of discovering an abandoned underground storage tank during construction, the applicant would be required to secure an Underground Storage Tank Removal Permit from Fresno County Environmental Health System.

**Response 2-2**

The City acknowledges the any abandoned sewage disposal systems discovered during construction in unincorporated County territory would be required to be properly destroyed under permit and inspection from the Department of Public Works and Planning, Building and Safety Section.

**Response 2-3**

The City is not aware of any existing wells that would be affected by project development but acknowledges that improper abandonment of wells presents a significant groundwater contamination risk. Any wells to be abandoned would be handled in accordance with state and local regulations requiring proper closure.

### Comment Letter 3

April 2, 2018

George Leighton Allen  
7027 N. DeWolf Ave.  
Clovis, CA 93619

Bryan Araki, City Planner City of Clovis, Planning & Development Services  
1033 Fifth Street  
Clovis, CA 93612  
Bryana@cityofclovis.com

Re: Herndon Ave. Widening Project

3-1

Since Herndon Ave. is being turned into a major thoroughfare through Clovis AND DeWolf Ave. has become the largest feeder street unto the large Loma Vista development, my property is bearing much of the risk to these expansions. As I view this, the widening proposal is not being done correctly, and the creation of a “choke point” at the Enterprise Canal is concerning. As I read this, the widening project is NOT going far enough to ensure smooth traffic and safe flow of fast moving cars.

I live at the corner of Herndon and DeWolf Ave., and I have great concerns over the attempt to widen Herndon to the southern leg of DeWolf Ave. The increased environmental, noise, and safety issues to my property and family are not being addressed correctly.

*Below are my concerns:*

3-2

**Environmental:** The pollution from increased cars is not being mitigated. Your report states in table 5.5 that my house levels for NOx will be 60.8, CO will be 43.2, and PM10 will be 8.0. These exceed California standards and will put my family to additional health risk if not mitigated correctly.

3-3

**Noise:** Noise pollution is already higher than previous years, but will only become worse with your widening project. Your current study states levels will be as high as 79 dBA in traffic and 68 dBA within 50 feet of the DeWolf intersection. My house is 50 feet from this intersection and this is concerning. Studies show that noise levels above 60 dBA have detrimental medical and hearing effects on most populations.

We agree with the report that, “A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver.” (15-2) I see no plans to mitigate this noise.

3-4

**Safety:** The choke point will create MANY MORE accidents. Your proposal is creating a safety hazard against my fence and property. Currently, the corner of Hendon and DeWolf has a major

accident every 3 months as people try to pass at the left turn on Herndon. This creating of a new choke-point at the Enterprise Canal Bridge will put all these accidents into my back-yard.

3-4

Your studies show that >1000 cars cross next to my back yard every hour in 2016, and all have to protect my family is a chain-link fence. Cars repeatedly hit this fence now, and your project is not dealing with this increased safety risk. As the number doubles into the next year, what is being done to protect the family and play and the animals I keep along Herndon?

3-5

**Conclusion:** We ask that this project be better planned on how expansion and traffic will be ruined on either side of the Enterprise Canal Bridge. We ask that a re-do of the Herndon Expansion be considered to take into these issues raised above.

Thank you for your consideration,

A handwritten signature in blue ink, reading "George Leighton Allen, Jr." in a cursive script.

George Leighton Allen, Jr.

## **Response to George Leighton Allen**

### **Response 3-1**

The first two paragraphs consist of introductory information that identifies the location of Mr. Allen's property and introduces the scope of Mr. Allen's concerns regarding the proposed widening of Herndon Avenue (i.e. air quality, noise, traffic/safety). The responses below address these concerns.

### **Response 3-2**

Table 5.5 referred to in the comment letter provides information on average daily construction generated emissions. It indicates that uncontrolled average daily emissions for the Herndon Avenue widening in pounds per day will be 6.4 for ROG, 60.8 for NOX, 43.2 for CO, 0.0 for SO<sub>2</sub>, 8.0 for PM<sub>10</sub>, and 3.2 for PM<sub>2.5</sub>. The San Joaquin Valley Air Pollution Control District's significance threshold per day for each of these pollutants is 100 pounds per day. The project is substantially under the significance thresholds for these pollutants. Regarding long term operational air pollutant emissions, a substantial component of which is mobile source emissions (motor vehicles), the Draft EIR concluded that the impact would be less than significant with the implementation of the mitigation measures provided in the document.

### **Response 3-3**

As discussed in Draft EIR Chapter 15, Noise, Mitigation Measure NO-2 would require the preparation of an acoustical analysis for the widening of Herndon Avenue once detailed plans for lane configurations and alignments become available. The acoustical analysis would be required to evaluate changes in traffic noise levels in comparison to the City of Clovis General Plan noise standards, and noise-reduction measures (e.g., sound walls) will be evaluated and implemented where feasible. The Draft EIR determined traffic noise associated with the widening of Herndon Avenue would be considered significant and unavoidable because in some instances the use of noise-reduction measures, such as sound walls, may not be feasible due to the need to preserve access to noise sensitive properties. However, for some properties, the addition of a noise barrier may be beneficial. The required acoustical analysis will determine this.

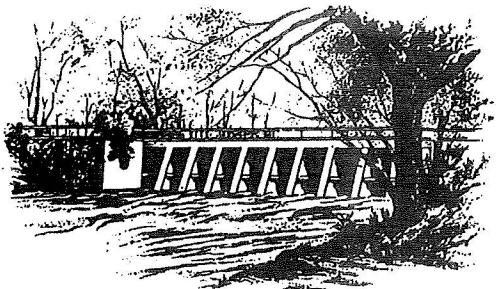
### **Response 3-4**

The widening of Herndon Avenue is necessary as an implementation of the Clovis General Plan's designation for the roadway as an arterial street to handle projected additional traffic due to planned growth in accordance with the adopted General Plan. A "choke point" where the roadway would narrow to two lanes west of the Enterprise Canal Bridge is not expected to develop. However, if traffic were to back up, it would occur substantially west of Mr. Allen's residence (west of the bridge), as it is eastbound traffic that would be heading into the narrowing roadway. Traffic traveling west would not back up because the roadway would be widening. Thus, the new configuration of the roadway would not create a substantial additional safety issue in relation to Mr. Allen's property.

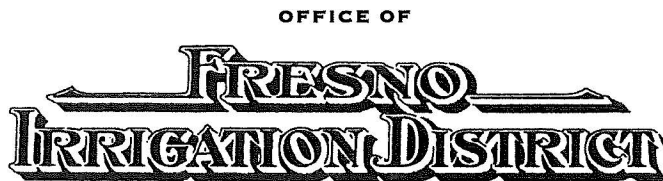
**Response 3-5**

The text here consists of summary/concluding remarks from Mr. Allen's letter. No additional response is necessary.





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April 4, 2018

Comment Letter 4

Bryan Araki  
City of Clovis  
Department of Planning and Development Services  
1033 Fifth Street  
Clovis, CA. 93612

RE: Notice of Availability of a Draft Environmental Impact Report for Clovis  
Community Medical Center Expansion and Herndon Avenue Widening Project  
FID Facilities: Enterprise No. 109, Clovis No. 115

Dear Mr. Araki:

The Fresno Irrigation District (FID) has reviewed the Draft Environmental Impact Report for Clovis Community Medical Center Expansion and Herndon Avenue Widening Project. Clovis Community Medical Center Expansion consists of 148 acres in size and lies within the north and south sides of Herndon Avenue, east and west of Temperance Avenue, within Fresno County. The Herndon Avenue Widening Project would extend from Temperance Avenue on the west to the southern leg of DeWolf Avenue on the east encompassing a distance of one-mile. FID's comments are as follows:

### Impacted Facilities

1. FID has facilities within the project location as shown on the attached FID exhibit map. The major facilities are: Enterprise No. 109 and Clovis No. 115. FID's canals range from a medium diameter pipeline to a large open canal. In many cases, the existing facilities will need to be relocated to accommodate new urban developments which will require new pipelines and new exclusive easements. FID anticipates it will require the same conditions on future projects as it would with any other project located within the common boundary of the City of Clovis and FID.
2. FID's Enterprise No. 109 runs northwesterly, traverses the northern portion of the project location, as shown in the attached FID exhibit map. FID's records indicate a recorded easement for the affected portion of open channel, recorded on May 3, 1991 as Document No. 91052869, Official Records of Fresno County, and will be impacted by the proposed developments.

4-1

3. FID's Clovis No. 115 runs westerly along the north side of Herndon Avenue, traverses the southern portion of the Clovis Community Medical Center in a 30 feet wide exclusive easement (i) recorded November 21, 1961, as Document No. 85505, in Book 4639, on Page 430, Official Records of Fresno County. And (ii) November 22, 1961, as Document No. 85786, in Book 4640, on Page 38, Official Records of Fresno County, and will be impacted by the proposed developments.
4. FID's facilities that are within the project location carry irrigation water for FID users, recharge water for the City of Fresno and Clovis, untreated drinking water for the City of Fresno, and flood waters during the winter months.
5. FID requires that, within the limits of the proposed project [and its remainder], the landowner(s) grant an exclusive easement for the land underlying the Enterprise Canal and associated area along the canal required for maintenance pursuant to Water Code Section 22425 and FID policy, where FID does not currently have one. FID's District Canal Right-of-Way Requirements sheet is enclosed for your reference. The proposed easement (width) will depend on several factors including: 1) Width of canal, 2) height of canal banks, 3) final alignment of canal, 4) additional space needed where roads/avenues intersect canal, etc.
6. FID requires that the Engineer/Land Surveyor use the inside top hinge of the canal to define the edge of FID's right-of-way such that FID has a minimum 20 feet wide right-of-way along the top of bank to be clear of obstructions, structures, vegetation, etc. to provide clear passage and full width. There are no minimum or suggested numbers of survey shots to take but, there must be enough survey points such that the top inside hinge of the canal bank is properly identified. Before finalizing the Final Maps, the Engineer/Land Surveyor will need to stake both the inside top hinge and the right-of-way/property for FID Staff to field evaluate an adequate width. FID staff must field verify the right-of-way/property boundary and the hinge line edge before signing plans to ensure that there are enough survey points to properly define the canal.
7. Typically, for any type of development that impacts a large open canal or is adjacent to one such as the Enterprise No. 109, FID requires the developer/applicant to improve the canal with either concrete lining, encasing the canal in a box culvert, or other approved means to protect the canal's integrity for an urban setting. FID does not have sufficient information to determine what kind of improvements will ultimately be required as part of the development. The engineers working on the project and FID's engineering staff must meet to discuss specific requirements as discussed below. In order to meet the "urban" standards for the canal, FID will require the following minimum conditions:



- a. Channel Stabilization: The proposed plan does not indicate any improvements to the Canal. If the Developer is not willing to concrete line the Canal or place it underground within a box culvert, they must come up with another means acceptable to and approved by FID to protect the Canal's integrity. On similar projects, Developers typically propose the following:
- i. Surrounding Development – All proposed building pad elevations must be a minimum of 12-inches above the canal's high water.
  - ii. Freeboard – FID typically requires between 1.0 to 1.5 feet of freeboard. Because the Canal is used to route stormwaters, and is one of the larger canals used to convey the stormwater, FID will require a minimum of 1.5 feet of freeboard and a maximum of 2.0 feet. The Developer will be required to either import or export material to match FID's standards.
  - iii. Maintenance – this reach of Canal does have a history of high loads of sediment deposits which requires periodic dredging. FID will typically dredge the Canal and deposit the spoils on top of the banks to dry out. Once the spoil has dried, FID will flatten the spoil as time permits. The hauling off of this material may occur several weeks after the deposit has been placed on the side of the canal, and the silts may be considered a nuisance (sight and smell). If the Developer, Applicant and/or City require a different level of maintenance effort, they will need to enter into an agreement for that purpose. The Developer, Applicant, and/or City will be responsible to fund the "higher level" of maintenance.
- b. Drive banks/maintenance roads and encroachments (both banks):
- i. One or both of the drive banks must be sloped a minimum of 2% away from the canal with provisions made for rainfall. Drainage will not be accepted into the Canal and must be routed away from FID property/drive banks. Runoff must be conveyed to nearby public streets or drainage system by drainage swales or other FID acceptable alternatives. Any drainage systems or swales proposed must be located outside FID's property/easement.
  - ii. One or both of the drive banks shall be overlaid with 3 inches of Class II aggregate base for all-weather access and for dust suppression. Aggregate to be a minimum of 20 feet wide along the top of the drive banks.

iii. Encroachments - All existing trees, bushes, debris, fencing, and other structures must be removed within FID's property/easement.

8. Trail - It is FID's understanding that a trail is master-planned along the Enterprise Canal. As with other developments with trails proposed along the canals, FID will not allow the trail to encroach/overlap FID's canal easement. The following requirements are intended for trail projects adjacent to FID-owned properties and right-of-ways for open canals:

- a. FID will not allow the trail easement to be in common use with FID-owned property or easements.
- b. FID requires all trail improvements be placed outside of FID-owned properties and easements.
- c. FID will not allow any portion of a tree canopy to encroach within its properties or easements.
- d. FID's canals will not accept any drainage from the trail or the canal bank.
- e. FID may require some improvements be made to the canal depending on the existing canal condition, the proposed trail, and the adjacent development.

9. If a fence will be installed between the development and open canal, a block/masonry wall shall be required. Chain-link and wood fencing will no longer be accepted for urban developments.

#### Water Impact

- 1. It appears the land within the Project Area for the medical center lies within the limits of the City of Clovis, however, eastern portion of the Herndon Avenue Project lies outside the limits of the City of Clovis.
- 2. The potential for increase in water consumption by the project will result in additional groundwater overdraft. There is a significant cone of depression beneath the City of Clovis. FID is concerned that the increased water demand due to a change in land use will have a significant impact to the groundwater quantity and/or quality underneath the City of Clovis, FID and the Kings Groundwater Sub-basin. The "demand" side of water consumed needs to be evaluated or scrutinized as much as the "supply" side of the water supply. The area was historically native, rural residential, and agricultural with minimal to no water use. Under current circumstances the project area is experiencing a modest but continuing groundwater overdraft. Should the proposed expansion result in a significant increase in dependence on groundwater, this deficit will increase. FID recommends the City of Clovis require the proposed development balance anticipated groundwater use with sufficient recharge of imported surface



water in order to preclude increasing the area's existing groundwater overdraft problem.

4-3

3. As noted in the Draft EIR, California enacted landmark legislation in 2014 known as the Sustainable Groundwater Management Act (SGMA). The act requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in their local water basins and adopt locally-based management plans. FID and the City of Clovis are members of the North Kings Groundwater Sustainability Agency which will manage the groundwater basin within the FID service area. This area is in an overdrafted groundwater basin and SGMA will impact all users of groundwater and those who rely on it. The City of Clovis should consider the impacts of the development on the City's ability to comply with the requirements of SGMA.

4-4

4. The Clovis Community Medical Center Expansion and Herndon Avenue Widening Project (*Responsible Agencies* page 2-7) states that "The Fresno Irrigation District must review and approve any project improvements that may encroach or adversely affect the Enterprise No. 109". This statement must be revised to state, "FID requires it review, approve and be made a party to signing all improvement plans which affect its property/easements and canal/pipeline facilities including, but not limited to Sewer and Water, FMFCD, Street, Landscaping, Dry Utilities, and all other utilities".

4-5

5. The Clovis Community Medical Center Expansion and Herndon Avenue Widening Project (*Hydrologic Settings* page 12-1) states that the Enterprise Canal is maintained by the Fresno metropolitan flood control district. This is incorrect, the Fresno Irrigation District (FID) owns, operates, and maintains this facility.

4-6

6. This same section, *Irrigation Systems Integration* on page 4.15-32, also states that whether a canal is left as-is, improved, or replaced with a pipeline is determined by the developer of the project. This is not true. The City of Clovis Municipal Code requires all irrigation or drainage canals of a capacity which can be accommodated by a pipeline having an inside diameter of fifty-four inches or less will be required to be piped and trash racks be installed at all newly constructed headwalls or pipe inlets. It should also be noted that all work, whether left as canal or piped, must be improved to meet FID's standards and requirements for an urban setting.

4-7

7. Discharges into FID Canals – FID will not allow any discharges into the canals for numerous reasons, including but not limited to: Federal/ State/Local regulations, FID's Rules and Regulations, and the potential negative impact to water quality. All new and existing discharges and runoff must be routed to FMFCD storm drain facilities.

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### **Agricultural Land Impact**

4-8

1. The FID water allocated to the agricultural land within FID boundary would be converted onto City water rates, as required, by the current agreement and any subsequent agreement or agreements between the City and FID.

4-9

1. The proposed land use (or change in land use) should be such that the need for water is minimized and/or reduced so that groundwater impacts to the proposed project area and any surrounding areas are eliminated.

4-10

3. California enacted landmark legislation in 2014 known as the Sustainable Groundwater Management Act (SGMA). The act requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in their local water basins and adopt locally-based management plans. FID and the City of Clovis are members of the North Kings Groundwater Sustainability Agency which will manage the groundwater basin within the FID service area. This area is completely reliant on groundwater pumping and SGMA will impact all users of groundwater and those who rely on it. The City of Clovis should consider the impacts of the development on the City's ability to comply with requirements of SGMA.

### **Road Improvement Impact**

4-11

1. There will be many FID canals impacted by future road improvements to meet the traffic demands. Significant effort will be required to allow for such growth and expansion in a manner that allows FID to maintain and operate its facilities in an efficient and effective manner.

4-12

2. Herndon Avenue will not be able to be expanded to the north because of the Enterprise No. 109 Canal. All expansions of Herndon Avenue must be located on the south side of the road or the canal be relocated and reconstructed to accommodate the necessary expansion(s). FID requires a 20 feet wide right-of-way for operations and maintenance on both sides of the canal (which currently FID does not fully have). As the area develops under the City of Clovis and the traffic increases, it will be significantly more difficult and hazardous for FID to maintain and operate the Enterprise Canal without road closures and/or traffic control unless the canal right-of-way is in place. The City needs to consider these issues in development, traffic and road improvements, need for any turn lanes, etc. for the future growth in the area and the expansion of Herndon Avenue. All right-of-way and easements necessary for the full build-out of the area must be obtained now as a part of this development.

### **Parks and Recreation Impact.**

4-13

1. It is our understanding that some of the parks and trails are planned near FID canals which raise concerns for FID operation and maintenance as well as liability. Parks and trails adjacent to FID facilities will increase the public

exposure to FID's water conveyance system(s) and public safety and liability concerns increase significantly unless properly mitigated. As seen in recent court cases, the trail immunity provision does not really provide any protection for the trail agency or adjacent properties. The trail, as well as parks, are expected to be free and clear of any and all hazards whether from along the trail or adjacent areas.

2. Protective measures must be considered and provided when planning for parks or trails close to FID open channels. FID is supportive of the City's efforts to provide these open space amenities and is open to discussing various alternatives to provide for public safety. In all situations where the park and/or trail are near FID facilities, there is a need to have a master indemnification agreement between the agencies which protects and indemnifies FID from the public exposure created as a result of the City amenity.
3. As you may be aware, FID is currently working with the City on various tracts within the City where trails have been planned adjacent to FID's right-of-way. While we are earnestly working with City staff on the concerns and issues with the City, there are significant issues and challenges to be resolved.

4-13

FID's most significant concerns on trails and parks near or adjacent to FID canals, are as follows:

- a. Liability/Indemnification – The City will need to indemnify and defend FID from any claims arising from the use of the trails and parks located near, adjacent to, or on FID facilities.
- b. FID's Ability to Perform Operations and Maintenance – Impacts to FID's ability to maintain and operate the canal facilities must be mitigated or minimized to the extent possible. Most of the canals impacted are the larger main canals, including the Enterprise, Gould, and Big Dry Creek canals, are significant features, and require substantial effort to maintain and operate. FID appreciates the City's work and effort in getting the smaller conveyance facilities placed in underground pipelines at the time of development.
- c. Right-of-Way/Property Issues – Legal title or easement rights for the FID facilities need to be provided or obtained.
- d. Design Standards – All improvements must be planned and constructed to not interrupt, interfere, or obstruct FID's ability to maintain and operate its facilities. Parks and trails will be required to be set back a certain distance from the canal and provided a physical barrier, to the extent warranted.



- e. Additional Costs as a result of the proximate trails and parks – The creation of a public trail or park adjacent to or near FID's canal system will result in additional burdens and costs to FID which will need to be mitigated and/or compensated.

4-13

4. When trails and/or parks are planned where there exists FID above-ground structures, FID will require City to provide protective fencing and/or features around the FID structures to ensure public safety. As you are aware, FID's systems were originally designed for an agricultural setting and not the public exposure created by urbanization. As part of a development or redevelopment and when possible, FID's facility should be relocated and realigned, or at a minimum protected, such that conflicts between the urban uses and FID facilities are minimized.

### General Comments

1. FID requires permanent drive approaches to access the Herndon Canal. Subject to the impact of the proposed project, FID's ability to access the canal may be impacted and/or impaired. In order to access the maintenance road with our larger equipment, FID requires a larger drive approach. FID's minimum access requirement off major roadways is 50 feet from edge of right-of-way narrowing to 20 feet wide drive banks (See attached "Drive Approach in Urban Areas" Detail No. 62). The 50 feet in width is defined as starting from the end portion of the bridge/railing outward (away from the bridge). In certain circumstances, a minimum 35 feet wide setback, to allow safe and adequate access has been accepted. Every road and canal intersection is different and therefore each access will be different. The major factors affecting the proposed width will be the angle of the road intersecting the Canal, grade of canal bank vs. County road, median vs. no median, etc.
2. FID requires its easements be shown on all maps/plans with proper recording information, and that FID be made a party to signing the final map.
3. FID requires it review, approve and be made a party to signing all improvement plans which affect its property/easements and canal/pipeline facilities.
4. FID assumes that all utilities will be located within the road right-of-way. FID's existing easements are exclusive and therefore FID will not allow any proposed utilities to be within its right-of-way/easement. FID's requirements will substantially change if any utilities are located within FID's right-of-way/easement.
5. FID requires it review, approve and be made a party to signing all improvement plans which affect its property/easements and canal/pipeline facilities including,

4-14

but not limited to Sewer and Water, FMFCD, Street, Landscaping, Dry Utilities, and all other utilities.

- 4-14
6. FID does not allow FID owned property or easements to be in common use with public utility easements but will in certain instances allow its property to be in common use with landscape easements if the City of Clovis enters into the appropriate agreement with FID. FID requires all block walls, fences, and footings to be located outside of its property and easement.
  7. FID's Engineering Department, (559) 233-7161, shall be notified 48 hours prior to construction affecting FID's facilities. No work shall begin without Contractor first obtaining an FID Permit to Work within Easement and Right-Of-Way. FID will require a permit for each crossing.
  8. As with most developer projects, there will be considerable time and effort required of FID's staff to plan, coordinate, engineer, review plans, prepare agreements, and inspect the project. FID's cost for associated plan review will vary and will be determined at the time of the plan review.
  9. The above comments are not to be construed as the only requests FID will have regarding this project. FID will make additional comments and requests as necessary as the project progresses and more detail becomes available.

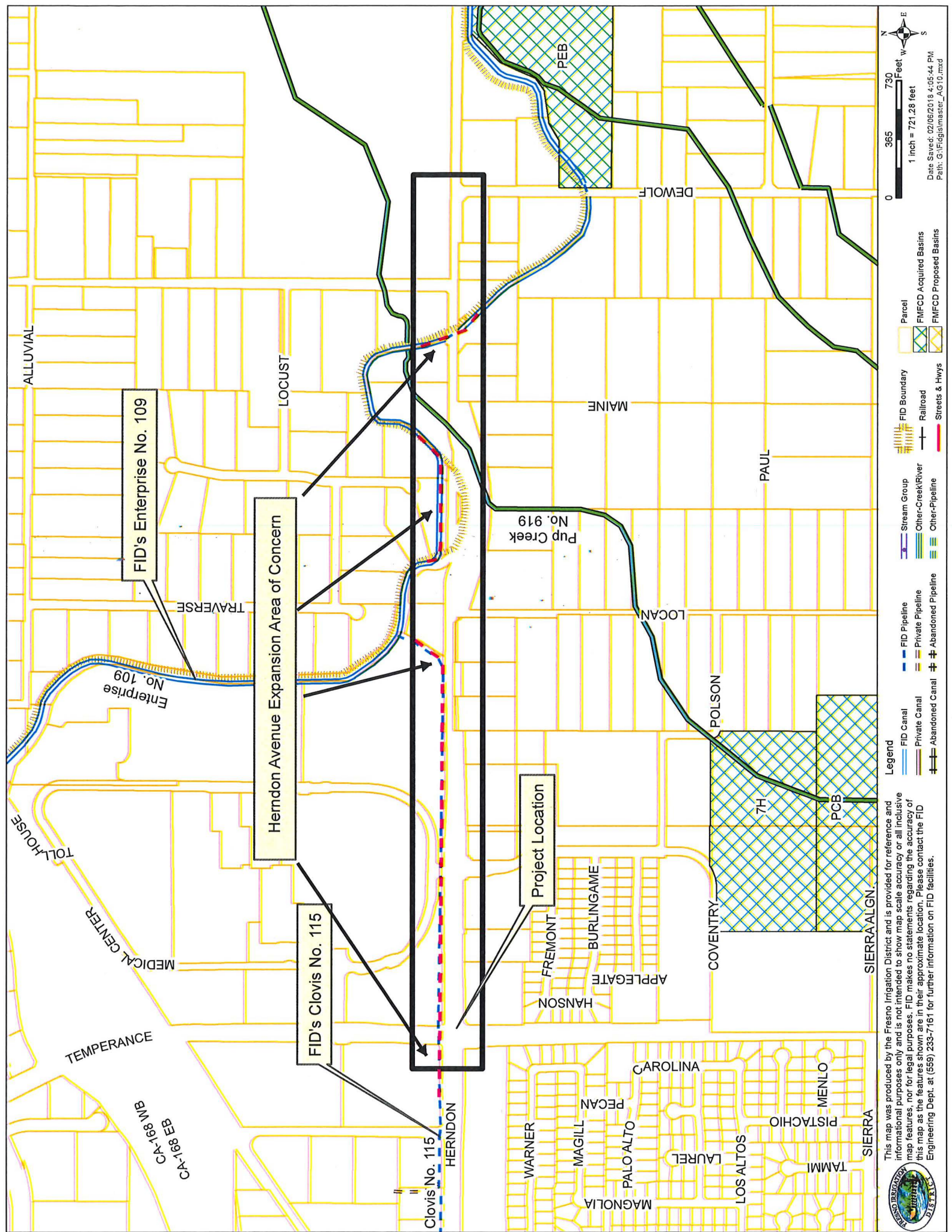
Thank you for submitting this for our review. We appreciate the opportunity to review and comment on the subject documents for the proposed project. If you have any questions, please feel free to contact Jeremy Landrith at (559) 233-7161 extension 7407 or [jlandrith@fresnoirrigation.com](mailto:jlandrith@fresnoirrigation.com).

Sincerely,

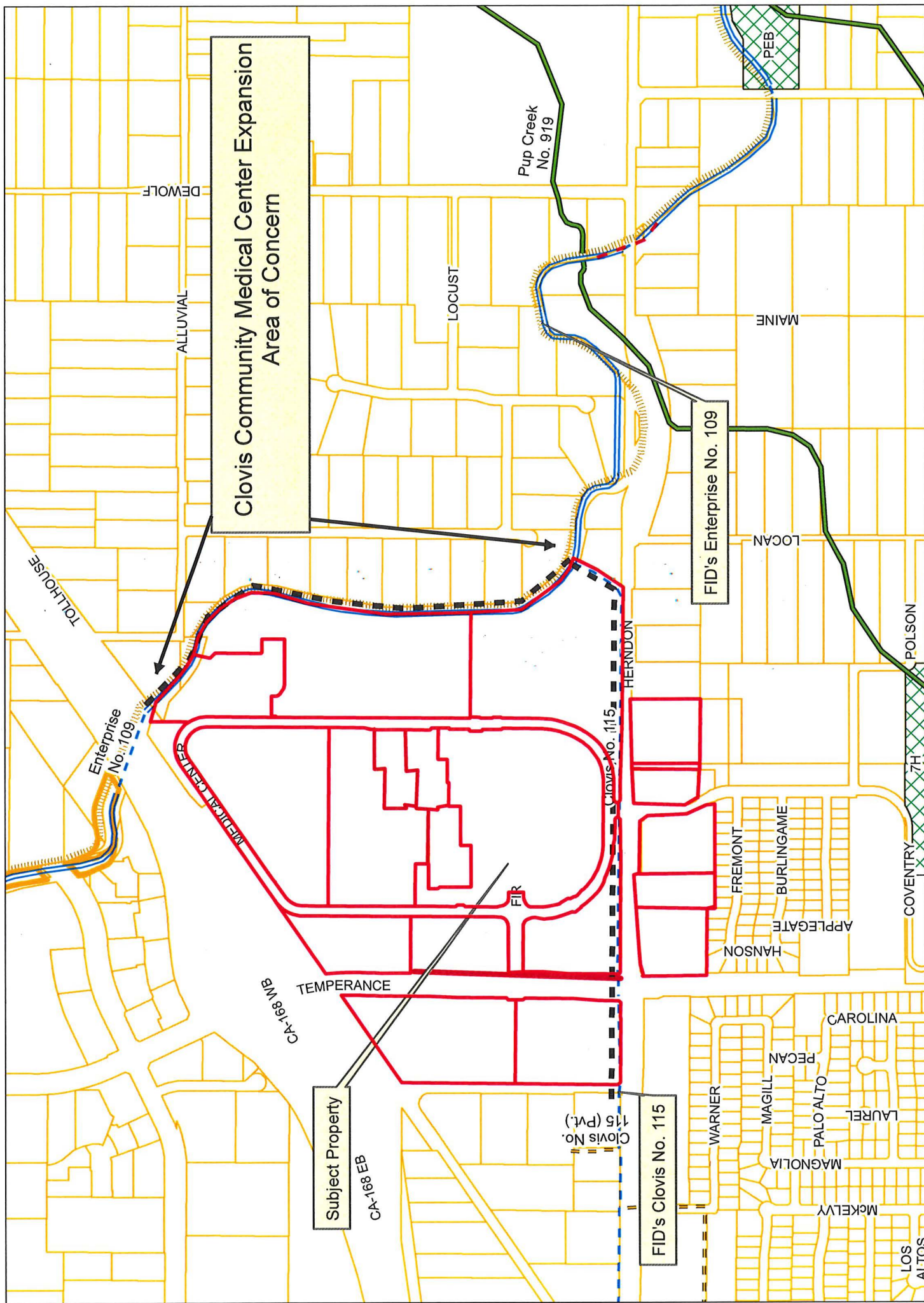


Laurence Kimura, P.E.  
Chief Engineer









This map was produced by the Fresno Irrigation District and is provided for reference and informational purposes only and is not intended to show map scale accuracy or all inclusive map features, nor for legal purposes. FID makes no statements regarding the accuracy of this map as the features shown are in their approximate location. Please contact the FID Engineering Dept. at (559) 233-7161 for further information on FID facilities.

**Legend**

- FID Canal
- Private Canal
- Abandoned Canal
- FID Pipeline
- Private Pipeline
- Abandoned Pipeline
- Stream Group
- Other-Creek/River
- Other-Pipeline
- FID Boundary
- Railroad
- Streets & Hwys
- Parcel
- FMFCD Acquired Basins
- FMFCD Proposed Basins

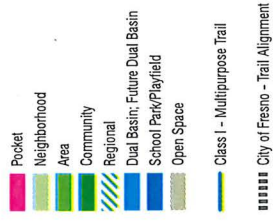
Scale: 1 inch = 721.28 feet  
 0 365 730 Feet

North Arrow

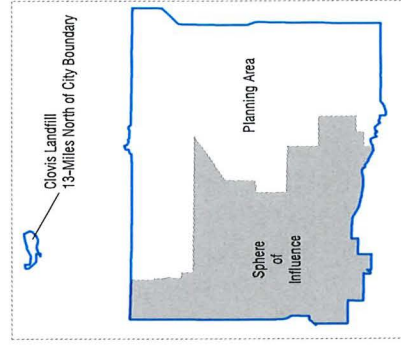
Date Saved: 04/04/2018 2:19:58 PM  
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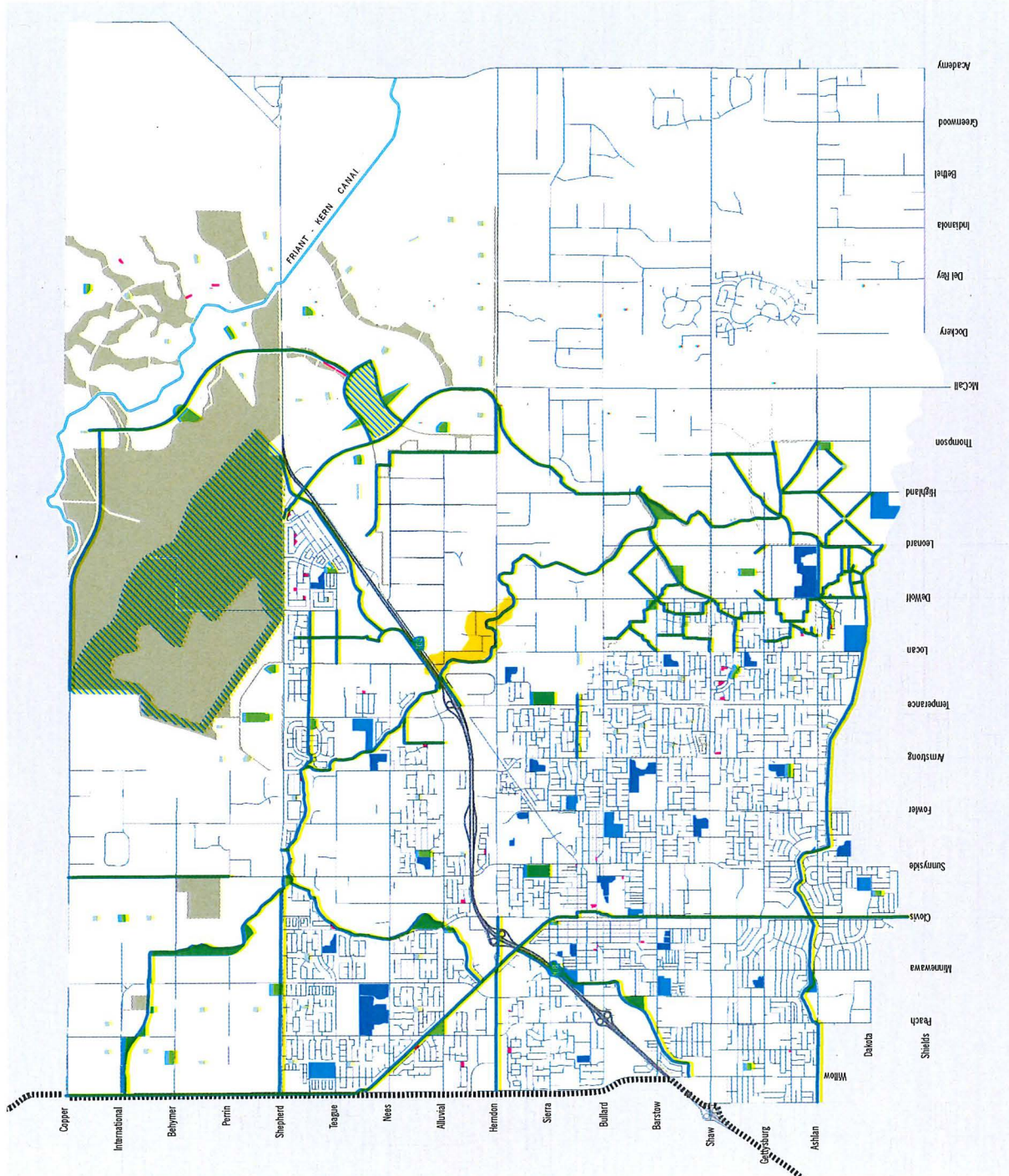
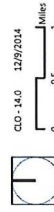
**Figure OS-1  
Parks & Open Space**

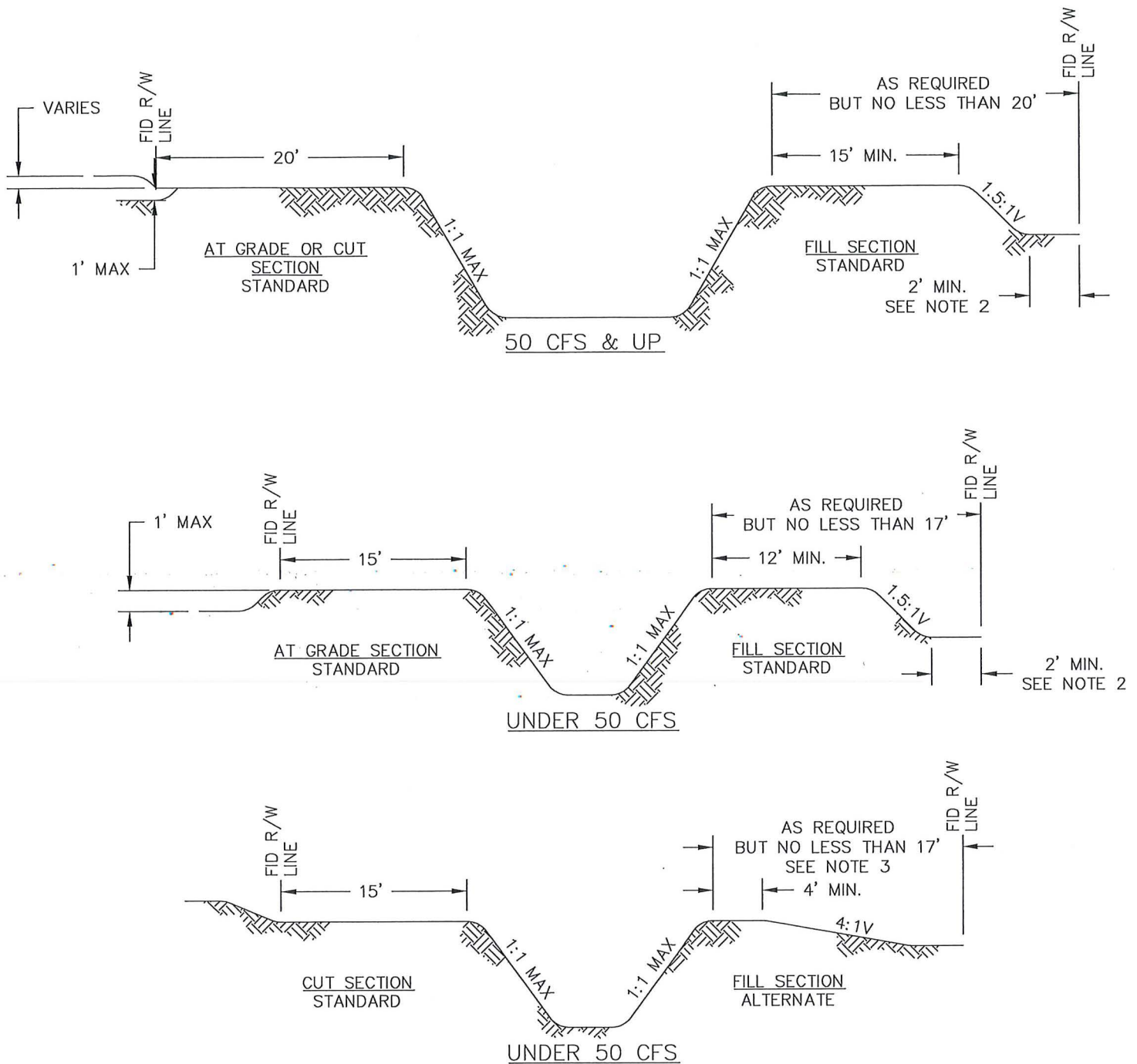


Note:  
For complete bike and trail network refer to Figure C-2 - Bicycle and Trails System.



# CLOVIS GENERAL PLAN





**NOTES:**

1. ALL PRIVATE FACILITIES TO BE LOCATED OUTSIDE FID RIGHT-OF-WAY
2. ADD 2 FEET TO EMBANKMENT WIDTH TO ESTABLISH OVERALL RIGHT-OF-WAY WIDTH TO ACCOMMODATE GRADER BLADE CLEARANCE.
3. THE ALTERNATE SECTION CANNOT BE USED IF THE OVERALL WIDTH EXCEEDS THE STANDARD WIDTH AND IS PERMITTED ONLY WHEN DISTRICT OPERATIONS AND MAINTENANCE FUNCTIONS DO NOT REQUIRE A STANDARD ROADWAY.



FRESNO IRRIGATION DISTRICT

"Your Most Valuable Resource – Water"

CANAL RIGHT-OF-WAY

SCALE: NOT TO SCALE

DATE: JANUARY 2018

STANDARD DETAIL

1-01

SHEET 1 OF 1

## **Response to Fresno Irrigation District (FID)**

### **Response 4-1**

The potential impacted facilities and FID's typical procedures and requirements related to development near such facilities are noted. The City and CCMC will comply with the existing policies, regulations and development standards of FID during the development process.

### **Response 4-2**

Informational comment noted and is correct.

### **Response 4-3**

The City recognizes that groundwater overdraft is an important issue and that the Kings Groundwater Sub-basin needs to ultimately reach sustainability. The Sustainable Groundwater Management Act (SGMA) was signed into law in 2014 to remedy unsustainable groundwater depletion in groundwater basins in California. SGMA requires the development and adoption of Groundwater Sustainability Plans (GSPs) by 2020 and that all high and medium priority groundwater basins must reach sustainability by 2040. This condition developed over a long period of time and it will take substantial time to rectify. As noted, the City of Clovis is a member of the North Kings Groundwater Sustainability Agency. This agency is responsible for developing a Groundwater Sustainability Plan (GSP). CCMC is already using recycled water from the City's wastewater treatment plant for landscape irrigation purposes, which constitutes a substantial portion of the CCMC's total water use. The City has been continually expanding its recycled water system. The City has diversified its water system over time to utilize surface water and recycled water while proportionately decreasing groundwater usage. The City and FMFCD have substantial groundwater recharge facilities that percolate surface water and stormwater into the ground. As a member of the North Kings Groundwater Sustainability Agency, the City is committed to working towards sustainability in the Kings Groundwater Sub-basin in accordance with SGMA.

### **Response 4-4**

The requested change to page 2-7 to the Draft EIR under Responsible Agencies has been made (see Chapter 4 of this Final EIR).

### **Response 4-5**

The requested change to page 12-1 to the Draft EIR under Hydrologic Setting has been made (see Chapter 4 of this Final EIR).

### **Response 4-6**

The Draft EIR does not have a page 4.15-32 nor does it have an "Irrigation Systems Integration" subsection. However, the existing requirements of the City of Clovis Municipal Code and FID indicated in the comment are noted.

**Response 4-7**

The existing regulations prohibiting any discharges into the canal are noted. All new and existing discharges and runoff will be routed to FMFCD storm drain facilities.

**Response 4-8**

The comment regarding FID water allocated to agricultural land and conversion to City water rates per agreement between the City and FID is noted.

**Response 4-9**

Please refer to Response 4-3.

**Response 4-10**

Please refer to Response 4-3.

**Response 4-11**

General comment on the need to make road improvements in a manner that allows FID to maintain and operate its facilities is noted.

**Response 4-12**

The City recognizes the constraints posed by the location of the Enterprise Canal, which runs parallel and adjacent to the north side of Herndon, east of Locan Avenue, for approximately 750 feet. The City has already anticipated in its preliminary design that the Herndon widening and related improvements would be shifted to the south in this area. One of the stated objectives for the Herndon Avenue Widening project (Draft EIR page 2-9) is to “minimize or avoid any encroachment or impact to the Enterprise Canal.” All rights-of-way and easements ultimately needed in relation to this section of the Enterprise Canal will be obtained with the implementation of this project.

**Response 4-13**

There are no parks or recreational facilities planned as part of this project. The City’s Parks and Recreation master plan does provide for a future trail to be located along the Enterprise Canal. The City is appreciative of FID’s support for the City’s trail planning, but the City recognizes that there are a number of issues of concern to FID, including public safety and liability concerns, minimizing the impact to FID’s ability to maintain and operate its canal facilities, right-of-way/property issues, and conflicts with FID above ground structures. The City looks forward to continuing to work with FID to resolve any issues and concerns such that successful trail planning and construction continues for the benefit of the community.

**Response 4-14**

The City acknowledges the various existing requirements, policies and procedures applicable to the development process reflected in the general comments, such as drive approach requirements, showing

easements on maps, review and approval of improvements plans, prohibition of utilities and fences/walls within the FID right-of-way, notification of construction activities affecting FID facilities, costs associated with FID plan review and the potential for other comments and requests by FID as more project detail becomes available. The City will work with FID as development takes place to be sure that existing regulations, policies and procedures are adhered to.



**DEPARTMENT OF TRANSPORTATION****DISTRICT 6**

1352 WEST OLIVE AVENUE

P.O. BOX 12616

FRESNO, CA 93778-2616

PHONE (559) 488-7307

FAX (559) 488-4088

TTY 711

www.dot.ca.gov

**Comment Letter 5***Making Conservation a  
California way of life.*

April 5, 2018

FRE-168-9.147

Clovis Community Medical Center Expansion/  
Herndon Avenue Widening  
SCH# 2016101005Mr. Bryan Araki  
City Planner  
City of Clovis  
1033 Fifth Street  
Clovis, California 93612

Dear Mr. Araki:

Thank you for including the California Department of Transportation (Caltrans) in the review process for continuation with the expansion of Clovis Community Medical Center per its Master Plan. The work would also include the widening of Herndon Avenue in the proximity of the Medical Center. The existing Medical Center is located on the northeast corner of the intersection of N. Temperance Avenue and E. Herndon Avenue, near State Route (SR) 168. The expansion would be phased over a 20 year period, and would include new inpatient bed towers, medical office buildings, a general support building, a cancer center, and a central plant and parking garage. The existing emergency department, surgical facilities, materials management, and outpatient community center would be expanded. The master plan also includes development of commercial buildings, a hotel, and an assisted living center across the street (N. Temperance Avenue and E. Herndon Avenue) from the main hospital campus. Caltrans provides the following comments:

Traffic Operations - N. Temperance Avenue

1. Caltrans recommends the addition of a right-turn lane (575 feet) from the SR168 eastbound off-ramp to southbound N. Temperance Avenue (E/B off-ramp) as an opening-day improvement. This ramp-intersection currently experiences some unstable flow during the morning peak travel periods, and the analysis worksheets show that this specific right-turn movement experiences considerable delay during both AM and PM peak travel periods. The first phase of the expansion would likely increase the volume of this specific turning movement by 45% during the morning peak travel period, and by 27% during the evening peak travel period (TIS Fig. 2, 4, 5). The second phase of the expansion would likely increase the volume of this specific turning movement by an additional 54% during the morning peak travel period, and by an additional 20% during the evening peak travel period (TIS Fig. 2, 10). Therefore, the proposed expansion project should construct the eastbound right-turn lane prior to opening-day.

**5-1**



- 5-2
2. The addition of a southbound lane on N. Temperance Avenue between the SR 168 E/B off-ramp and Fir Avenue is recommended. Intersections 4 and 5 (TIS Fig. 2, 7) show an increase in volume along this segment sufficient to substantiate the need for a third southbound lane. The first phase of the expansion would likely increase the volume along this southbound segment by 35% during the morning peak travel period, and by 24% during the evening peak travel period (TIS Fig. 2, 4). The second phase of the expansion would likely increase the volume along this southbound segment by an additional 41% during the morning peak travel period, and by an additional 19% during the evening peak travel period. Compared to the percentages of the impacts from other sources, the impact of the proposed expansion is substantial. Having a third receiving lane would be the preferred configuration with the addition of a second right-turn lane from the SR 168 E/B off-ramp.
- 5-3
3. Caltrans concurs with the traffic study's recommendation that an additional left-turn lane from the SR 168 E/B off-ramp is needed however, traffic generated from the proposed expansion does not impact this specific movement. Caltrans also concurs with the recommendation that a third northbound lane is needed on N. Temperance Avenue between the SR 168 E/B off-ramp and Fir Avenue. However, the operation along this northbound segment of N. Temperance Avenue does not affect the operation of the ramp intersection, so it falls upon the City to determine the priority and mechanism for such improvement.
- 5-4
4. The establishment of a New Access Road, proposed on northbound N. Temperance Avenue between the SR 168 E/B off-ramp and Fir Avenue would not affect the operation of the ramp. It is Caltrans' understanding that this New Access Road would be situated approximately mid-way between the ramp intersection and Fir Avenue, and would have only right-in and right-out access.
- 5-5
5. An encroachment permit must be obtained for all proposed activities for placement of encroachments within, under or over the State highway rights-of-way. Activity and work planned in the State right-of-way shall be performed to State standards and specifications, at no cost to the State. Engineering plans, calculations, specifications, and reports (documents) shall be stamped and signed by a licensed Engineer or Architect. Engineering documents for encroachment permit activity and work in the State right-of-way may be submitted using English Units. The Permit Department and the Environmental Planning Branch will review and approve the activity and work in the State right-of-way before an encroachment permit is issued. The Streets and Highways Code Section 670 provides Caltrans discretionary approval authority for projects that encroach on the State Highway System. Encroachment permits will be issued in accordance with Streets and Highway Codes, Section 671.5, "Time Limitations." Only the legal property owner or his/her authorized agent can pursue obtaining an encroachment permit. Please call the Caltrans Encroachment Permit Office - District 6: 1352 W. Olive, Fresno, CA 93778, at (559) 488-4058.

#### Sustainability

- 5-6
6. Caltrans recommends the project provide charging stations for electric vehicles as part of the statewide effort to reduce greenhouse gas emissions. Other environmental considerations include the use of solar or alternative energies; strategic placement of windows; heating water utilizing sunlight, to supplement or reduce the significant energy demands of a facility of this size.

Mr. Bryan Araki

April 5, 2018

Page 3

5-7

7. Caltrans recommends green paint be applied to the roadway in locations of potential conflict between motorists and bicyclists—particularly the SR 168 interchange at N. Temperance Avenue. There are class II bike lanes north and south of the interchange and it is anticipated that bike travel may increase with the development of the Health Science Center to the north. Caltrans reminds the developer that bike parking should be provided on site in accordance with the City of Clovis' Active Transportation Plan.

Please be advised these recommendations were arrived at subsequent to planning-level analysis. Additional requirements may arise during the permit process as a result of field review. Questions about these comments can be directed to Jamaica Gentry at (559) 488-7307.

Sincerely,



MICHAEL NAVARRO

Branch Chief

Transportation Planning - North

## **Response to State of California, Department of Transportation (Caltrans)**

### **Response 5-1**

The eastbound right turn lane from SR 168 eastbound off-ramp to southbound Temperance Avenue is part of a City fee that is proposed to take effect this year. Instead of construction, the project will participate in the fee program.

### **Response 5-2**

Addition of a third lane with a Class II bike lane would require modifications to the Temperance curb alignments. The City's Active Transportation Plan requires a Class II bike lane on the north and south directions of Temperance Avenue, thus this would be the currently required improvement. Another option, which would not require modifications to the curb alignments, would be to restripe Temperance to provide three lanes and provide a Class I bike lane. This option, however, would require modification of the Active Transportation Plan.

### **Response 5-3**

The comment reflects that Caltrans concurs with the findings of the Traffic Study while adding minor clarifications as to the scope of effects on State roadways. No additional response is required.

### **Response 5-4**

The comment regarding establishment of a New Access Road in relation to the SR 168 E/B off-ramp is noted. No additional response is required.

### **Response 5-5**

This comment identifies Caltrans' encroachment permit requirements for activities within, over, or under the State highway right-of-way. It is acknowledged that development of the project will require adherence to these requirements.

### **Response 5-6**

As indicated on page 8-5 in Chapter 8 (Energy), the majority of the mitigation measures included to address impacts to Air Quality and Greenhouse Gas Emissions (Chapters 5 and 10, respectively) entail energy-efficient and/or energy reducing qualities. These measures include: utilizing green building materials in construction of facilities; utilizing drought-resistant shade trees to reduce sun exposure of buildings and parking areas; installing high-efficiency heating and cooling systems; utilizing high-efficiency gas or solar water heaters; utilizing built-in energy-efficient appliances (i.e., Energy Star rated); utilizing double- or triple-paned windows; utilizing energy-efficient interior lighting; utilizing low-energy street lights (i.e., sodium, light-emitting diode [LED]); and installing energy-saving systems in rooms that reduce energy usage associated with HVAC systems and appliances when rooms are not occupied, except where such systems would pose a safety or health concern. The project is also generally subject to the California Green Building Standards Code (Title 24, Part 11) and the California Energy Code (Title 24, Part 6 – with some exceptions for acute care medical facilities

included in the proposal). The standards collectively include additional requirements to improve the energy efficiency of buildings, including more efficient windows, insulation, lighting, ventilation systems and numerous other improvements. The City will encourage CCMC to provide charging stations for electric vehicles.

The City of Clovis will consider applying green paint in locations of potential conflict between motorists and bicyclists. CCMC will provide bike parking in accordance with the City of Clovis' Active Transportation Plan.





**MITCHELL  
CHADWICK**

**Comment Letter 6**

Patrick G. Mitchell  
pmitchell@mitchellchadwick.com  
916-462-8887  
916-788-0290 Fax

April 6, 2018

**VIA U.S. MAIL AND EMAIL**

Bryan Araki  
City Planner  
Planning and Development Services Department  
City of Clovis  
1033 Fifth Street  
Clovis, CA 93612  
bryana@cityofclovis.com

**Re: Comments on DEIR for Clovis Community Medical Center Expansion and  
Herndon Avenue Widening Project**

Dear Mr. Araki:

This letter presents the comments of my client, Suburban Propane, L.P., regarding the February 2018 Draft Environmental Impact Report ("DEIR") prepared for the Clovis Community Medical Center Expansion and Herndon Avenue Widening Project, pursuant to the California Environmental Quality Act ("CEQA").

The DEIR states that the Clovis Community Medical Center ("CCMC") proposes to expand its healthcare facilities on the CCMC campus located east of Temperance Avenue, between Herndon Avenue and State Route 168. In addition, the project proposes development on land owned by CCMC west of Temperance Avenue and on land south of Herndon Avenue. The project is split into two phases, a 2-10 year expansion plan, and a 20 year expansion plan. The area adjacent to Suburban Propane's storage tank is proposed to include 150,000 square feet of commercial uses and a 150-room hotel within the next 2 to 10 years. (See DEIR pp. 2-4, 2-5 and Table 2.2.)

Suburban Propane has a 30,000-gallon above-ground propane storage tank located off of Tollhouse Road, just west of Temperance Avenue. (See the attachment to this letter, which shows the location of the propane tank on DEIR Figure 3.2.) This storage tank has been in use at this location since June 13, 1998. Under the proposed project, the open field adjacent to the east side of the storage tank would be developed for commercial purposes and a hotel.

{00033844;1 }

6-2

The effect of the proximity of the proposed project to Suburban Propane's existing storage tank is not examined at all in the DEIR. Suburban Propane seeks to alert the Clovis Planning Department, Planning Commission, and City Council to the existence of Suburban Propane's storage tank now, in order to avoid being asked to relocate the storage tank in the future.

We do not believe that proposing a hotel and commercial uses adjacent to Suburban Propane's existing storage tank constitutes appropriate land use planning. In addition, the proposed project could have an impact on Suburban Propane's tank use, which tank provides a utility service to the public. Despite that, Chapter 21 of the DEIR fails to acknowledge Suburban Propane's storage tank facility and potential related impacts to it. We also note that DEIR chapters 20 and 21 are both paginated starting with page 21-1. Please revise the DEIR to address these concerns.

6-3

There may be additional concerns with the DEIR, which Suburban Propane will address if necessary.

Please contact me or Sarah Taylor at 916-462-8888 if you have any questions.

Sincerely yours,

MITCHELL CHADWICK LLP



Patrick G. Mitchell

cc: Susan Delia (Suburban Propane)  
Sarah Taylor (Mitchell Chadwick)



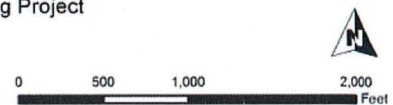
Figure 3.2 –Herndon Avenue Widening Area Photos



### Project Area

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project  
City of Clovis

ODELL Planning & Research, Inc.



## **Response to Mitchell Chadwick/Suburban Propane**

### **Response 6-1**

These paragraphs include introductory information about the purpose of the letter; a restatement of information from the Draft EIR project description; information on the size of the propane tank (30,000 gallons) and how long it has been in place (June 13, 1998); and indicates that the area west of Temperance Avenue proposed for retail use and a hotel is adjacent to Suburban Propane's storage tank.

### **Response 6-2**

The comment letter notes the proximity of the of the project to the existing tank and does "not believe that proposing a hotel and commercial uses adjacent to Suburban Propane's existing storage tank constitutes appropriate land use planning." In response to this statement, City of Clovis provides the following:

The comment letter indicates that the propane tank has been in use at that location since 1998. The City notes that the land to the east proposed for commercial and hotel use has been designated for commercial use (business corridor) in the Herndon-Shepherd Specific Plan since 1988 and in the City of Clovis General Plan since 1993. Thus, a designation for commercial land use existed prior to the approval and installation of the propane tank.

The comment letter does not provide any information or analysis that demonstrates the tank will pose a significant hazard to future commercial use to the east. National Fire Protection Association *Liquefied Petroleum Gas Code* (NFPA 58) requires that propane storage tanks containing 2,001- 30,000 gallons must be located no less than 50 feet from the property line. The tank is located approximately 54 feet from the west property line of the 0.52-acre propane tank parcel and approximately 170 feet from the east property line. The nearest point of the CCMC commercial property is 280 feet east of the propane tank. The CCMC property is 495 feet wide so most of the commercial uses would likely be substantially further than 280 feet from the propane tank.

It is noted that existing residences are located 185 feet southwest, 230 feet west and 280 feet southeast of the propane tank. These homes all existed when the tank was installed in 1998.

Lastly, it is unclear how the project would have an impact on Suburban Propane's tank use. No information is provided to support this contention.

### **Response 6-3**

The comment indicates there may be additional concerns with the Draft EIR but does not provide any further elaboration as to the character or nature of those concerns.





FRESNO METROPOLITAN FLOOD CONTROL DISTRICT

File 170.11  
310. "7H"  
550.30 "7H"

Comment Letter 7

April 11, 2018

Mr. Bryan Araki  
City of Clovis  
1033 Fifth Street  
Clovis, CA 93612

Dear Mr. Araki,

**Fresno Metropolitan Flood Control District Comments for  
Notice of Availability of a Draft Environmental Impact Report for  
Clovis Community Medical Center Expansion and  
Herndon Avenue Widening Project  
Drainage Area "7H"**

The Fresno Metropolitan Flood Control District (FMFCD) has reviewed the subject Draft Environmental Impact Report (DEIR) and requests the following revisions:

- 7-1 1. Page 12-1, Hydrologic Setting section, paragraph 2, the DEIR incorrectly states that the Enterprise Canal is maintained by the Fresno Metropolitan Flood Control District. The canal is maintained by the Fresno Irrigation District.
- 7-2 2. The DEIR should address the major storm requirements included on page 2, paragraph 3 of the FMFCD's letter to the City of Clovis dated November 7, 2016. Major storm flows from areas east of Temperance Avenue have historically flowed across the westerly portion of the proposed expansion site and then over to Magnolia Avenue (old Temperance Avenue). The westerly portion of the expansion shall be graded to maintain the historical major storm path.
- 7-3 3. Page 12-6, HY-3 section, paragraph 2, the DEIR states facilities are adequate to serve CCMC's existing stormwater needs and the additional stormwater runoff created as a result of the expansion plan. This statement is partially correct. CCMC's existing facilities have adequate service, but stormwater runoff from a portion of the expansion project, specifically APN's 553-020-34, 40, 42, 53, 70, 71, 72, and 73, may exceed the existing pipeline capacity and require mitigation. Please reference FMFCD's letter to the City of Clovis dated November 7, 2016.

For your reference we have enclosed a copy of our November 7, 2016 response letter to the Notice of Preparation issued by the City of Clovis for this project.

**Mr. Bryan Araki**  
**Notice of Availability of a Draft Environmental Impact Report for**  
**Clovis Community Medical Center Expansion and**  
**Herndon Avenue Widening Project**  
**April 11, 2018**  
**Page 2**

Thank you for the opportunity to comment. Please keep our office informed on the development of the project and if you have any further questions, or need any additional information, please contact the District at (559) 456-3292.

Very truly yours,



Robert Villalobos  
Engineering Technician III

RV/lrl

Enclosure



## FRESNO METROPOLITAN FLOOD CONTROL DISTRICT

*Capturing stormwater since 1956.*

File 170.11

310. "7H"

550.30 "7H"

November 7, 2016

Mr. Bryan Araki  
City of Clovis  
1033 Fifth Street  
Clovis, CA 93612

Dear Mr. Araki,

**Fresno Metropolitan Flood Control District Comments for  
Notice of Preparation of a Draft Environmental Impact Report for  
Clovis Community Medical Center Expansion and  
Herndon Avenue Widening Project  
Drainage Area "7H"**

The Fresno Metropolitan Flood Control District (FMFCD) bears responsibility for storm water management within the Fresno-Clovis metropolitan area, including the area of the proposed project site. Within the metropolitan area, storm runoff produced by land development is to be controlled through a system of pipelines and storm drainage retention basins. The community has developed and adopted a Storm Drainage and Flood Control Master Plan. Each property contributes its pro-rata share to the cost of the public drainage system. All properties are required to participate in the community system for everyone. It is this form of participation in the cost and/or construction of the drainage system that will mitigate the impact of development.

The subject property shall pay drainage fees pursuant to the Drainage Fee Ordinance prior to approval of any final maps and/or issuance of building permits at the rates in effect at the time of such approval. Please contact FMFCD for a final fee obligation prior to issuance of any construction permits. Should land use densities of existing residential areas be increased, the property would be subject to a reassessment of drainage fees based on the proposed increased land uses and may include the requirement of additional drainage fees to be paid to offset the increased land use. Each proposed development will be reviewed and assessed upon submittal to FMFCD. Any drainage fees previously paid on a property would be given a credit against any new fee responsibility.

k:\letters\environmental impact report letters\deir ccmc expansion- herndon widening.docx

**Mr. Bryan Araki**  
**Notice of Preparation of a Draft Environmental Impact Report for**  
**Clovis Community Medical Center Expansion and**  
**Herndon Avenue Widening Project**  
**November 7, 2016**  
**Page 2**

There are existing storm drain facilities located throughout the plan area. Any proposed relocation, construction of proposed or reconstruction of existing storm drainage facilities will need to be reviewed and approved by FMFCD prior to implementation. Any storm drainage facilities that are not located within the public street right-of way shall be within a dedicated pipeline easement to FMFCD. No encroachments into the easement shall be permitted including, but not limited to, foundations, roof overhangs, swimming pools, and trees.

Much of the FMFCD Master Plan storm drainage system for the plan area is complete. This system was designed for land use densities designated on prior General Plans and have been reflected in the Master Plan. Any proposed densification of existing residential areas within the plan area may exceed the capacity of the existing storm drainage system and will require FMFCD review and approval prior to implementation. Mitigation of site storm water discharge may be required in some circumstances. Such mitigation shall be in the form of on-site retention or FMFCD system modifications. All mitigation shall be reviewed and approved by FMFCD.

The grading of any proposed development within the plan areas including public street areas shall be consistent with the FMFCD Master Plan. Additionally, grading shall not have an adverse impact to major storm conveyance, and to the passage of storm water to the adjacent roadways and existing storm drainage pipelines and inlets. Development shall provide the appropriate surface flowage easements or covenants for any portion of the development area that cannot convey storm water to the public right-of-way without crossing private property.

Any proposed new structures within the plan area with street level entry may be at risk for flooding during a large storm event. Therefore, any new development within the plan area is required to provide street capacity calculations and/or check the overflow point to determine the finish floor that provides protection of the structure from flooding during a large storm event.

Clovis Community Medical Center shall excavate the District's Basin "7H" as needed to provide storage for the additional runoff generated from the project area.

FMFCD will need to review and approve the final improvement plans for all development (i.e. grading, street improvement and storm drain facilities) within the boundaries of the proposed project to insure consistency with the approved Storm Drainage Master Plan.

**Mr. Bryan Araki**

**Notice of Preparation of a Draft Environmental Impact Report for  
Clovis Community Medical Center Expansion and  
Herndon Avenue Widening Project**

**November 7, 2016**

**Page 3**

If there are to be storm water discharges from private facilities to the FMFCD's storm drainage system, they shall consist only of storm water runoff and shall be free of solids and debris. Landscape and/or area drains are not allowed to connect directly to FMFCD's facilities.

In an effort to improve storm runoff quality, outdoor storage areas shall be constructed and maintained such that material that may generate contaminants will be prevented from contact with rainfall and runoff and thereby prevent the conveyance of contaminants in runoff into the storm drain system.

FMFCD encourages, but does not require that roof drains from non-residential development be constructed such that they are directed onto and through a landscaped grassy swale area to filter out pollutants from roof runoff.

Runoff from areas where industrial activities, product, or merchandise come into contact with and may contaminate storm water must be directed through landscaped areas or otherwise treated before discharging it off-site or into a storm drain. Roofs covering such areas are recommended. Cleaning of such areas by sweeping instead of washing is to be required unless such wash water can be directed to the sanitary sewer system. Storm drains receiving untreated runoff from such areas that directly connect to FMFCD's system will not be permitted. Loading docks, depressed areas, and areas servicing or fueling vehicles are specifically subject to these requirements. FMFCD's policy governing said industrial site NPDES program requirements are available. Contact FMFCD's Environmental Department for further information regarding these policies related to industrial site requirements.

Thank you for the opportunity to comment. Please keep our office informed on the development of these plans. If you should have any questions or comments, please contact FMFCD at (559) 456-3292.

Very truly yours,



**Robert Villalobos  
Engineering Technician III**

RV/lrl

## **Response to Fresno Metropolitan Flood Control District (FMFCD)**

### **Response 7-1**

The comment correctly notes that the Enterprise Canal is owned, operated, and maintained by the Fresno Irrigation District (FID) rather than FMFCD. This correction has been made and is reflected in Chapter 5 of this Final EIR.

### **Response 7-2**

FMFCD's comments regarding the historic grading pattern in the western area of the project site are noted. The detailed project development plans, when proposed, will require subsequent review by FMFCD and will be required conform to FMFCD requirements, including grading to maintain the historical major storm path.

### **Response 7-3**

FMFCD's comments regarding existing pipeline capacity in a small portion of the proposed project area (southeast corner of Herndon and Coventry Avenues) are noted. FMFCD should be aware that APNs 553-020-34, 40, 42 and 53 are part of the existing Cedarwood Elementary School campus and not part of the project site. These parcels comprise the northern portion of the elementary school turfed play fields, and therefore would not generate a large amount of runoff compared to more intense urban uses. In any event, the project development plans, when proposed, will require subsequent review by FMFCD and will be required conform to FMFCD requirements.





April 19, 2018

Comment Letter 8

Bryan Araki  
City of Clovis  
Planning & Development Services  
1033 Fifth Street  
Clovis, CA 93612

**Project: Draft Environmental Impact Report for the Clovis Community Medical Center Expansion and Herndon Avenue Widening Project**

**District CEQA Reference No: 20180180**

Dear Mr. Araki:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the Notice of Preparation (NOP) for the Clovis Community Medical Center Expansion and Herndon Avenue Widening Project. The proposed project consists of an expansion to the existing Clovis Community Medical Center and road widening on Herndon Avenue. The Clovis Community Medical Center Expansion includes two major phases: a 2–10 year expansion plan and a 20 year expansion plan. The 2–10 year expansion plan would add 410,172 square feet to the existing Clovis Community Medical Center. The 2–10 year plan also includes up to 150,000 square feet of commercial space and a 150 room hotel. The 20 year expansion plan would add 413,769 square feet to the existing Clovis Community Medical Center. The 20 year plan also includes up to 70,000 square feet of retail and/or office space and a 100 unit assisted living or memory care facility. The project would also widen the current five lanes on Herndon Avenue between Temperance and Coventry Avenues to six lanes and widen the roadway between Coventry and the southern leg of DeWolf Avenue from two lanes to a four lane divided roadway. The District offers the following comments:

### **1. Voluntary Emissions Reduction Agreement (VERA)**

For Mitigation Measure AQ-2, the Draft EIR indicates that Clovis Community Medical Center, (the project proponent) will enter into a VERA with the District. On Page 20, the Draft EIR Appendices Mitigation Measure AQ-2 states, "... *The VERA shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming compliance with the VERA, prior to issuance of final discretionary approval (e.g., approval of the grading permit)....*"

**Sayed Sadredin**

Executive Director/Air Pollution Control Officer

**Northern Region**  
4800 Enterprise Way  
Modesto, CA 95356-8718  
Tel: (209) 557-6400 FAX: (209) 557-6475

**Central Region (Main Office)**  
1990 E. Gettysburg Avenue  
Fresno, CA 93726-0244  
Tel: (559) 230-6000 FAX: (559) 230-6061

**Southern Region**  
34946 Flyover Court  
Bakersfield, CA 93308-9725  
Tel: 661-392-5500 FAX: 661-392-5585

Based on project information and the intent of the project mitigation, the VERA is to be approved by the District prior to the City's issuance of construction/grading permits. This is consistent with the requirements of a VERA to have mitigation in place prior to the start of the first activity generating emissions, including but not limited to demolition, grading, etc., whichever occurs first. This will ensure that the targeted emissions reductions and the project emissions occur contemporaneously.

8-1 Additionally, the VERA will include requirements for the District, upon successful fulfillment of mitigation under the VERA of project-related emissions, to verify in writing to the project proponent and to the City of Clovis that the project related impacts on air quality have been mitigated as required under the VERA. This process, which includes the funding of clean emission reduction projects, will occur over an extended period of time, however contemporaneous with the project. As such, the following changes are recommended (see ~~strikeout~~ and underline):

*"The VERA shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming ~~compliance with~~ entering into the VERA, prior to issuance of final discretionary approval (e.g., approval of the grading permit)."*

## 2. District Rule 9510 Indirect Source Review (ISR)

District Rule 9510 is intended to reduce a project's impact on air quality through project design elements or by payment of applicable off-site mitigation fees. Any applicant subject to District Rule 9510 is required to submit an AIA application to the District no later than applying for final discretionary approval.

8-2 Based on information provided to the District, the proposed Project would equal or exceed 20,000 square feet of medical offices. Therefore, the District concludes that the proposed Project is subject to District Rule 9510, which requires that an AIA application be submitted at this time.

The District recommends that demonstration of compliance with District Rule 9510 be made a condition of project approval. Information about how to comply with District Rule 9510 can be found online at: <http://www.valleyair.org/ISR/ISRHome.htm>.

## 3. Other District Permits/Rules

8-3 The project may be subject to District Rules and Regulations, including: Regulation VIII (Fugitive PM10 Prohibitions), Rule 4102 (Nuisance), Rule 4601 (Architectural Coatings), Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving, and Maintenance Operations). In the event an existing building will be renovated, partially demolished or removed, the project may be subject to District Rule 4002 (National Emission Standards for Hazardous Air Pollutants). The above list of rules is neither exhaustive nor exclusive. To identify other District rules or regulations that apply to this project or to obtain information about District permit requirements, the applicant is



8-3

strongly encouraged to contact the District's Small Business Assistance Office at (559) 230-5888. Current District rules can be found online at: [www.valleyair.org/rules/1ruleslist.htm](http://www.valleyair.org/rules/1ruleslist.htm).

District staff is available to meet with you and/or the applicant to further discuss the regulatory requirements that are associated with this project. If you have any questions or require further information, please call Michael Corder at (559) 230-5818.

Sincerely,

Arnaud Marjollet  
Director of Permit Services

A handwritten signature in blue ink, appearing to read "B. Clements", is written over the printed name.

Brian Clements  
Program Manager

AM:mc

## Response to San Joaquin Valley Air Pollution Control District (SJVAPCD)

### Response 8-1

SJVAPCD's comments regarding the timing of approval for a VERA and requirements for written verification by the District upon successful fulfillment of mitigation are noted. Mitigation Measure AQ 1.2 has been updated to provide improved clarity and detail regarding the VERA, given that this is a Program EIR that covers a phased long-term project. The updated language includes the change recommended in SJVAPCD's comment letter (i.e. changing "compliance with" to "entering into").

**AQ 1.2:** A Voluntary Emissions Reduction Agreement (VERA) shall be entered into with the SJVAPCD to reduce operational emissions of ROG and NOX to less than 10 tons/year and emissions of PM10 to below 15 tons/year. Operational emissions of ROG, NOX and PM10 (inclusive of PM2.5) shall be reduced in excess of the reductions required per compliance with SJVAPCD's ISR Rule (Refer to Mitigation Measure AQ-1). Emission reductions may be achieved by use of newer, low-emission equipment, implementation of on-site or off-site mitigation, and/or the funding of off-site mitigation, through participation in the SJVAPCD's off-site mitigation program. The project development plans are long term and conceptual in nature and subject to change in uses and extent otherwise allowed by City zoning that have lesser or equal impacts to those assessed in the EIR. VERA emission estimates shall be based on project-specific modeling assumptions where available (e.g., truck trip generation). Modeling performed shall account for declining emissions during the 10-year mitigation period due to vehicle turnover projected by the latest State approved emission models. VERA emission estimates may be revised to reflect actual development plans proposed for the site at the time each building or phase is finalized. VERA mitigation fee payments for a building or phase may be deferred until no later than 30 days prior to commencing construction activities for the building or phase. The VERA shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming ~~compliance with~~ entering into the VERA, prior to issuance of final discretionary approval (e.g., approval of the grading permit for the first construction project relying on this EIR). Development and implementation of the VERA shall be fully funded by the project proponent/owner as development progresses. With approval by SJVAPCD, the VERA may also be used to demonstrate compliance with emission reductions required by SJVAPCD's ISR Rule (Rule 9510).

### Response 8-2

SJVAPCD's comment regarding the applicability of District Rule 9510 (Indirect Source Review) is noted. Mitigation Measure AQ 1.1 requires that the project to comply with Rule 9510. Accordingly, an Air Impact Assessment (AIA) shall be prepared for the project, and the AIA shall be submitted to and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis.

### Response 8-3

SJVAPCD's comment that additional District rules and regulations may apply to the project is noted. The project will comply with subsequent rules and regulations as such rules and regulations become applicable during the course of development of the project.

# CHAPTER 5

## Revisions to the Draft EIR

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### INTRODUCTION

This chapter contains revisions to the Draft EIR resulting from comments received on the Draft EIR. Added text is underlined and deleted text is shown in ~~striketrough~~ type. The revisions consist of clarifications and amplifications to the existing document.

### DRAFT EIR REVISIONS

#### Chapter 2, Responsible Agencies, Page 2-7:

##### Responsible Agencies

Under CEQA, the following state and local agencies will be Responsible Agencies for the project. The agencies and discretionary approvals necessary from each are as follows:

- a. The California Office of Statewide Health Planning and Development must review and approve the construction plans and geotechnical reports for the CCMC expansion.
- b. The County of Fresno must review and approve the Herndon Avenue Widening project improvements within its jurisdiction.
- c. The Fresno Irrigation District requires that it review, approve and be made a party to signing all improvement plans which affect its property/easements and canal/pipeline facilities including, but not limited to sewer and water, FMFCD, street, landscaping, dry utilities and all other utilities. must review and approve any project improvements that may encroach upon or adversely affect the Enterprise Canal.
- d. The Fresno Metropolitan Flood Control District must review and approve any plans for storm drainage improvements or modifications.

#### Chapter 12, Second Paragraph under Hydrologic Settings, Page 12-1:

Notable surface water features in the vicinity of the project site include the Enterprise Canal, which forms the eastern boundary of the CCMC campus, and tributaries of Pup Creek. The Enterprise Canal is owned, operated and maintained by Fresno Irrigation District. ~~These surface water features are components of~~ The stormwater drainage system is maintained by the Fresno Metropolitan Flood Control District (FMFCD), and is discussed more below.

#### Chapter 1, Mitigation Measure AQ-1.2, Page 1-6 and Chapter 5, Mitigation Measure AQ-1.2, Page 5-21:

~~AQ-1.2: A Developer Mitigation Contract (DMC)~~ Voluntary Emission Reduction Agreement (VERA) shall be entered into with the SJVAPCD to reduce operational emissions of ROG and NOX to less than 10 tons/year and emissions of PM10 to below 15 tons/year. Operational emissions of ROG, NOX and PM10 (inclusive of PM2.5) shall be reduced in excess of the reductions required per compliance with SJVAPCD's ISR Rule (Refer to Mitigation Measure AQ-1). Emission reductions may be achieved by use of newer, low-emission equipment, implementation of on-site or off-site mitigation, and/or the funding of off-site mitigation, through participation in the SJVAPCD's off-site mitigation program. The project development plans are long term and conceptual in nature and subject to change in uses and extent otherwise allowed by City zoning that have lesser or equal impacts to those assessed in the

EIR. VERA emission estimates shall be based on project-specific modeling assumptions where available (e.g., truck trip generation). Modeling performed shall account for declining emissions during the 10-year mitigation period due to vehicle turnover projected by the latest State approved emission models. VERA emission estimates may be revised to reflect actual development plans proposed for the site at the time each building or phase is finalized. VERA mitigation fee payments for a building or phase may be deferred until no later than 30 days prior to commencing construction activities for the building or phase. The ~~DMC~~ VERA shall be reviewed and approved by the SJVAPCD prior to issuance of construction/grading permits by the City of Clovis. The project proponent/owner shall submit to the City of Clovis Planning Department documentation confirming ~~compliance with~~ entering into the ~~DMC~~ VERA prior to issuance of final discretionary approval (e.g., approval of the grading permit for the first construction project relying on this EIR). Development and implementation of the ~~DMC~~ VERA shall be fully funded by the project proponent/owner as development progresses. With approval by SJVAPCD, the ~~DMC~~ VERA may also be used to demonstrate compliance with emission reductions required by SJVAPCD's ISR Rule (Rule 9510).

**Draft CEQA Resolution**  
**Draft CUP85-18A11 Resolution**

**DRAFT  
RESOLUTION 18-\_\_**

**RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF CLOVIS  
RECOMMENDING THAT THE CITY COUNCIL: (1) CERTIFY THE CLOVIS  
COMMUNITY MEDICAL CENTER ENVIRONMENTAL IMPACT REPORT AND ADOPT  
A MITIGATION MONITORING/ REPORTING PROGRAM FOR THE CLOVIS MEDICAL  
CENTER EXPANSION AND HERNDON AVENUE WIDENING PROJECTS**

**WHEREAS**, the Project applicant is Clovis Community Medical Centers (“Applicant”); and

**WHEREAS**, the Applicant is proposing to undertake the Clovis Community Medical Center Expansion Project (“Project”), which consists of a ten-year expansion plan for additional facilities and improvements and a long range site development master plan for 20 years in the future; and

**WHEREAS**, the Clovis Medical Center Expansion Project consists of approximately 148 acres and is located on the north and south sides of Herndon Avenue and east and west sides of Temperance Avenue, in the City of Clovis, Fresno County, California; and

**WHEREAS**, the Herndon Avenue Widening Capital Investment Project is located on Herndon Avenue between Temperance and DeWolf Avenues, in the City of Clovis and County of Fresno; and

**WHEREAS**, the City caused to be prepared a Draft Program Environmental Impact Report (“Draft EIR”) for the Project in February 2018 to evaluate potentially significant adverse environmental impacts; and

**WHEREAS**, the Draft EIR was made available for public review and comment in conformance with CEQA and the State CEQA Guidelines; and

**WHEREAS**, written comments were received on the Draft EIR during its public review period; and

**WHEREAS**, the City caused to be prepared a Final Program Environmental Impact Report (“Final EIR”) for the Project in May 2018, which contains the written comments upon the Draft EIR and responses thereto, as well as changes and additions to the Draft EIR text; and

**WHEREAS**, the Draft EIR and the Final EIR collectively make up the Environmental Impact Report (the “EIR”) for the Project; and

**WHEREAS**, the EIR was prepared, circulated, and made available for public comment pursuant to the California Environmental Quality Act (“CEQA”), Public Resources Code, Sections 21000 et seq., and the Guidelines for Implementation of CEQA, 14 California Code of Regulations, Sections 15000 et seq. (the “CEQA Guidelines”); and

**WHEREAS**, on May 9, 2018, the City published a Notice of a Planning Commission Hearing for May 31, 2018 (the “Notice”) in The Business Journal and provided it to interested parties; and

**WHEREAS**, the Notice informed the public and interested parties that the Planning Commission would be considering the following actions (“Project Approvals”), as well as the associated EIR: CUP85-18A11, which request the approval of a conditional use permit amendment, for the Clovis Community Medical Center Expansion; and

**WHEREAS**, on June 4, 2018, the Planning Commission considered testimony and information received at the public hearing and the oral and written reports from City staff, as well as other documents contained in the record of proceedings relating to the Project and EIR, which are maintained at the offices of the City of Clovis Planning and Development Services; and

**WHEREAS**, the Planning Commission has independently reviewed and considered the EIR; and

**WHEREAS**, the Planning Commission has evaluated and considered all comments, written and oral, received from persons who reviewed the Draft EIR and Final EIR, or otherwise commented on the Project; and

**WHEREAS**, the Planning Commission has independently reviewed and considered the Mitigation Monitoring/Reporting Program of the Final EIR.

**NOW, THEREFORE**, the Planning Commission of the City of Clovis adopts the foregoing recitals as true and correct and resolves as follows:

1. Finds that the EIR for the Project is adequate and has been completed in compliance with CEQA and the CEQA Guidelines.
2. Finds and declares that the EIR was presented to the Planning Commission and that the Planning Commission has independently reviewed and considered the information contained in the EIR prior to recommending approval of the Project.
3. Based upon its review of the EIR, finds that the EIR is an adequate assessment of the potentially significant environmental impacts of the Project as described in the EIR, sets forth a reasonable range of alternatives to the Project, and represents the independent judgment of the Planning Commission .
4. Finds that the Final EIR additions, clarifications, amplifications, modifications and other information in response to comments on the Draft EIR are not significant new information as that term is defined under the provisions of CEQA or the CEQA Guidelines because such changes and additional information do not indicate that (i) any new significant environmental impacts not already evaluated would result from the Project; (ii) there is any substantial increase in the severity of any environmental impact from the Project unless mitigation measures are adopted that reduce the impact to a level of insignificance; (iii) any feasible alternatives or mitigation measures considerably different from those previously analyzed in the Draft EIR have been proposed that would lessen significant environmental impacts of the Project but the proponents decline to adopt it. Accordingly, the Planning Commission hereby finds and determines that recirculation of the Final EIR for further public review and comment is not warranted.

5. The Planning Commission has considered all feasible mitigation measures, and has examined potentially feasible alternatives to the Project.
6. Recommends that the City Council certify that the EIR is adequate and has been completed in compliance with CEQA and the CEQA Guidelines.
7. Recommends that the City Council adopt the Mitigation Monitoring/Reporting Program set forth in Final EIR, including the mitigation measures identified therein and as described in the EIR.
8. Directs that the record of these proceedings be contained in the Department of Planning and Development Services located at 1033 5<sup>th</sup> Street, Clovis, CA 93612, and that the custodian of the record be the City Planner, Bryan Araki or other person designated by the Planning and Development Services Director.
9. Recommends that the City Council authorize the Planning and Development Services Director, or his designee, to file a Notice of Determination for the Project in accordance with CEQA and to pay any fees required for such filing, including Department of Fish and Game fees.

The foregoing resolution was approved upon a motion by Commissioner \_\_\_\_\_, seconded by Commissioner \_\_\_\_\_, and passed by the following vote, to wit:

AYES:  
NOES:  
ABSENT:  
ABSTAIN:

PLANNING COMMISSION RESOLUTION 18-\_\_\_\_  
CONDITIONAL USE PERMIT NO. CUP85-18A11  
DATED: May 31, 2018

\_\_\_\_\_  
Paul Hinkle, Chairperson

ATTEST:

\_\_\_\_\_  
Dwight Kroll, Secretary



**DRAFT  
RESOLUTION 18-\_\_**

**A RESOLUTION OF THE CLOVIS PLANNING COMMISSION APPROVING A CONDITIONAL  
USE PERMIT AMENDMENT FOR THE EXPANSION OF THE CLOVIS COMMUNITY  
MEDICAL CENTER LOCATED AT THE INTERSECTION OF HERNDON AND TEMPERANCE  
AVENUES INCLUDING AN EXPANSION OF THE MAIN HOSPITAL CAMPUS, COMMERCIAL  
DEVELOPMENT ON THE WEST SIDE OF TEMPERANCE AVENUE, AND OFFICE/MEDICAL  
DEVELOPMENT ON THE SOUTH SIDE OF HERNDON AVENUE**

**WHEREAS**, the project proponent, Clovis Community Medical Center, located at 2755 Herndon Avenue, Clovis, CA 93619, has applied for a conditional use permit amendment, CUP85-18A11; and

**WHEREAS**, this is a request is to approve a conditional use permit amendment for a the expansion of the Clovis Community Medical Center Campus located on the north and south sides of Herndon Avenue and east and west sides of Temperance Avenue, in the City of Clovis, Fresno County, California; and

**WHEREAS**, a public notice was mailed to area residents within 600 feet of said property boundaries twenty-one days prior to said hearing; and

**WHEREAS**, in compliance with the California Environmental Quality Act, the Draft EIR was available for public review and comment from February 16, 2018, to April 6, 2018; and

**WHEREAS**, a duly noticed hearing was held on May 31, 2018; and

**WHEREAS**, the proposed conditional use permit CUP85-18A11 was assessed under the provisions of the California Environmental Quality Act (CEQA) and the potential effects on the environment were considered by the Planning Commission, together with comments received and public comments, and the entire public record was reviewed; and

**WHEREAS**, staff does recommend adoption of a Program Environmental Impact Report for CUP85-18A11; and

**WHEREAS**, the Commission, has reviewed and considered the staff report and all written materials submitted in connection with the request including the conditions attached as Exhibit "A" to this resolution and incorporated herein by this reference, and hearing and considering the testimony presented during the public hearing; and

**WHEREAS**, after hearing substantial evidence in the record the Commission, finds as follows:

1. The proposed use is conditionally allowed within, and would not impair the integrity and character of, the subject zoning district and is in compliance with all of the applicable provisions of this Development Code;
2. The proposed use is consistent with the General Plan and any applicable specific plan;

3. The design, location, size, and operating characteristics of the proposed use are compatible with the existing and future land uses and would not create significant noise, traffic, or other conditions or situations that may be objectionable or detrimental to other allowed uses operating nearby or adverse to the public interest, health, safety, convenience, or welfare of the City;
4. The subject parcel is physically suitable in size and shape for the type and density/intensity of use being proposed;
5. There are adequate provisions for public access, water, sanitation, and public utilities and services to ensure that the proposed use would not be detrimental to public health and safety; and
6. That the Project has been evaluated according to CEQA guidelines and an EIR has been prepared for the Project pursuant to the California Environmental Quality Act ("CEQA"), including a Mitigation Monitoring/Reporting Plan.

**WHEREAS**, the record of proceedings is contained in the Department of Planning and Development Services Department located at 1033 Fifth Street, Clovis, California 93612, and the custodian of record is the Deputy City Planner.

**NOW, THEREFORE, BE IT FURTHER RESOLVED** that the Clovis Planning Commission does approve CUP85-18A11, subject to the attached conditions labeled Exhibit "A."

\* \* \* \* \*

The foregoing resolution was adopted by the Clovis Planning Commission at its regular meeting on May 31, 2018, upon a motion by Commissioner \_\_\_\_\_, seconded by Commissioner \_\_\_\_\_, and passed by the following vote, to wit:

AYES:  
NOES:  
ABSENT:  
ABSTAIN:

PLANNING COMMISSION RESOLUTION 18-\_\_\_\_\_  
CONDITIONAL USE PERMIT NO. CUP85-18A11  
DATED: May 31, 2018

ATTEST: \_\_\_\_\_  
Dwight Kroll, Secretary

\_\_\_\_\_  
Paul Hinkle, Chairperson

