AGENDA ITEM NO: X-C

- 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
- Appendices to the Draft EIR

Final Environmental Impact Report
- Response to Comments
- Mitigation Monitoring/Reporting Program

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 to10 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 an approximate 150-bed Assisted Living or Memory Care facility south of Herndon Avenue.

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.

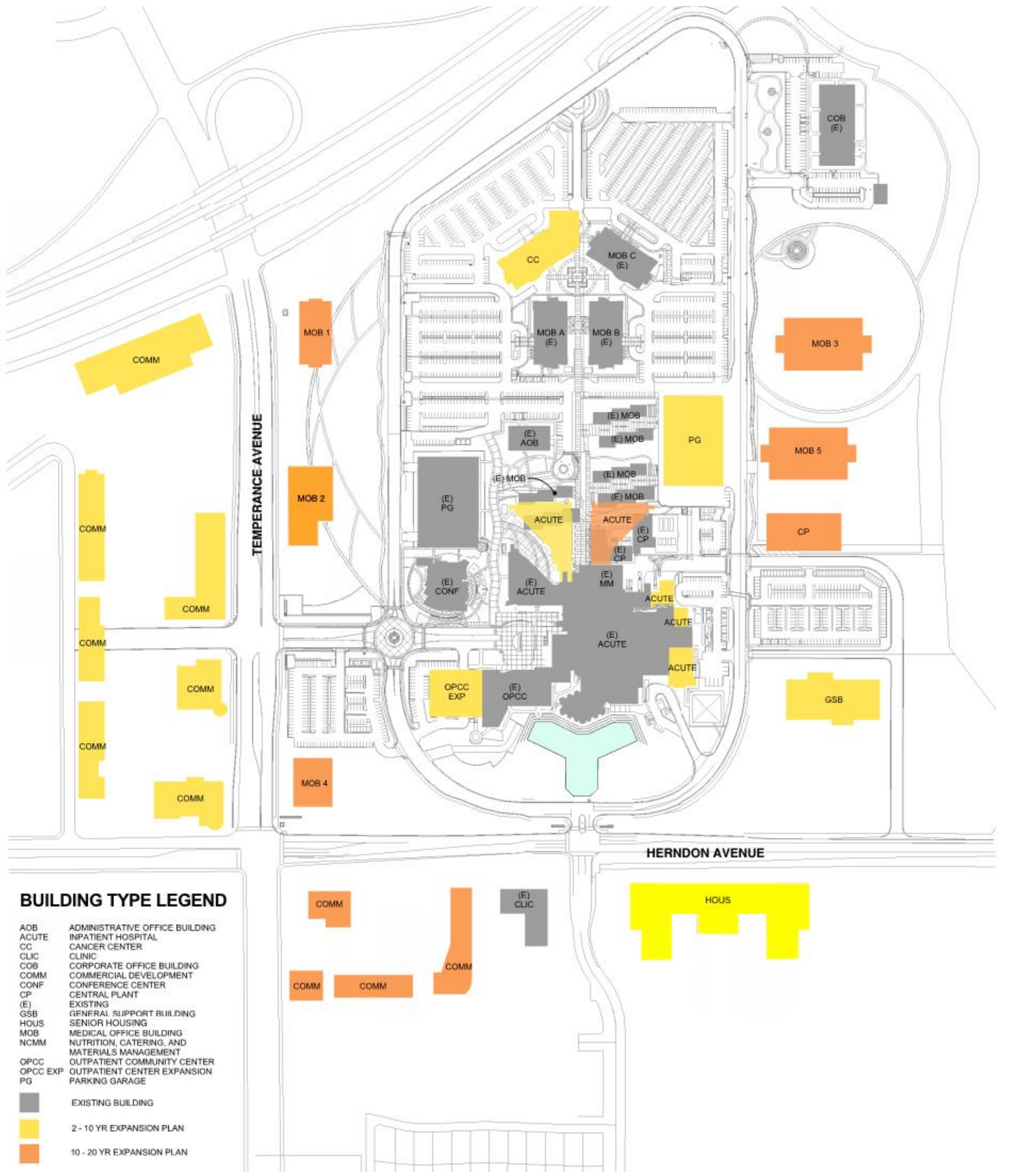

Figure A – 2018 Master Plan

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

CUP85-18A11

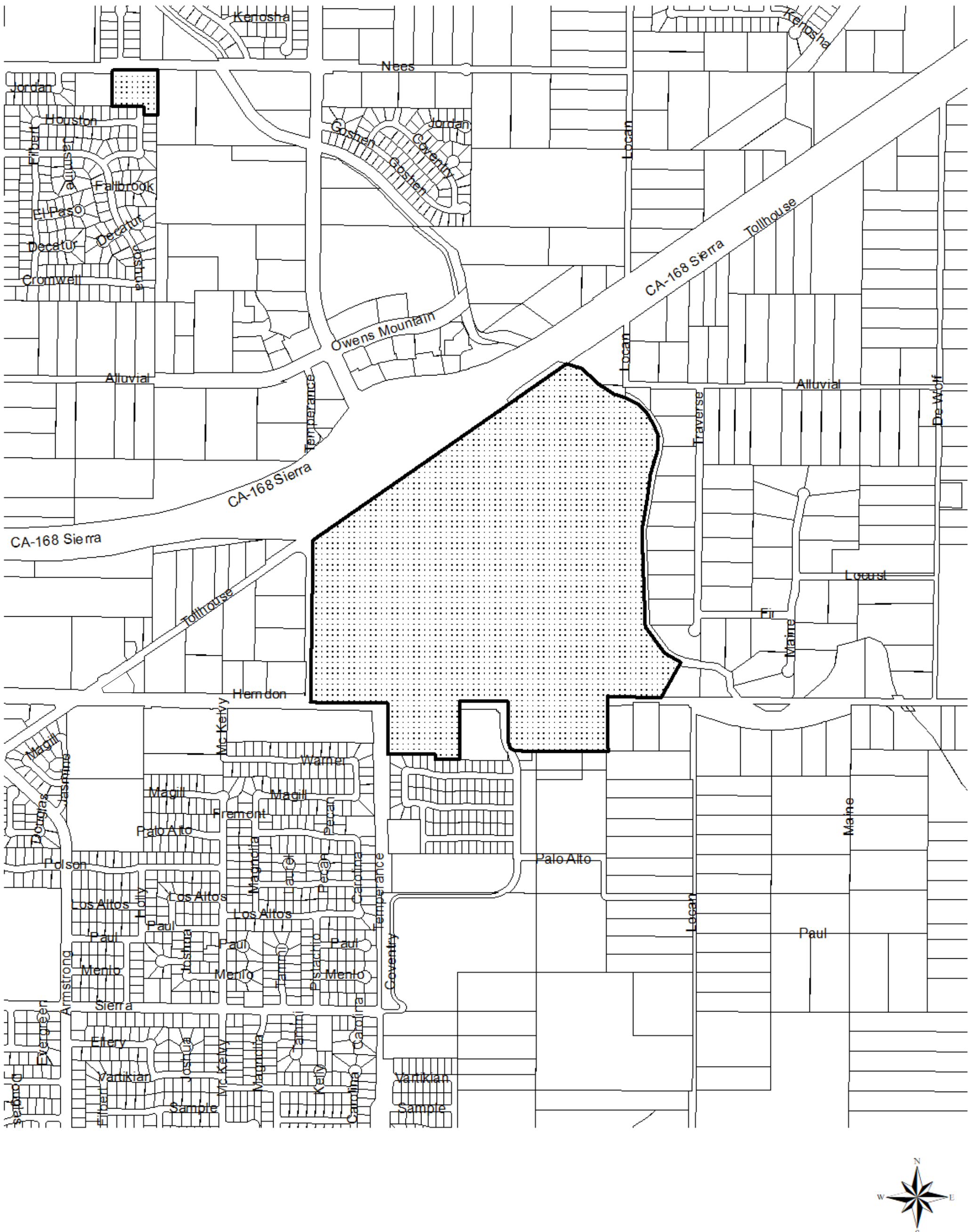

EXHIBIT A
Conditions of Approval – CUP85-18A11

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

ATTACHMENT 1

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:

City of Clovis
Planning and Development Services Department
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February 2018

Table of Contents

APPENDICES

Introduction

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

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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JLB Traffic Engineering, Inc. Jose Luis Benavides, P.E., T.E., President 1300 E. Shaw Avenue, Suite 103, Fresno, CA 93710 (559) 570-8991 / jbenavides@jlbtraffic.com	Traffic and Transportation

CHAPTER 1
Summary

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

EIR Section	Impact/Mitigation Measure/Significance
GH-1 **Greenhouse Gas Emissions**	**Impact:** The project would increase the generation of greenhouse gas emissions. **Level of Significance without Mitigation:** Potentially significant **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 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.
GH-2 **Greenhouse Gas Emissions**	**Impact:** The project may conflict with an applicable greenhouse gas reduction plan, policy or regulation. **Level of Significance:** Potentially Significant **Mitigation Measures:** Implement Mitigation Measure GH-1. **Level of Significance with Mitigation:** 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.
NO-2 **Noise**	**Impact:** The project would result in an increase in long-term ambient noise levels from traffic sources. **Level of Significance:** Potentially Significant **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:** 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.

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

EIR **Section**	**Impact/Mitigation Measure/Significance**
AE-1 **Aesthetics**	**Impact:** Clearing and construction activity would temporarily degrade the visual quality of the project site. **Level of Significance without Mitigation:** Potentially significant **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. **Level of Significance with Mitigation:** Less than significant

Table 1.2
Significant Impacts and Mitigation Measures

AE-2 **Aesthetics**	**Issue and Threshold of Significance:** The project would increase in illumination and glare due to project lighting, building surfaces and parking areas. **Level of Significance without Mitigation:** Potentially significant **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. **Level of Significance with Mitigation:** Less than significant
AQ-1 **Air Quality**	**Impact:** The project would increase long-term operational emissions of particulate matter and ozone precursor emissions. **Level of Significance without Mitigation:** 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.

Table 1.2
Significant Impacts and Mitigation Measures

	(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 with Mitigation:** Less than significant
AQ-2 **Air Quality**	**Impact:** Impacts to sensitive receptors may occur due to localized PM concentrations from construction activities and air emissions from stationary sources. **Level of Significance without Mitigation:** Potentially significant **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 expose 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.

Table 1.2
Significant Impacts and Mitigation Measures

	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 and ww.arb.ca.gov/regact/2007/ordiesl07/frooal.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 with Mitigation:** Less than significant
AQ-3 **Air Quality**	**Impact:** The project may be inconsistent with the applicable air quality plan. **Level of Significance without Mitigation:** Potentially significant

Table 1.2
Significant Impacts and Mitigation Measures

	Mitigation Measures: Implement Measures AQ-1.1 through AQ-2. **Level of Significance with Mitigation:** Less than significant
BR-1 **Biological Resources**	**Impact:** The project would potentially impact Special Status Species including Vernal Pool Fairy Shrimp (VPFS), Burrowing Owl, Swainson's Hawk and other bird species. **Level of Significance without Mitigation:** Potentially significant **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. ***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.

Table 1.2
Significant Impacts and Mitigation Measures

	(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." **Level of Significance with Mitigation:** Less than significant
BR-2 **Biological Resources**	**Impact:** The widening of Herndon Avenue would impact 0.204 acres of wetlands. **Level of Significance without Mitigation:** Potentially 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).

Table 1.2
Significant Impacts and Mitigation Measures

	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. **Level of Significance with Mitigation:** Less than significant
BR-3 **Biological Resources**	**Impact:** The widening of Herndon Avenue would impact a small wetland swale riparian habitat. **Level of Significance without Mitigation:** Potentially significant **Mitigation Measures:** Implement Mitigation Measures BR-2.1 and BR-2.2. **Level of Significance with Mitigation:** Less than significant
CR-1 **Cultural Resources**	**Impact:** Potential disturbance of subsurface cultural and/or paleontological resources may result from project construction activities. **Level of Significance without Mitigation:** Potentially 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. **Level of Significance with Mitigation:** Less than significant
NO-1 **Noise**	**Impact:** Temporary or periodic increases in ambient noise levels would result from construction activities. **Level of Significance without Mitigation:** 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.

Table 1.2
Significant Impacts and Mitigation Measures

	Level of Significance with Mitigation: Less than significant
NO-3 **Noise**	**Impact:** An increase in long-term ambient noise levels from operational features would result from the project. **Level of Significance without Mitigation**: Potentially 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:** Less than significant
TT-1 **Transportation and Traffic**	**Impact:** The "Existing Conditions plus Project" Scenario would result in unacceptable levels of service at the following intersection: • SR 168 EB Ramps at Temperance Avenue **Level of Significance without Mitigation:** Potentially 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. **Level of Significance with Mitigation:** Less than significant
TT-2 **Transportation and Traffic**	**Impact:** 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) **Level of Significance without Mitigation:** Potentially 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 [see Chapter 19, Transportation and Traffic]. **Level of Significance with Mitigation:** Less than significant

Table 1.2
Significant Impacts and Mitigation Measures

TT-3 **Transportation and Traffic**	**Impact:** 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 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 • Bullard Avenue at De Wolf Avenue • Alluvial Avenue at Temperance Avenue • Herndon Avenue at Tollhouse Road • New Access Road/Temperance Avenue **Level of Significance without Mitigation:** Potentially significant **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 [see Chapter 19, Transportation and Traffic]. **Level of Significance with Mitigation:** Less than significant
TT-4 **Transportation and Traffic**	**Impact:** 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

Table 1.2
Significant Impacts and Mitigation Measures

	• New Access Road/Temperance Avenue • Bullard Avenue/Locan Avenue • Bullard Avenue/DeWolf Avenue **Level of Significance without Mitigation:** Potentially significant **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). **Level of Significance with Mitigation:** Less than significant
TR-1 **Tribal Cultural Resources**	**Impact:** Disturbance of subsurface tribal cultural resources would potentially result from construction activities. **Level of Significance without Mitigation:** Potentially significant **Mitigation Measures:** Incorporate Mitigation Measures CR-1.1 through 1.3. **Level of Significance with Mitigation:** Less than significant

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:

(a) 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.

(b) 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.

(c) 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.

(d) 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

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

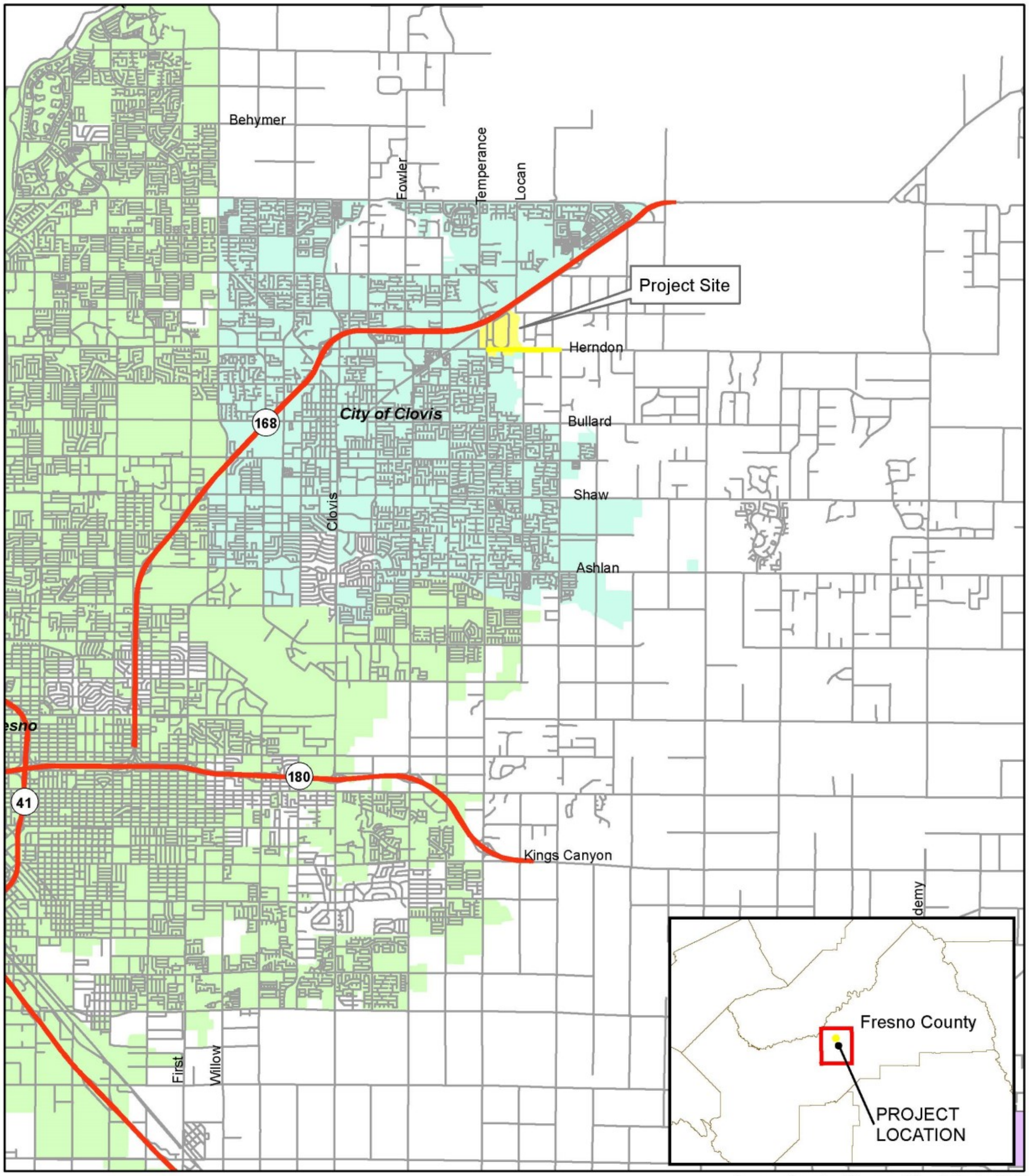
Project Location – CCMC

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

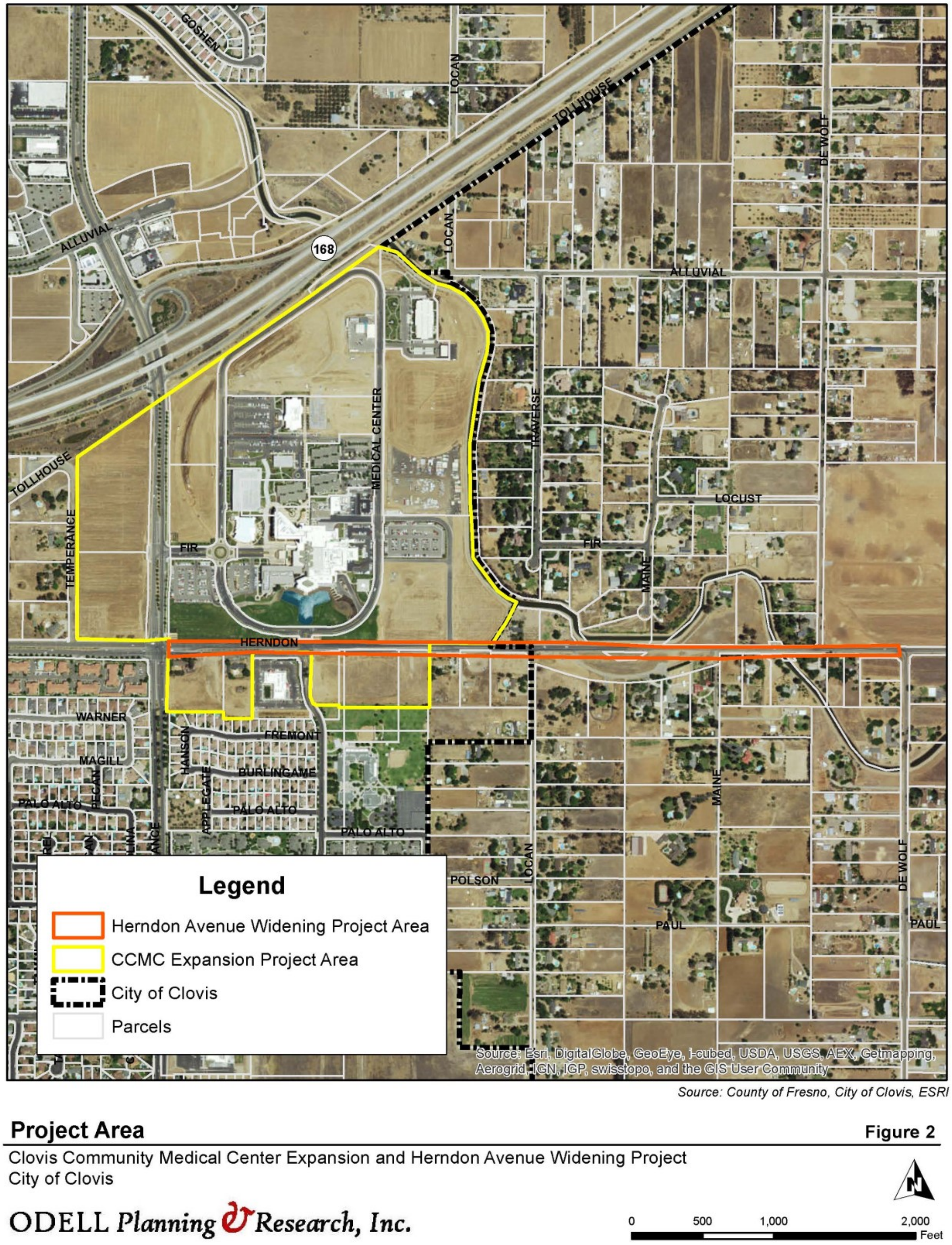
Project Location **Figure 1**

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

ODELL *Planning & Research, Inc.*

0 0.5 1 2 3 4 Miles

Figure 2.2 – Project Area



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

New Five Story Bed Tower (133,672 sq. ft. and 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.)		
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		

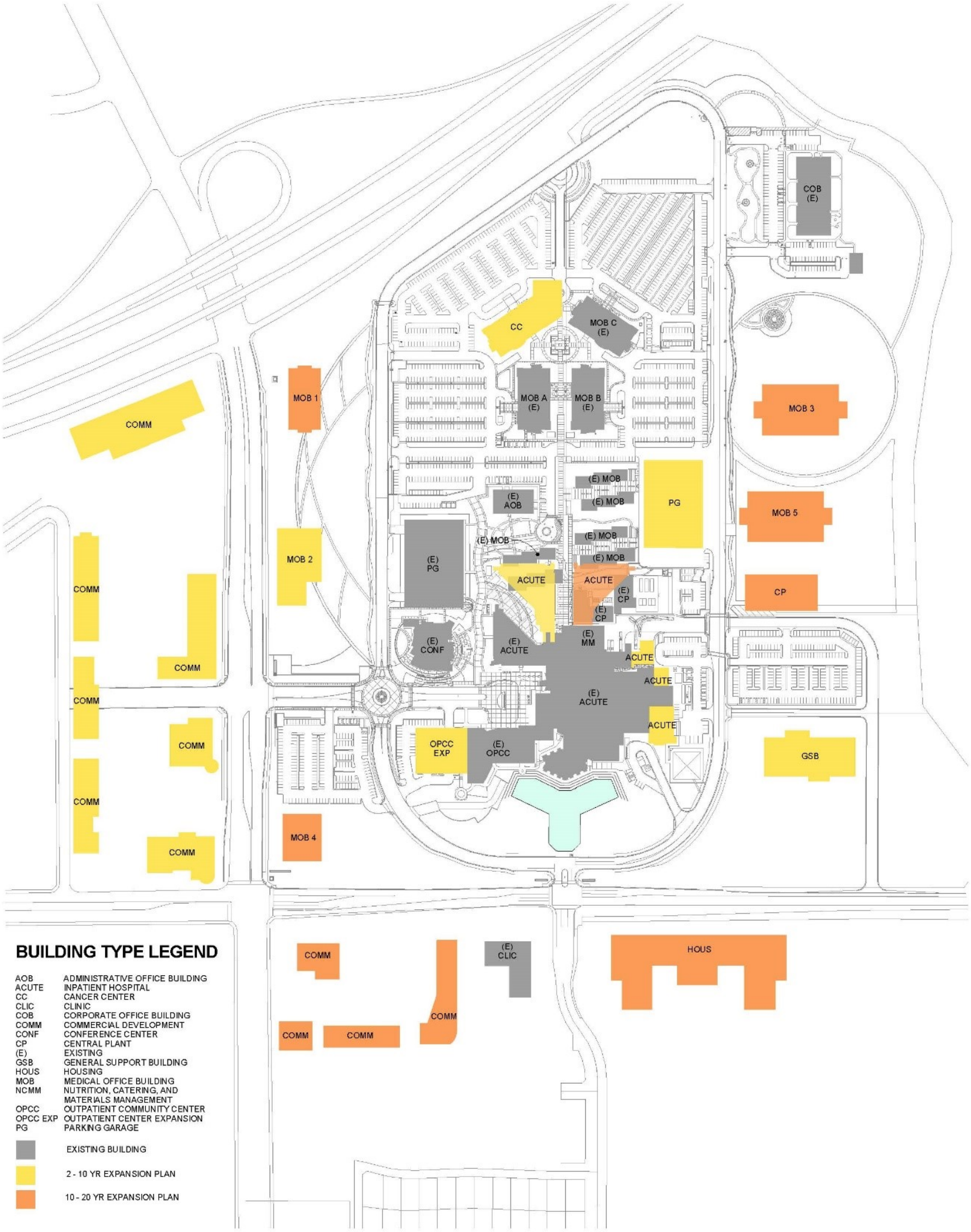
Source: Clovis Community Medical Center – Facilities Management

Table 2.3
20 Year Expansion Plan

Future 5 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.)
New commercial area (70,000 sq. ft.) and 100-unit Assisted Living or Memory Care Center

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[1] 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[2] 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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[1]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."

[2]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[3]

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).

[3] 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 than 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

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


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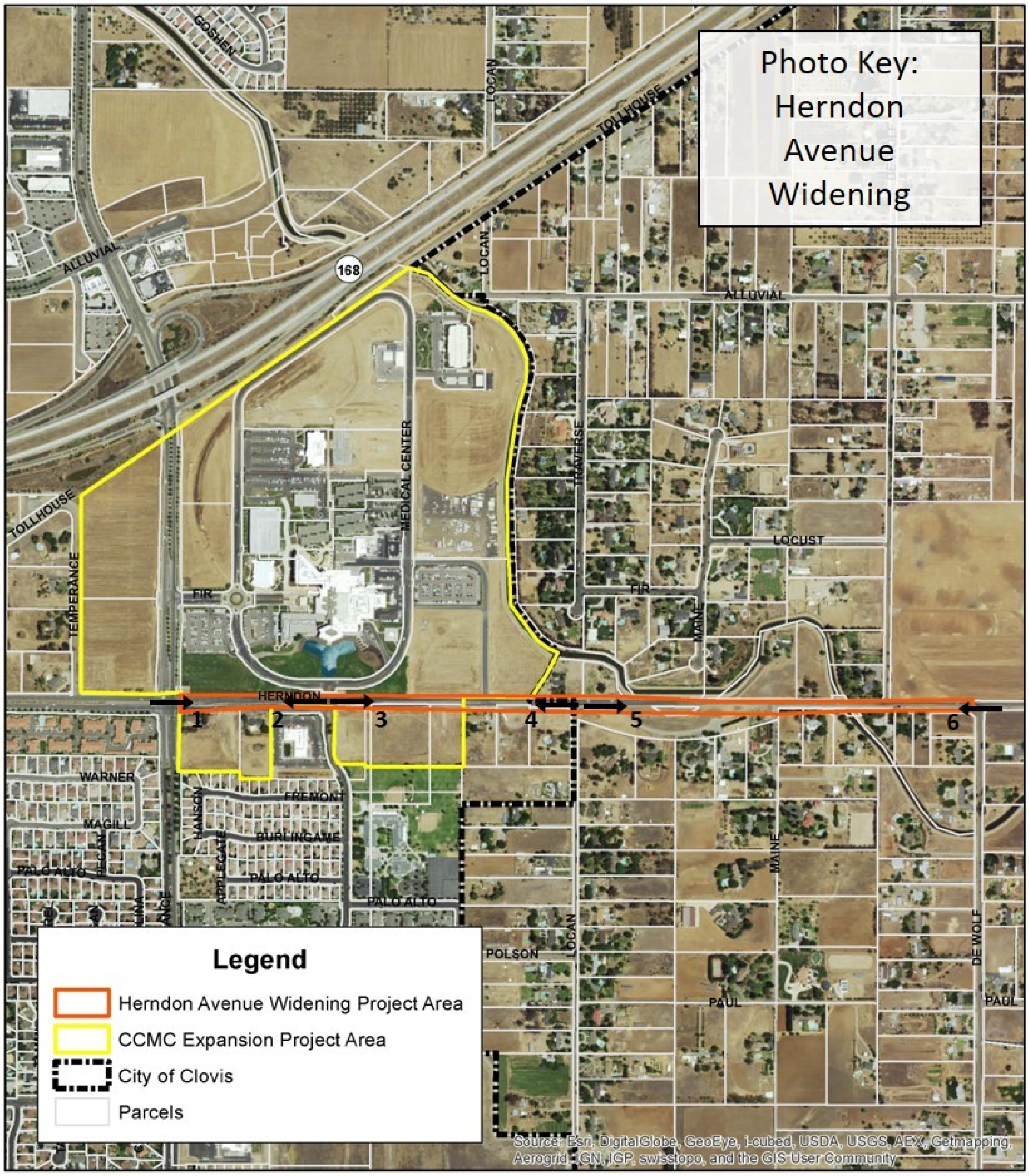
Figure 3.2 –Herndon Avenue Widening Area Photos



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.*

0 500 1,000 2,000 Feet


1
2
3
4
5
6

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 tails. 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.

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CHAPTER 4
Agricultural and Forestry Resources

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).

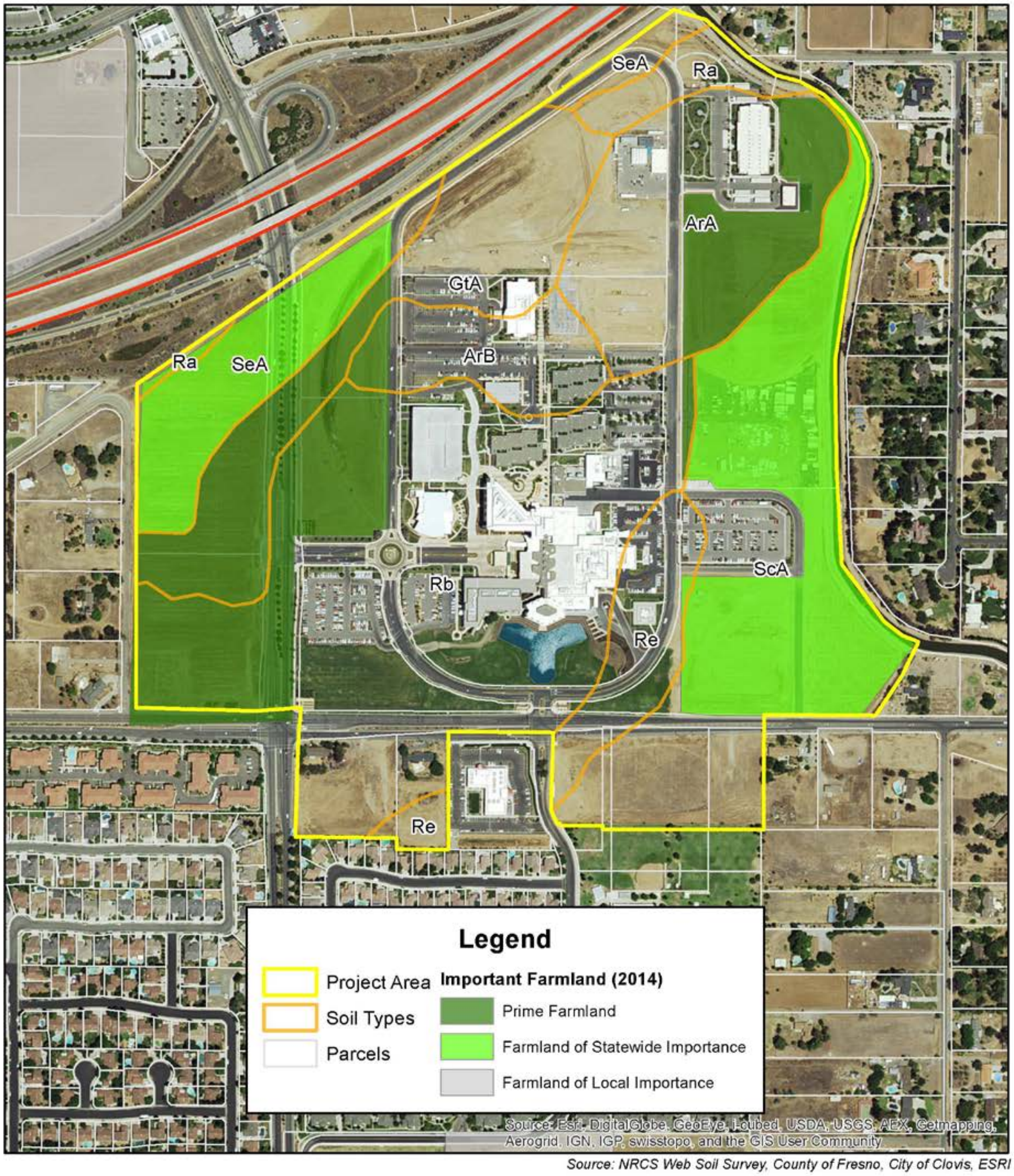
Another useful description of the suitability of a given soil for intensive agriculture is the Storie Index rating. This index considers soil characteristics, texture, slope, and other limiting factors, and assigns a rating of up to 100. A rating of 100 expresses the most favorable conditions for crop 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

Soil	Approximate Site Area (acres)	Capability Classification	CA Revised Storie Index Rating - Grade	FMMP Rating[a]	Acres of FMMP in Project Area
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	IIe	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



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

Clovis Community Medical Center Master Plan Expansion Project
City of Clovis

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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

Land Classification	Class Description
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 though 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.

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CHAPTER 5
Air Quality

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 ($PM_{2.5}$- PM_{10})," such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.

- "Fine particles ($PM_{2.5}$)," 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 fossils fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM_{10}, $PM_{2.5}$, 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, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} 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_{10}. 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_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. However, like airborne NO_X, suspended SO_X particles contribute to the poor visibility. These SO_X particles can also combine with other pollutants to form $PM_{2.5}$. 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_2S) 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_2S.

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_4^{2-}) 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_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 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_2H_3Cl 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_3)	1-hour	0.09 ppm	–
	8-hour	0.070 ppm	0.070 ppm
Particulate Matter (PM_{10})	AAM	20 µg/m3	–
	24-hour	50 µg/m3	150 µg/m3
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m3	12 µg/m3
	24-hour	No Standard	35 µg/m3
	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_2)	AAM	0.030 ppm	53 ppb
	1-hour	0.18 ppm	100 ppb
Sulfur Dioxide (SO_2)	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%.	

** For more information on standards visit :http//ww.arb.ca.gov.research/aaqs/aaqs2.pdf*
*** No federal 1-hour standard. Reclassified extreme nonattainment for the federal 8-hour standard May 5, 2010.*
****Secondary Standard*
Source: ARB 2017b

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 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 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_2, and NO_2 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:

> <u>Regulation VIII (Fugitive Dust Prohibitions). Regulation VIII (Rules 8011-8081):</u> 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 f 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.
>
> <u>Rule 4002 (National Emissions Standards for Hazardous Air Pollutants):</u> 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.
>
> <u>Rule 4102 (Nuisance):</u> Applies to any source operation that emits or may emit air contaminants or other materials.
>
> <u>Rule 4103 (Open Burning):</u> 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.
>
> <u>Rule 4601 (Architectural Coatings):</u> Limits volatile organic compounds from architectural coatings.
>
> <u>Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations):</u> This rule applies to the manufacture and use of cutback, slow cure, and emulsified asphalt during paving and maintenance operations.
>
> <u>Rule 9510 (Indirect Source Review – ISR):</u> 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 NOx; (2) 45-percent reduction of construction equipment exhaust PM_{10}; (3) 33-percent reduction of operational NOx over 10 years; and (4) 50-percent reduction of operational PM_{10} 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-jurisdicitonal 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_2 as "does not meet the primary standards," "cannot be classified," or "better than national standards." For SO_2, 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_{10} based on the likelihood that they would violate national PM_{10} 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_{10} standard, ozone, and $PM_{2.5}$ standards. The SJVAB is designated nonattainment for the national 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the US EPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan (SJVAPCD 2015).

Table 5.2
SJVAB Attainment Status Designations

Pollutant	National Designation	State Designation
Ozone, 1 hour	No Standard*	Nonattainment/Severe
Ozone, 8 hour	Nonattainment/Extreme	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	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 PM2.5. Ambient monitoring data for nitrogen dioxide and PM_{10} 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 PM2.5 standards as well as the national PM_{10} standards were exceeded on numerous occasions during the past three years. The state and national standards for NOX and national standards for PM_{10} 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[1]

	2013	2014	2015
Ozone			
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
Nitrogen Dioxide (NO_2)			
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
Suspended Particulate Matter (PM_{10})			
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[2])	0/0	0/0	0/NA
Number of days state standard exceeded (measured/calculated[2])	5/NA	8/50.3	3/NA
Suspended Particulate Matter ($PM_{2.5}$)			
Maximum concentration (state/national)	72.8/72.8	80.7/80.7	50.4/50.4
Number of days national standard exceeded (measured/calculated[2])	26/40.4	14/15.4	8/8.2

ppm = parts per million by volume, $\mu g/m^3$ = micrograms per cubic meter, NA=Not Available
[1] Ambient data was obtained from the Clovis-N. Villa Avenue Monitoring Station.
[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.
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_{10}) – 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_x) – Construction impacts associated with the proposed project would be considered significant if the project generates emissions of ROG or NO_X that exceeds 10 TPY.
- Long-term Emissions of Particulate Matter (PM_{10}) – Operational impacts associated with the proposed project would be considered significant if the project generates emissions of PM_{10} that exceed 15 TPY.
- Long-term Emissions of Ozone Precursors (ROG and NO_x) – Operational impacts associated with the proposed project would be considered significant if the project generates emissions of ROG or NO_X that exceeds 10 TPY.
- Conflict with or Obstruct Implementation of Applicable Air Quality Plan – Due to the region's non-attainment status for ozone, $PM_{2.5}$, and PM_{10}, if the project-generated emissions of either of the ozone precursor pollutants (i.e., ROG and NO_x) or PM_{10} 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 or ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, or SO_2 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 Mangement 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 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 is not 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 is 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_X, 23.8 tons/year of CO, 10.7 tons/year of PM_{10}, and 3.0 tons/year of $PM_{2.5}$. At project buildout, the proposed project would generate approximately 10.8 tons/year of ROG, 71.8 tons/year of NO_X, 37.7 tons/year of CO, 20.3 tons/year of PM_{10}, and 5.6 tons/year of $PM_{2.5}$. Operational emissions of SO_X would be negligible (i.e, less than 0.3 tons/year). Annual operational emissions of ROG, NO_X, and PM_{10} 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)[1]					
		ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
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[2]	2030	0.3	1.1	0.6	1.2	0.0	0.0
Highest Annual Emissions							
Phase I at Buildout Year 2029[3]		6.3	**38.6**	23.8	0.2	10.7	3.0
Phases I & II at Buildout Year 2035[3]		**10.8**	**71.8**	37.7	0.3	**20.3**	5.6
Permitted Stationary Sources[2]		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)[2]							
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_X, and PM_{10} 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 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 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.

<u>Toxic Air Contaminants:</u>

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 expose 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 and ww.arb.ca.gov/regact/2007/ordiesl07/frooal.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 SJVPACD Regulation VIII (Fugitive PM_{10} 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_X and PM_{10} 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_X) 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_x, 5.3 tons/year of CO, 0.7 tons/year of PM_{10}, and 0.5 tons/year of $PM_{2.5}$. 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_x, 3.0 tons/year of CO, 0.6 tons/year of PM_{10}, and 0.3 tons/year of $PM_{2.5}$. 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_x, 2.7 tons/year of CO, 0.5 tons/year of PM_{10}, and 0.2 tons/year of $PM_{2.5}$. Emissions of SO_2 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_x, or 15 tons/year PM_{10}. 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_x, 45.4 lbs/day of CO, 3.0 lbs/day of PM_{10}, and 2.0 lbs/day of $PM_{2.5}$. Average-daily construction emissions for Phase II would total 37.9 lbs/day of ROG, 25.9 lbs/day of NO_x, 32.0 lbs/day of CO, 3.0 lbs/day of PM_{10}, and 2.2 lbs/day of $PM_{2.5}$. Emissions of SO_2 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) [1]					
		ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
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[3]	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[2]		3.7	7.6	5.4	0	0.8	0.5
Phase II[3]		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.
2. Phase I maximum annual emissions assumes construction of the cancer center, hotel, and shopping center could potentially occur simultaneously.
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.
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) [4]					
		ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
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.
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.
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 $PM_{2.5}$ ambient air quality standards and the state PM_{10} standard. As discussed under Impacts AQ-1 and AQ-2, annual operational emissions of ozone-precursor pollutants (e.g., ROG and NO_X) 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_X and PM_{10} 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

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CHAPTER 6
Biological Resources

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 aunnus, 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-quad 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 brachyrhyncos), black phoebe (Sayornis nigricans), mourning dove (Zenaida 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 (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).

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 mesovallensis) and California linderiella (Linderiella occicentalis), 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.

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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

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 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

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:

> <u>Goal 3</u>: 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** (square feet)	**Electricity Use** (Megawatt-hours)	**Natural Gas Use** (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
Net Energy Use Increase		**7,615**	**211,310**

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** (square feet)	**Electricity Use** (Megawatt-hours)	**Natural Gas Use** (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 (Assisted Living)	100,000	473	15,923
Net Energy Use Increase		**13,115**	**340,701**

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.

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CHAPTER 9
Geology and Soils

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 signficant cumulative impact.

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CHAPTER 10
Greenhouse Gas Emissions

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_2):** Carbon dioxide (CO2) is a colorless, odorless gas. CO2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO2 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 CO2 emissions. The atmospheric lifetime of CO2 is variable because it is so readily exchanged in the atmosphere (U.S. EPA 2016).
>
> **Methane (CH_4):** Methane (CH4) is a colorless, odorless gas that is not flammable under most circumstances. CH4 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_20): Nitrous oxide (N_2O) is a clear, colorless gas with a slightly sweet odor. N_2O is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N_2O 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_2O 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_6, are the most heat-absorbent. Over a 100-year timeframe, CH_4 traps roughly 25 times more heat per molecule than CO_2, and N_2O absorbs approximately 298 times more heat per molecule than CO_2. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), 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_2 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 (MMTCO2e). 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_2 emissions, with 53 percent of those emissions coming from personal automobile use. Residential uses, primarily from energy use, accounted for 21 percent of CO_2 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$_2$*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$_2$*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_2e ($MMTCO_2e$) 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 $MTCO_2e$/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 $MTCO_2e$/year. Use of the 900 $MTCO_2e$/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 $MTCO_2e$. In total, construction activities would generate approximately 5,383.2 $MTCO_2e$. 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 $MTCO_2e$/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 $MTCO_2e$/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 $MTCO_2e$/year at year 2020 to approximately 38,496.7 $MTCO_2e$/year at year 2030. Operational emissions are projected to decrease in future years, totaling approximately 37,524.5 $MTCO_2e$ 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 $MTCO_2e$/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 $MTCO_2e$/year. As a result, this impact would be considered potentially significant.

Table 10.1
Annual Construction-Generated GHG Emissions

Project Phase/Land Use	Construction Year	Total GHG Emissions ($MTCO_2e$)
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

Based on CalEEMod computer modeling. Amortized emissions assume an average project life of 30 years. Refer to Appendix A for modeling results and assumptions.

Table 10.2
Annual Operational GHG Emissions

Project Phase	Annual Emissions ($MTCO_2e$/year) [1]
Phase I –Year 2020[2]	13,518.8
Phase I –Year 2029[3]	21,103.3
Phase II –Year 2030[4]	38,496.7
Phase II –Year 2035[5]	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

1. Project-generated emissions were quantified using the CalEEMod computer program.

2. Includes emissions associated with development of 150,000-sf shopping center, 150-room hotel, and 96,500-sf medical center expansion.

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.

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

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

Refer to Appendix A for modeling results and assumptions.

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_X, PM_{10}) 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.

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CHAPTER 11
Hazards and Hazardous Materials

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 NEPAssist 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.

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CHAPTER 12
Hydrology and Water Quality

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 meetare 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 than 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.

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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

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

CCMC Expansion Portion of Project Site				
Fresno County Assessor's Parcel Numbers	**Parcel Size (Acres)**	**Existing Land Uses**	**Clovis General Plan Land Use Designation**	**City or County Zone District**
564-042-42S	9.93	Vacant	Mixed Use/ Business Campus	C-P
564-042-41S	7.16	Vacant	Mixed Use/ 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, 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, 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
Herndon Widening Portion of Project Site				
Fresno County Assessor's Parcel Numbers	**Parcel Size (Acres)**	**Existing Land Uses**	**General Plan Land Use Designation**	**City or County Zone District**
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

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) R-R, AL-20 (County)
Legend: See Table 13.3			

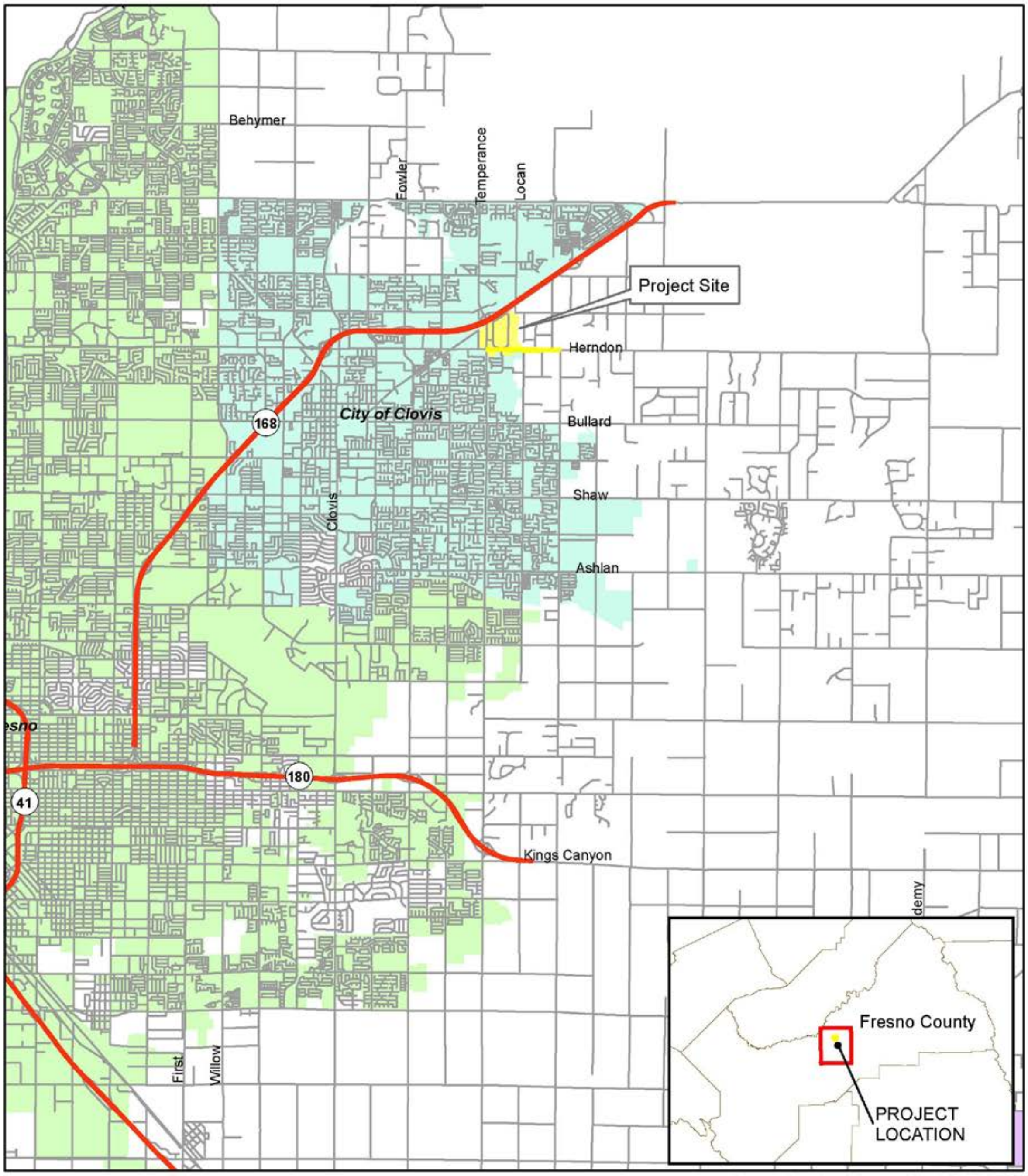
Sources: Fresno County Assessor's Office, Clovis General Plan, Clovis Development Code, Fresno County Zoning Ordinance, Odell Planning & Research, Inc., Google

TABLE 13.3
Zoning Districts Applicable to Project

Zoning District	**Purpose and Population Density**
"R-R" Rural Residential (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 (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 (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 (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 (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 (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

Figure 1

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

ODELL *Planning & Research, Inc.*

0 0.5 1 2 3 4 Miles

Figure 13.2
Aerial View of Project Site and Nearby Land

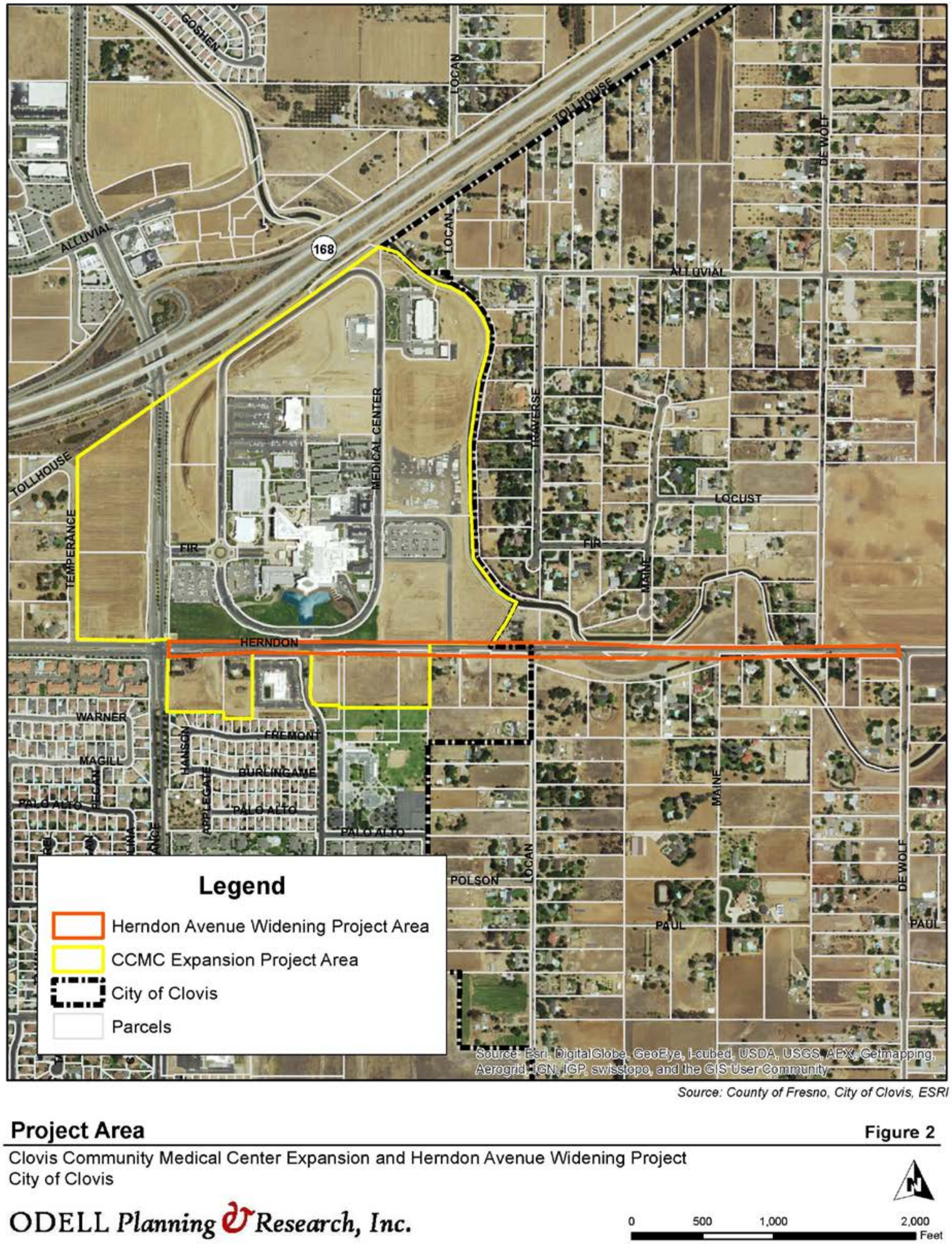


Figure 13.3
***Clovis General Plan* Land Use Designations**

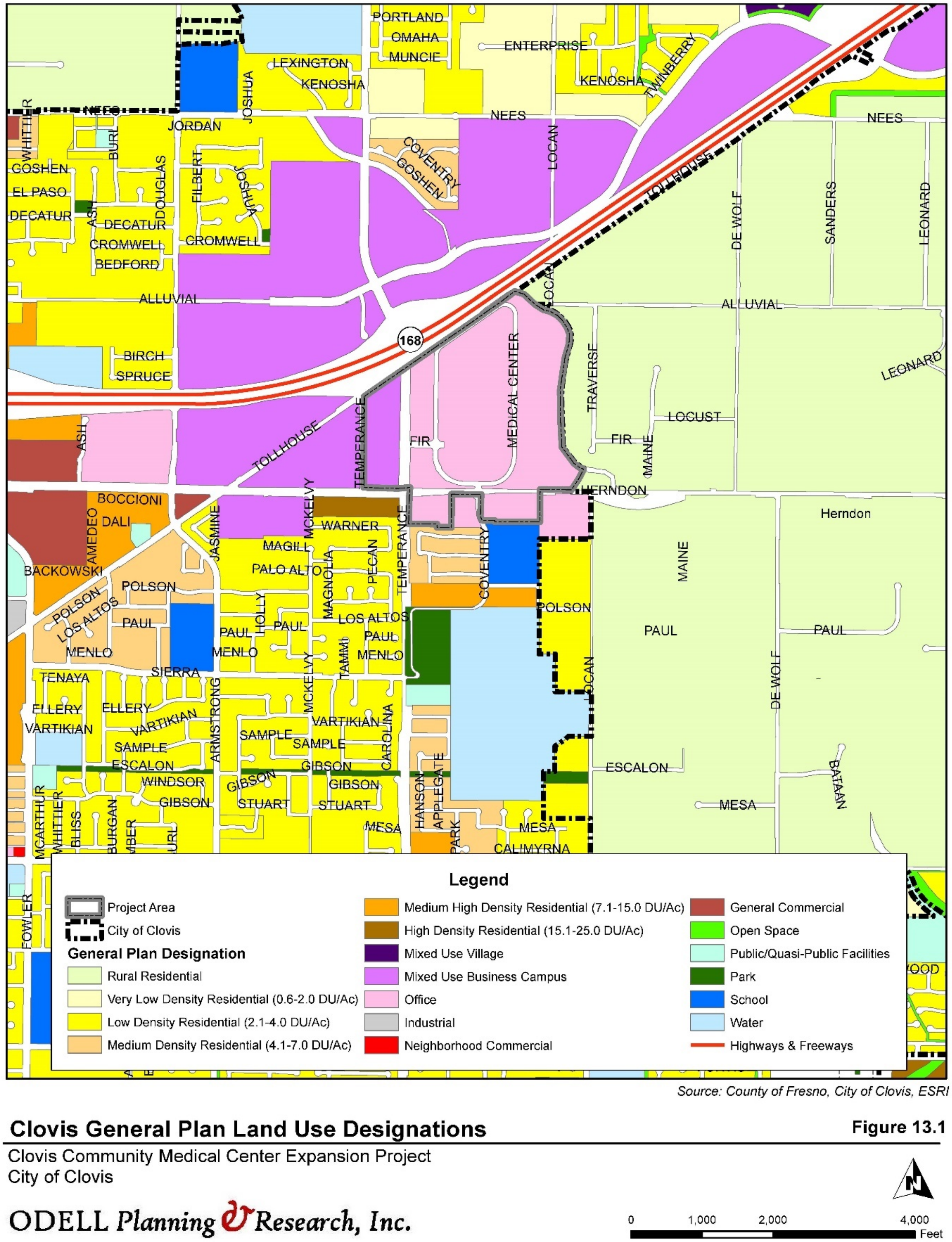
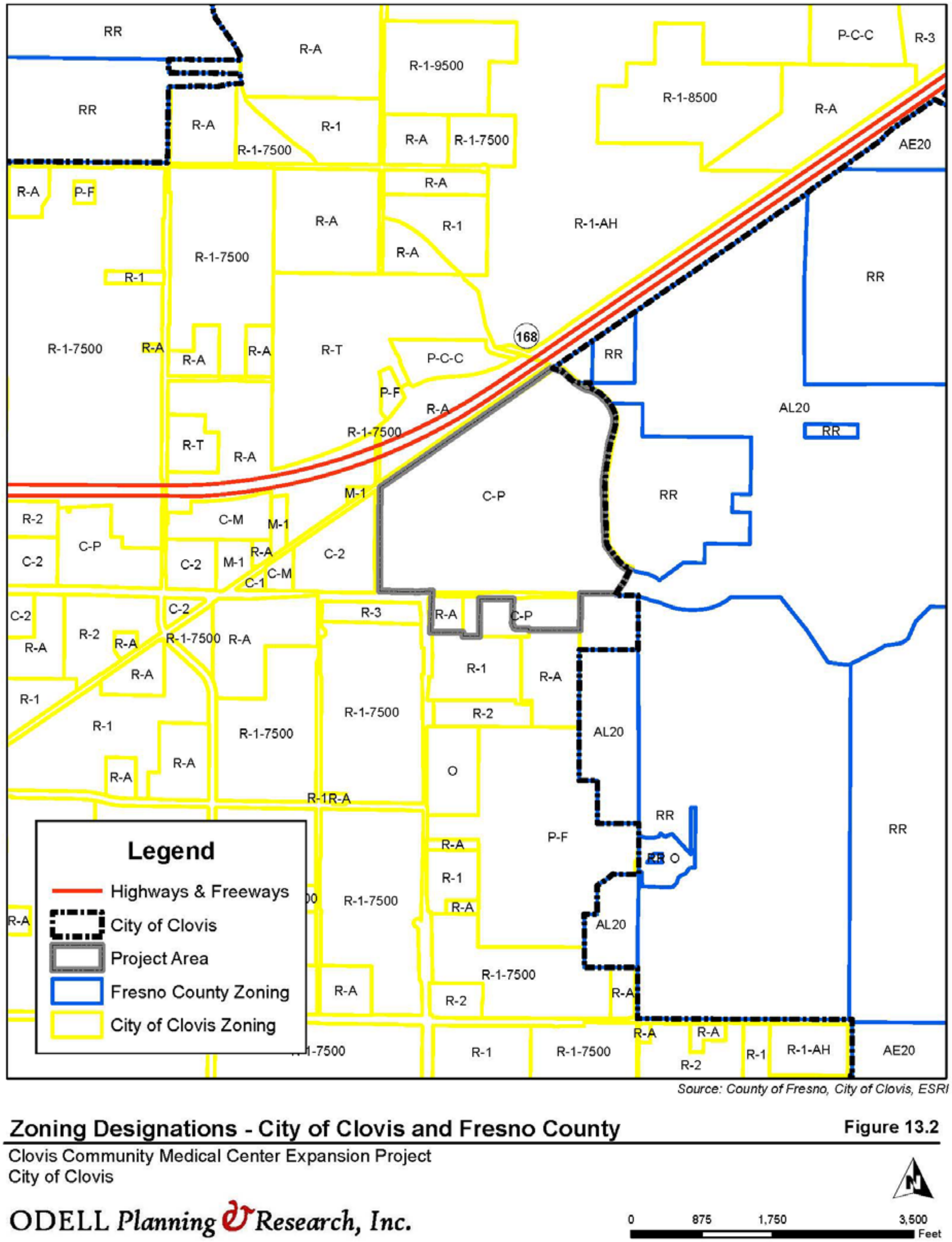


Figure 13.4
Zoning Designations



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

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

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

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 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
Source: FICON 2000	

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 dB 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_{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 (Caltrans 2002[a].)

Allowing for an average exterior-to-interior noise reduction of 20 dB, an exterior noise level of 65 dBA CNEL/L_{dn} would equate to an interior noise level of 45 dBA CNEL/L_{dn}. An interior noise level of 45 dB CNEL/L_{dn} 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_{dn} 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_{eq} or L_{max} 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
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.				

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Table 15.4
Project Area 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

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_{dn} 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[1]	**Exterior[2]**
Residential	Single Family, Multifamily	45[3]/55[4]	65[7]
	Mobile Home	--	65[5]
Commercial/Industrial	Hotel, Motel, Transient Lodging	45	65[6]
	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

Notes:
Compatibility zones indicate the degree to which the land uses listed are compatible with the noise levels (CNEL) shown in the table.
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.
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.
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.
Zone D. Clearly Incompatible. New construction or development should generally not be undertaken.

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_{dn} 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_{dn} are categorized as "generally discouraged," and noise levels above 75 dBA CNEL/L_{dn} 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 (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

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.
Source: Caltrans 2013

Table 15.8
Annoyance Potential to People at Various Groundborne Vibration Levels

Human Response	**Vibration Level (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

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.
Source: Caltrans 2013

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 Lmax) 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

Source: FTA 2006

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 reduce 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
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.				

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 is 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

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.

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 Leq, 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.

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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

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.

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CHAPTER 17
Public Services

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

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 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

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.

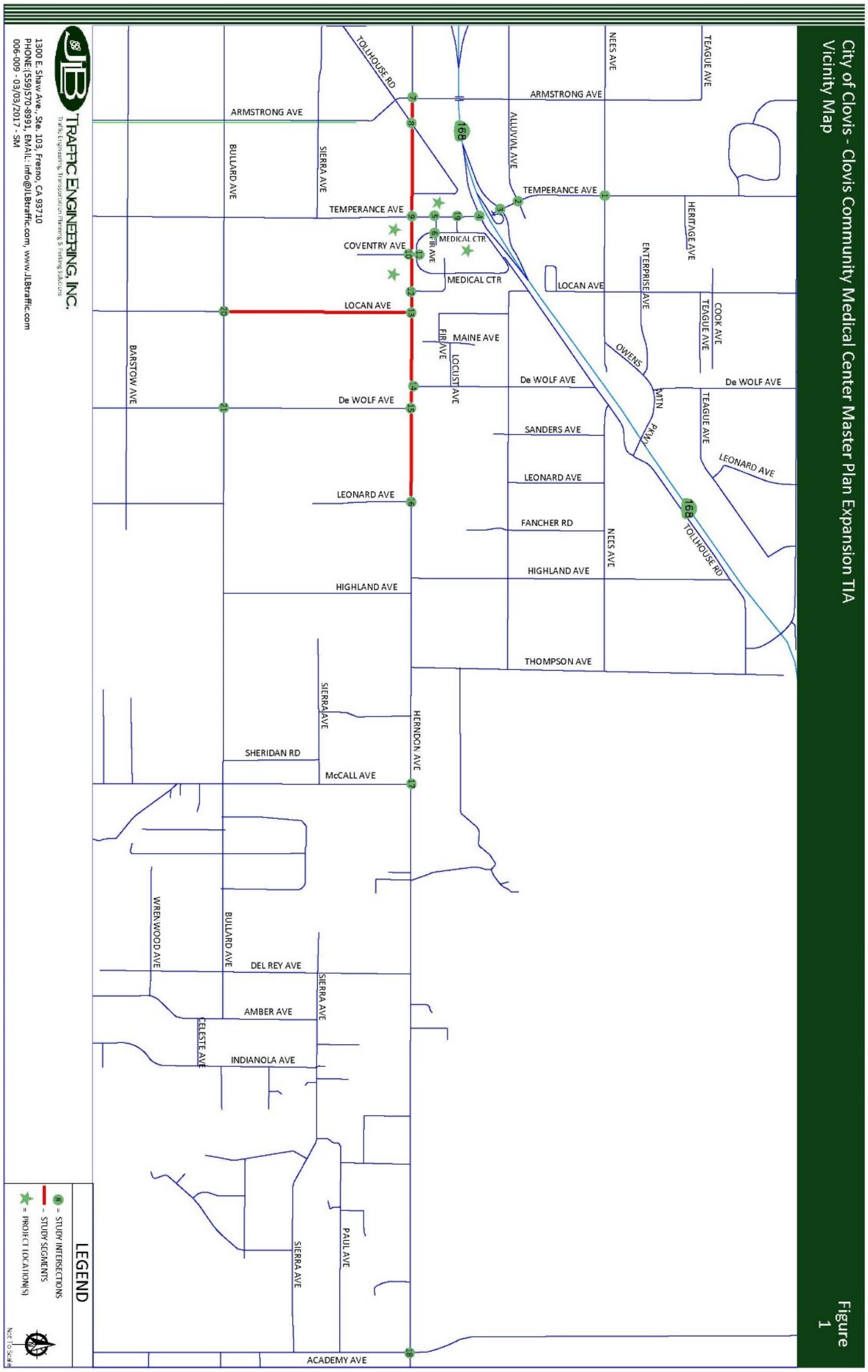
De Wolf Avenue is an existing north-south two-lane collector in the vicinity of the proposed project site. In this area, De Wolf Avenue connects Tollhouse Road and Herndon Avenue and continues south of Herndon Avenue approximately five miles to Olive Avenue in the City of Fresno. The 2035 Clovis General 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

	Intersection	*Intersection Control*	*(7-9) AM Peak Hour*		*(2-4) PM Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (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	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

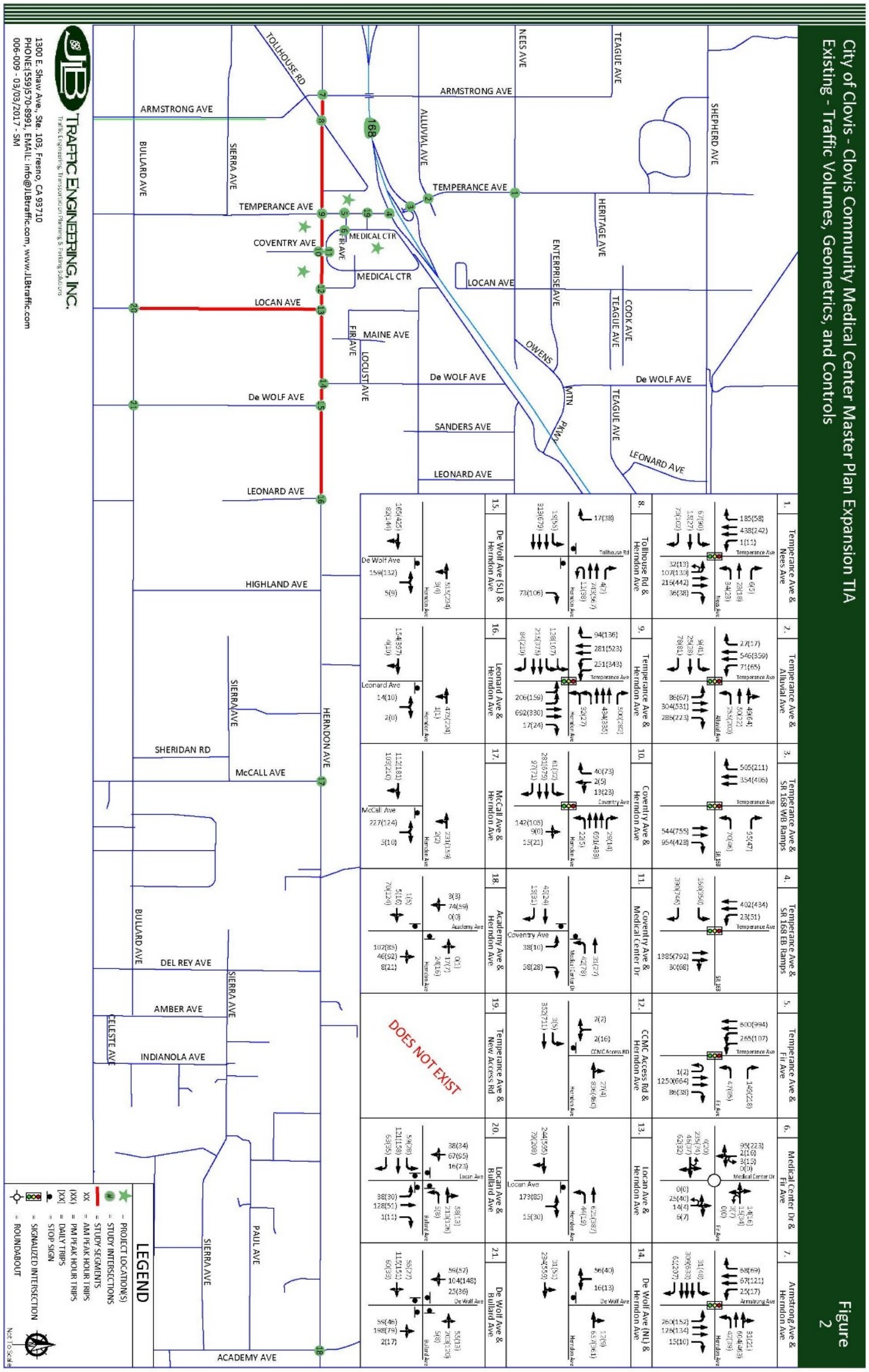
Notes: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls; LOS for Two-Way and One-Way STOP controlled intersections are based on the worst approach/movement of the minor street.

Table 19.2
Existing Segment LOS Results

Study Segment	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
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."

<u>Caltrans Level of Service Standard</u>

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:

> <u>Goal 1:</u> 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
>
> <u>Goal 2:</u> 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
>
> <u>Goal 3:</u> 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.
>
> <u>Goal 4:</u> 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.

<u>Fresno County Level of Service Standard</u>

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 is 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
Total Project Trips				**15,121**			**507**	**249**	**756**			**518**	**760**	**1,278**

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
Total Project Trips				**14,887**			**646**	**220**	**866**			**460**	**914**	**1,374**

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
Total Project Trips	**30,008**	**1,153**	**469**	**1,622**	**978**	**1,674**	**2,652**

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

	Intersection	*Intersection Control*	*(7-9) AM Peak Hour*		*(2-4) PM Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
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	**65.0**	**E**	**77.6**	**E**
		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

Study Segment	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
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

	Intersection	Intersection Control	(7-9) AM Peak Hour		(2-4) PM Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
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

Study Segment	Limits	Lanes	24-hour Volume	LOS
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

	Intersection	Intersection Control	(7-9) AM Peak Hour		(2-4) PM Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	Nees Avenue / Temperance Avenue	Signalized	36.1	D	27.7	C
2	Alluvial Avenue / Temperance Avenue	Signalized	**108.1**	**F**	**95.4**	**F**
		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	**46.1**	**D**	**50.8**	**D**
		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	**64.1**	**E**	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	**65.4**	**E**	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	**>120**	**F**	**>120**	**F**
		Signalized (Mitigated)	21.0	C	18.5	B
14	Herndon Avenue / De Wolf Avenue (NL)	One-Way STOP	19.3	C	**37.4**	**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)	22.0	C	22.3	C
16	Herndon Avenue / Leonard Avenue	One-Way STOP	**69.5**	**F**	**>120**	**F**
		Signalized (Mitigated)	16.9	B	22.7	C
17	Herndon Avenue / McCall Avenue	Two-Way STOP	**>120**	**F**	**>120**	**F**
		Signalized (Mitigated)	40.3	D	39.5	D
18	Herndon Avenue / Academy Avenue	Two-Way STOP	**26.3**	**D**	**93.3**	**F**
		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	**64.1**	**F**	**67.4**	**F**
		Signalized (Mitigated)	48.5	D	42.5	D
21	Bullard Avenue / De Wolf Avenue	All-Way STOP	**68.7**	**F**	**78.1**	**F**
		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

Study Segment	Limits	Lanes	24-hour Volume	LOS
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 (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	Nees Avenue / Temperance Avenue	Signalized	37.2	D	29.9	C
2	Alluvial Avenue / Temperance Avenue	Signalized	**107.3**	**F**	**117.7**	**F**
		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	**>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 19.13
Cumulative Year 2035 plus Project Segment LOS Results

Study Segment	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
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 Traffic Volumes (PM Peak)	Year 2035 + Project Traffic Volumes (PM Peak)	Project PM Peak Hour Trips	Project Fair 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

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.

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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

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 RWRF 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 RWRF and is entitled to a maximum capacity of 9.3 mgd. If required, the City has the capability to acquire additional capacity at the RWRF. 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 UMWP, 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 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 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:

<u>Water Supply:</u> Clovis Municipal Code Chapter 6.5, Water System, addresses topics such as initiation of water service, water restrictions, water conversation 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.

<u>Wastewater:</u> 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.

<u>Stormwater:</u> 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.

<u>Solid Waste:</u> 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 polices related to utilities and service systems:

> <u>Goal 1:</u> 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

Land Use	Size	Water Usage (gallons/yr)	Annual Gallons/Size
Hospital*			
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	–
MOB*			
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	–
Site Recycled Water*			
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	–
Mixed Use/Business Campus parcels**		Water use factor: 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	–
Office parcels**		Water use factor: 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	–
TOTAL			

1. *Residential are measured by rooms; nonresidential are measured by square foot*
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)*

Sources: Community Medical Providers*; City of Clovis Water Master Plan III**

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[1]	Wastewater Generation Rate[2] (Gallons per day)	Projected Total (Gallons per day)
Hospital	300,172 sf	0.18/sf	54,031
Hotel	150 Rooms	71.3/person[3]	21,390
Medical Office Building	94,392 sf	0.18/sf	16,991
Regional Shopping Center	150,000 sf	0.18/sf	27,000
Total			**119,412**

1. *Residential uses are measured by rooms; nonresidential uses are measured by square foot*
2. *Wastewater Generation Rate assumes a 20 percent reduction in residential wastewater generation and a 10 percent reduction in nonresidential wastewater generation.*
3. *The Hotel rate assumes an occupancy of two persons per room.*

Source: 2014 City of Clovis General Plan Draft EIR

Table 21.3
CCMC Expansion – Projected Wastewater Generation (Full Buildout)

Land Use	Size[1]	Wastewater Generation Rate[2] (Gallons per day)	Projected Total (Gallons per day)
Hospital	468,844 sf	0.18/sf	84,392
Hotel	150 Rooms	71.3/person[3]	21,390
Medical Office Building	354,392 sf	0.18/sf	63,791
Regional Shopping Center	220,000 sf	0.18/sf[4]	39,600
Congregate Care (Assisted Living)	100 Units	71.3/person	71,300
Total			**280,473**

1. *Residential uses are measured by rooms; nonresidential uses are measured by square foot.*
2. *Wastewater Generation Rate assumes a 20 percent reduction in residential wastewater generation and a 10 percent reduction in nonresidential wastewater generation.*
3. *The Hotel rate assumes an occupancy of two persons per room.*
4. *The Congregate Care (Assisted Living) rate assumes an occupancy of one person per room.*

Source: 2014 City of Clovis General Plan Draft EIR

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 than 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

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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

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 than 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 it 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

AIR QUALITY & GREENHOUSE GAS IMPACT ANALYSIS

FOR

MASTER PLAN EXPANSION OF THE CLOVIS COMMUNITY MEDICAL CENTER PROJECT

CLOVIS, CA

JULY 2017

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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_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 ($PM_{2.5}$- PM_{10})," such as those found near roadways and dusty industries, are between 2.5 and 10 micrometers in diameter. $PM_{2.5-10}$ is deposited in the thoracic region of the lungs.
- "Fine particles ($PM_{2.5}$)," 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 fossils fuels, meat, wood and other hydrocarbons. While UFP mass is a small portion of $PM_{2.5}$, its high surface area, deep lung penetration, and transfer into the bloodstream can result in disproportionate health impacts relative to their mass.

PM_{10}, $PM_{2.5}$, 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, $PM_{2.5}$ and UFP are emitted by combustion sources like vehicles, power generation, industrial processes, and wood burning, while PM_{10} 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_{10}. 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_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. However, like airborne NO_X, suspended SO_X particles contribute to the poor visibility. These SO_X particles can also combine with other pollutants to form $PM_{2.5}$. 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_2S) 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_2S.

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_4^{2-}) 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_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 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_2H_3Cl 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 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 (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

Pollutant	Averaging Time	California Standards*	National Standards* (Primary)
Ozone (O_3)	1-hour	0.09 ppm	–
	8-hour	0.070 ppm	0.070 ppm
Particulate Matter (PM_{10})	AAM	20 μg/m^3	–
	24-hour	50 μg/m^3	150 μg/m^3
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 μg/m^3	12 μg/m^3
	24-hour	No Standard	35 μg/m^3
Carbon Monoxide (CO)	1-hour	20 ppm	35 ppm
	8-hour	9 ppm	9 ppm
	8-hour (Lake Tahoe)	6 ppm	–
Nitrogen Dioxide (NO_2)	AAM	0.030 ppm	53 ppb
	1-hour	0.18 ppm	100 ppb
Sulfur Dioxide (SO_2)	AAM	–	0.03 ppm
	24-hour	0.04 ppm	0.14 ppm
	3-hour	–	0.5 ppm (1300 μg/m^3)***
	1-hour	0.25 ppm	75 ppb
Lead	30-day Average	1.5 μg/m^3	–
	Calendar Quarter	–	1.5 μg/m^3
	Rolling 3-Month Average	–	0.15 μg/m^3
Sulfates	24-hour	25 μg/m^3	No Federal Standards
Hydrogen Sulfide	1-hour	0.03 ppm (42 μg/m^3)	
Vinyl Chloride	24-hour	0.01 ppm (26 μg/m^3)	
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 :http//ww.arb.ca.gov.research/aaqs/aaqs2.pdf*
*** 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_2, and NO_2 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 NOx; (2) 45-percent reduction of construction equipment exhaust PM_{10}; (3) 33-percent reduction of operational NOx over 10 years; and (4) 50-percent reduction of operational PM_{10} 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_2 as "does not meet the primary standards," "cannot be classified," or "better than national standards." For SO_2, 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_{10} based on the likelihood that they would violate national PM_{10} 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_{10} standard, ozone, and $PM_{2.5}$ standards. The SJVAB is designated nonattainment for the national 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the U.S. EPA redesignated the San Joaquin Valley to attainment for the PM_{10} NAAQS and approved the PM_{10} 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_{10}	Attainment	Nonattainment
$PM_{2.5}$	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 $PM_{2.5}$. Ambient monitoring data for nitrogen dioxide and PM_{10} 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 $PM_{2.5}$ standards, as well as, the national PM_{10} standards were exceeded on numerous occasions during the past 3 years. The state and national standards for NO_X and national standards for PM_{10} 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[1]

	2013	2014	2015
Ozone			
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
Nitrogen Dioxide (NO_2)			
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
Suspended Particulate Matter (PM_{10})			
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[2])	0/0	0/0	0/NA
Number of days state standard exceeded (measured/calculated[2])	5/NA	8/50.3	3/NA
Suspended Particulate Matter ($PM_{2.5}$)			
Maximum concentration (state/national)	72.8/72.8	80.7/80.7	50.4/50.4
Number of days national standard exceeded (measured/calculated[2])	26/40.4	14/15.4	8/8.2

ppm = parts per million by volume, μg/m³ = micrograms per cubic meter, NA=Not Available

1 *Ambient data was obtained from the Clovis-N. Villa Avenue Monitoring Station.*

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.*

Source: ARB 2017a

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. Olher 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 Mangement 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 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 is not 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 is 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_X, 27 TPY of SO_X, or 15 TPY of PM_{10} or $PM_{2.5}$.
- 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_X, 27 TPY of SO_X, or 15 TPY of PM_{10} or $PM_{2.5}$.

- Conflict with or Obstruct Implementation of Applicable Air Quality Plan—Due to the region's non-attainment status for ozone, $PM_{2.5}$, and PM_{10}, if project-generated emissions of ozone precursor pollutants (i.e., ROG and NO_x) 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 or ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, or SO_2 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_X) 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_x, 5.3 tons/year of CO, 0.7 tons/year of PM_{10}, and 0.5 tons/year of $PM_{2.5}$ (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_x, 3.0 tons/year of CO, 0.6 tons/year of PM_{10}, and 0.3 tons/year of $PM_{2.5}$. 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_x, 2.7 tons/year of CO, 0.5 tons/year of PM_{10}, and 0.2 tons/year of $PM_{2.5}$. Emissions of SO_2 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_x, or 15 tons/year PM_{10}. 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_x, 45.4 lbs/day of CO, 3.0 lbs/day of PM_{10}, and 2.0 lbs/day of $PM_{2.5}$. Average-daily construction emissions for Phase II would total 37.9 lbs/day of ROG, 25.9 lbs/day of NO_x, 32.0 lbs/day of CO, 3.0 lbs/day of PM_{10}, and 2.2 lbs/day of $PM_{2.5}$. Emissions of SO_2 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) [1]					
		ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
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[3]	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[2]		3.7	7.6	5.4	0	0.8	0.5
Phase II[3]		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.*
2. *Phase I maximum annual emissions assumes construction of the cancer center, hotel, and shopping center could potentially occur simultaneously.*
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.*

Refer to Appendix A for modeling results and assumptions.

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_X, 23.8 tons/year of CO, 10.7 tons/year of PM_{10}, and 3.0 tons/year of $PM_{2.5}$. At project buildout, the proposed project would generate approximately 10.8 tons/year of ROG, 71.8 tons/year of NO_X, 37.7 tons/year of CO, 20.3 tons/year of PM_{10}, and 5.6 tons/year of $PM_{2.5}$. Operational emissions of SO_X would be negligible (i.e, less than 0.3 tons/year). Annual operational emissions of ROG, NO_X, and PM_{10} 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) [4]					
		ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
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.*
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.*

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_X, and PM_{10} 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)[1]					
		ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
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[2]	2030	0.3	1.1	0.6	1.2	0.0	0.0
Highest Annual Emissions							
Phase I at Buildout Year 2029[3]		6.3	**38.6**	23.8	0.2	10.7	3.0
Phases I & II at Buildout Year 2035[3]		**10.8**	**71.8**	37.7	0.3	**20.3**	5.6
Permitted Stationary Sources[2]		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)[2]							
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 for modeling assumptions and results.

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_X, and PM_{10}.** A Voluntary Emissions Reduction Agreement (VERA) shall be entered into with the SJVAPCD to reduce operational emissions of ROG and NO_X to less than 10 tons/year and emissions of PM_{10} to below 15 tons/year. Operational emissions of ROG, NO_X and PM_{10} (inclusive of $PM_{2.5}$) 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 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_X and PM_{10} 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 $PM_{2.5}$ ambient air quality standards and the state PM_{10} standard. As discussed in *Impact AQ-1*, annual operational emissions of ozone-precursor pollutants (e.g., ROG and NO_X) 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_X and PM_{10} 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 expose 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 and ww.arb.ca.gov/regact/2007/ordiesl07/frooal.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 SJVPACD Regulation VIII (Fugitive PM_{10} 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_X and PM_{10} 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 (CO_2) is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of 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 CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere (U.S. EPA 2016).

- **Methane**. Methane (CH_4) is a colorless, odorless gas that is not flammable under most circumstances. 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 (N_2O) is a clear, colorless gas with a slightly sweet odor. N_2O is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N_2O 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_2O 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).

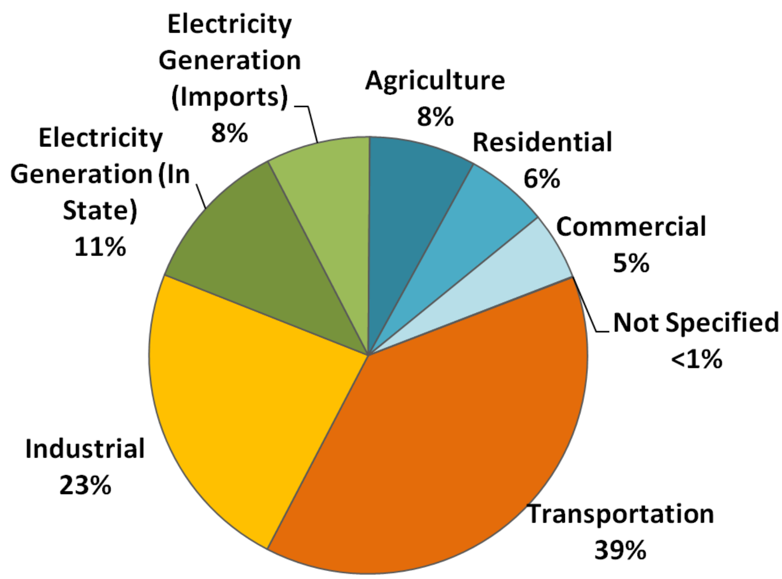
Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Gases with high global warming potential, such as HFCs, PFCs, and SF_6, are the most heat-absorbent. Over a 100-year timeframe, CH_4 traps roughly 25 times more heat per molecule than CO_2, and N_2O absorbs approximately 298 times more heat per molecule than CO_2. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), 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_2 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 ($MMTCO_2e$). 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



Emissions inventory is categorized based on main economic sector, which differ slightly from the categories identified in the state's Climate Change Scoping Plan. "Not Specified" includes sources that could not be attributed to an individual sector, such as evaporative losses and emissions from use of ozone-depleting substances. Source: ARB 2017c

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_2 emissions, with 53 percent of those emissions coming from personal automobile use. Residential uses, primarily from energy use, accounted for 21 percent of CO_2 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_2. 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 $MMTCO_2e$. 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 $MMTCO_2e$ 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_2e ($MMTCO_2e$) 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.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 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

Year 2020	
Land Use Sectors GHG Emissions Target[1]	287,000,000
Population[2]	40,619,346
Employment[3]	18,195,720
Service Population	58,815,066
GHG Efficiency Threshold (MTCO$_2$e/SP/yr)	4.9
Year 2029	
Land Use Sectors GHG Emissions Target[1]	177,000,000
Population[2]	43,756,527
Employment[3]	20,620,226
Service Population	64,376,753
GHG Efficiency Threshold (MTCO$_2$e/SP/yr)	2.8
Year 2030	
Land Use Sectors GHG Emissions Target[1]	168,000,000
Population[2]	44,085,600
Employment[3]	20,908,816
Service Population	64,994,416
GHG Efficiency Threshold (MTCO$_2$e/SP/yr)	2.6
Year 2035	
Land Use Sectors GHG Emissions Target[1]	129,000,000
Population[2]	45,747,645
Employment[3]	22,413,493
Service Population	68,161,138
GHG Efficiency Threshold (MTCO$_2$e/SP/yr)	1.9

Based on AB 32 Scoping Plan's land use inventory sectors for year 2020; Includes transportation sources.

1. *California Air Resources Board. California 1990 Greenhouse Gas Emissions Level and 2020 Limit — by Sector and Activity (Land Use-driven sectors only) MMT CO2e - (based upon IPCC Fourth Assessment Report Global Warming Potentials)*
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*
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 ($MTCO_2e$)
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

Based on CalEEMod computer modeling. Amortized emissions assume an average project life of 30 years. Refer to Appendix A for modeling results and assumptions.

Based on the modeling conducted, the highest annual emissions of GHGs associated with construction of the proposed project would total approximately 744.0 $MTCO_2e$. In total, construction activities would generate approximately 5,383.2 $MTCO_2e$. 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 $MTCO_2e$/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 conditons. As depicted, annual operational GHG emissions would range from approximately 13,124 $MTCO_2e$/year at year 2020 to approximately 35,992 $MTCO_2e$/year at year 2030. Operational emissions are projected to decrease in future years, totaling approximately 35,127 $MTCO_2e$ 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 $MTCO_2e$/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 $MTCO_2e$/SP/Year under year 2020 conditions to 16.9 $MTCO_2e$/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.

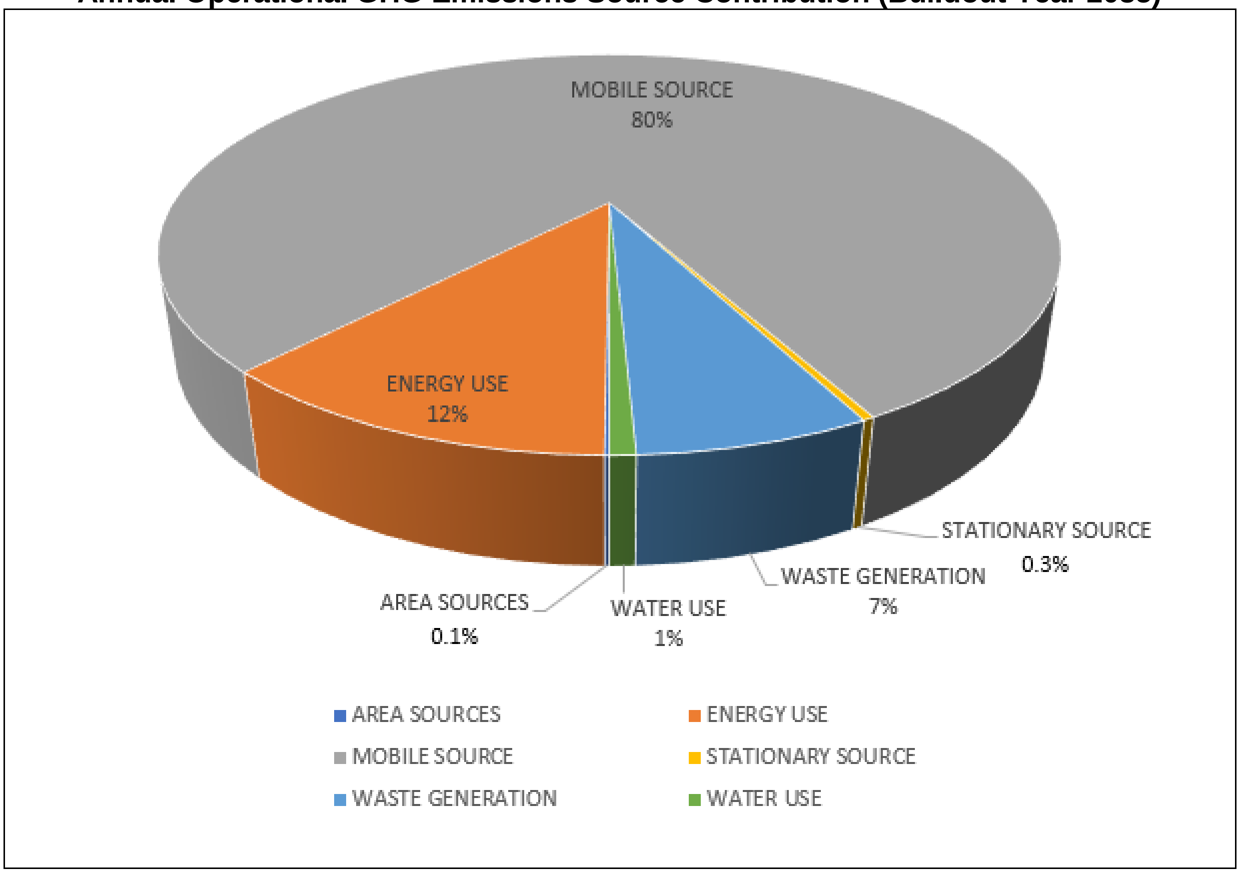
Table 9
Annual Operational GHG Emissions

Project Phase	Annual GHG Emissions ($MTCO_2e$/year) [1]	Total GHGs w/Amortized Construction Emissions	Number of Employees	GHG Efficiency ($MTCO_2e$/SP/Year)		Exceeds Threshold?
				Proposed Project	Threshold[2]	
Phase I –Year 2020[3]	13,124	13,304	575	23.1	4.9	Yes
Phase I –Year 2029[4]	19,847	20,026	1,070	18.7	2.8	Yes
Phase II –Year 2030[5]	35,992	36,171	2,085	17.3	2.6	Yes
Phase II –Year 2035[6]	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_X, PM_{10}) 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.

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APPENDIX A

EMISSIONS MODELING & DOCUMENTATION

Average-Daily Onsite Construction-Generated Emissions

Land Use	Construction Period/Activity	Uncontrolled Average-Daily Onsite Emissions (TPY) [1]					
		ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
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.							

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> Herndon Widening

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (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 ->	2018
Project Length (months) ->	6
Total Project Area (acres) ->	3
Maximum Area Disturbed/Day (acres) ->	1
Water Truck Used? ->	Yes

Phase	Total Material Imported/Exported Volume (yd^3/day): Soil	Total Material Imported/Exported Volume (yd^3/day): Asphalt	Daily VMT (miles/day): Soil Hauling	Daily VMT (miles/day): Asphalt Hauling	Daily VMT (miles/day): Worker Commute	Daily VMT (miles/day): Water Truck
Grubbing/Land Clearing	0	0	0	0	280	40
Grading/Excavation	275	0	420	0	880	40
Drainage/Utilities/Sub-Grade	275	0	420	0	600	40
Paving	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 (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (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.

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.

The CO2e emissions are reported as metric tons per phase.

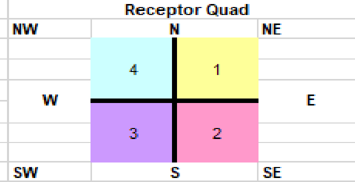
SUMMARY OF STATIONARY SOURCE EMISSIONS

	ROG	NOX	CO	SO2	PM10	PM2.5	CO2E
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

Date : 7/3/2017
Facility Name: Clovis Community Medical Center-New Central Plant
Facility Location: 100m Receptor Distance
Facility ID #:

Receptor Quad



Update Risk

Unit #	BHP	PM10 g/bhp-hr	Receptor Distance (m)	Quad	Hours/ Year	Load %	Lb/yr	Location U=Urban UB=Urban Near Building R=Rural RB=Rural Near Building UW=Urban Worker UWB=Urban Worker Near Building RW=Rural Worker RWB=Rural Worker Near Building	Risk QUAD 1	Risk QUAD 2	Risk QUAD 3	Risk QUAD 4	Facility Risk
1	1000	0.15	100	2	100	73	24.14	R	1.32E-06	6.78E-06	4.27E-07	1.71E-06	**6.78E-06**
2	1000	0.15	100	2	100	73	24.14	R	1.32E-06	6.78E-06	4.27E-07	1.71E-06	**6.78E-06**
3	1000	0.15	100	2	100	73	24.14	R	1.32E-06	6.78E-06	4.27E-07	1.71E-06	**6.78E-06**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
						100	0.00						**0.00E+00**
												Facility Totals =	**2.04E-05**

CCMC- Phase II Stationary Source

Fresno County, Annual

1.0 Project Characteristics

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/MWhr)	364.4	**CH4 Intensity (lb/MWhr)**	0.016	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Stationary source emissions only.

Land Use - .

Construction Phase - Construction emissons 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 -

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

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**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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
Total	**0.2535**	**1.1380**	**0.6525**	**1.3600e-003**	**0.0117**	**0.0365**	**0.0482**	**3.1600e-003**	**0.0364**	**0.0396**						**141.2692**

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
Total	**0.2535**	**1.1380**	**0.6525**	**1.3600e-003**	**0.0117**	**0.0365**	**0.0482**	**3.1600e-003**	**0.0364**	**0.0396**						**141.1699**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.07**

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	

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

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
Total	**3.6000e-003**	**0.0446**	**0.0207**	**5.0000e-005**	**2.6500e-003**	**1.8400e-003**	**4.4900e-003**	**2.9000e-004**	**1.6900e-003**	**1.9800e-003**						**4.4126**

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
Total	**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**

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
Total	**3.6000e-003**	**0.0446**	**0.0207**	**5.0000e-005**	**2.6500e-003**	**1.8400e-003**	**4.4900e-003**	**2.9000e-004**	**1.6900e-003**	**1.9800e-003**						**4.4126**

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
Total	**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**

4.0 Operational Detail - Mobile

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

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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

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

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

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
Total		**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**

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
Total		**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**

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
Total					**2.2511**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hospital	12961.6				2.1518
Total					**2.1518**

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	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
Total	**4.6100e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**2.0000e-005**

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
Total	**4.6100e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	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
Total					**0.2974**

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
Total					**0.2974**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				5.4313
Unmitigated				5.4313

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	10.8				5.4313
Total					**5.4313**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	10.8				5.4313
Total					**5.4313**

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
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
Total	**0.2461**	**1.1008**	**0.6277**	**1.1800e-003**		**0.0362**	**0.0362**		**0.0362**	**0.0362**						**114.6396**

11.0 Vegetation

CCMC- Asst. Liv., Hospital Exp., Med-Dent. Office, Shopping Center

Fresno County, Annual

1.0 Project Characteristics

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/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 - 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

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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

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

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**	**N20**	**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**

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						2,382.455 1
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
Total	**2.8928**	**0.6945**	**2.4175**	**7.8600e-003**	**0.0000**	**0.2441**	**0.2441**	**0.0000**	**0.2441**	**0.2441**						**5,077.167 0**

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
Total	**2.8928**	**0.6945**	**2.4175**	**7.8600e-003**	**0.0000**	**0.2441**	**0.2441**	**0.0000**	**0.2441**	**0.2441**						**5,077.1670**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/1/2028	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

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

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
Total	**0.0124**	**0.1262**	**0.0896**	**1.9000e-004**	**0.0903**	**5.4300e-003**	**0.0958**	**0.0497**	**5.0000e-003**	**0.0547**						**16.8688**

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
Total	**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**

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
Total	**4.6600e-003**	**0.0953**	**0.1148**	**1.9000e-004**	**0.0352**	**4.7300e-003**	**0.0400**	**0.0194**	**4.7300e-003**	**0.0241**						**16.8688**

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
Total	**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**

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
Total	**0.0435**	**0.4191**	**0.3950**	**9.3000e-004**	**0.1301**	**0.0170**	**0.1471**	**0.0540**	**0.0156**	**0.0696**						**82.4204**

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
Total	**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**

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
Total	**0.0229**	**0.4497**	**0.5508**	**9.3000e-004**	**0.0507**	**0.0195**	**0.0702**	**0.0210**	**0.0195**	**0.0405**						**82.4203**

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
Total	**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**

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
Total	**0.1504**	**1.3717**	**1.7693**	**2.9700e-003**		**0.0580**	**0.0580**		**0.0546**	**0.0546**						**256.6106**

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
Total	**0.0824**	**0.8425**	**0.4785**	**4.1200e-003**	**0.2711**	**1.7600e-003**	**0.2729**	**0.0736**	**1.6500e-003**	**0.0753**						**386.0772**

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
Total	**0.0741**	**1.5649**	**1.9661**	**2.9700e-003**		**0.0994**	**0.0994**		**0.0994**	**0.0994**						**256.6103**

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
Total	**0.0824**	**0.8425**	**0.4785**	**4.1200e-003**	**0.2711**	**1.7600e-003**	**0.2729**	**0.0736**	**1.6500e-003**	**0.0753**						**386.0772**

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
Total	**0.1436**	**1.3093**	**1.6889**	**2.8300e-003**		**0.0554**	**0.0554**		**0.0521**	**0.0521**						**244.9465**

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
Total	**0.0740**	**0.7970**	**0.4315**	**3.8900e-003**	**0.2588**	**1.6100e-003**	**0.2604**	**0.0703**	**1.5100e-003**	**0.0718**						**363.9510**

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
Total	**0.0708**	**1.4937**	**1.8767**	**2.8300e-003**		**0.0949**	**0.0949**		**0.0949**	**0.0949**						**244.9462**

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
Total	**0.0740**	**0.7970**	**0.4315**	**3.8900e-003**	**0.2588**	**1.6100e-003**	**0.2604**	**0.0703**	**1.5100e-003**	**0.0718**						**363.9510**

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
Total	**4.4090**	**0.0229**	**0.0362**	**6.0000e-005**		**1.0300e-003**	**1.0300e-003**		**1.0300e-003**	**1.0300e-003**						**5.1135**

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
Total	**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**

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
Total	**4.4068**	**0.0271**	**0.0367**	**6.0000e-005**		**1.9000e-003**	**1.9000e-003**		**1.9000e-003**	**1.9000e-003**						**5.1135**

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
Total	**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**

4.0 Operational Detail - Mobile

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
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

	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
Congregate Care (Assisted	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

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

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
Total		**0.0698**	**0.6296**	**0.4984**	**3.8000e-003**		**0.0482**	**0.0482**		**0.0482**	**0.0482**						**694.5817**

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
Total		**0.0698**	**0.6296**	**0.4984**	**3.8000e-003**		**0.0482**	**0.0482**		**0.0482**	**0.0482**						**694.5817**

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
Total					**1,687.873 5**

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
Total					**1,687.873 5**

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	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
Total	**2.8230**	**0.0649**	**1.9190**	**4.0500e-003**		**0.1959**	**0.1959**		**0.1959**	**0.1959**						**73.0496**

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
Total	**2.8230**	**0.0649**	**1.9190**	**4.0500e-003**		**0.1959**	**0.1959**		**0.1959**	**0.1959**						**73.0496**

7.0 Water Detail

7.1 Mitigation Measures Water

	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
Total					**210.5563**

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
Total					**210.5563**

8.0 Waste Detail

8.1 Mitigation Measures Waste

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
Total					**2,411.1060**

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				1,412.147 5
Regional Shopping Center	73.5				36.9633
Total					**2,411.106 0**

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

11.0 Vegetation

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/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 - 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

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

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**	**N20**	**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**

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
Total	**1.3840**	**6.7556**	**5.8465**	**0.0346**	**1.9231**	**0.0432**	**1.9663**	**0.5184**	**0.0421**	**0.5605**						**5,532.4818**

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
Total	**1.3840**	**6.7556**	**5.8465**	**0.0346**	**1.9231**	**0.0432**	**1.9663**	**0.5184**	**0.0421**	**0.5605**						**5,532.4818**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/1/2020	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

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
Total	**6.1100e-003**	**0.0636**	**0.0323**	**6.0000e-005**	**0.0271**	**3.3000e-003**	**0.0304**	**0.0149**	**3.0300e-003**	**0.0179**						**5.0552**

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
Total	**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**

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
Total	**1.4000e-003**	**0.0286**	**0.0344**	**6.0000e-005**	**0.0106**	**1.4200e-003**	**0.0120**	**5.8100e-003**	**1.4200e-003**	**7.2300e-003**						**5.0551**

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
Total	**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**

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
Total	**0.0243**	**0.2639**	**0.1605**	**3.0000e-004**	**0.0655**	**0.0127**	**0.0783**	**0.0337**	**0.0117**	**0.0454**						**26.2694**

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
Total	**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**

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
Total	**7.2600e-003**	**0.1484**	**0.1899**	**3.0000e-004**	**0.0256**	**7.5600e-003**	**0.0331**	**0.0131**	**7.5600e-003**	**0.0207**						**26.2694**

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
Total	**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**

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
Total	**0.2533**	**2.2927**	**2.0134**	**3.2200e-003**		**0.1335**	**0.1335**		**0.1255**	**0.1255**						**278.4620**

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
Total	**0.1173**	**1.1056**	**0.7192**	**3.9300e-003**	**0.2148**	**6.6000e-003**	**0.2214**	**0.0584**	**6.2800e-003**	**0.0647**						**366.8737**

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
Total	**0.0805**	**1.7000**	**2.1359**	**3.2200e-003**		**0.1080**	**0.1080**		**0.1080**	**0.1080**						**278.4617**

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
Total	**0.1173**	**1.1056**	**0.7192**	**3.9300e-003**	**0.2148**	**6.6000e-003**	**0.2214**	**0.0584**	**6.2800e-003**	**0.0647**						**366.8737**

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
Total	**0.1910**	**1.7519**	**1.6658**	**2.7100e-003**		**0.0963**	**0.0963**		**0.0906**	**0.0906**						**234.1996**

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
Total	**0.0881**	**0.8438**	**0.5431**	**3.2300e-003**	**0.1807**	**2.9900e-003**	**0.1837**	**0.0491**	**2.8200e-003**	**0.0519**						**302.7463**

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
Total	**0.0677**	**1.4297**	**1.7963**	**2.7100e-003**		**0.0908**	**0.0908**		**0.0908**	**0.0908**						**234.1993**

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
Total	**0.0881**	**0.8438**	**0.5431**	**3.2300e-003**	**0.1807**	**2.9900e-003**	**0.1837**	**0.0491**	**2.8200e-003**	**0.0519**						**302.7463**

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
Total	**1.1988**	**0.0305**	**0.0364**	**6.0000e-005**		**1.8800e-003**	**1.8800e-003**		**1.8800e-003**	**1.8800e-003**						**5.1153**

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
Total	**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**

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
Total	**1.1956**	**0.0271**	**0.0367**	**6.0000e-005**		**1.9000e-003**	**1.9000e-003**		**1.9000e-003**	**1.9000e-003**						**5.1153**

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
Total	**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**

4.0 Operational Detail - Mobile

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	0.5696	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

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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
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

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

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
Total		**0.0376**	**0.3417**	**0.2870**	**2.0500e-003**		**0.0260**	**0.0260**		**0.0260**	**0.0260**						**374.1985**

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
Total		**0.0376**	**0.3417**	**0.2870**	**2.0500e-003**		**0.0260**	**0.0260**		**0.0260**	**0.0260**						**374.1985**

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
Total					**1,166.199 7**

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
Total					**1,166.199 7**

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	0.7769	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
Total	**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

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
Total	**0.7769**	**7.0000e-005**	**7.7200e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**						**0.0160**

7.0 Water Detail

7.1 Mitigation Measures Water

	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
Total					**64.4084**

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
Total					**64.4084**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				888.9488
Unmitigated				888.9488

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking Structure	0				0.0000
Hospital	1767.64				888.9488
Total					**888.9488**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking Structure	0				0.0000
Hospital	1767.64				888.9488
Total					**888.9488**

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

11.0 Vegetation

CCMC- Cancer Center Construction
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

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

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**	**N20**	**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**

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
Total	**0.9806**	**5.9914**	**5.0113**	**0.0221**	**1.1337**	**0.0451**	**1.1789**	**0.3057**	**0.0437**	**0.3493**						**3,109.6155**

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
Total	**0.9806**	**5.9914**	**5.0113**	**0.0221**	**1.1337**	**0.0451**	**1.1789**	**0.3057**	**0.0437**	**0.3493**						**3,109.6155**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/1/2017	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

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
Total	**3.2000e-003**	**0.0401**	**0.0216**	**4.0000e-005**	**2.3900e-003**	**1.6600e-003**	**4.0500e-003**	**2.6000e-004**	**1.5300e-003**	**1.7900e-003**						**3.4395**

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
Total	**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**

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
Total	**9.0000e-004**	**0.0178**	**0.0205**	**4.0000e-005**	**9.3000e-004**	**7.5000e-004**	**1.6800e-003**	**1.0000e-004**	**7.5000e-004**	**8.5000e-004**						**3.4395**

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
Total	**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**

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
Total	**0.0232**	**0.2616**	**0.1078**	**2.1000e-004**	**0.0618**	**0.0130**	**0.0748**	**0.0333**	**0.0120**	**0.0452**						**19.3082**

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
Total	**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**

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
Total	**5.0400e-003**	**0.1022**	**0.1215**	**2.1000e-004**	**0.0241**	**4.8500e-003**	**0.0290**	**0.0130**	**4.8500e-003**	**0.0178**						**19.3082**

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
Total	**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**

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
Total	**0.3960**	**2.7289**	**1.9328**	**2.9600e-003**		**0.1742**	**0.1742**		**0.1667**	**0.1667**						**253.7777**

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
Total	**0.0330**	**0.3030**	**0.2059**	**8.6000e-004**	**0.0419**	**2.9500e-003**	**0.0449**	**0.0114**	**2.8100e-003**	**0.0143**						**80.1310**

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
Total	**0.0846**	**1.6142**	**1.8259**	**2.9600e-003**		**0.0969**	**0.0969**		**0.0969**	**0.0969**						**253.7774**

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
Total	**0.0330**	**0.3030**	**0.2059**	**8.6000e-004**	**0.0419**	**2.9500e-003**	**0.0449**	**0.0114**	**2.8100e-003**	**0.0143**						**80.1310**

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
Total	**0.2956**	**2.1018**	**1.5954**	**2.5400e-003**		**0.1276**	**0.1276**		**0.1223**	**0.1223**						**215.6794**

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
Total	**0.0249**	**0.2432**	**0.1532**	**7.3000e-004**	**0.0359**	**2.0500e-003**	**0.0380**	**9.8000e-003**	**1.9600e-003**	**0.0118**						**67.8769**

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
Total	**0.0725**	**1.3827**	**1.5639**	**2.5400e-003**		**0.0830**	**0.0830**		**0.0830**	**0.0830**						**215.6791**

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
Total	**0.0249**	**0.2432**	**0.1532**	**7.3000e-004**	**0.0359**	**2.0500e-003**	**0.0380**	**9.8000e-003**	**1.9600e-003**	**0.0118**						**67.8769**

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
Total	**0.6769**	**0.0401**	**0.0371**	**6.0000e-005**		**3.0100e-003**	**3.0100e-003**		**3.0100e-003**	**3.0100e-003**						**5.1187**

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
Total	**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**

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
Total	**0.6721**	**0.0271**	**0.0367**	**6.0000e-005**		**1.9000e-003**	**1.9000e-003**		**1.9000e-003**	**1.9000e-003**						**5.1186**

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
Total	**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**

4.0 Operational Detail - Mobile

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	0.5144	5.7899	4.8412	0.0209	1.1337	0.0298	1.1636	0.3057	0.0283	0.3340						1,944.728 5
Unmitigated	0.5144	5.7899	4.8412	0.0209	1.1337	0.0298	1.1636	0.3057	0.0283	0.3340						1,944.728 5

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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

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

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						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
Total		**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

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
Total		**0.0222**	**0.2015**	**0.1692**	**1.2100e-003**		**0.0153**	**0.0153**		**0.0153**	**0.0153**						**220.6251**

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
Total					**382.1609**

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
Total					**382.1609**

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

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
Total	**0.4441**	**1.0000e-005**	**9.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.8400e-003**

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
Total	**0.4441**	**1.0000e-005**	**9.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.8400e-003**

7.0 Water Detail

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
Total					**37.9753**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hospital	12.1089 / 2.30645				37.9753
Total					**37.9753**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				524.1240
Unmitigated				524.1240

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	1042.2				524.1240
Total					**524.1240**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	1042.2				524.1240
Total					**524.1240**

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

11.0 Vegetation

CCMC- Hotel & Shopping Center Construction

Fresno County, Annual

1.0 Project Characteristics

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

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2020
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 - 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

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

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**	**N20**	**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**

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
Total	**4.2143**	**28.7644**	**20.2231**	**0.0909**	**4.4521**	**0.1271**	**4.5793**	**1.2004**	**0.1219**	**1.3223**						**9,745.6826**

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
Total	**4.2143**	**28.7644**	**20.2231**	**0.0909**	**4.4521**	**0.1271**	**4.5793**	**1.2004**	**0.1219**	**1.3223**						**9,745.6826**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/1/2018	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)

<u>OffRoad Equipment</u>

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

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
Total	**0.0228**	**0.2410**	**0.1124**	**1.9000e-004**	**0.0903**	**0.0129**	**0.1032**	**0.0497**	**0.0119**	**0.0615**						**17.5152**

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
Total	**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**

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
Total	**4.6600e-003**	**0.0953**	**0.1148**	**1.9000e-004**	**0.0352**	**4.7300e-003**	**0.0400**	**0.0194**	**4.7300e-003**	**0.0241**						**17.5152**

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
Total	**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**

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
Total	**0.0277**	**0.3067**	**0.1658**	**3.0000e-004**	**0.0655**	**0.0155**	**0.0810**	**0.0337**	**0.0143**	**0.0479**						**27.3178**

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
Total	**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**

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
Total	**7.2600e-003**	**0.1484**	**0.1899**	**3.0000e-004**	**0.0256**	**7.5600e-003**	**0.0331**	**0.0131**	**7.5600e-003**	**0.0207**						**27.3178**

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
Total	**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**

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
Total	**0.3095**	**2.7016**	**2.0305**	**3.1100e-003**		**0.1732**	**0.1732**		**0.1629**	**0.1629**						**276.3032**

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
Total	**0.1199**	**1.0473**	**0.7465**	**3.3100e-003**	**0.1743**	**8.9200e-003**	**0.1832**	**0.0474**	**8.5000e-003**	**0.0559**						**308.9996**

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
Total	**0.0778**	**1.6431**	**2.0644**	**3.1100e-003**		**0.1044**	**0.1044**		**0.1044**	**0.1044**						**276.3029**

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
Total	**0.1199**	**1.0473**	**0.7465**	**3.3100e-003**	**0.1743**	**8.9200e-003**	**0.1832**	**0.0474**	**8.5000e-003**	**0.0559**						**308.9996**

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
Total	**0.1169**	**1.0434**	**0.8496**	**1.3300e-003**		**0.0639**	**0.0639**		**0.0600**	**0.0600**						**117.0853**

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
Total	**0.0462**	**0.4229**	**0.2828**	**1.3900e-003**	**0.0747**	**3.2700e-003**	**0.0780**	**0.0203**	**3.1300e-003**	**0.0234**						**130.2196**

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
Total	**0.0334**	**0.7042**	**0.8848**	**1.3300e-003**		**0.0447**	**0.0447**		**0.0447**	**0.0447**						**117.0852**

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
Total	**0.0462**	**0.4229**	**0.2828**	**1.3900e-003**	**0.0747**	**3.2700e-003**	**0.0780**	**0.0203**	**3.1300e-003**	**0.0234**						**130.2196**

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
Total	**2.5625**	**0.0367**	**0.0368**	**6.0000e-005**		**2.5800e-003**	**2.5800e-003**		**2.5800e-003**	**2.5800e-003**						**5.1173**

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
Total	**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**

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
Total	**2.5583**	**0.0271**	**0.0367**	**6.0000e-005**		**1.9000e-003**	**1.9000e-003**		**1.9000e-003**	**1.9000e-003**						**5.1173**

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
Total	**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**

4.0 Operational Detail - Mobile

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	2.4836	28.4160	19.9277	0.0888	4.4521	0.1006	4.5528	1.2004	0.0954	1.2958						8,306.206 4
Unmitigated	2.4836	28.4160	19.9277	0.0888	4.4521	0.1006	4.5528	1.2004	0.0954	1.2958						8,306.206 4

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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
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

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

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
Total		**0.0383**	**0.3484**	**0.2927**	**2.0900e-003**		**0.0265**	**0.0265**		**0.0265**	**0.0265**						**381.5786**

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
Total		**0.0383**	**0.3484**	**0.2927**	**2.0900e-003**		**0.0265**	**0.0265**		**0.0265**	**0.0265**						**381.5786**

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
Total					**886.1142**

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
Total					**886.1142**

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	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
Total	**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

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
Total	**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**

7.0 Water Detail

7.1 Mitigation Measures Water

	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
Total					**51.2675**

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
Total					**51.2675**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				120.5103
Unmitigated				120.5103

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
Total					**120.5103**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hotel	82.13				41.3033
Strip Mall	157.5				79.2070
Total					**120.5103**

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

11.0 Vegetation

CCMC- Outpatient Comm. Ctr. Expansion

Fresno County, Annual

1.0 Project Characteristics

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

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2027
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 - 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

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

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**	**N20**	**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**

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
Total	**0.3064**	**1.5386**	**1.1324**	**7.8000e-003**	**0.4696**	**0.0100**	**0.4797**	**0.1265**	**9.8100e-003**	**0.1363**						**1,166.4293**

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
Total	**0.3064**	**1.5386**	**1.1324**	**7.8000e-003**	**0.4696**	**0.0100**	**0.4797**	**0.1265**	**9.8100e-003**	**0.1363**						**1,166.4293**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/1/2025	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

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
Total	**6.6000e-004**	**7.1900e-003**	**5.7400e-003**	**1.0000e-005**	**2.7000e-004**	**2.5000e-004**	**5.2000e-004**	**3.0000e-005**	**2.3000e-004**	**2.6000e-004**						**1.2926**

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
Total	**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**

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
Total	**3.6000e-004**	**7.3100e-003**	**8.7900e-003**	**1.0000e-005**	**1.0000e-004**	**3.6000e-004**	**4.6000e-004**	**1.0000e-005**	**3.6000e-004**	**3.7000e-004**						**1.2926**

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
Total	**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**

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
Total	**5.7400e-003**	**0.0510**	**0.0736**	**1.2000e-004**	**7.5300e-003**	**2.1000e-003**	**9.6300e-003**	**4.1400e-003**	**2.0100e-003**	**6.1500e-003**						**10.4714**

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
Total	**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**

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
Total	**2.6500e-003**	**0.0596**	**0.0794**	**1.2000e-004**	**2.9400e-003**	**4.0200e-003**	**6.9600e-003**	**1.6100e-003**	**4.0200e-003**	**5.6300e-003**						**10.4714**

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
Total	**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**

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
Total	**0.0636**	**0.6332**	**0.8118**	**1.3200e-003**		**0.0279**	**0.0279**		**0.0256**	**0.0256**						**116.7782**

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
Total	**6.0300e-003**	**0.0687**	**0.0362**	**3.1000e-004**	**0.0174**	**1.3000e-004**	**0.0175**	**4.7400e-003**	**1.2000e-004**	**4.8600e-003**						**29.2015**

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
Total	**0.0323**	**0.7080**	**0.9197**	**1.3200e-003**		**0.0445**	**0.0445**		**0.0445**	**0.0445**						**116.7781**

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
Total	**6.0300e-003**	**0.0687**	**0.0362**	**3.1000e-004**	**0.0174**	**1.3000e-004**	**0.0175**	**4.7400e-003**	**1.2000e-004**	**4.8600e-003**						**29.2015**

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
Total	**0.0273**	**0.2714**	**0.3479**	**5.7000e-004**		**0.0119**	**0.0119**		**0.0110**	**0.0110**						**50.0478**

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
Total	**2.4700e-003**	**0.0291**	**0.0147**	**1.3000e-004**	**7.4400e-003**	**6.0000e-005**	**7.4900e-003**	**2.0300e-003**	**6.0000e-005**	**2.0800e-003**						**12.3426**

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
Total	**0.0138**	**0.3034**	**0.3941**	**5.7000e-004**		**0.0191**	**0.0191**		**0.0191**	**0.0191**						**50.0477**

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
Total	**2.4700e-003**	**0.0291**	**0.0147**	**1.3000e-004**	**7.4400e-003**	**6.0000e-005**	**7.4900e-003**	**2.0300e-003**	**6.0000e-005**	**2.0800e-003**						**12.3426**

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
Total	**0.2815**	**0.0229**	**0.0362**	**6.0000e-005**		**1.0300e-003**	**1.0300e-003**		**1.0300e-003**	**1.0300e-003**						**5.1135**

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
Total	**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**

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
Total	**0.2793**	**0.0271**	**0.0367**	**6.0000e-005**		**1.9000e-003**	**1.9000e-003**		**1.9000e-003**	**1.9000e-003**						**5.1135**

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
Total	**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**

4.0 Operational Detail - Mobile

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	0.1131	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

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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

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

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						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
Total		**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

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
Total		**9.1900e-003**	**0.0835**	**0.0702**	**5.0000e-004**		**6.3500e-003**	**6.3500e-003**		**6.3500e-003**	**6.3500e-003**						**91.4508**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hospital	542400				158.4087
Total					**158.4087**

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
Total					**158.4087**

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

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
Total	**0.1841**	**0.0000**	**3.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**7.6000e-004**

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
Total	**0.1841**	**0.0000**	**3.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**7.6000e-004**

7.0 Water Detail

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 / 0.956042				15.7410
Total					**15.7410**

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
Total					**15.7410**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				217.2535
Unmitigated				217.2535

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	432				217.2535
Total					**217.2535**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	432				217.2535
Total					**217.2535**

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

11.0 Vegetation

CCMC- Parking Lots and Asphalt Surfaces (Phase II)

Fresno County, Annual

1.0 Project Characteristics

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

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2031
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 - 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

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

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**	**N20**	**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**

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
Total	**0.0270**	**0.0000**	**7.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**						**81.1650**

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
Total	**0.0270**	**0.0000**	**7.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**						**81.1650**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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

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)

<u>OffRoad Equipment</u>

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

<u>Trips and VMT</u>

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

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
Total	**0.0278**	**0.1716**	**0.2916**	**4.6000e-004**		**8.3700e-003**	**8.3700e-003**		**7.7000e-003**	**7.7000e-003**						**40.3622**

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
Total	**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**

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
Total	**0.0207**	**0.2259**	**0.3459**	**4.6000e-004**		**0.0122**	**0.0122**		**0.0122**	**0.0122**						**40.3622**

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
Total	**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**

4.0 Operational Detail - Mobile

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

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

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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

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
Total					**81.1648**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	277913				81.1648
Total					**81.1648**

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	0.0270	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
Total	**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

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
Total	**0.0270**	**0.0000**	**7.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.4000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	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
Total					**0.0000**

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
Total					**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				0.0000
Unmitigated				0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0				0.0000
Total					**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0				0.0000
Total					**0.0000**

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

11.0 Vegetation

CCMC- Parking Lots and Asphalt Surfaces (Phase I)
Fresno County, Annual

1.0 Project Characteristics

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

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2017
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 - 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

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

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**	**N20**	**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**

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
Total	**0.0233**	**0.0000**	**6.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**						**69.9698**

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
Total	**0.0233**	**0.0000**	**6.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**						**69.9698**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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

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

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
Total	**0.0471**	**0.4144**	**0.3006**	**4.6000e-004**		**0.0232**	**0.0232**		**0.0213**	**0.0213**						**42.6105**

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
Total	**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**

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
Total	**0.0194**	**0.2259**	**0.3459**	**4.6000e-004**		**0.0122**	**0.0122**		**0.0122**	**0.0122**						**42.6104**

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
Total	**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**

4.0 Operational Detail - Mobile

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	0.460473	0.036633	0.167238	0.147836	0.023143	0.005958	0.030501	0.116272	0.002399	0.001935	0.005629	0.001175	0.000809

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

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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

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
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**0.0000**

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
Total					**69.9697**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	239580				69.9697
Total					**69.9697**

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	0.0233	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
Total	**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

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
Total	**0.0233**	**0.0000**	**6.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.2000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	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
Total					**0.0000**

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
Total					**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				0.0000
Unmitigated				0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0				0.0000
Total					**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0				0.0000
Total					**0.0000**

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

11.0 Vegetation

CCMC- Medical-Dental Office Building

Fresno County, Annual

1.0 Project Characteristics

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

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2024
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 - 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

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

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

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**	**N20**	**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**

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
Total	**1.0793**	**7.6114**	**5.6352**	**0.0340**	**1.9337**	**0.0219**	**1.9557**	**0.5212**	**0.0208**	**0.5420**						**4,020.8236**

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
Total	**1.0793**	**7.6114**	**5.6352**	**0.0340**	**1.9337**	**0.0219**	**1.9557**	**0.5212**	**0.0208**	**0.5420**						**4,020.8236**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	1/15/2022	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)

<u>OffRoad Equipment</u>

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

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
Total	**6.8900e-003**	**0.0783**	**0.0503**	**1.2000e-004**	**2.3900e-003**	**2.9800e-003**	**5.3700e-003**	**2.6000e-004**	**2.7400e-003**	**3.0000e-003**						**10.8606**

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
Total	**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**

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
Total	**3.0100e-003**	**0.0593**	**0.0682**	**1.2000e-004**	**9.3000e-004**	**2.4900e-003**	**3.4200e-003**	**1.0000e-004**	**2.4900e-003**	**2.5900e-003**						**10.8606**

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
Total	**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**

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
Total	**0.0154**	**0.1698**	**0.0922**	**2.1000e-004**	**0.0618**	**7.4200e-003**	**0.0692**	**0.0333**	**6.8300e-003**	**0.0401**						**18.2491**

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
Total	**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**

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
Total	**5.0400e-003**	**0.1022**	**0.1215**	**2.1000e-004**	**0.0241**	**4.8500e-003**	**0.0290**	**0.0130**	**4.8500e-003**	**0.0178**						**18.2491**

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
Total	**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**

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
Total	**0.2032**	**1.5991**	**1.5717**	**2.7400e-003**		**0.0769**	**0.0769**		**0.0737**	**0.0737**						**228.5066**

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
Total	**0.0168**	**0.1823**	**0.1016**	**6.9000e-004**	**0.0372**	**5.9000e-004**	**0.0377**	**0.0101**	**5.6000e-004**	**0.0107**						**64.7632**

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
Total	**0.0782**	**1.4916**	**1.6872**	**2.7400e-003**		**0.0896**	**0.0896**		**0.0896**	**0.0896**						**228.5063**

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
Total	**0.0168**	**0.1823**	**0.1016**	**6.9000e-004**	**0.0372**	**5.9000e-004**	**0.0377**	**0.0101**	**5.6000e-004**	**0.0107**						**64.7632**

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
Total	**0.0951**	**0.7561**	**0.7889**	**1.3900e-003**		**0.0341**	**0.0341**		**0.0326**	**0.0326**						**115.8197**

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
Total	**7.3400e-003**	**0.0726**	**0.0457**	**3.4000e-004**	**0.0188**	**1.5000e-004**	**0.0190**	**5.1300e-003**	**1.3000e-004**	**5.2700e-003**						**31.8631**

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
Total	**0.0396**	**0.7560**	**0.8552**	**1.3900e-003**		**0.0454**	**0.0454**		**0.0454**	**0.0454**						**115.8195**

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
Total	**7.3400e-003**	**0.0726**	**0.0457**	**3.4000e-004**	**0.0188**	**1.5000e-004**	**0.0190**	**5.1300e-003**	**1.3000e-004**	**5.2700e-003**						**31.8631**

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
Total	**0.6601**	**0.0261**	**0.0362**	**6.0000e-005**		**1.4200e-003**	**1.4200e-003**		**1.4200e-003**	**1.4200e-003**						**5.1142**

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
Total	**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**

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
Total	**0.6575**	**0.0271**	**0.0367**	**6.0000e-005**		**1.9000e-003**	**1.9000e-003**		**1.9000e-003**	**1.9000e-003**						**5.1141**

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
Total	**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**

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
Total	**8.4400e-003**	**0.0831**	**0.0698**	**1.2000e-004**	**7.6800e-003**	**4.1900e-003**	**0.0119**	**1.1600e-003**	**3.9100e-003**	**5.0700e-003**						**10.6060**

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
Total	**4.9000e-004**	**8.5100e-003**	**2.7300e-003**	**3.0000e-005**	**1.1300e-003**	**3.0000e-005**	**1.1500e-003**	**3.1000e-004**	**2.0000e-005**	**3.3000e-004**						**3.0608**

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
Total	**2.8100e-003**	**0.0605**	**0.0771**	**1.2000e-004**	**3.0000e-003**	**3.5900e-003**	**6.5900e-003**	**4.5000e-004**	**3.5900e-003**	**4.0400e-003**						**10.6060**

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
Total	**4.9000e-004**	**8.5100e-003**	**2.7300e-003**	**3.0000e-005**	**1.1300e-003**	**3.0000e-005**	**1.1500e-003**	**3.1000e-004**	**2.0000e-005**	**3.3000e-004**						**3.0608**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	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						3,147.607 0
Unmitigated	0.6383	7.5507	5.5833	0.0336	1.9337	0.0173	1.9510	0.5212	0.0162	0.5374						3,147.607 0

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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
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

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						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
Total		**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

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
Total		**6.6800e-003**	**0.0607**	**0.0510**	**3.6000e-004**		**4.6100e-003**	**4.6100e-003**		**4.6100e-003**	**4.6100e-003**						**66.4797**

5.3 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
Total					**256.9273**

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
Total					**256.9273**

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

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
Total	**0.4344**	**1.0000e-005**	**8.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.8000e-003**

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
Total	**0.4344**	**1.0000e-005**	**8.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**						**1.8000e-003**

7.0 Water Detail

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
Total					**37.1449**

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
Total					**37.1449**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				512.6628
Unmitigated				512.6628

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
Total					**512.6628**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Medical Office Building	1019.41				512.6628
Total					**512.6628**

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

11.0 Vegetation

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

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	532.02	**CH4 Intensity (lb/MWhr)**	0.024	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Energy intensity factors include RPS adjustment.

Land Use - Hotel (150 room); Shopping Center (150KSF); Hospital-Cancer Center (96.5KSF),

Construction Phase - Construction emissons 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

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**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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
Total	**5.2854**	**36.2434**	**26.6761**	**0.1225**	**6.2090**	**0.1786**	**6.3876**	**1.6740**	**0.1715**	**1.8456**						**13,518.8118**

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
Total	**5.2854**	**36.2434**	**26.6761**	**0.1225**	**6.2090**	**0.1786**	**6.3876**	**1.6740**	**0.1715**	**1.8456**						**13,124.4150**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.92**

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

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

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
Total	**2.1700e-003**	**0.0228**	**0.0110**	**2.0000e-005**	**9.0300e-003**	**1.2000e-003**	**0.0102**	**4.9700e-003**	**1.1000e-003**	**6.0700e-003**						**1.7220**

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
Total	**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**

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
Total	**2.1700e-003**	**0.0228**	**0.0110**	**2.0000e-005**	**9.0300e-003**	**1.2000e-003**	**0.0102**	**4.9700e-003**	**1.1000e-003**	**6.0700e-003**						**1.7220**

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
Total	**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**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	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

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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

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

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
Total		**0.0605**	**0.5499**	**0.4619**	**3.3000e-003**		**0.0418**	**0.0418**		**0.0418**	**0.0418**						**602.2037**

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
Total		**0.0605**	**0.5499**	**0.4619**	**3.3000e-003**		**0.0418**	**0.0418**		**0.0418**	**0.0418**						**602.2037**

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
Total					**1,052.084 6**

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
Total					**994.9408**

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	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
Total	**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

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
Total	**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**

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

	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
Total					**80.3008**

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
Total					**65.3649**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

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
Total					**644.6343**

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
Total					**322.3171**

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

11.0 Vegetation

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

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2029
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	532.02	**CH4 Intensity (lb/MWhr)**	0.024	**N2O Intensity (lb/MWhr)**	0.005

1.3 User Entered Comments & Non-Default Data

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 emissons 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

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**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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
Total	**6.3131**	**38.6014**	**23.8138**	**0.1724**	**10.5252**	**0.1554**	**10.6807**	**2.8351**	**0.1506**	**2.9857**						**21,103.2871**

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
Total	**6.3131**	**38.6014**	**23.8138**	**0.1724**	**10.5252**	**0.1554**	**10.6807**	**2.8351**	**0.1506**	**2.9857**						**19,846.5495**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**5.96**

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

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

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
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**						**0.0000**

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
Total	**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**

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
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**						**0.0000**

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
Total	**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**

4.0 Operational Detail - Mobile

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 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 22

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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

	ROG	NOx	CO	SO2	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
Total		**0.1140**	**1.0358**	**0.8701**	**6.2100e-003**		**0.0787**	**0.0787**		**0.0787**	**0.0787**						**1,134.3327**

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
Total		**0.1140**	**1.0358**	**0.8701**	**6.2100e-003**		**0.0787**	**0.0787**		**0.0787**	**0.0787**						**1,134.3327**

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
Total					**1,934.310 6**

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
Total					**1,844.614 6**

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	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
Total	**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

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
Total	**3.5080**	**6.0000e-005**	**6.3700e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**						**0.0132**

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

	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
Total					**186.2790**

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
Total					**150.9872**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				1,131.749 7
Unmitigated				2,263.499 4

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	3241.84				1,630.326 3
Hotel	82.13				41.3033
Medical Office Building	1019.41				512.6628
Regional Shopping Center	157.5				79.2070
Total					**2,263.499 4**

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
Total					**1,131.749 7**

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

11.0 Vegetation

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

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/MWhr)	364.4	**CH4 Intensity (lb/MWhr)**	0.016	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

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 emissons 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).

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

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**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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
Total	**11.5330**	**72.5004**	**45.0823**	**0.3267**	**20.0576**	**0.4618**	**20.5194**	**5.4024**	**0.4531**	**5.8555**						**38,496.7264**

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
Total	**11.5330**	**72.5004**	**45.0823**	**0.3267**	**20.0576**	**0.4618**	**20.5194**	**5.4024**	**0.4531**	**5.8555**						**35,991.5850**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**6.51**

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

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

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
Total	**2.1700e-003**	**0.0228**	**0.0110**	**2.0000e-005**	**9.0300e-003**	**1.2000e-003**	**0.0102**	**4.9700e-003**	**1.1000e-003**	**6.0700e-003**						**1.7220**

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
Total	**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**

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
Total	**2.1700e-003**	**0.0228**	**0.0110**	**2.0000e-005**	**9.0300e-003**	**1.2000e-003**	**0.0102**	**4.9700e-003**	**1.1000e-003**	**6.0700e-003**						**1.7220**

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
Total	**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**

4.0 Operational Detail - Mobile

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						29,321.8412
Unmitigated	4.9082	70.7701	41.7896	0.3126	20.0576	0.1390	20.1966	5.4024	0.1303	5.5327						29,321.8412

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	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

	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	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

	ROG	NOx	CO	SO2	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						2,176.980 2
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						2,284.901 8
NaturalGas Mitigated	0.1837	1.6654	1.3685	0.0100		0.1269	0.1269		0.1269	0.1269						1,828.914 4
NaturalGas Unmitigated	0.1837	1.6654	1.3685	0.0100		0.1269	0.1269		0.1269	0.1269						1,828.914 4

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
Total		**0.1837**	**1.6654**	**1.3685**	**0.0100**		**0.1269**	**0.1269**		**0.1269**	**0.1269**						**1,828.9143**

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						1,071.904 2
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
Total		**0.1837**	**1.6654**	**1.3685**	**0.0100**		**0.1269**	**0.1269**		**0.1269**	**0.1269**						**1,828.914 3**

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				1,055.420 2
Hotel	1.7816e +006				295.7662
Medical Office Building	3.30293e +006				548.3239
Regional Shopping Center	1.837e +006				304.9625
Total					**2,284.901 9**

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				1,008.844 7
Hotel	1.72759e +006				286.7992
Medical Office Building	3.13339e +006				520.1782
Regional Shopping Center	1.70289e +006				282.6984
Total					**2,176.980 2**

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	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
Total	**6.4410**	**0.0649**	**1.9241**	**4.0500e-003**		**0.1959**	**0.1959**		**0.1959**	**0.1959**						**73.0626**

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
Total	**6.4410**	**0.0649**	**1.9241**	**4.0500e-003**		**0.1959**	**0.1959**		**0.1959**	**0.1959**						**73.0626**

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

	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
Total					**313.4060**

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
Total					**253.4864**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				2,337.300 2
Unmitigated				4,674.600 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 8
Hotel	82.13				41.3033
Medical Office Building	3827.41				1,924.810 3
Regional Shopping Center	231				116.1703
Total					**4,674.600 4**

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				1,273.213 4
Hotel	41.065				20.6517
Medical Office Building	1913.7				962.4052
Regional Shopping Center	115.5				58.0851
Total					**2,337.300 2**

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

11.0 Vegetation

Appendix 6A
Biological Resources Assessment

Biological Resources Assessment
Herndon Avenue Widening Project
City of Clovis

Prepared by

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September 18, 2017

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 ºF (Average range: 50-76 ºF) (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 aunnus*, *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
BIRDS (ALL PROTECTED BY THE MIGRATORY BIRD TREATY ACT*)	
Anas platyrhynchos	Mallard
Aphelocoma californica	Western Scrub-jay
Branta canadensis	Canada goose
Calypte anna	Anna’s hummingbird
Columba livia	Rock dove*
Larus californicus	California gull
MAMMALS	
Canis familiaris	Domestic dog (scat)
Thomomys 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 brachyrhyncos*), black phoebe (*Sayornis nigricans*), mourning dove (*Zenaida 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:

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 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 swansoni*), 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 CNDDB 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 (CNDDB 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 occicentalis*) 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. <u>Avoidance</u>. 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. <u>Pre-construction Surveys.</u>
    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. <u>Minimization/Establish Buffers.</u>

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. <u>If avoidance is not feasible,</u> 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, 4-3and 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.

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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.

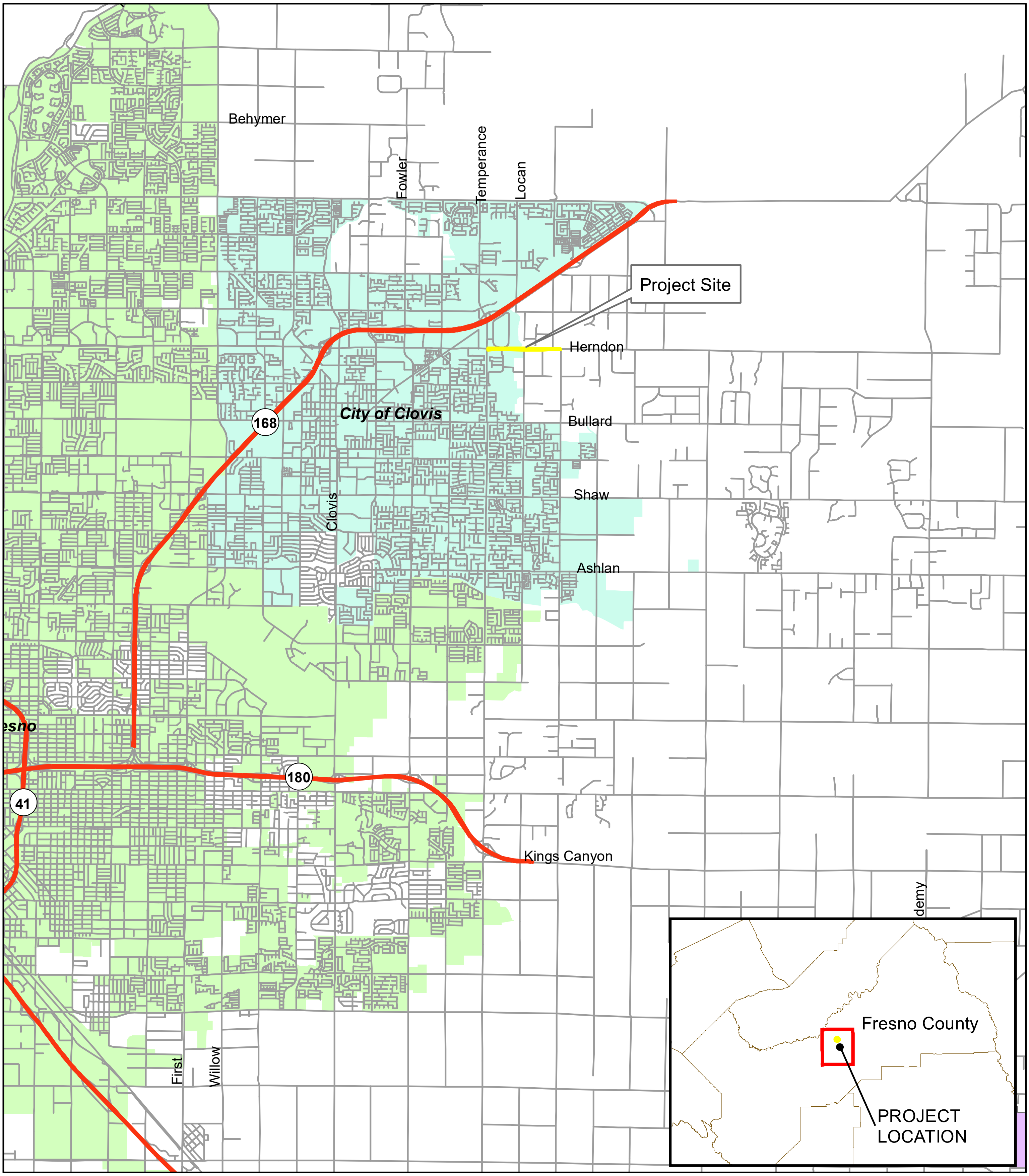
Project area along Herndon Avenue. Existing Enterprise Canal and access road on left side of photo. Intersection with Locan Avenue in background. Looking west. October 2016.

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

Figure 1

Herndon Avenue Widening Project
City of Clovis

ODELL Planning & Research, Inc.

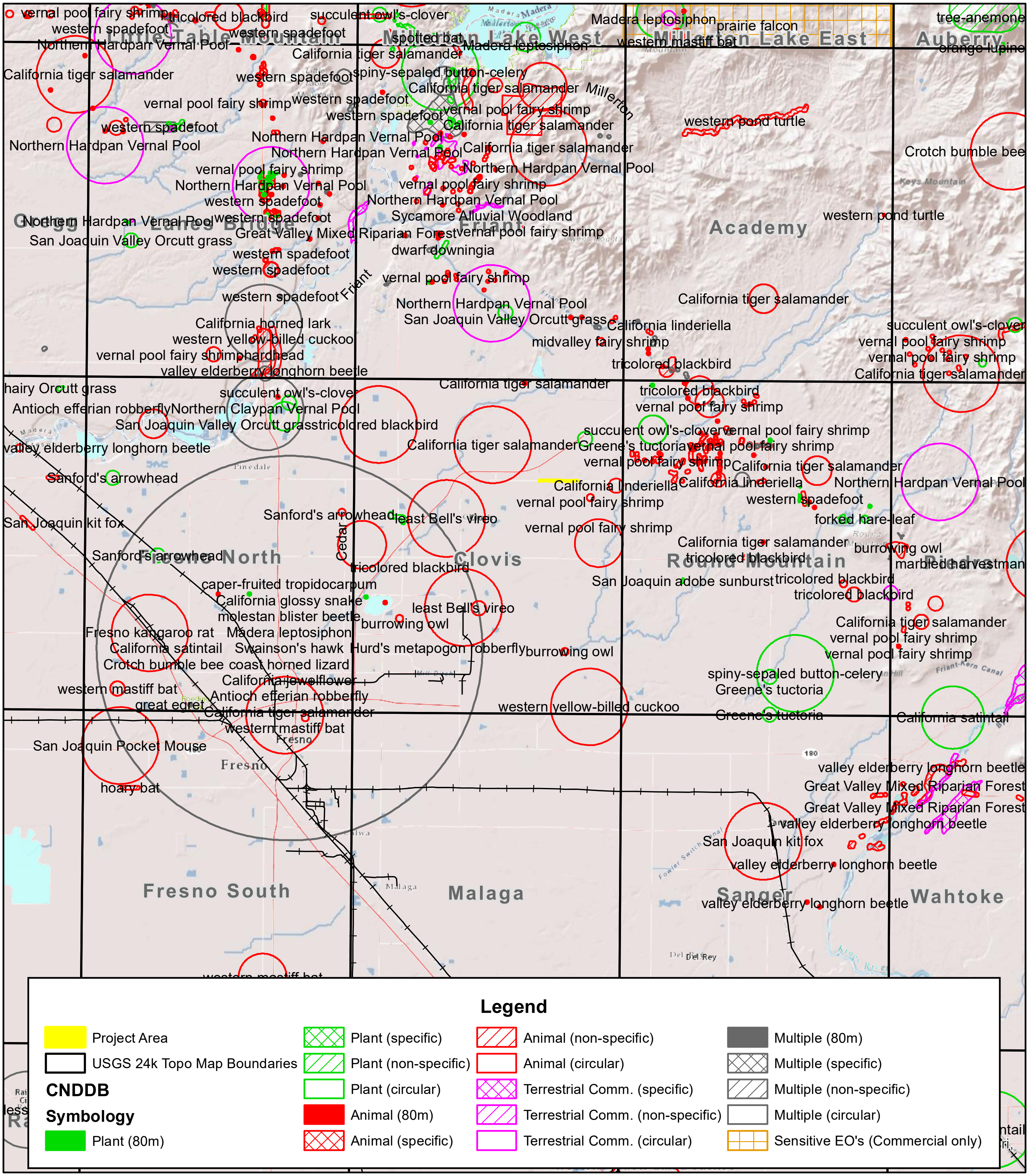
0 0.5 1 2 3 4 Miles

Source: County of Fresno, City of Clovis, ESRI

Project Area **Figure 2**

Herndon Avenue Widening Project
City of Clovis

ODELL *Planning & Research, Inc.*



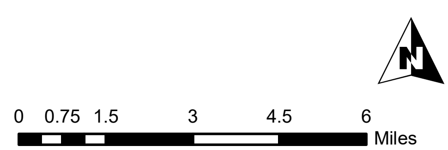
Source: CDFW, City of Clovis, ESRI

California Natural Diversity Database (CNDDB) Map

Figure 3

Herndon Avenue Widening Project
City of Clovis

ODELL Planning & Research, Inc.
School Facility Planning • Environmental Analysis • Demographics



Appendix A. Special status animal species known from the vicinity of the CCMC Healthcare Campus Expansion Project.

Name	Status* State	Status* Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
MAMMALS					
Pallid bat (*Antrozous pallidus*)	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 (*Dipodomys nitratoides exilis*)	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 (*Euderma maculatum*)	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 (*Eumops perotis us*)	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 (*Taxidea taxus*)	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 (*Vulpes macrotis mutica*)	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.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
			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).
BIRDS					
Tricolored blackbird (*Agelaius tricolor*)	SSC 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 (*Aechmophorus occidentalis*) (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 (*Asio flammeus*) (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 (*Athene cunicularia*)	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 (*Baeolophus inornatus*)		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.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
			another population in the Cape District of south Baja California.		
Swainson's hawk (*Buteo swainsoni*)	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 (*Charadrius alexandrines*)	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 (*Circus cyaneus*)	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 (*Coccyzus americanus occidentalis*)	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) (*Elanus leucurus*)	FP	None	Fairly common in grasslands, open agricultural fields and fallow highway median strips. Substantial groves of dense, broad-leafed 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 (*Falco peregrinus*)	FP; delisted	FSC; delisted	Nests near wetlands, lakes, rivers, or other water, on cliffs, banks, dunes, or human-made structures. Nests consist of e or 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. Suitably nesting habitat is not present. Winter foraging habitat is marginal due to lack of riparian or wetland habitat.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
Bald eagle (*Haliaeetus leucocephalus*) (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 (*Lanius ludovicianus*)	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 (*Limosa fedoa*) (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 (*Melanerpes lewis*) (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 (*Numenius americanus)* (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 (*Passerella iliaca*) (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.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
			California, in dense brushy patches and thickets within woodlands		
Yellow-bill magpie (*Pica nuttalli*)	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 CNDDB	Possible. Could nest in trees within the study area and forage in open fields, agricultural land, or hospital landscaped areas.
Nuttall's woodpecker (*Picoides nuttallii*)	None	FSC	Oak forest and woodlands, including riparian zones. Requires standing snag or hollow tree for nest cavity.	Not followed in CNDDB	Possible. Project area and adjacent trees are suitable habitat for this species year-round.
Williamson's sapsucker (*Sphyrapicus thyroids*)	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 CNDDB	None. No habitat present.
Least Bell's vireo (*Vireo bellii pusillus*)	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.
REPTILES					
Blunt-nosed leopard lizard (*Gambelia (=Crotaphytus) sila)*	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 *Atriplex* sp. Small mammal burrows provide cover for this species.	None	None. No habitat present.

Name	Status* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
Western pond turtle (*Emys marmorata* aka *Actinemys marmorata*)	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 (*Thamnophis gigas*)	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.
AMPHIBIANS					
California tiger salamander (*Ambystoma californiense*)	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 (*Rana draytonii*)	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 (*Spea hammondii*)	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* State	Federal	Description of Habitat Required [c, e, f]	Historic 9 Quad Presence[a]	Potential to Occur in Study Area [a,b,d]
			grasslands, open chaparral, pine-oak woodlands. Often associated with vernal pools.	Mountain, Piedra	
FISH					
Delta smelt (*Hypomesus tranpacificus*)	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 (*Mylopharodon conocephalus*)	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.
INVERTEBRATES					
Conservancy fairy shrimp (*Branchinecta conservatio*)	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 (*Branchinecta lynchi*)	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 (*Desmocerus californicus dimorphus*)	None	FT	Nearly always found on or close to its host plant, elderberry (*Sambucus* 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[a] State	Status[a] Federal	Description of Habitat Required[b]	Blooming Period	Historic 9 Quad Presence[c]	Potential to Occur in Study Area[d]
Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*)	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 (*Caulanthus californicus*)	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 CNDDB occurrence does not have date- no habitat left within vicinity of Fresno- Extirpated from Fresno Area)
Dwarf downingia (*Downingia pusilla*)	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-sepaled button-celery (*Eryngium spinosepalum*)	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 (*Imperata brevifolia*)	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 (*Lagophylla dichotoma*)	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 (*Leptosiphon serrulatus*)	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 CNDDB occurrence is a 1922 collection. Location was mapped from a best guess, but was in the "foothills".

Name	Status[a]		Description of Habitat Required[b]	Blooming Period	Historic 9 Quad Presence[c]	Potential to Occur in Study Area[d]
	State	Federal				
San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)	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 (*Orcuttia pilosa*)	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 (*Pseudobahia bahiifolia*)	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 (*Pseudobahia peirsonii*)	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 (*Sagittaria sanfordii*)	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 (*Tropidocarpum capparideum*)	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 (*Tuctoria greenei*)	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.

a 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.
FSC = Federal Species of 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.
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 Mach 2017.

Appendix C

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. Two 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

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.

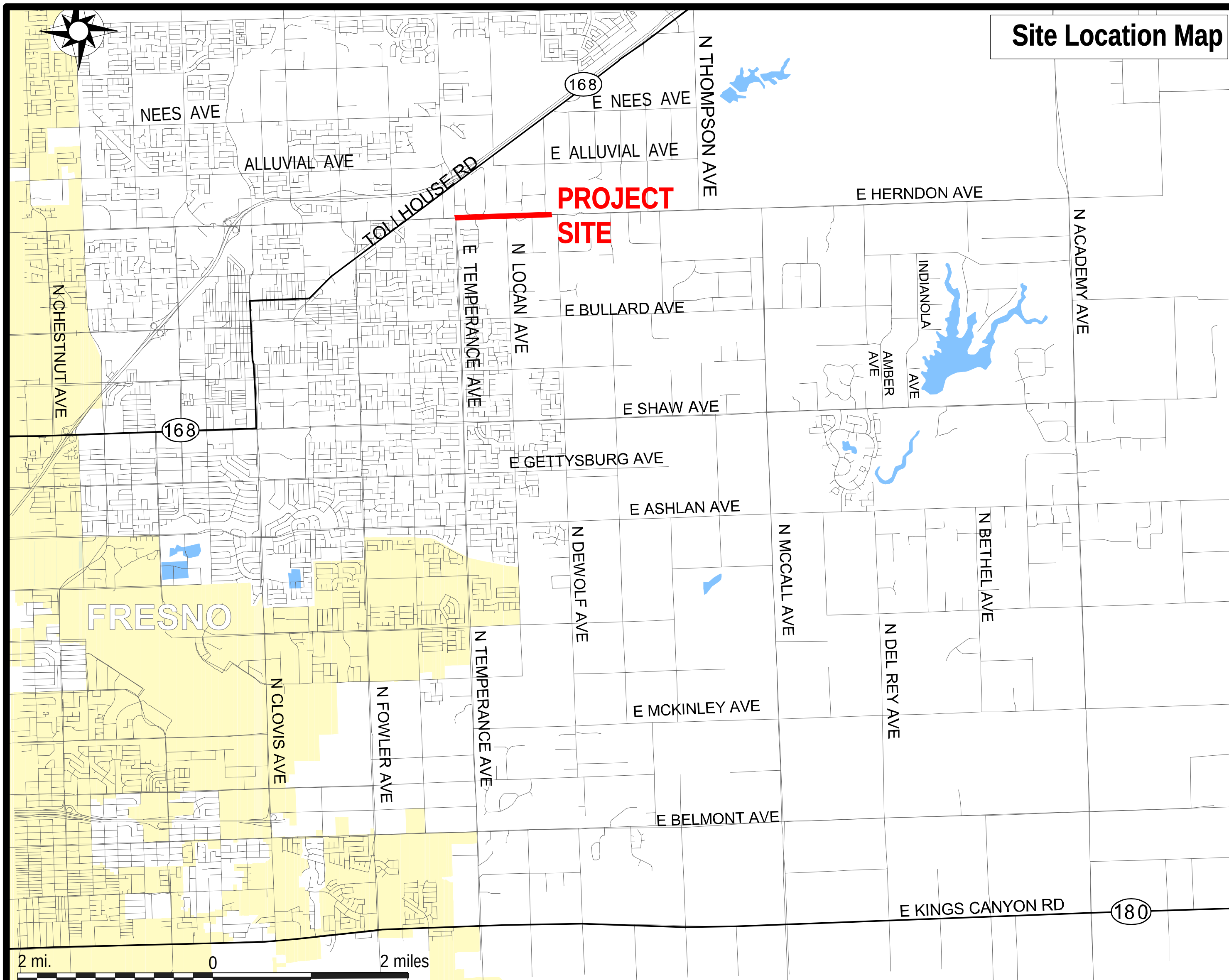
Section 404 of the federal Clean Water Act (CWA) regulates the discharge of dredged or fill material into "navigable waters" (33 U.S.C. §1344). The CWA defines "navigable waters" as "the waters of the United States, including the territorial seas" (33 U.S.C. §1362(7). By regulation (33 CFR § 328.3(a) (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;

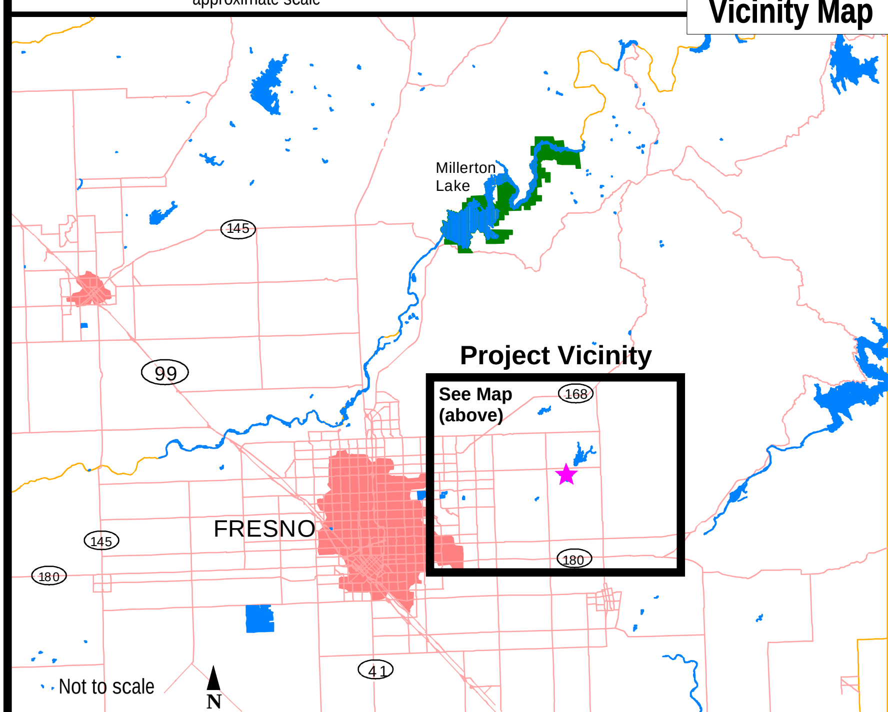
(2) All interstate waters including interstate wetlands;

(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:

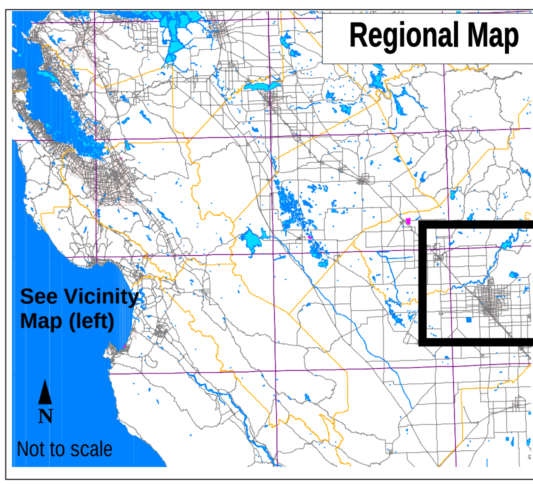
Site Location Map



Vicinity Map



Regional Map



Live Oak Associates, Inc.

Herndon Avenue Widening
Site / Vicinity Map

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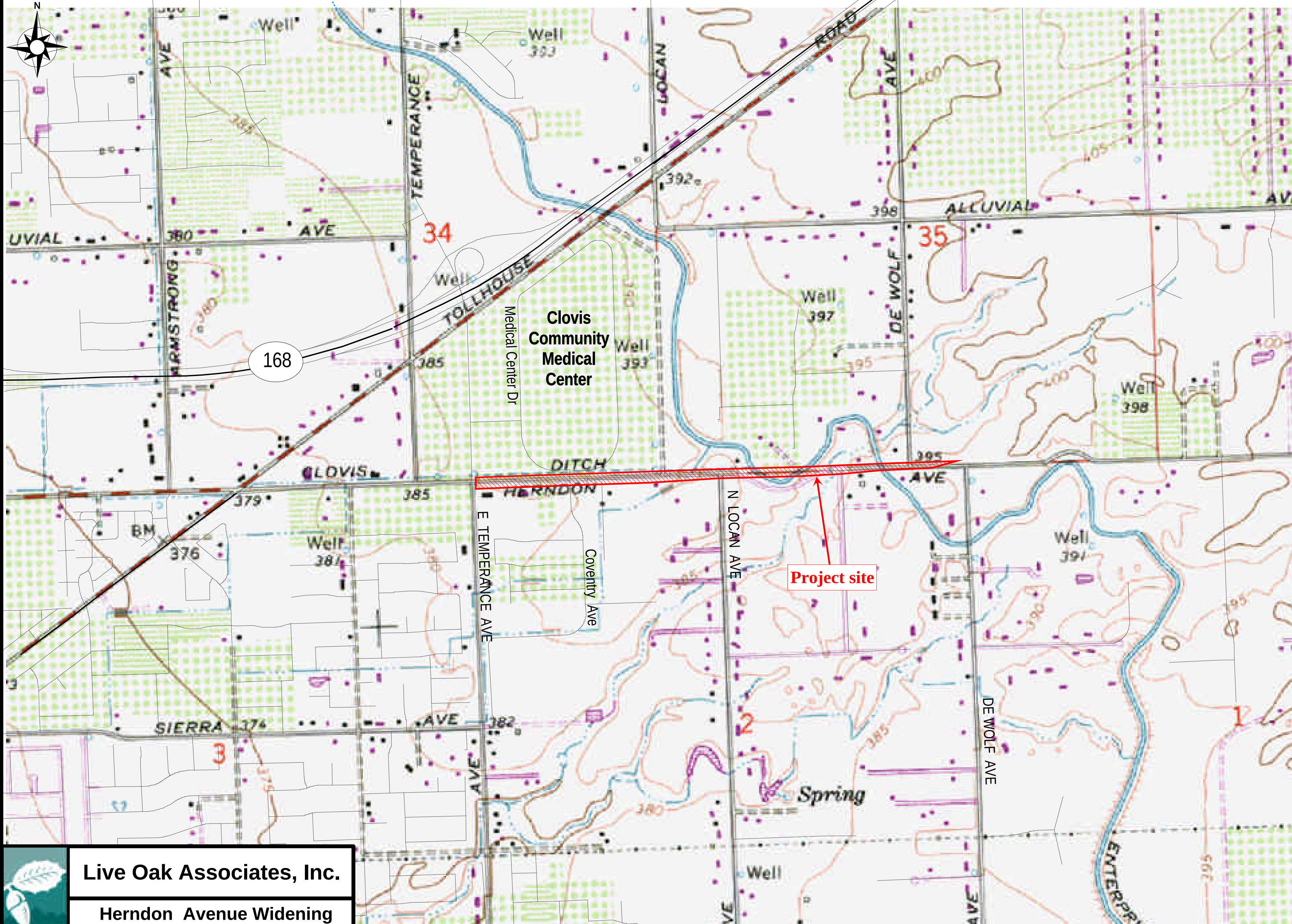

Live Oak Associates, Inc.

Herndon Avenue Widening
U.S.G.S. Quadrangle

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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

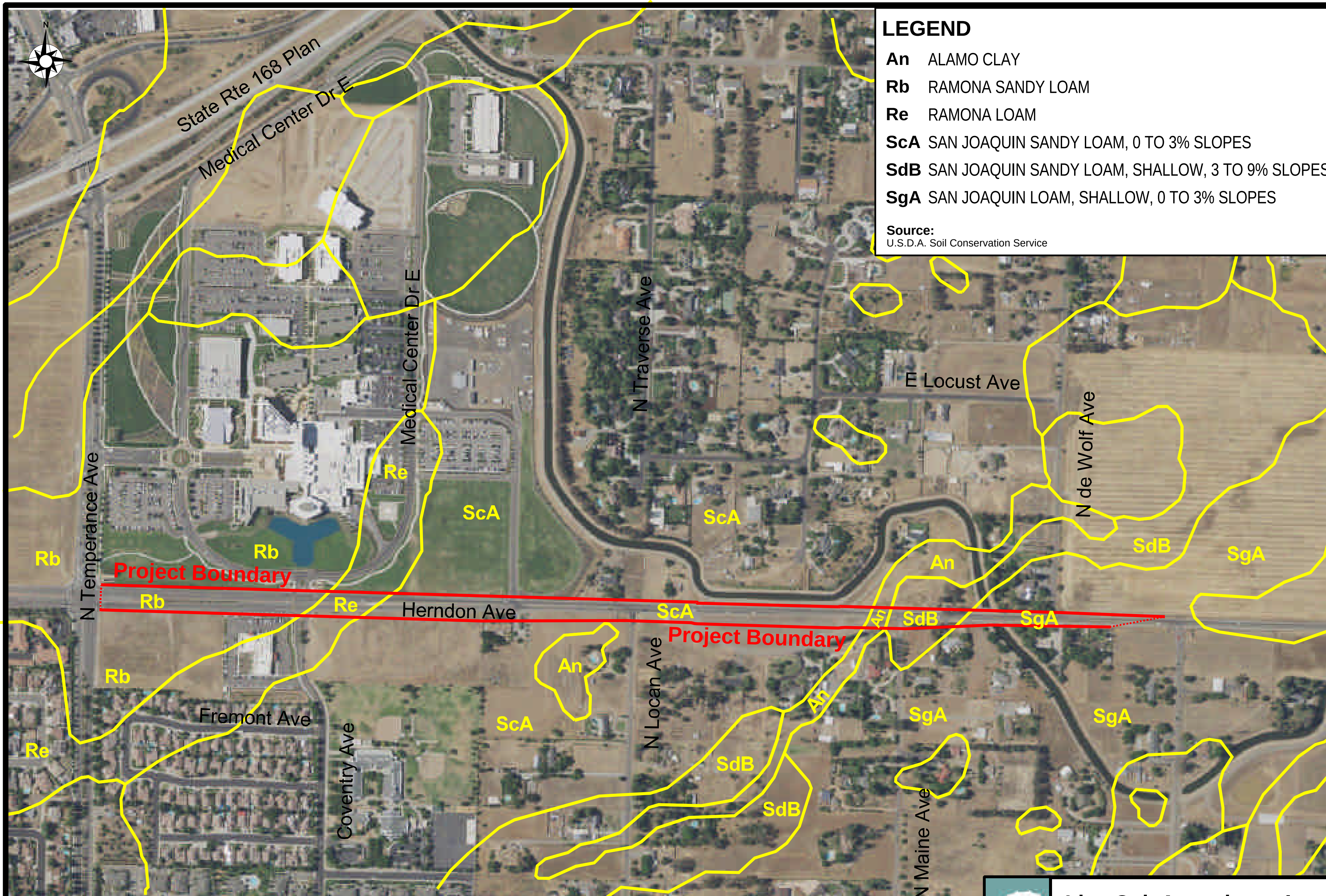
3.1 SETTING

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.



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

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TABLE 1. SOILS OF THE HERNDON AVENUE WIDENING PROJECT SITE (NRCS 2017).				
Soil Series/Soil	**Map Unit Symbol**	**Parent Material**	**Drainage Class**	**Hydric**
Alamo Clay	An	Formed in alluvium from mixed sources	Poorly drained, Moderately Deep to hardpan	Yes
Ramona Sandy Loam Ramona Loam	Rb Re	Formed in alluvium, derived mostly from granite and related rock sources	Well drained	Yes
San Joaquin Sandy Loam, 0-3 % slopes San Joaquin Sandy Loam, Shallow, 3-9% slopes San Joaquin Loam, Shallow, 0-3% slopes	ScA SdB 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.

TABLE 2. POTENTIALLY JURISDICTIONAL WATERS OF THE HERNDON AVENUE IMPROVEMENT PROJECT SITE		
Type of Water	**Approx. Square Footage**	**Approx. Acreage**
Seasonal Wetland Swale	1,059	0.024
Roadside Depression	7,841	0.18
Total	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.)
- SP1 - Sample Points
- Culvert

1,000' 0 500' 1,000 feet

Approximate Scale
1' = 400'

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
Potential Waters of the U.S.

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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 pricklegrass (*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 though 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), **i**t 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.

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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 Gathe Section, Township, Range: Sec 2, T13 S, R21E
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 ✓ No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:
Roadside Pool, greater than average precipitation this year

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Crypsis schoenoides	30	Y	FACW
2. Cynodon dactylon	50	Y	FACU
3. Polygonum aviculare	20	y	FAC
4.			
5.			
6.			
7.			
8.			
Total Cover:	10		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 90 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	30	x 2 = 60
FAC species	20	x 3 = 60
FACU species	50	x 4 = 200
UPL species		x 5 =
Column Totals:	100 (A)	320 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:
Only 10% of soil surface is vegetated

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 3/2	70	2.5YR 3/4	30	RM	M	sandy loam	- heavy redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: hardpan - though we couldn't dig deep enough
Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks: Soil is compacted and very dry - cannot dig a deeper soil pit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ✓ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Pool is currently dry (as expected this time of year)

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Herndon 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 Godhino 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 ✓
Hydric Soil Present?	Yes ____	No ✓
Wetland Hydrology Present?	Yes ____	No ✓

Is the Sampled Area within a Wetland? Yes ____ No ✓

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Cynodon dactylon	30	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species	30	x 4 = 120
UPL species		x 5 =
Column Totals:	30 (A)	120 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

- __ Dominance Test is >50%
- __ Prevalence Index is ≤3.0[1]
- __ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/3	100	Ø				Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]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)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): __________

Water Table Present? Yes _____ No _____ Depth (inches): __________

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): __________

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicatorc present

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Herndon 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 Goldhino 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 ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____
Is the Sampled Area within a Wetland?	Yes ✓	No ____

Remarks: south of culvert below Herndon

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Juncus bufonius — Total Cover:	1	N	FACW
Herb Stratum			
1. Eleocharis macrostachya	15	n	OBL
2. Cynodon dactylon	20	Y	FACU
3. Lythrum hyssopifolium	20	Y	OBL
4. Polygon aviculare	25	Y	FAC
5. Xanthium strumarium	5	n	FAC
6. Hordeum murinum glaucum	2	n	FAC
7. Festuca (Lolium) multiflora	4	n	FAC
8. Rumex crispus	1	n	FAC
Panicum capillare — Total Cover:	4	n	FAC
Woody Vine Stratum			
1. Amsinckia sp	3	N	UPL
2.			
Total Cover:	100		

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	1	x 2 =	2
FAC species	41	x 3 =	123
FACU species	20	x 4 =	60
UPL species	3	x 5 =	15
Column Totals:	100 (A)		235 (B)

Prevalence Index = B/A = 2.35

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 2/1	-	7.5YR 4/4	2-3	C	RC		Clay loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: none apparent
Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:
Hydric Soils Prevalent.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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 Gathe Section, Township, Range: Sec 2, T13S, R21E
Landform (hillslope, terrace, etc.): roadshoulder 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 ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____ No ✓	
Wetland Hydrology Present?	Yes ____ No ✓	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Croton setigerus	7	no	UPL
2. Cynodon dactylon	50	yes	FACU
3. Erigeron canadensis	7	n	FACU
4. Sonchus oleraceus	3	n	UPL
5. Festuca perennis	5	n	FAC
6. Malva parviflora	3	n	UPL
7. Acmispon - Lotus scoparius	5	n	UPL
8. Panicum capillare	15	n	FAC
Salsola tragus	5	n	UPL
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 =
FACW species	0	x 2 =
FAC species	20	x 3 = 60
FACU species	57	x 4 = 228
UPL species	23	x 5 = 115
Column Totals:	100 (A)	403 (B)

Prevalence Index = B/A = 4.03

Hydrophytic Vegetation Indicators:
__ Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 3/2		n/a				Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:
Compacted soil - hard to dig

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Road shoulder approx 30' east of culvert

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Herndon 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 Godkin 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 ✓	Is the Sampled Area within a Wetland? Yes ___ No ✓
Hydric Soil Present?	Yes ___ No ✓	
Wetland Hydrology Present?	Yes ___ No ✓	

Remarks:
Disced field, Heavy rainfall year

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Avena fatua	30	Y	UPL
2. Trichostema lanceolata	5	n	UPL
3. Bromus diandrus	35	Y	UPL
4. Bromus hordeaceus	30	Y	FACU
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species	30	x 4 = 120
UPL species	70	x 5 = 350
Column Totals:	100 (A)	470 (B)

Prevalence Index = B/A = 4.7

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3		none				Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (**LRR C**)
- __ 1 cm Muck (A9) (**LRR D**)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- __ 1 cm Muck (A9) (**LRR C**)
- __ 2 cm Muck (A10) (**LRR B**)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]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)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (**Nonriverine**)
- __ Sediment Deposits (B2) (**Nonriverine**)
- __ Drift Deposits (B3) (**Nonriverine**)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water-Stained Leaves (B9)
- __ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Plowed Soils (C6)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (**Riverine**)
- __ Sediment Deposits (B2) (**Riverine**)
- __ Drift Deposits (B3) (**Riverine**)
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Thin Muck Surface (C7)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ______

Water Table Present? Yes ____ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators present - former blue line on U.S.G.S map

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		
Agave sp.	Cultivated Agave	UPL
AMARATHACEAE- Amaranth Family		
Amaranthus blitoides	Prostrate Amaranth	FACU
APIACEAE – Carrot Family		
Eryngium castrense	Great Valley Coyote Thistle	OBL
APOCYNACEAE – Dogbane Family		
Nerium oleander	Oleander	UPL
ARALIACEAE – Ginseng Family		
Hedera helix	English Ivy	UPL
ASTERACEAE – Sunflower Family		
Centrolmadia pungens	Tarweed	UPL
Erigeron canadensis	Canada Horseweed	
Lactuca serriola	Prickly Lettuce	FACU
Helianthus annuus	Annual Sunflower	FACU
Hypochaeris glabra	Smooth Cats Ear	UPL
Sonchus oleraceus	Sow Thistle	UPL
Xanthium strumarium	Rough Cocklebur	FAC
BIGNONACEAE – Bignonia Family		
Campsis radicans	Trumpet Vine	UPL
BORAGINACEAE – Borage Family		
Amsinckia sp.	Fiddleneck	UPL
BRASSICACEAE – Mustard Family		
Brassica nigra	Black Mustard	UPL
CARYOPHYLLACEAE – Carnation Family		
Spergularia rubra	Red Sand Spurrey	FAC
CHENOPODIACEAE – Goosefoot Family		
Chenopodium album	Common Goosefoot	UPL
CONVOLVULACEAE – Morning Glory Family		
Convolvulus arvense	Common Morning Glory	UPL

Convolvolus sp.	Cultivated Morning Glory	UPL
Cuscuta sp.	Dodder	UPL
CUPRESSACEAE – Cypress Family		
Sequoia sempervirens	Coast Redwood	UPL
EUPHORBIACEAE – Spruge Family		
Croton setiger	Turkey Mullein	UPL
FAGACEAE – Oak Family		
Quercus lobata	Valley Oak	FACU
GERANIACEAE – Geranium Family		
Acmispon glaber	Spanish Clover	UPL
Erodium botrys	Red-stemmed Filaree	FACU
JUGLANDACEAE – Walnut Family		
Juglans regia	English Walnut	UPL
JUNCACEAE- Rush Family		
Eleocharis macrostachya	Creeping Spikerush	FACW
Juncus bufonius	Toad Rush	FACW
LAMIACEAE – Mint Family		
Trichostema lanceolatum	Vinegar Weed	FACU
LYTHRACEAE – Loosestrife Family		
Lythrum hyssopifolium	Hyssop's Loosestrife	OBL
MALVACEAE – Mallow Family		
Malva parviflora	Mallow	UPL
MORACEAE – Mulberry Family		
Morus sp.	Mulberry	UPL
MYRTACEAE – Eucalyptus Family		
Eucalyptus rostrata	Red Gum	UPL
PINACEAE – Pine Family		
Pinus sp.	Ornamental Pine	UPL
POACEAE – Grass Family		
Avena fatua	Wild Oats	UPL
Bromus diandrus	Ripgut Brome	UPL
Bromus hordeaceus	Soft Chess	FACU
Crypsis schoenoides	Swamp Timothy Grass	FACW
Cynodon dactylon	Bermuda Grass	FACU
Distichlis spicata	Inland Saltgrass	FAC
Hordeum marinum gussonianum	Mediterranean Barley	FACU
Hordeum murinum ssp. *leporinum*	Foxtail Barley	FACU
Festuca perennis	Ryegrass	FAC
Panicum capillare	Blue Panic Grass	FACW
POLYGONACEAE – Smartweed Family		
Polygonum aviculare	Prostrate Knotweed	FAC
Rumex crispus	Curly Dock	FAC
SALICACEAE – Willow Family		
Salix × sepulcralis	Weeping Willow	-
ZYGOPHYLLACEAE – Puncture Vine Family		
Tribulus terrestris	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, Fiddyment, Kaseberg, Madera, San Joaquin and Yokohl soils. Cometa soils have an argillic horizon. Fiddyment 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.

LOCATION RAMONA CA
Established Series
Rev. GB/LAB/LCL
01/2003

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 course 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

OSED 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, Fiddyment, 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. Fiddyment 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)

Appendix 6B

Clovis Healthcare Campus Expansion Biotic Study (2008)

CLOVIS HEALTHCARE CAMPUS EXPANSION
BIOTIC STUDY

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Fresno, CA 93721

16 September 2008 File No. 2975-01

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TABLES

CONTRIBUTORS

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Jeff N. Davis, B.S., Project Manager

Jeff Seay, B.A., Senior Wildlife Ecologist

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).

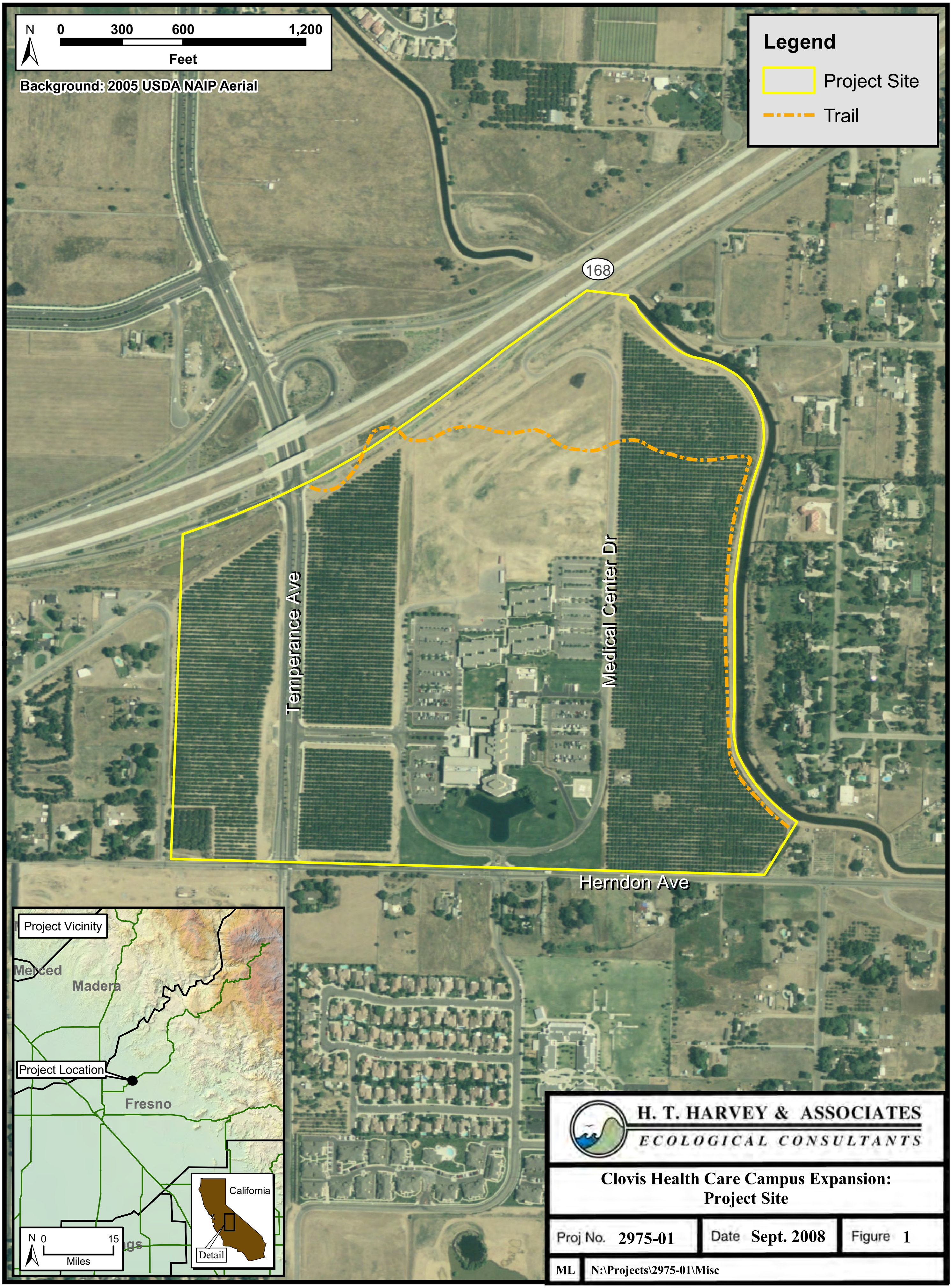
CM 2. Habitat Assessment Survey for Burrowing Owl. A habitat assessment survey for burrowing owl (*Athene cunicularia*), a California Bird Species of Special Concern, shall be conducted no more than 30 days prior to ground-disturbing activities. Burrowing owls require ground squirrel burrows or similar 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.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H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS
Clovis Health Care Campus Expansion:
Project Site
Proj No. 2975-01
Date Sept. 2008
Figure 1
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Table 1. **Summary of Soil Types at the Clovis Healthcare Campus Project Site.**

Soil type	Slope percentage	Soil Coverage in acres
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 ruderale 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[1] (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.[2] 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 (CNDDB; CNDDB 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 CNDDB 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. CNDDB (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

[1] 16 U.S.C., Sec. 703, Supp. I, 1989.
[2] Section 3503.5, 1992.

northeast of the project site. After negative surveys in 1981 and 1987 the population was presumed to be extirpated (CNDDB 2008).

Special-status plant species in Fresno County (CNDDB 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 CNDDB 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 CNDDB (2008) and information available through the Service, CDFG, Museum of Vertebrate Zoology, and California Academy of Sciences.

A CNDDB 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 northhwest 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.

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APPENDIX A.
CDFG STAFF REPORT ON BURROWING OWL MITIGATION

State of California

M e m o r a n d u m

To : "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. Alterative 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 3 1) 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.

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APPENDIX B.
PLANT SPECIES OBSERVED ON THE PROJECT SITE

PLANT SPECIES OBSERVED ON THE PROJECT SITE		
FAMILY NAME	**SCIENTIFIC NAME**	**COMMON NAME**
Amaranthaceae	*Amaranthus albus*	pigweed
Asteraceae	*Ambrosia acanthicarpa*	annual bur-sage
Asteraceae	*Anaphalis margaritacea*	pearly everlasting
Asteraceae	*Conyza canadensis*	horseweed
Asteraceae	*Heterotheca grandiflora*	telegraph weed
Asteraceae	*Lactuca serriola*	prickly lettuce
Asteraceae	*Sonchus asper* ssp. *asper*	prickly sow thistle
Brassicaceae	*Brassica nigra*	black mustard
Euphorbiaceae	*Chamaesyce maculata*	spotted spurge
Euphorbiaceae	*Eremocarpus setigerus*	turkey mullein
Geraniaceae	*Erodium botrys*	broadleaf filaree
Molluginaceae	*Mollugo verticillata*	carpet weed
Poaceae	*Avena fatua*	wild oats
Poaceae	*Bromus diandrus*	ripgut brome
Poaceae	*Cynodon dactylon*	Bermuda grass
Poaceae	*Distichlis spicata*	salt grass
Poaceae	*Paspalum dilatatum*	dallisgrass
Poaceae	*Phalaris minor*	littleseed canarygrass
Polygonaceae	*Polygonum* sp.	knotweed
Solanaceae	*Datura wrightii*	Jimson weed
Zygophyllaceae	*Tribulus terrestris*	puncture vine

APPENDIX C.
SPECIAL-STATUS PLANT SPECIES
CONSIDERED BUT REJECTED FOR OCCURRENCE ON THE PROJECT SITE

SPECIAL-STATUS PLANT SPECIES CONSIDERED BUT REJECTED 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**
Castilleja campestris ssp. *succulenta*	Succulent owl's-clover					X	X
Caulanthus californicus	California jewel-flower			X			X
Downingia pusilla	Dwarf downingia			X		X	X
Eryngium spinosepalum	Spiny-sepaled button-celery			X		X	X
Leptosiphon serrulatus	Madera leptosiphon				X		X
Orcuttia inaequalis	San Joaquin Valley orcutt grass					X	X
Orcuttia pilosa	Hairy orcutt grass					X	X
Pseudobahia bahiifolia	Hartweg's golden sunburst		X	X			X
Pseudobahia peirsonii	San Joaquin adobe sunburst		X	X			X
Sagittaria sanfordii	Sanford's arrowhead						X
Tropidocarpum capparideum	Caper-fruited tropidocarpum	X	X				X
Tuctoria greenei	Greene's tuctoria					X	X

APPENDIX D.
SPECIAL-STATUS WILDLIFE SPECIES
CONSIDERED BUT REJECTED FOR OCCURRENCE ON THE PROJECT SITE

SPECIAL-STATUS WILDLIFE SPECIES CONSIDERED BUT REJECTED FOR OCCURRENCE ON THE PROJECT SITE				
Scientific Name	**Common Name**	**Outside of known current range**	**Lack of suitable aquatic habitat**	**Lack of suitable terrestrial habitat**
Branchinecta lynchi	Vernal pool fairy shrimp		X	
Branchinecta mesovallensis	Midvalley fairy shrimp		X	
Lepidurus packardi	Vernal pool tadpole shrimp		X	
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle		X	X
Mylopharodon conocephalus	Hardhead		X	
Ambystoma californiense	California tiger salamander		X	X
Spea hammondii	Western spadefoot		X	X
Actinemys marmorata	Western pond turtle		X	X
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	X		X
Agelaius tricolor	Tricolored blackbird		X	X
Antrozous pallidus	Pallid bat			X
Eudera macualtum	Spotted bat			X
Eumops perotis californicus	Western mastiff bat			X
Lasiurus cinereus	Hoary bat			X
Dipodomys nitratoides exilis	Fresno kangaroo rat	X		X
Taxidea taxus	American badger			X
Vulpes macrotis mutica	San Joaquin kit fox	X		X

Appendix 7
Cultural Resources Assessment

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:

C. Kristina Roper, M.A., RPA
Sierra Valley Cultural Planning
41845 Sierra Drive
Three Rivers, CA 93271
(559) 561-3816

Submitted to:

Mr. Scott B. Odell, AICP
Odell Planning & Research, Inc.
49370 Road 426, Suite C
Oakhurst, CA 93644

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)*

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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 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

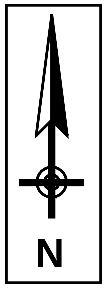
The Project APE is located at the eastern edge of the City of Clovis, south of State Route 168 and west of the Enterprise Canal. This area is developing to urban and residential uses; however, residual rural residential uses and vacant parcels remain in the vicinity. Adjacent land uses include urban 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.

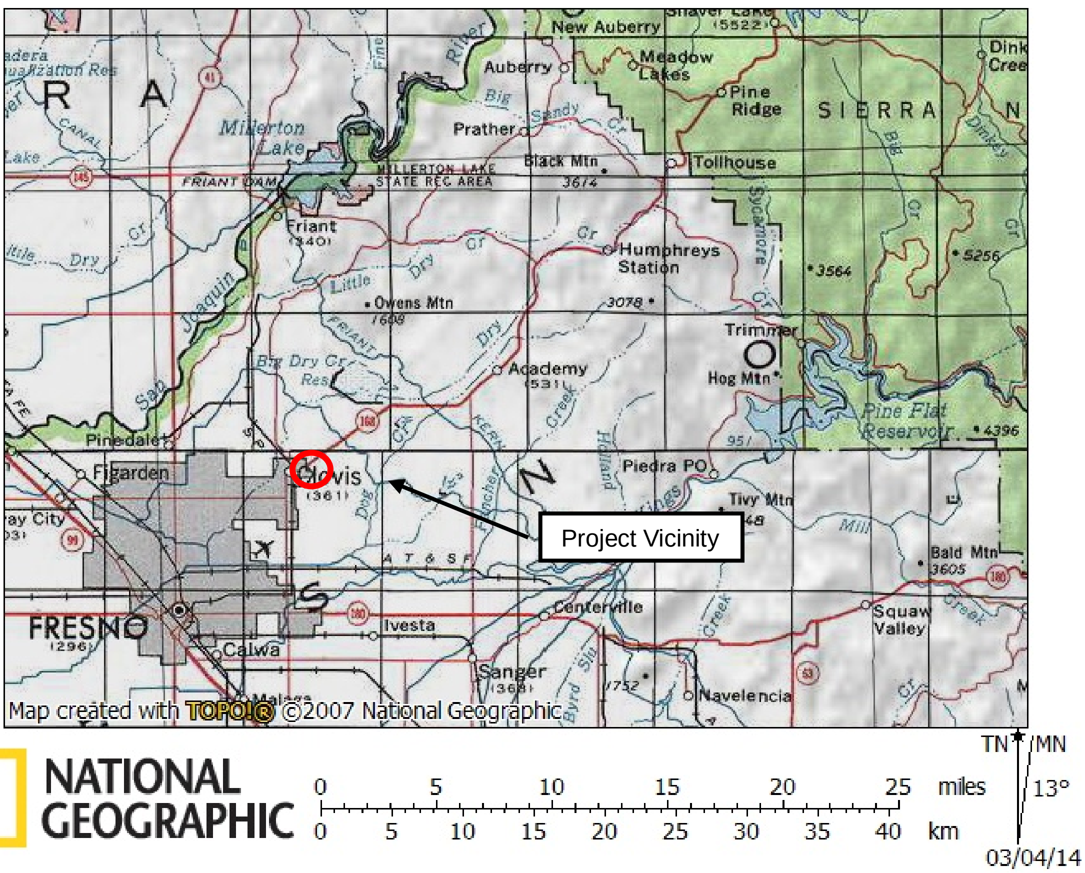
The proposed expansion is divided into two major phases: a 2-10 year expansion plan and a 20 year expansion plan. The initial expansion will increase the building square footage of the medical center by a net increase of 394,564 square feet to a total of 1,114,112 square feet, taking into account that 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

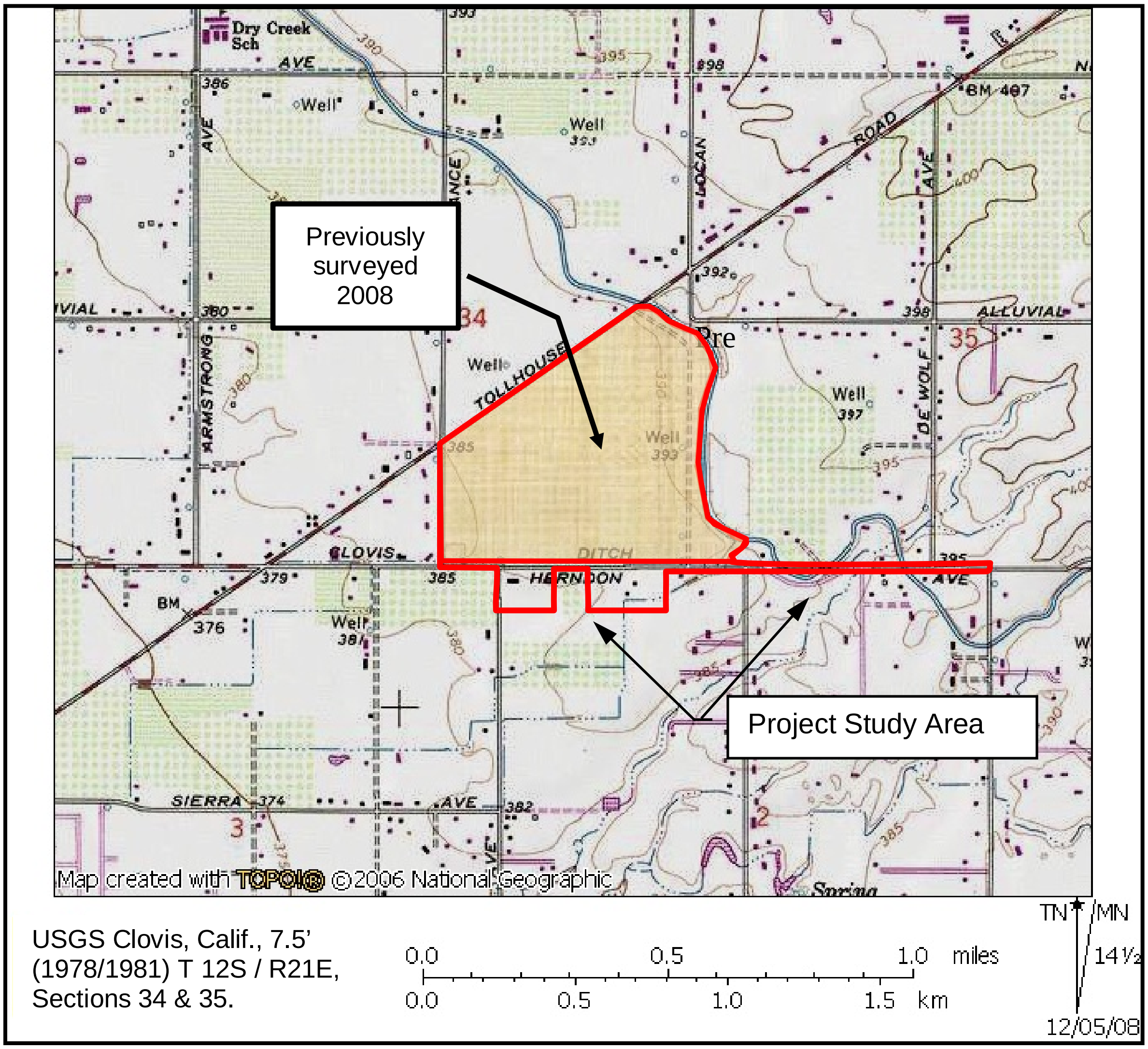


MAP 1. PROJECT VICINITY

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



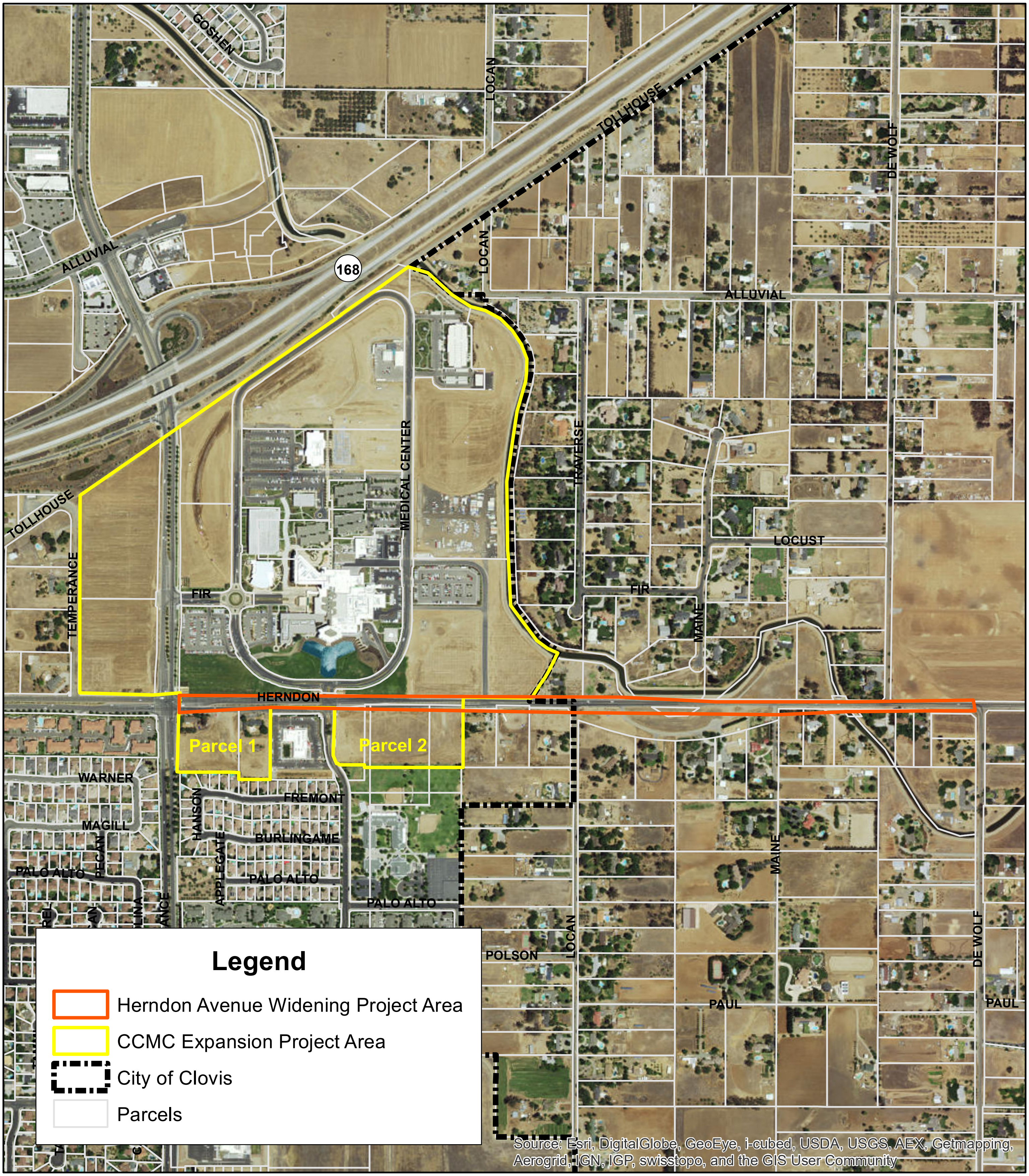
NATIONAL GEOGRAPHIC



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

ODELL *Planning & Research, Inc.*

0 500 1,000 2,000 Feet

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 millingstones (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).

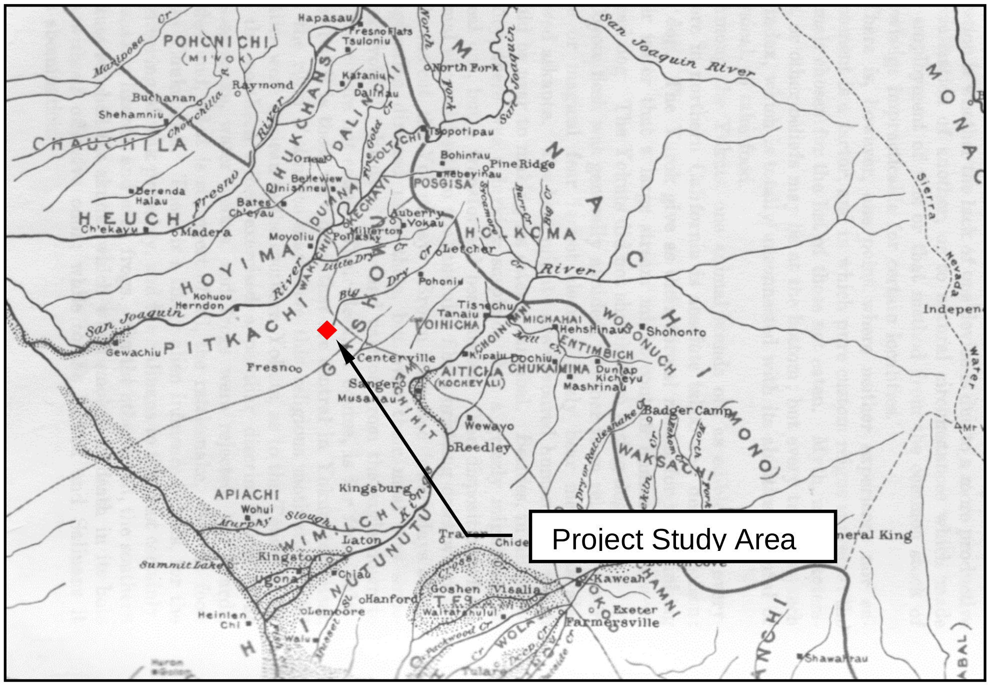


Figure 5. Northern Valley Yokuts Village Locations (from Kroeber 1925: Plate 47).

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.

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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

California
Historical
Resources
Information
System

Fresno
Kern
Kings
Madera
Tulare

Southern San Joaquin Valley Information Center
California State University, Bakersfield
Mail Stop: 72 DOB
9001 Stockdale Highway
Bakersfield, California 93311-1022
(661) 654-2289
E-mail: ssjvic@csub.edu
Website: www.csub.edu/ssjvic

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.

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

NOISE IMPACT ASSESSMENT

FOR

MASTER PLAN EXPANSION OF THE CLOVIS COMMUNITY MEDICAL CENTER PROJECT

CLOVIS, CA

JULY 2017

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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.

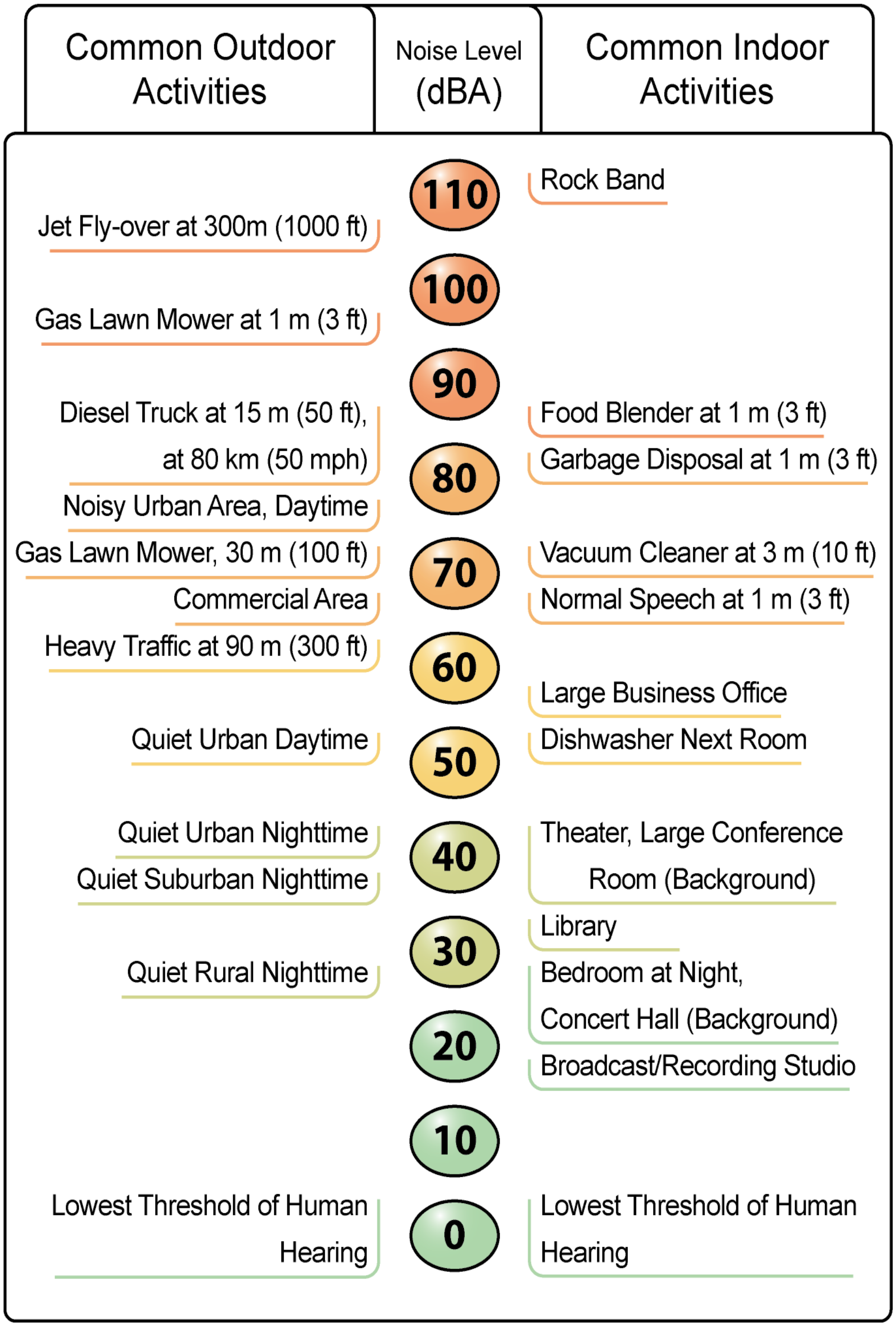
FREQUENCY

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



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 Ldn 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 Ldn.
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 equates 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 Ldn 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_{dn} would equate to an interior noise level of 45 dBA CNEL/L_{dn}. An interior noise level of 45 dB CNEL/L_{dn} 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_{dn} 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_{dn} 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_{dn} 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[3]/55[4]	65[7]
	Mobile Home	--	65[5]
Commercial/Industrial	Hotel, Motel, Transient Lodging	45	65[6]
	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.

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

Notes:
Compatibility zones indicate the degree to which the land uses listed are compatible with the noise levels (CNEL) shown in the table.
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.
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.
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.
Zone D. Clearly Incompatible. New construction or development should generally not be undertaken.

Table 5
Damage Potential to Buildings at Various Groundborne Vibration Levels

Structure and Condition	Vibration Level (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

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.
Source: Caltrans 2013

Table 6
Annoyance Potential to People at Various Groundborne Vibration Levels

Human Response	Vibration Level (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

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.
Source: Caltrans 2013

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
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.					

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
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).	

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:

a) 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.

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 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) 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
Sources: FTA 2006	

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 reduce 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 is 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
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.				

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 is considered less than significant.

<u>Non-Transportation Noise Sources</u>

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:

<u>Parking Structure</u>

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

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.

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.

<u>Parking Lots</u>

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.

<u>Central Plant Expansion</u>

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.

<u>Building Mechanical Equipment</u>

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.

<u>Herndon Avenue Widening</u>

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
Source: FTA 2006, Caltrans 2013	

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?***

<u>Non-Transportation Noise</u>

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.)

<u>Transportation Noise</u>

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.

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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 (±2.0dB)?: 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
DSTANCE 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

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

JLB Traffic Engineering, Inc.

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JLB Traffic Engineering, Inc.

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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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 is 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.

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

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 (sec/veh)	*LOS*	*Average Delay (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	**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 II: Existing Segment LOS Results

Study Segment	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
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

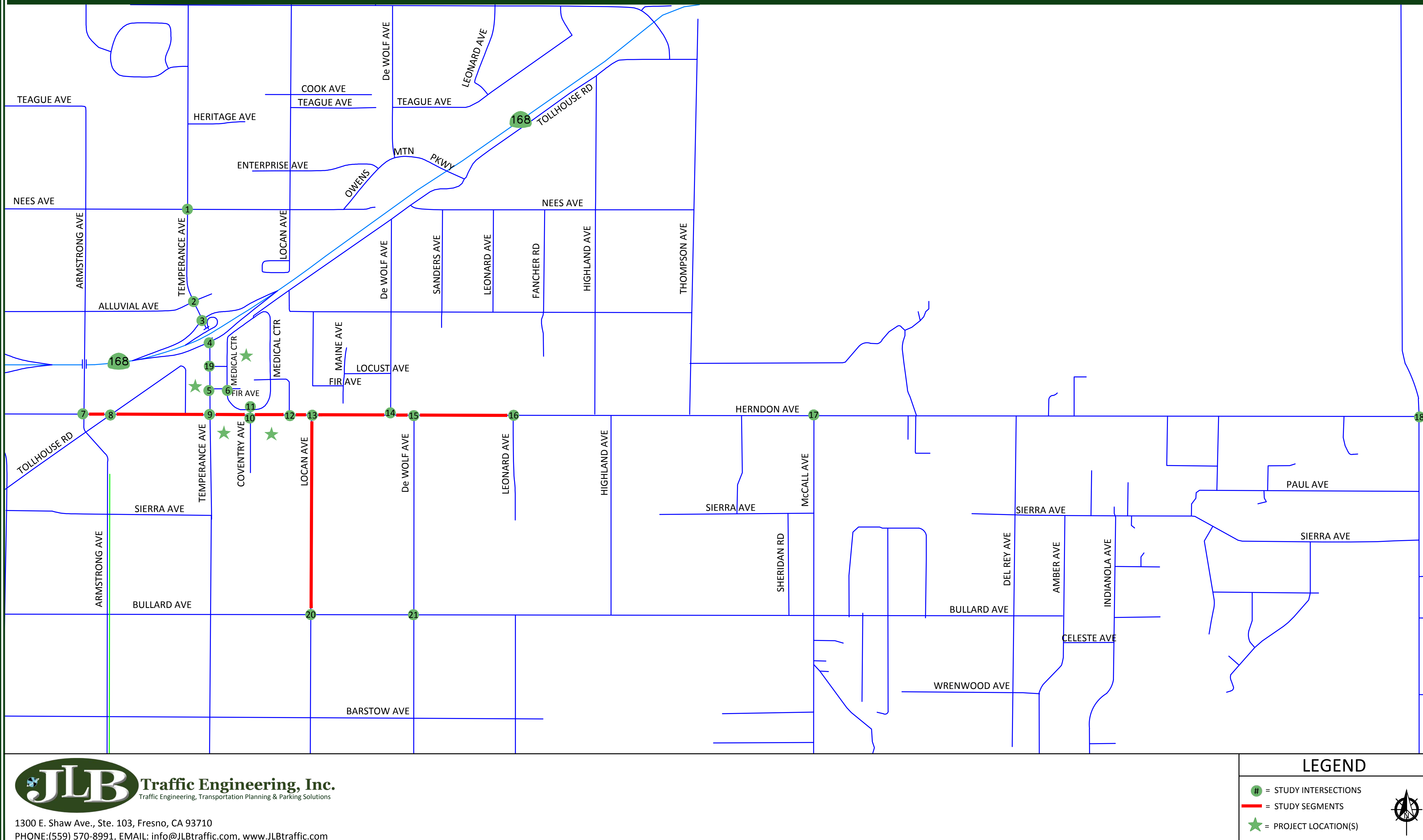
Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

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



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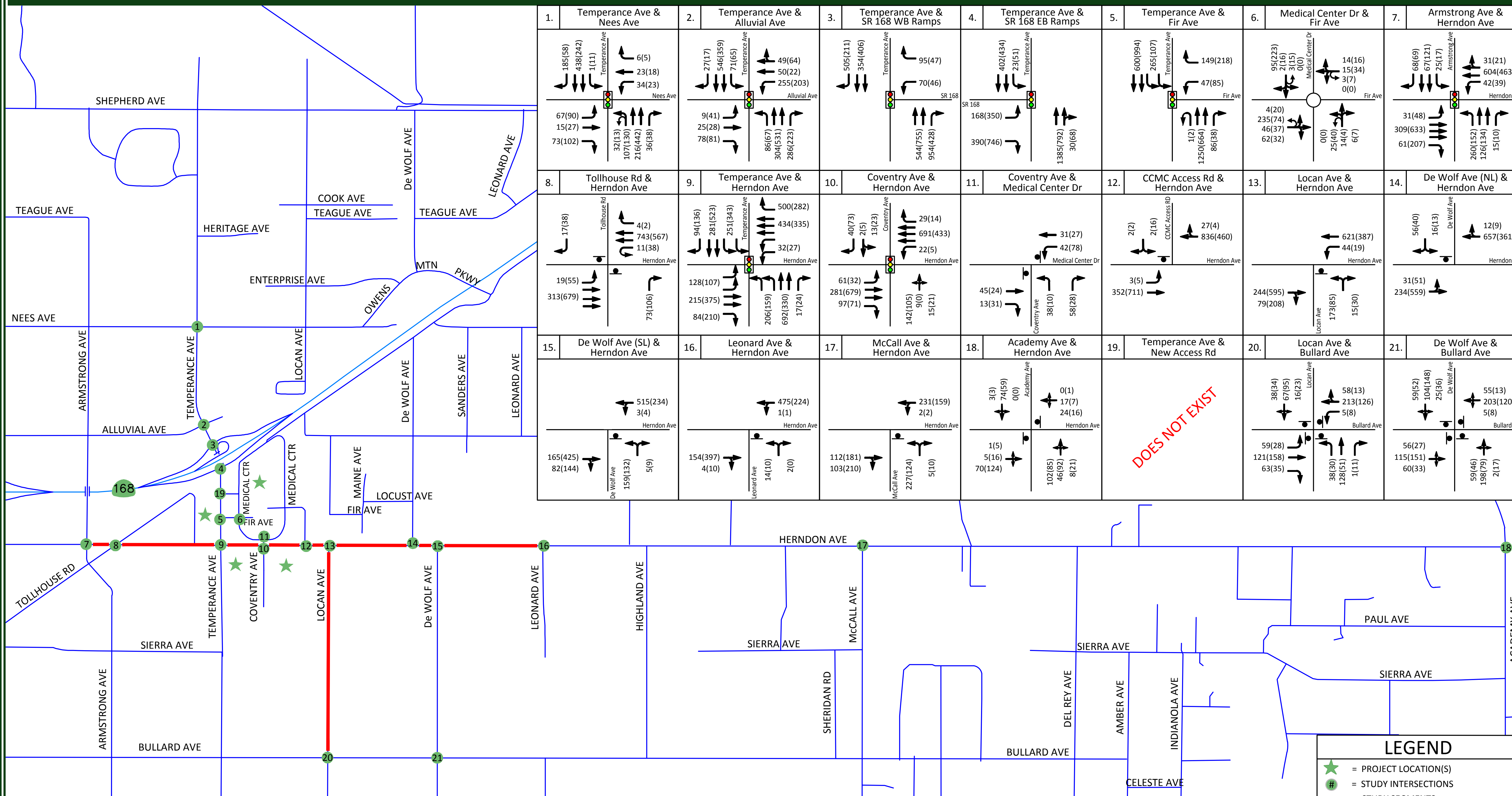
City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA
Existing - Traffic Volumes, Geometrics and Controls

Figure 2



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

Not To Scale

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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 is 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*
Total Project Trips	**30,008**	**1,153**	**469**	**1,622**	**978**	**1,674**	**2,652**

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 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

	Intersection	*Intersection Control*	*(7-9) AM Peak Hour*		*(4-6) PM Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
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	**65.0**	**E**	**77.6**	**E**
		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

Study Segment	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
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

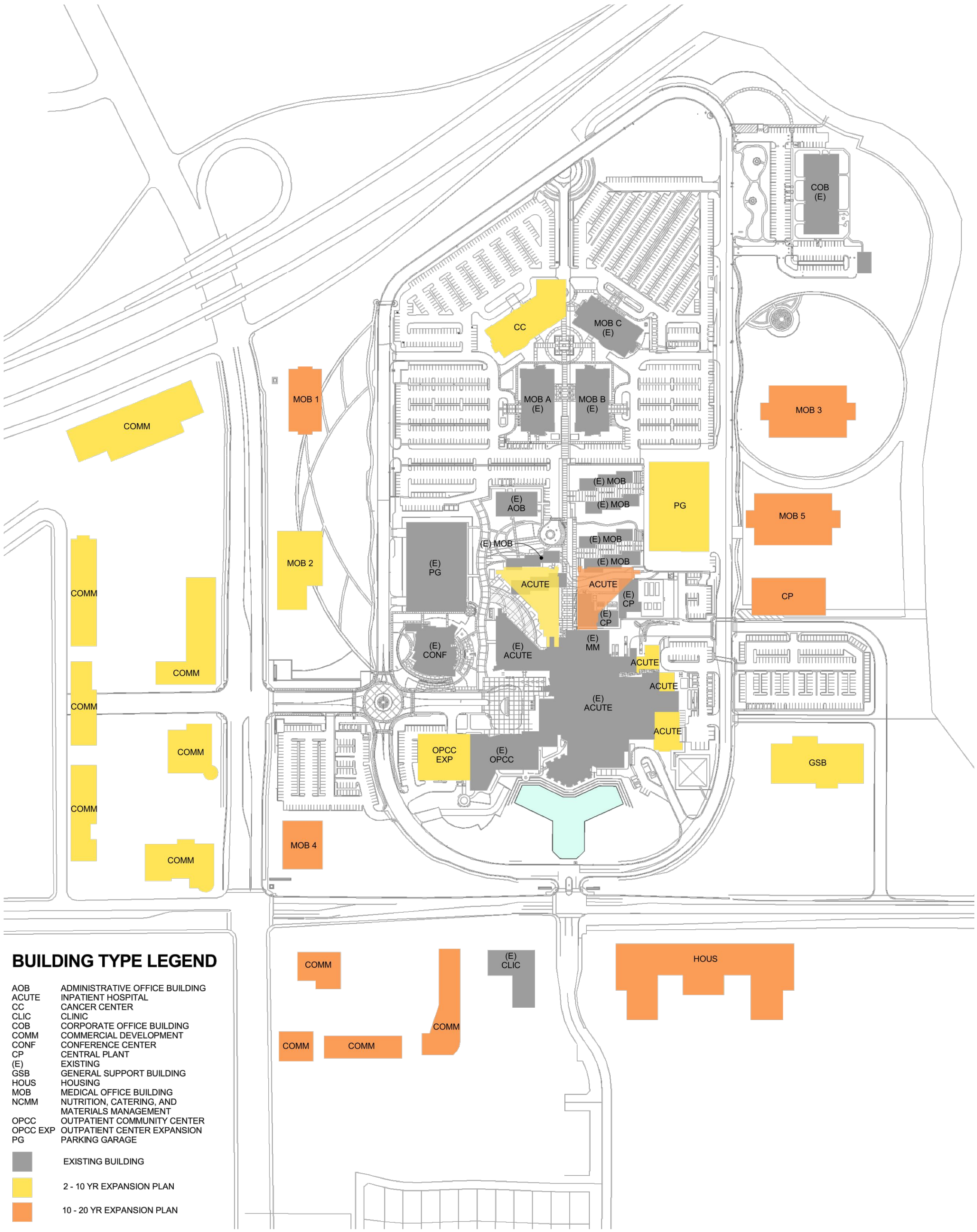
Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

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.

City of Clovis - CCMC Master Plan Expansion TIA
Site Plan

Figure 3



BUILDING TYPE LEGEND

AOB	ADMINISTRATIVE OFFICE BUILDING
ACUTE	INPATIENT HOSPITAL
CC	CANCER CENTER
CLIC	CLINIC
COB	CORPORATE OFFICE BUILDING
COMM	COMMERCIAL DEVELOPMENT
CONF	CONFERENCE CENTER
CP	CENTRAL PLANT
(E)	EXISTING
GSB	GENERAL SUPPORT BUILDING
HOUS	HOUSING
MOB	MEDICAL OFFICE BUILDING
NCMM	NUTRITION, CATERING, AND MATERIALS MANAGEMENT
OPCC	OUTPATIENT COMMUNITY CENTER
OPCC EXP	OUTPATIENT CENTER EXPANSION
PG	PARKING GARAGE

EXISTING BUILDING

2 - 10 YR EXPANSION PLAN

10 - 20 YR EXPANSION PLAN

Not To Scale

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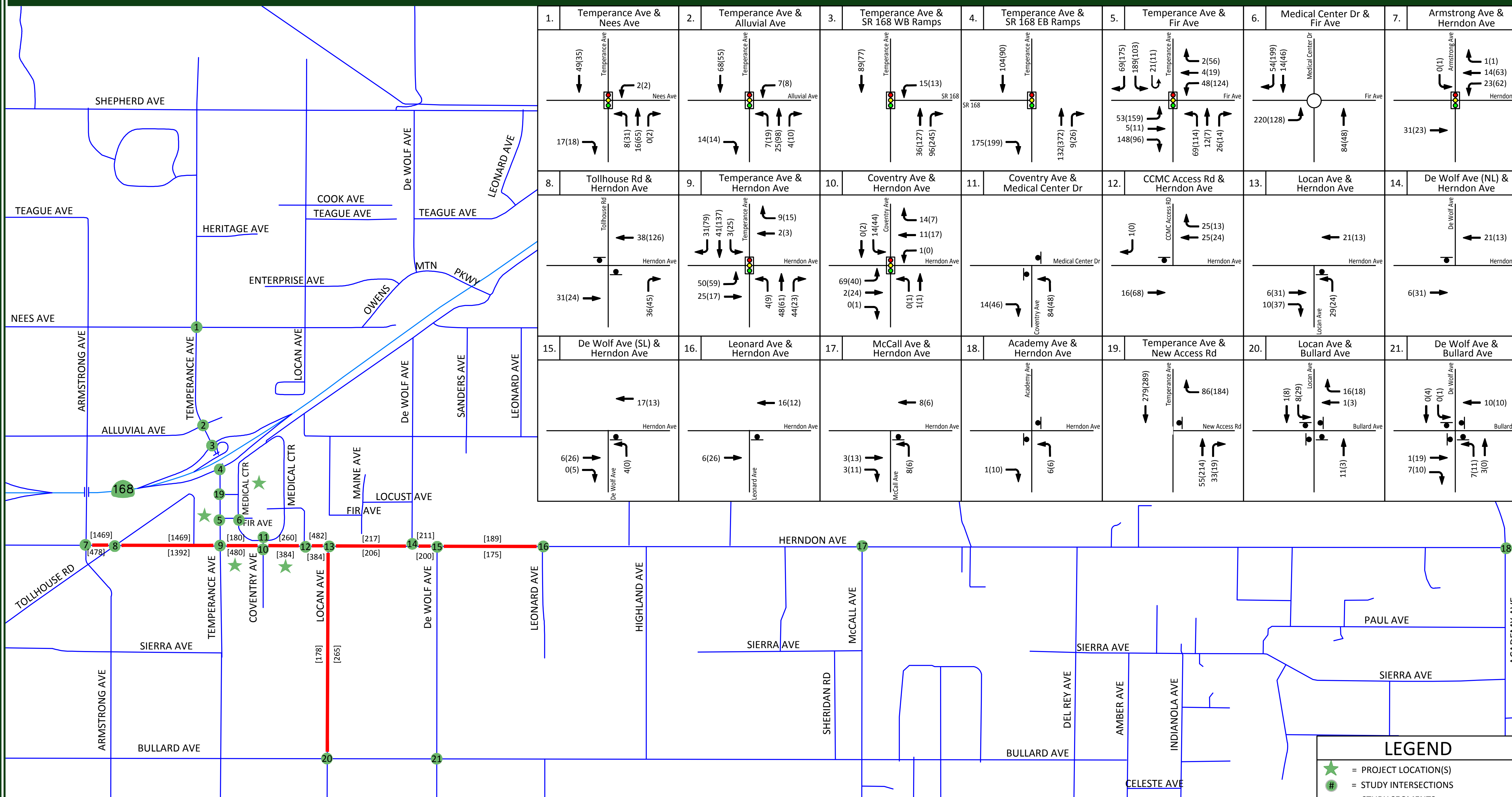
City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA
Phase 1 (2026) - Project Only Trip Assignment

Figure 4



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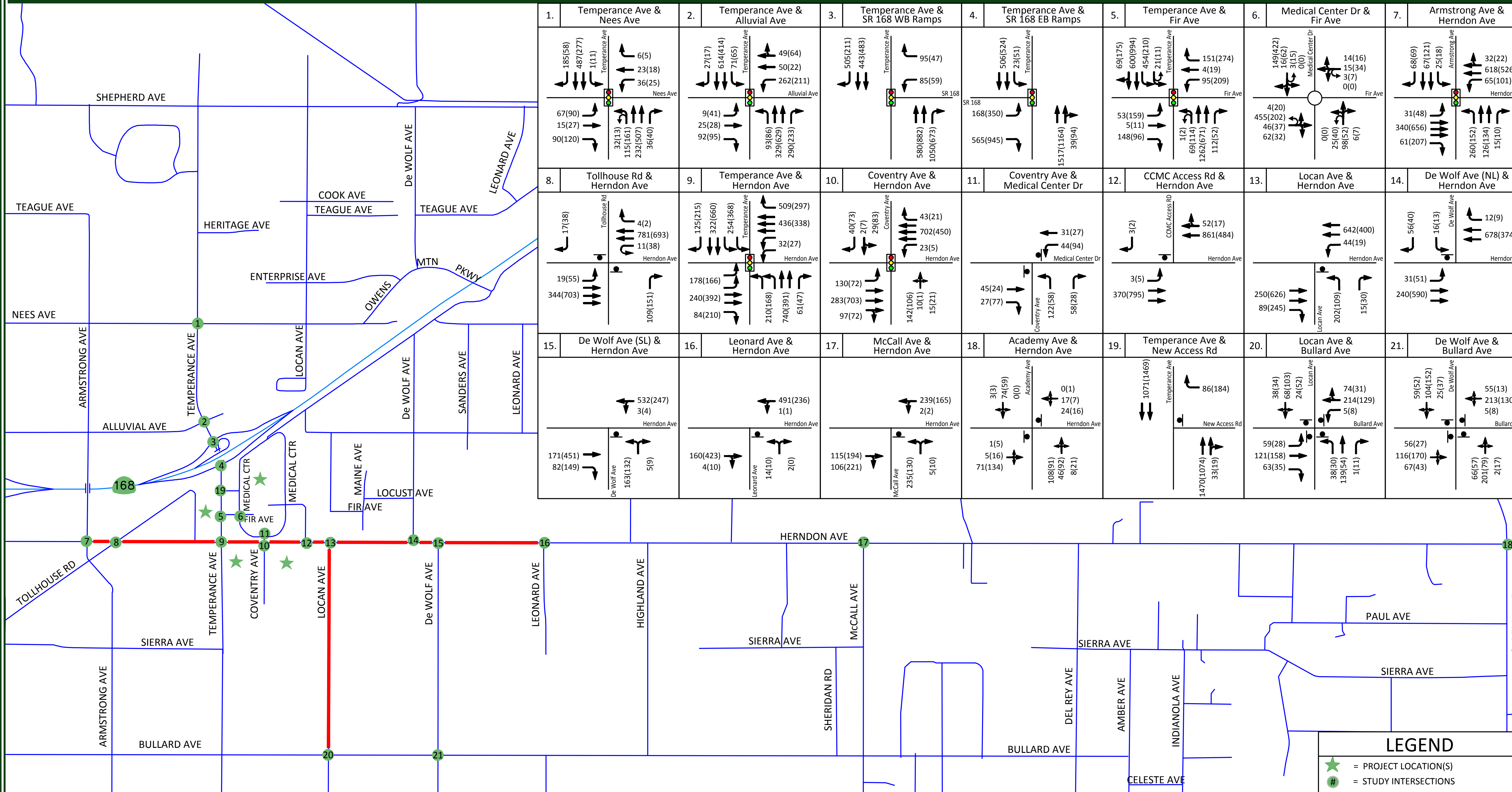
City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA
Existing plus Project Phase 1 - Traffic Volumes, Geometrics and Controls

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
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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

Approved Project Location	*Approved or Pipeline Project Name*	*Daily Trips*	*AM Peak Hour Trips*	*PM Peak Hour Trips*
A	TT 5427 Single Family Subdivision[1]	3,265	257	343
B	TT 5461[1]	457	36	48
C	TT 5472 Single Family Subdivision (portion of)[1]	1,457	115	153
D	TT 5546[2]	314	25	33
E	TT 5550 Single Family Subdivision[2]	295	23	31
F	TT 5605[2]	3,084	243	324
G	TT 5701[2]	1,152	91	121
H	TT 5717 Various Land Uses (portion of)[3]	4,823	595	622
I	TT 5720A[2]	219	17	23
J	TT 5836[1]	381	30	40
K	TT 6049[2]	238	19	25
L	TT 6067[3]	942	74	99
M	TT 6072 Single Family Subdivision (portion of)[1]	809	64	85
N	TT 6109 Single Family Subdivision[4]	2,742	216	288
O	TT 6112 Single Family Subdivision (portion of)[2]	724	57	76
P	TT 6128[4]	419	33	44
Q	TT 6145[4]	657	52	69
R	20,000 square-foot Office Building[2]	221	31	30
S	C-09-106[3]	2,065	148	159
T	Harbor House Apartments[4]	313	24	29
U	Harlan Ranch Commercial[2]	4,687	105	407
V	RT Park[1]	16,055	2,351	2,153
W	Subdivision at NWQ of Ashlan and De Wolf[2]	619	49	65
Total Approved and Pipeline Project Trips		**45,938**	**4,655**	**5,267**

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

	Intersection	Intersection Control	(7-9) AM Peak Hour		(4-6) PM Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
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	**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 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

Study Segment	Limits	Lanes	24-hour Volume	LOS
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

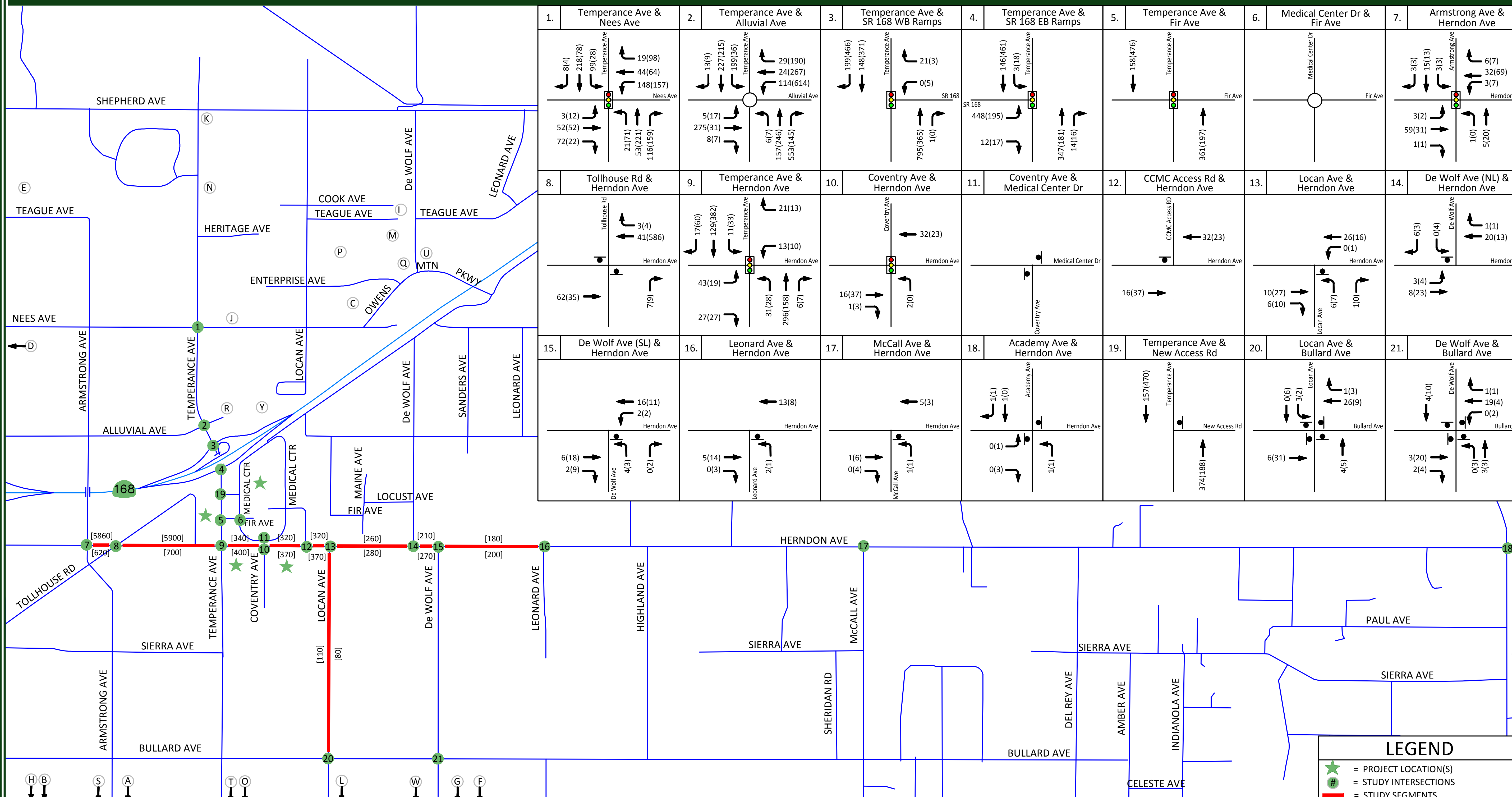
Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

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



LEGEND
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- = STUDY SEGMENTS
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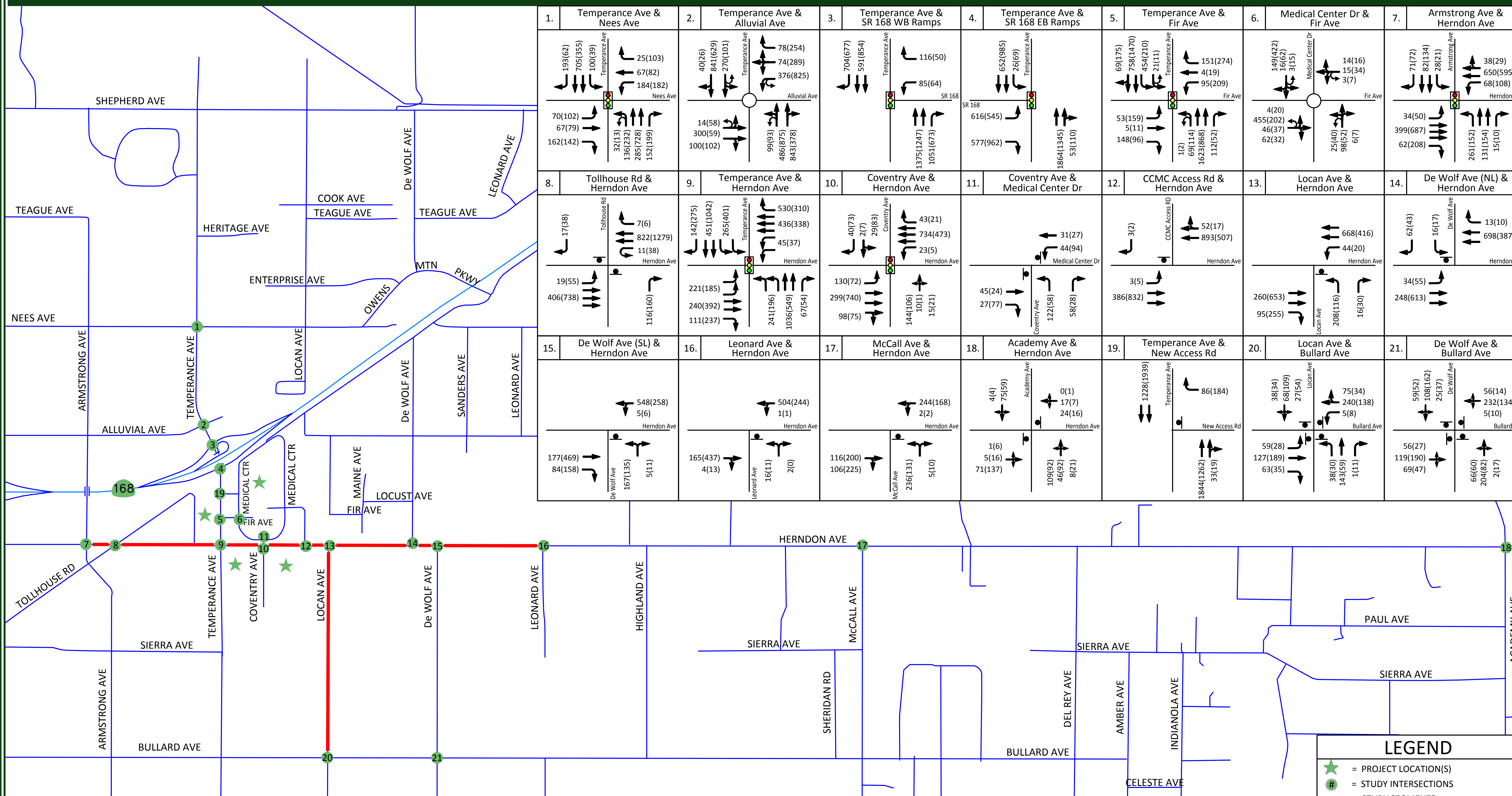
City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA
Near Term plus Project Phase 1 - Traffic Volumes, Geometrics and Controls

Figure 7



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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 (sec/veh)	*LOS*	*Average Delay (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	**46.1**	**D**	**50.8**	**D**
		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	**64.1**	**E**	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	**65.4**	**E**	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	**>120**	**F**	**>120**	**F**
		Signalized (Mitigated)	21.0	C	18.5	B
14	Herndon Avenue / De Wolf Avenue (NL)	One-Way STOP	19.3	C	**37.4**	**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)	22.0	C	22.3	C
16	Herndon Avenue / Leonard Avenue	One-Way STOP	**69.5**	**F**	**>120**	**F**
		Signalized (Mitigated)	16.9	B	22.7	C
17	Herndon Avenue / McCall Avenue	Two-Way STOP	**>120**	**F**	**>120**	**F**
		Signalized (Mitigated)	40.3	D	39.5	D
18	Herndon Avenue / Academy Avenue	Two-Way STOP	**26.3**	**D**	**93.3**	**F**
		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	**64.1**	**F**	**67.4**	**F**
		Signalized (Mitigated)	48.5	D	42.5	D
21	Bullard Avenue / De Wolf Avenue	All-Way STOP	**68.7**	**F**	**78.1**	**F**
		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

Study Segment	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
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

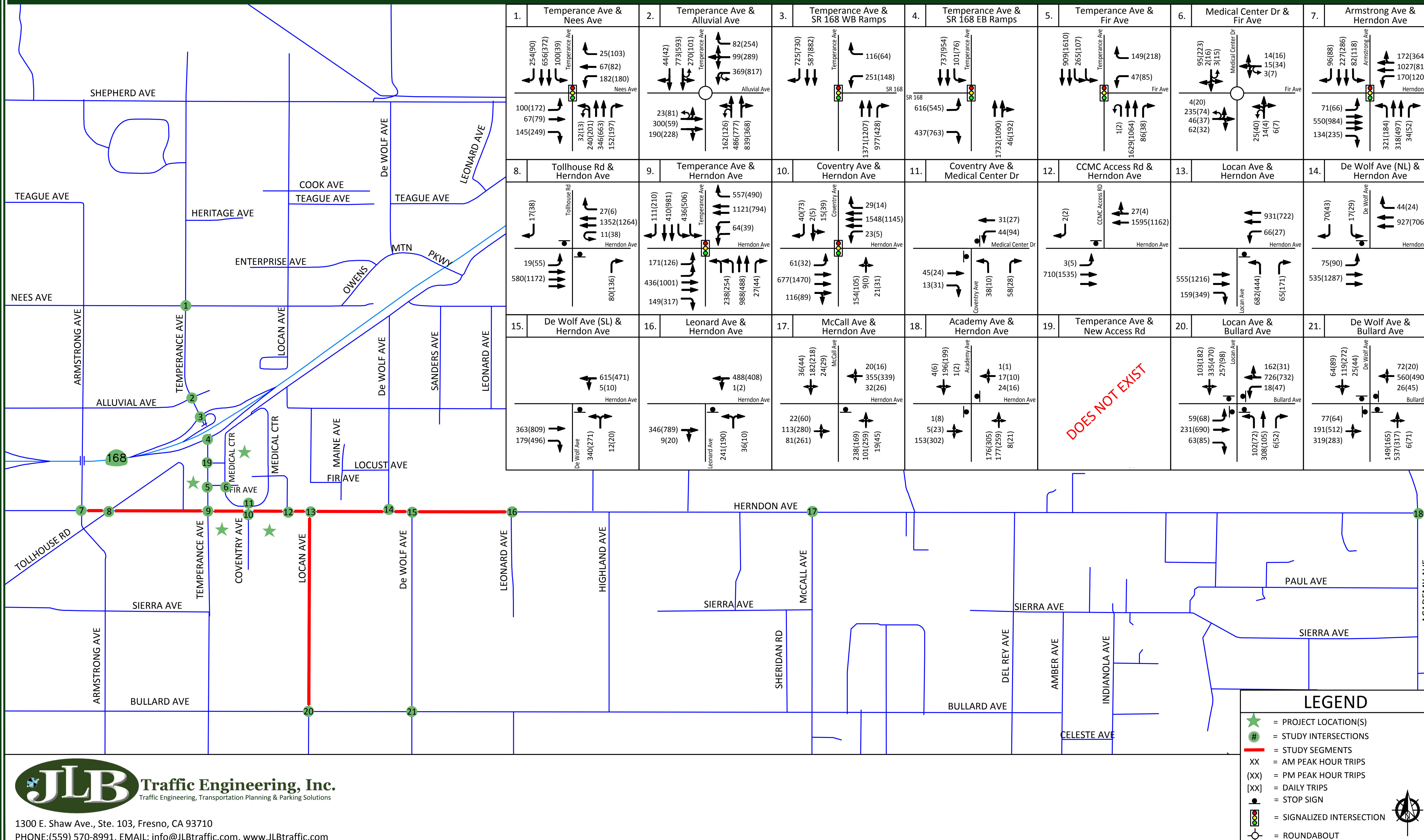
Notes: LOS = Level of Service per the Florida Roadway Segment LOS Tables

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



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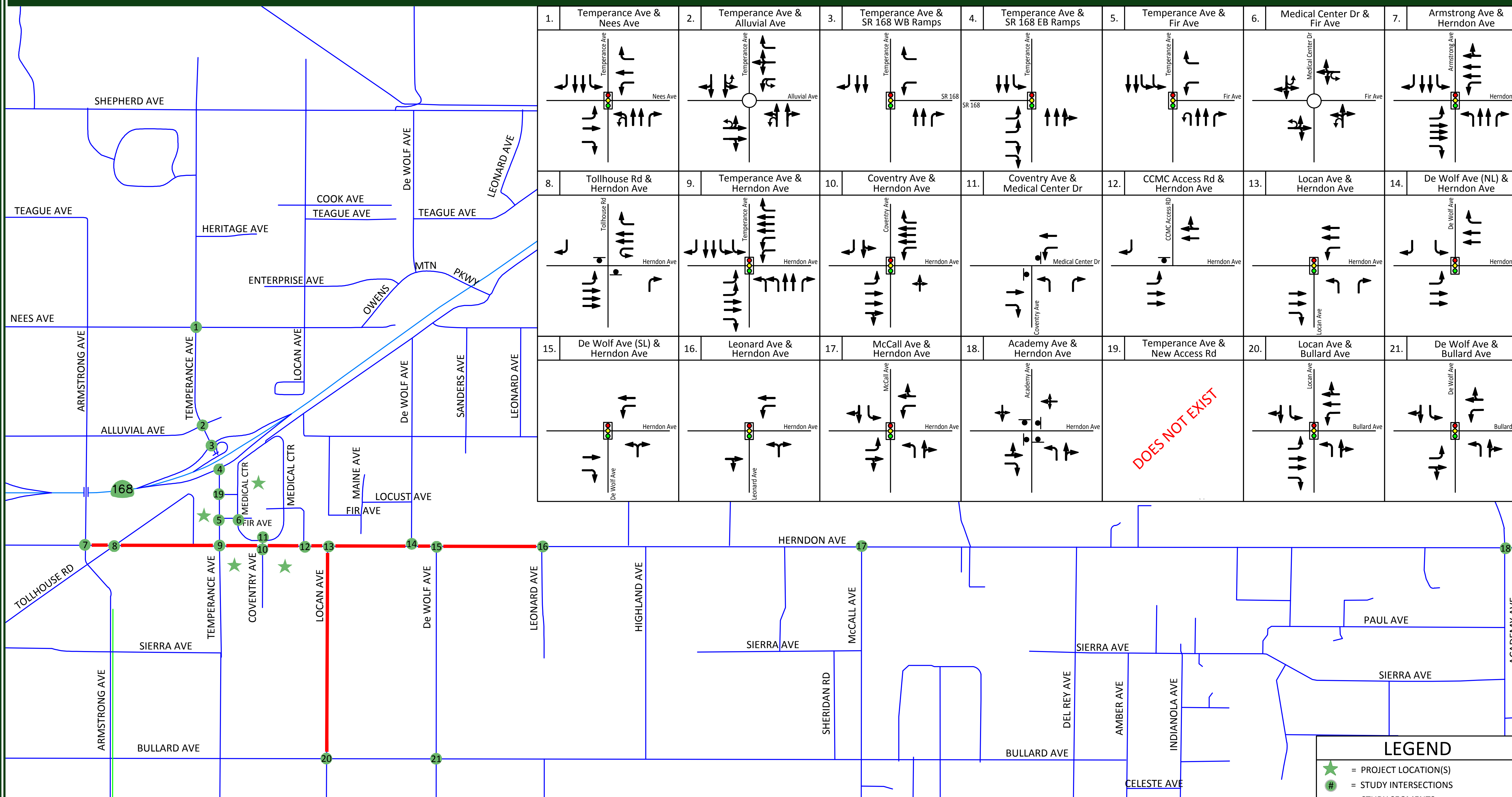
City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA
Cumulative Year 2035 No Project - Mitigated Geometrics and Controls

Figure
9



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 (sec/veh)	*LOS*	*Average Delay (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

Study Segment	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
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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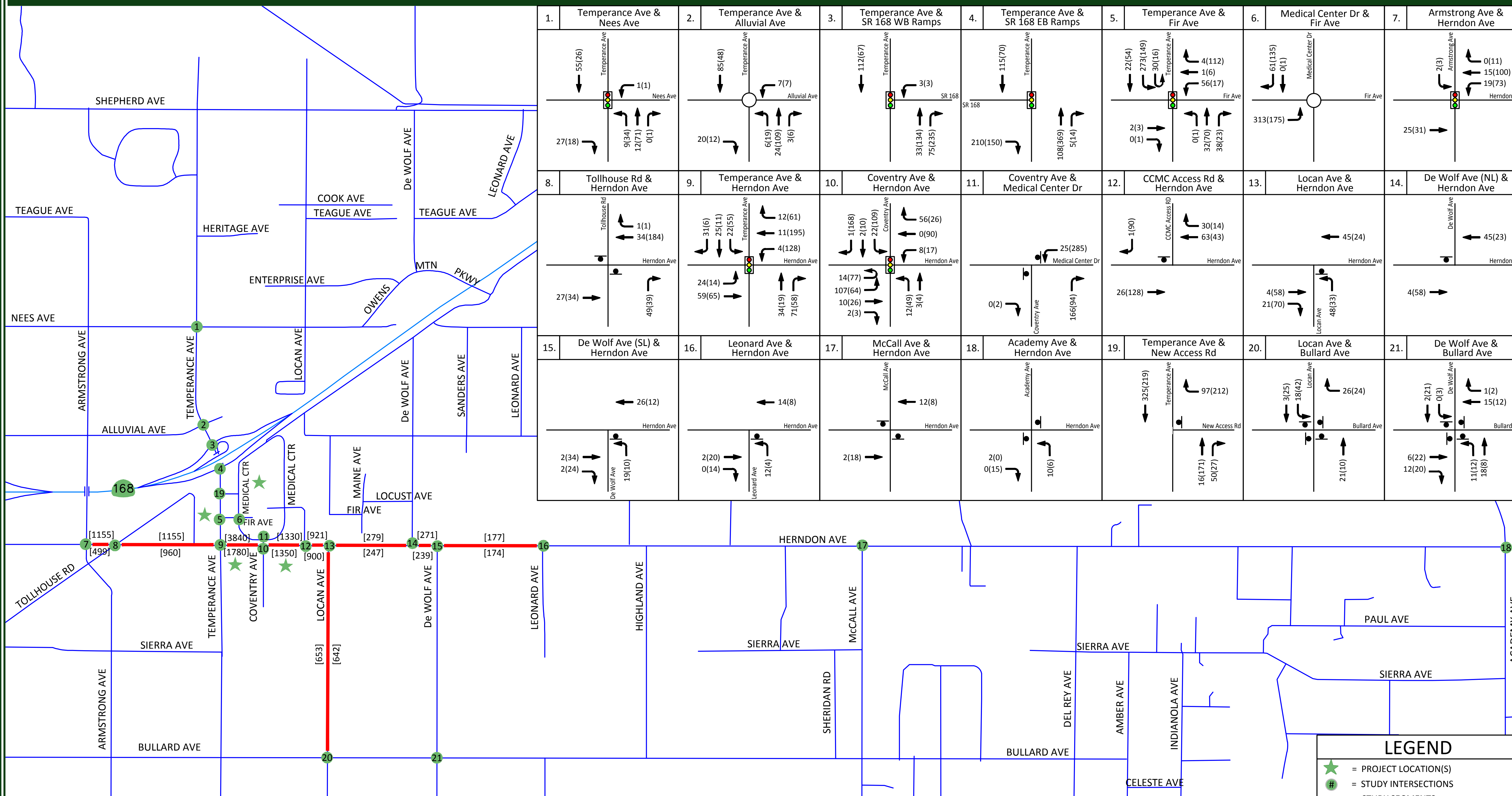
Phase 2 (2035) - Project Only Trip Assignment

Figure 10



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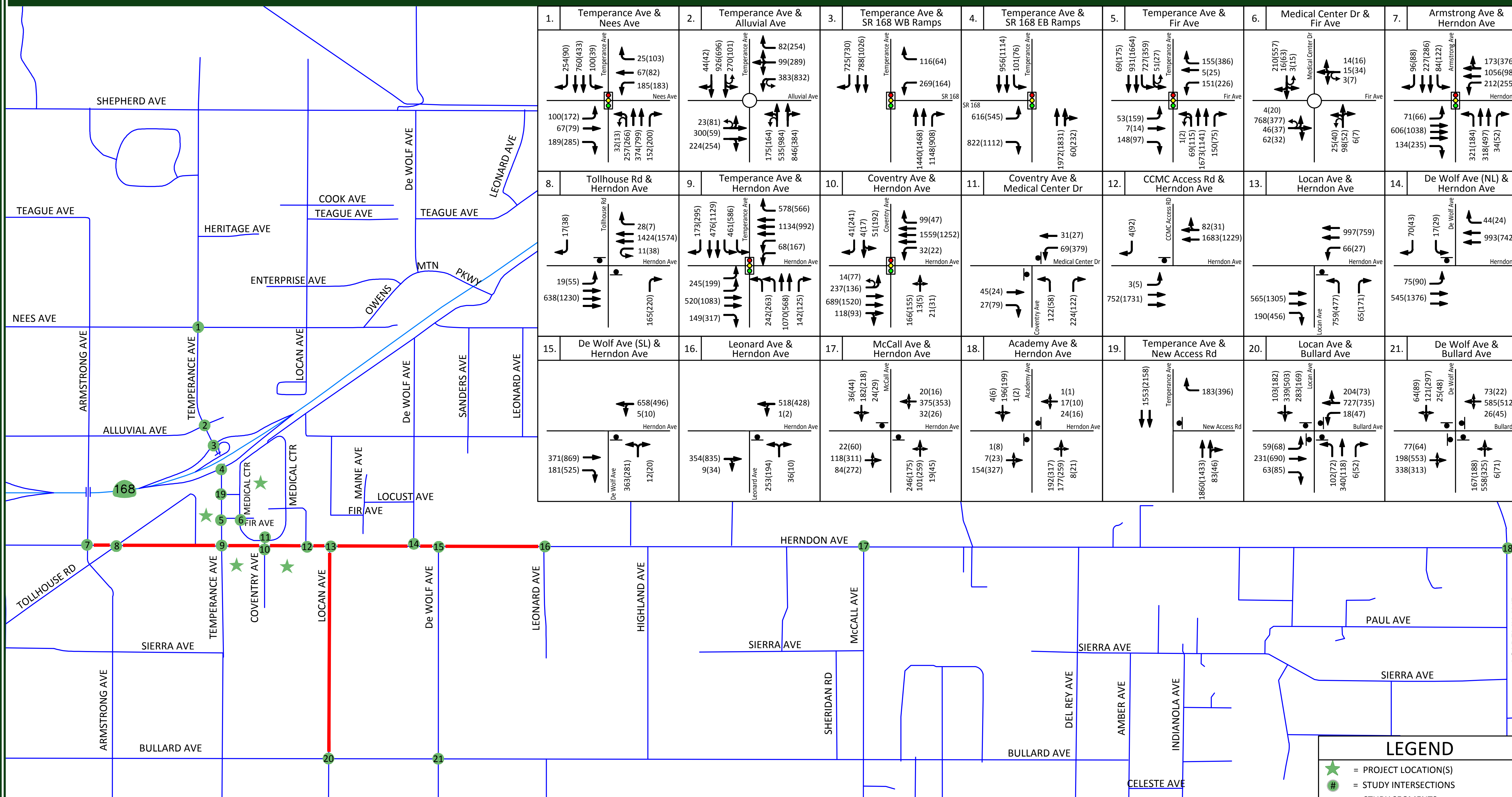
Cumulative Year 2035 plus Project - Traffic Volumes, Geometrics and Controls

Figure 11



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

Not To Scale

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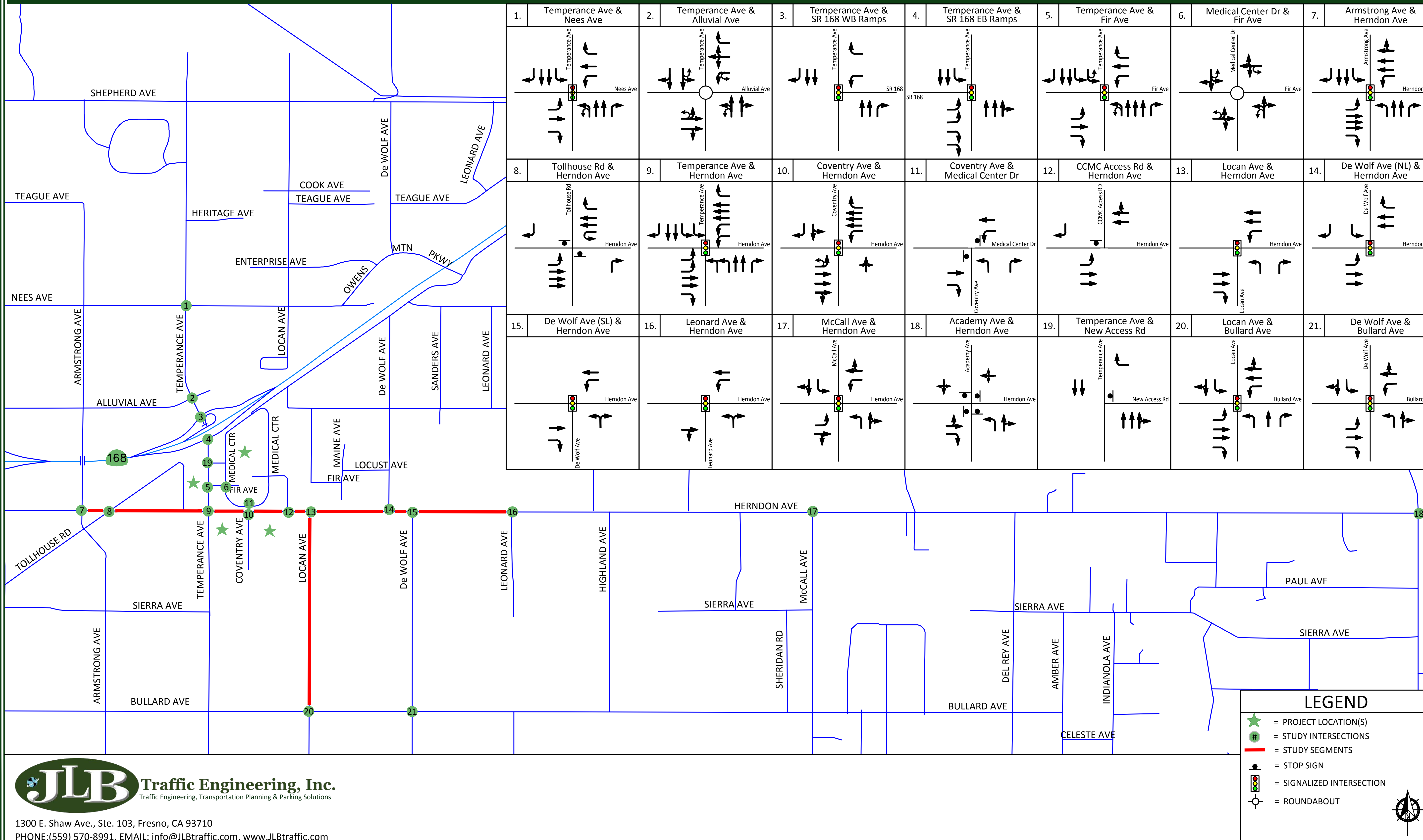
City of Clovis - Clovis Community Medical Center Master Plan Expansion TIA
Cumulative Year 2035 plus Project - Mitigated Geometrics and Controls

Figure 12



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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 un-necessary 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

- 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 Storage Length (ft.)		Existing		Existing + Project		Near Term + Project		2035 No Project		2035 + 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

Table XVI: Queuing Analysis (Continued)

ID	Intersection	Existing Queue Storage Length (ft.)		Existing		Existing + Project		Near Term + Project		2035 No Project		2035 + 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

Table XV: Queuing Analysis (Continued)

ID	Intersection	Existing Queue Storage Length (ft.)		Existing		Existing + Project		Near Term + Project		2035 No Project		2035 + 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 Traffic Volumes (PM Peak)	Year 2035 + Project Traffic Volumes (PM Peak)	Project PM Peak Hour Trips	Project Fair 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

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 is 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.

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References

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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

Appendix A: Methodology

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[a]**	
	≤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

[a] = 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 the 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 i ndividual 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

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 ≤ 1.0	**v/c > 1.0**
≤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

Appendix B: Draft Scope of Work

September 20, 2016

Mike Harrison, P.E.
City Engineer
City of Clovis
1033 Fifth Street
Clovis, CA 93612

Via Email Only: 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

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
Total Project Trips					**15,190**			**750**	**290**	**1,040**			**415**	**909**	**1,324**

Table II: Year 2026 Project Only Trip Generation (Phase 1: 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
Total Project Trips					**17,546**			**633**	**283**	**916**			**586**	**932**	**1,518**

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
Total Project Trips					**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
Total Project Trips	32,433	1,279	503	1,782	1,046	1,846	2,892

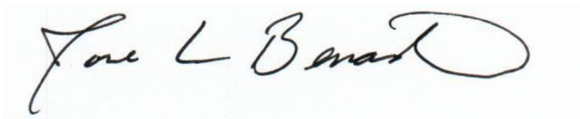
Near Term Projects to be Included

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.

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.

Sincerely,

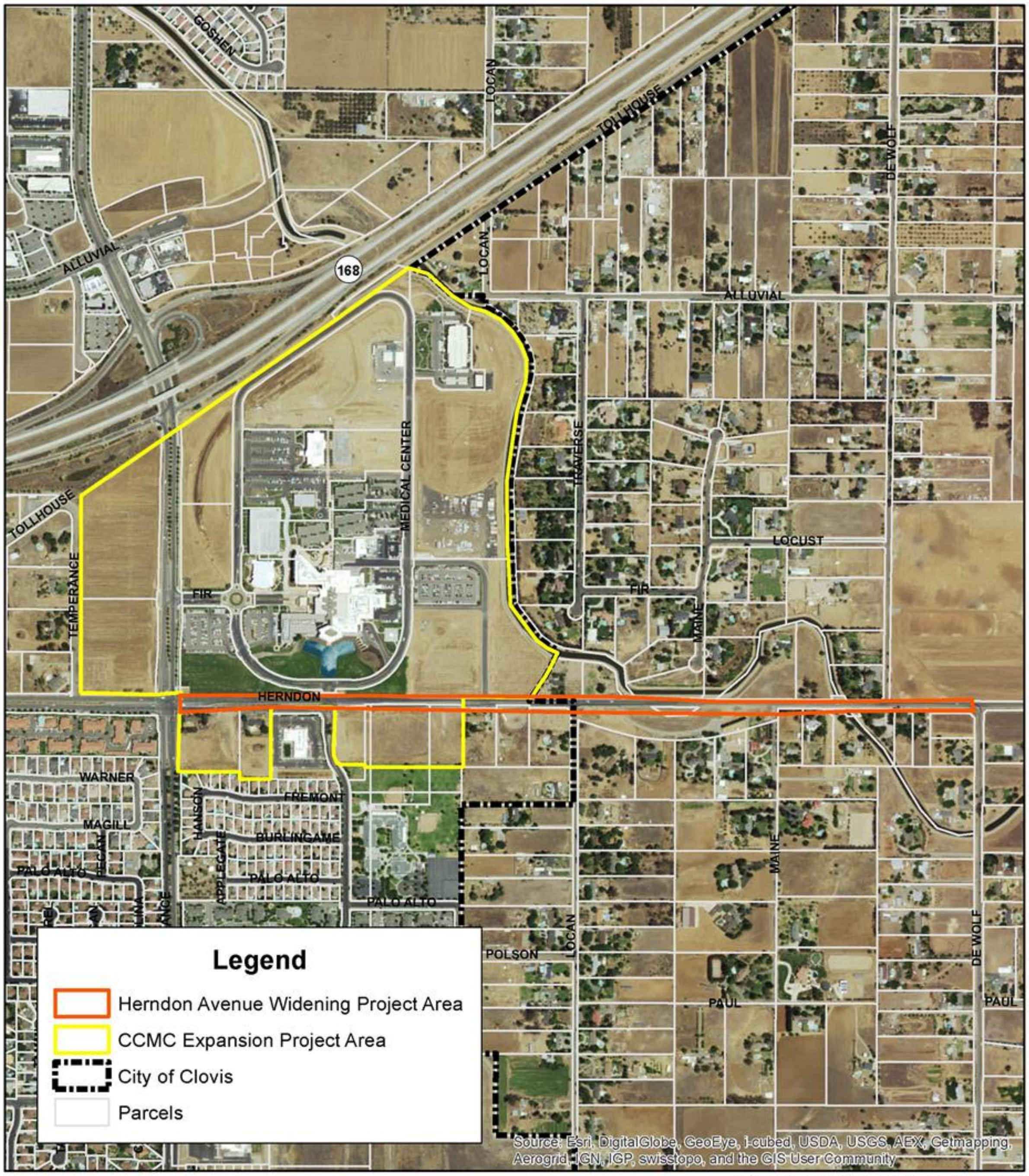


Jose Luis Benavides, P.E., T.E.
President

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

Exhibt 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.

0 500 1,000 2,000 Feet

Exhibt B – Site Plan

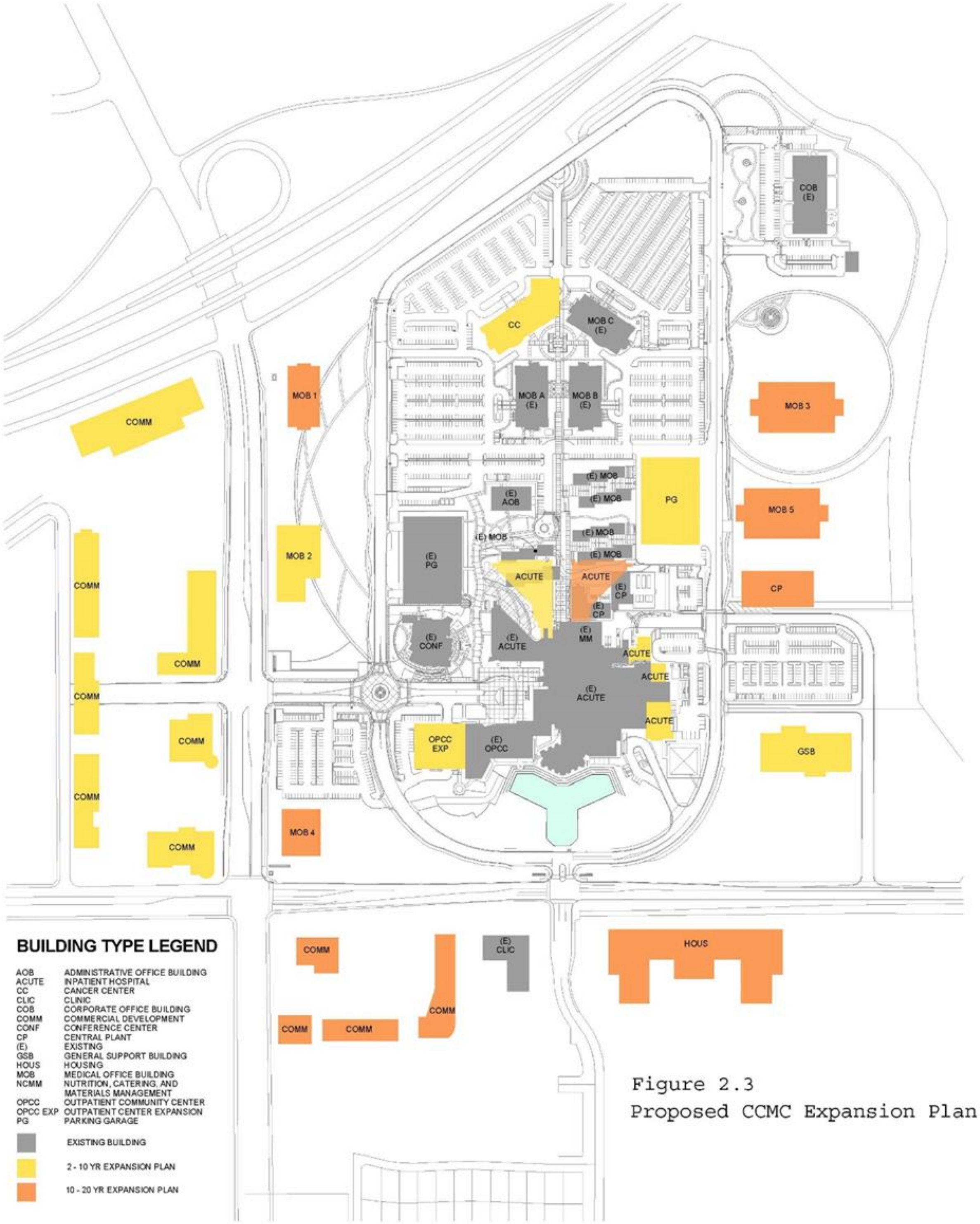


Figure 2.3
Proposed CCMC Expansion Plan

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

JLB TRAFFIC ENGINEERING, INC.
Traffic Engineering, Transportation Planning and Parking Solutions
Certified Disadvantaged Business Enterprise (DBE) and Small Business Enterprise (SBE)

1300 E. Shaw Ave., Ste. 103
Fresno, CA 93710
Office: (559) 570-8991
Cell: (559) 694-6000
www.JLBtraffic.com

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
1033 Fifth Street ■ Clovis, CA 93612
T 559.324.2363 ■ C 559.765.7505
email 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,

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Sincerely,

Jose Luis Benavides, P.E., T.E.

President

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1300 E. Shaw Ave., Ste. 103

Fresno, CA 93710

Office: (559) 570-8991

Cell: (559) 694-6000

www.JLBtraffic.com

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 30th 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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Fresno, CA 93710

Office: (559) 570-8991
Cell: (559) 694-6000
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

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President

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Office: (559) 570-8991
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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

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Fresno, CA 93710
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Cell: (559) 694-6000
www.JLBtraffic.com

Appendix C: Traffic Counts

JLB Traffic Engineering, Inc.

1300 E. Shaw Ave., Ste. 103
Fresno, CA 93710
(559) 570-8991
Traffic Engineering, Transportation Planning & Parking Solutions
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 Southbound					NEES Westbound					TEMPERANCE Northbound					NEES 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

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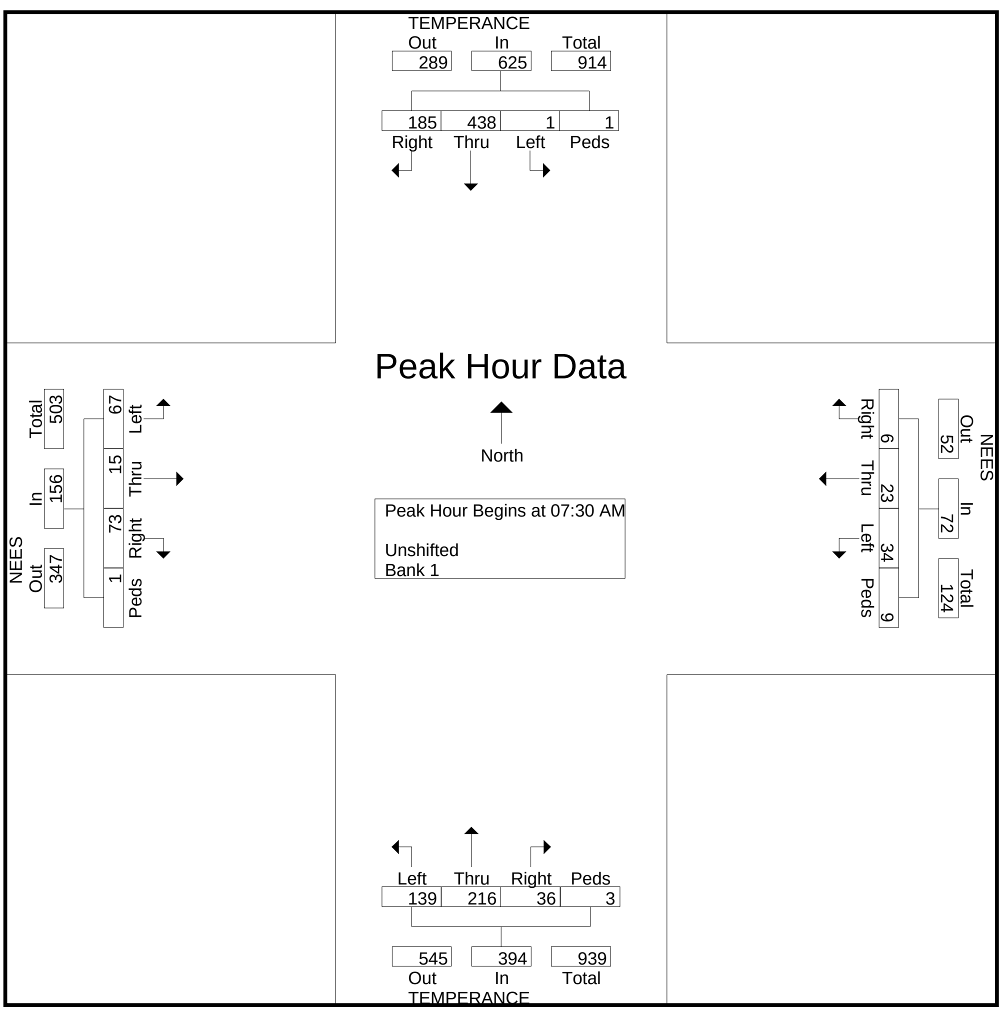
File Name : 01 Nees at Temperance (091316)
Site Code : 00000000
Start Date : 9/13/2016

	TEMPERANCE Southbound					NEES Westbound					TEMPERANCE Northbound					NEES 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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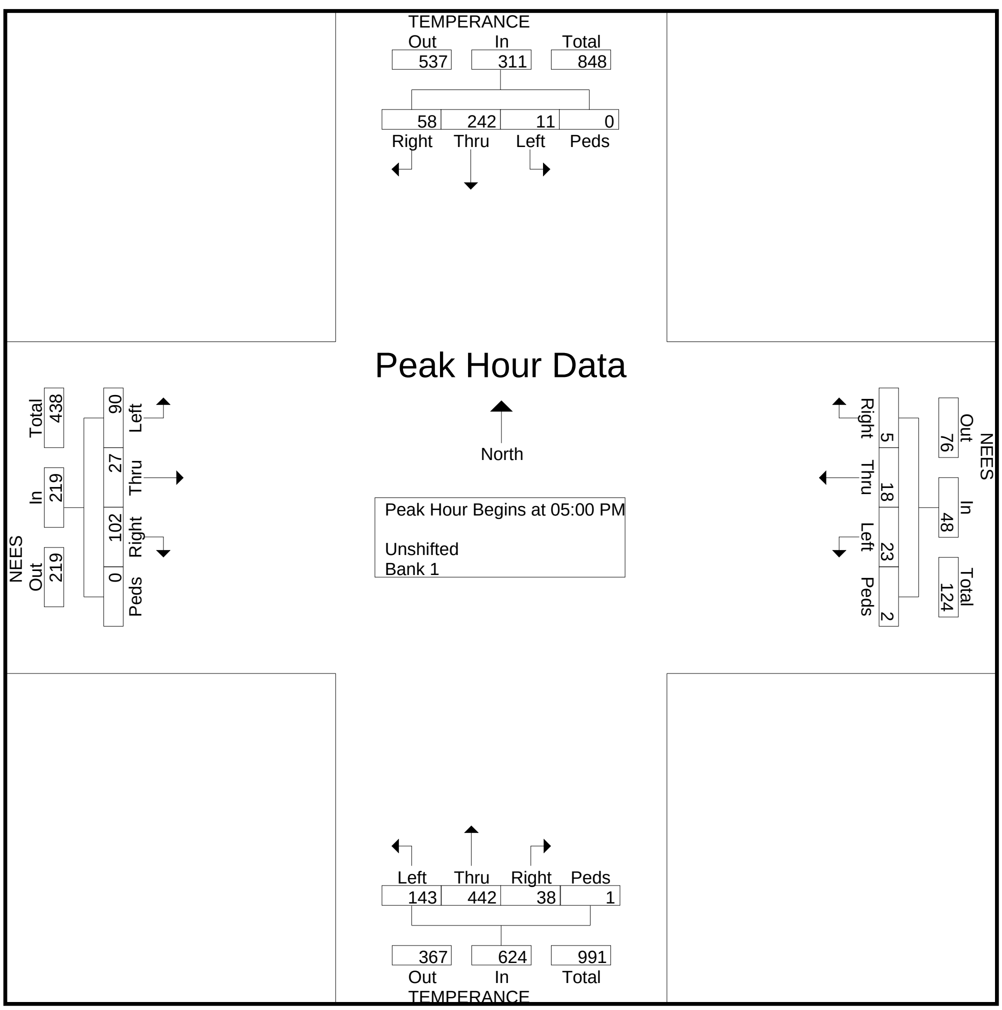
File Name : 01 Nees at Temperance (091316)
Site Code : 00000000
Start Date : 9/13/2016
Page No : 3

	TEMPERANCE Southbound					NEES Westbound					TEMPERANCE Northbound					NEES 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	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



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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 Southbound					NEES Westbound					TEMPERANCE Northbound					NEES 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 Southbound					ALLUVIAL Westbound					TEMPERANCE Northbound					ALLUVIAL 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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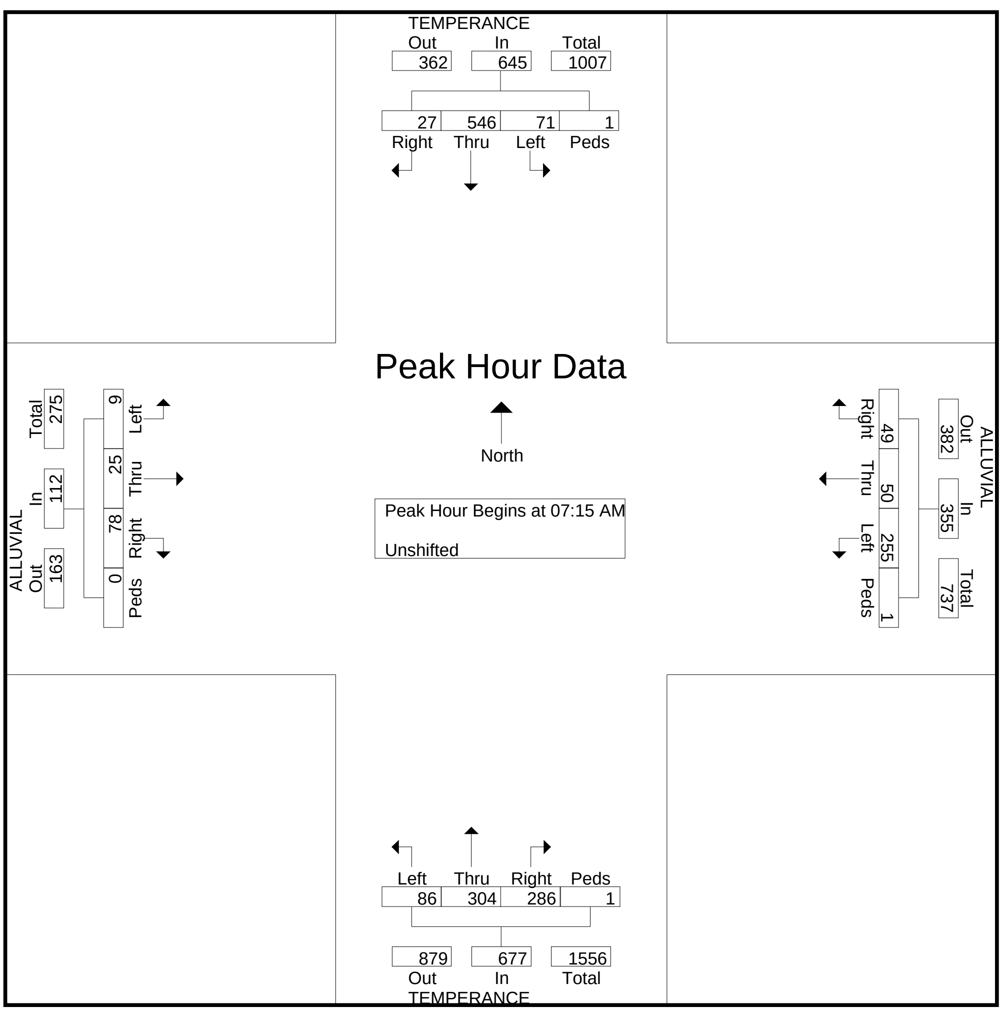
File Name : 02 Alluvial at Temperance
Site Code : 00000000
Start Date : 2/2/2016
Page No : 2

	TEMPERANCE Southbound					ALLUVIAL Westbound					TEMPERANCE Northbound					ALLUVIAL 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	**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
08:00 AM	21	106	5	**1**	133	66	9	**16**	**1**	92	20	**94**	69	**1**	**184**	**4**	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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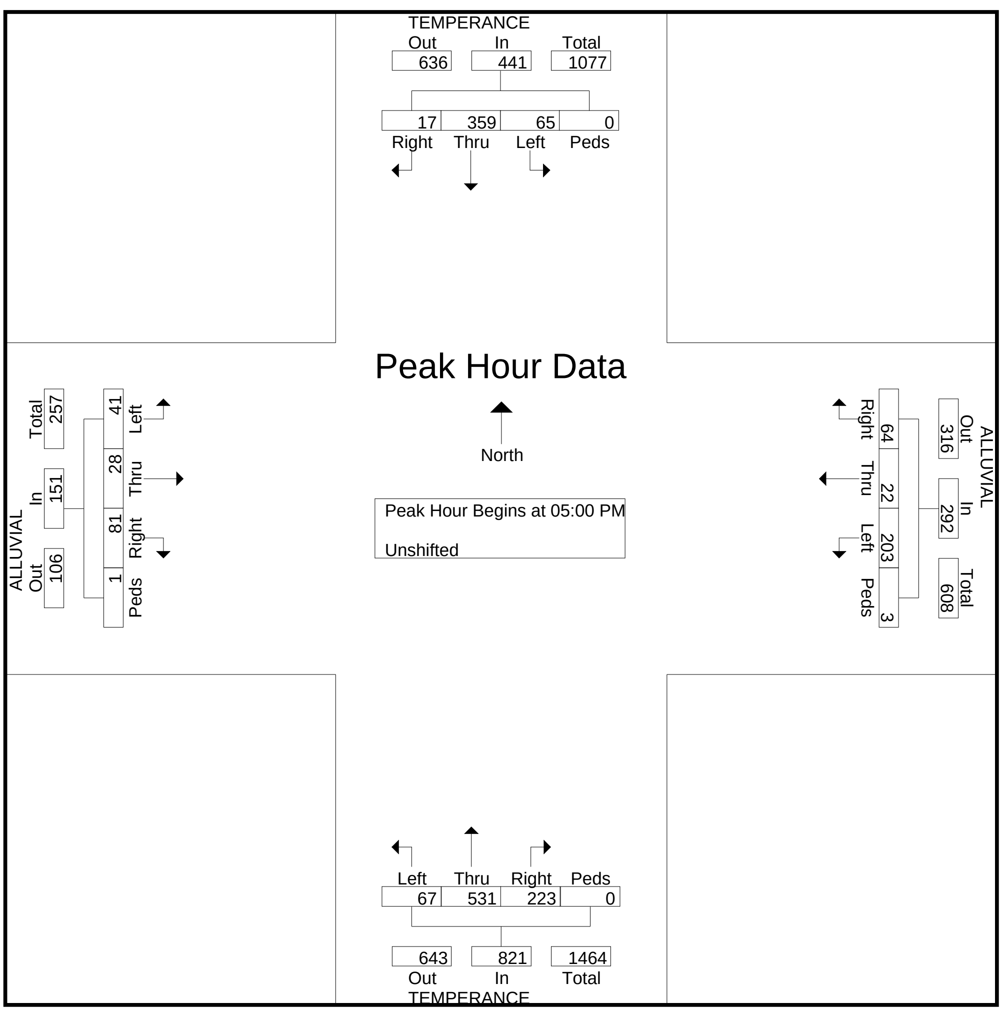
File Name : 02 Alluvial at Temperance
Site Code : 00000000
Start Date : 2/2/2016
Page No : 3

	TEMPERANCE Southbound					ALLUVIAL Westbound					TEMPERANCE Northbound					ALLUVIAL 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

	TEMPERANCE Southbound				168 WB Westbound					TEMPERANCE Northbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. 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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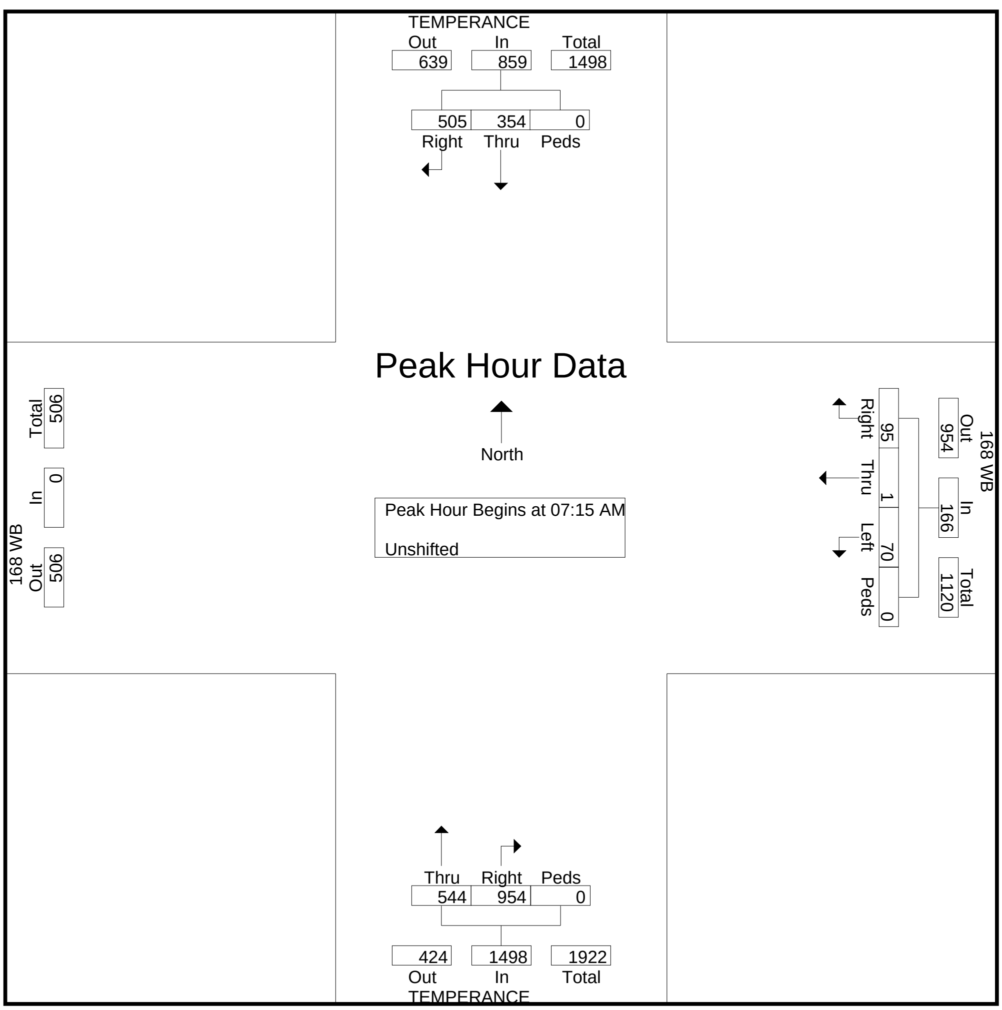
File Name : 03 sr 168 wb ramps to temperence
Site Code : 00000000
Start Date : 2/3/2016
Page No : 2

	TEMPERANCE Southbound				168 WB Westbound					TEMPERANCE 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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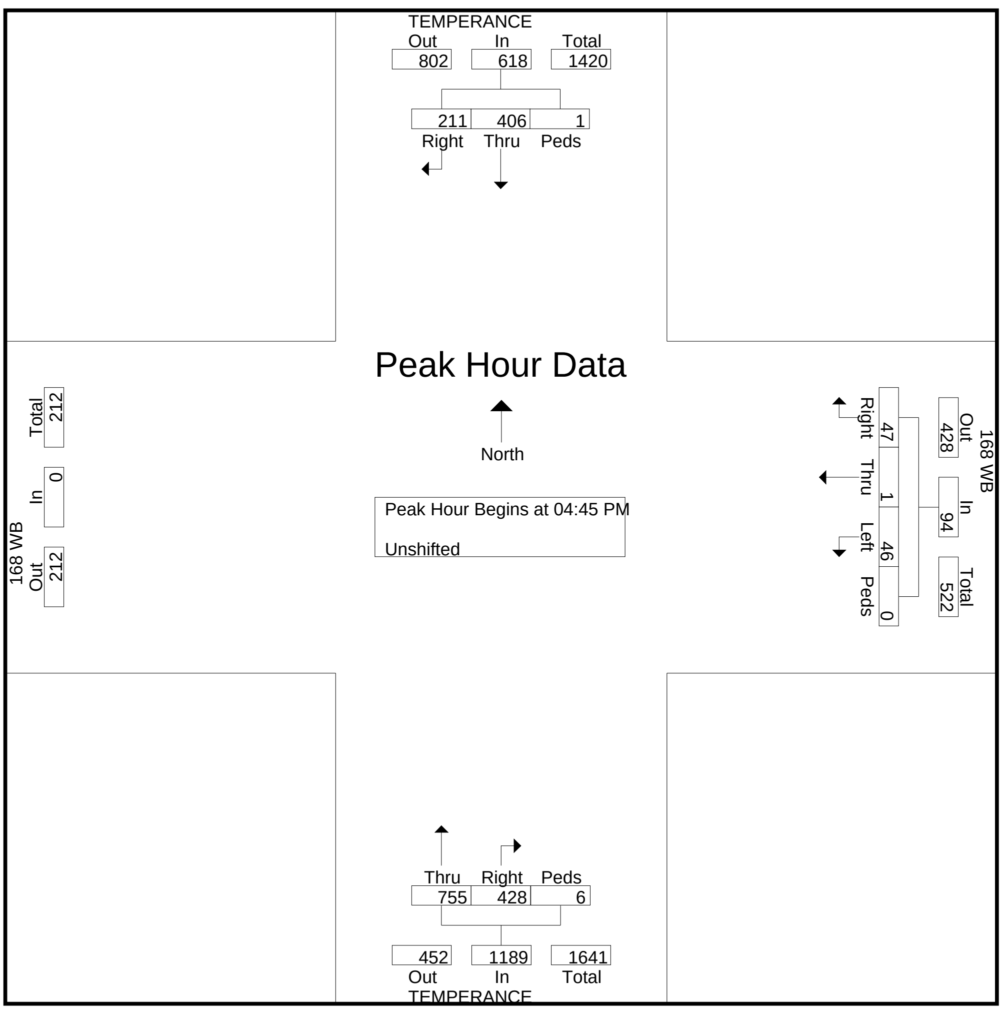
File Name : 03 sr 168 wb ramps to temperence
Site Code : 00000000
Start Date : 2/3/2016

	TEMPERANCE Southbound				168 WB Westbound					TEMPERANCE 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	**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
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

	TEMPERANCE Southbound				TEMPERANCE Northbound				168 EB Eastbound					
Start Time	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. 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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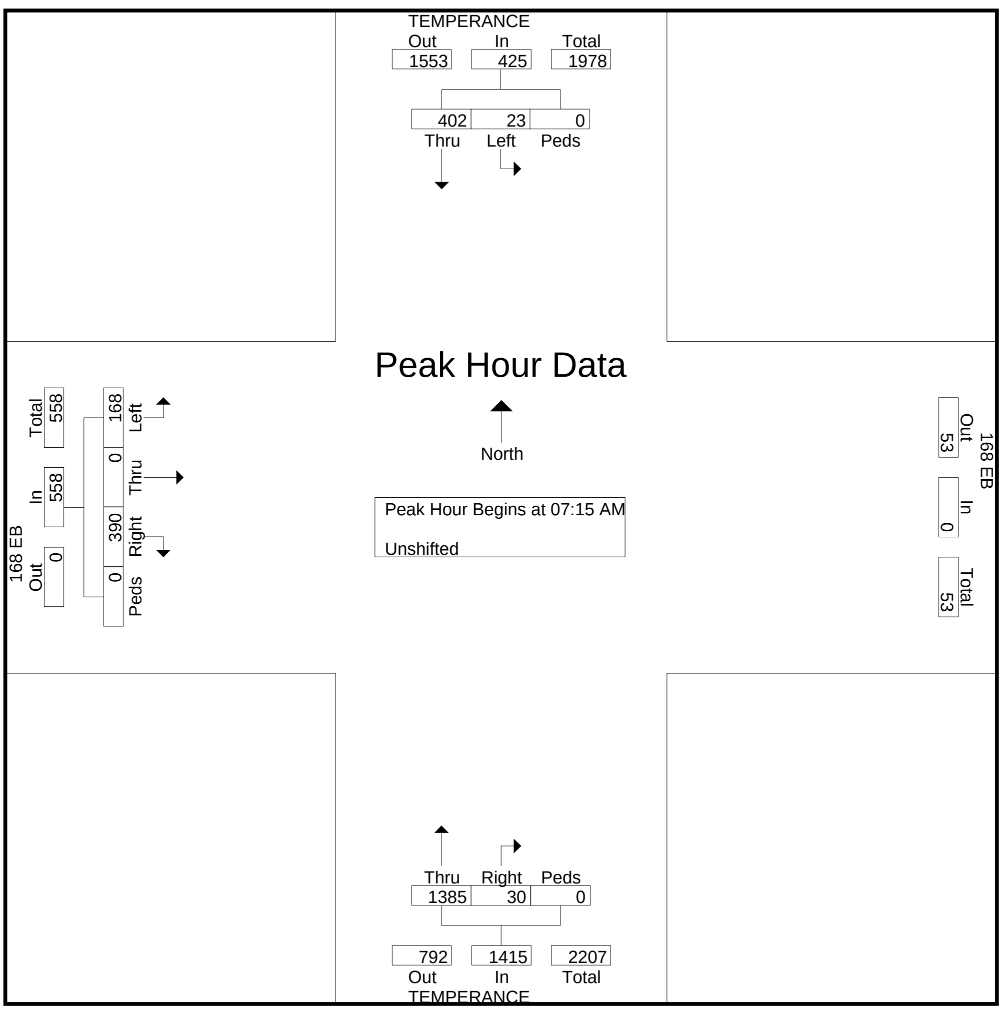
File Name : 04 SR 168 EB Ramps to Temperence
Site Code : 00000000
Start Date : 2/4/2016
Page No : 2

	TEMPERANCE Southbound				TEMPERANCE Northbound				168 EB 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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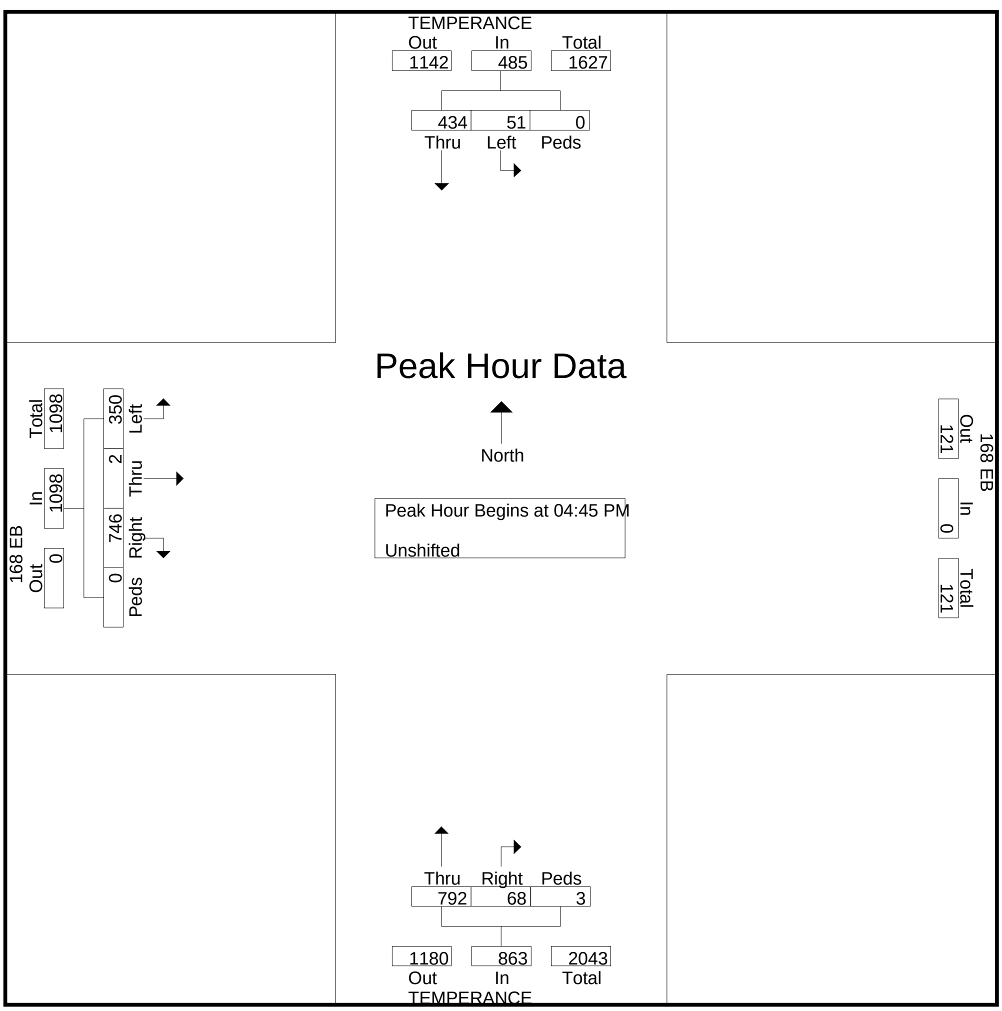
File Name : 04 SR 168 EB Ramps to Temperence
Site Code : 00000000
Start Date : 2/4/2016
Page No : 3

	TEMPERANCE Southbound				TEMPERANCE Northbound				168 EB 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

Groups Printed- Unshifted

	TEMPERANCE Southbound				FIR Westbound				TEMPERANCE 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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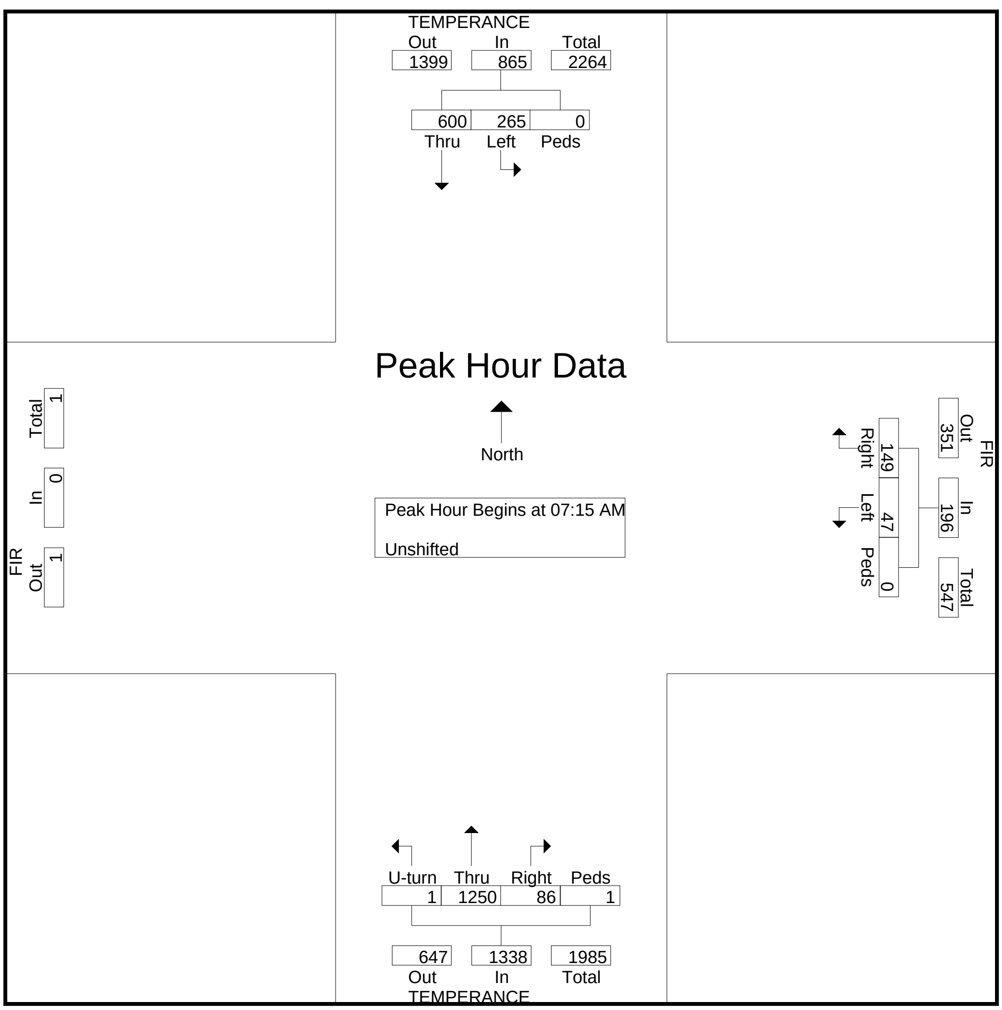
File Name : 05 Fir at Temperence
Site Code : 00000000
Start Date : 2/24/2016

	TEMPERANCE Southbound				FIR Westbound				TEMPERANCE 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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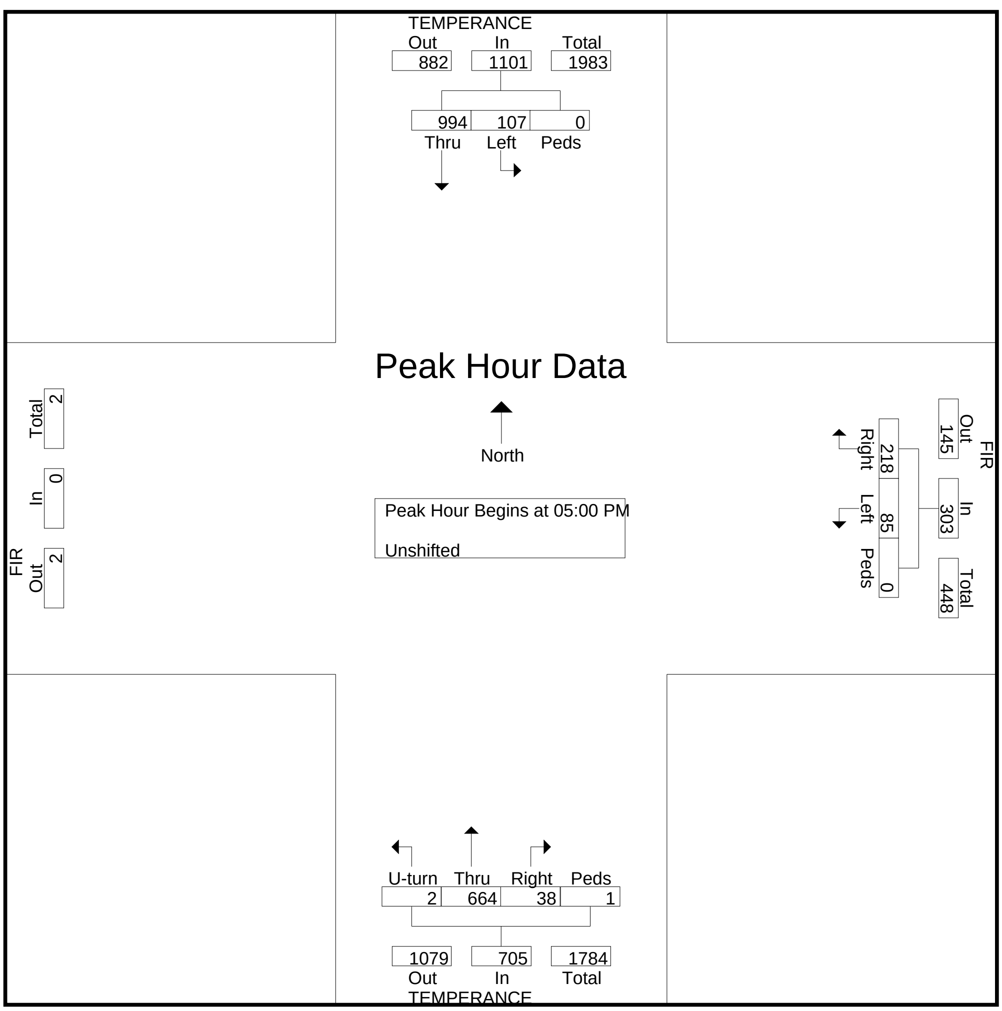
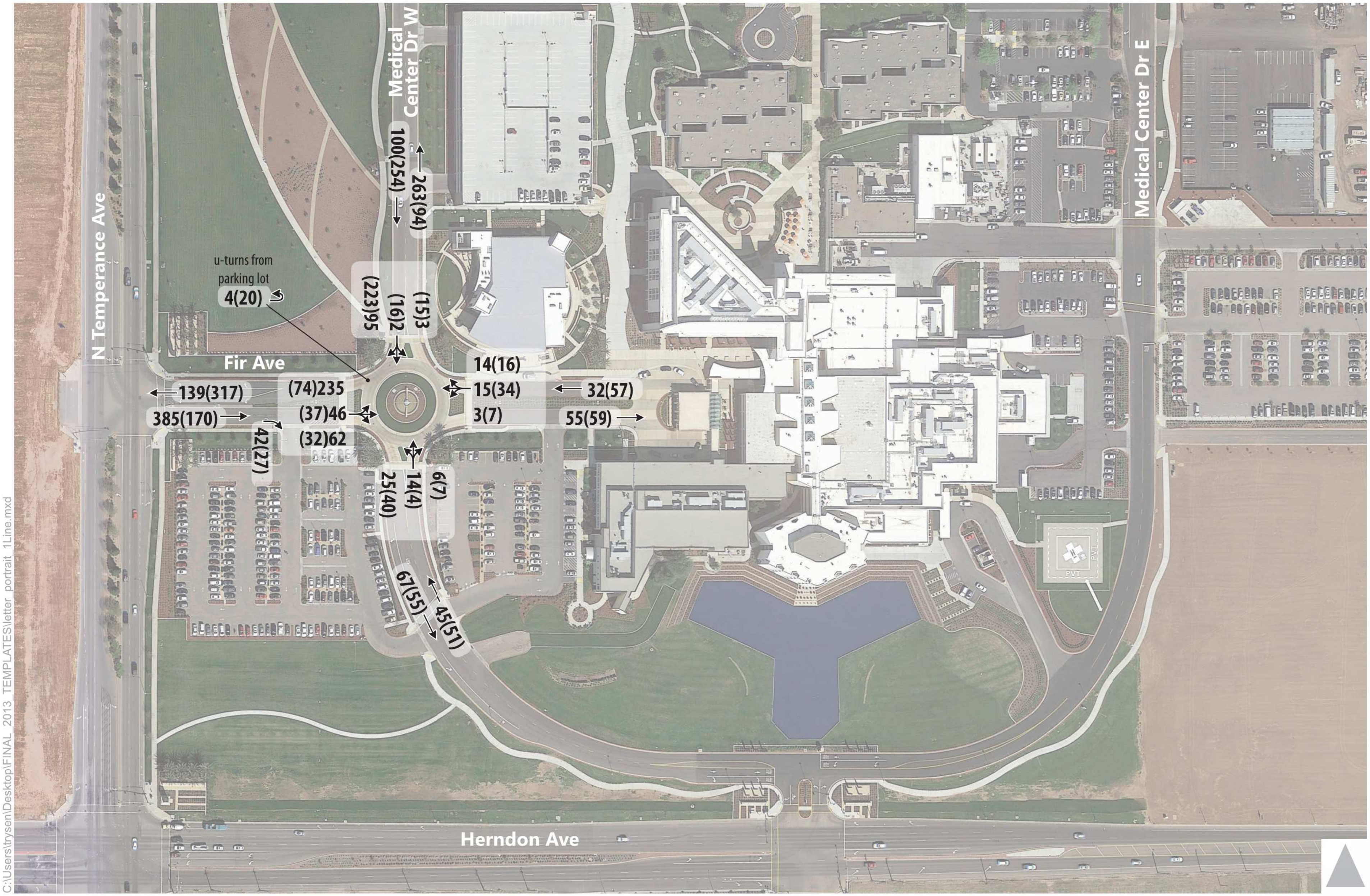
File Name : 05 Fir at Temperence
Site Code : 00000000
Start Date : 2/24/2016

	TEMPERANCE Southbound				FIR Westbound				TEMPERANCE 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





Turn Lane

AM(PM) Peak Hour Traffic Volume

AM: 7:30- 8:30

PM: 4:00- 5:00

Roundabout Level of Service

AM- **A**

PM- **A**

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 Southbound					HERNDON Westbound					ARMSTRONG Northbound					HERNDON 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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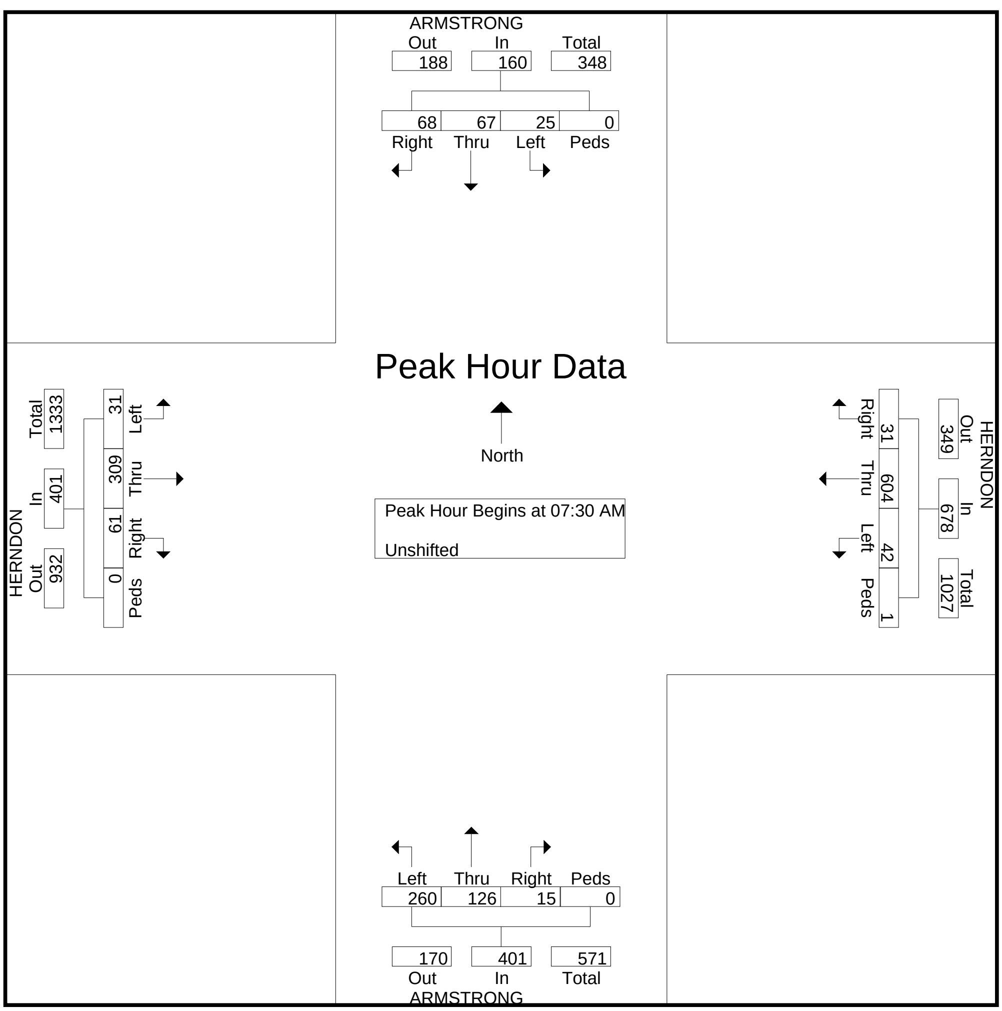
File Name : 07 Herndon at Armstrong
Site Code : 00000000
Start Date : 1/14/2016

	ARMSTRONG Southbound					HERNDON Westbound					ARMSTRONG Northbound					HERNDON 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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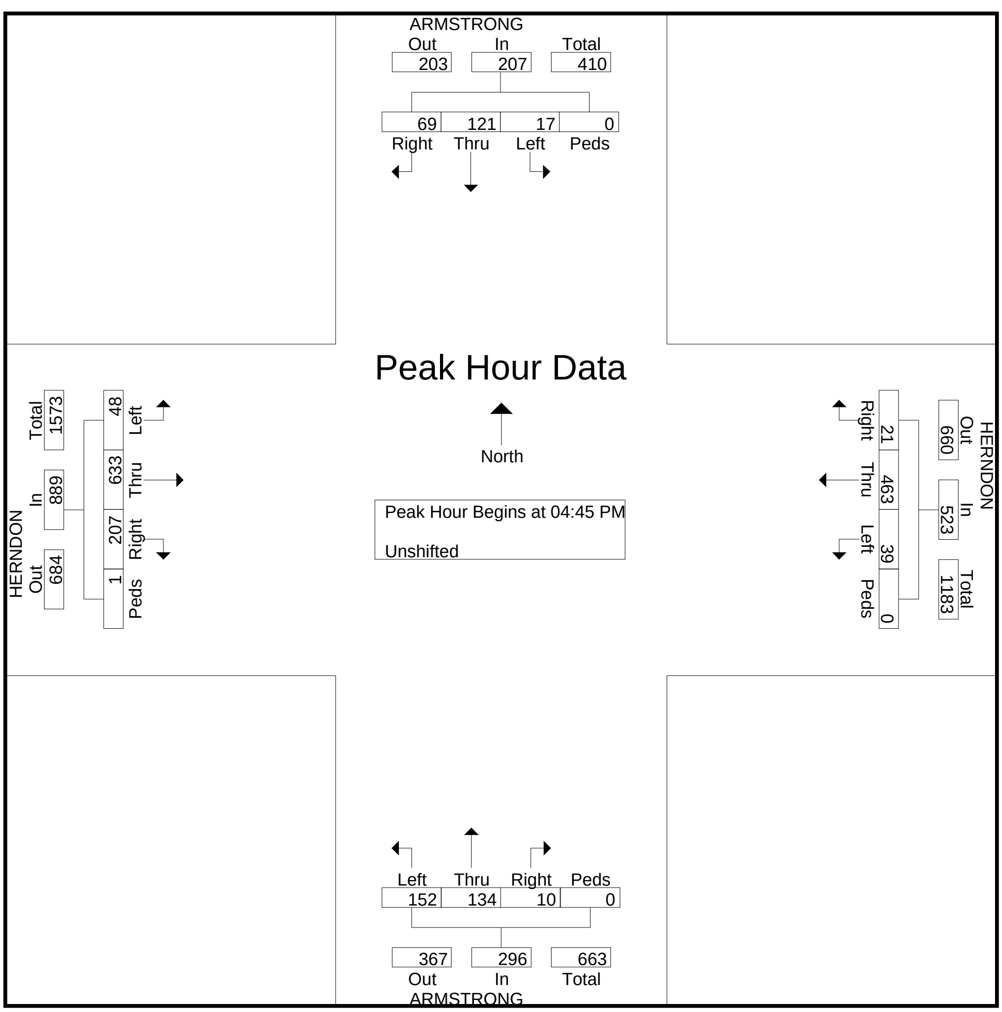
File Name : 07 Herndon at Armstrong
Site Code : 00000000
Start Date : 1/14/2016
Page No : 3

	ARMSTRONG Southbound					HERNDON Westbound					ARMSTRONG Northbound					HERNDON 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
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Groups Printed- Unshifted

	TOLLHOUSE Southbound			HERNDON Westbound					TOLLHOUSE Northbound			HERNDON 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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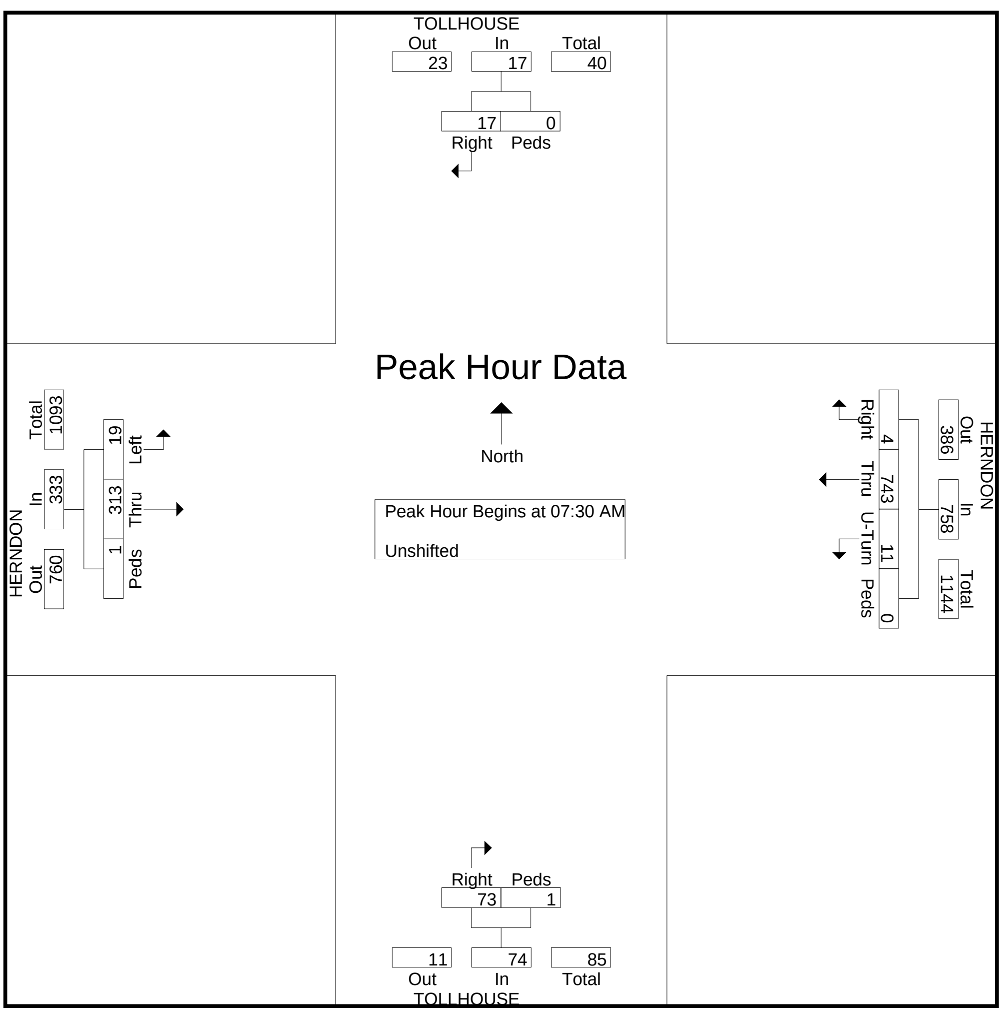
	TOLLHOUSE Southbound			HERNDON Westbound					TOLLHOUSE Northbound			HERNDON Eastbound				
Start Time	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																
Peak Hour 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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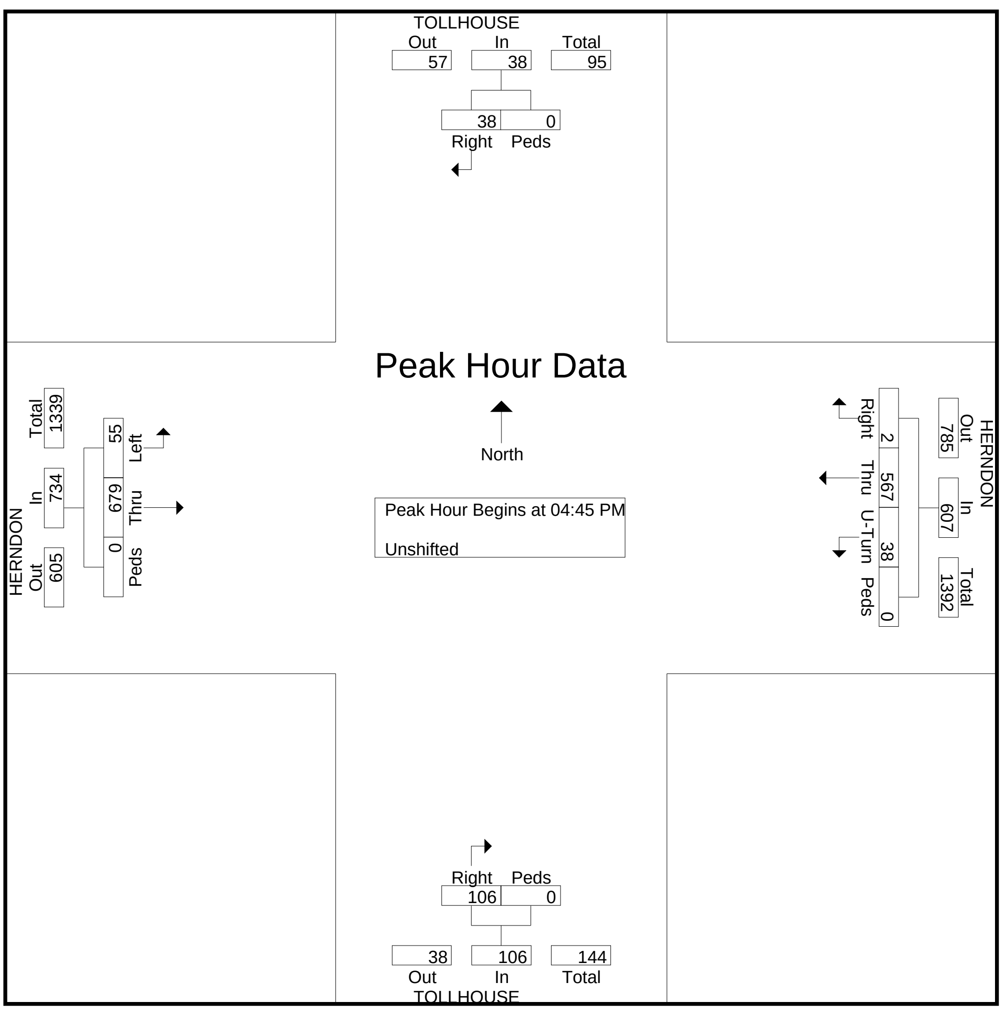
	TOLLHOUSE Southbound			HERNDON Westbound					TOLLHOUSE Northbound			HERNDON Eastbound				
Start Time	Right	Peds	App. Total	U-Turn	Thru	Right	Peds	App. Total	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																
Peak Hour 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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Groups Printed- Unshifted

	TEMPERANCE Southbound					HERNDON Westbound					TEMPERANCE Northbound					HERNDON 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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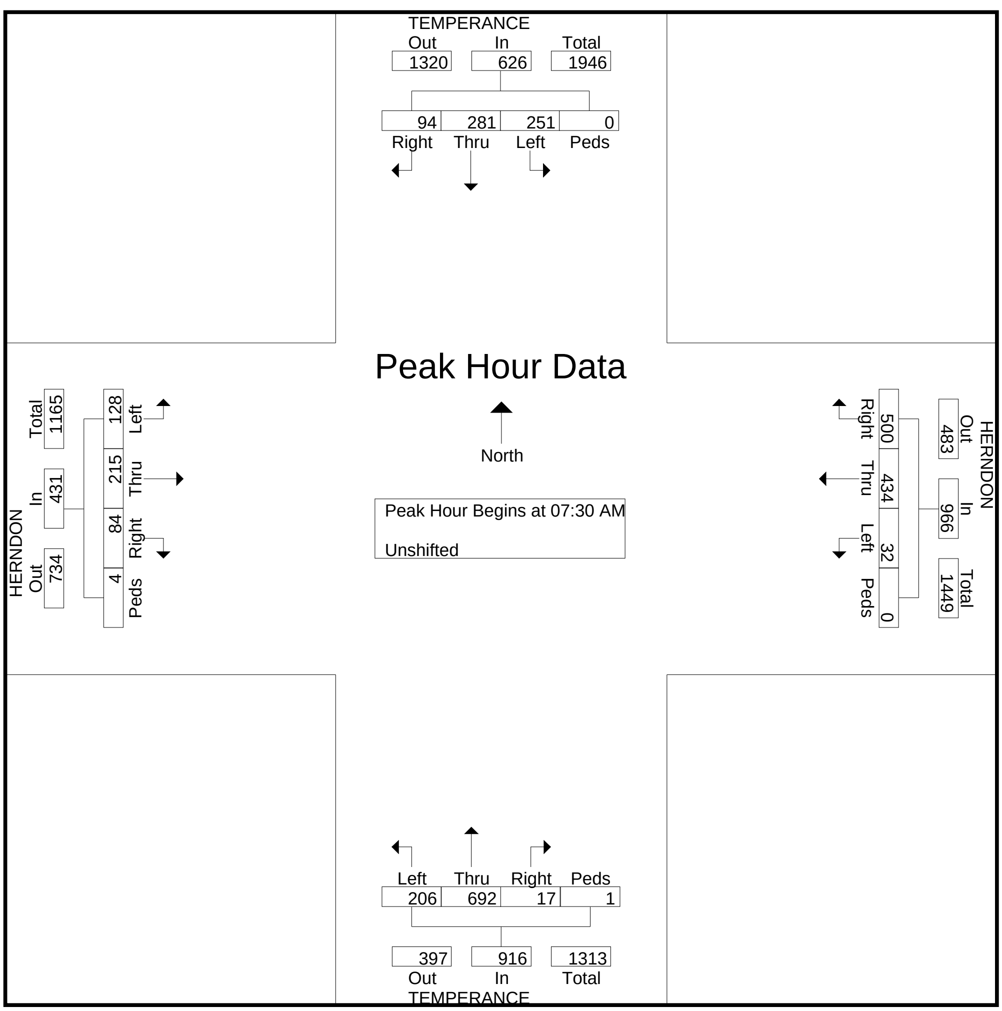
	TEMPERANCE Southbound					HERNDON Westbound					TEMPERANCE Northbound					HERNDON Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 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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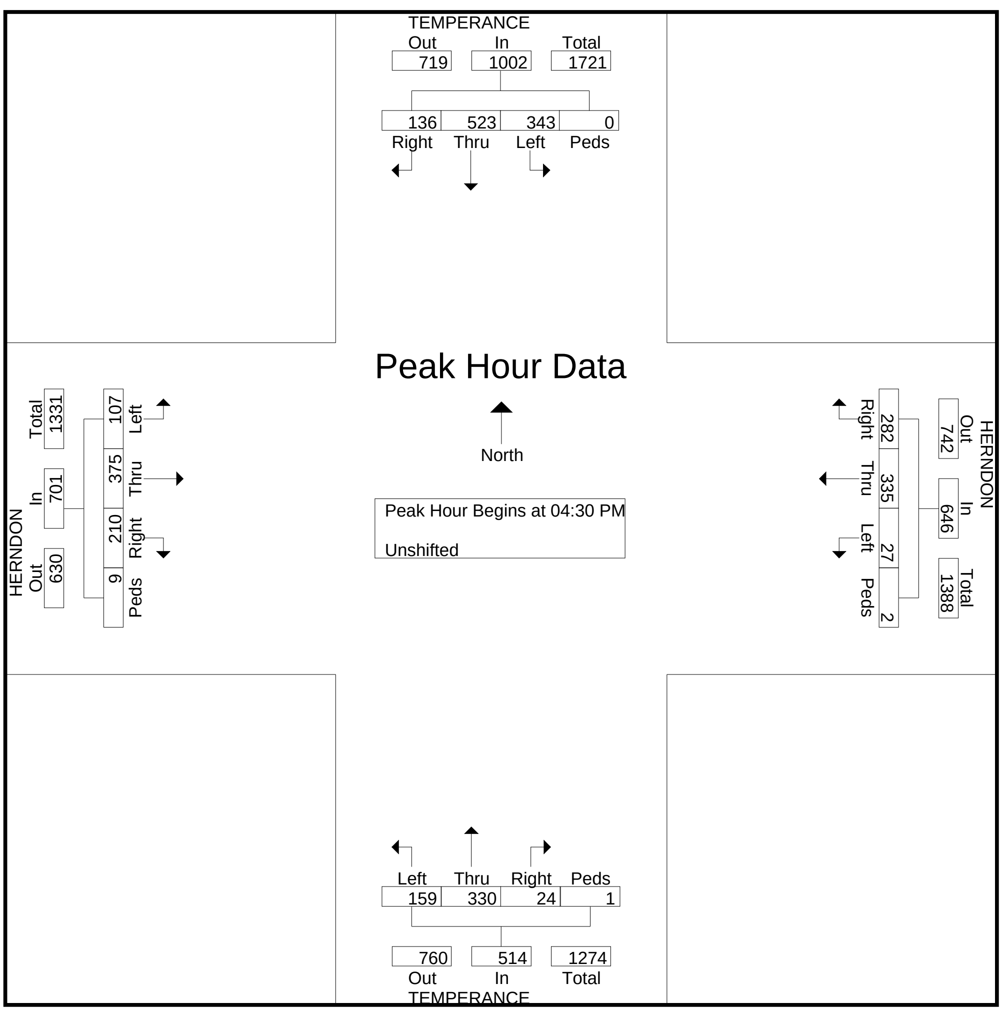
	TEMPERANCE Southbound					HERNDON Westbound					TEMPERANCE Northbound					HERNDON Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 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
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Groups Printed- Unshifted

	COVENTRY Southbound					HERNDON Westbound					COVENTRY Northbound					HERNDON 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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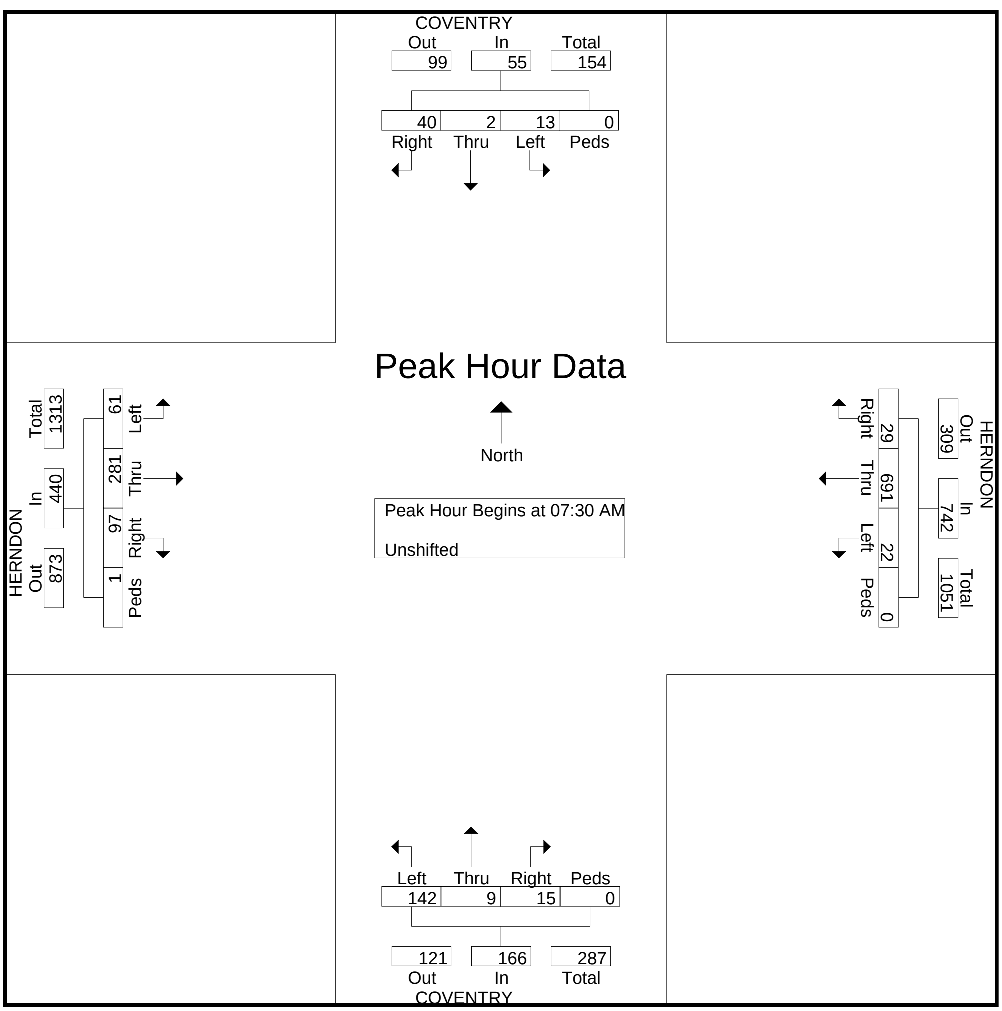
	COVENTRY Southbound					HERNDON Westbound					COVENTRY Northbound					HERNDON Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
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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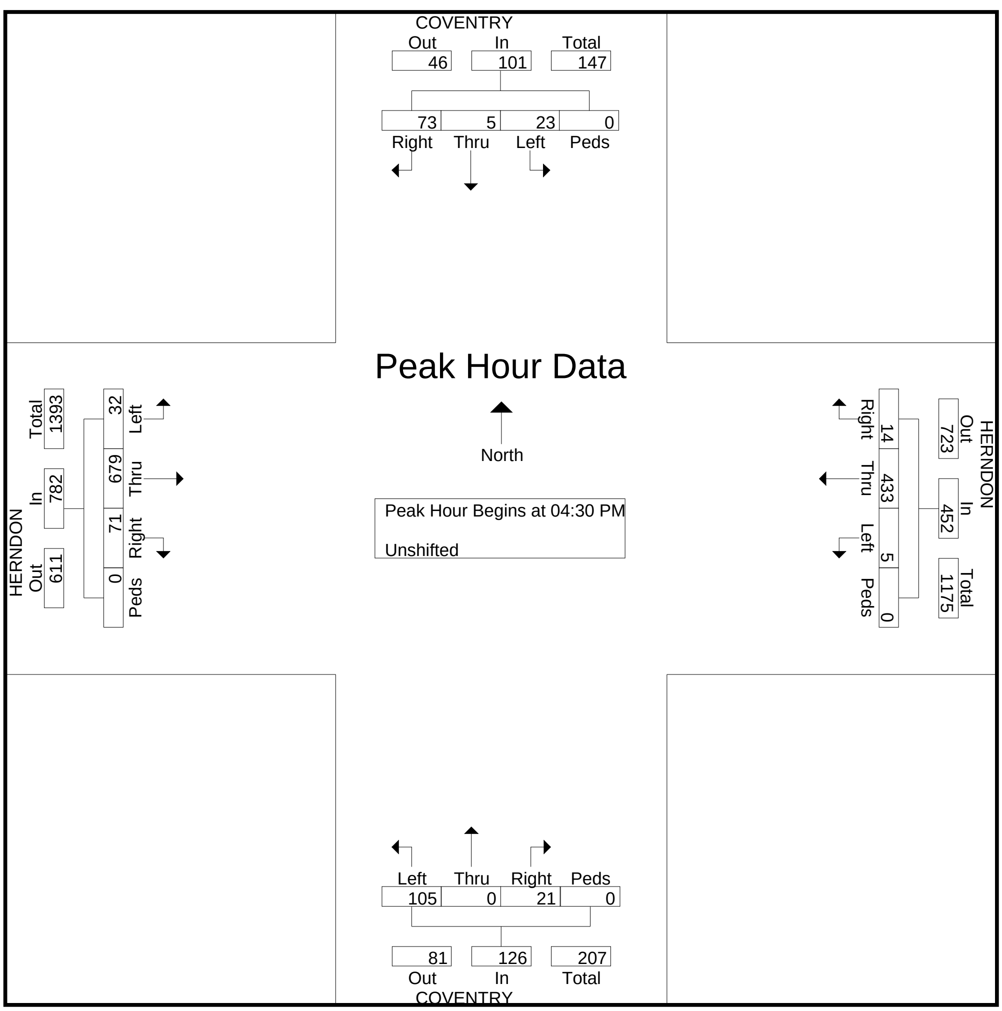
	COVENTRY Southbound					HERNDON Westbound					COVENTRY Northbound					HERNDON Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
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



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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

	Medical Center Westbound				Coventry Northbound				Medical Cetner Eastbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. 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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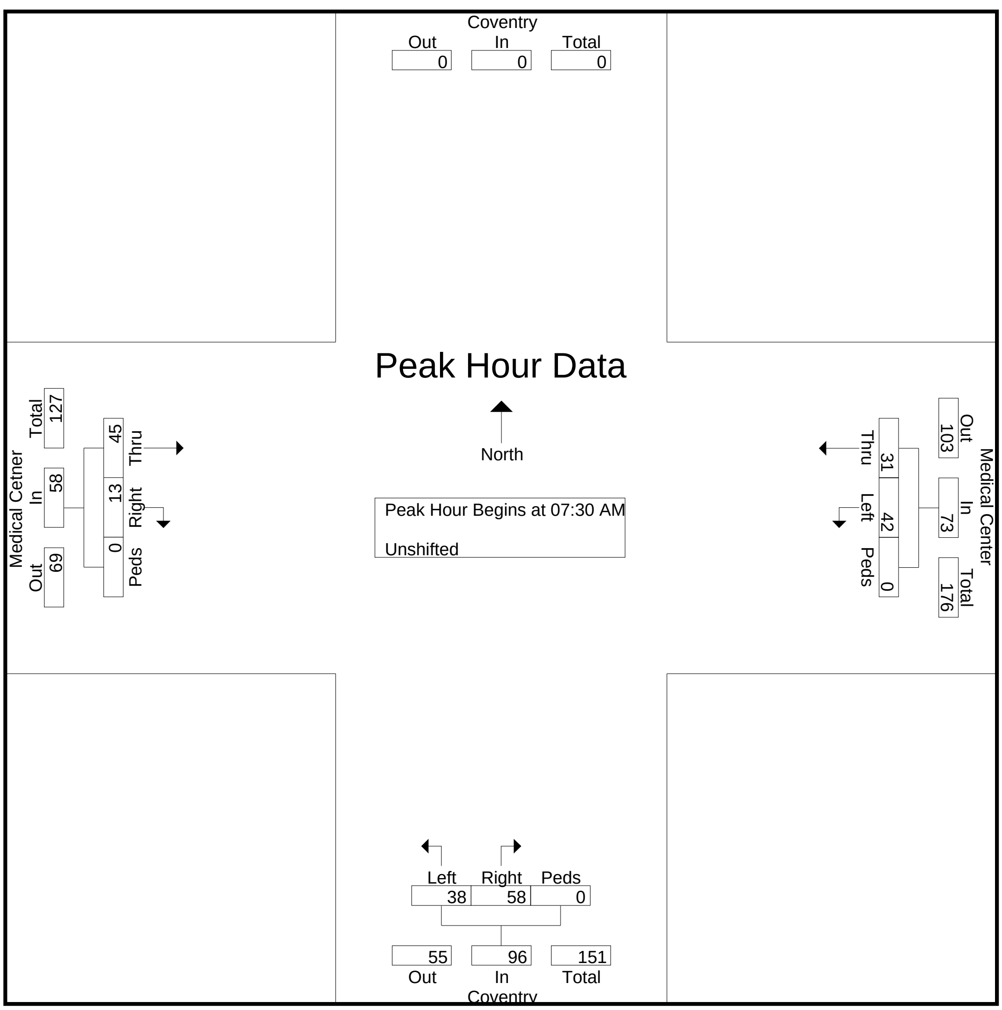
File Name : 11 Conentry at Medical Center
Site Code : 00000011
Start Date : 12/8/2015
Page No : 2

	Medical Center Westbound				Coventry Northbound				Medical Cetner 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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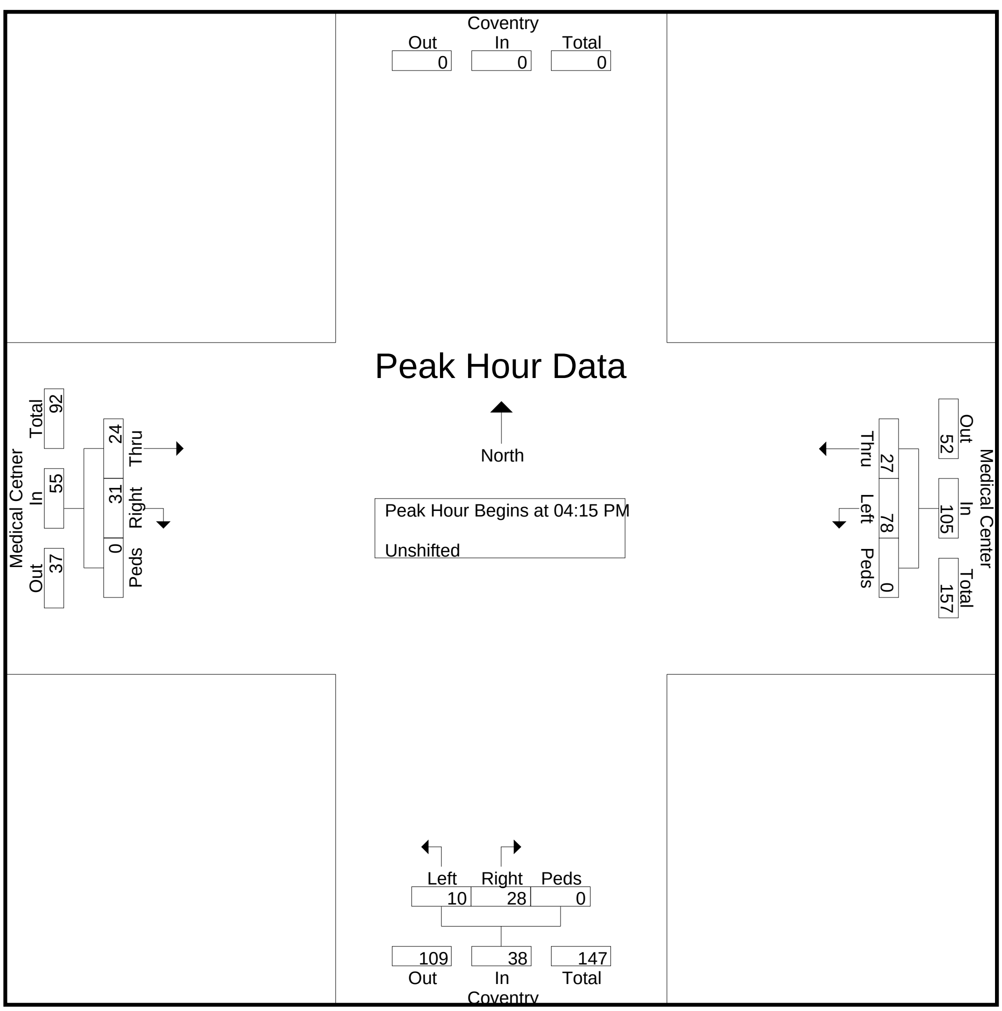
File Name : 11 Conentry at Medical Center
Site Code : 00000011
Start Date : 12/8/2015
Page No : 3

	Medical Center Westbound				Coventry Northbound				Medical Cetner 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 Southbound					HERNDON Westbound					CCMC ACCESS RD Northbound					HERNDON 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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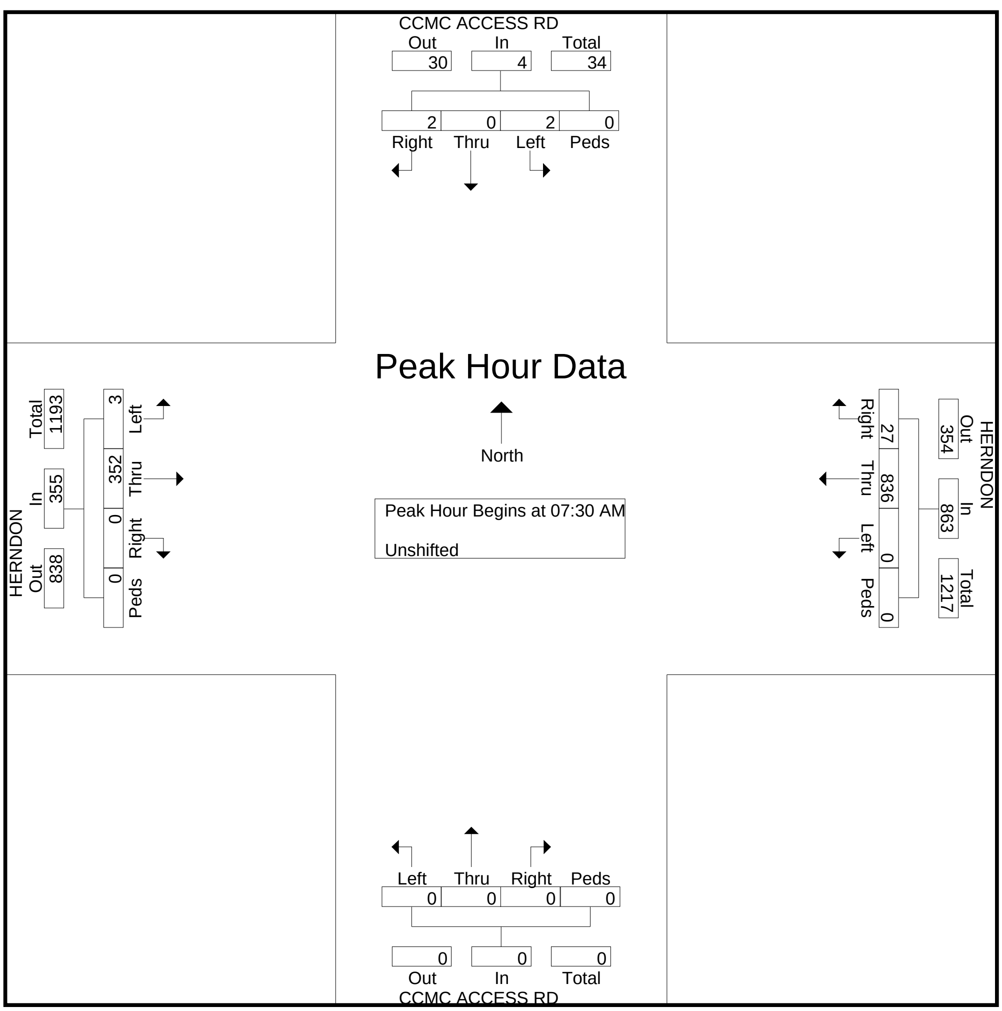
File Name : 12 Herndon at CCMC Access Rd
Site Code : 00000000
Start Date : 12/16/2015
Page No : 2

	CCMC ACCESS RD Southbound					HERNDON Westbound					CCMC ACCESS RD Northbound					HERNDON 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	**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
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
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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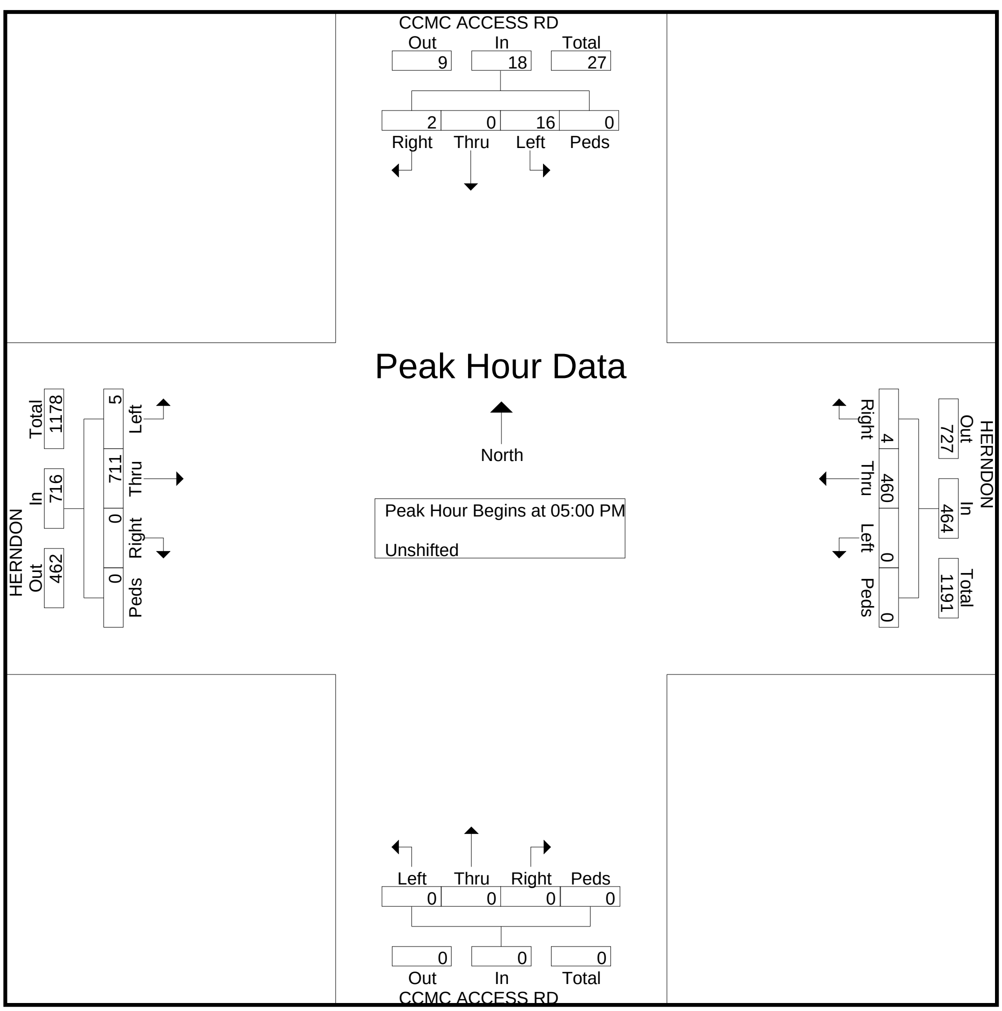
File Name : 12 Herndon at CCMC Access Rd
Site Code : 00000000
Start Date : 12/16/2015
Page No : 3

	CCMC ACCESS RD Southbound					HERNDON Westbound					CCMC ACCESS RD Northbound					HERNDON 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 Southbound					HERNDON Westbound					LOCAN Northbound					HERNDON 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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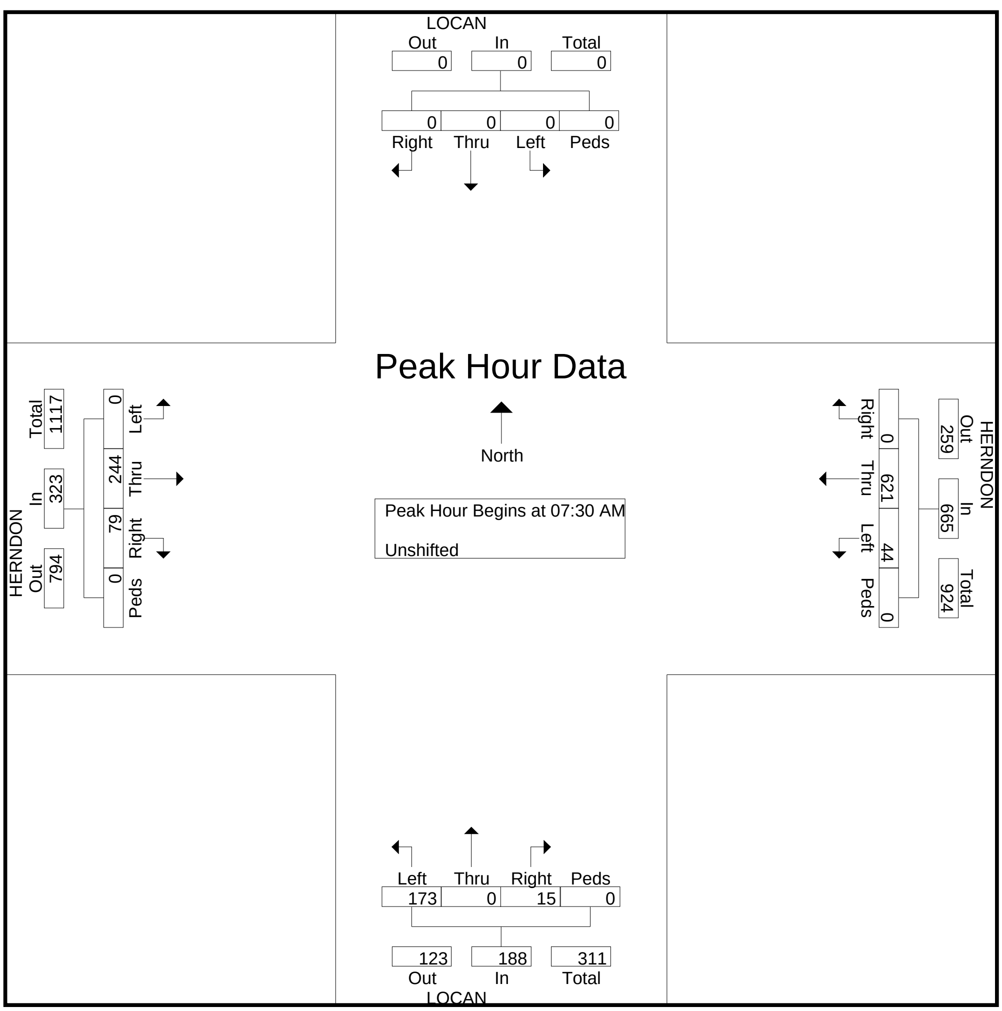
File Name : 13 Herndon at Locan
Site Code : 00000000
Start Date : 12/15/2015

	LOCAN Southbound					HERNDON Westbound					LOCAN Northbound					HERNDON 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	**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		6.6	93.4	0	0		92	0	8	0		0	75.5	24.5	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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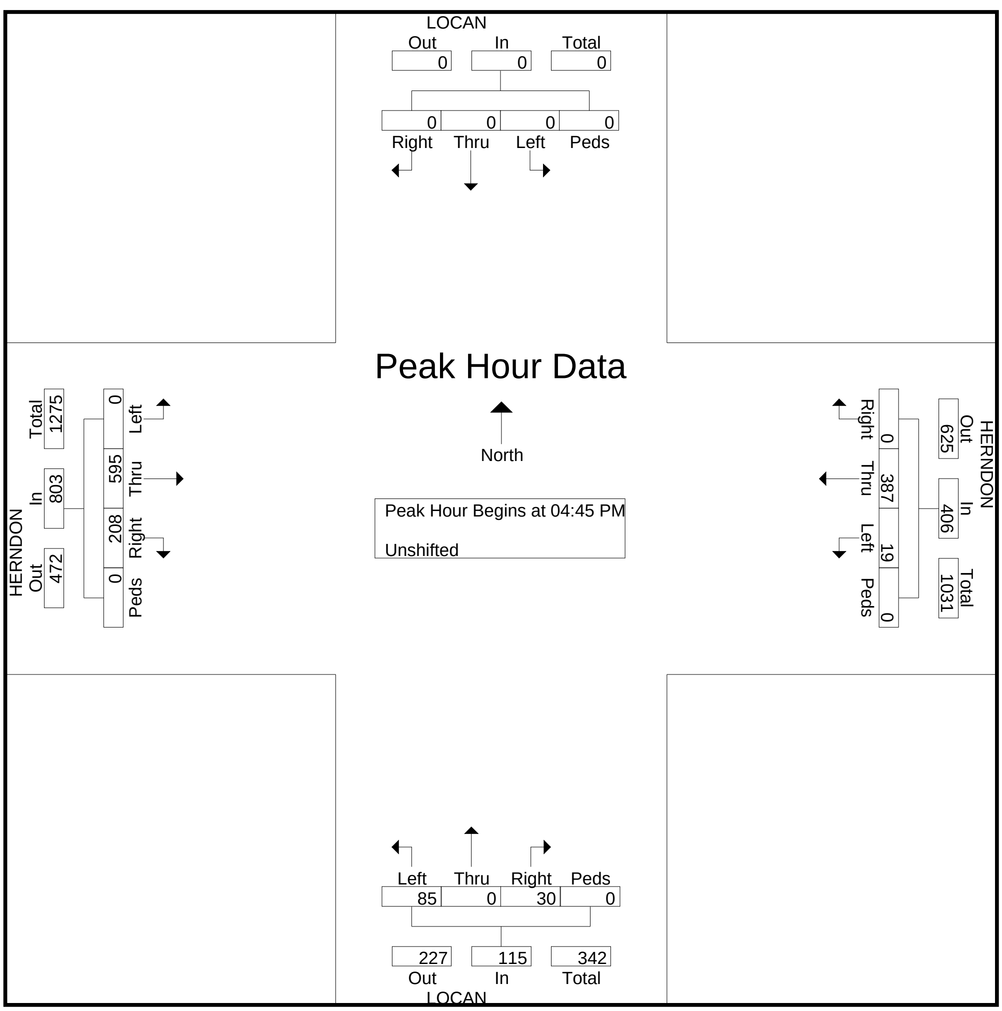
File Name : 13 Herndon at Locan
Site Code : 00000000
Start Date : 12/15/2015
Page No : 3

	LOCAN Southbound					HERNDON Westbound					LOCAN Northbound					HERNDON 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		4.7	95.3	0	0		73.9	0	26.1	0		0	74.1	25.9	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

	DEWOLF Southbound				HERNDON Westbound				HERNDON Eastbound				
Start Time	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. 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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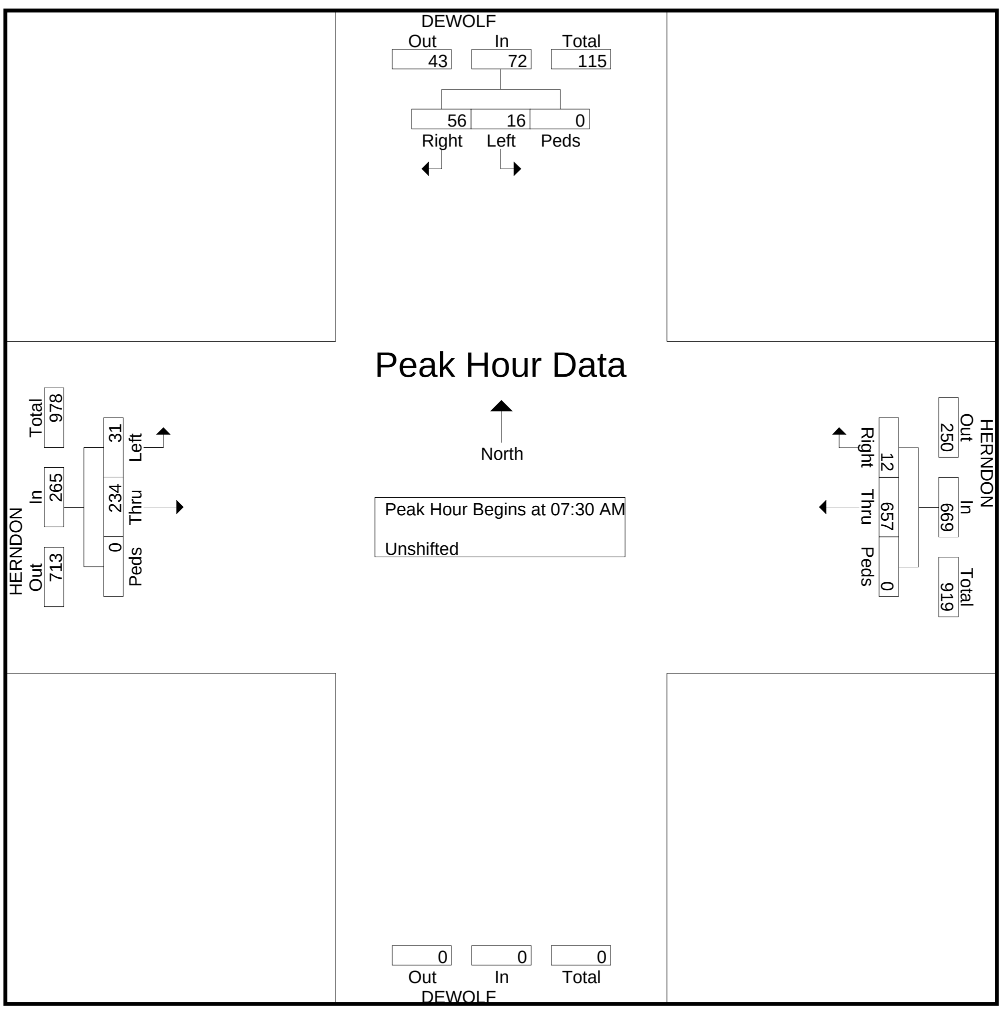
File Name : Herndon Dewolf north leg
Site Code : 00000000
Start Date : 1/12/2016

	DEWOLF Southbound				HERNDON Westbound				HERNDON 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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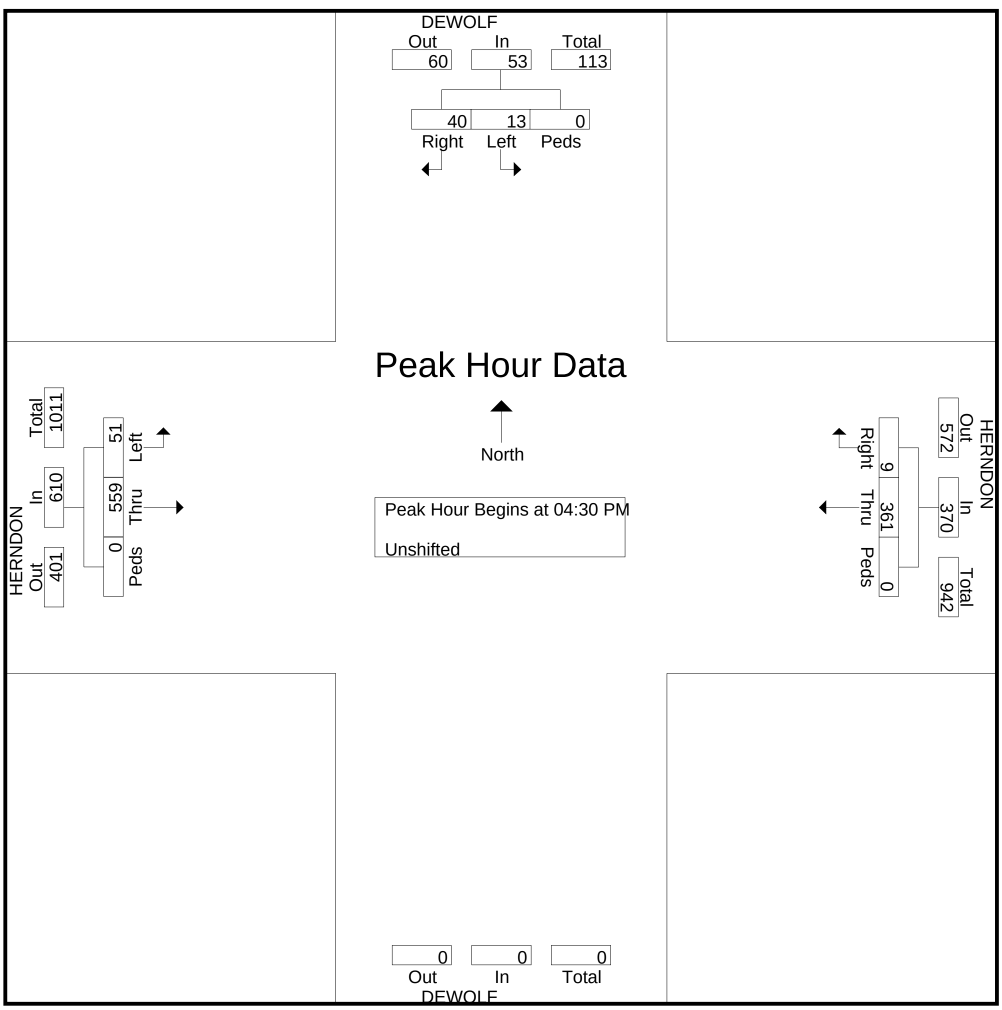
File Name : Herndon Dewolf north leg
Site Code : 00000000
Start Date : 1/12/2016
Page No : 3

	DEWOLF Southbound				HERNDON Westbound				HERNDON 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 Westbound				DE WOLF Northbound				HERNDON 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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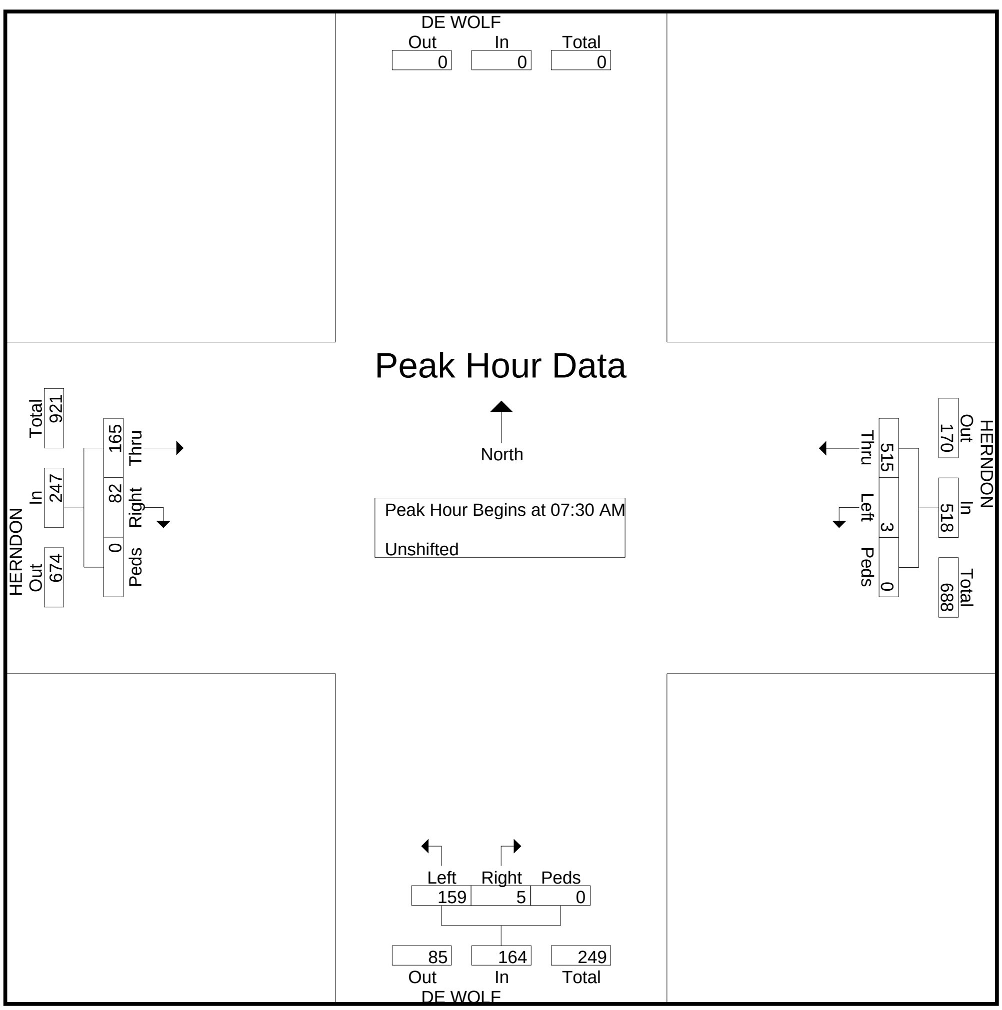
File Name : 15 Herndon at Dewolf south leg
Site Code : 00000000
Start Date : 1/12/2016

	HERNDON Westbound				DE WOLF Northbound				HERNDON 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	**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
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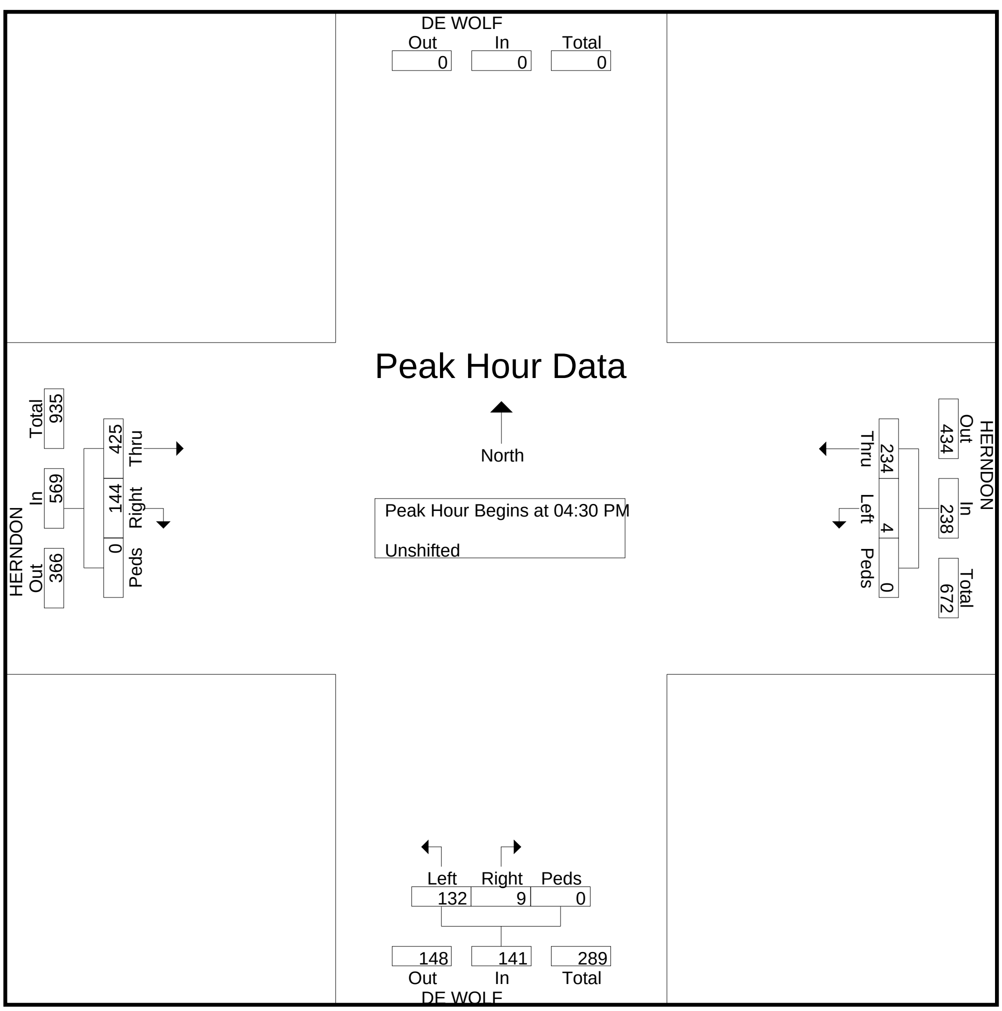
	HERNDON Westbound				DE WOLF Northbound				HERNDON Eastbound				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
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 Southbound					HERNDON Westbound					LEONARD Northbound					HERNDON 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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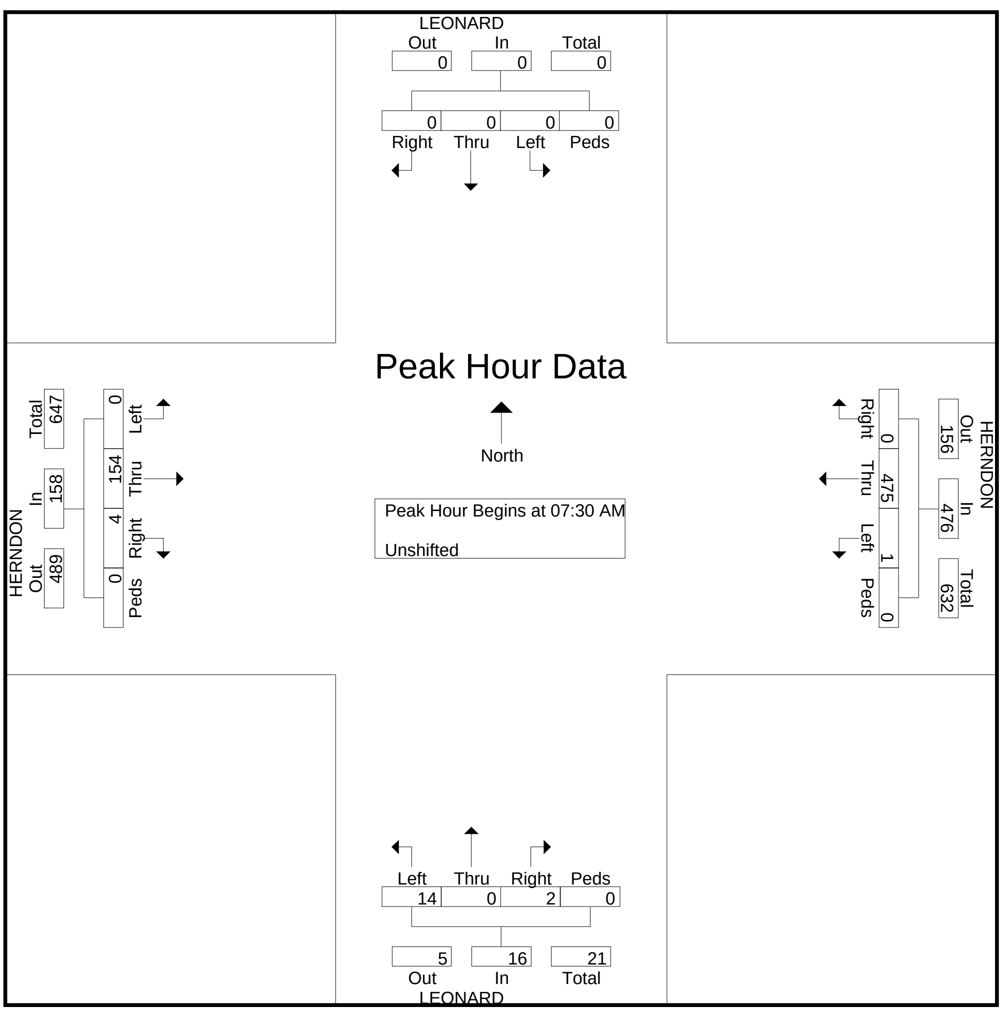
File Name : 16 Herndon at Leonard
Site Code : 00000000
Start Date : 12/10/2015

	LEONARD Southbound					HERNDON Westbound					LEONARD Northbound					HERNDON 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	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		0.2	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
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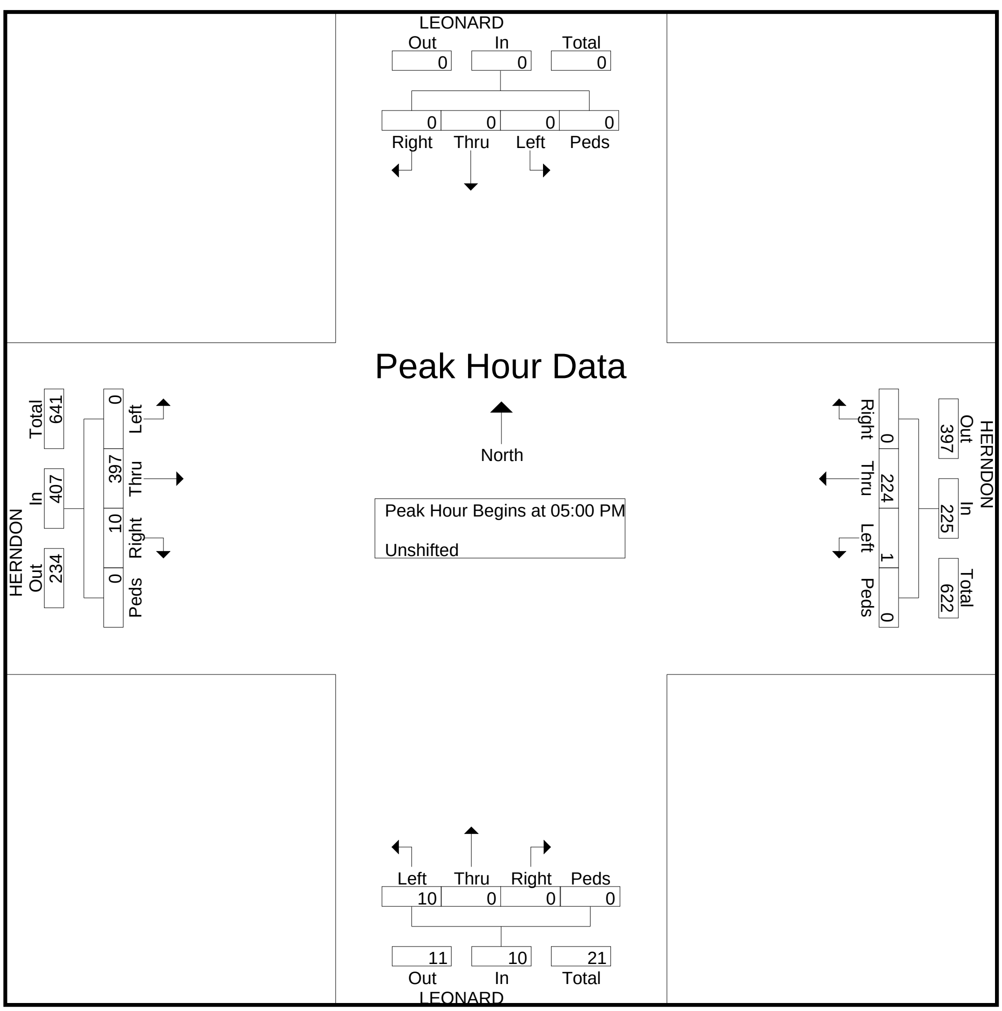
	LEONARD Southbound					HERNDON Westbound					LEONARD Northbound					HERNDON Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
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		0.4	99.6	0	0		100	0	0	0		0	97.5	2.5	0		
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 Southbound					HERNDON Westbound					MCCALL Northbound					HERNDON 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
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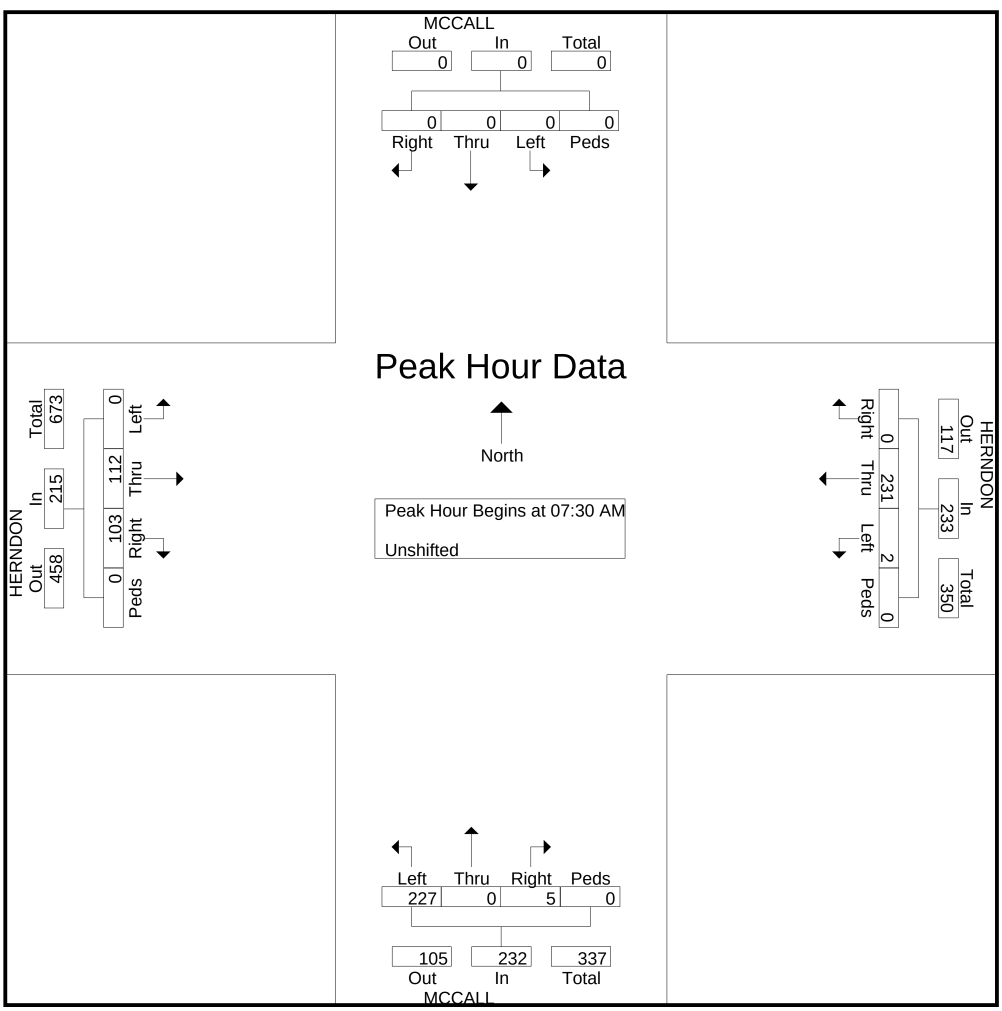
Page No : 2

	MCCALL Southbound					HERNDON Westbound					MCCALL Northbound					HERNDON 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		0.9	99.1	0	0		97.8	0	2.2	0		0	52.1	47.9	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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Fresno, CA 93704
(559) 570-8991
Traffic Engineering, Transportation Planning & Parking Solutions
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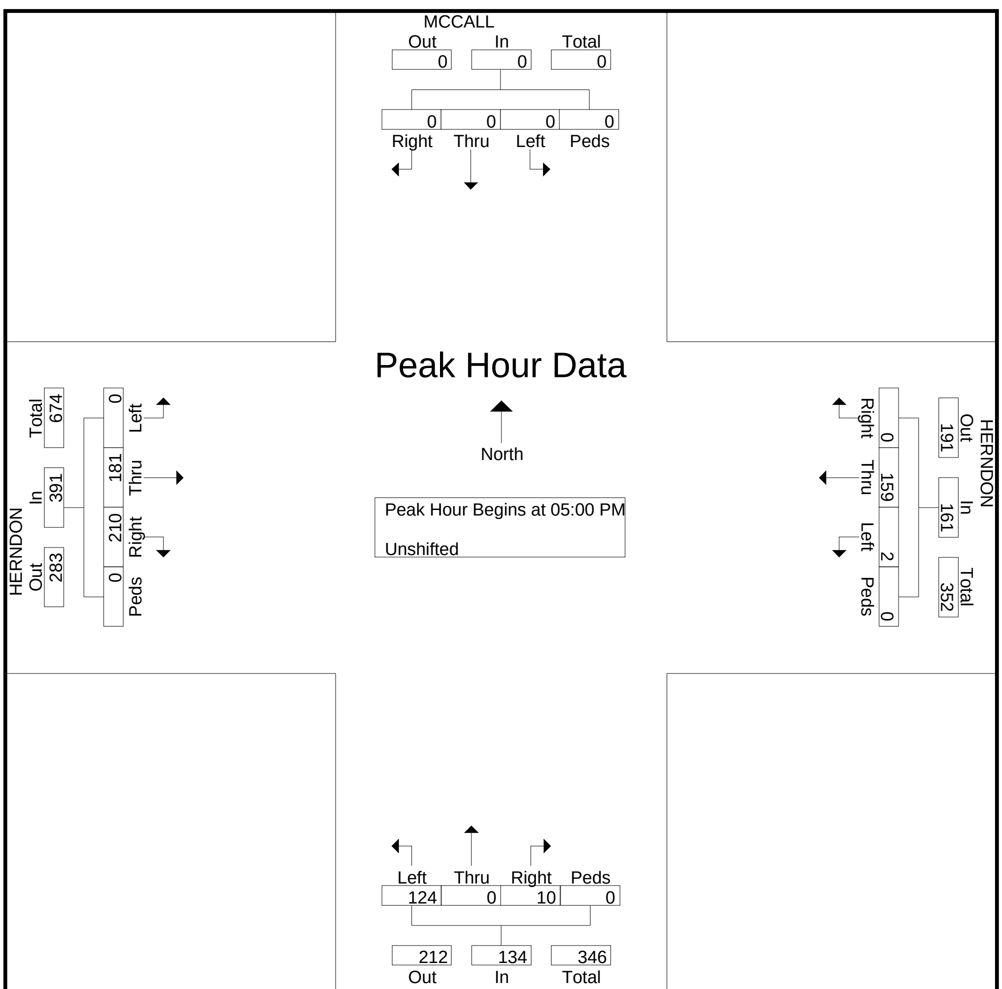
File Name : 17 Herndon at McCall
Site Code : 00000000
Start Date : 12/9/2015

	MCCALL Southbound					**HERNDON Westbound**					**MCCALL Northbound**					**HERNDON 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 Southbound					HERNDON Westbound					ACADEMY Northbound					HERNDON 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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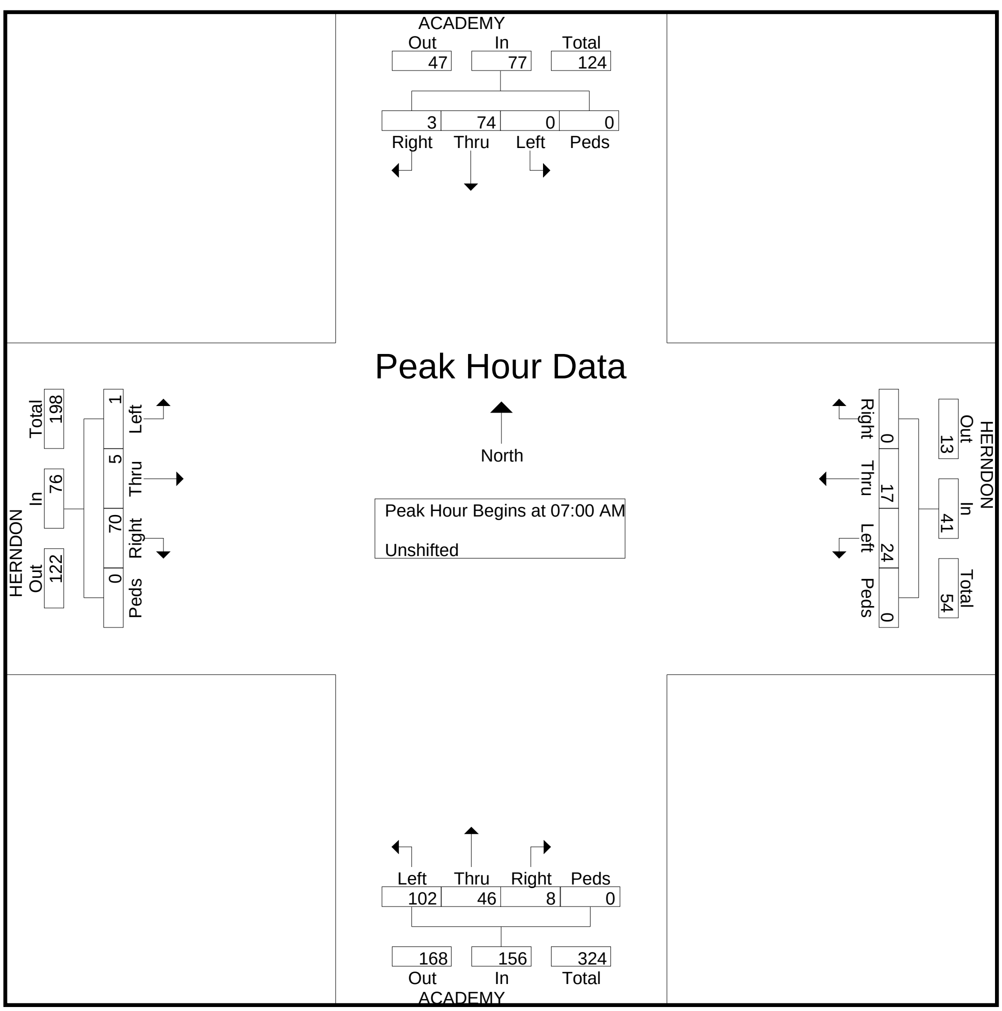
File Name : 18 Herndon at Academy
Site Code : 00000000
Start Date : 12/3/2015

	ACADEMY Southbound					HERNDON Westbound					ACADEMY Northbound					HERNDON 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 07:00 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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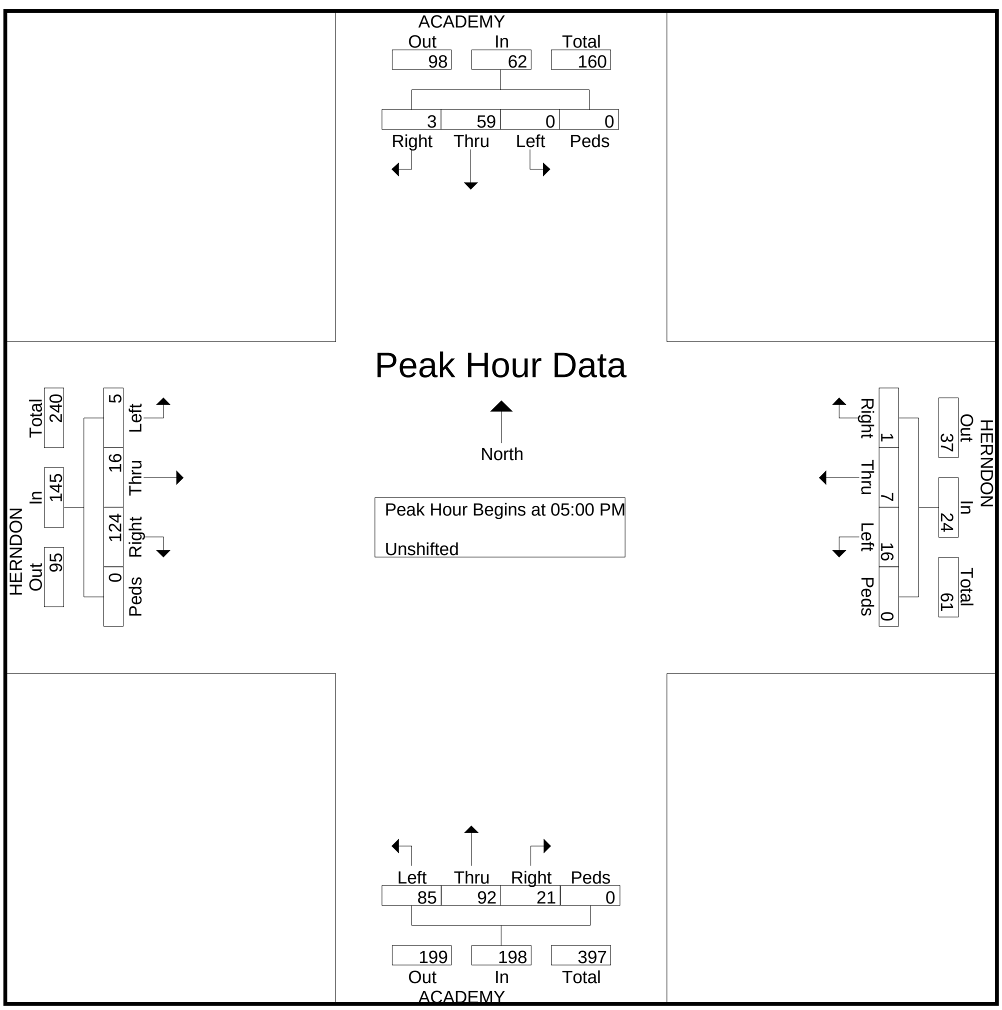
File Name : 18 Herndon at Academy
Site Code : 00000000
Start Date : 12/3/2015
Page No : 3

	ACADEMY Southbound					HERNDON Westbound					ACADEMY Northbound					HERNDON 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	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
1033 Fifth Street ¦ Clovis, CA 93612
T 559.324.2363 ¦ C 559.765.7505
email seans@cityofclovis.com

cc: project file

From: Susana Maciel [mailto:smaciel@jlbtraffic.com]
Sent: Tuesday, February 28, 2017 12:28 PM
To: Sean Smith
Cc: Jose Benavides; Scott Odell (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
Web: www.JLBtraffic.com

Intersection Turning Movement

Prepared by:

NDS

National Data & Surveying Services

TMC Summary of Locan Ave/Bullard Ave

Project #: 09-8118-001

N

Locan Ave

Bullard Ave

Bullard Ave

Locan Ave

SOUTHBOUND APPROACH LANES

	0	1	0
TOTAL	53	121	29
PM	25	71	17
NOON	0	0	0
AM	28	50	12

EASTBOUND APPROACH LANES

	TOTAL	AM	NOON	PM
1	65	44	0	21
1	208	90	0	118
1	73	47	0	26

WESTBOUND APPROACH LANES

AM	NOON	PM	TOTAL	
43	0	10	53	0
159	0	94	253	1
4	0	6	10	1

NORTHBOUND APPROACH LANES

PM	22	38	8
NOON	0	0	0
AM	28	95	1
TOTAL	50	133	9
	1	1	0

TURNING MOVEMENT COUNT

Locan Ave / Bullard Ave

(Intersection Name)

Tuesday
Day

12/15/09
Date

COUNT PERIODS

am	7:00 AM	-	9:00 AM
noon		-	
pm	4:00 PM	-	6:00 PM

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			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	0	1	0	1	1	1	1	1	0	
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	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
VOLUMES =	55	140	5	24	85	55	70	134	61	11	261	69	970

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	28	95	1	12	50	28	44	90	47	4	159	43	601
PEAK HR. 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			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	1	0	0	1	0	1	1	1	1	1	0	
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	9	7	1	4	8	2	3	26	5	2	31	4	102
4:15 PM	3	10	1	0	9	6	8	31	5	1	23	6	103
4:30 PM	5	15	1	8	18	12	8	38	5	1	17	4	132
4:45 PM	9	6	4	5	22	5	5	29	5	4	20	1	115
5:00 PM	5	5	1	3	12	7	4	23	9	0	23	1	93
5:15 PM	3	12	2	1	19	1	4	28	7	1	34	4	116
5:30 PM	5	12	3	4	9	2	5	26	11	1	19	3	100
5:45 PM	2	6	1	1	9	4	3	21	7	1	12	1	68
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	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:		0.810			0.743			0.809			0.705		0.864

CONTROL: 4-Way Stop

Appendix D: Traffic Modeling

~~September 20~~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 to10 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 1 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 1 and 2 select zone analysis (with Link and TAZ modifications); and
5. Differences between model runs 3 and 1 and 4 and 1 above.

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
Total Project Trips					**15,190**			**750**	**290**	**1,040**			**415**	**909**	**1,324**

Table II: Year 2026 Project Only Trip Generation (Phase 1: 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 ~~161.500~~	k.s.f	36.13	3,410 ~~5,835~~	2.39	79 : 21	179 ~~305~~	47 ~~81~~	226 ~~386~~	3.57	28 : 72	94 ~~162~~	243 ~~415~~	337 ~~577~~
Total Project Trips					**15,121** ~~**17,546**~~			**507** ~~**633**~~	**248** ~~**283**~~	**756** ~~**916**~~			**518** ~~**586**~~	**760** ~~**932**~~	**1,278** ~~**1,518**~~

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
Total Project Trips					**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*
Total Project Trips	**30,008** ~~**32,433**~~	**1,153** ~~**1,279**~~	**469** ~~**503**~~	**1,622** ~~**1,782**~~	**978** ~~**1,046**~~	**1,674** ~~**1,846**~~	**2,652** ~~**2,892**~~

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.

Sincerely,

Jose Luis Benavides, P.E., T.E.
President
cc: Muyi Zhou, Senior Regional Planner

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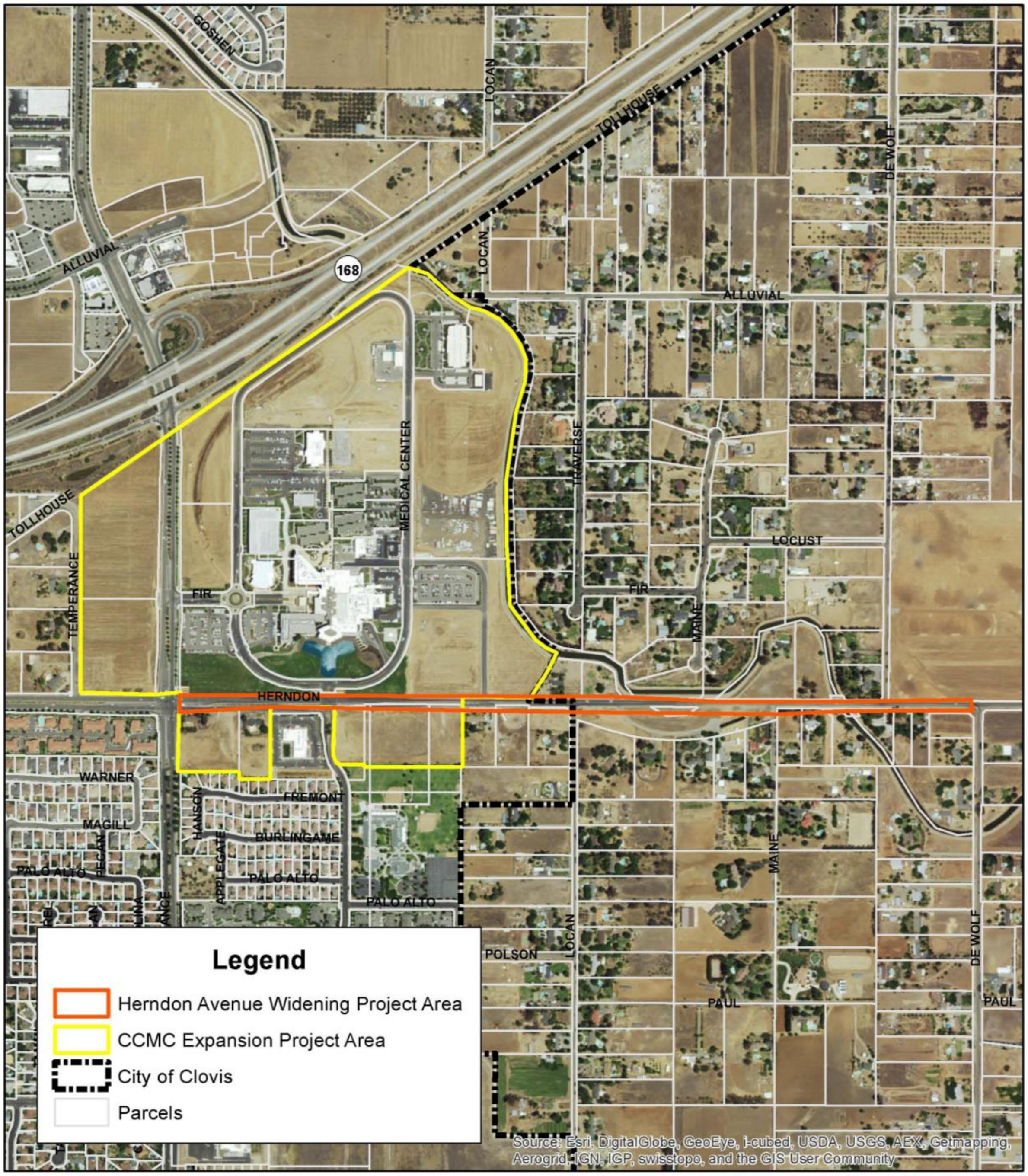
Exhibt A – Aerial



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.*

0 500 1,000 2,000 Feet

Exhibt B – Site Plan

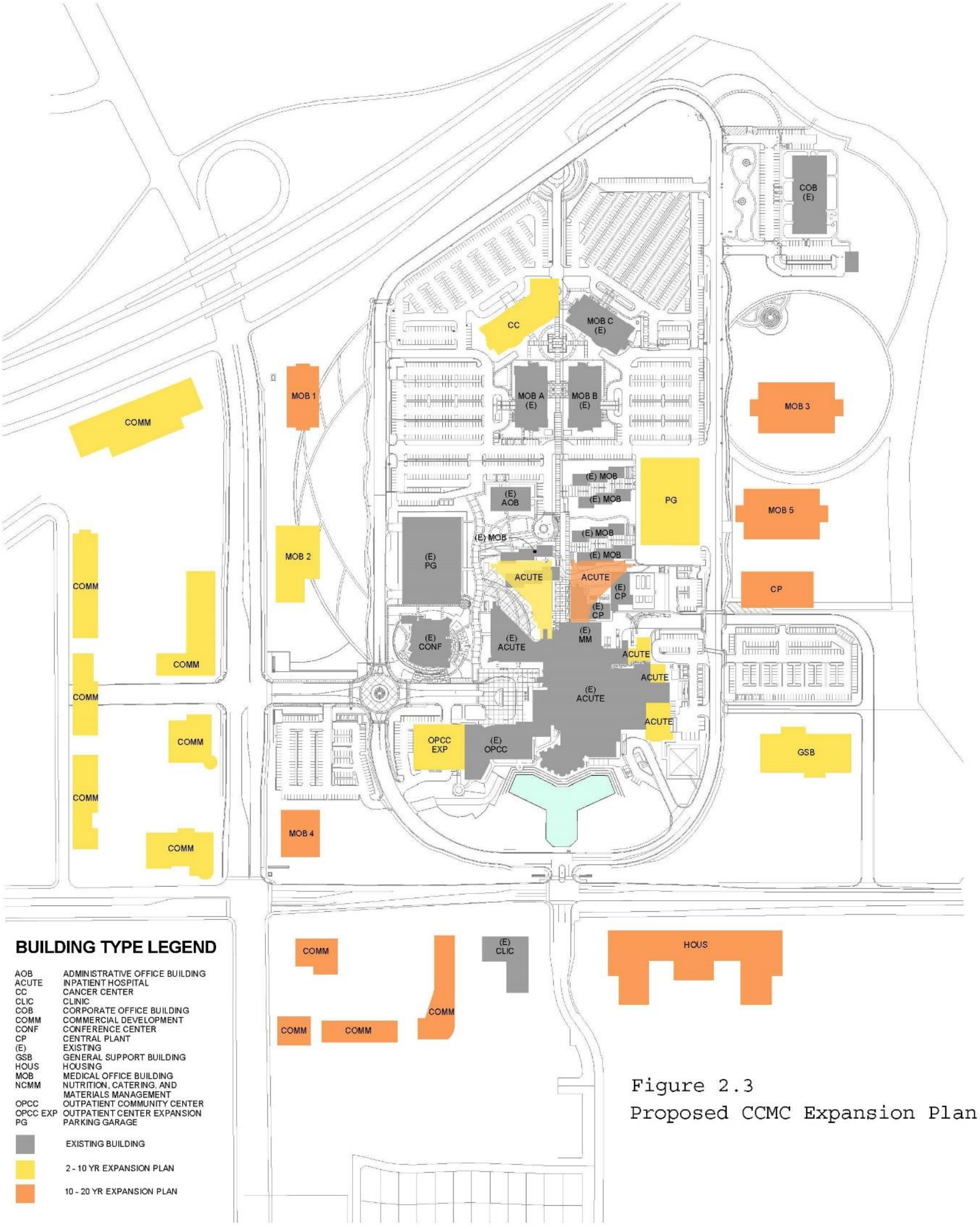
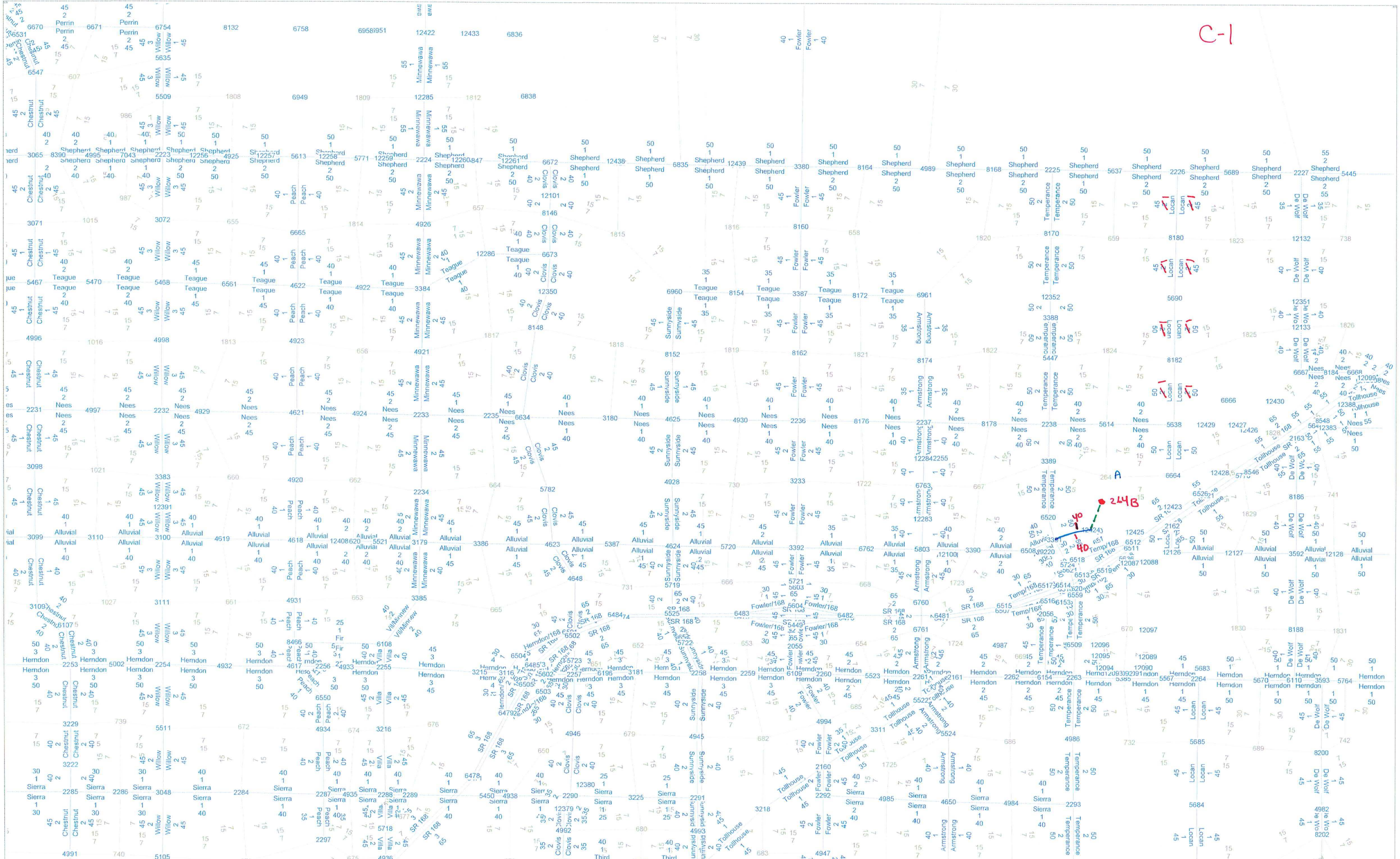
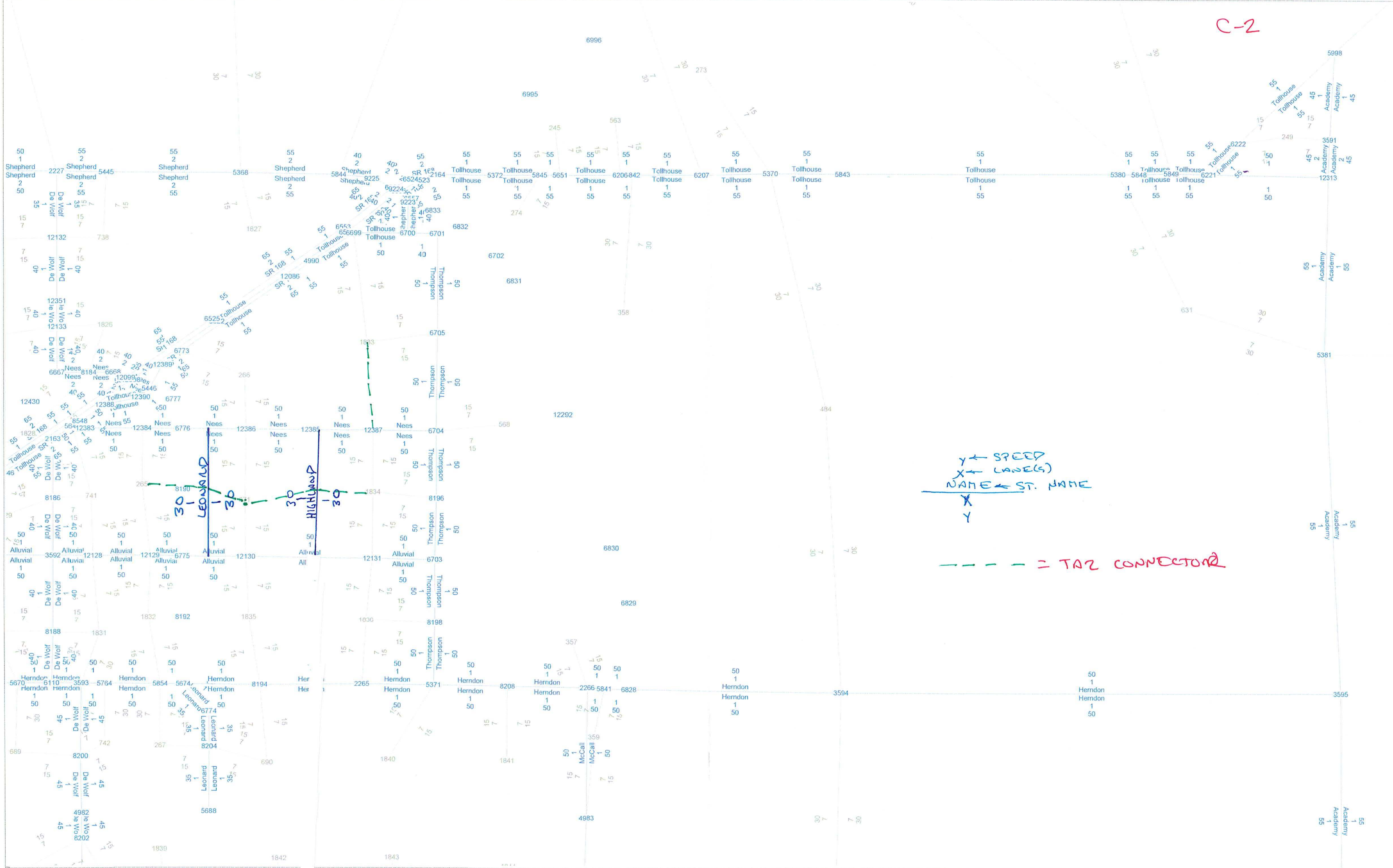


Figure 2.3
Proposed CCMC Expansion Plan



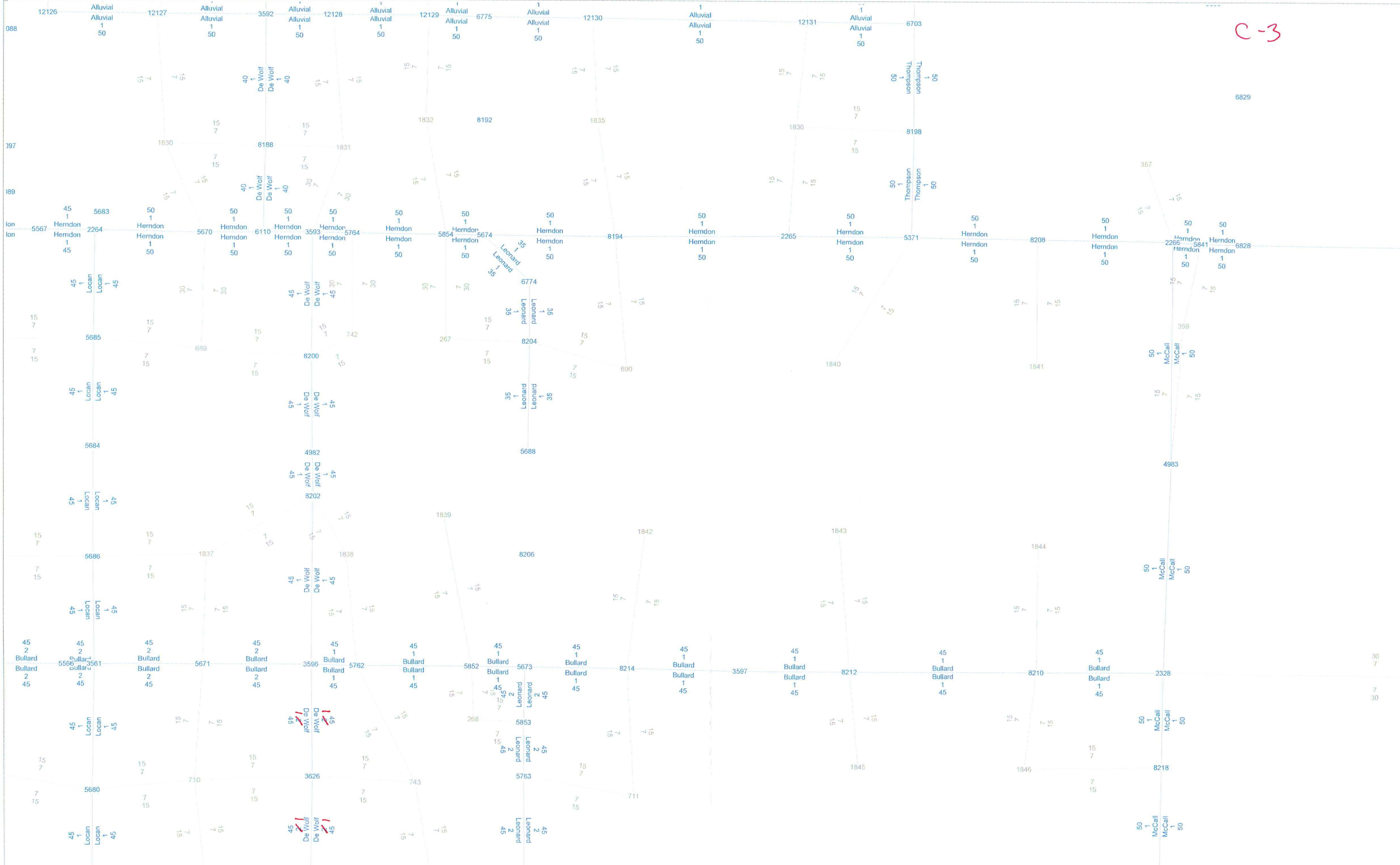
Base Year 2016
Name, Lanes and Speed

C-2

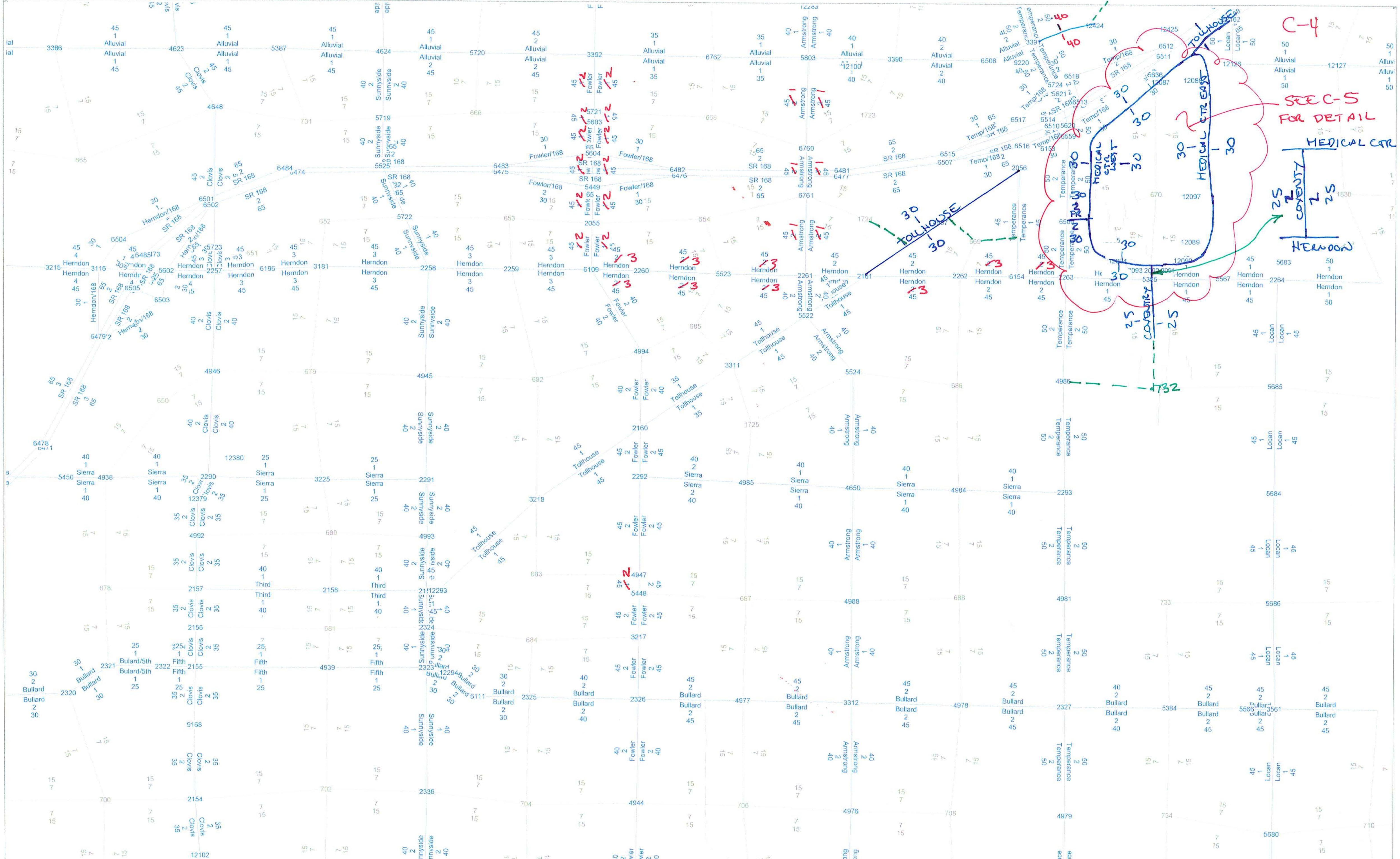


Base Year 2016
Name, Lanes and Speed

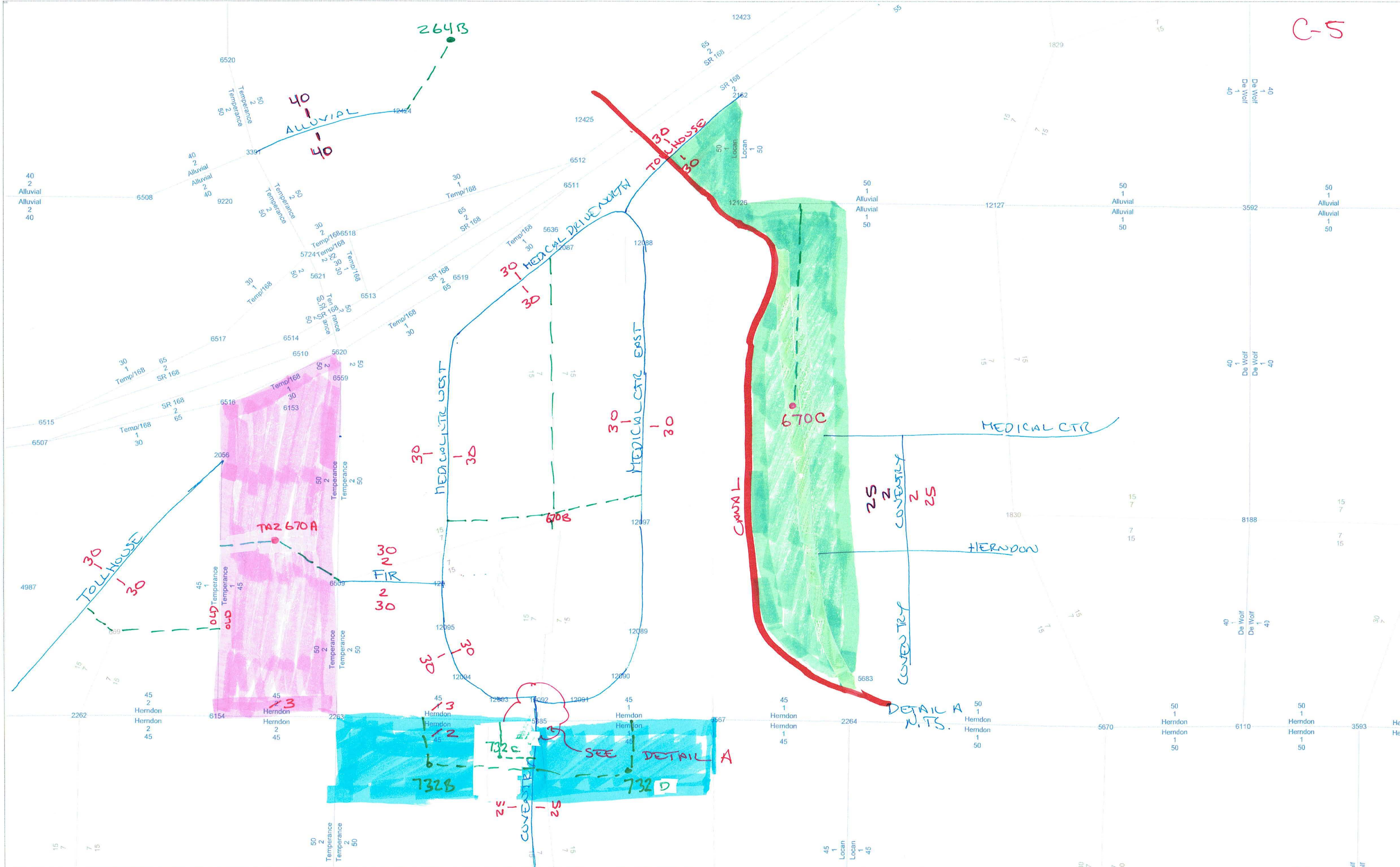
C-3



Base Year 2016
Name, Lanes and Speed

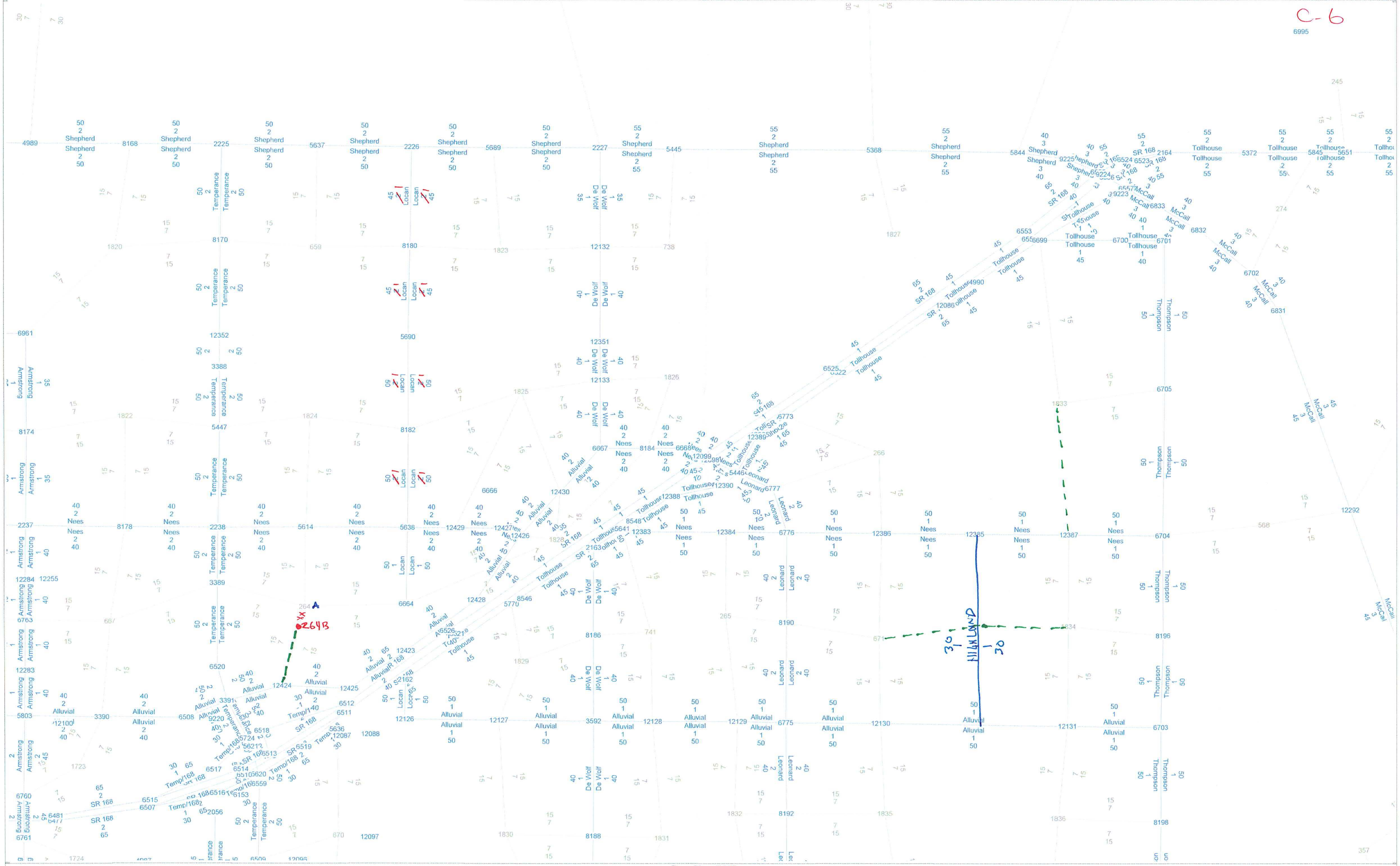


Base Year 2016
Name, Lanes and Speed



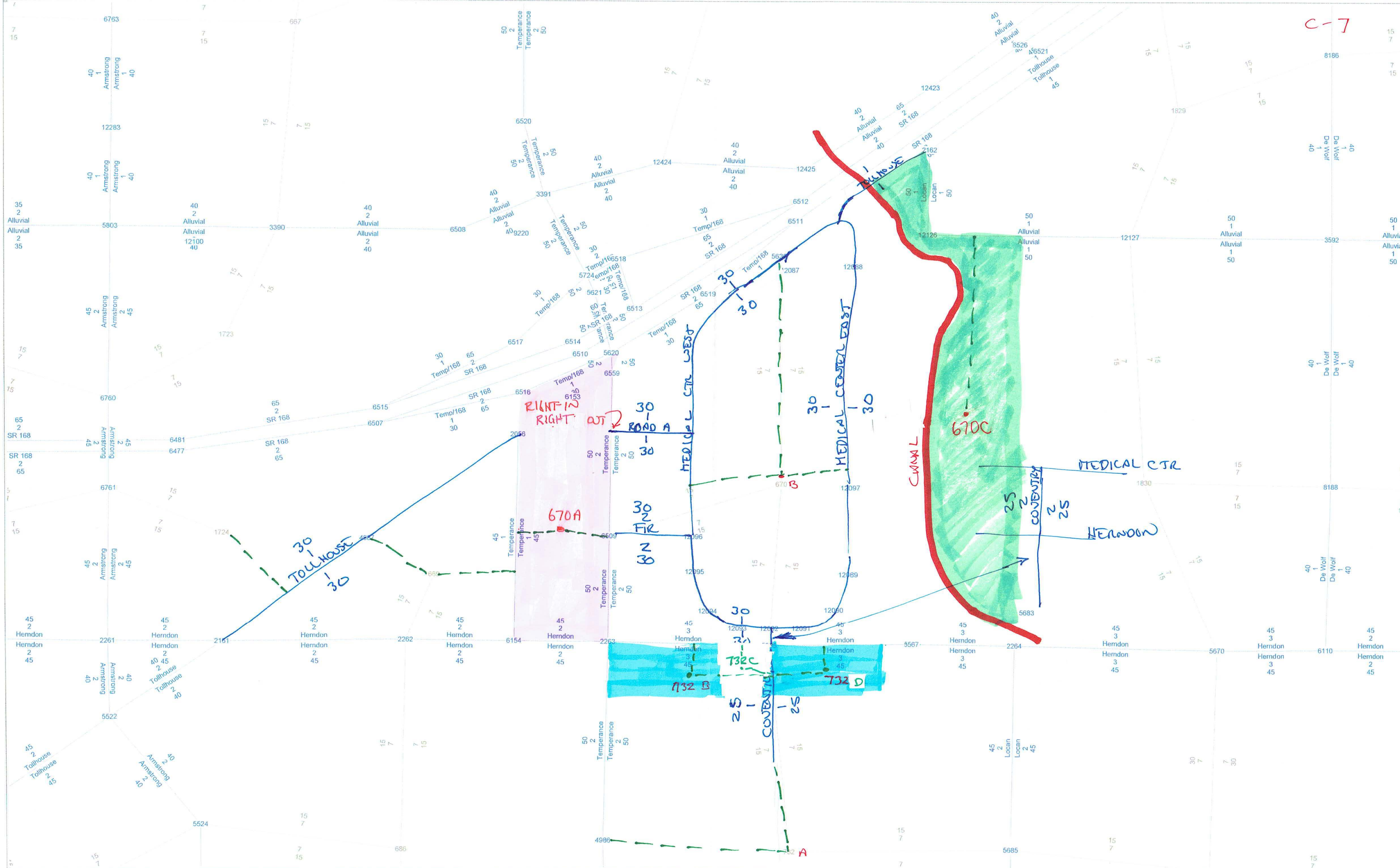
Base Year 2016
Name, Lanes and Speed

C-6



Base Year 2035
Name, Lanes and Speed

viper



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 1 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 1 and 2 select zone analysis (with Link and TAZ modifications); and
5. Differences between model runs 3 and 1 and 4 and 1 above.

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
Total Project Trips					**15,190**			**750**	**290**	**1,040**			**415**	**909**	**1,324**

Table II: Year 2026 Project Only Trip Generation (Phase 1: 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
Total Project Trips					**17,546**			**633**	**283**	**916**			**586**	**932**	**1,518**

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
Total Project Trips					**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
Total Project Trips	**32,433**	**1,279**	**503**	**1,782**	**1,046**	**1,846**	**2,892**

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.

Sincerely,

Jose Luis Benavides, P.E., T.E.
President
cc: Muyi Zhou, Senior Regional Planner

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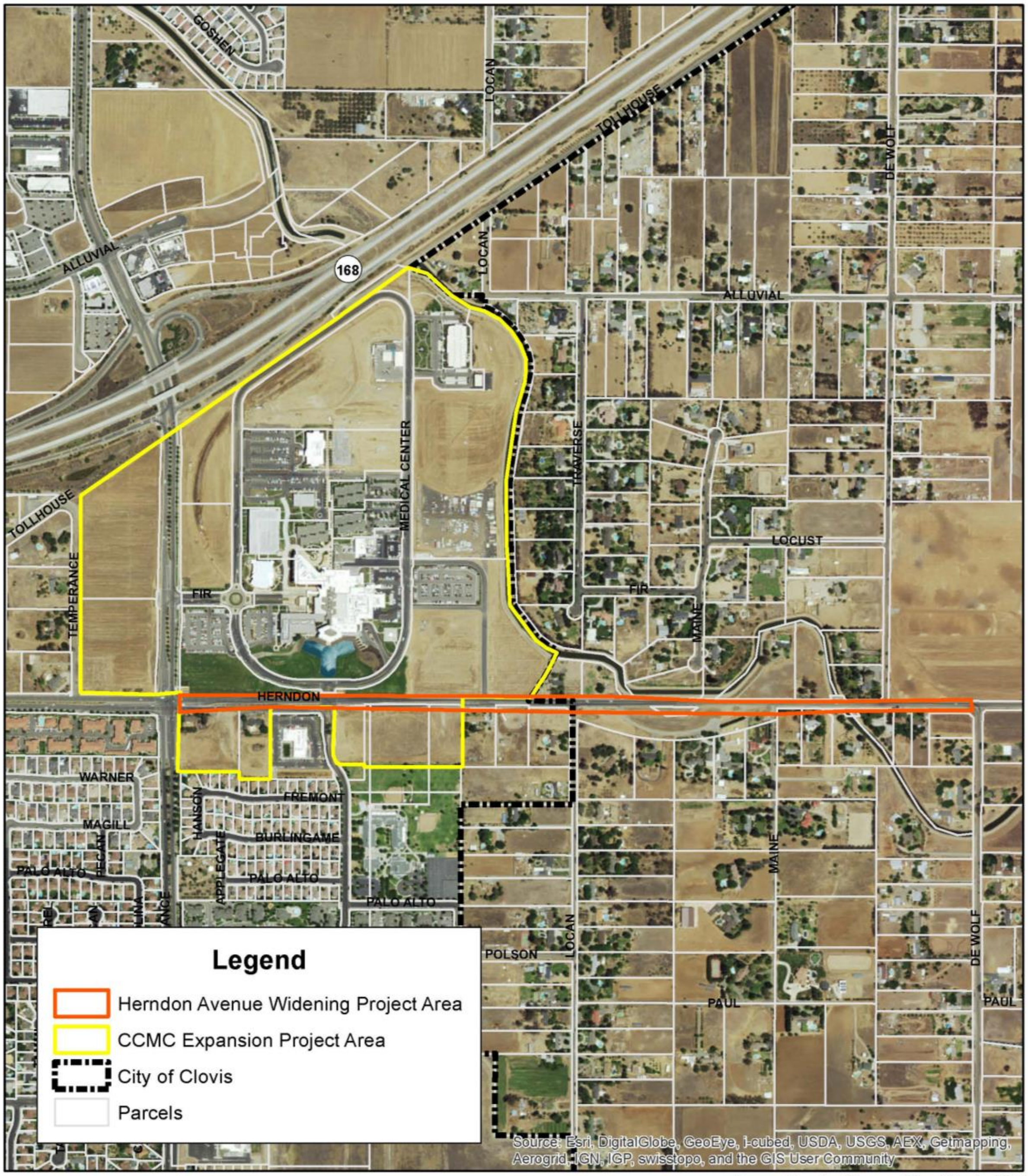
Exhibt A – Aerial



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.*

0 500 1,000 2,000 Feet

Exhibt B – Site Plan

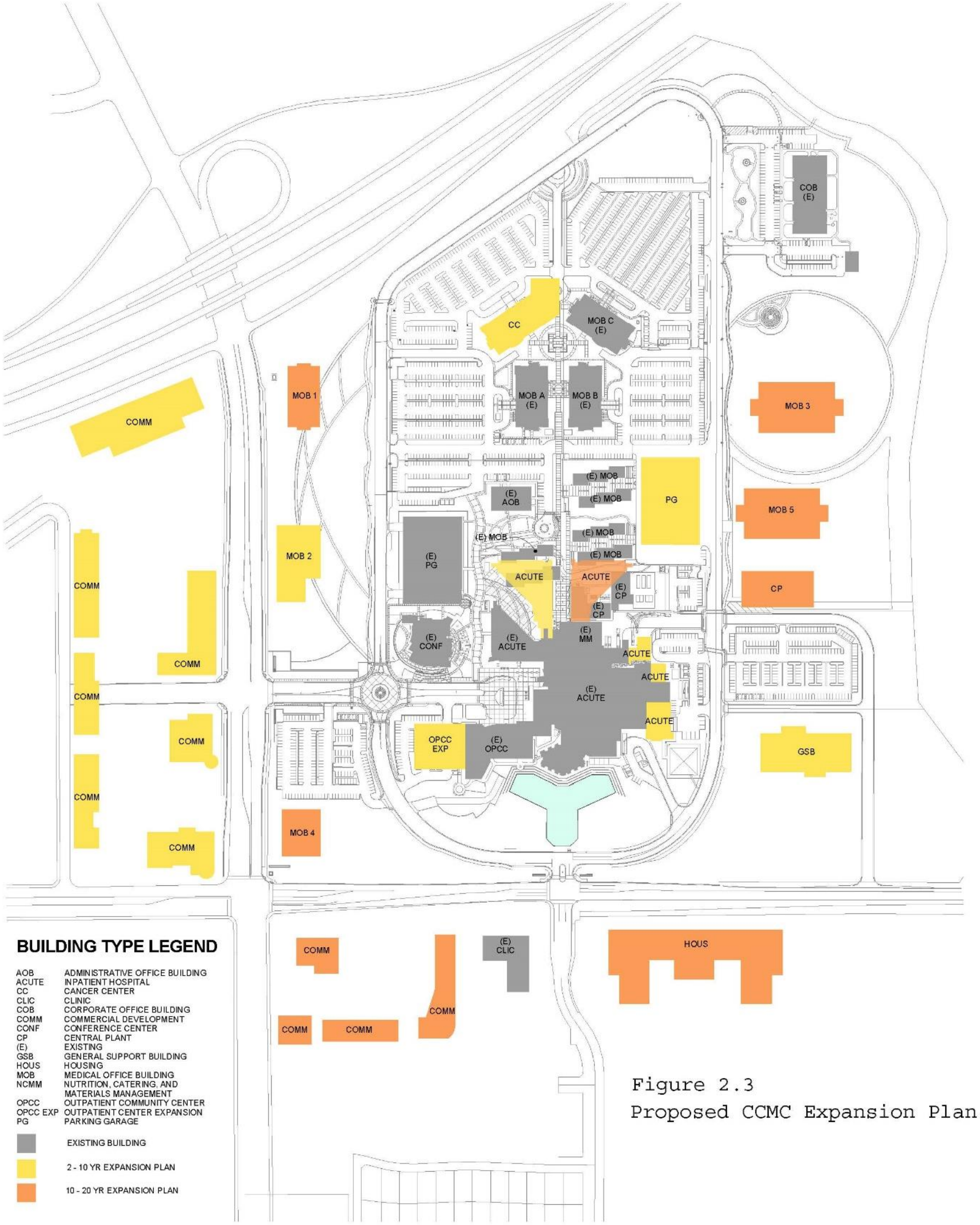
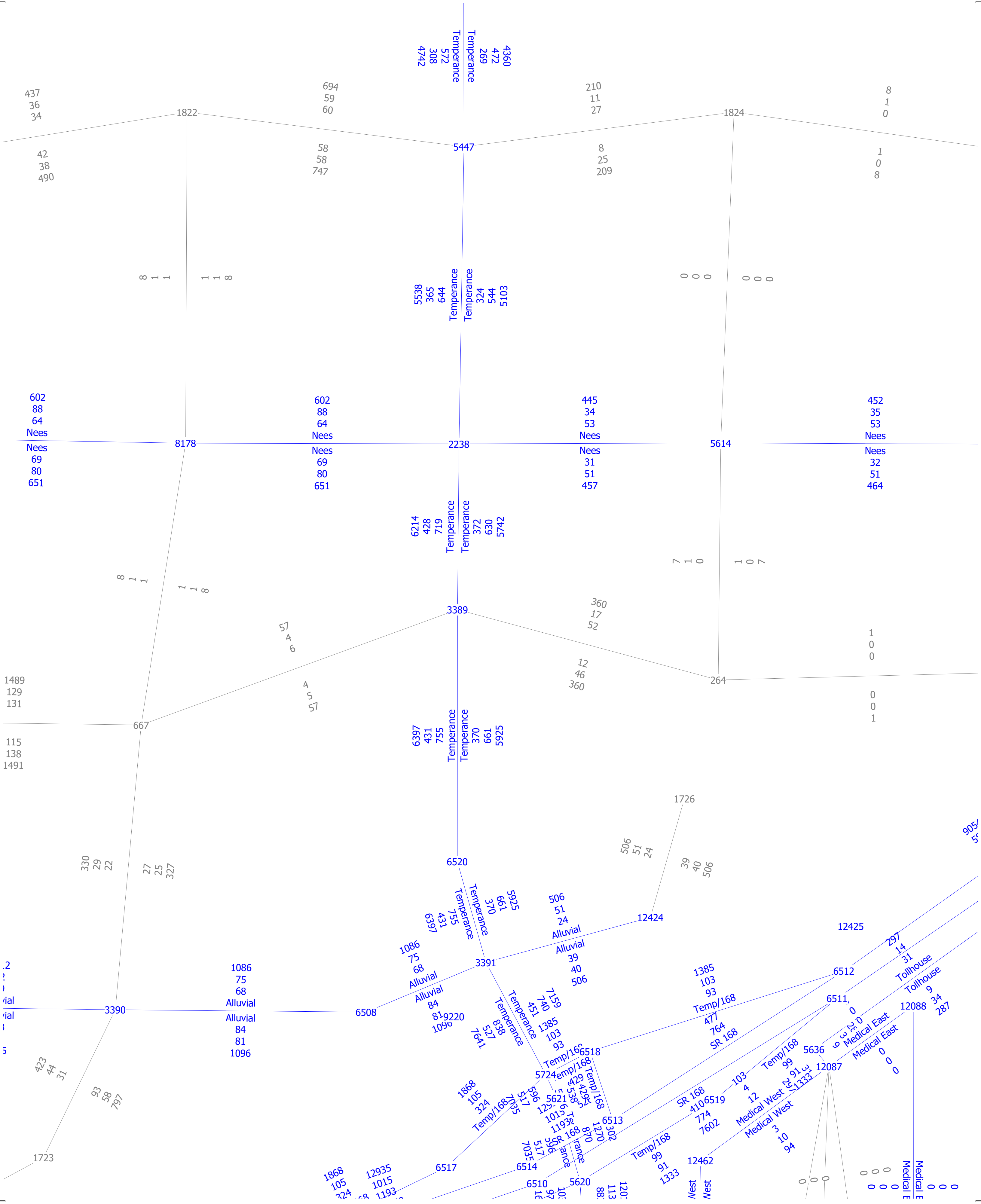
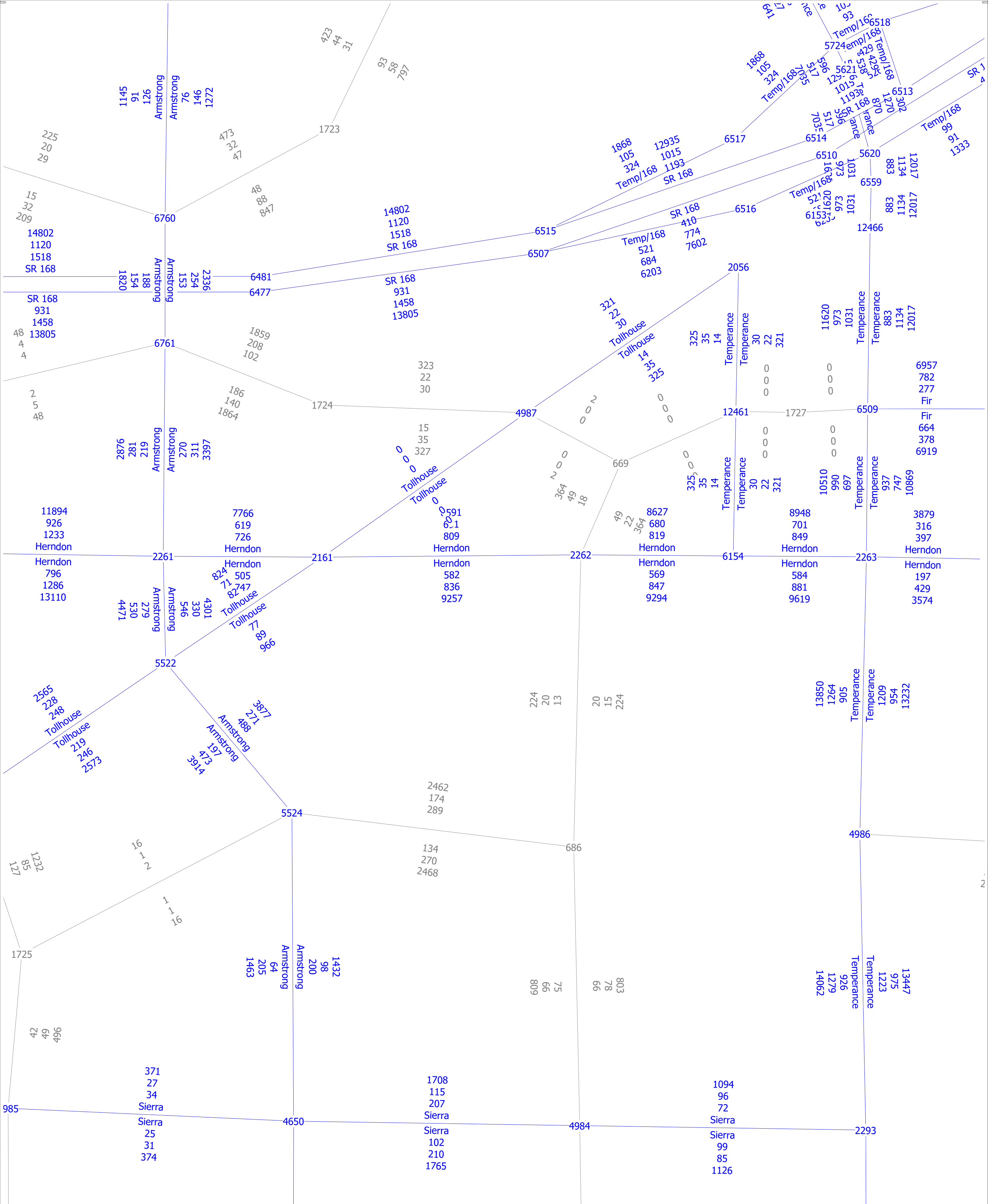


Figure 2.3
Proposed CCMC Expansion Plan

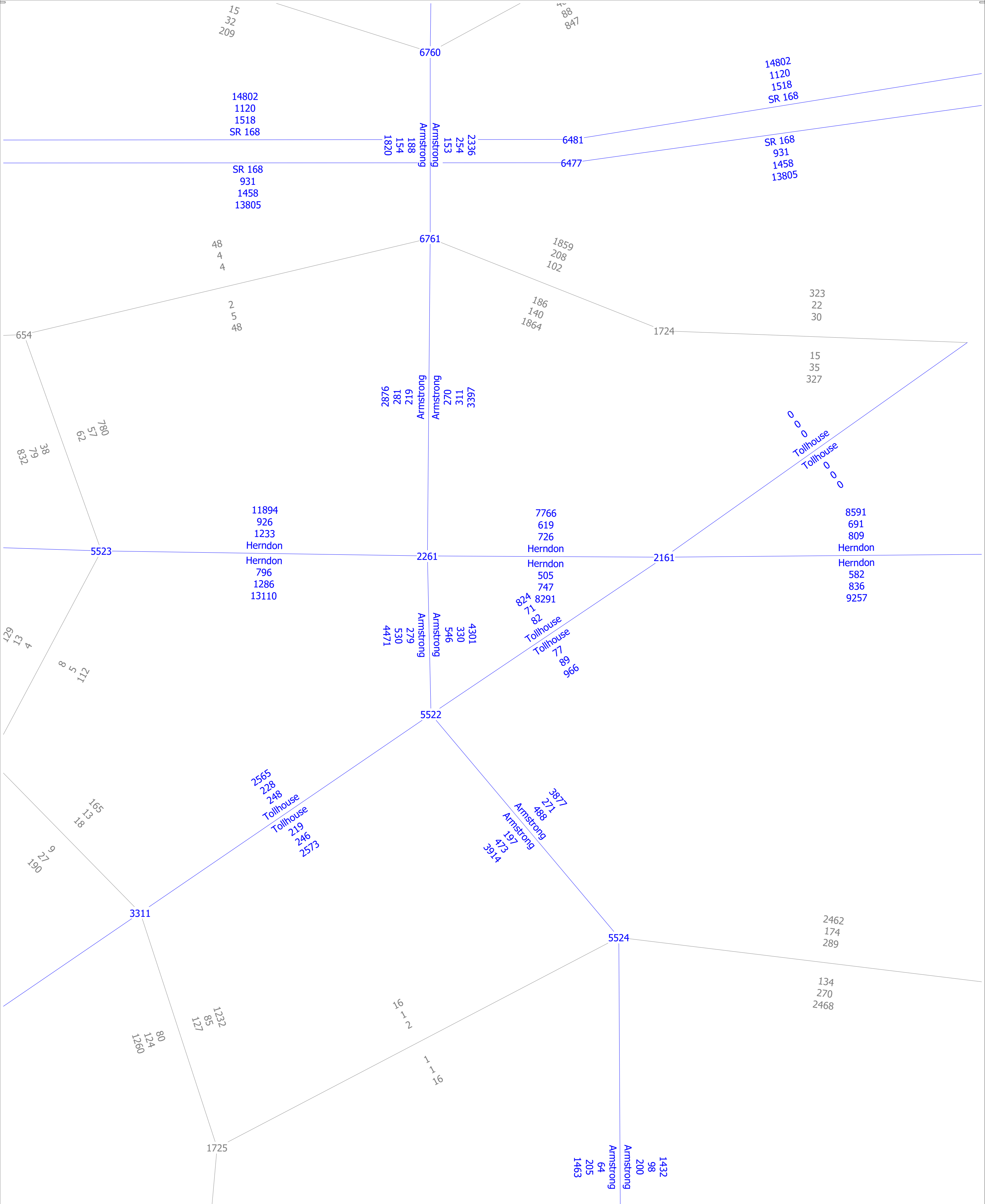


Base Year 2016
AM, PM and Daily Volumes



Base Year 2016

AM, PM and Daily Volumes



Base Year 2016
AM, PM and Daily Volumes

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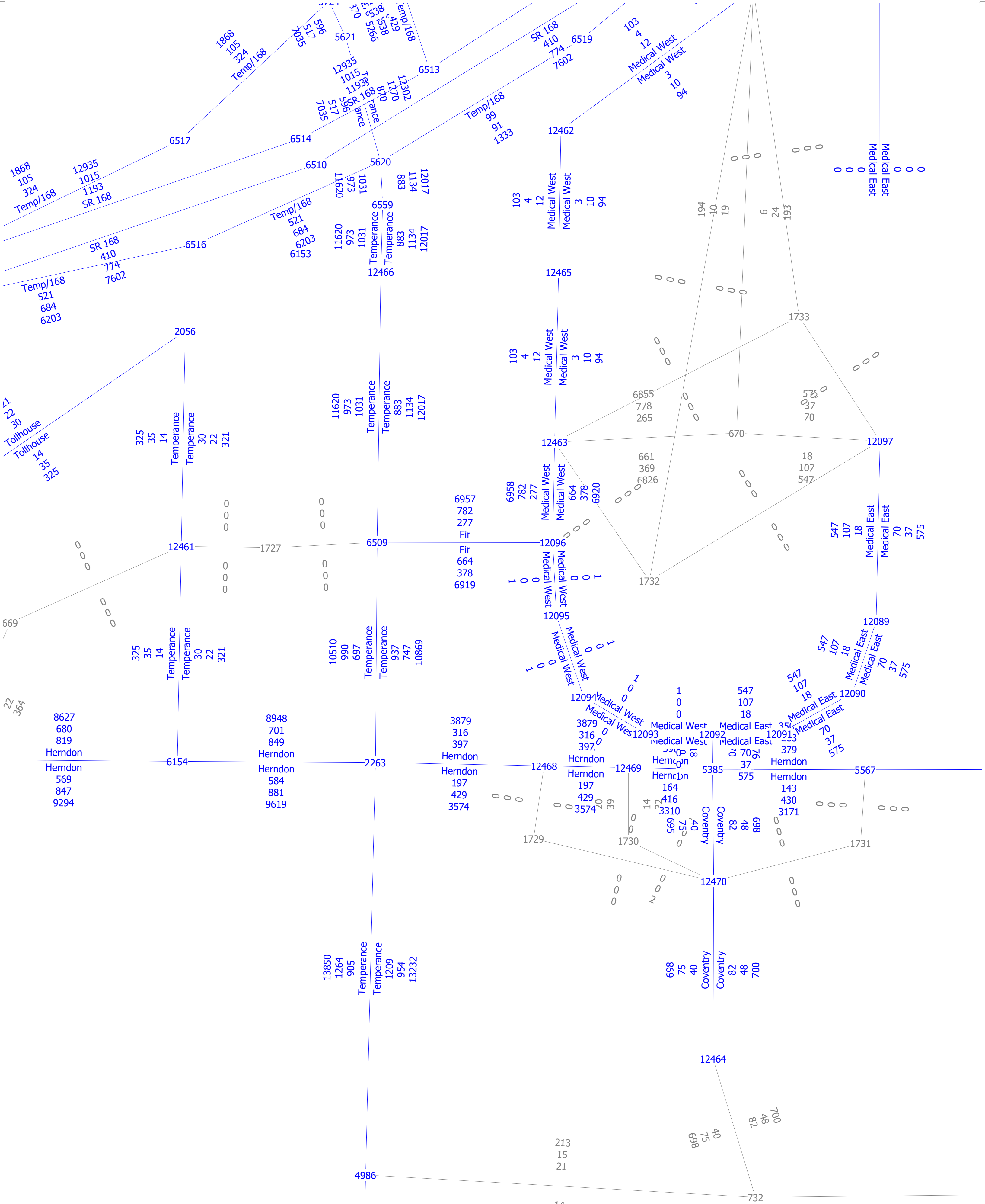
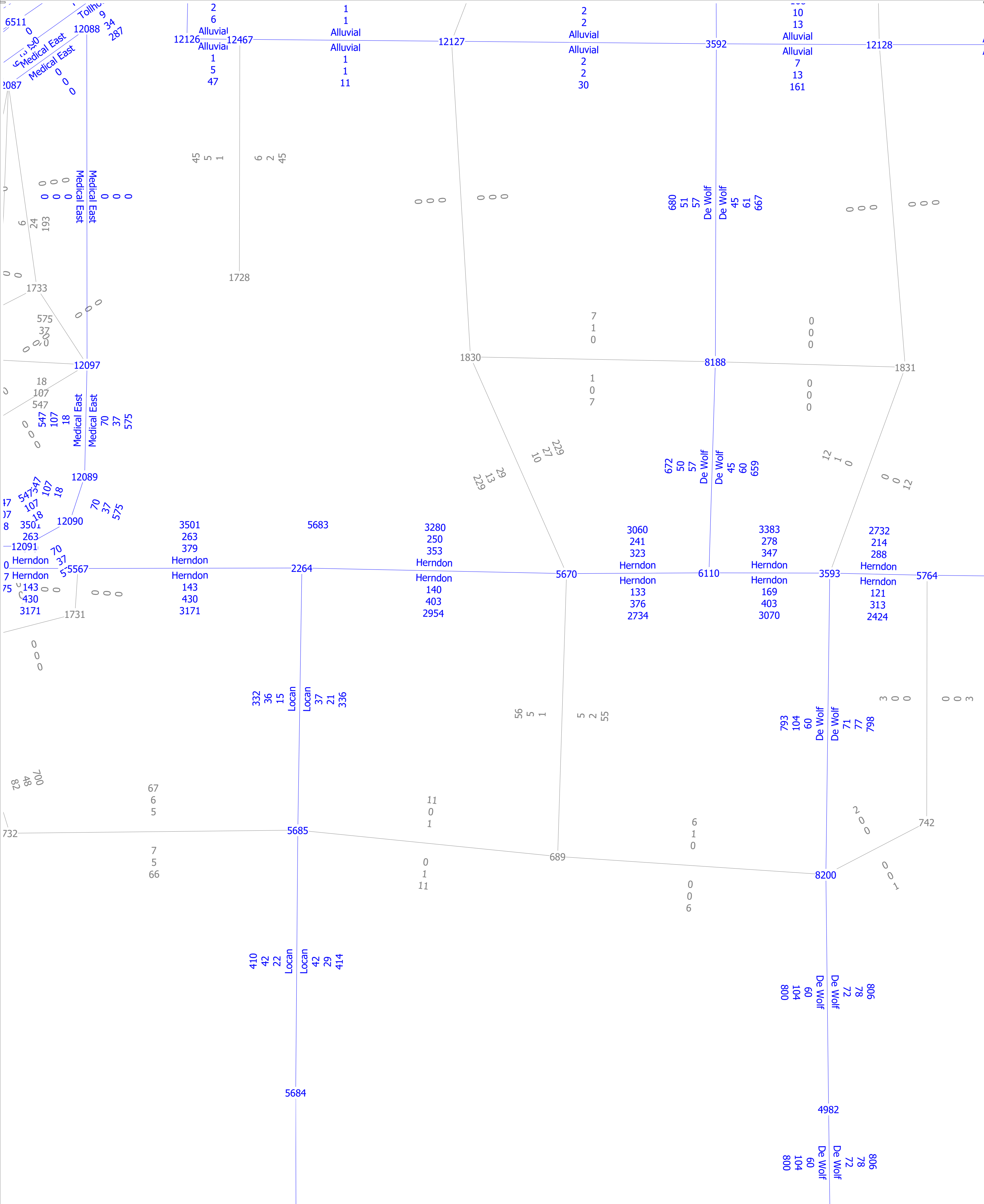


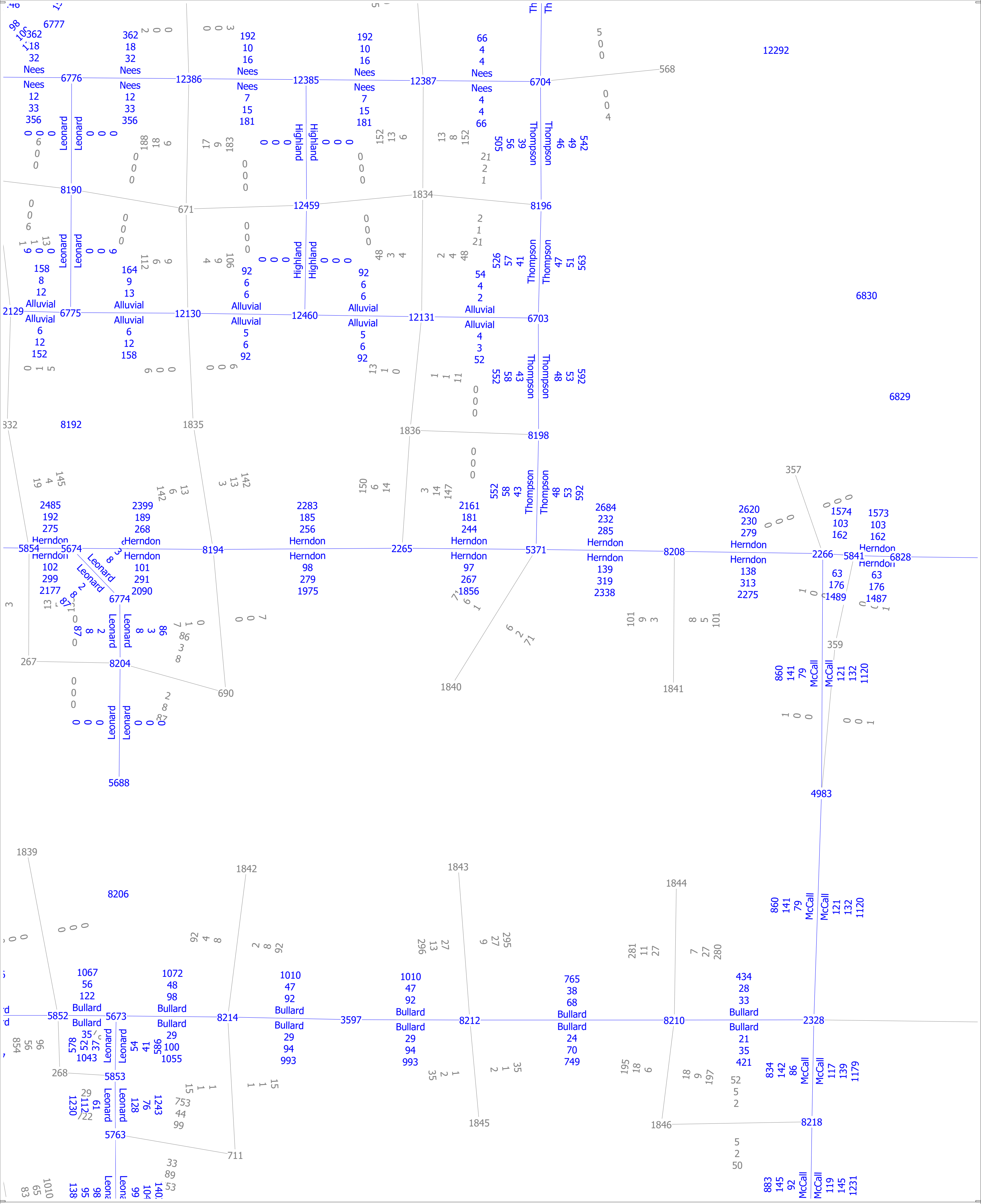
Base Year 2016

AM, PM and Daily Volumes

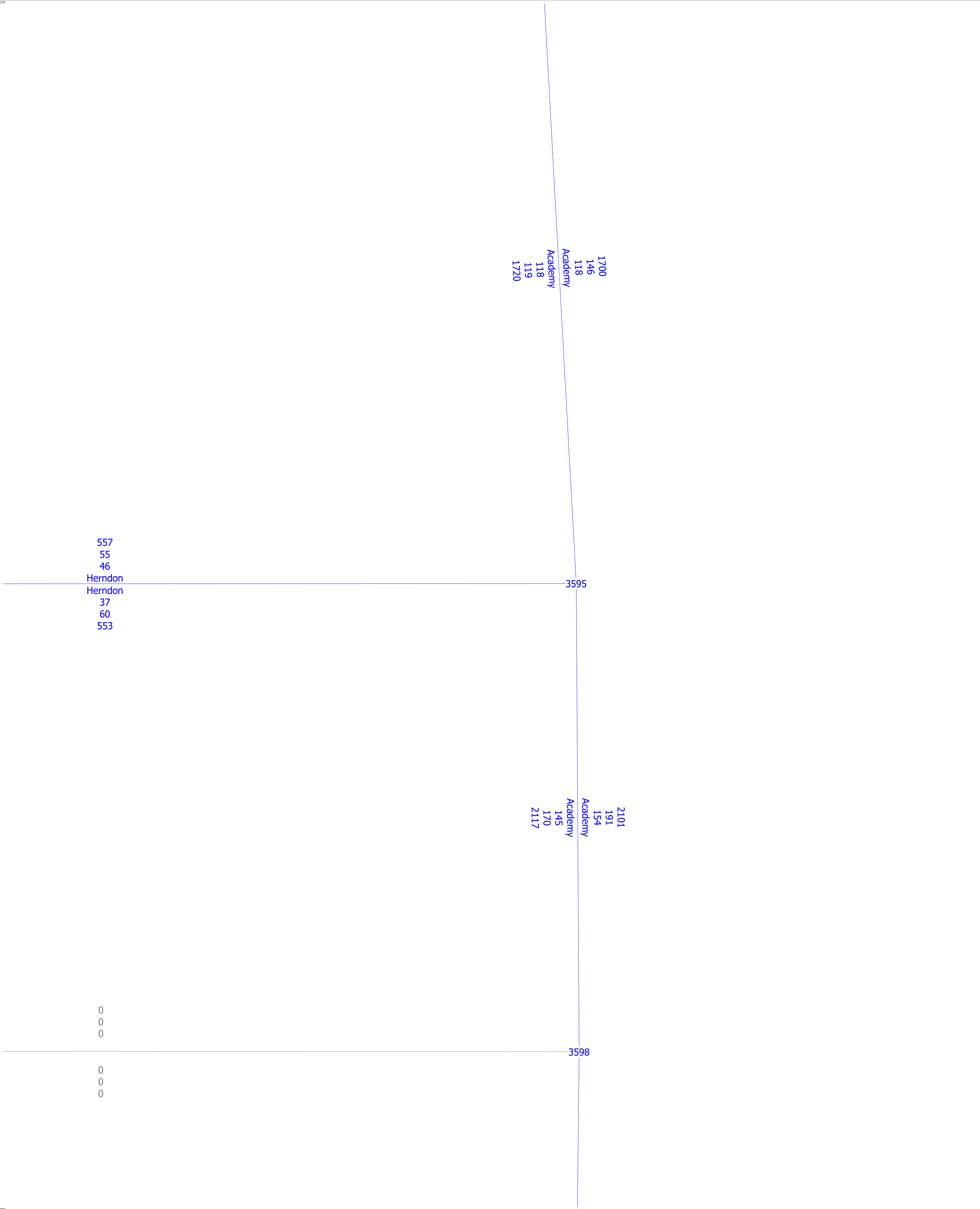


Base Year 2016

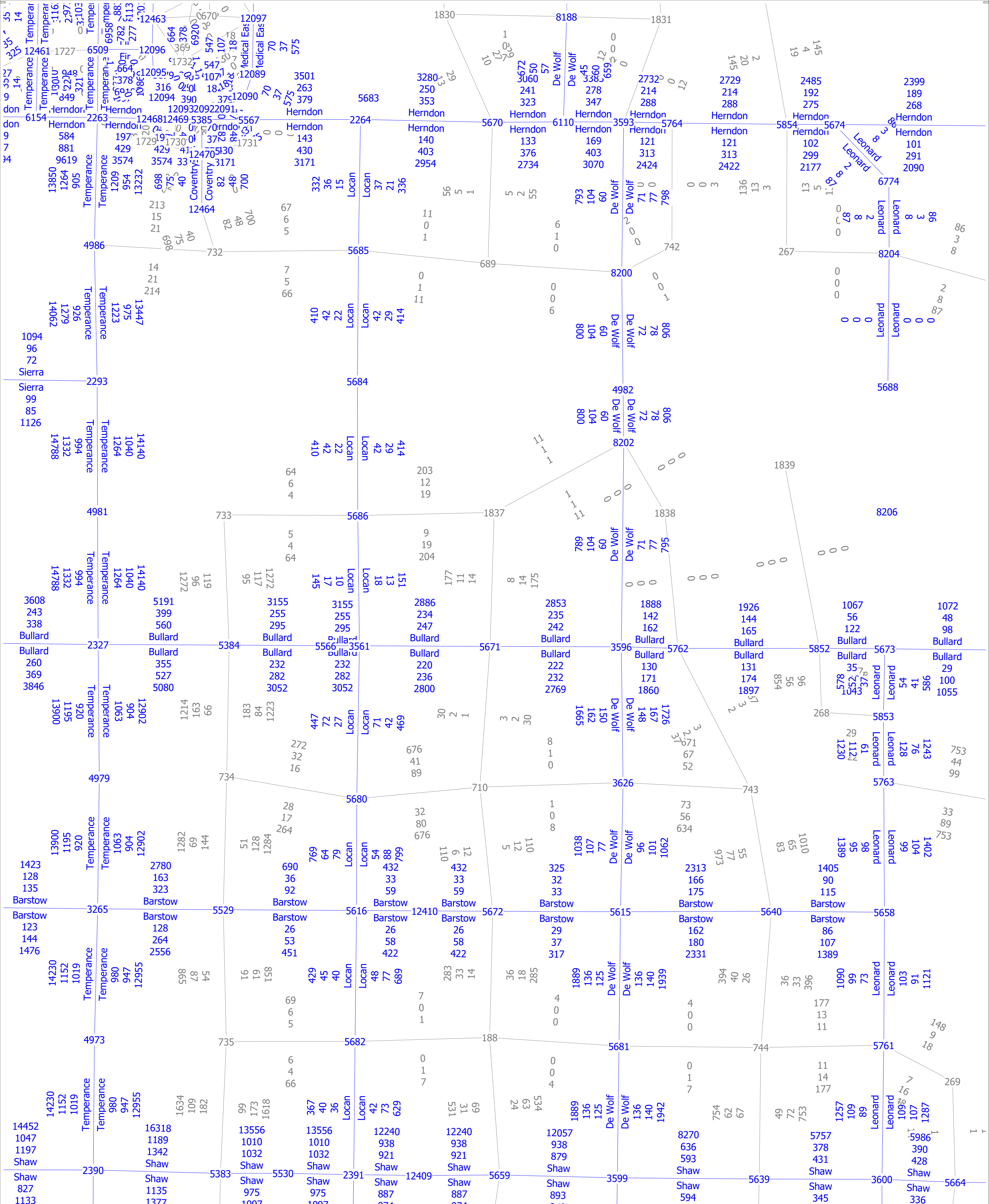
AM, PM and Daily Volumes



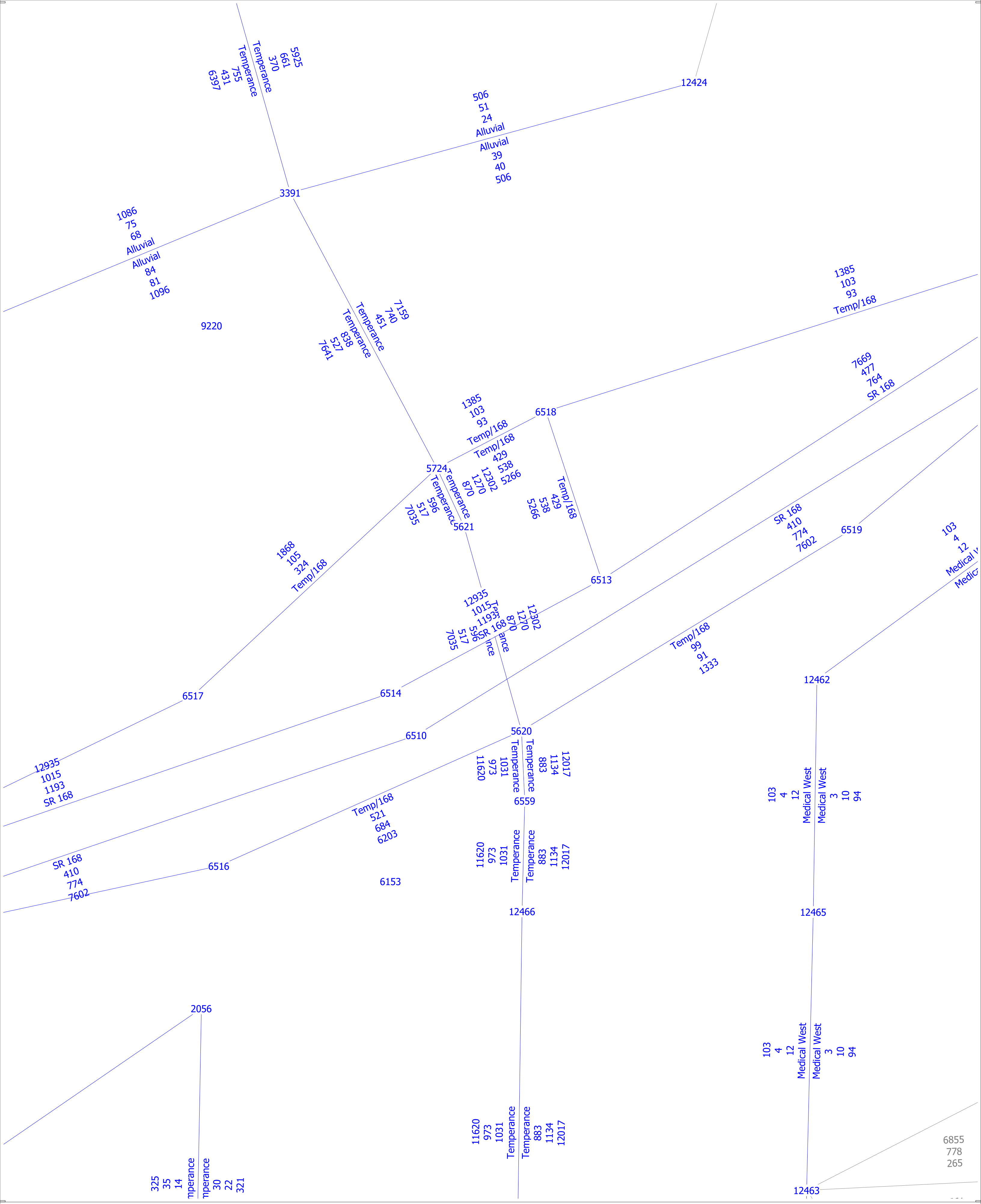
Base Year 2016
AM, PM and Daily Volumes



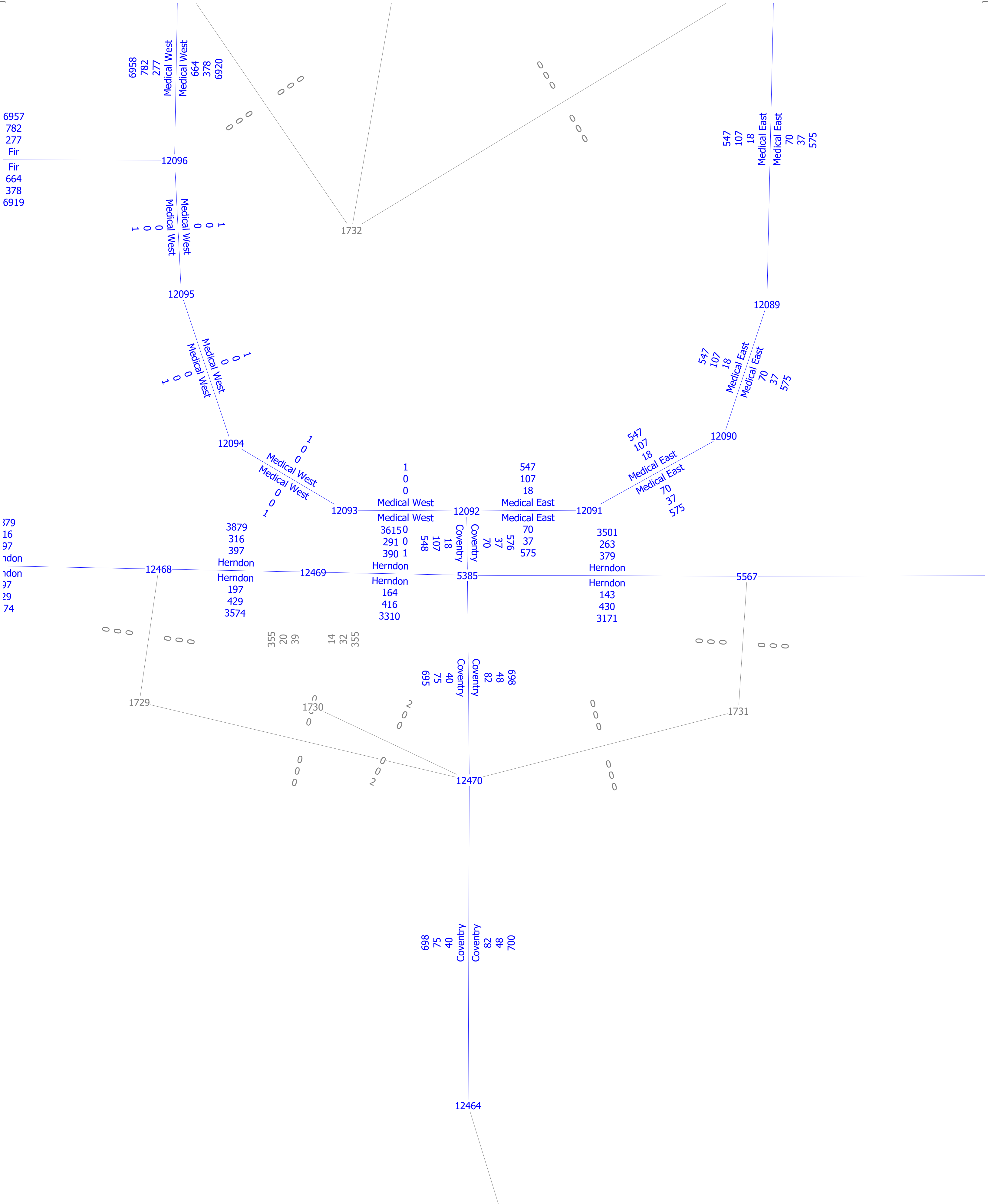
Base Year 2016
AM, PM and Daily Volumes



Base Year 2016
AM, PM and Daily Volumes



Base Year 2016
AM, PM and Daily Volumes



Base Year 2016
AM, PM and Daily Volumes

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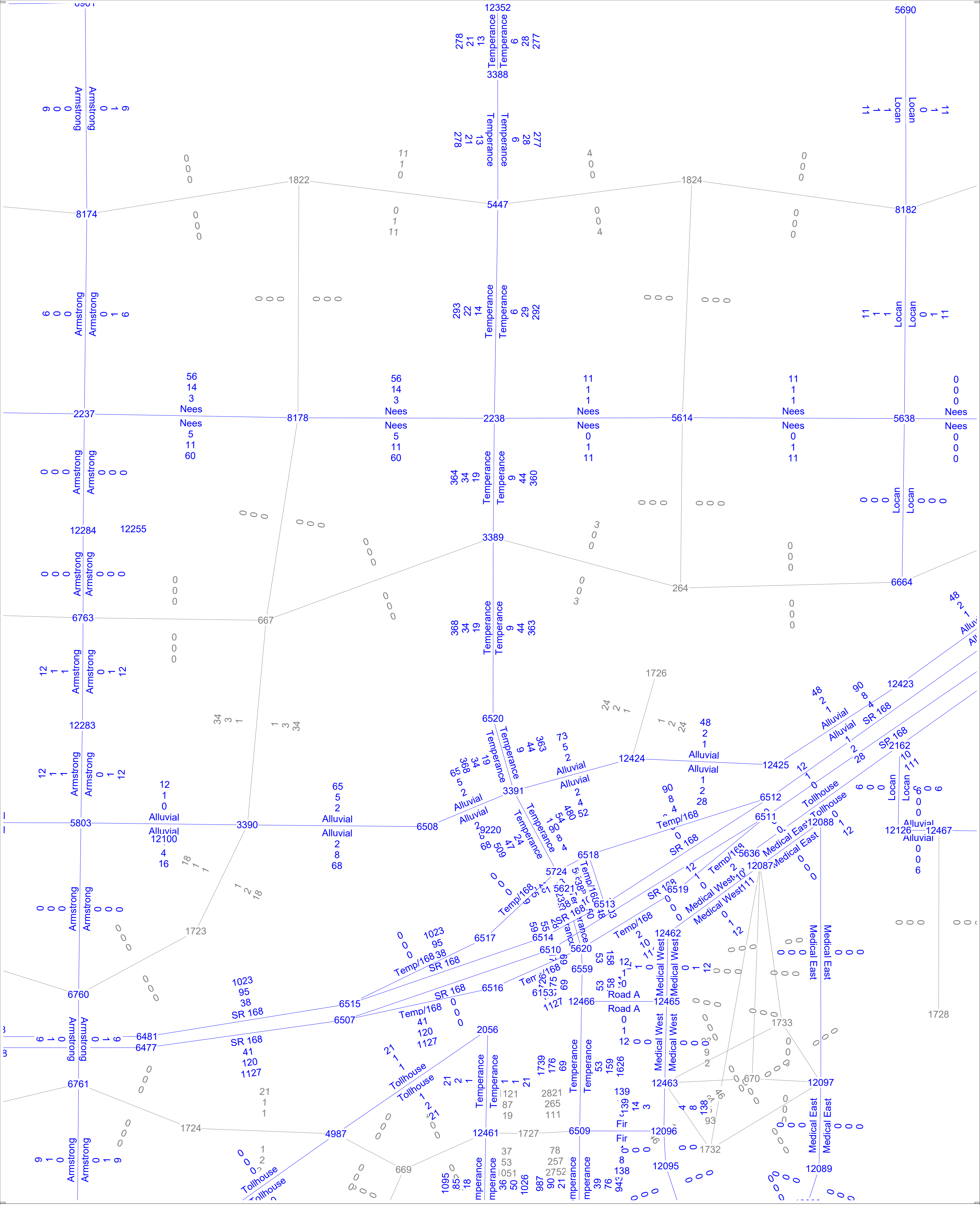
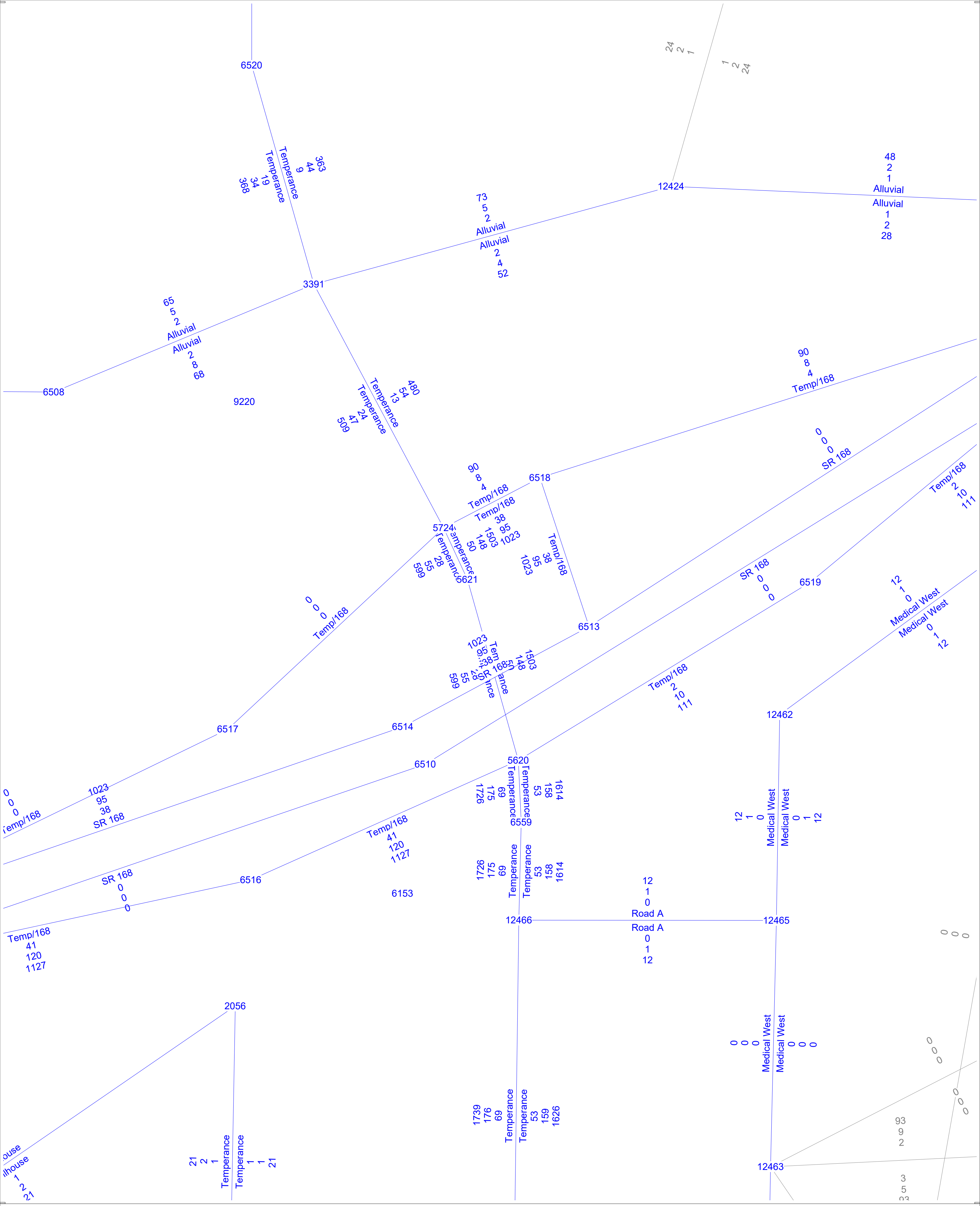
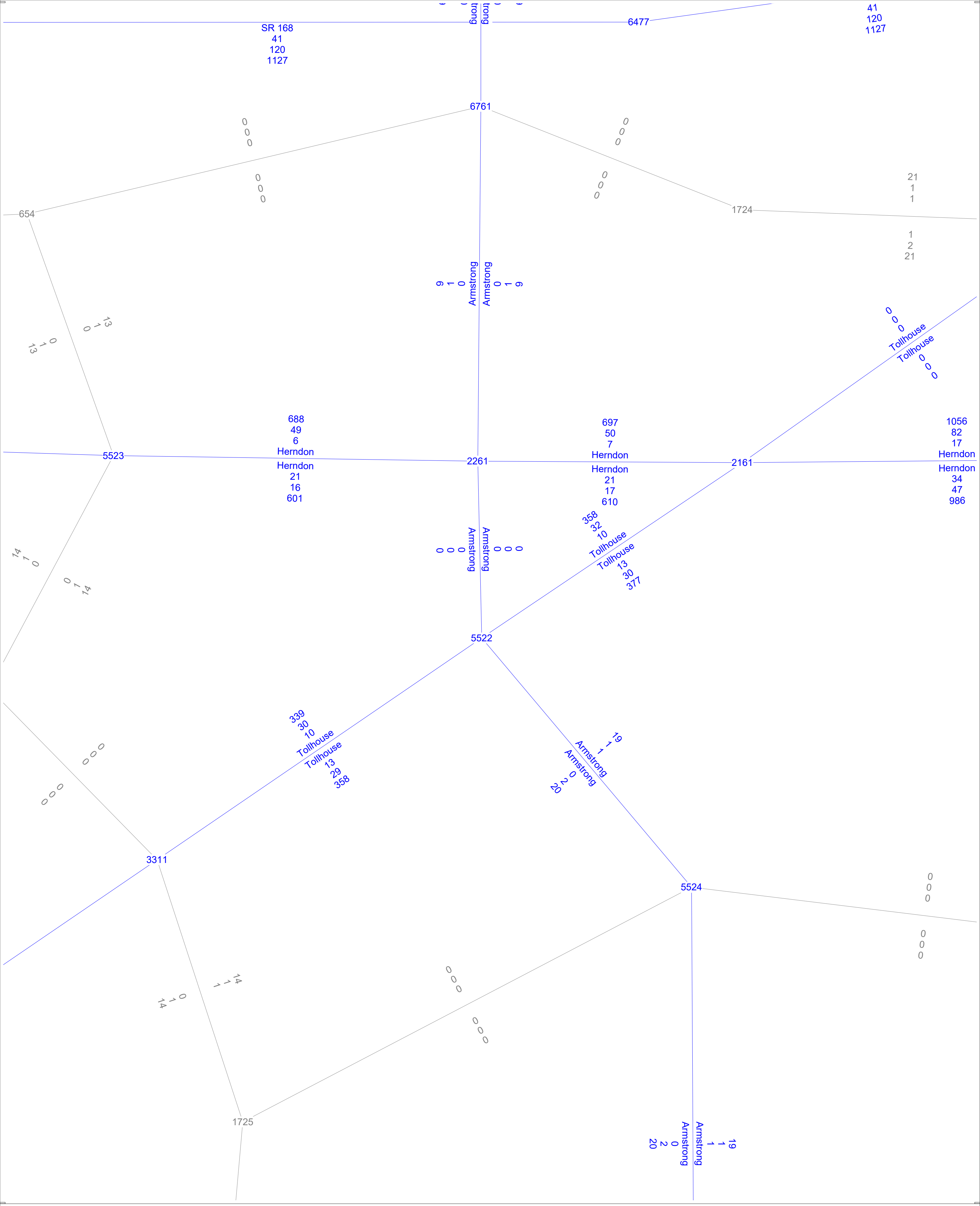


Hotel-Shopping Center Select Zone (2026)

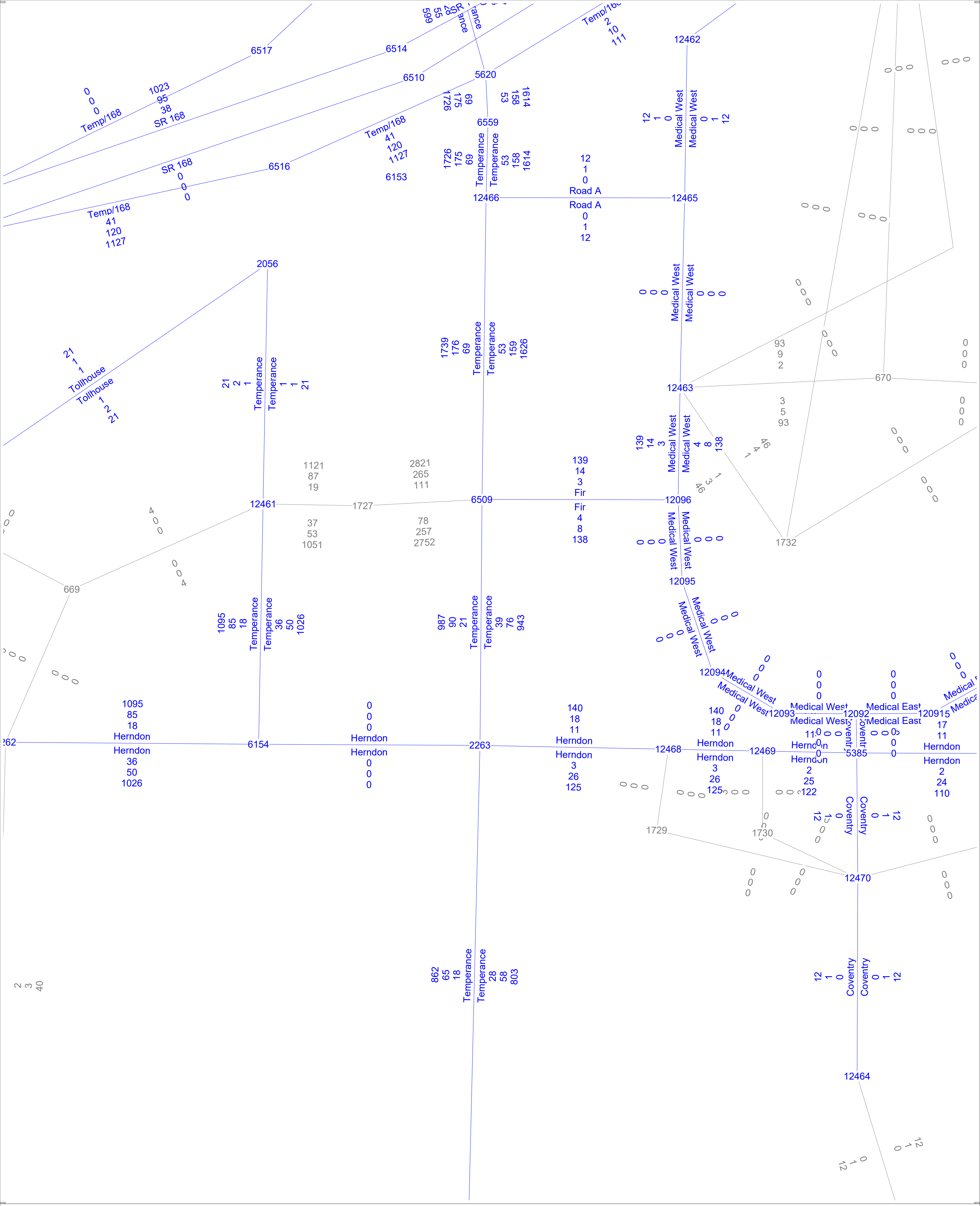
AM, PM and Daily Project Only Trips



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



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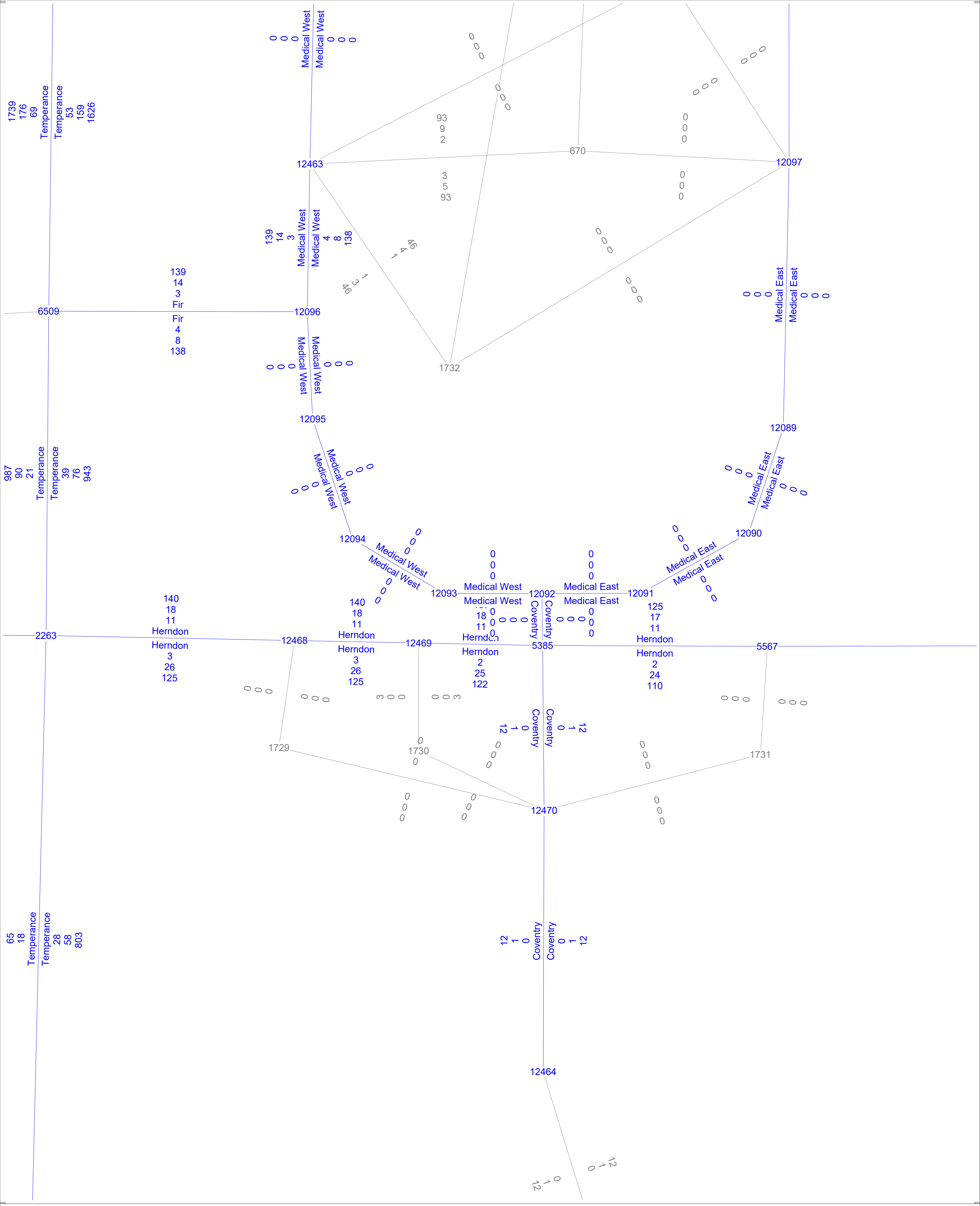
AM, PM and Daily Project Only Trips



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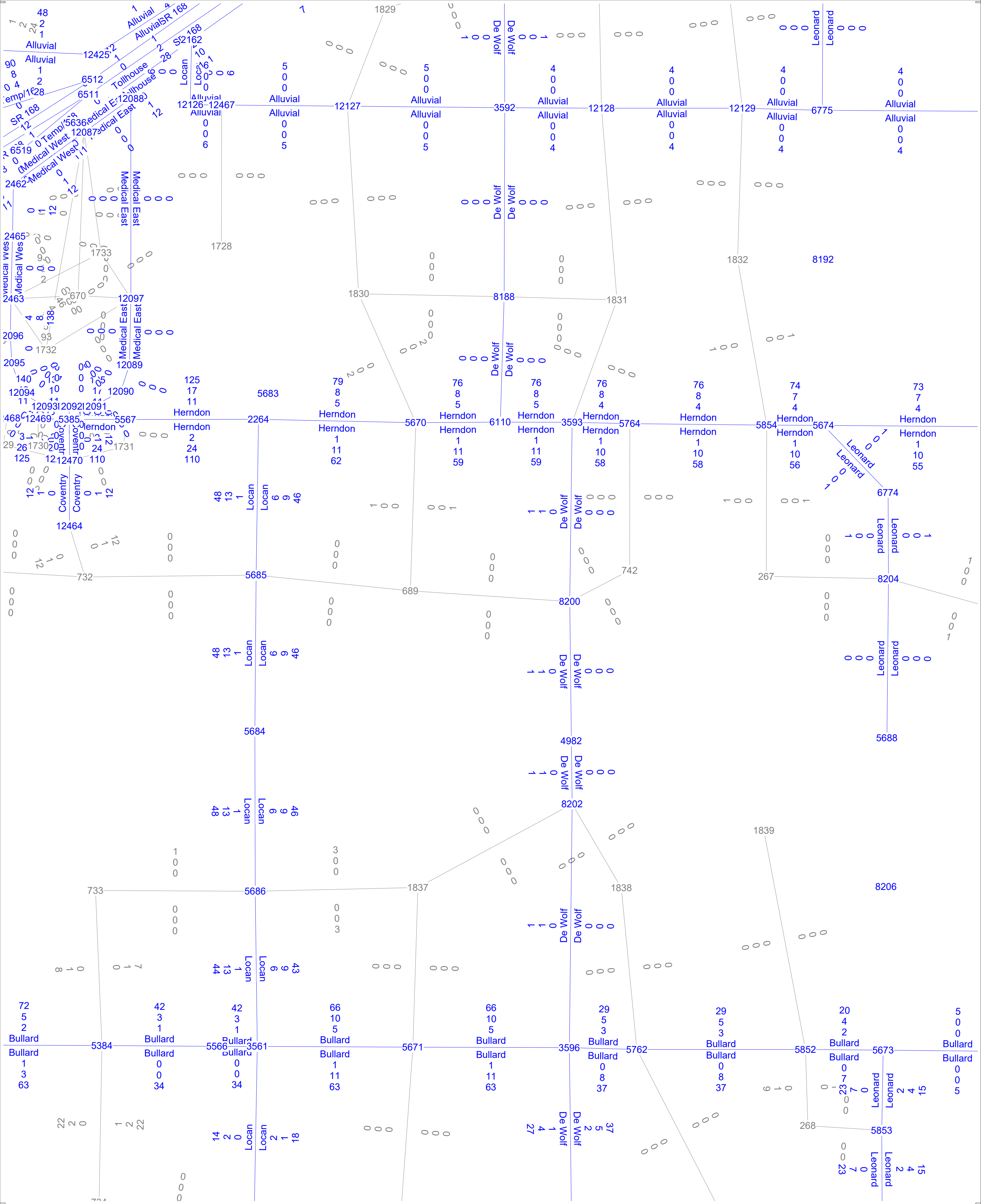
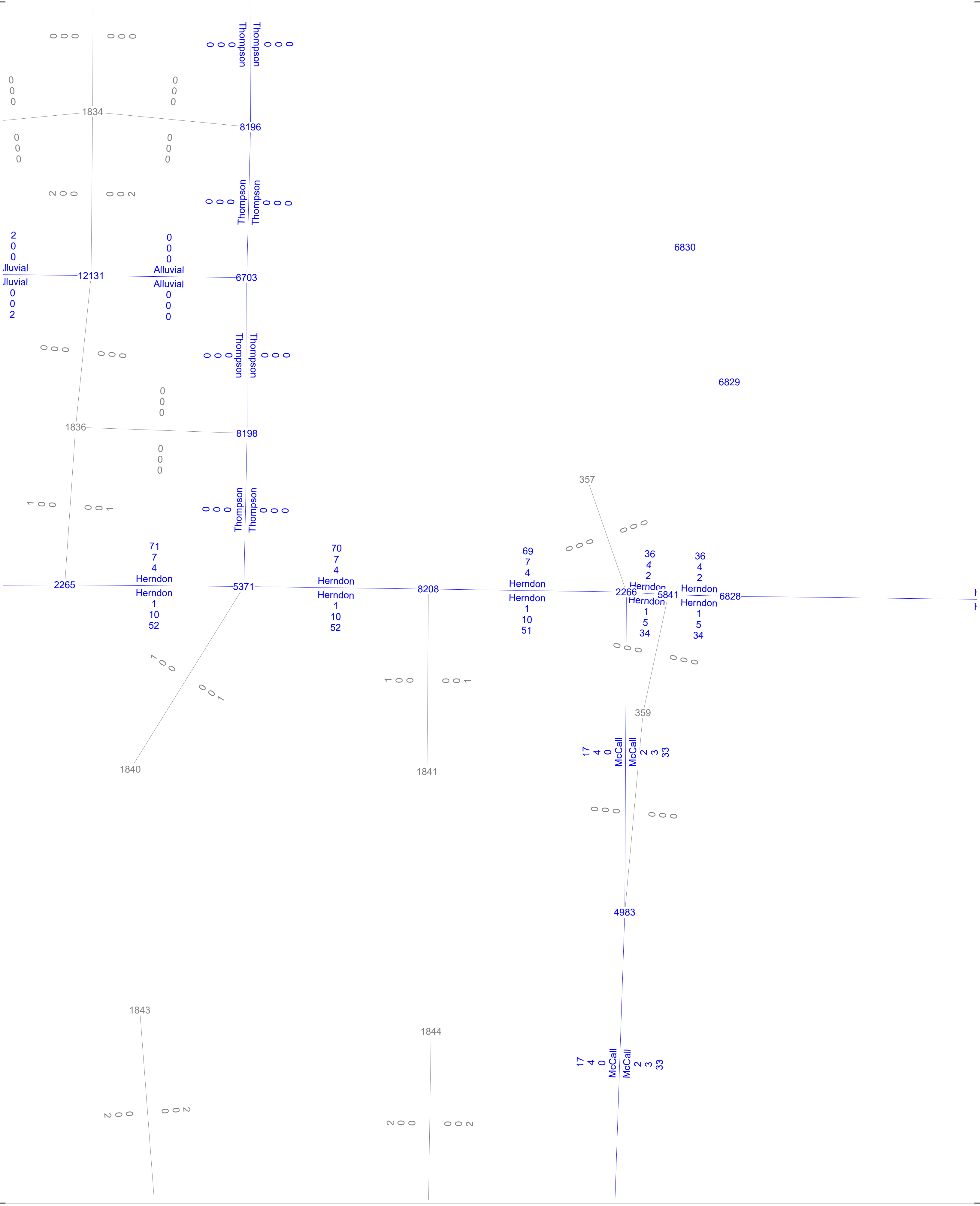
AM, PM and Daily Project Only Trips



Hotel-Shopping Center Select Zone (2026)
AM, PM and Daily Project Only Trips



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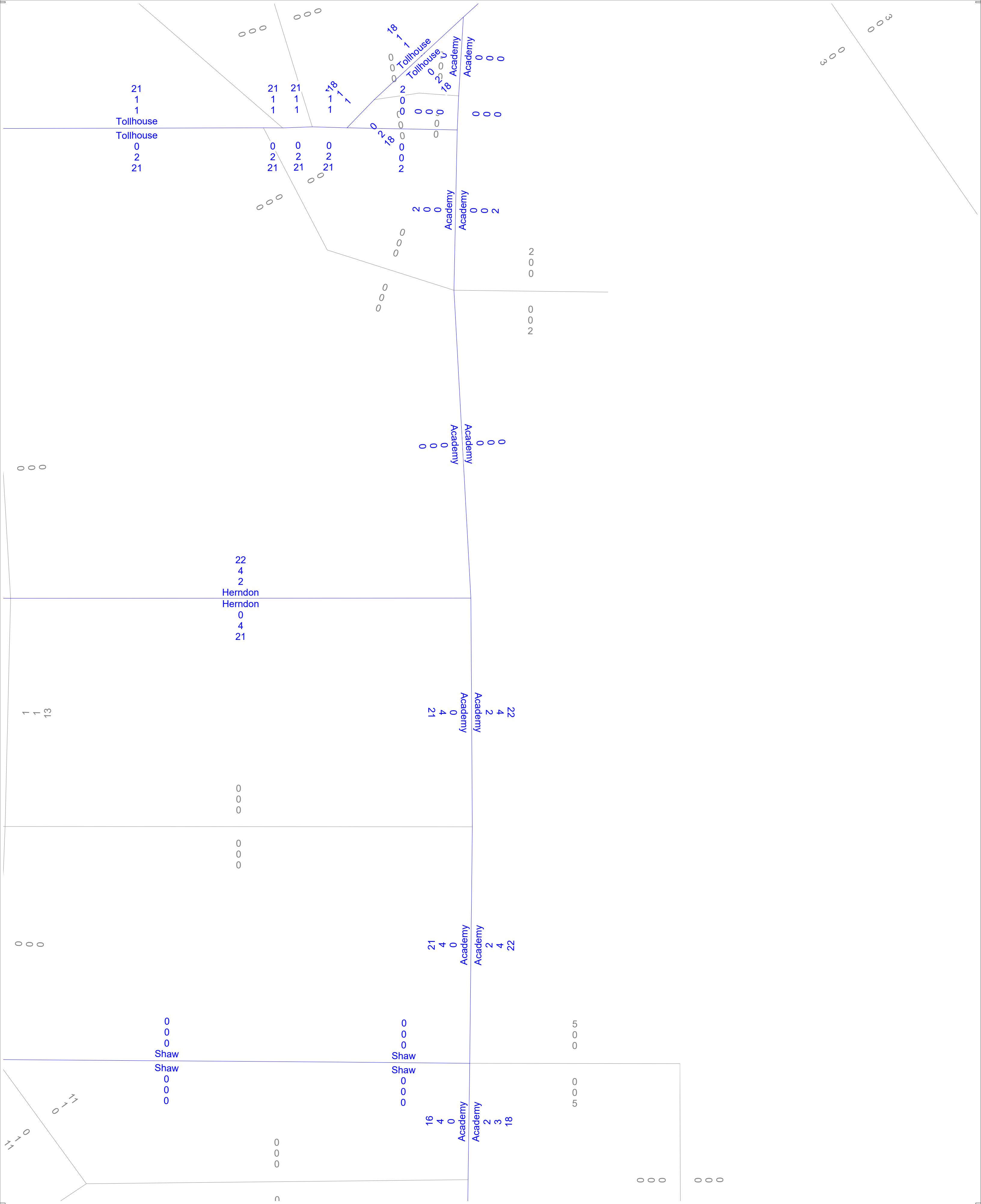
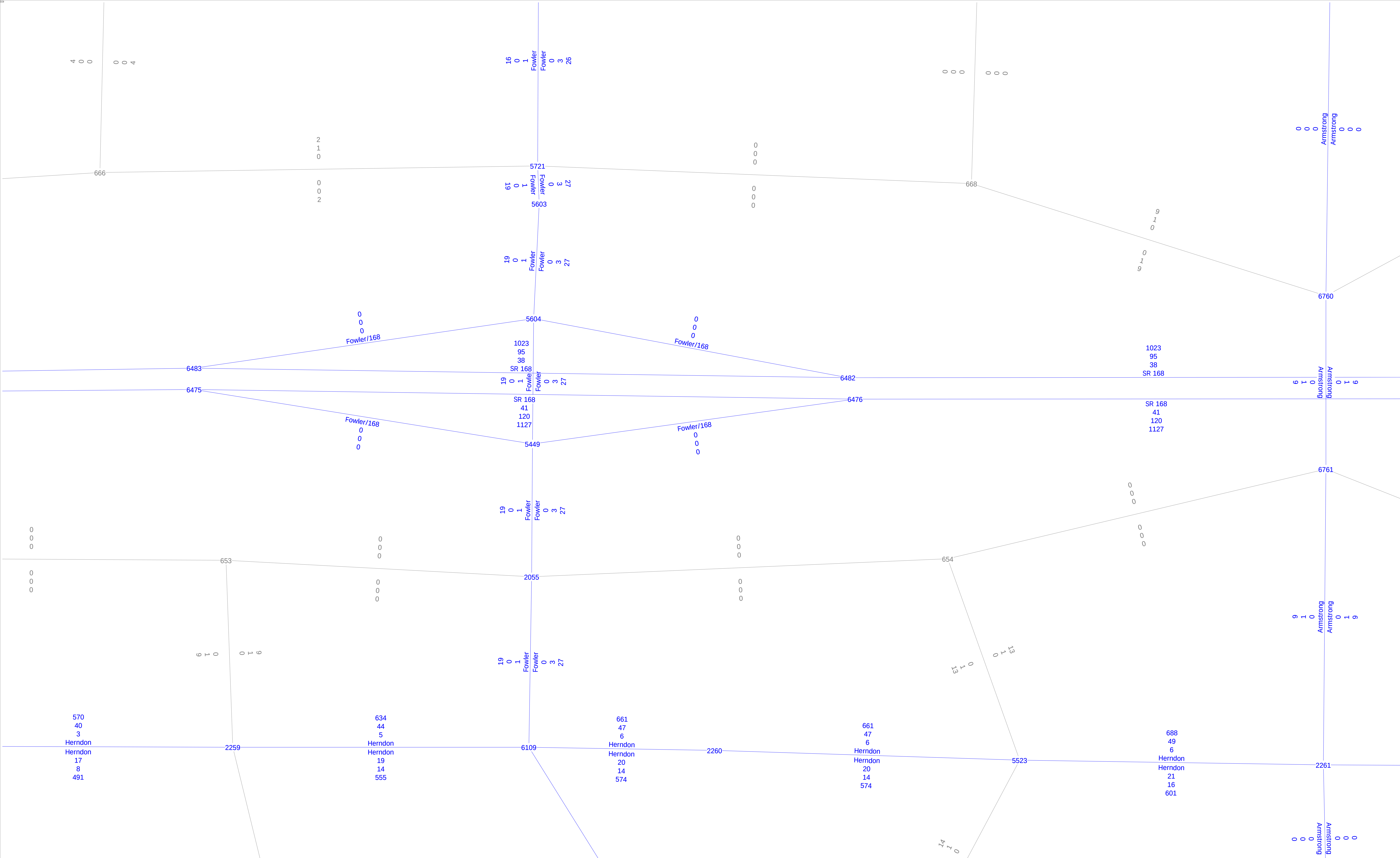
AM, PM and Daily Project Only Trips



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

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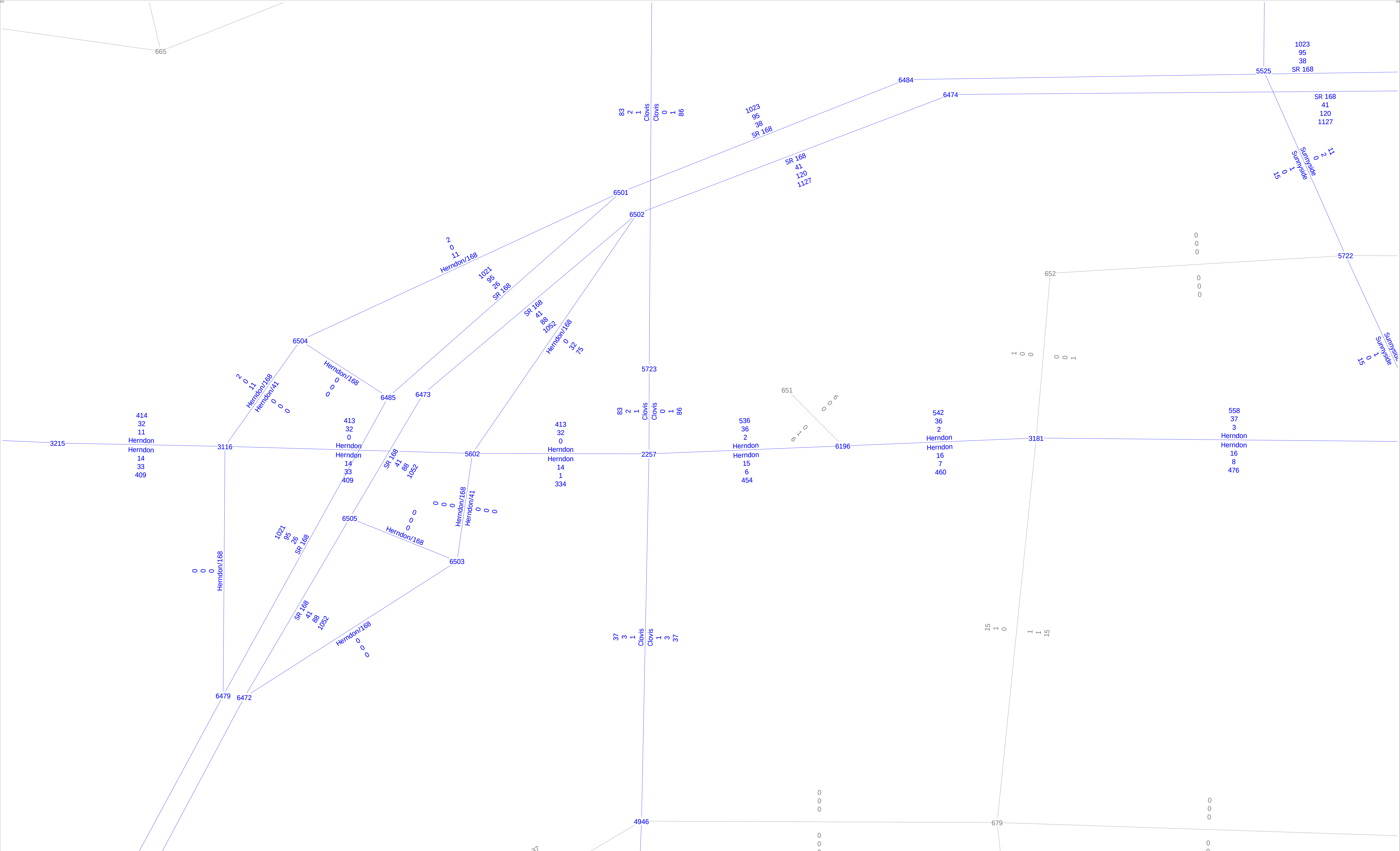

Hotel and Shopping Ctr Select Zone (2026)

AM, PM, and Daily Project Only Trips

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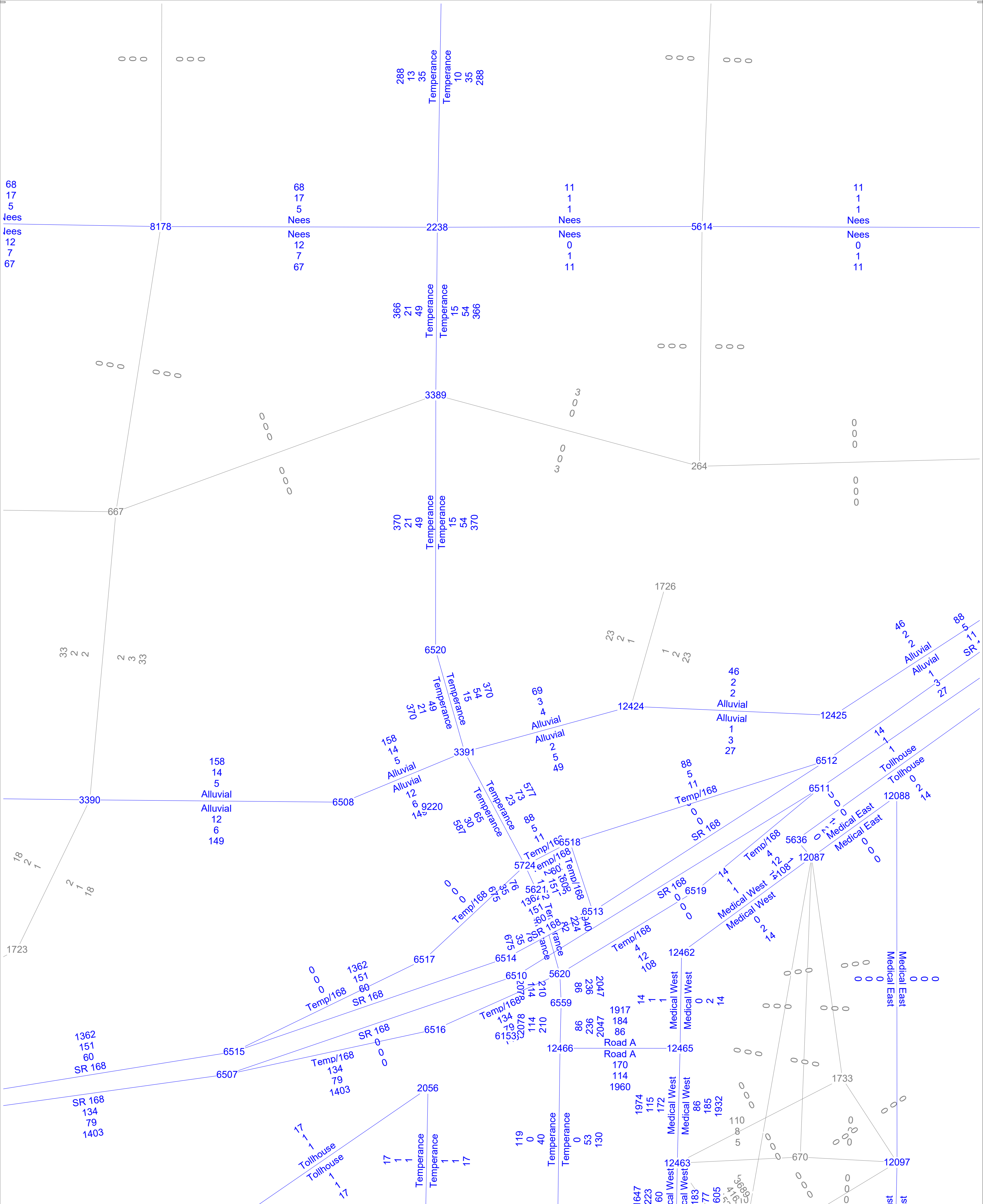
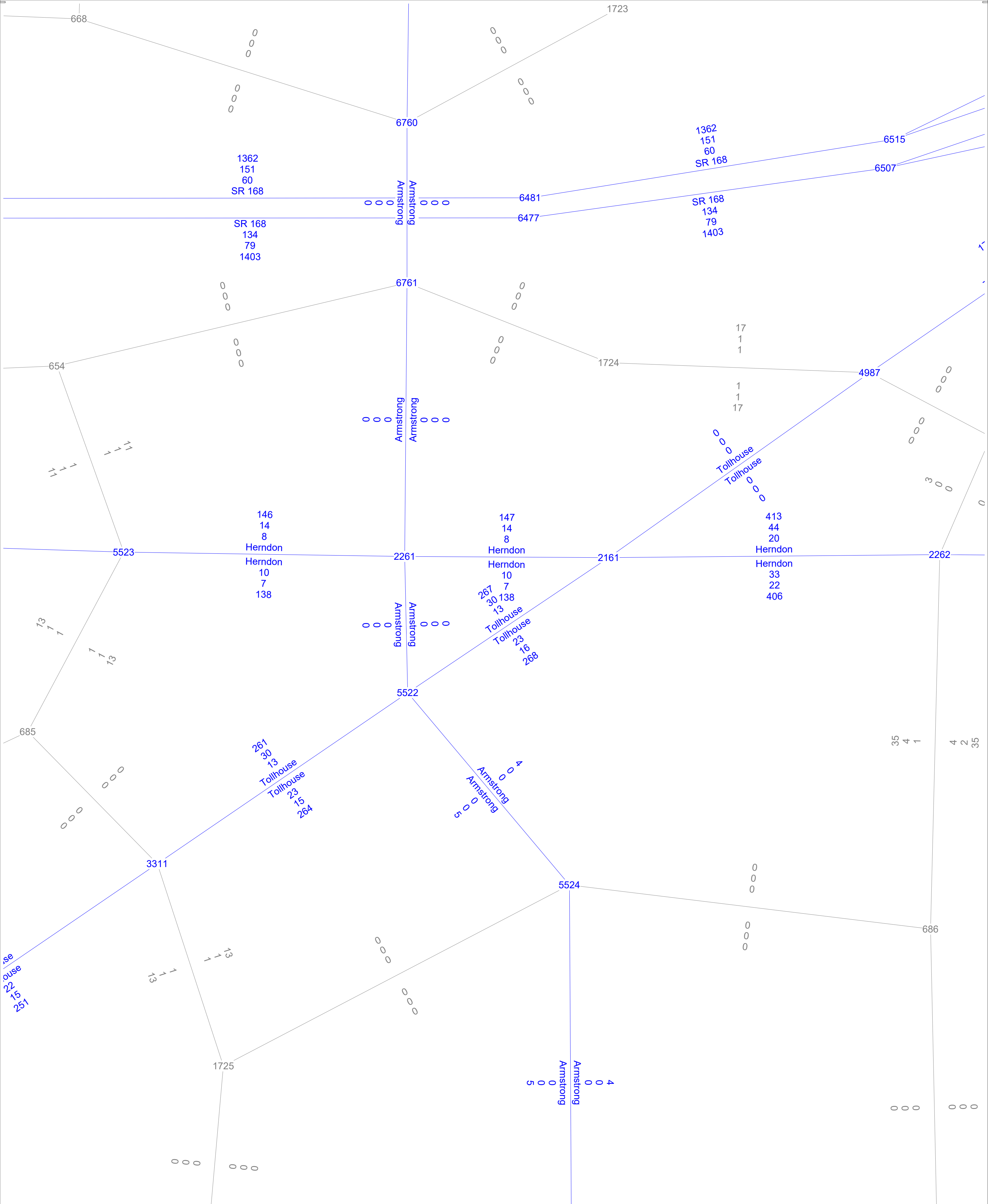


Hospital Select Zone (2026)
AM, PM and Daily Project Only Trips



Hospital Select Zone (2026)
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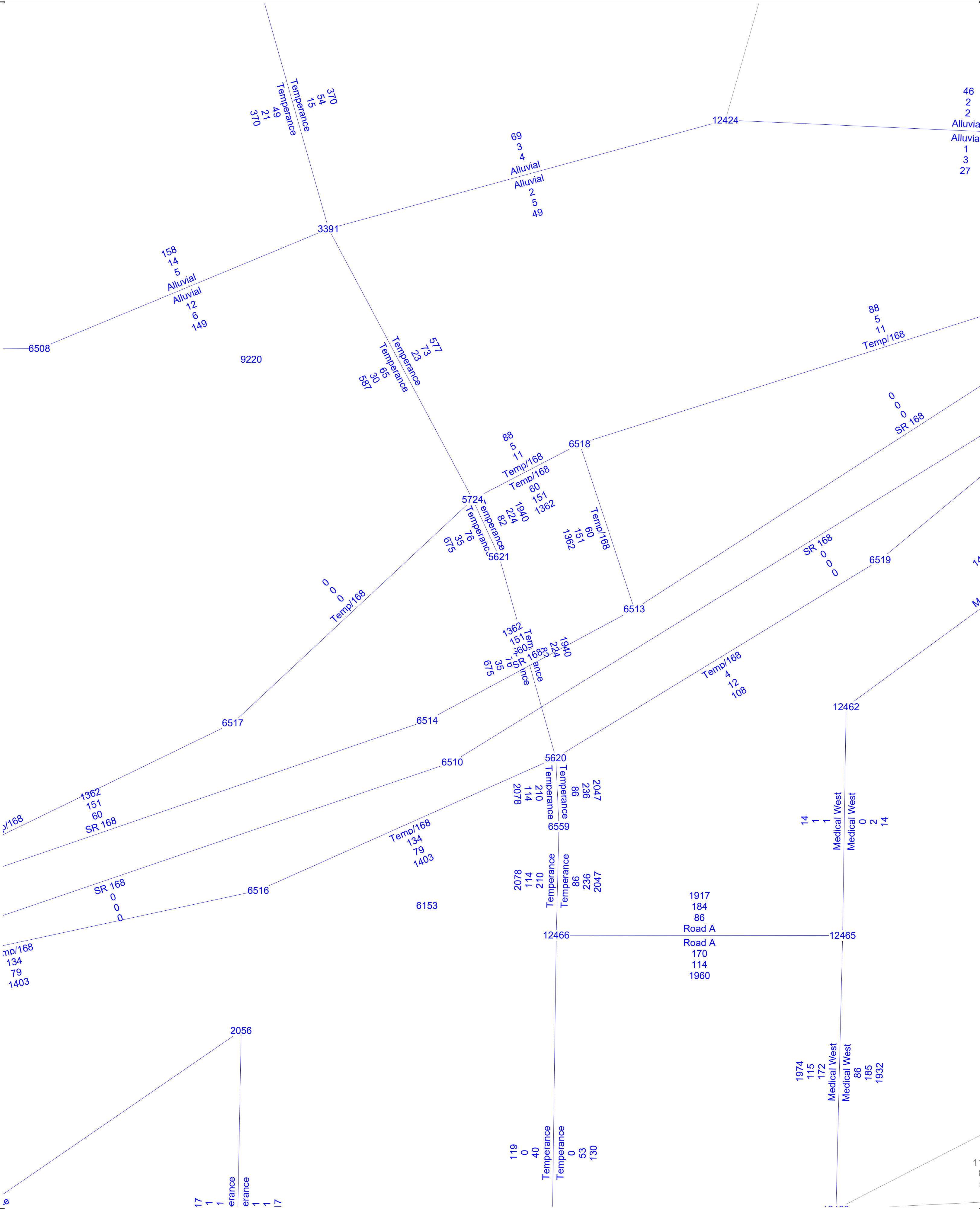

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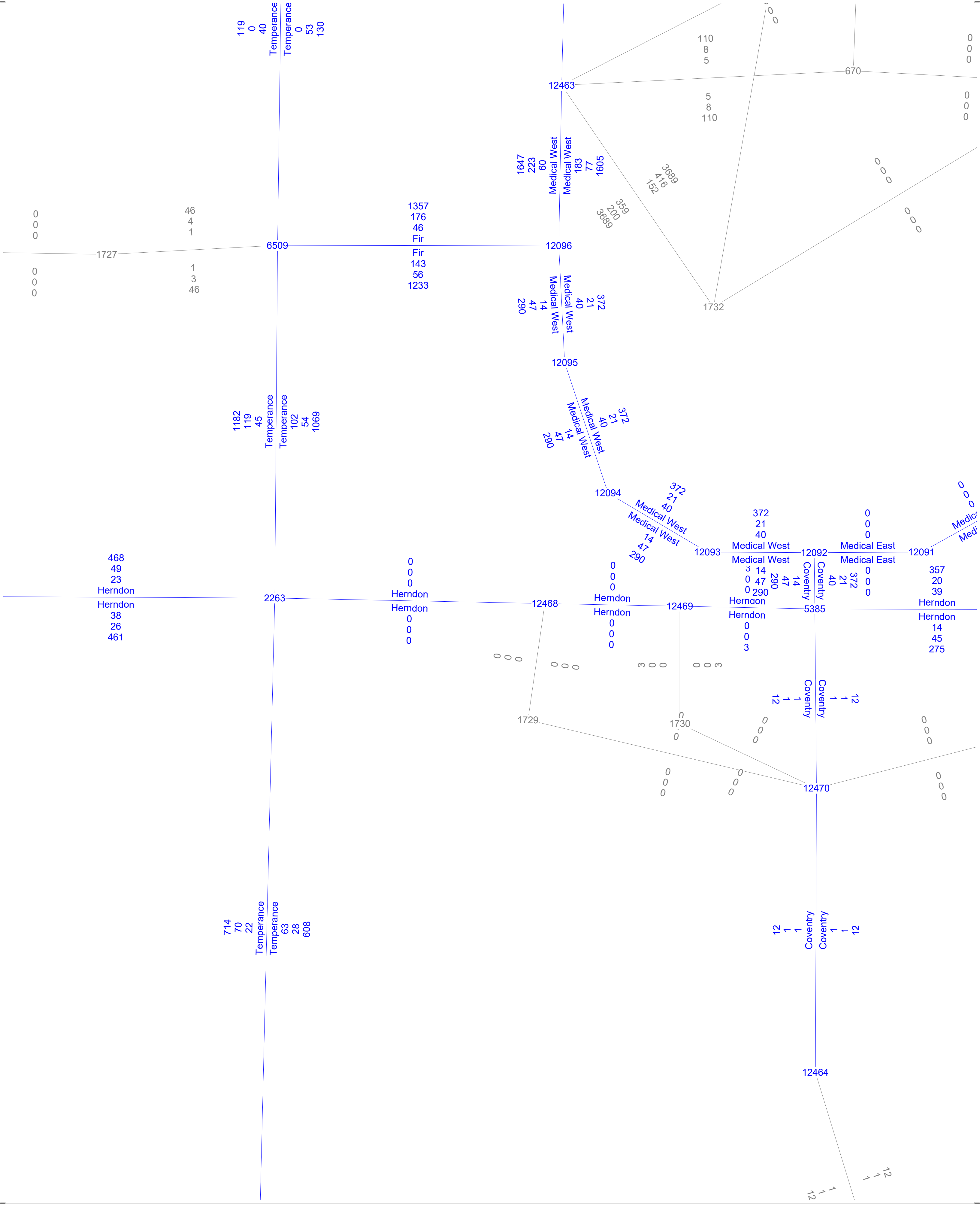
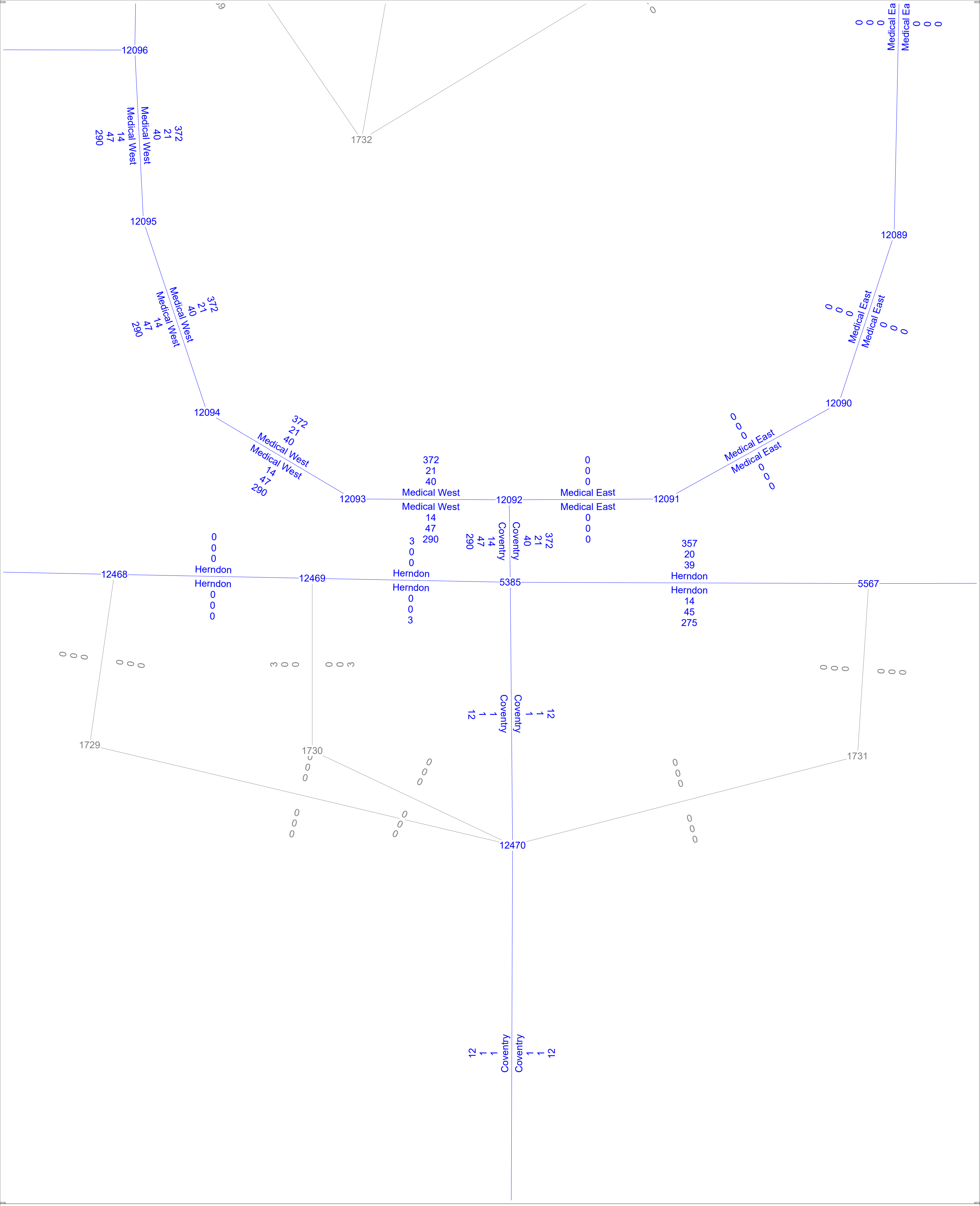
AM, PM and Daily Project Only Trips



Hospital Select Zone (2026)

AM, PM and Daily Project Only Trips



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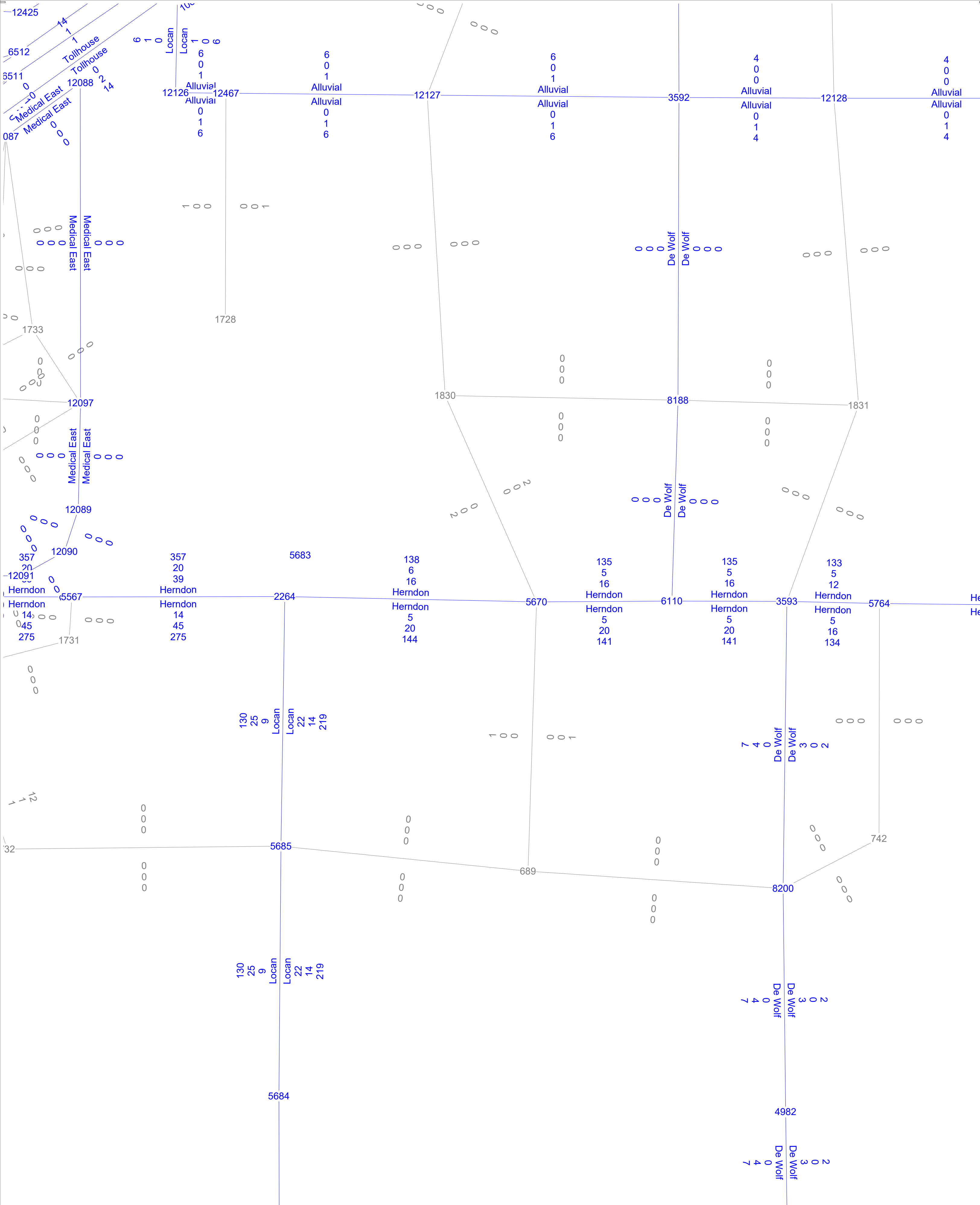
AM, PM and Daily Project Only Trips



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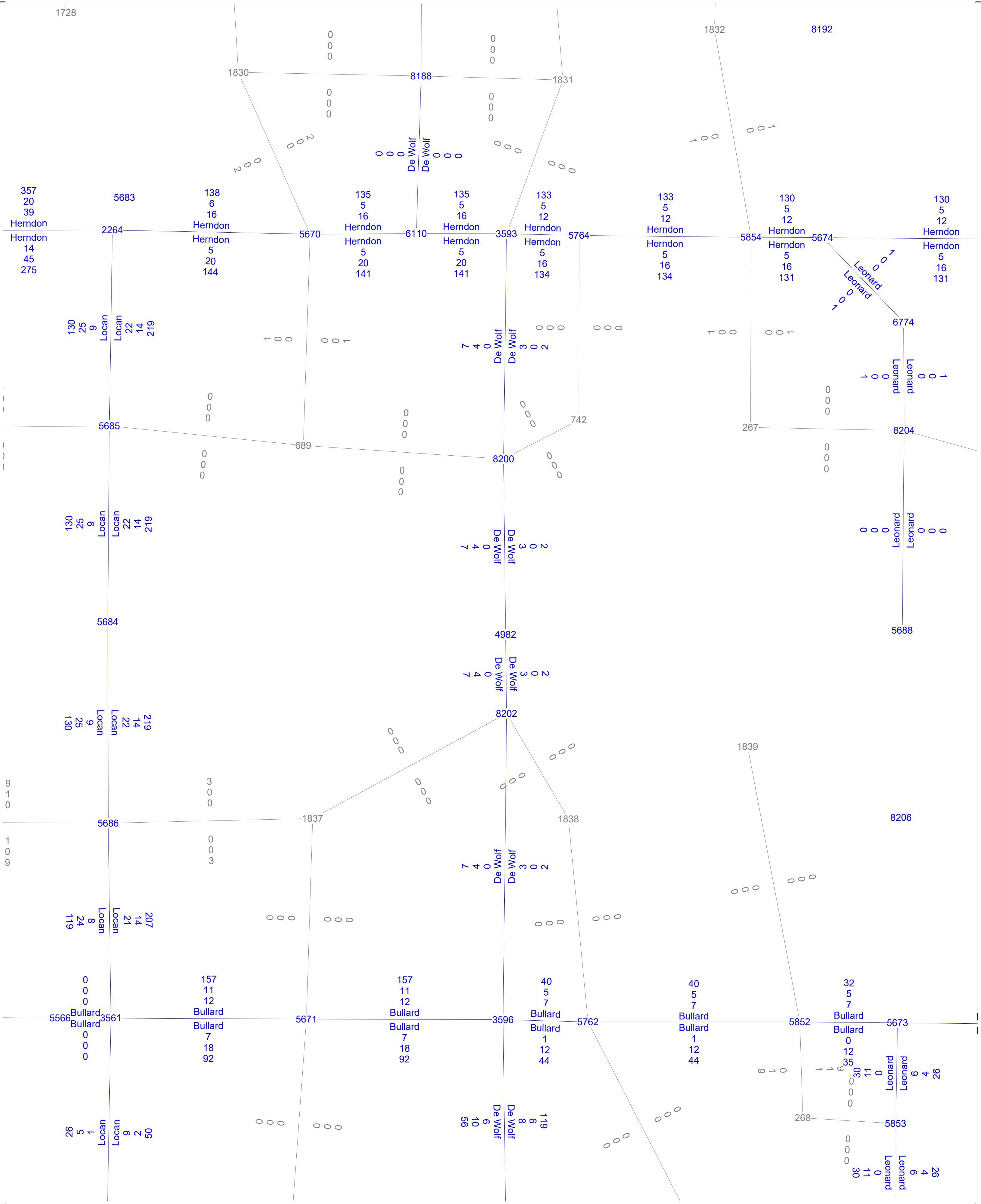
AM, PM and Daily Project Only Trips



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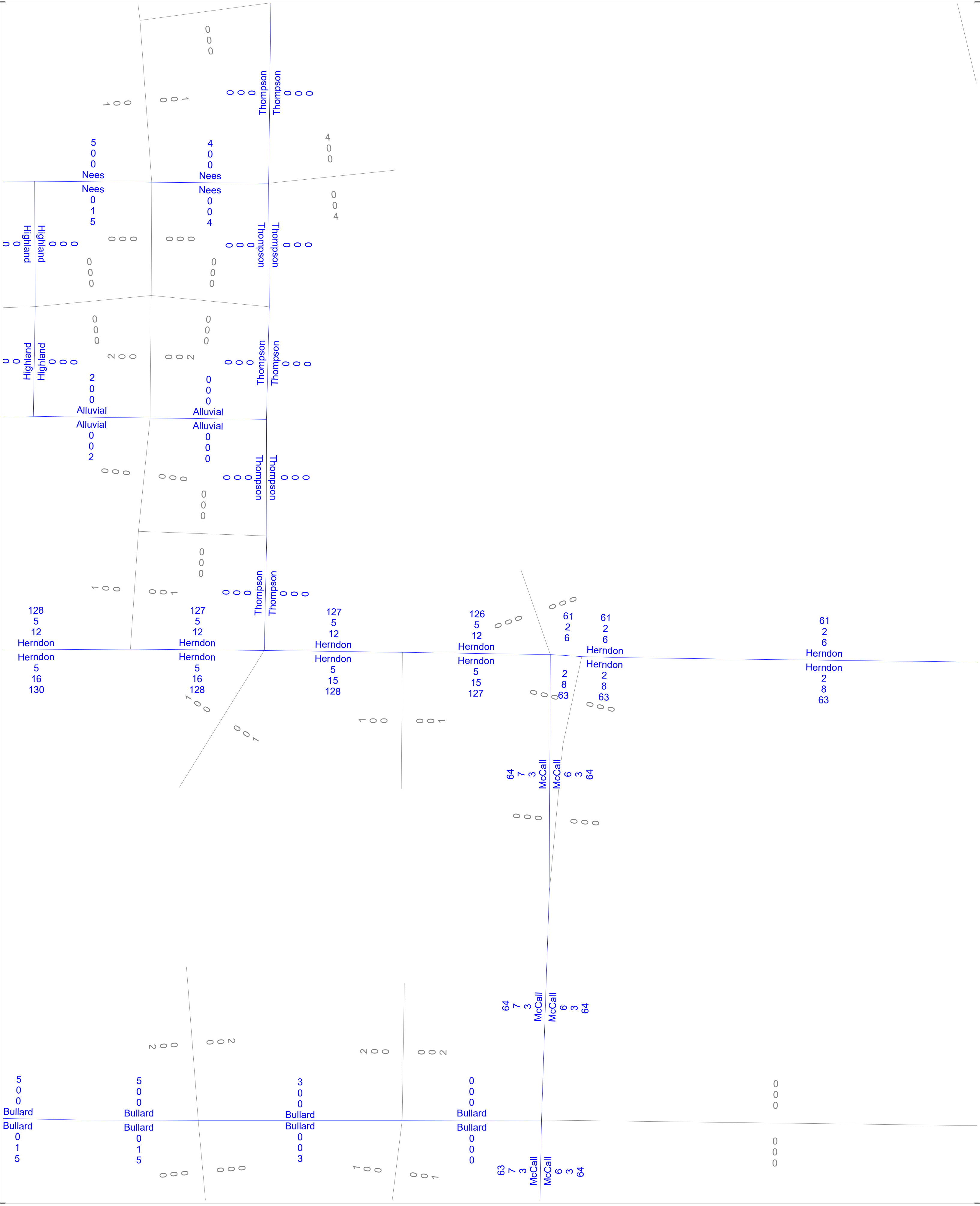

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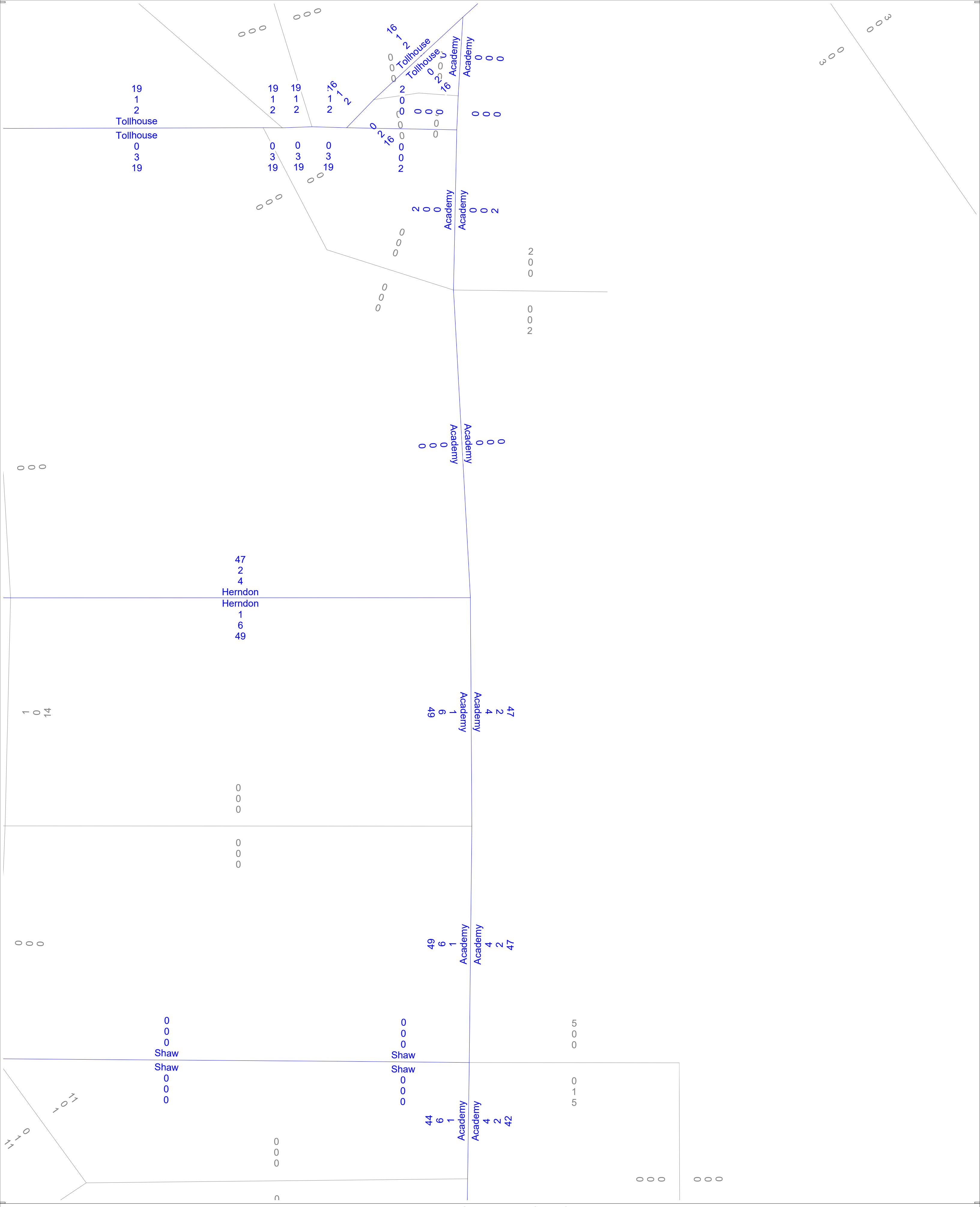
AM, PM, and Daily Project Only Trips



Hospital Slecet Zone (2026)
AM, PM, and Daily Project Only Trips

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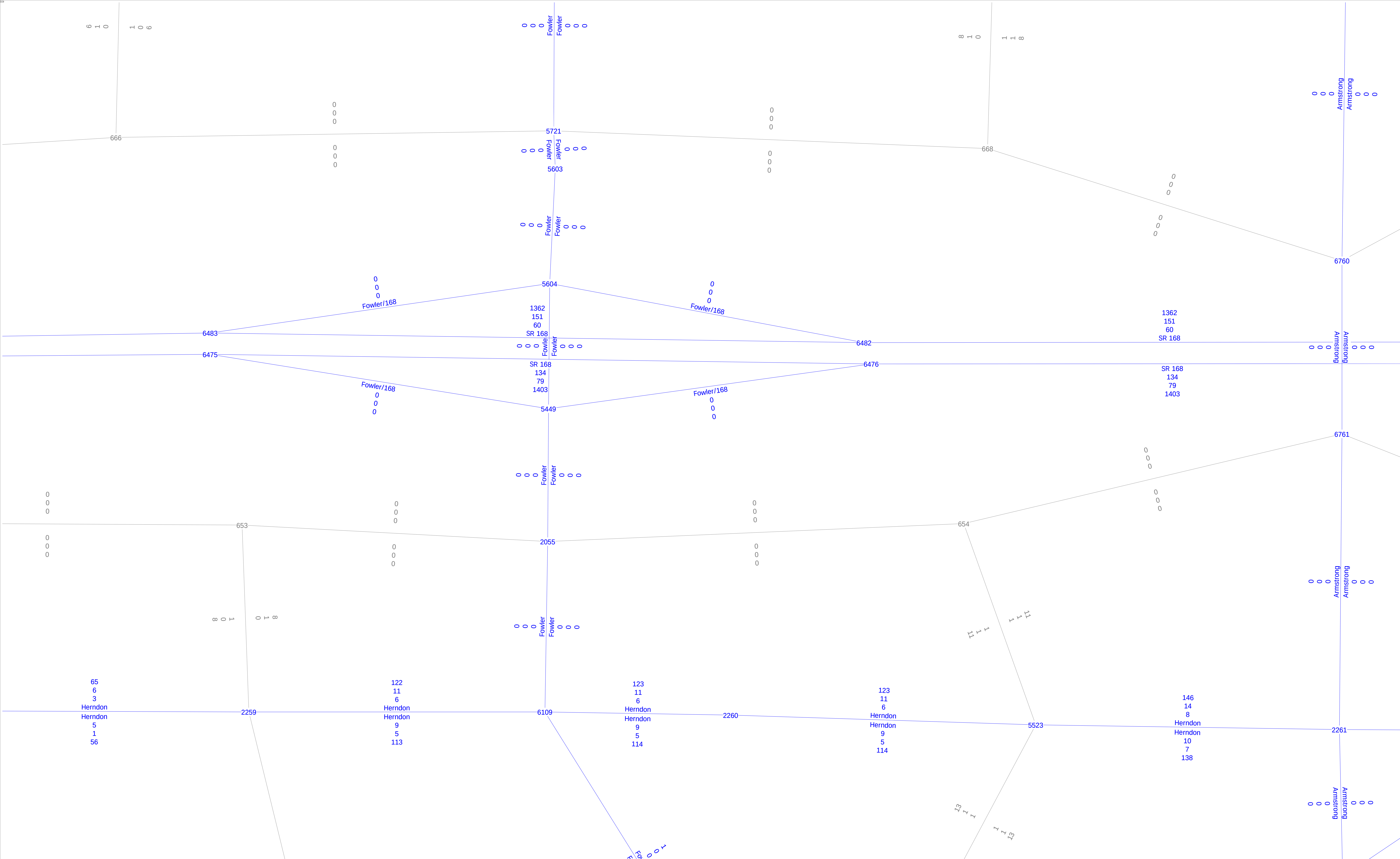

Hospital Select Zone (2026)
AM, PM, and Daily Project Only Trips

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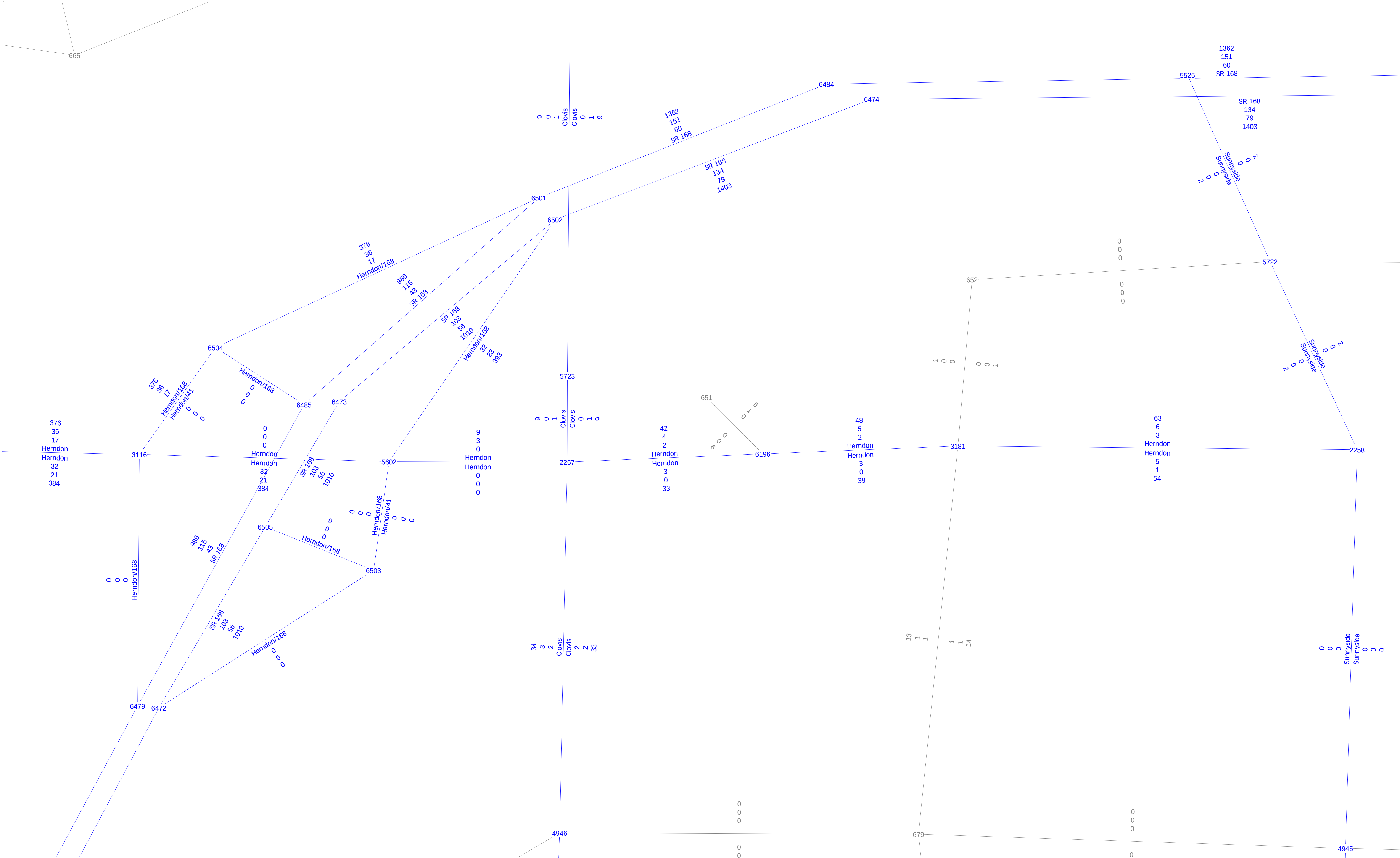

Hospital Select Zone (2026)
AM, PM, and Daily Project Only Trips

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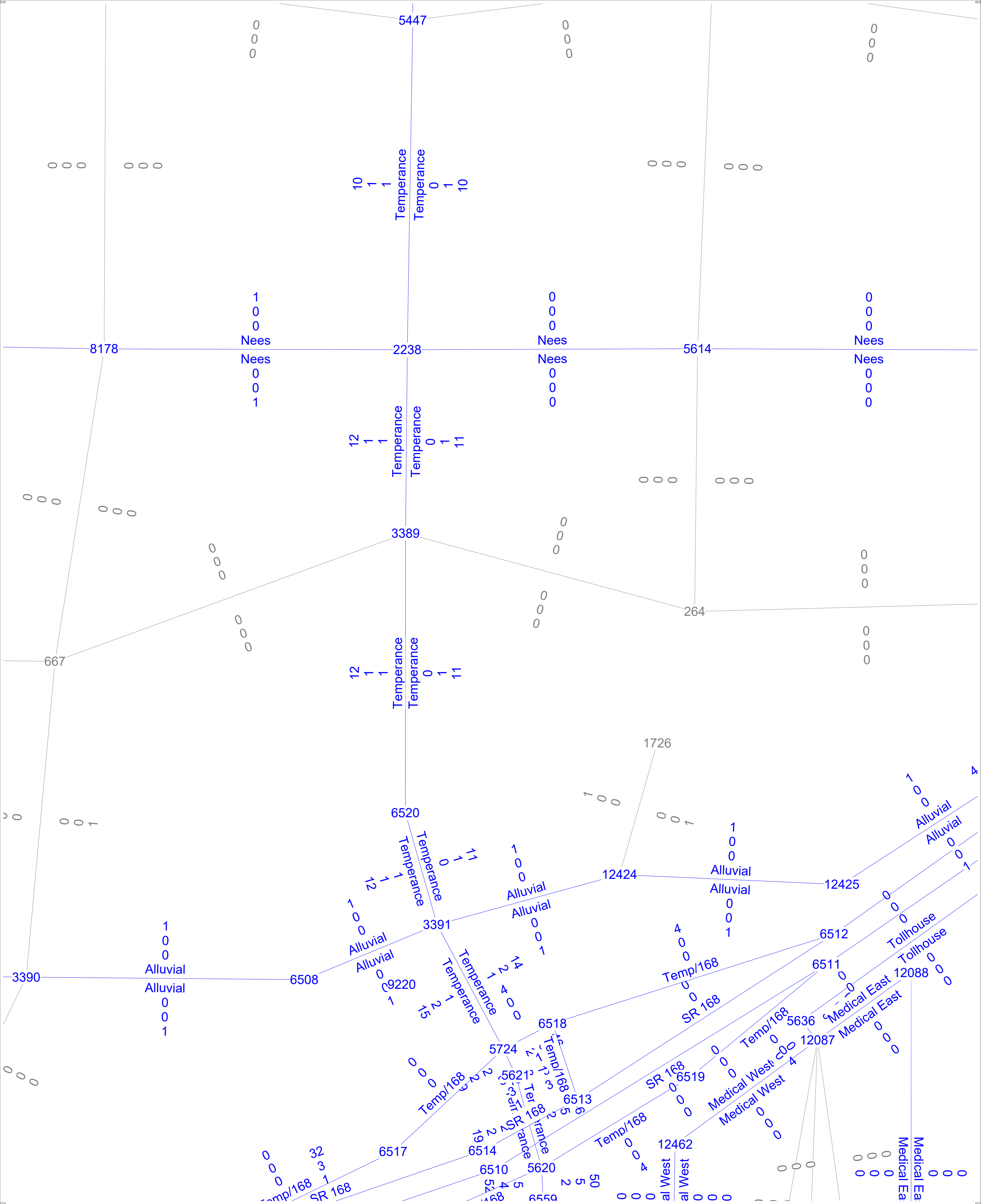
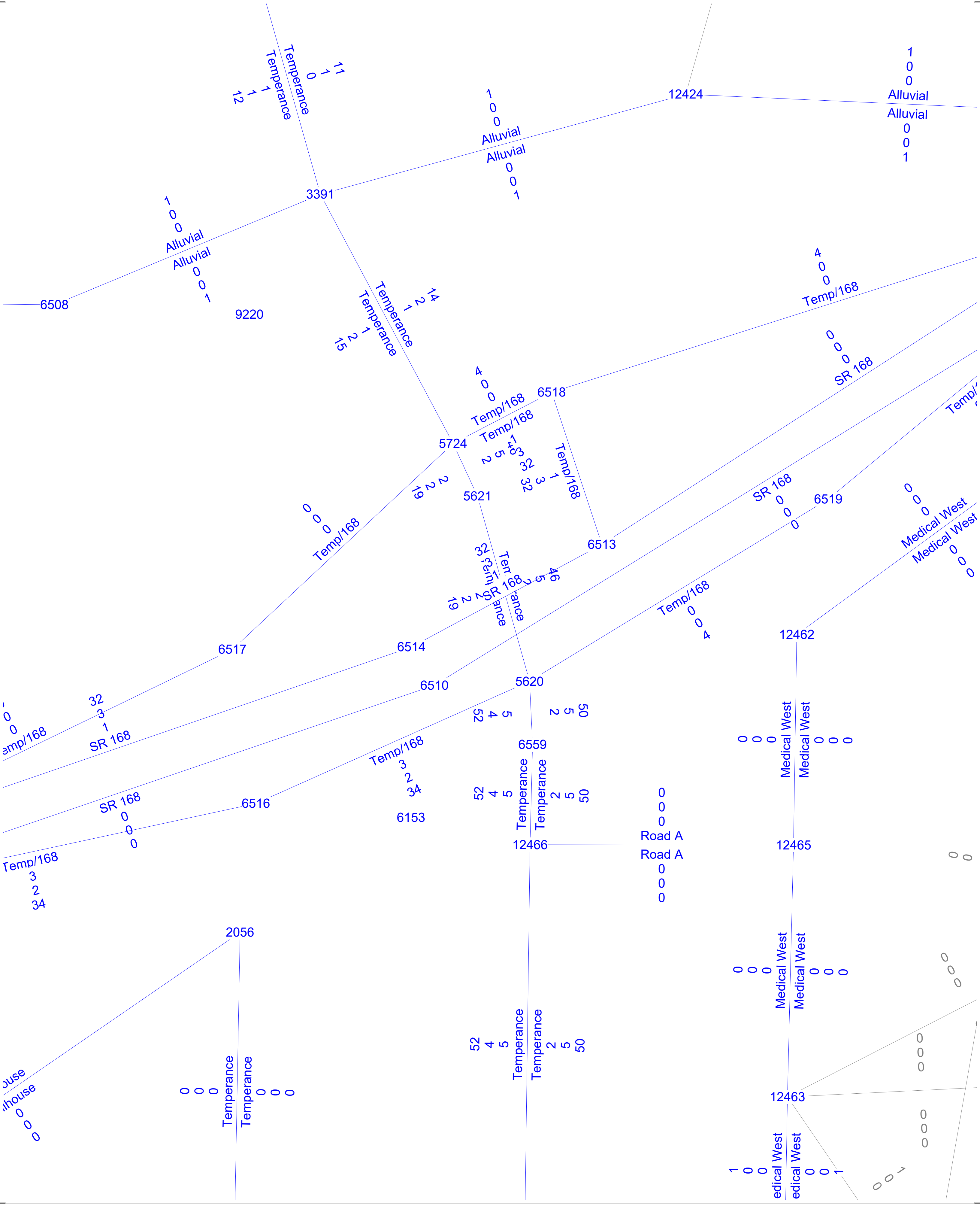


Assisted Living Select Zone (2035)
AM, PM and Daily Project Only Trips



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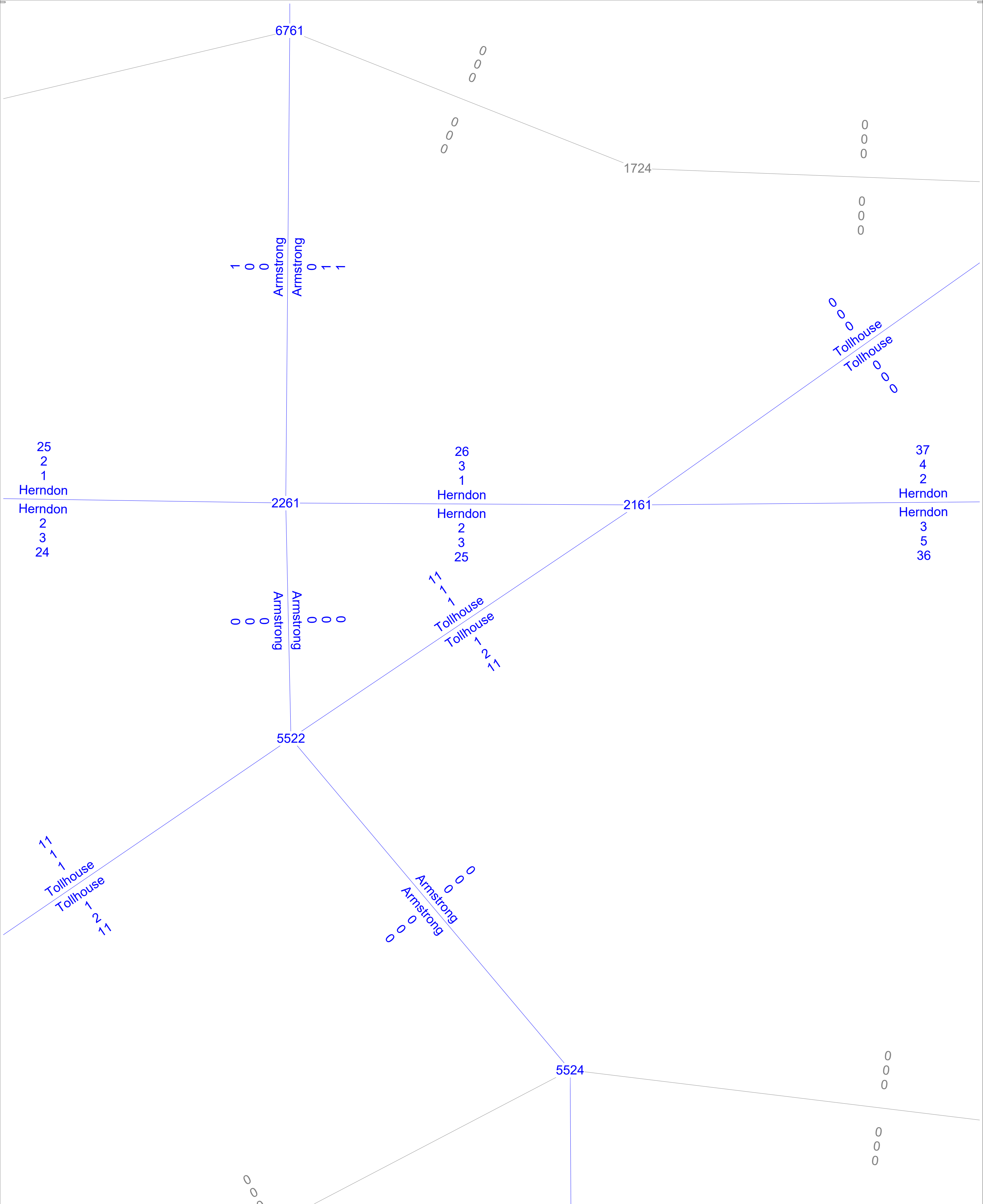
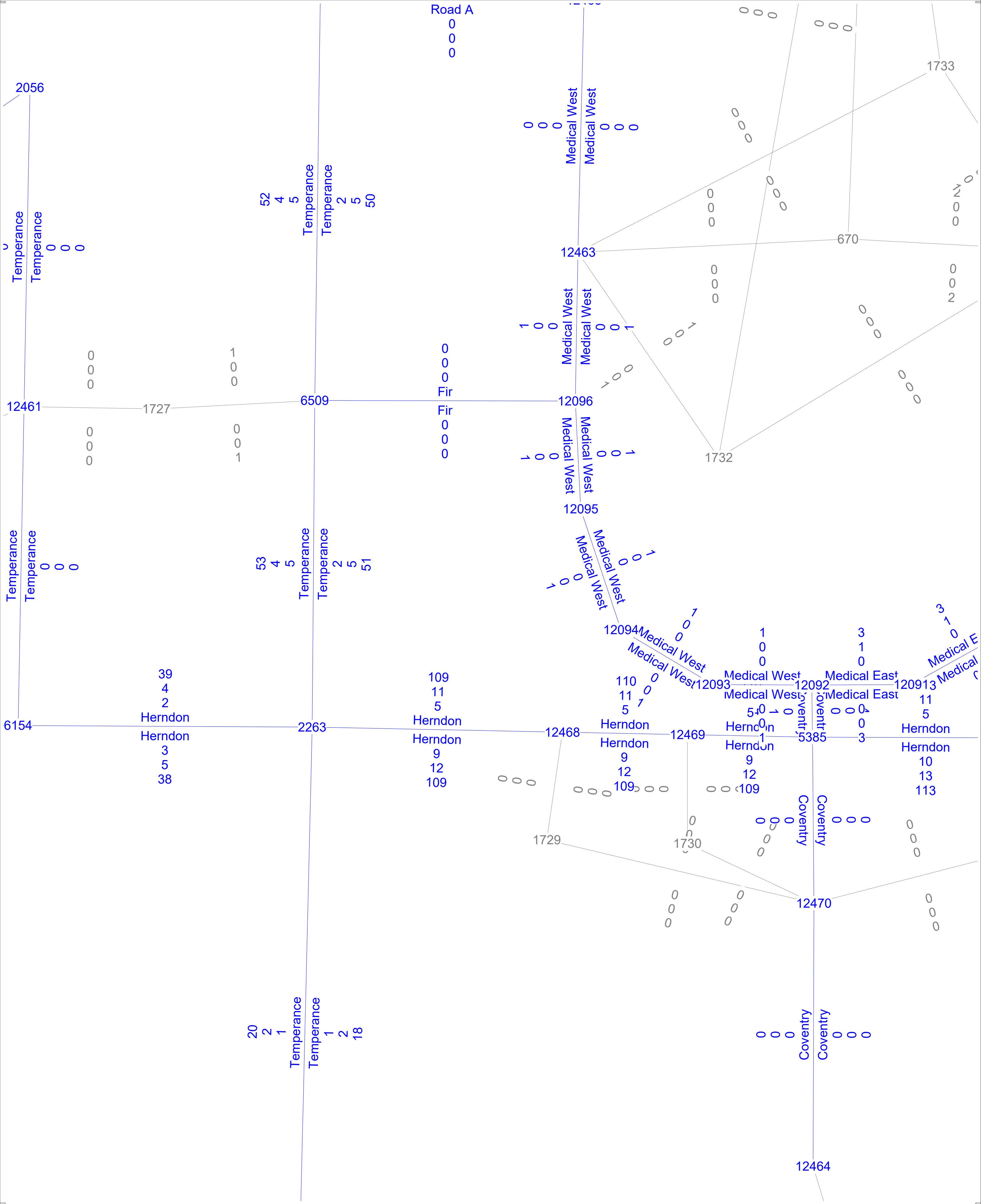
AM, PM and Daily Project Only Trips



Assisted Living Select Zone (2035)
AM, PM and Daily Project Only Trips



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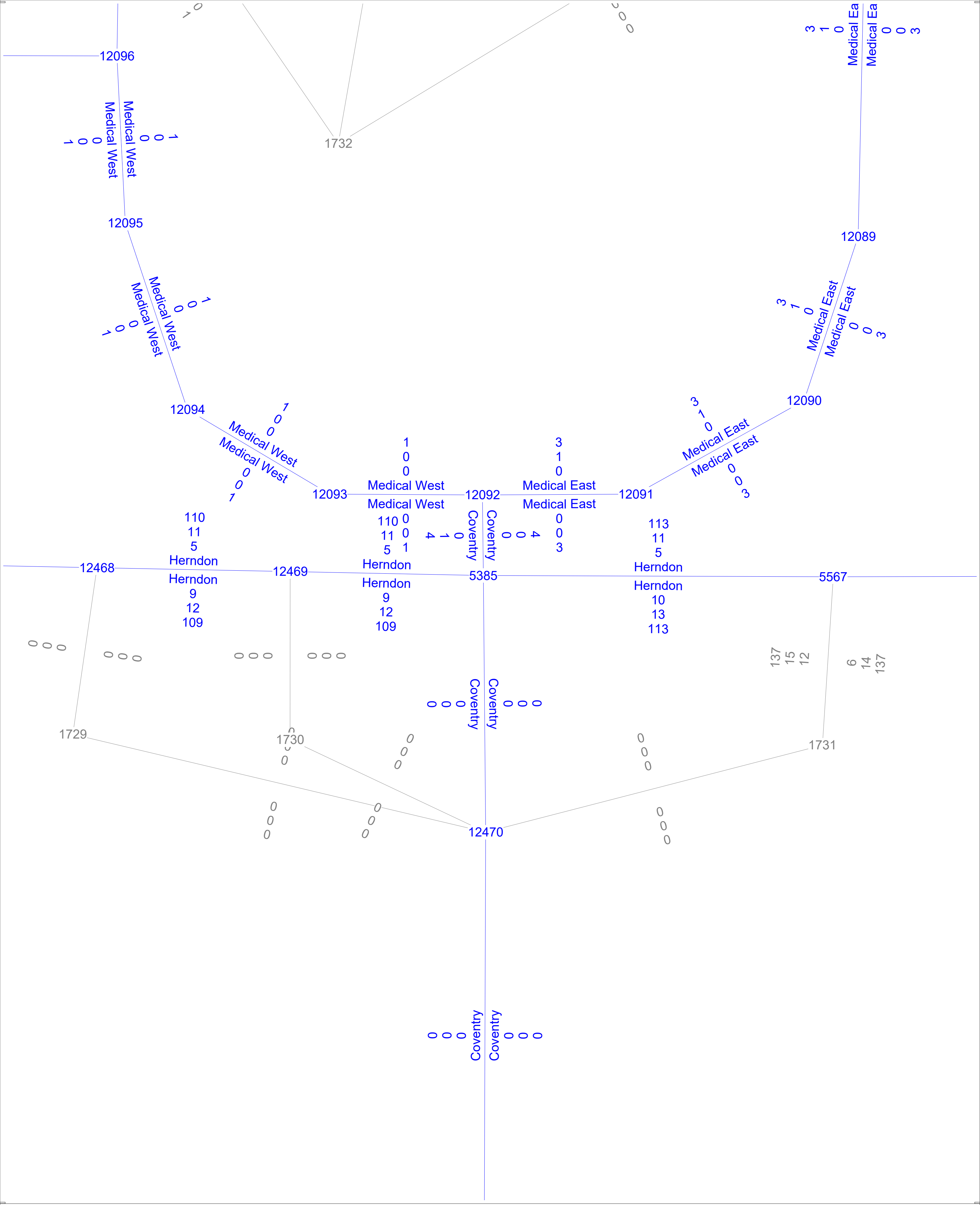
AM, PM and Daily Project Only Trips



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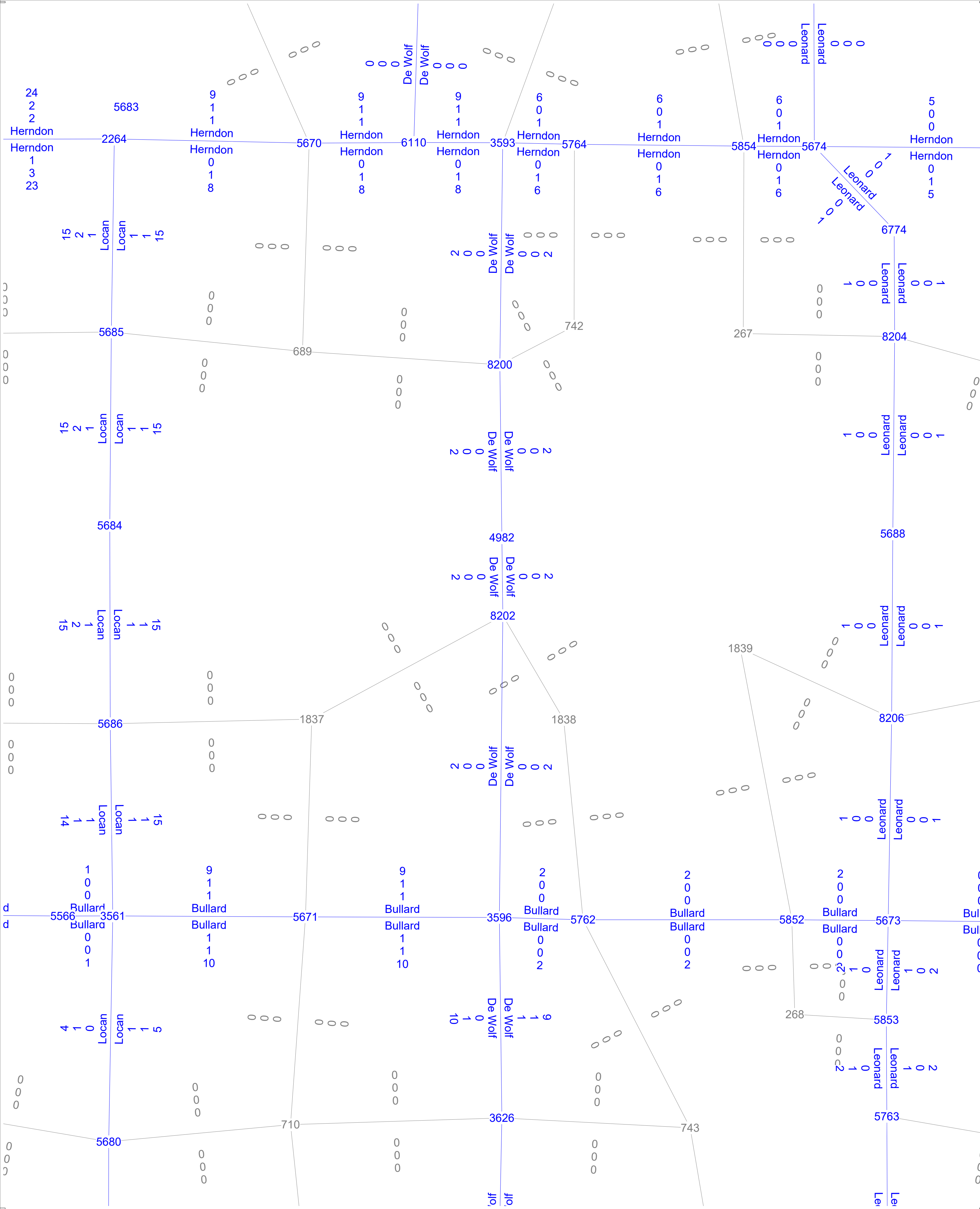
AM, PM and Daily Project Only Trips



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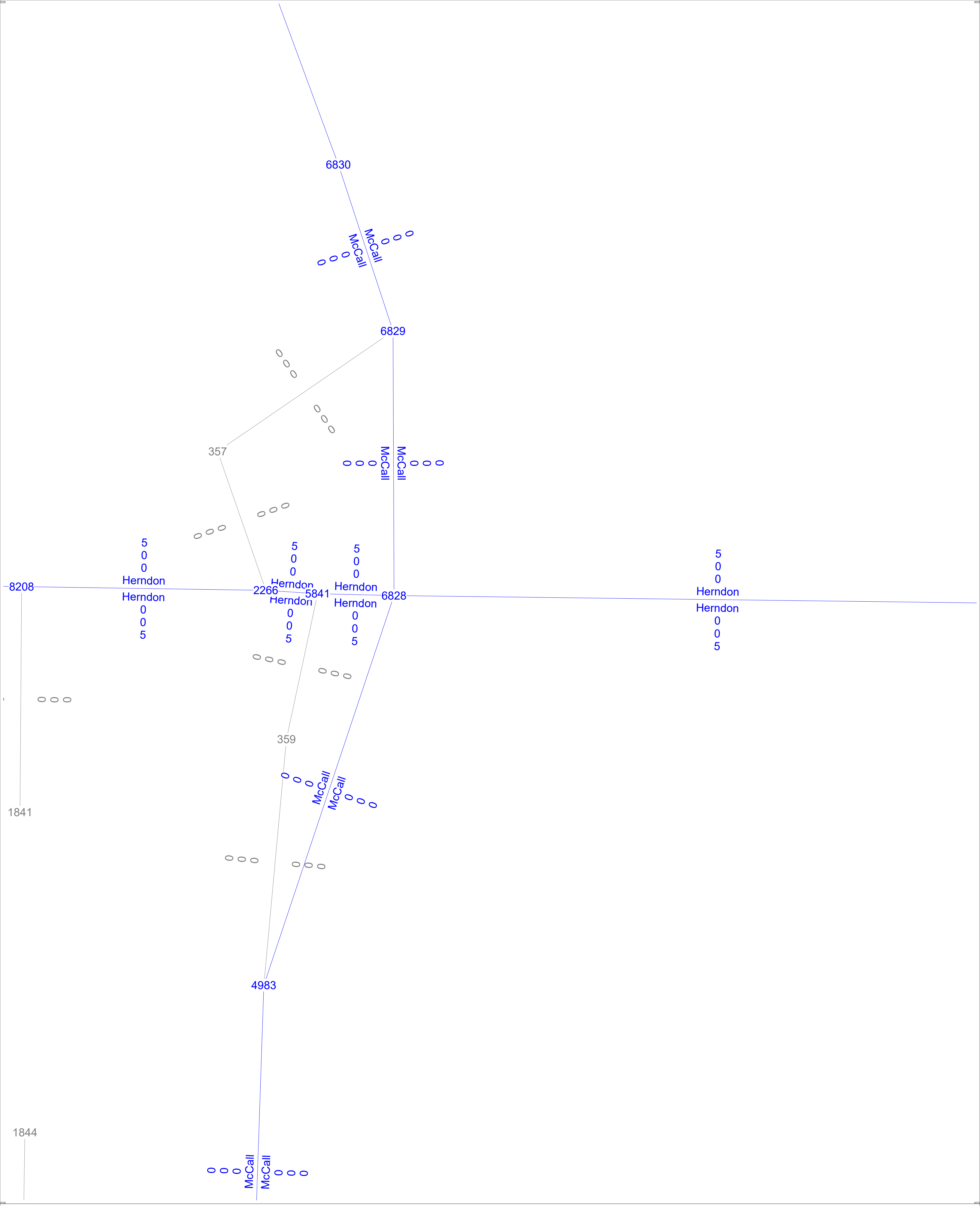
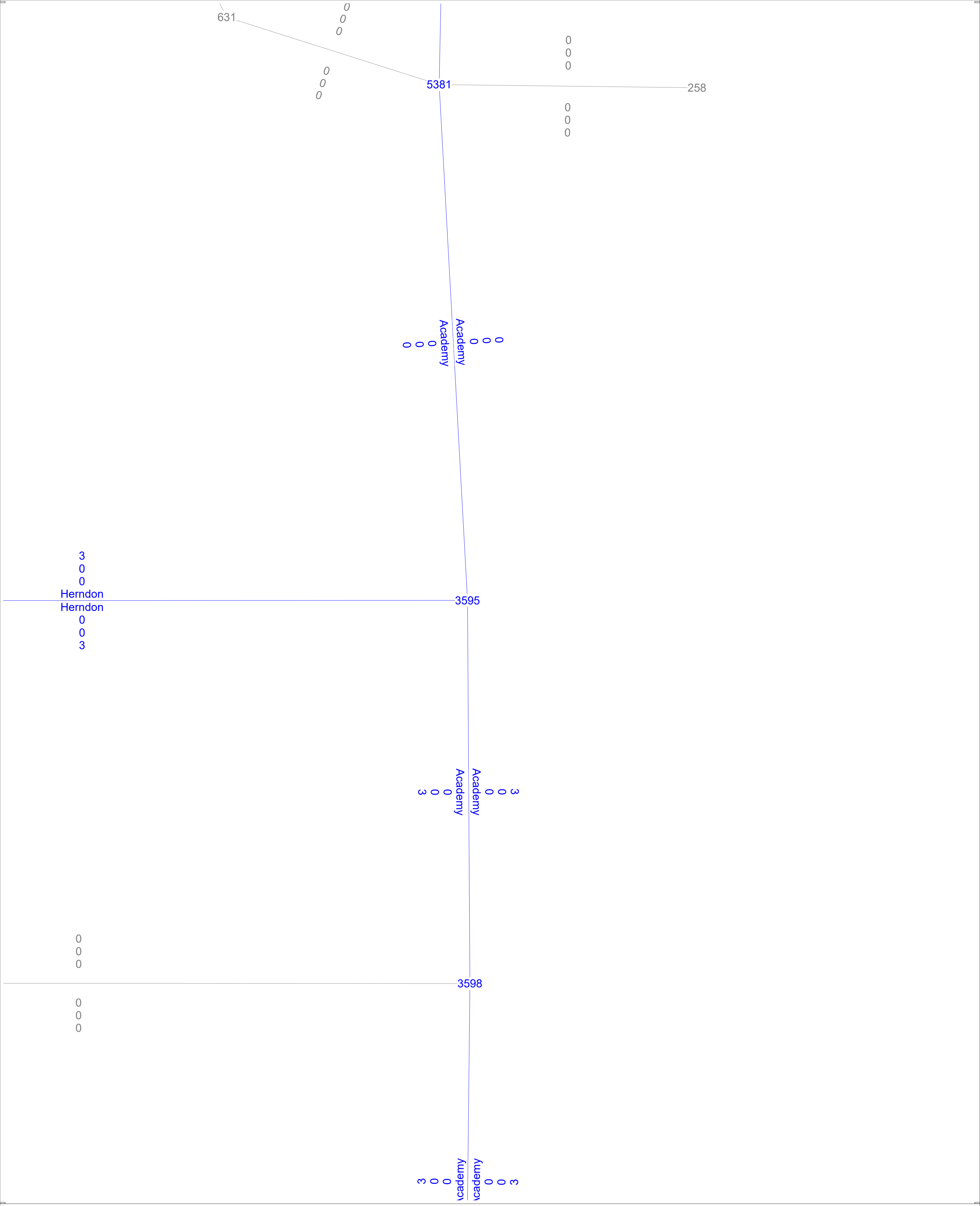


Assisted Living Select Zone (2035)
AM, PM and Daily Project Only Trips



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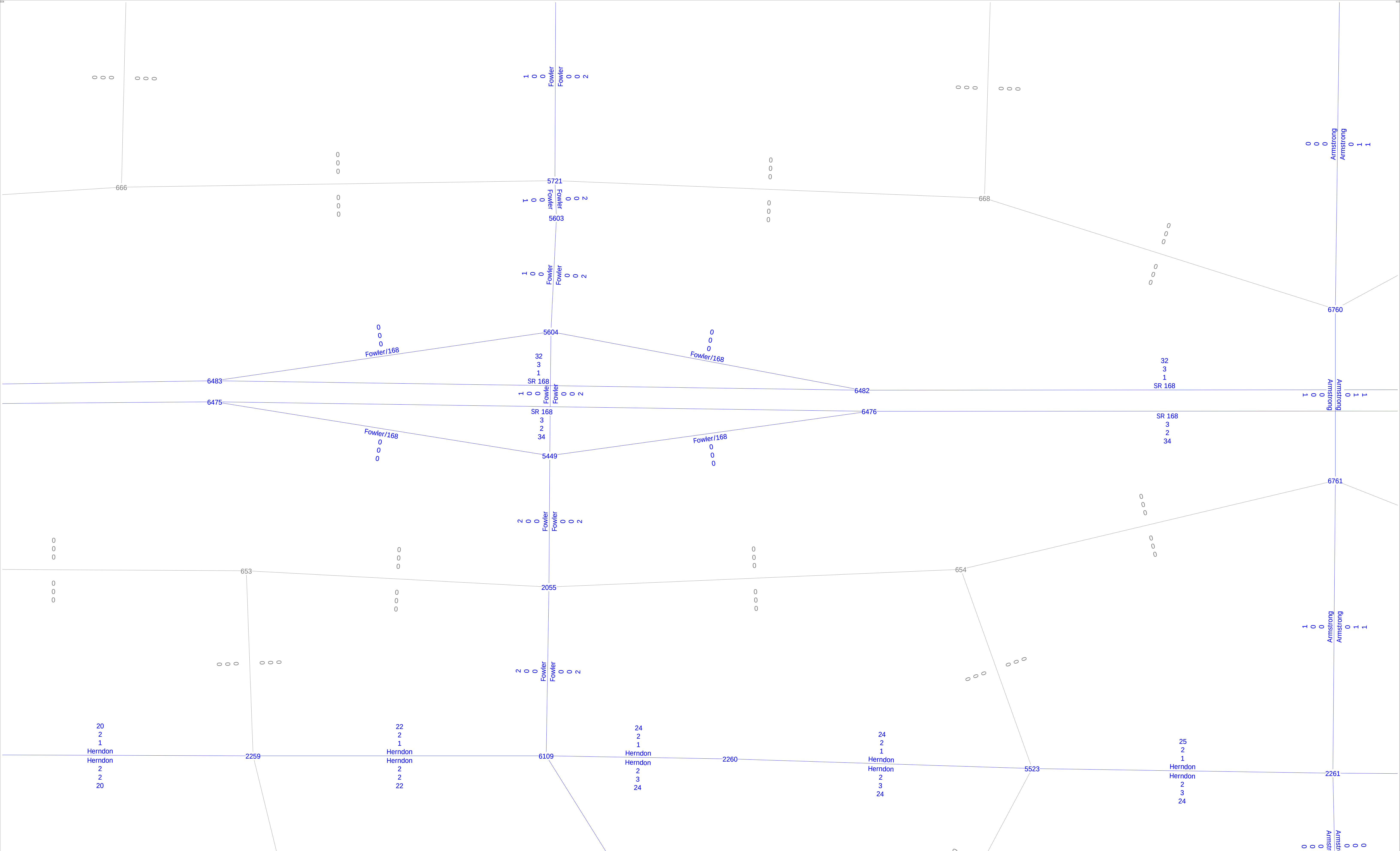
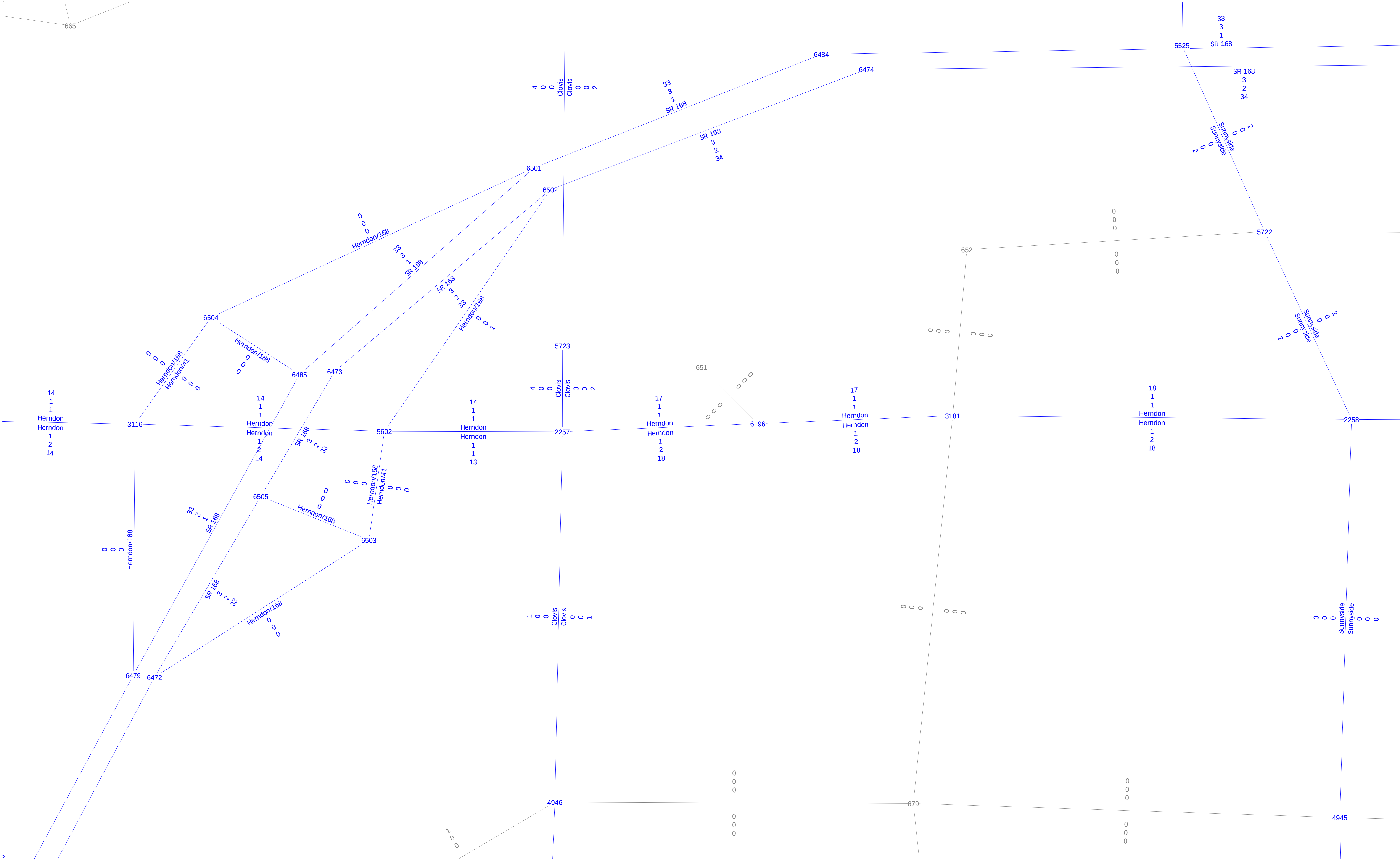
AM, PM and Daily Project Only Trips



Assisted Living Select Zone (2035)
AM, PM and Daily Project Only Trips



Assisted Living Select Zone (2035)

AM, PM and Daily Project Only Trips

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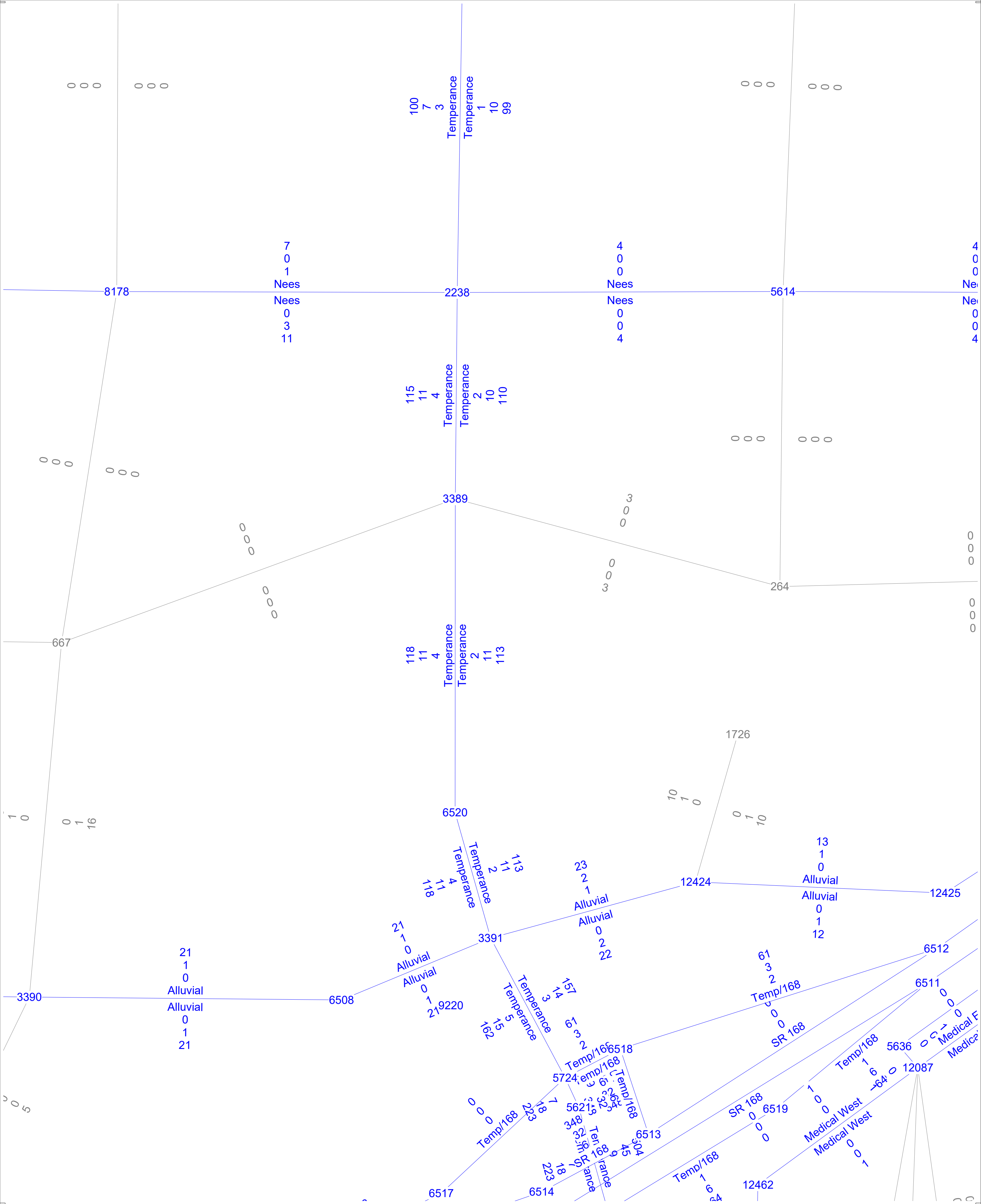
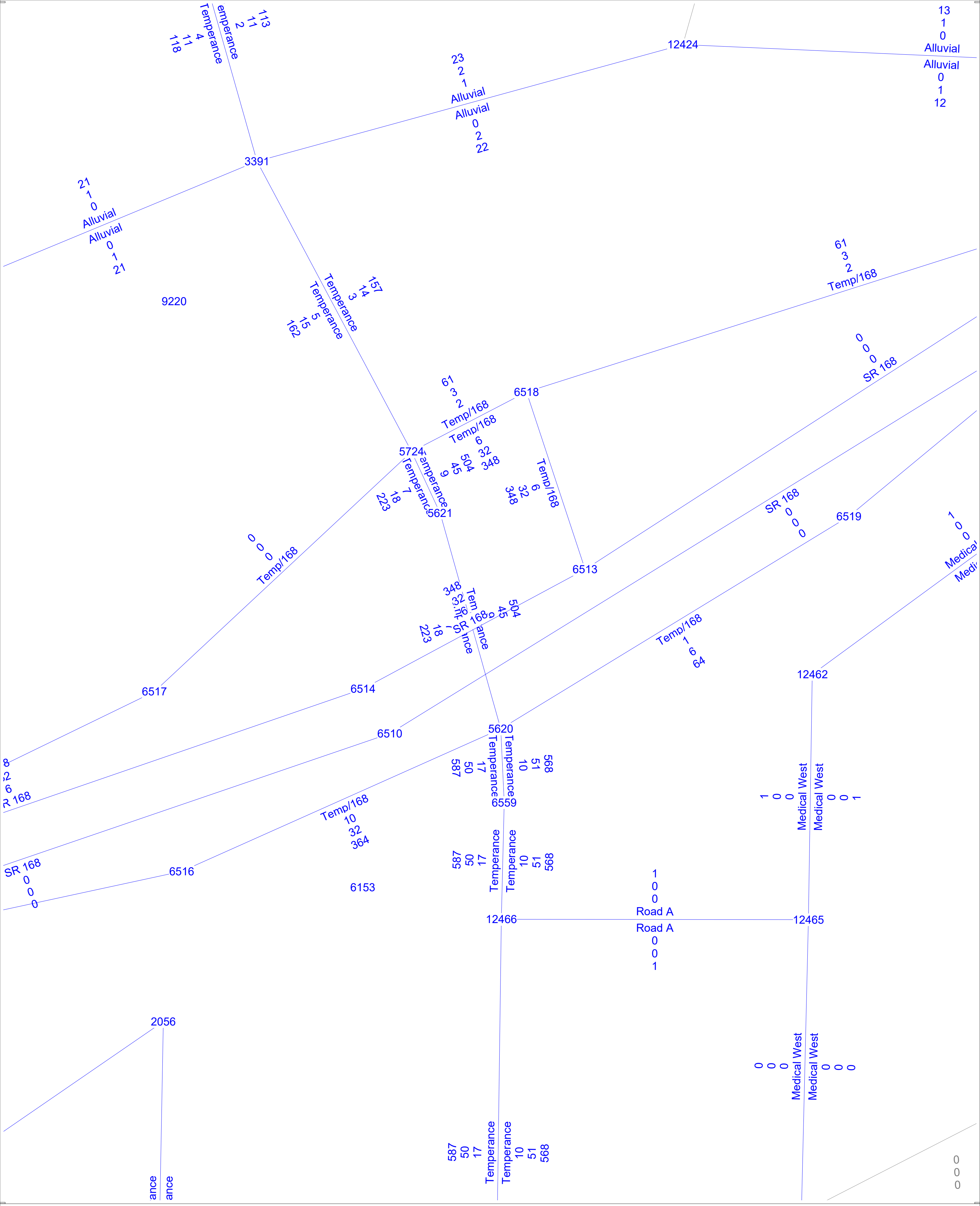


Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)
AM, PM and Daily Project Only Trips



Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)
AM, PM and Daily Project Only Trips

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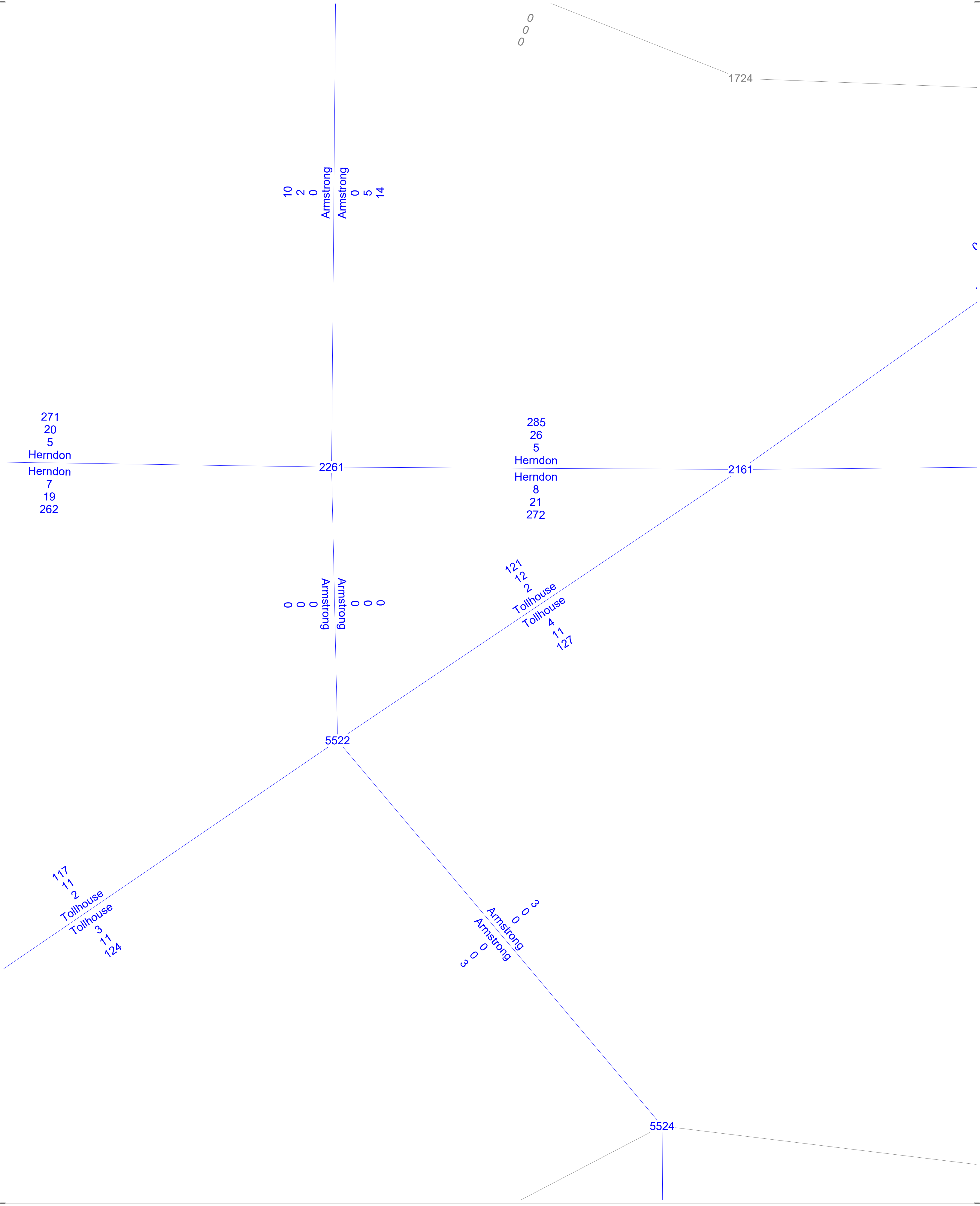

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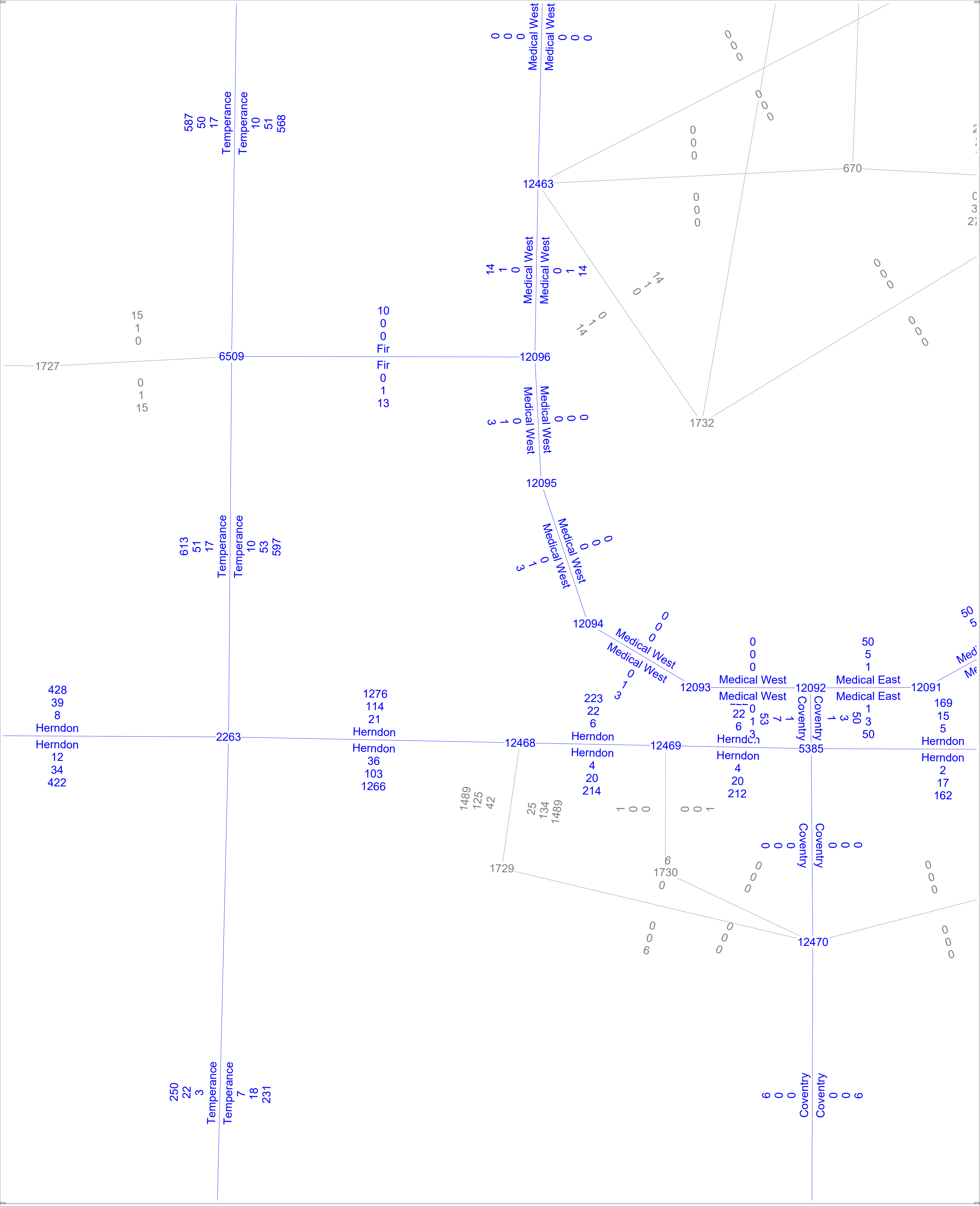

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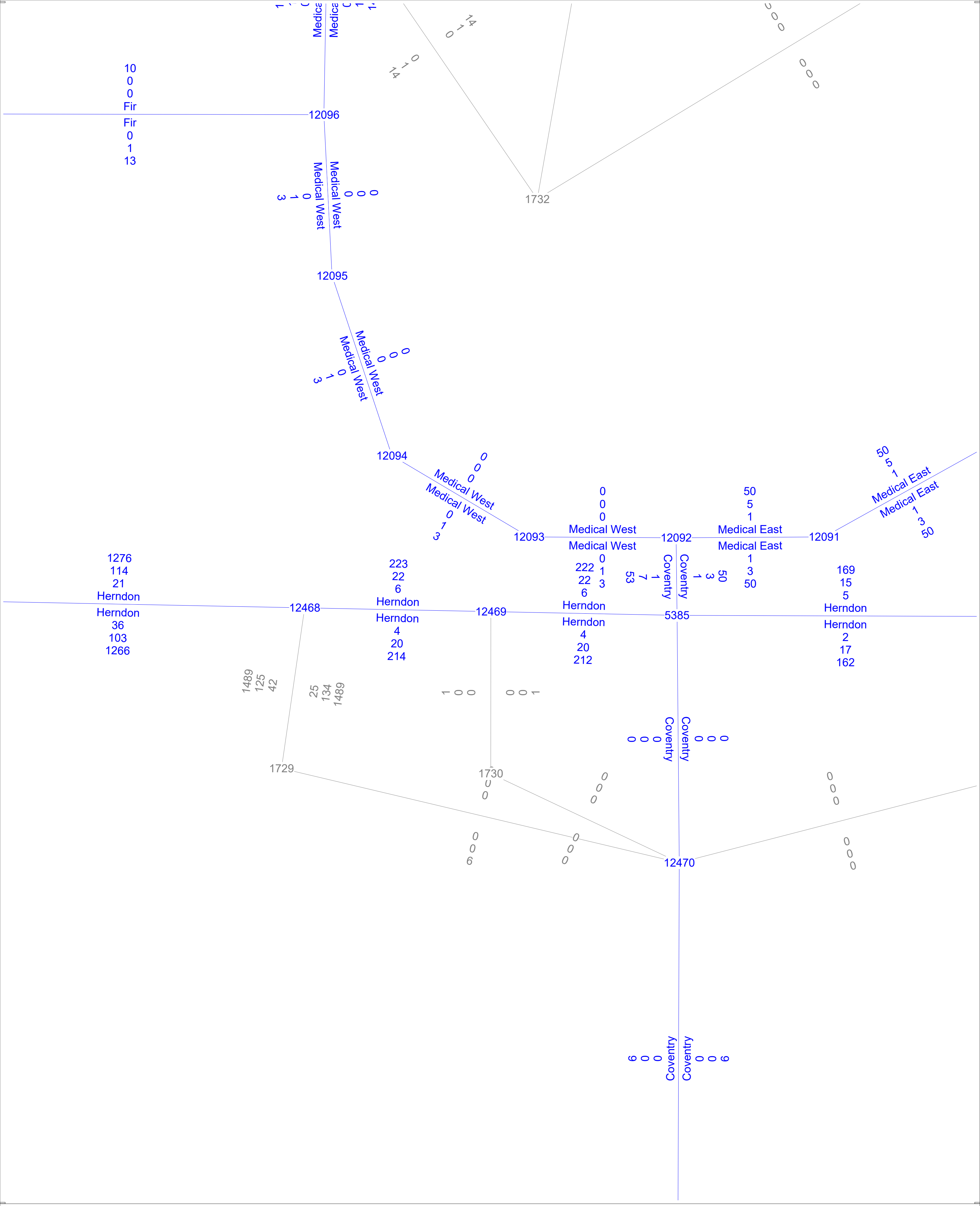

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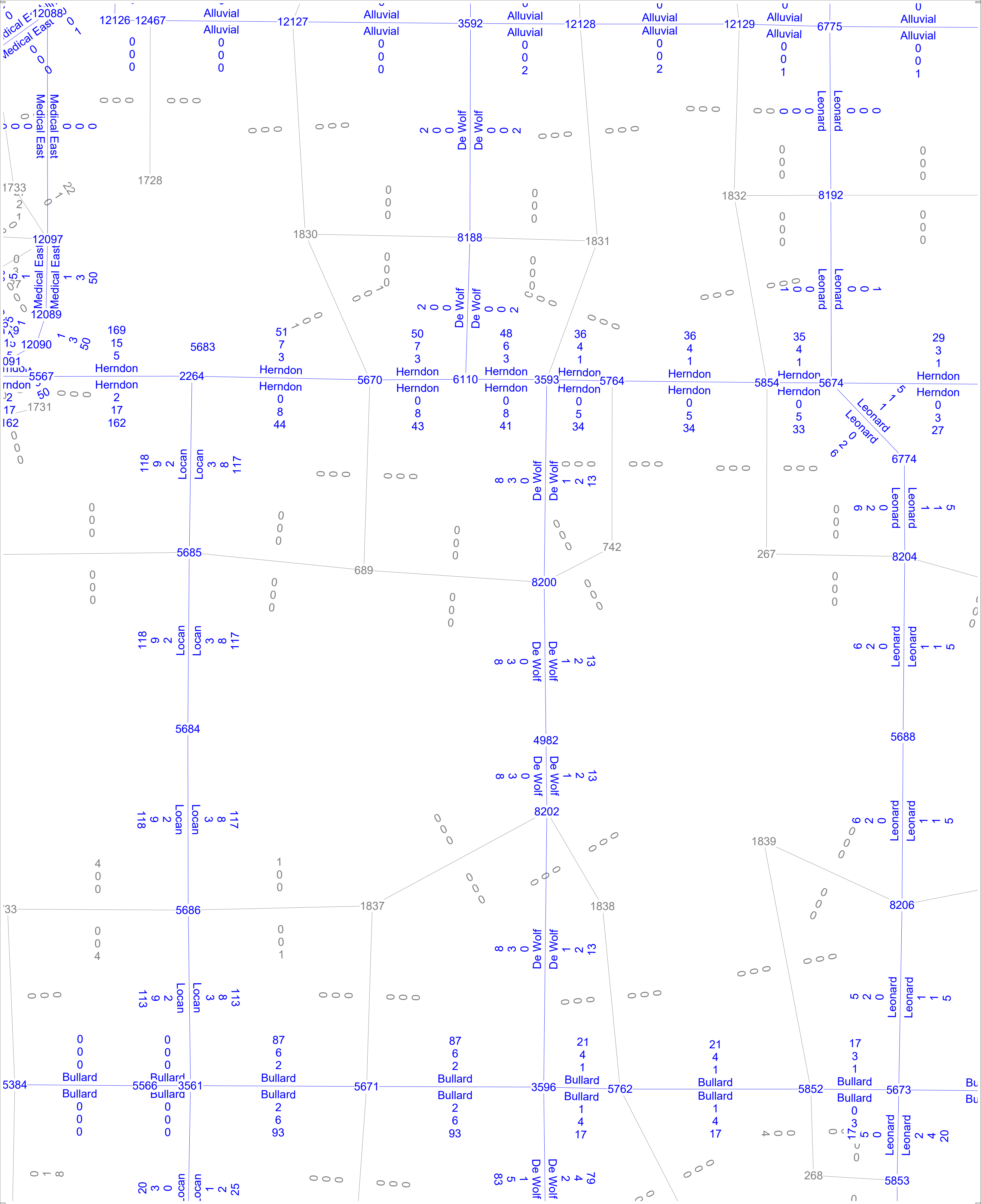

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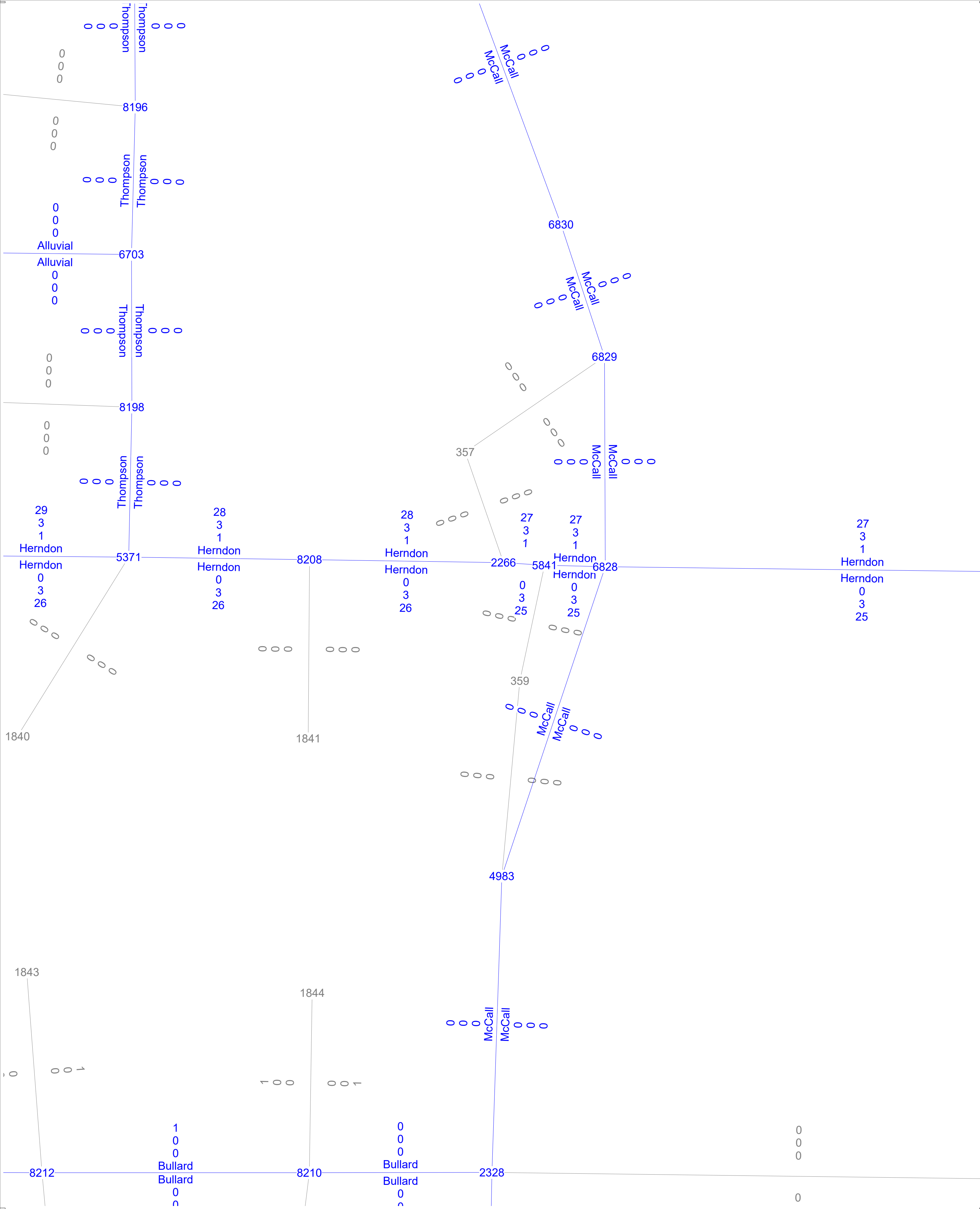

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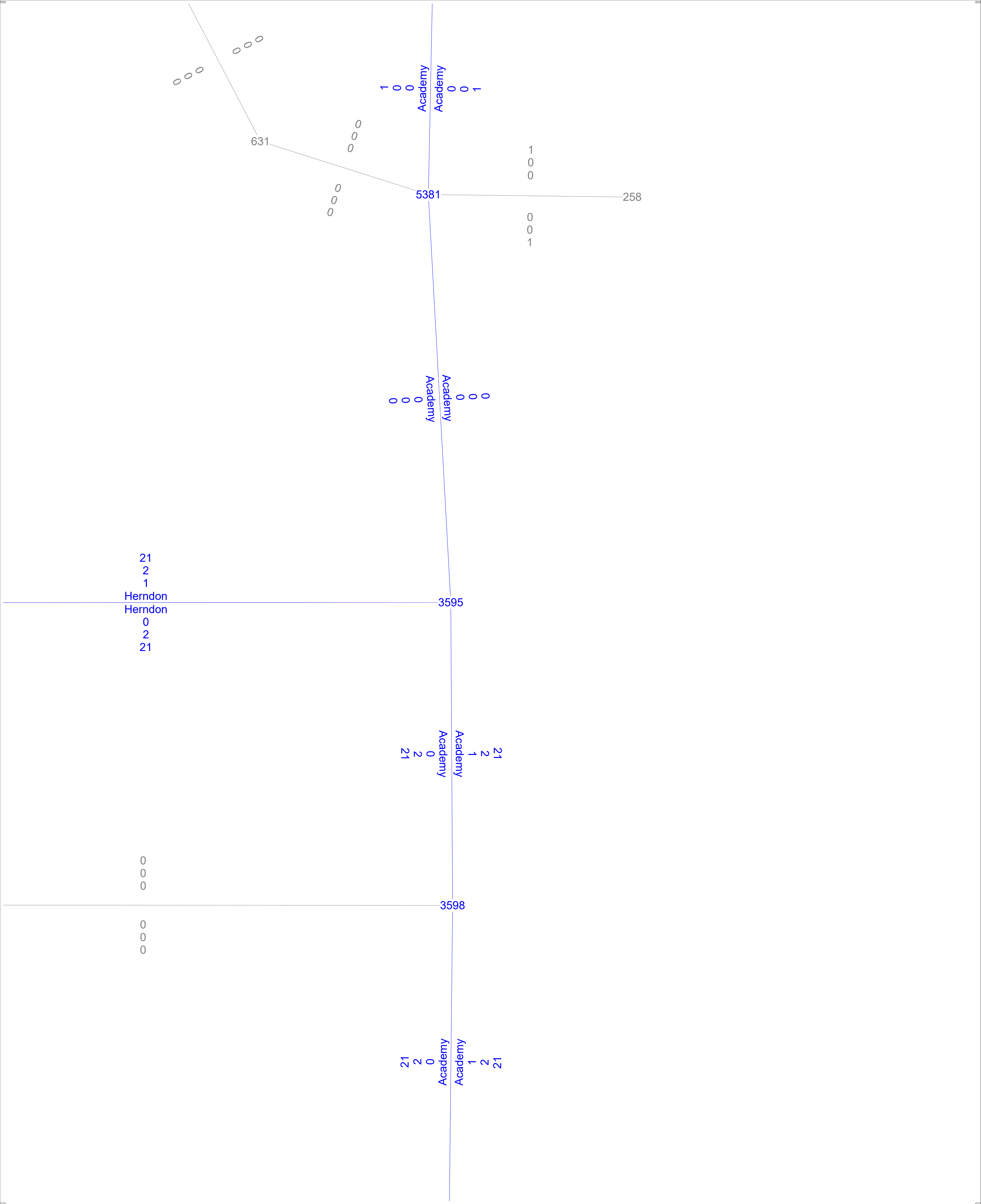

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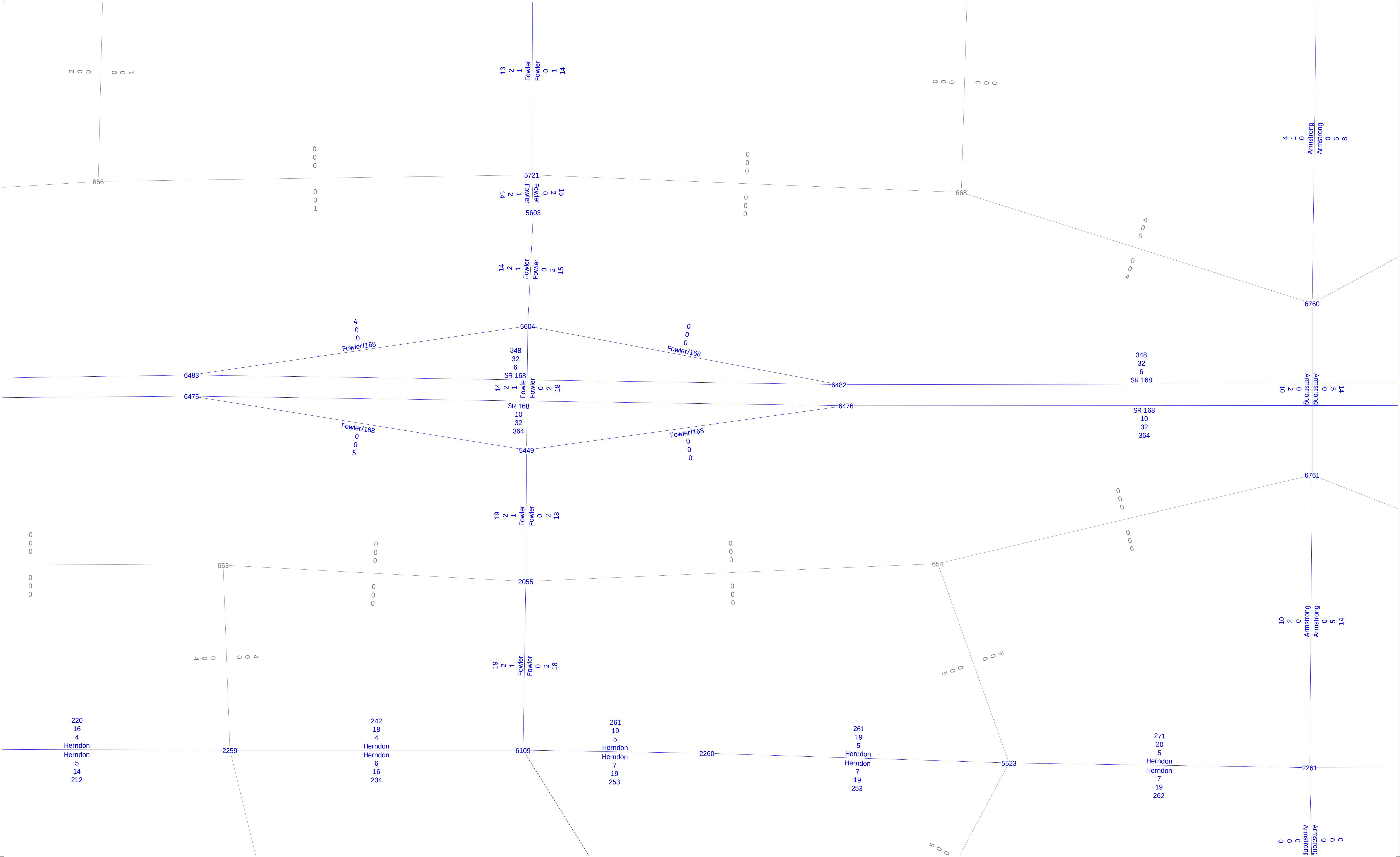
AM, PM and Daily Project Only Trips



Shopping Ctr SEC of Herndon & Temperance Select Zone (2035)
AM, PM and Daily Project Only Trips

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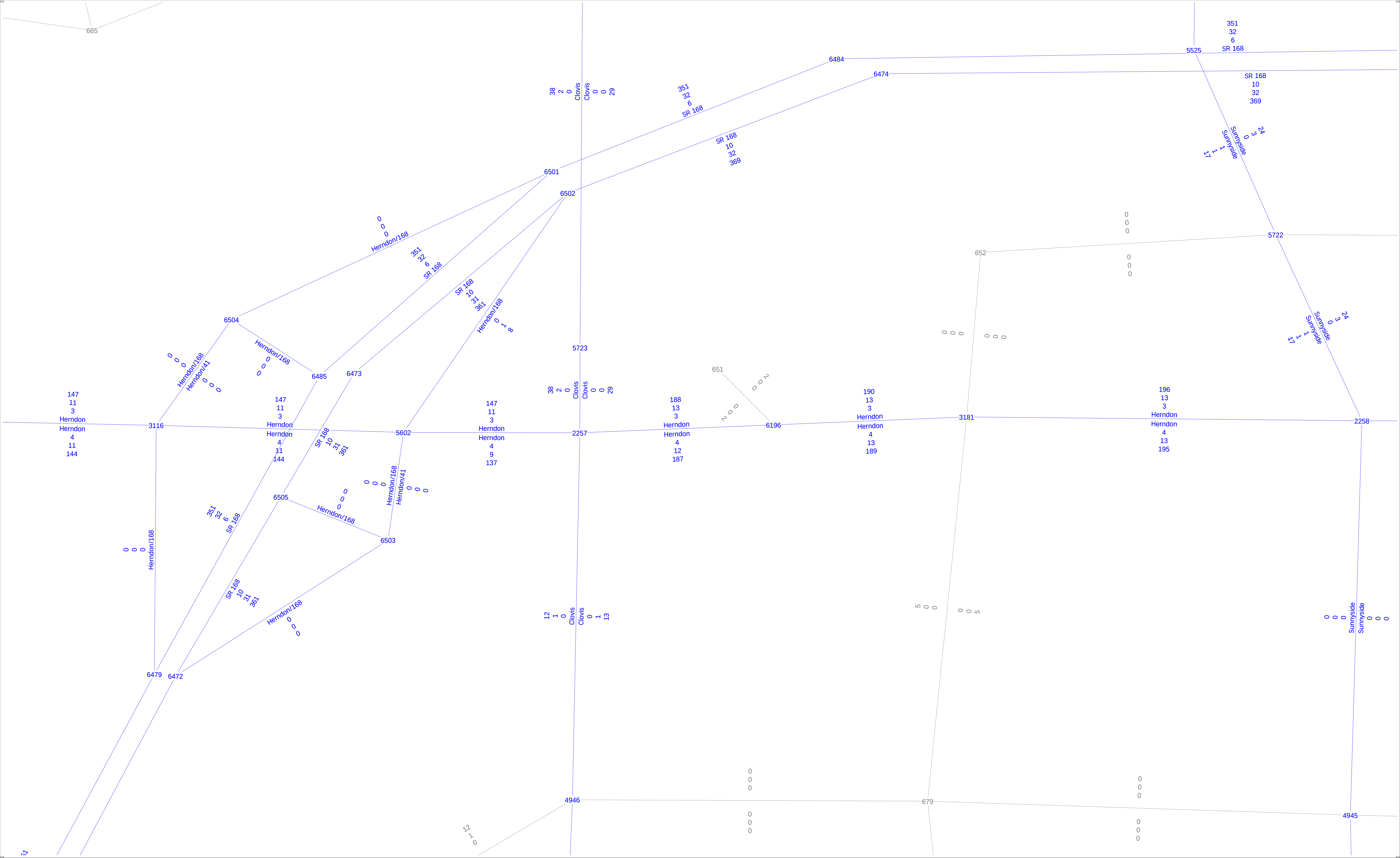

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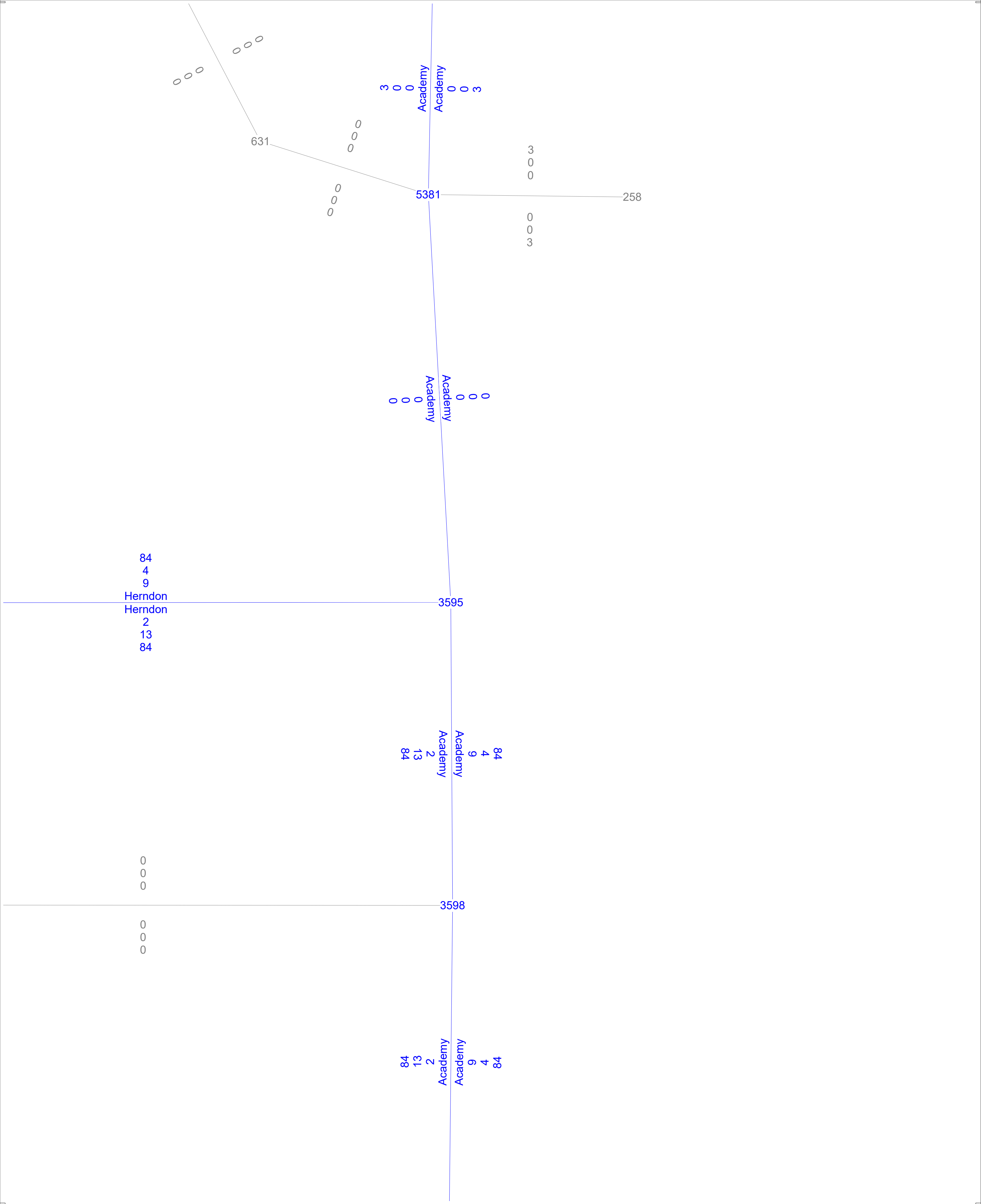
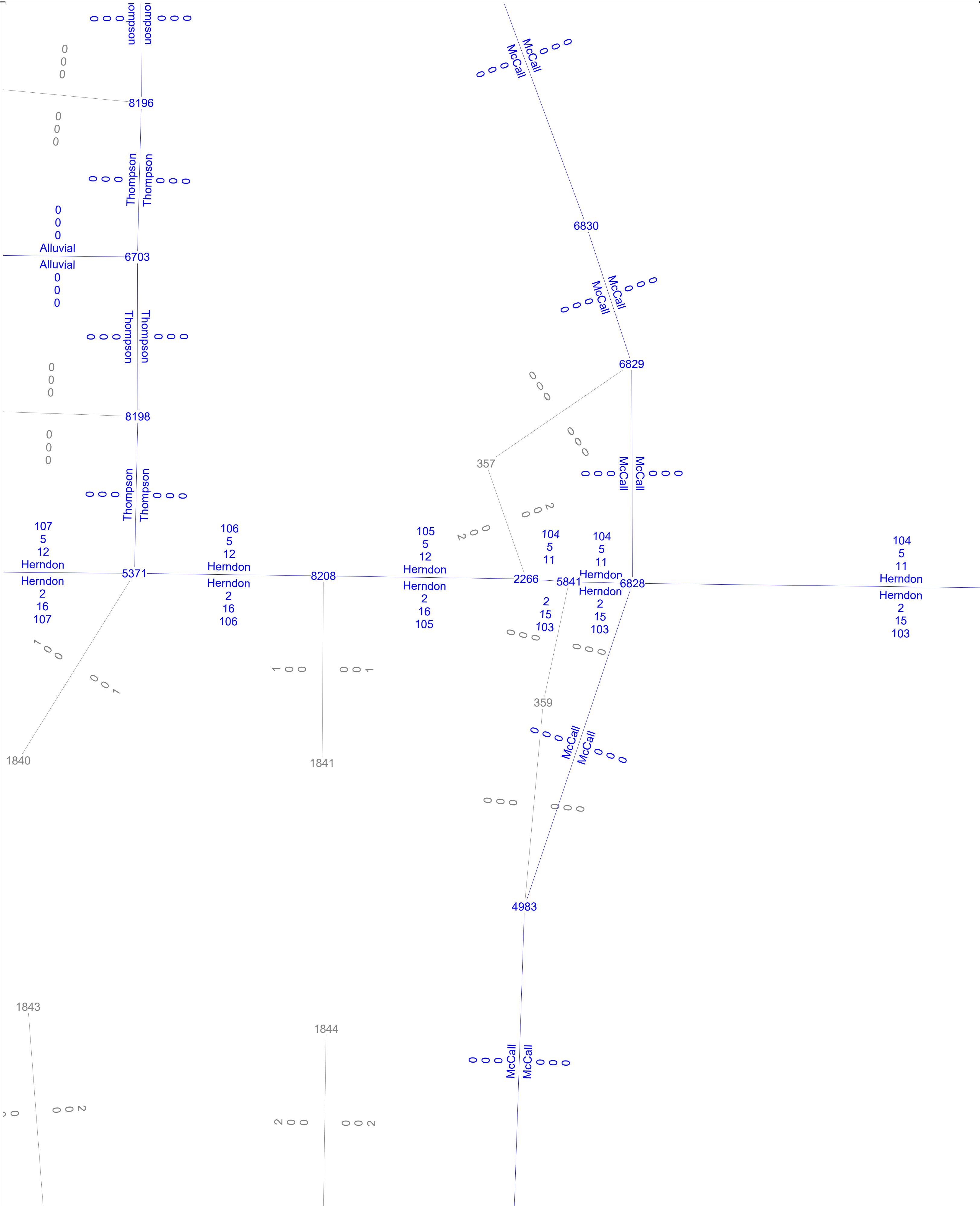


Hospital Phase 2 Select Zone (2035)
AM, PM and Daily Project Only Trips



Hospital Phase 2 Select Zone (2035)
AM, PM and Daily Project Only Trips

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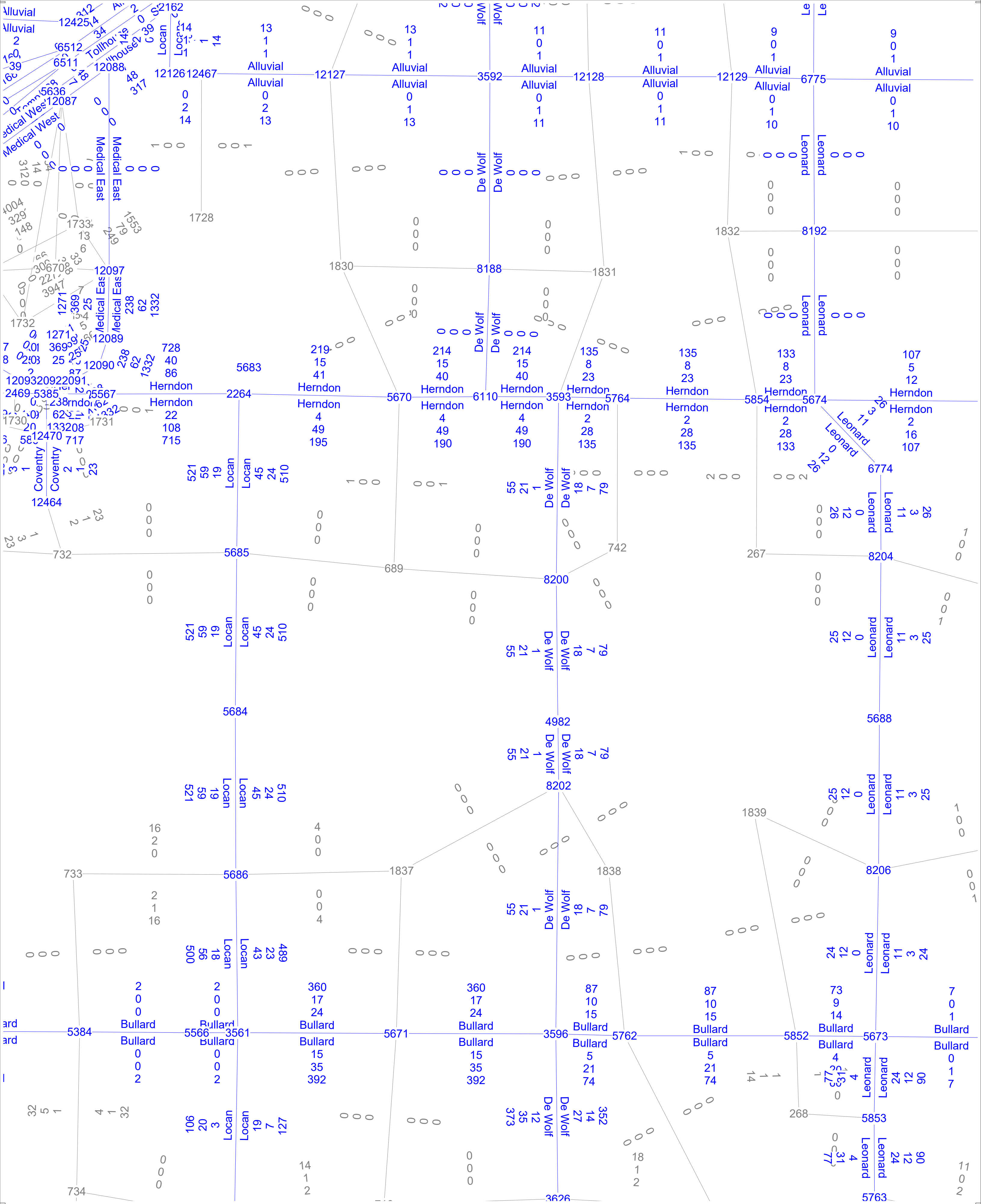
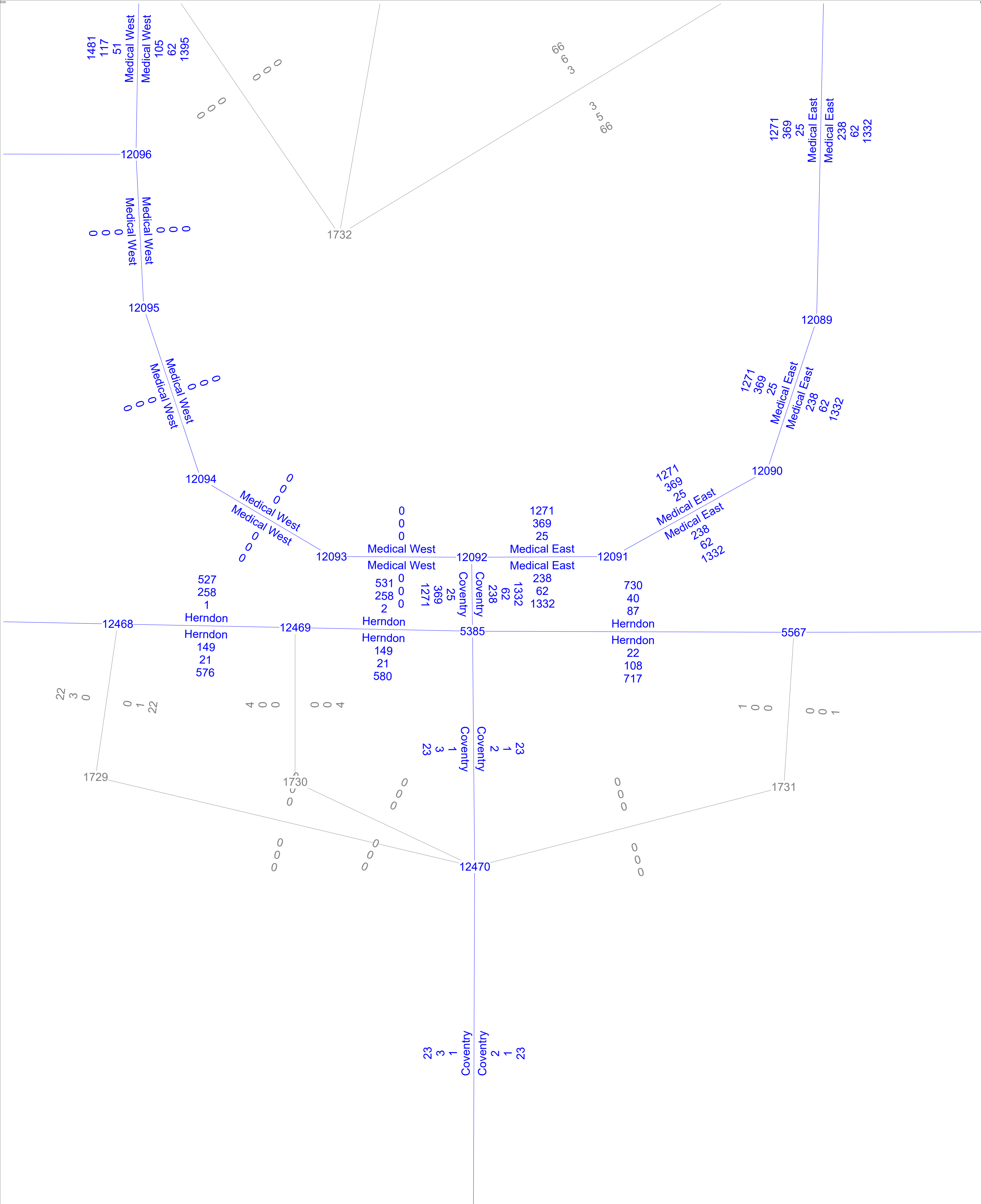


Hospital Phase 2 Select Zone (2035)
AM, PM and Daily Project Only Trips



Hospital Phase 2 Select Zone (2035)
AM, PM and Daily Project Only Trips

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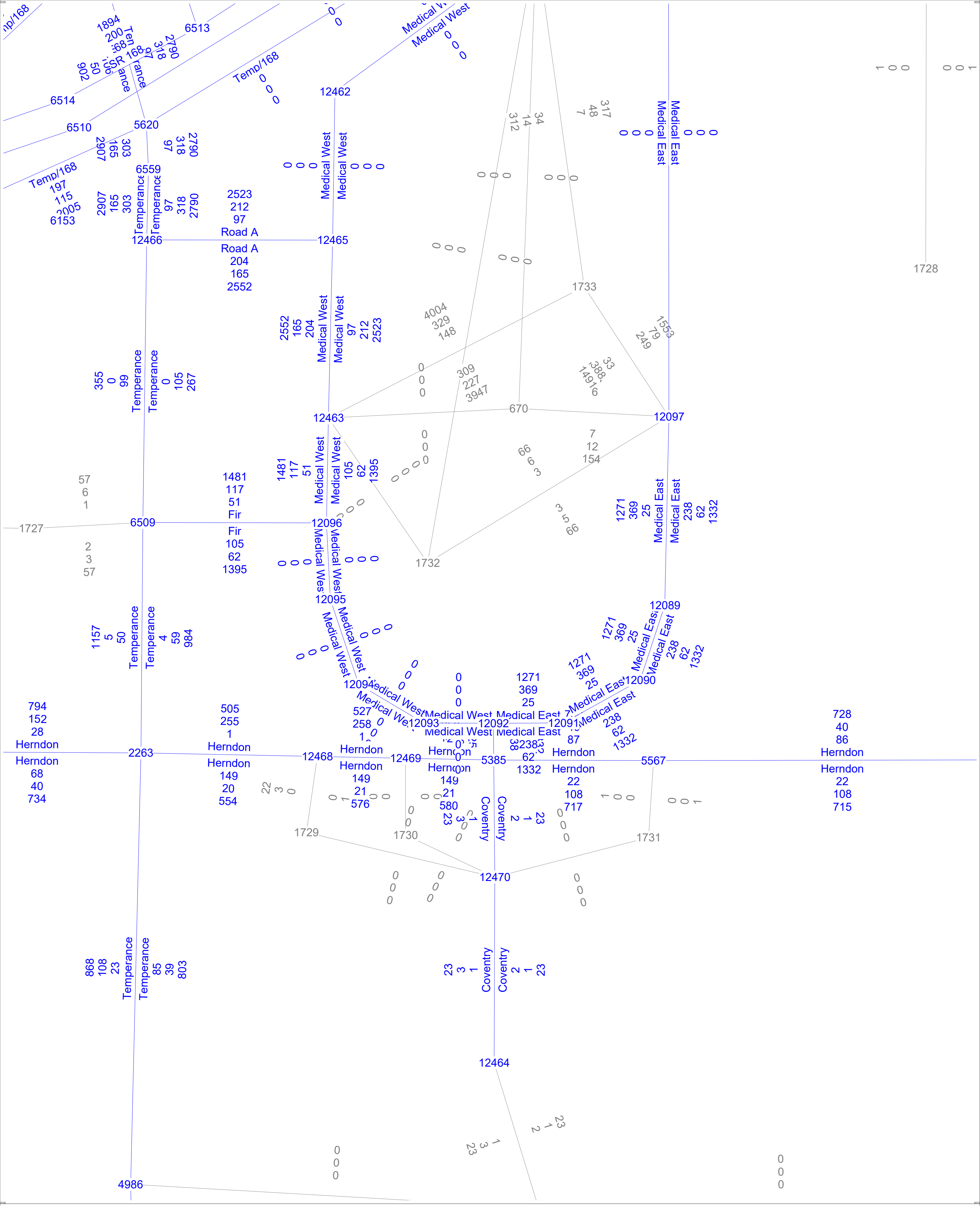
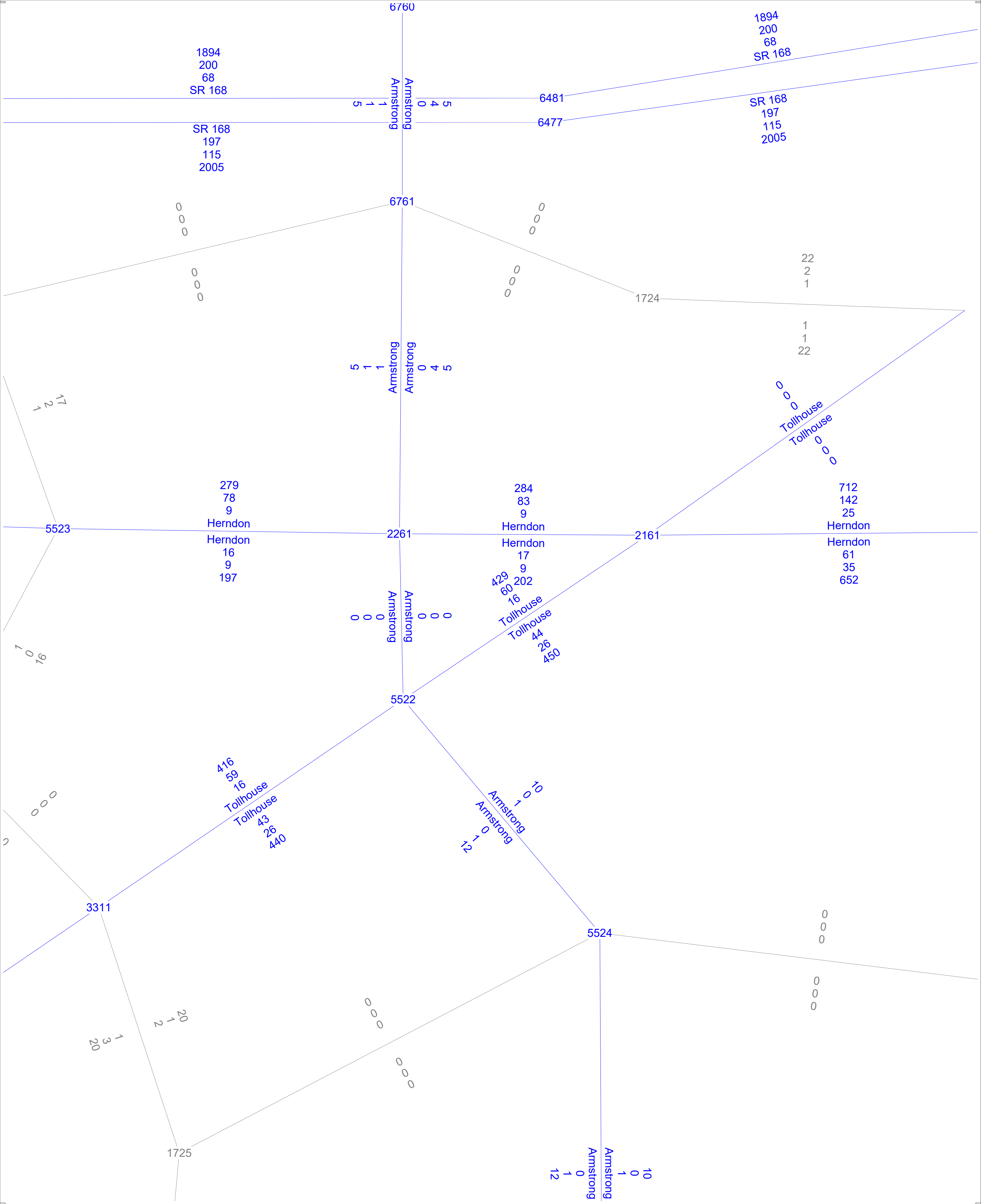
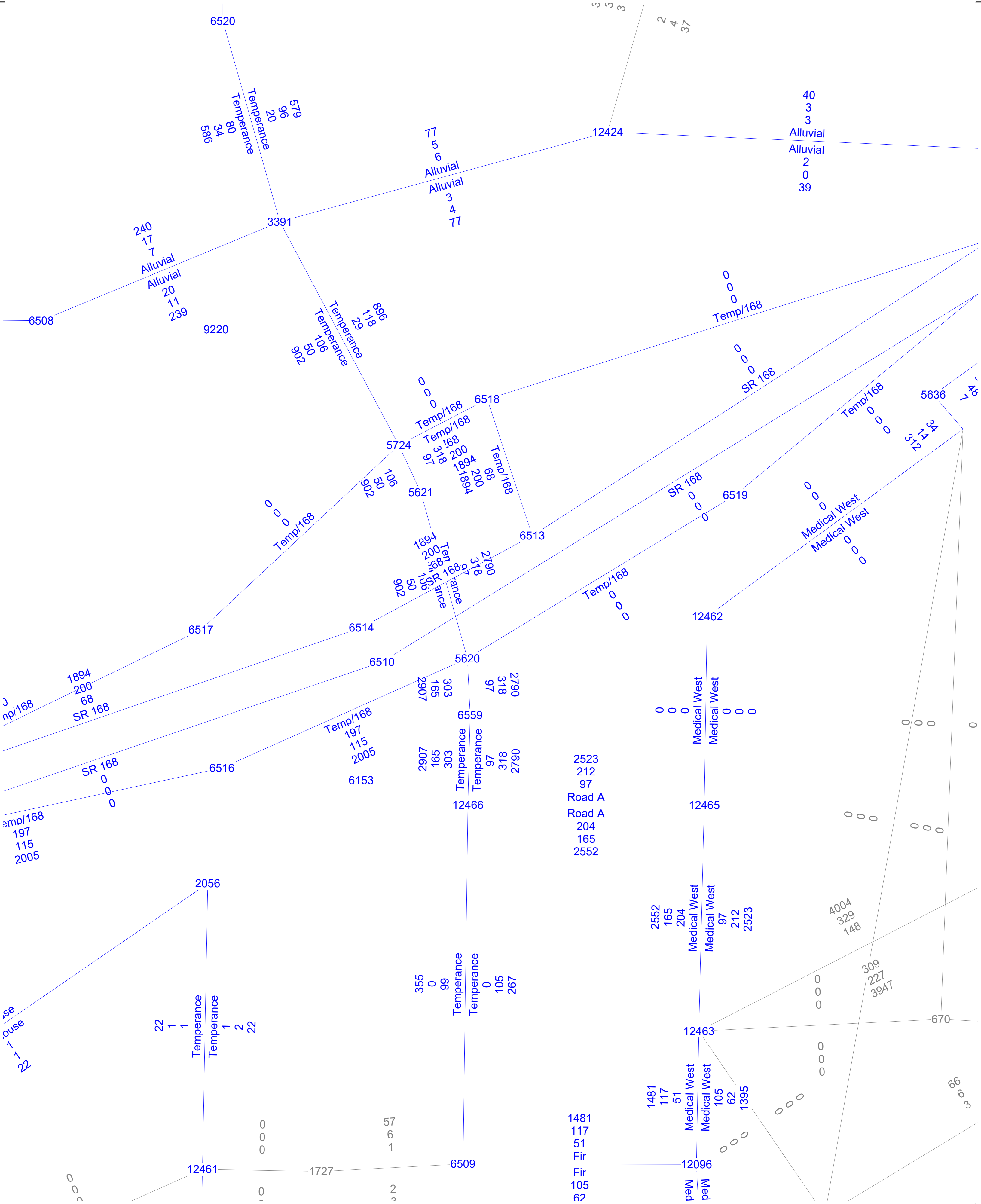


Hospital Phase 2 Select Zone (2035)
AM, PM and Daily Project Only Trips



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

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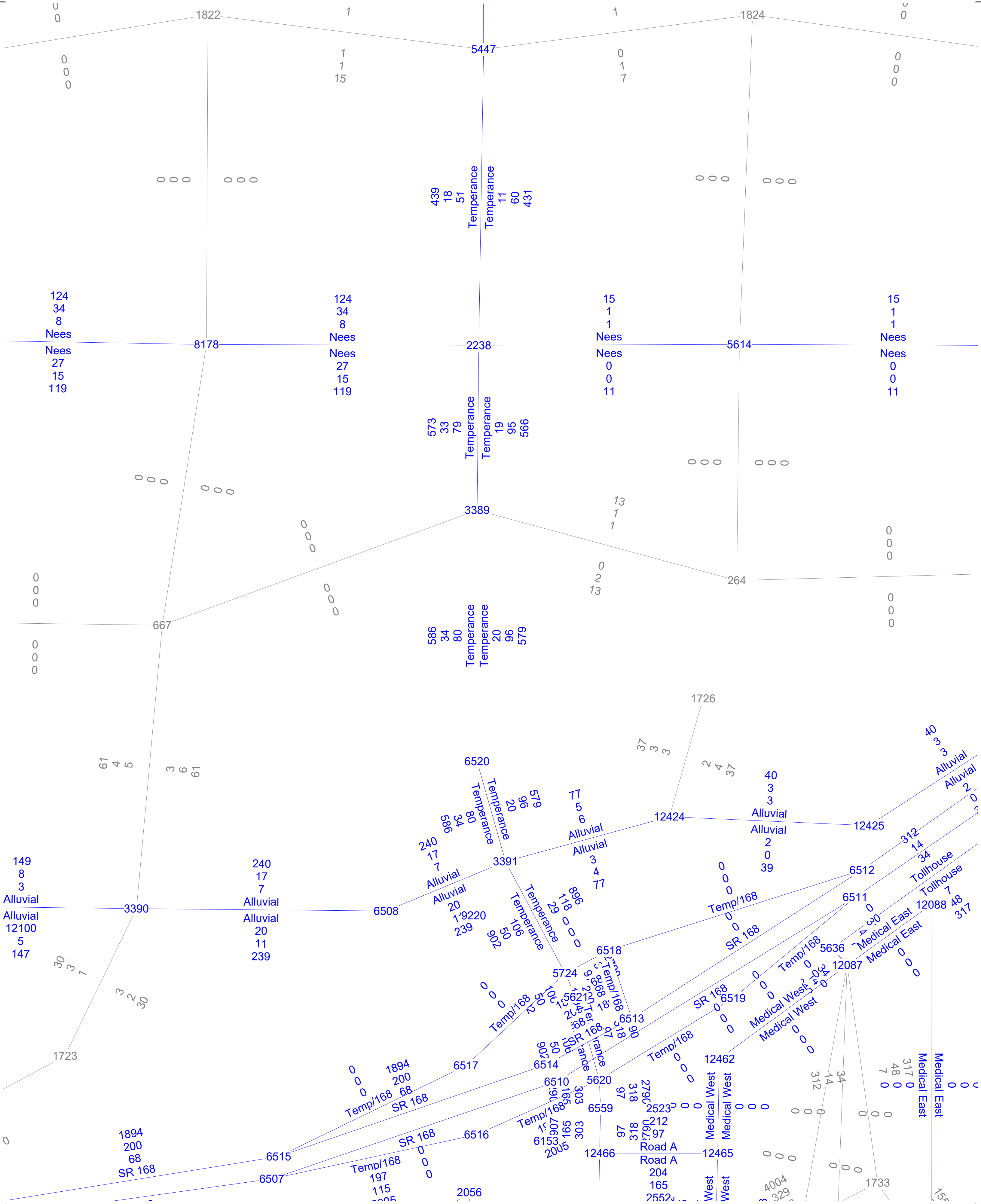
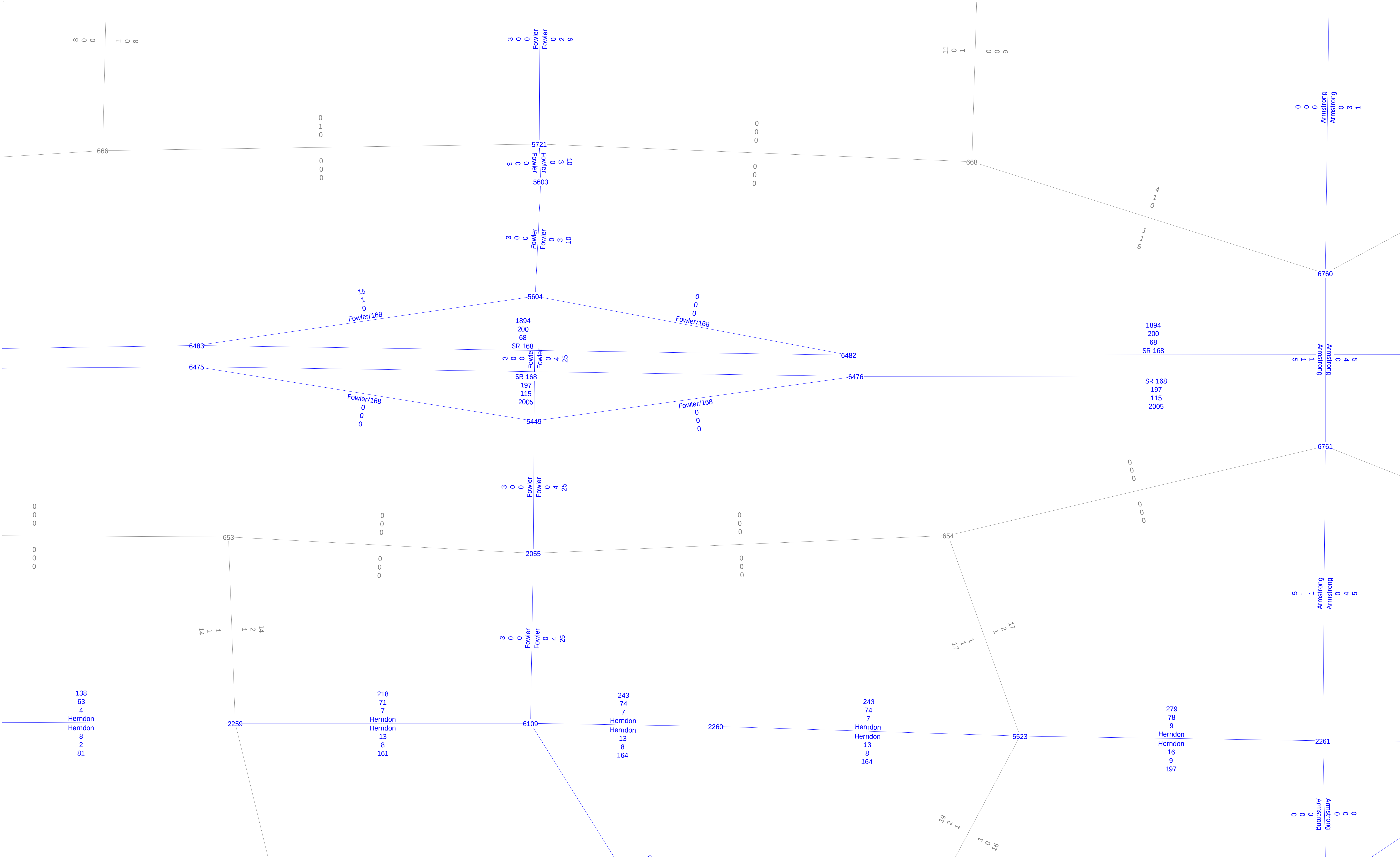


Hospital Phase 2 Select Zone (2035)
AM, PM and Daily Project Only Trips



Hospital Phase 2 Select Zone (2035)

AM, PM and Daily Project Only Trips

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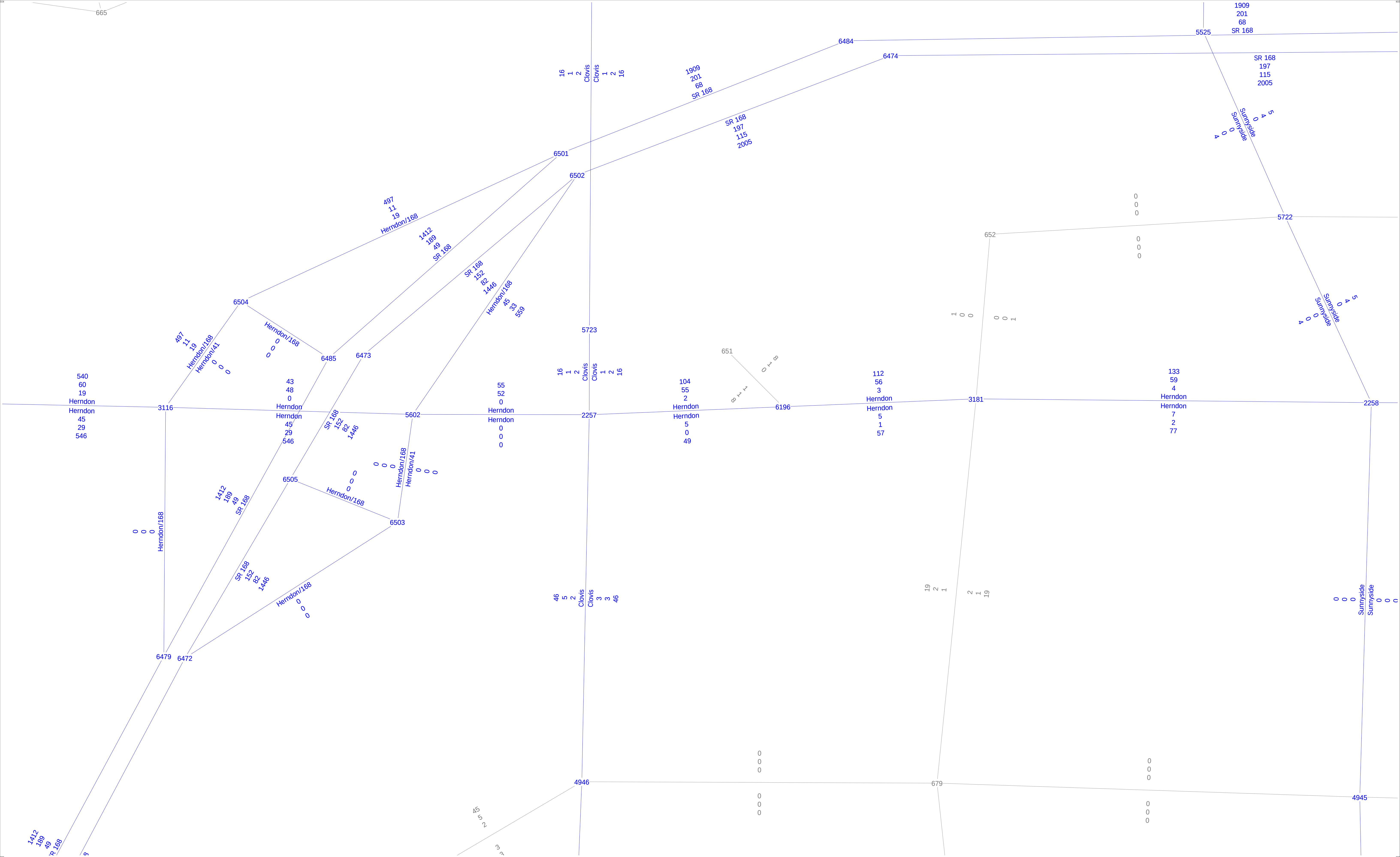

Hospital Phase 2 Select Zone (2035)
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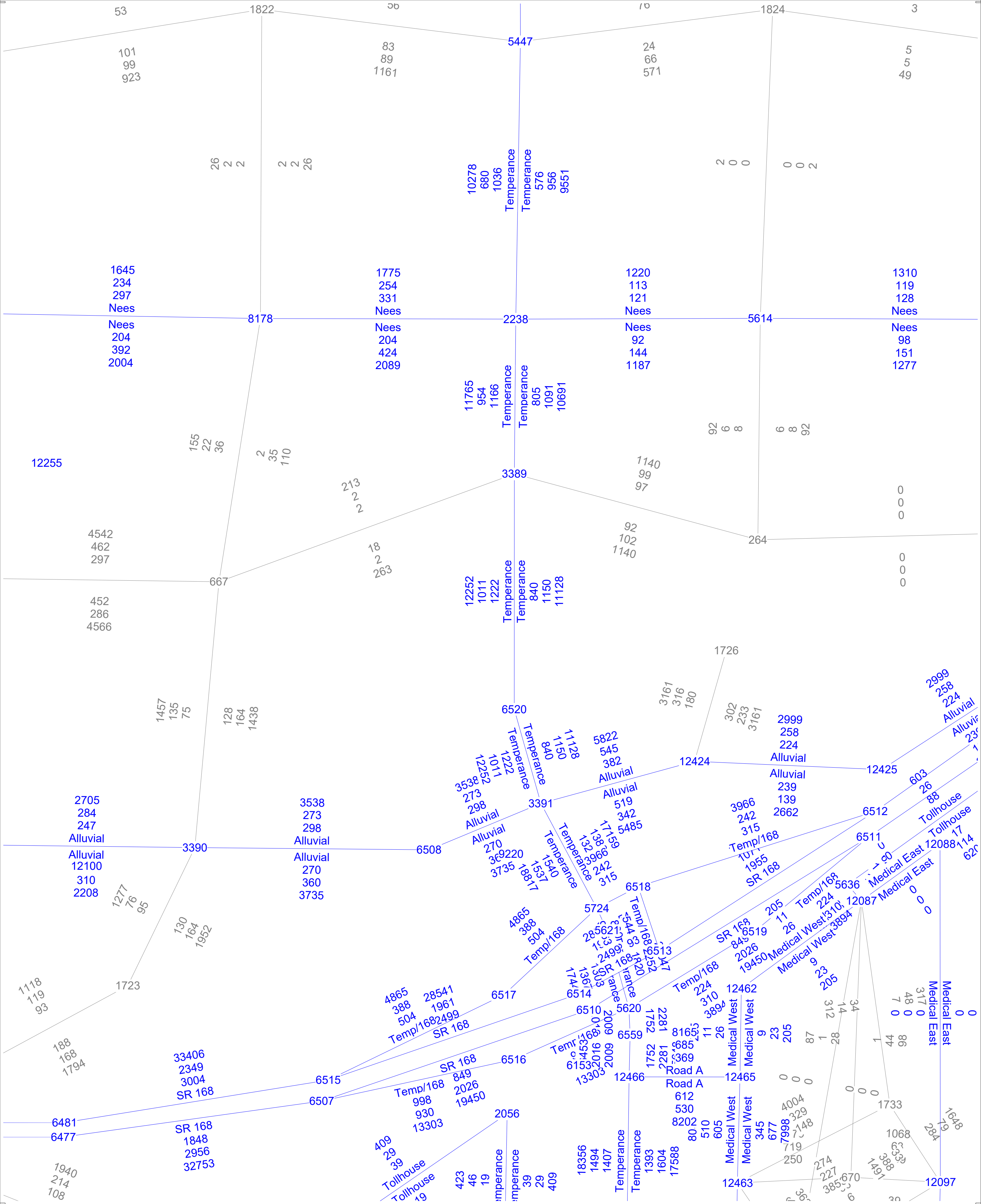

Cumulative Year 2035
AM, PM and Daily Total Traffic Volumes

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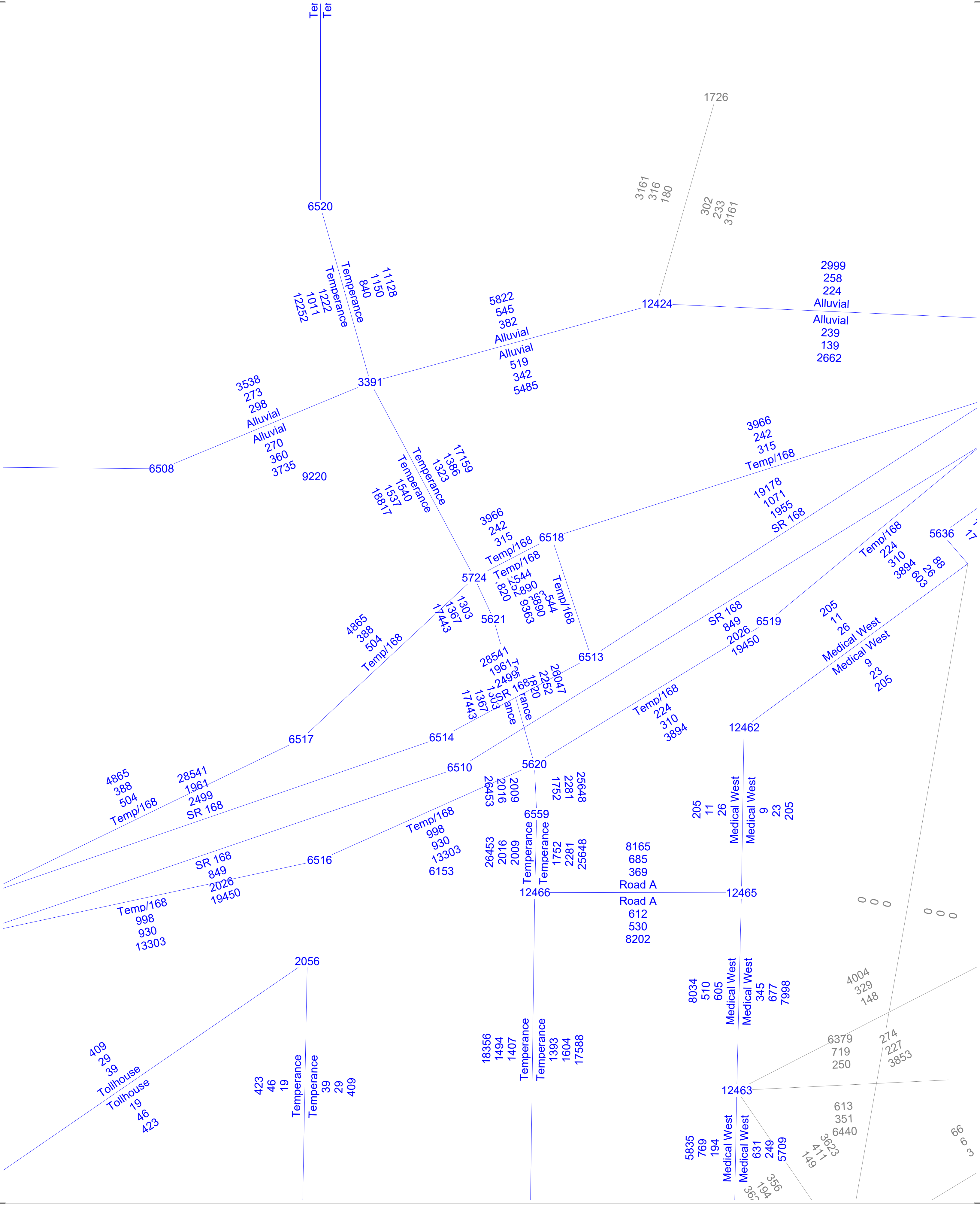
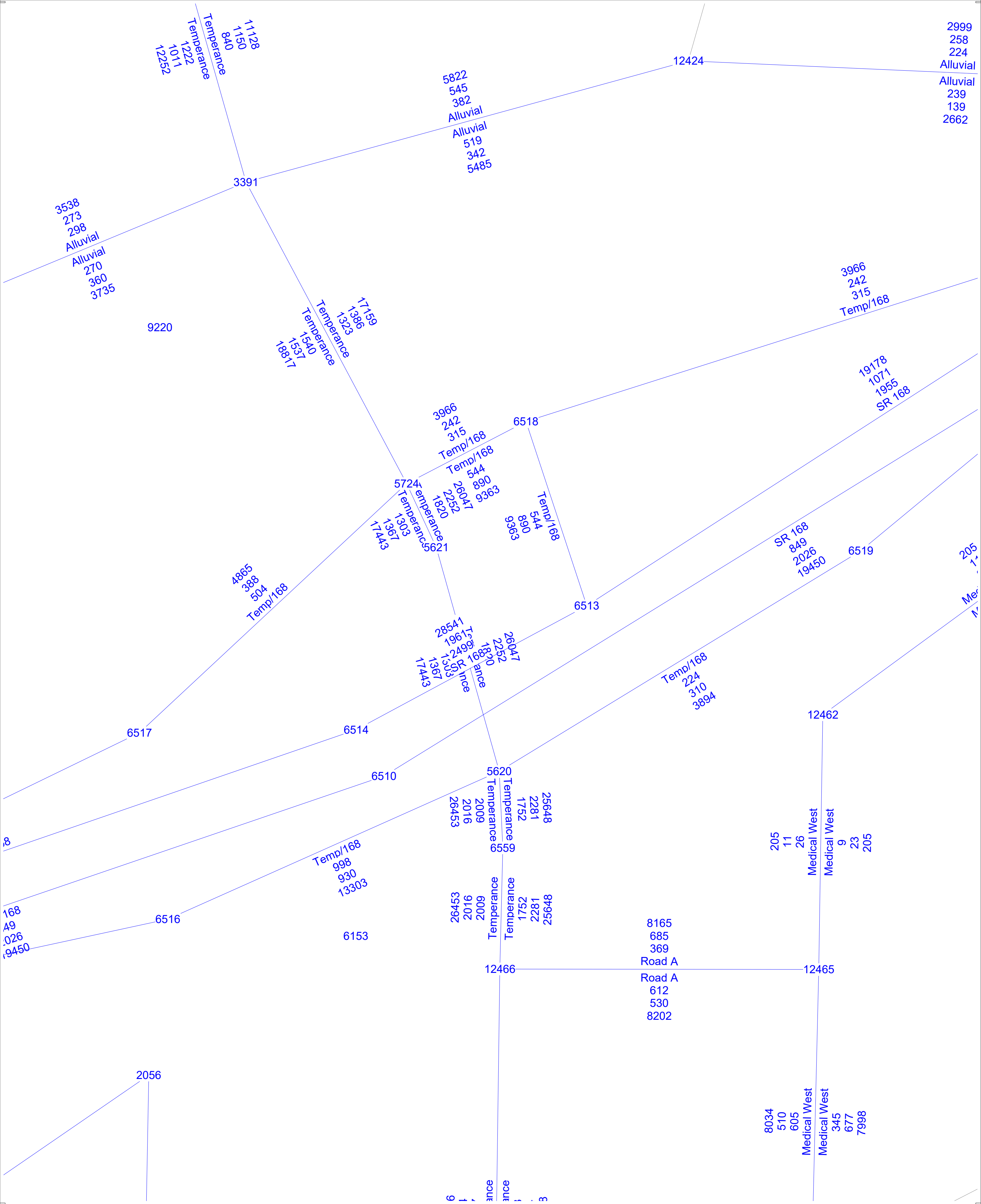
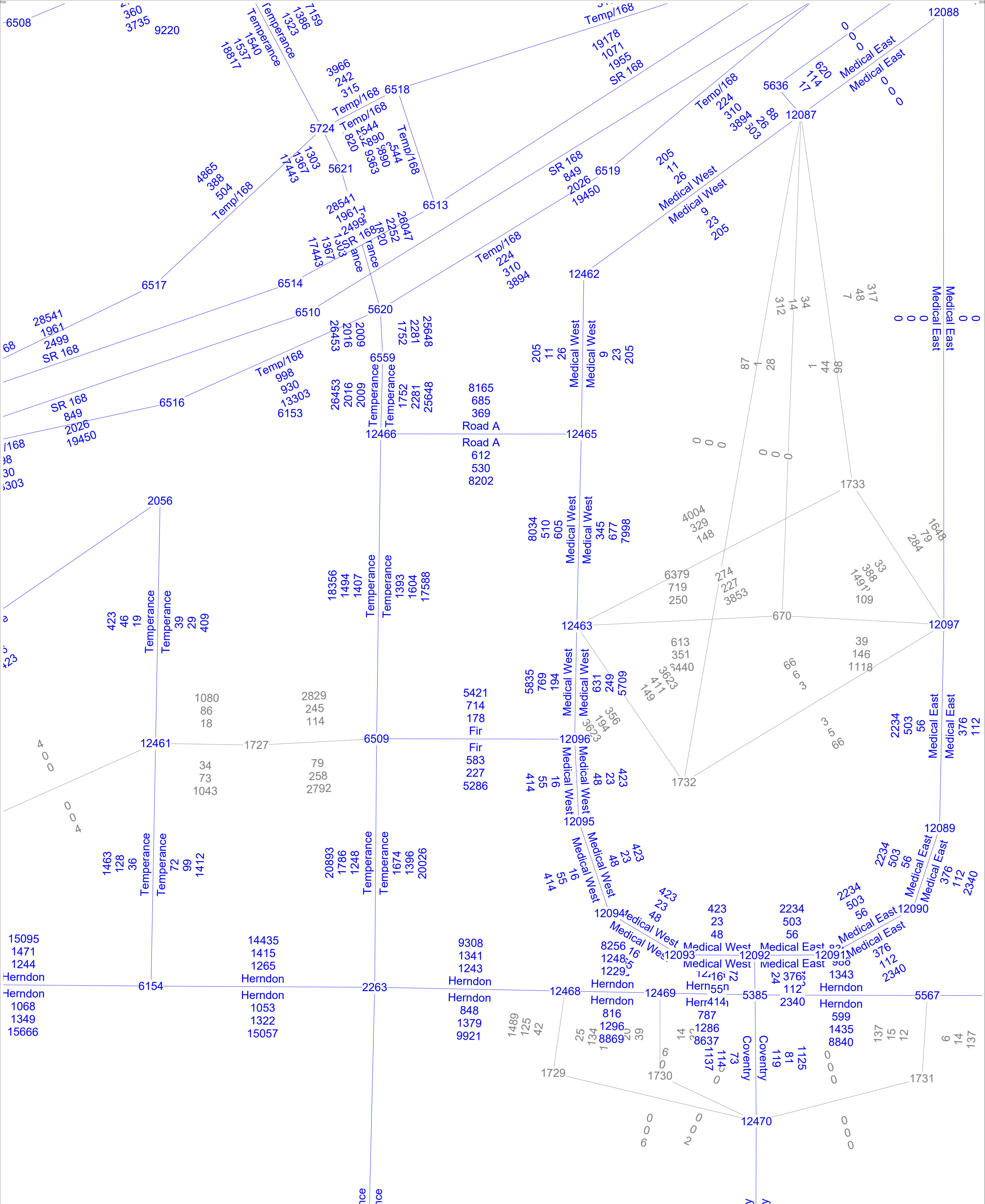


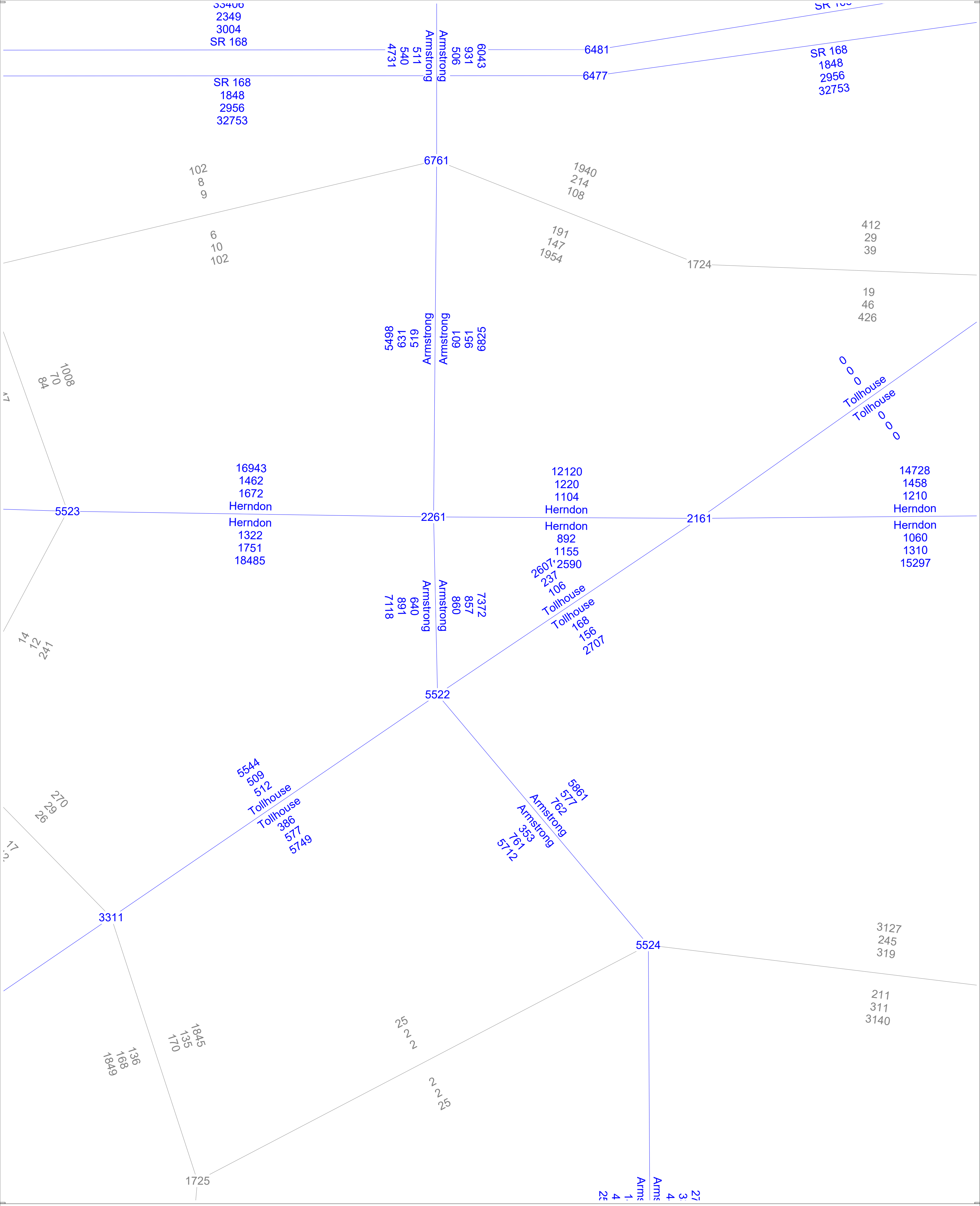
Cumulative Year 2035
AM, PM and Daily Total Traffic Volumes



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

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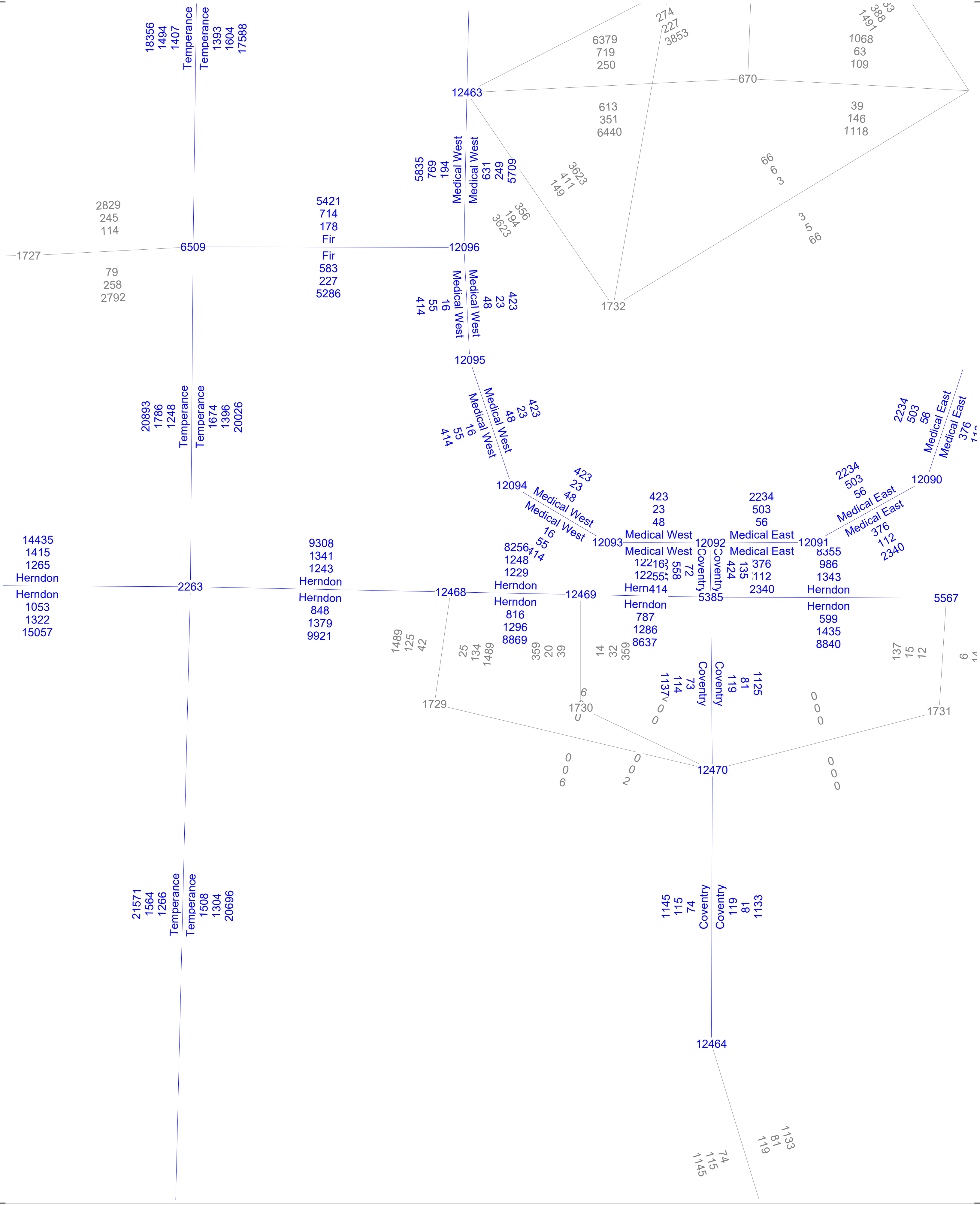
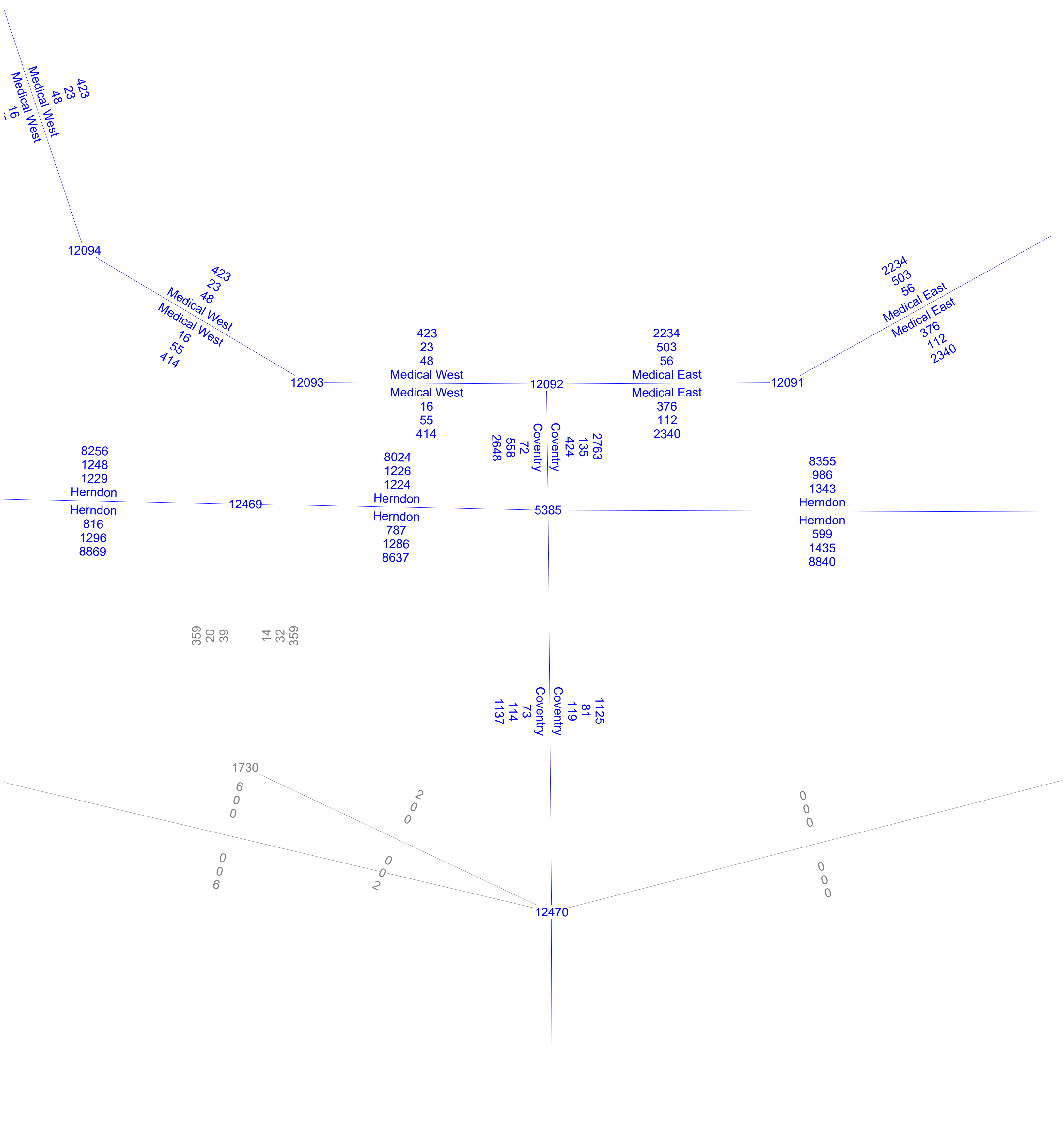
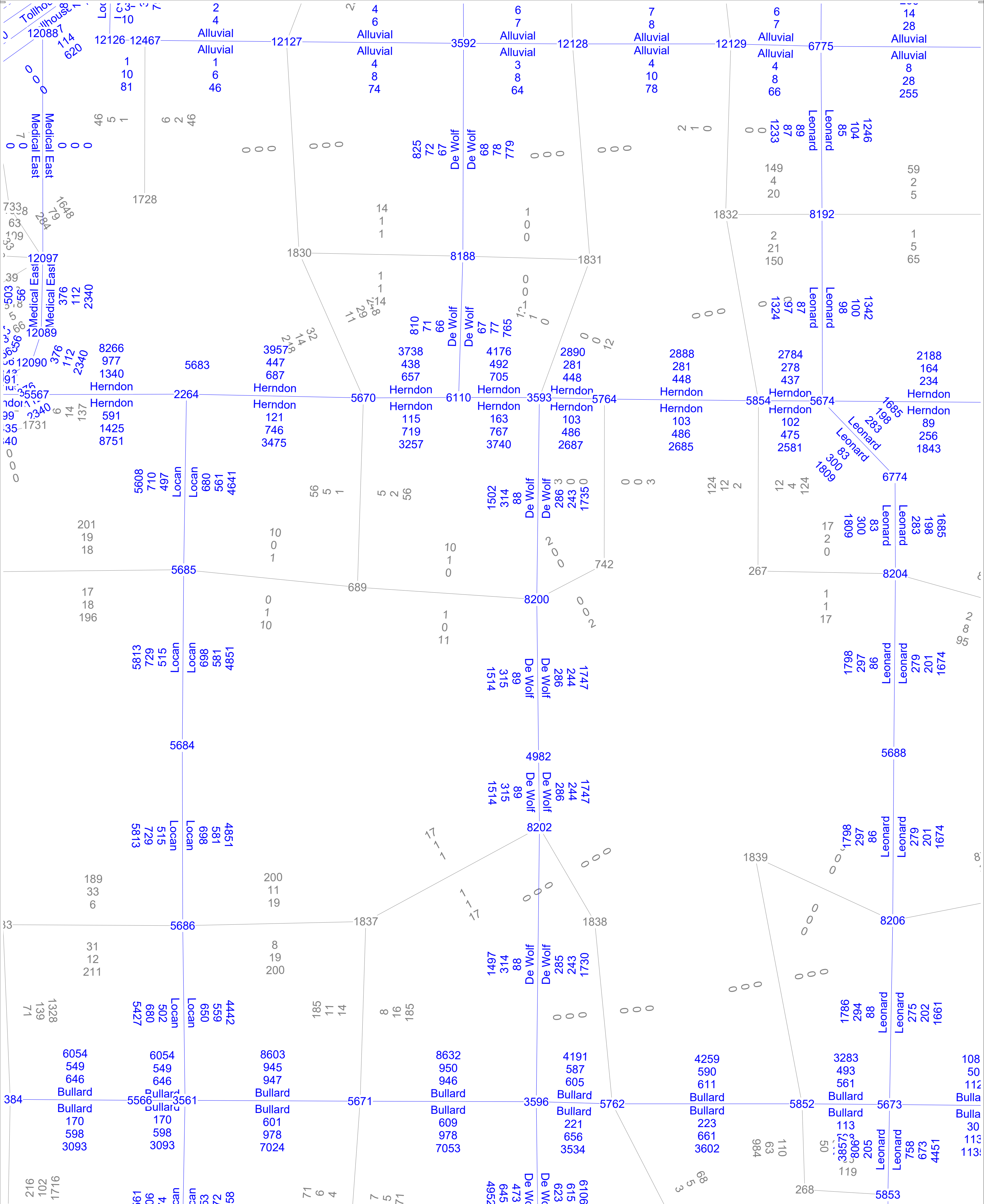


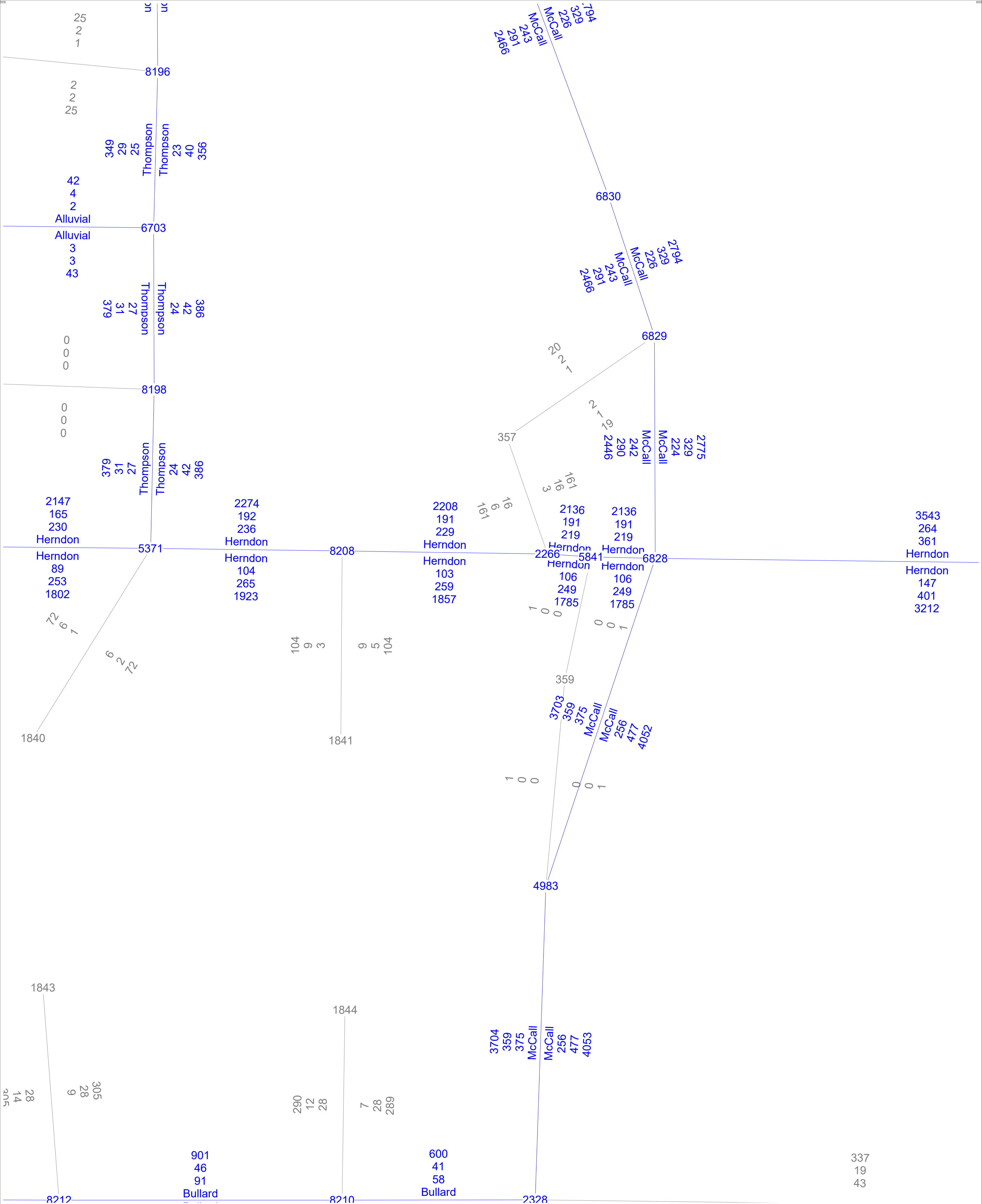
Cumulative Year 2035
AM, PM and Daily Total Traffic Volumes



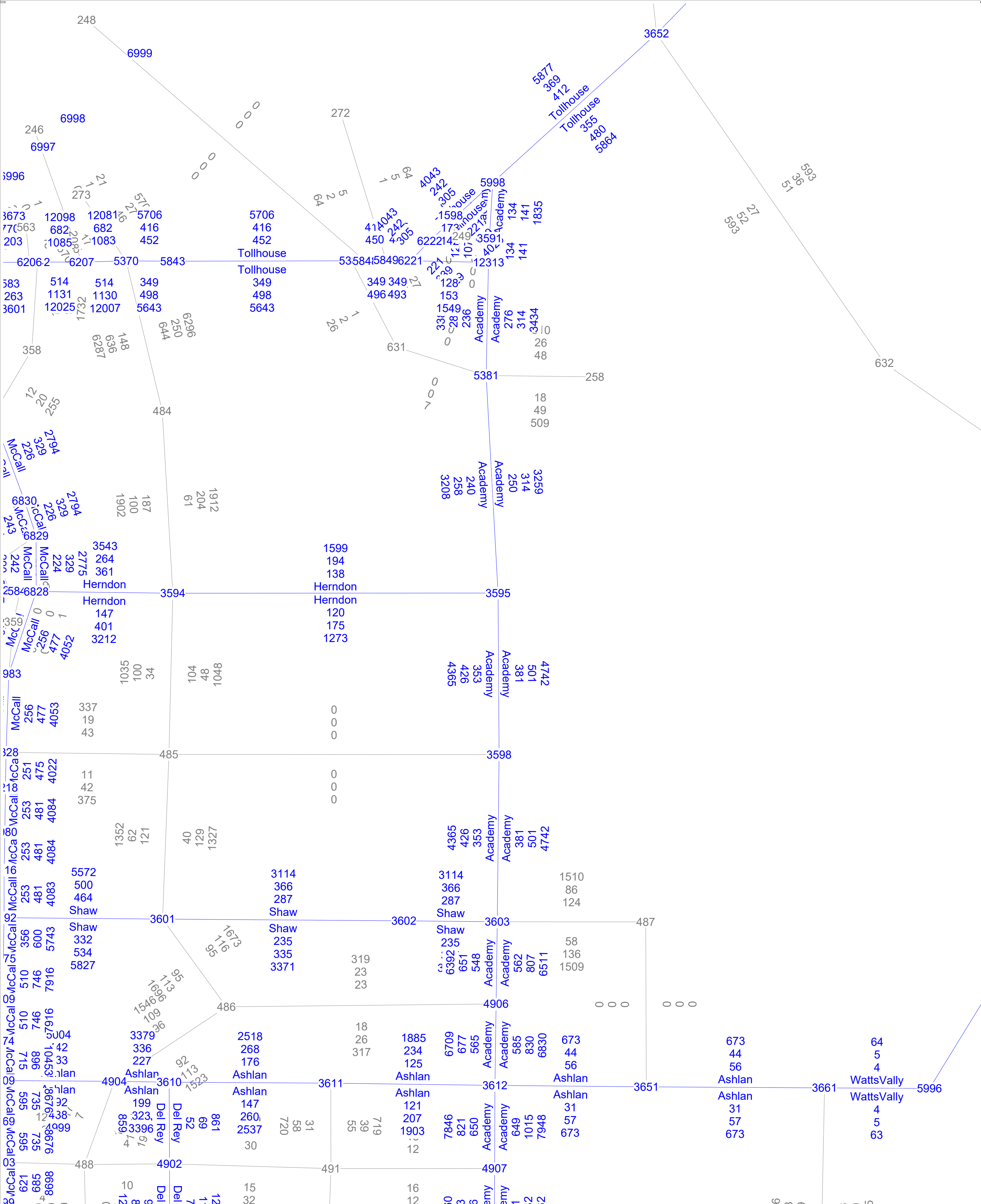
Cumulative Year 2035
AM, PM and Daily Total Traffic Volumes



Cumulative Year 2035
AM, PM and Daily Total Traffic Volumes



Cumulative Year 2035
AM, PM and Daily Total Traffic Volumes



Cumulative Year 2035
AM, PM and Daily Total Traffic Volumes

Appendix E: LOS Worksheets, Existing

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

Intersection Summary			
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

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

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

Intersection Summary	
HCM 2010 Ctrl Delay	44.6
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary	
HCM 2010 Ctrl Delay	4.9
HCM 2010 LOS	A

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary			
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

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

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.

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

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

Intersection Summary	
HCM 2010 Ctrl Delay	33.2
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	-	0	1285	904
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	381	-
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	739	-	-	-	181	334
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	688	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	739	-	-	-	180	334
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	347	0	1067	305
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	762	-
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	-	-	1206	-	245	732
Stage 1	-	-	-	-	745	-
Stage 2	-	-	-	-	459	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1206	-	235	732
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	-	0	1023	708
Stage 1	-	-	-	-	708	-
Stage 2	-	-	-	-	315	-
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	881	-	-	-	260	433
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	738	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	881	-	-	-	248	432
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	0	790	224
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	566	-
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	-	-	1290	-	358	813
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	566	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1290	-	357	813
Mov Cap-2 Maneuver	-	-	-	-	357	-
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	564	-

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	0	736	181
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	555	-
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	-	-	1385	-	385	859
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	573	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1385	-	385	859
Mov Cap-2 Maneuver	-	-	-	-	385	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	572	-

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	222	0	411	169
Stage 1	-	-	-	-	169	-
Stage 2	-	-	-	-	242	-
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	-	-	1341	-	595	872
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	796	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1341	-	594	872
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	EBLn1	WBLn1	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/veh	14.3
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

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

Intersection Summary			
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

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

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

Intersection Summary	
HCM 2010 Ctrl Delay	16.0
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary	
HCM 2010 Ctrl Delay	2.9
HCM 2010 LOS	A

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		

Intersection Summary			
HCM 2010 Ctrl Delay			32.3
HCM 2010 LOS			C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary			
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

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

Intersection Summary	
HCM 2010 Ctrl Delay	15.2
HCM 2010 LOS	B

Notes

* 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

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.

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

Intersection Summary	
HCM 2010 Ctrl Delay	11.7
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	-	0	1245	486
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	759	-
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	1070	-	-	-	191	579
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	460	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1070	-	-	-	190	579
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	819	0	1147	713
Stage 1	-	-	-	-	713	-
Stage 2	-	-	-	-	434	-
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	-	-	805	-	219	430
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	651	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	805	-	214	430
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	-	0	1104	393
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	711	-
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	1155	-	-	-	233	654
Stage 1	-	-	-	-	680	-
Stage 2	-	-	-	-	485	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1155	-	-	-	216	654
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	0	778	523
Stage 1	-	-	-	-	523	-
Stage 2	-	-	-	-	255	-
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	-	-	973	-	363	552
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	785	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	973	-	361	552
Mov Cap-2 Maneuver	-	-	-	-	361	-
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	781	-

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	0	690	442
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	248	-
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	-	-	1108	-	409	613
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	791	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1108	-	409	613
Mov Cap-2 Maneuver	-	-	-	-	409	-
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	790	-

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	0	504	321
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	183	-
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	-	-	1116	-	526	718
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	846	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1116	-	525	718
Mov Cap-2 Maneuver	-	-	-	-	525	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	844	-

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

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

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

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						
Intersection Summary												
HCM 2010 Ctrl Delay			27.7									
HCM 2010 LOS			C									

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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		

Intersection: 21: De Wolf Ave & Bullard Ave

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)				

Network Summary

Network wide Queuing Penalty: 58

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		

Intersection: 21: De Wolf Ave & Bullard Avenue

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)				

Network Summary

Network wide Queuing Penalty: 36

Appendix F: LOS Worksheets, Existing plus Project Phase 1

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

Intersection Summary			
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

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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary	
HCM 2010 Ctrl Delay	6.4
HCM 2010 LOS	A

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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

Movement	SBT	SBR
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

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

Intersection Summary	
HCM 2010 Ctrl Delay	37.8
HCM 2010 LOS	D

Notes

* 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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	-	0	1147	486
Stage 1	-	-	-	-	944	-
Stage 2	-	-	-	-	203	-
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	699	-	-	-	191	525
Stage 1	-	-	-	-	336	-
Stage 2	-	-	-	-	808	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	699	-	-	-	190	525
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	-	0	918	364
Stage 1	-	-	-	-	724	-
Stage 2	-	-	-	-	194	-
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	868	-	-	-	269	630
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	817	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	868	-	-	-	257	628
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	0	771	186
Stage 1	-	-	-	-	186	-
Stage 2	-	-	-	-	585	-
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	-	-	1382	-	367	854
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	555	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1382	-	366	854
Mov Cap-2 Maneuver	-	-	-	-	366	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	553	-

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	228	0	424	173
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	251	-
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	-	-	1334	-	585	868
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1334	-	584	868
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	0	1634	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	NBR	WBLn1	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/veh	15.1
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

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

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	19.4
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary			
HCM 2010 Ctrl Delay			1.7
HCM 2010 LOS			A

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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

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

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

Intersection Summary	
HCM 2010 Ctrl Delay	46.1
HCM 2010 LOS	D

Notes

* 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

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

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary		
HCM 2010 Ctrl Delay		22.8
HCM 2010 LOS		C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	-	0	947	264
Stage 1	-	-	-	-	518	-
Stage 2	-	-	-	-	429	-
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	1029	-	-	-	258	731
Stage 1	-	-	-	-	560	-
Stage 2	-	-	-	-	621	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1029	-	-	-	257	731
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	-	0	829	201
Stage 1	-	-	-	-	402	-
Stage 2	-	-	-	-	427	-
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	1146	-	-	-	307	803
Stage 1	-	-	-	-	641	-
Stage 2	-	-	-	-	623	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1146	-	-	-	292	803
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	0	743	475
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	268	-
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	-	-	1082	-	381	588
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	775	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1082	-	379	588
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	NBR	WBLn1	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/veh	11.7
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

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.

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

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			1298
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			1298
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

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

Intersection Summary			
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

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 Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed 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.

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

Intersection Summary			
HCM 2010 Ctrl Delay			4.3
HCM 2010 LOS			A

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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

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

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

Intersection Summary	
HCM 2010 Ctrl Delay	38.4
HCM 2010 LOS	D

Notes

* 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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	-	0	1190	503
Stage 1	-	-	-	-	978	-
Stage 2	-	-	-	-	212	-
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	679	-	-	-	179	511
Stage 1	-	-	-	-	323	-
Stage 2	-	-	-	-	800	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	679	-	-	-	178	511
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	-	0	950	374
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	204	-
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	851	-	-	-	256	621
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	807	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	851	-	-	-	244	619
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	0	799	192
Stage 1	-	-	-	-	192	-
Stage 2	-	-	-	-	607	-
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	-	-	1375	-	353	847
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	542	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1375	-	351	847
Mov Cap-2 Maneuver	-	-	-	-	351	-
Stage 1	-	-	-	-	838	-
Stage 2	-	-	-	-	539	-

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	229	0	430	174
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	256	-
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	-	-	1333	-	580	867
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	784	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1333	-	579	867
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	0	2040	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	NBR	WBLn1	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/veh	16.1
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

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

Intersection Summary			
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

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 Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed 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.

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

Intersection Summary			
HCM 2010 Ctrl Delay			2.5
HCM 2010 LOS			A

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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

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

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

Intersection Summary	
HCM 2010 Ctrl Delay	51.3
HCM 2010 LOS	D

Notes

* 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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	-	0	991	276
Stage 1	-	-	-	-	543	-
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	1007	-	-	-	241	718
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	608	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1007	-	-	-	240	718
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	0	778	494
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	284	-
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	-	-	1064	-	363	573
Stage 1	-	-	-	-	611	-
Stage 2	-	-	-	-	762	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1064	-	360	573
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	0	757	487
Stage 1	-	-	-	-	487	-
Stage 2	-	-	-	-	270	-
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	-	-	1064	-	374	579
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1064	-	374	579
Mov Cap-2 Maneuver	-	-	-	-	374	-
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	772	-

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	478	0	544	351
Stage 1	-	-	-	-	351	-
Stage 2	-	-	-	-	193	-
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	-	-	1079	-	498	690
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	837	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1079	-	497	690
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	0	1392	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	NBR	WBLn1	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/veh	12.4
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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary	
HCM 2010 Ctrl Delay	39.9
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	20.5
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

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		

Intersection Summary			
HCM 2010 Ctrl Delay			20.9
HCM 2010 LOS			C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	15.3
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	

Intersection: 21: De Wolf Ave & Bullard Ave

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)				

Network Summary

Network wide Queuing Penalty: 3557

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			1298
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

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

Intersection Summary			
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

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 Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed 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.

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

Intersection Summary			
HCM 2010 Ctrl Delay			6.7
HCM 2010 LOS			A

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary			
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

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

Intersection Summary	
HCM 2010 Ctrl Delay	64.1
HCM 2010 LOS	E

Notes

* 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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary		
HCM 2010 Ctrl Delay		26.8
HCM 2010 LOS		C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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	-	0	2095	863
Stage 1	-	-	-	-	1711	-
Stage 2	-	-	-	-	384	-
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	358	-	-	-	44	296
Stage 1	-	-	-	-	130	-
Stage 2	-	-	-	-	655	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	358	-	-	-	44	296
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	0	1239	298
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	642	-
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	-	-	969	-	~ 166	695
Stage 1	-	-	-	-	~ 510	-
Stage 2	-	-	-	-	~ 483	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	969	-	~ 153	695
Mov Cap-2 Maneuver	-	-	-	-	~ 153	-
Stage 1	-	-	-	-	~ 510	-
Stage 2	-	-	-	-	~ 446	-

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	-	0	1433	496
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	444	-
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	689	-	-	-	124	517
Stage 1	-	-	-	-	318	-
Stage 2	-	-	-	-	611	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	689	-	-	-	109	516
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	0	1074	395
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	679	-
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	-	~ 242	652
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	502	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1158	-	~ 240	652
Mov Cap-2 Maneuver	-	-	-	-	~ 240	-
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	498	-

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	0	914	381
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	533	-
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	-	-	1167	-	302	664
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	586	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1167	-	302	664
Mov Cap-2 Maneuver	-	-	-	-	302	-
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	585	-

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/veh	68.7
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

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

Intersection Summary			
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

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 Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed 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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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

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	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+I1), 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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary			
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

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

* 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	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

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			1731	
Approach Delay, s/veh		30.3			23.7			48.8			31.4	
Approach LOS		C			C			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	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 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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	-	0	2043	614
Stage 1	-	-	-	-	1225	-
Stage 2	-	-	-	-	818	-
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	558	-	-	-	48	432
Stage 1	-	-	-	-	239	-
Stage 2	-	-	-	-	392	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	558	-	-	-	48	432
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	-	0	1644	380
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	885	-
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	842	-	-	-	90	615
Stage 1	-	-	-	-	420	-
Stage 2	-	-	-	-	361	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	842	-	-	-	80	615
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	0	1369	852
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	517	-
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	-	-	783	-	~ 161	358
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	596	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	783	-	~ 158	358
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	0	1316	868
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	448	-
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	-	-	764	-	~ 173	350
Stage 1	-	-	-	-	409	-
Stage 2	-	-	-	-	642	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	764	-	~ 172	350
Mov Cap-2 Maneuver	-	-	-	-	~ 172	-
Stage 1	-	-	-	-	409	-
Stage 2	-	-	-	-	640	-

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

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

Intersection	
Intersection Delay, s/veh	78.1
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

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+I1), 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 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary	
HCM 2010 Ctrl Delay	48.5
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary	
HCM 2010 Ctrl Delay	49.9
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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 computational engine requires equal clearance times for the phases crossing the barrier.

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		

Intersection Summary		
HCM 2010 Ctrl Delay		3.8
HCM 2010 LOS		A

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	

Intersection Summary			
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			

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	

Intersection Summary			
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			

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

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	10.9
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

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

Intersection Summary	
HCM 2010 Ctrl Delay	48.5
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 computational engine requires equal clearance times for the phases crossing the barrier.

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			1731	
Approach Delay, s/veh		50.7			41.3			56.1			40.2	
Approach LOS		D			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	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 computational engine requires equal clearance times for the phases crossing the barrier.

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 computational engine requires equal clearance times for the phases crossing the barrier.

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		

Intersection Summary	
HCM 2010 Ctrl Delay	3.1
HCM 2010 LOS	A

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	

Intersection Summary			
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			

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	

Intersection Summary			
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			

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

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	16.6
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

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+I1), 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

Intersection Summary	
HCM 2010 Ctrl Delay	42.5
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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+I1), 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

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			1298
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			1298
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

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

Intersection Summary			
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

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 Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed 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.

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

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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

Movement	SBT	SBR
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

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

Intersection Summary			
HCM 2010 Ctrl Delay			67.5
HCM 2010 LOS			E

Notes

* 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
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

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

Intersection Summary	
HCM 2010 Ctrl Delay	66.8
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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

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	-	0	2240	939
Stage 1	-	-	-	-	1834	-
Stage 2	-	-	-	-	406	-
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	312	-	-	-	35	263
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	638	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	312	-	-	-	35	263
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	0	1286	304
Stage 1	-	-	-	-	608	-
Stage 2	-	-	-	-	678	-
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	-	-	960	-	~ 155	689
Stage 1	-	-	-	-	~ 503	-
Stage 2	-	-	-	-	~ 463	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	960	-	~ 143	689
Mov Cap-2 Maneuver	-	-	-	-	~ 143	-
Stage 1	-	-	-	-	~ 503	-
Stage 2	-	-	-	-	~ 428	-

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	-	0	1508	531
Stage 1	-	-	-	-	1059	-
Stage 2	-	-	-	-	449	-
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	647	-	-	-	110	490
Stage 1	-	-	-	-	292	-
Stage 2	-	-	-	-	607	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	647	-	-	-	96	489
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	0	1129	403
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	726	-
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	-	-	1150	-	~ 225	645
Stage 1	-	-	-	-	673	-
Stage 2	-	-	-	-	477	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1150	-	~ 223	645
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	NBR	WBLn1	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

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

Intersection Summary			
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

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 Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed 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.

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

Intersection Summary			
HCM 2010 Ctrl Delay			5.4
HCM 2010 LOS			A

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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

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/veh	12.3
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

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

Intersection Summary			
HCM 2010 Ctrl Delay			50.5
HCM 2010 LOS			D

Notes

* 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

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

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

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	-	0	2232	663
Stage 1	-	-	-	-	1310	-
Stage 2	-	-	-	-	922	-
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	511	-	-	-	36	401
Stage 1	-	-	-	-	215	-
Stage 2	-	-	-	-	345	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	511	-	-	-	36	401
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	0	1774	666
Stage 1	-	-	-	-	1332	-
Stage 2	-	-	-	-	442	-
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	-	-	509	-	~ 73	400
Stage 1	-	-	-	-	~ 209	-
Stage 2	-	-	-	-	612	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	509	-	~ 69	400
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	0	1458	915
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	543	-
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	-	-	741	-	~ 142	329
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	580	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	741	-	~ 139	329
Mov Cap-2 Maneuver	-	-	-	-	~ 139	-
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	568	-

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	0	1396	926
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	470	-
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	-	-	722	-	~ 155	324
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	627	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	722	-	~ 154	324
Mov Cap-2 Maneuver	-	-	-	-	~ 154	-
Stage 1	-	-	-	-	384	-
Stage 2	-	-	-	-	624	-

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, %		-	-		-	-						
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	0	1608	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	NBR	WBLn1	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/veh	78.1
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

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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

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

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

Intersection Summary	
HCM 2010 Ctrl Delay	48.5
HCM 2010 LOS	D

Notes

* 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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	

Intersection Summary			
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			

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	

Intersection Summary			
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			

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

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	11.1
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

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

Intersection Summary		
HCM 2010 Ctrl Delay		51.1
HCM 2010 LOS		D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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 computational engine requires equal clearance times for the phases crossing the barrier.

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		

Intersection Summary		
HCM 2010 Ctrl Delay		32.2
HCM 2010 LOS		C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			

Intersection Summary			
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

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

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

Intersection Summary	
HCM 2010 Ctrl Delay	43.2
HCM 2010 LOS	D

Notes
* 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

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 computational engine requires equal clearance times for the phases crossing the barrier.

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 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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	

Intersection Summary			
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			

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	

Intersection Summary			
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			

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

Intersection Summary	
HCM 2010 Ctrl Delay	41.4
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	17.8
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

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

Intersection Summary	
HCM 2010 Ctrl Delay	43.7
HCM 2010 LOS	D

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

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			1298
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			150
Storage Blk Time (%)	0	28	67	2	3	5		0	
Queuing Penalty (veh)	0	69	95	13	6	12		0	

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

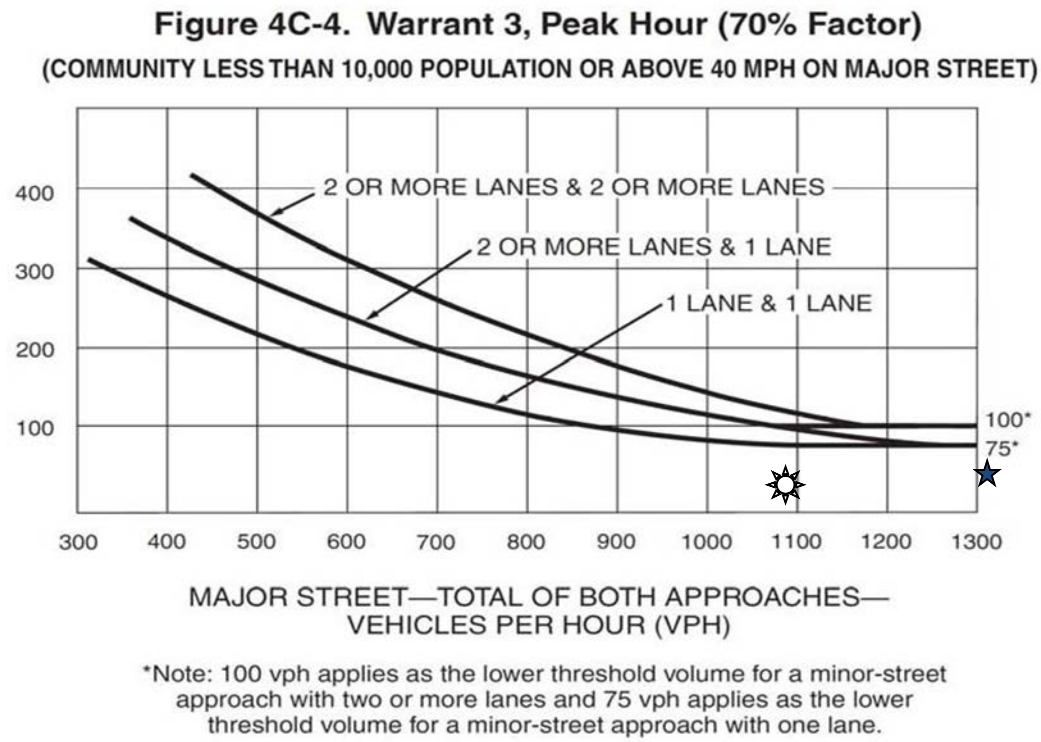
Network wide Queuing Penalty: 2968

Appendix J: Signal Warrants

Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour
Intersection: Tollhouse Road at Herndon Avenue

Tollhouse Rd
Highest Approach
Volume = 37 (53) VPH



Herndon Ave Total Volume = 1090 (1341) VPH

AM Peak Hour Volume – Signal Warrant is Not Met

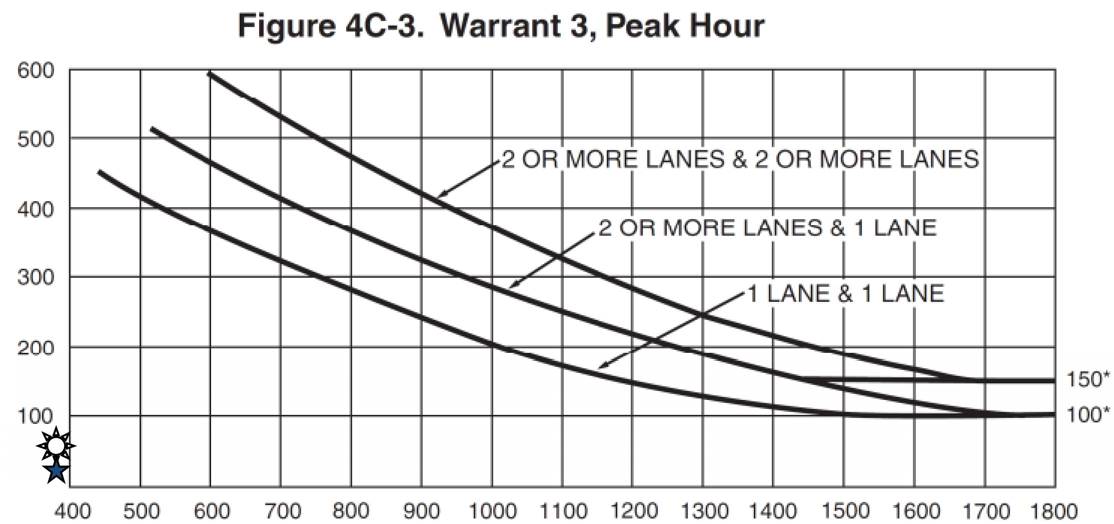
PM Peak Hour Volume – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Part 4: Highway Traffic Signals, November 7, 2014

Peak Hour Warrant (Urban Areas)

Existing– AM (PM) Peak Hour
Intersection: Medical Center Drive at Coventry Avenue

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 = 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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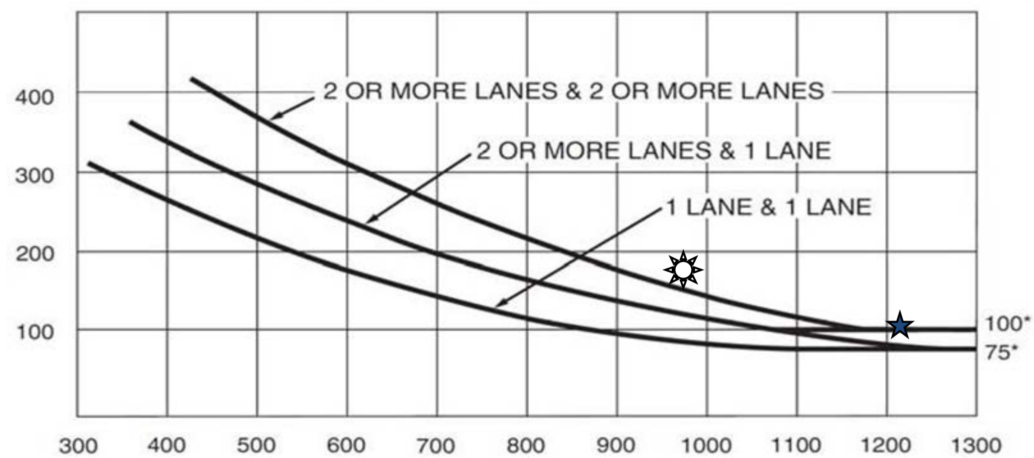
Peak Hour Warrant (Rural Areas)

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)

Locan Ave Highest Approach Volume = 181(100) VPH



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (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 = 988(1209) VPH

AM Peak Hour Volume – Signal Warrant is Met

PM Peak Hour Volume – Signal Warrant is Met

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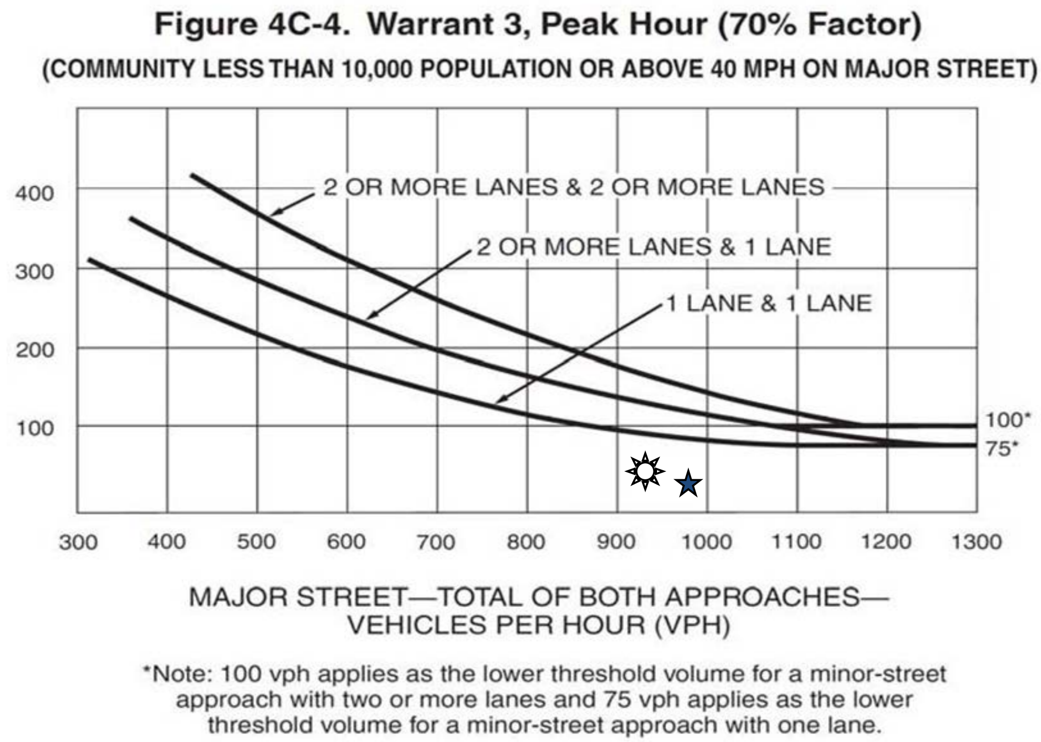
Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour
Intersection: De Wolf Avenue (NL) at Herndon Avenue

De Wolf Ave (NL)
Highest Approach
Volume = 44(33) VPH



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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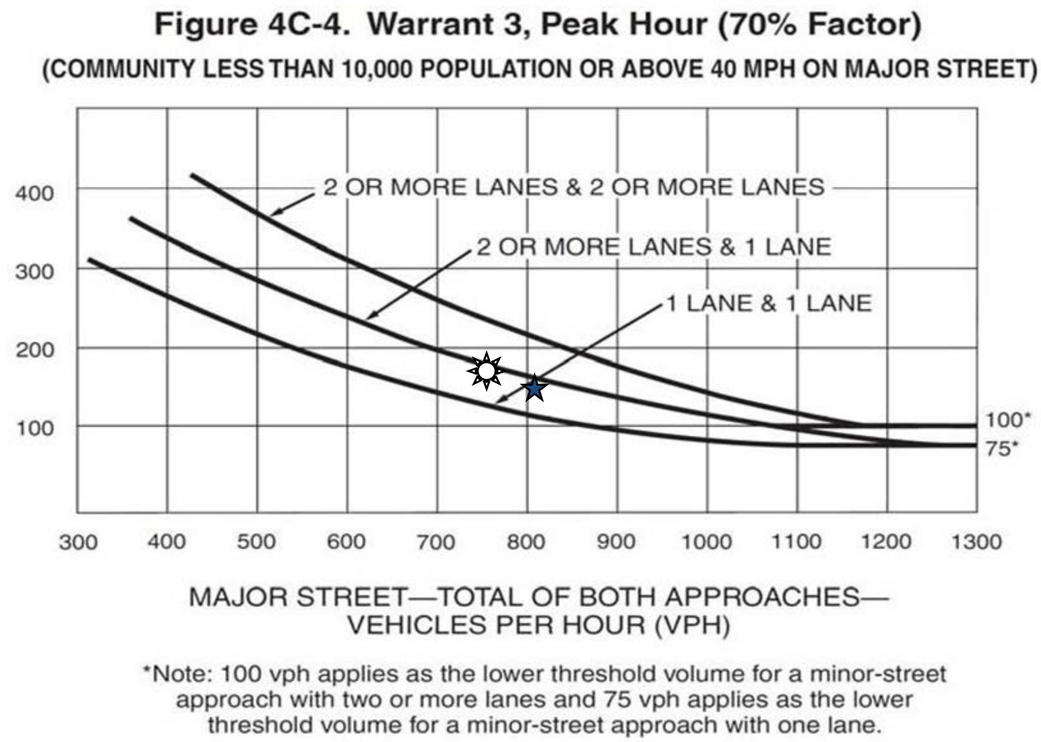
Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour
Intersection: De Wolf Avenue (SL) at Herndon Avenue

De Wolf Ave (SL)
Highest Approach
Volume = 162(137) VPH



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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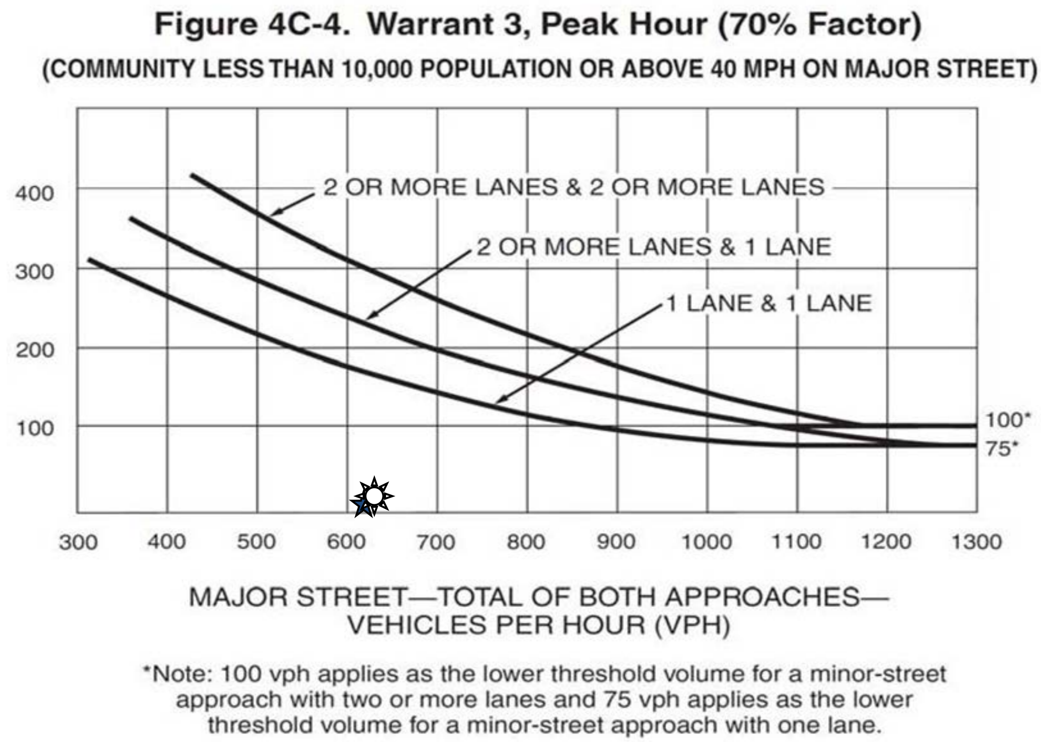
Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour
Intersection: Leonard Avenue at Herndon Avenue

Leonard Ave Highest Approach Volume = 15(10) VPH



Herndon Ave Total Volume = 633(632) VPH

AM Peak Hour Volume – Signal Warrant is Not Met

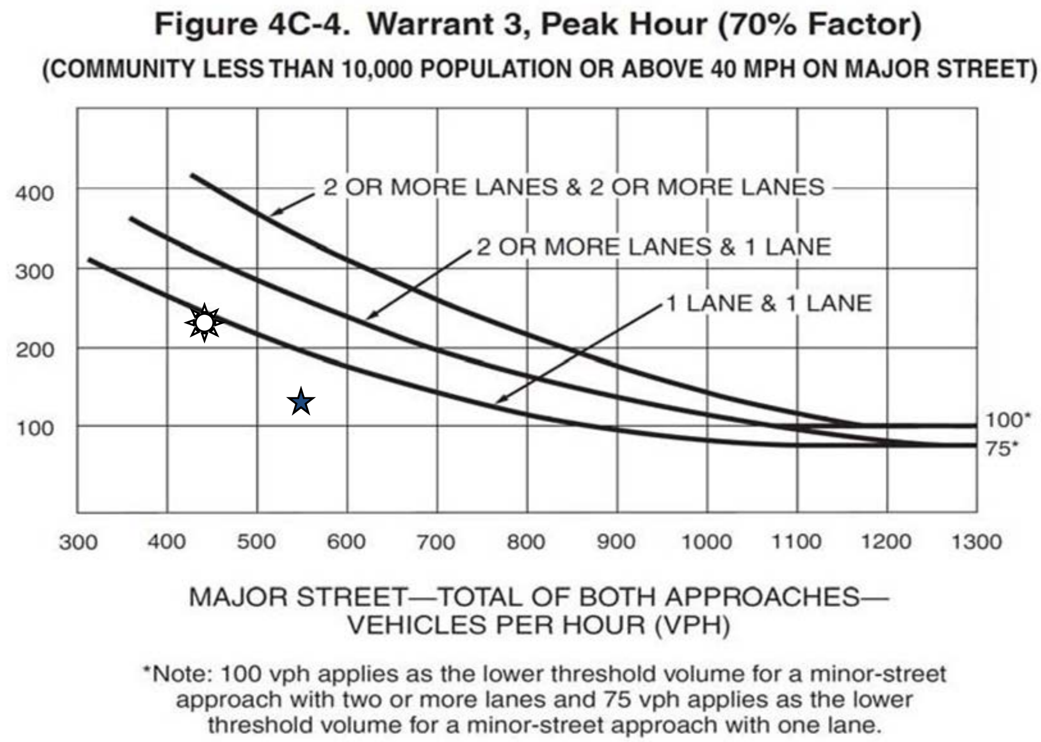
PM Peak Hour Volume – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition) Part 4: Highway Traffic Signals, November 7, 2014

Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour
Intersection: McCall Avenue at Herndon Avenue

McCall Ave
Highest Approach
Volume = 230(129) VPH



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**

***Source:** California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)*
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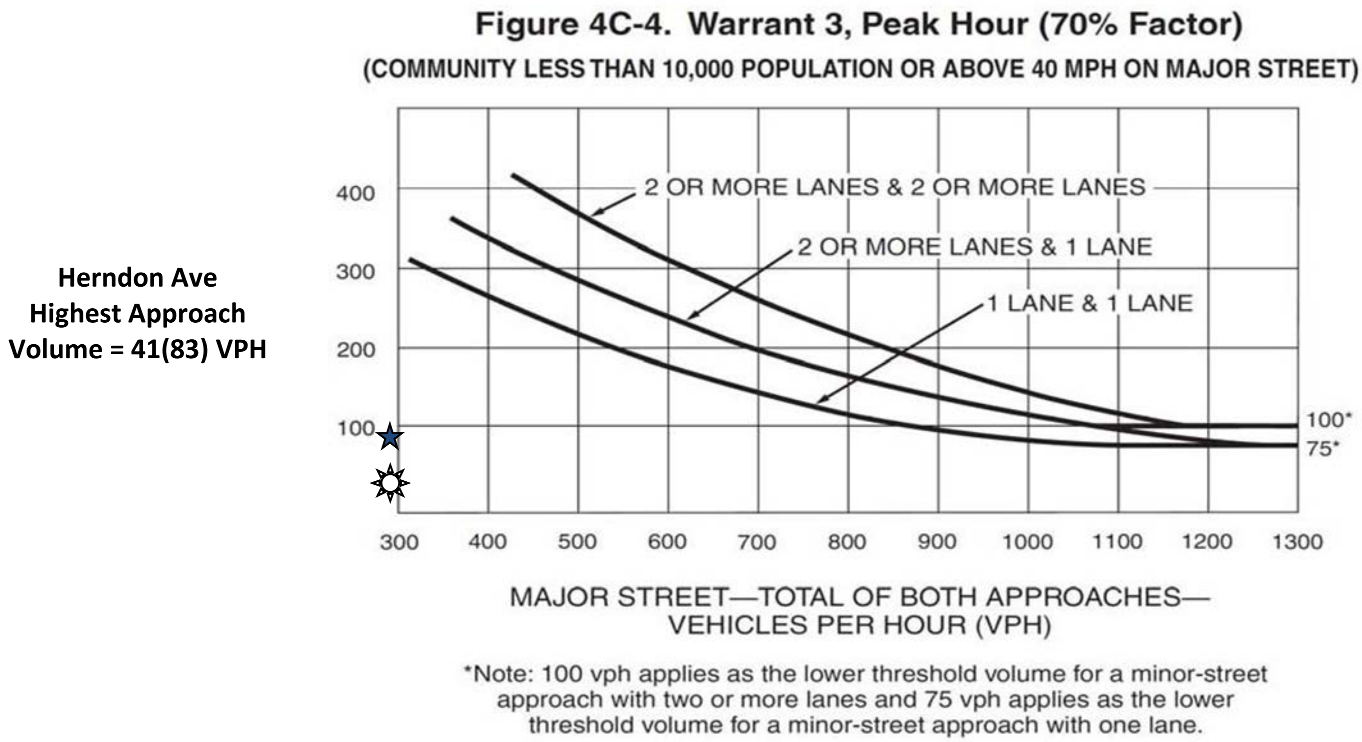
Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour
Intersection: Academy Avenue at Herndon Avenue



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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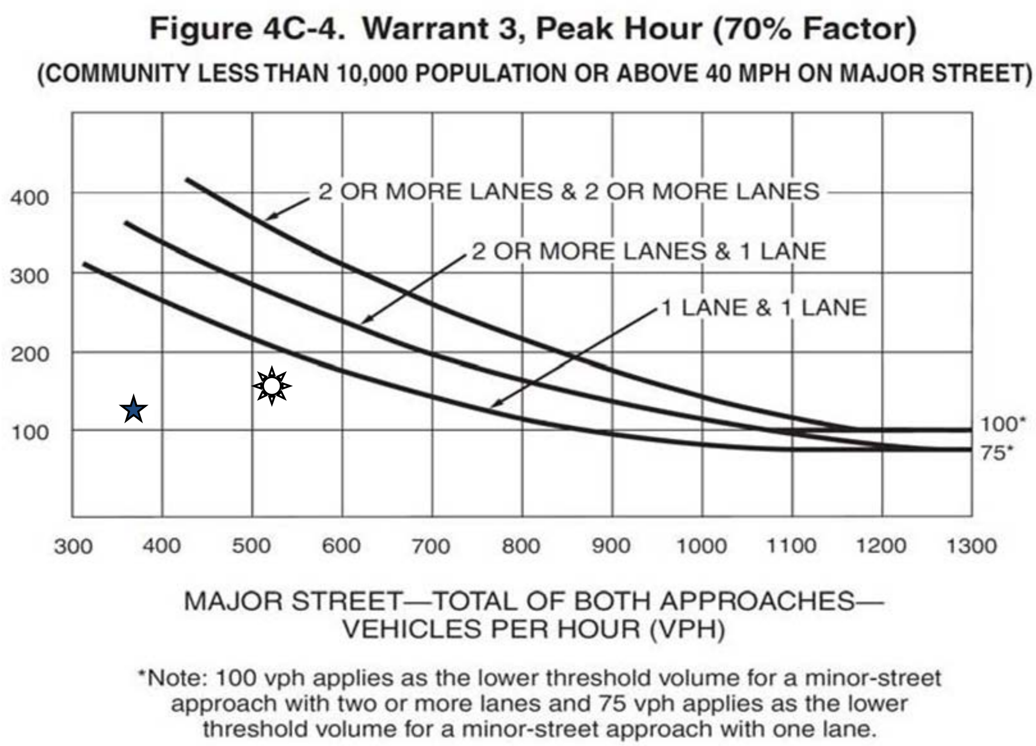
Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour
Intersection: Locan Avenue at Bullard Avenue

Locan Ave
Highest Approach
Volume = 166(135) VPH



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**

Source:* *California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
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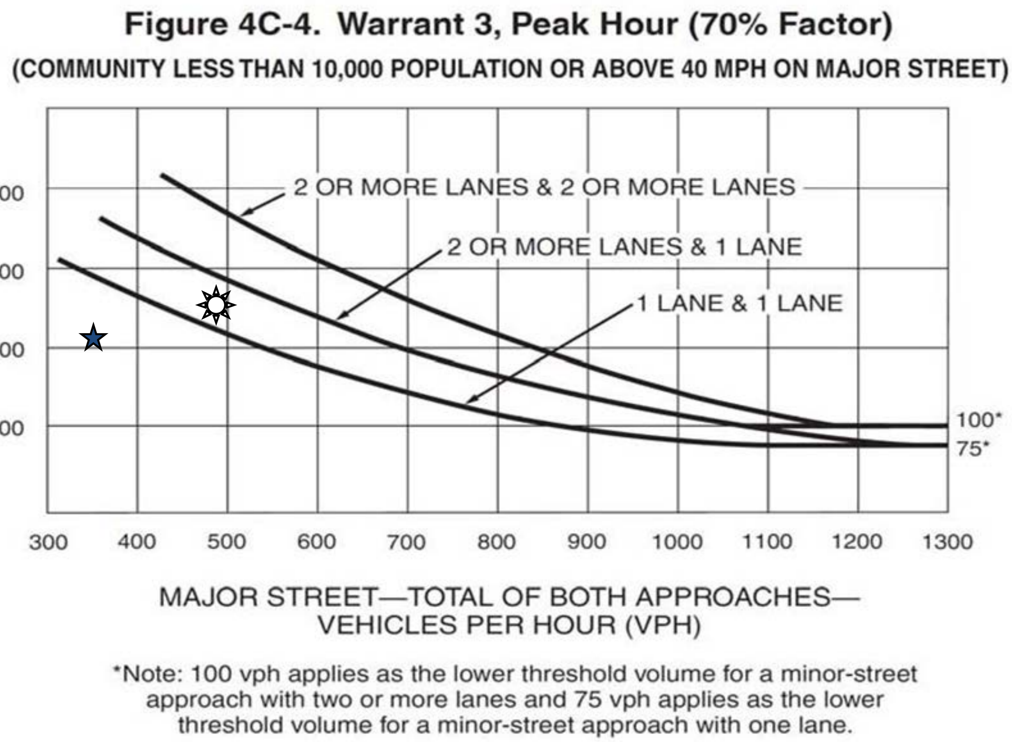
Peak Hour Warrant (Rural Areas)

Existing - AM (PM) Peak Hour
Intersection: DeWolf Avenue at Bullard Avenue

DeWolf Ave
Highest Approach
Volume = 258(210) VPH



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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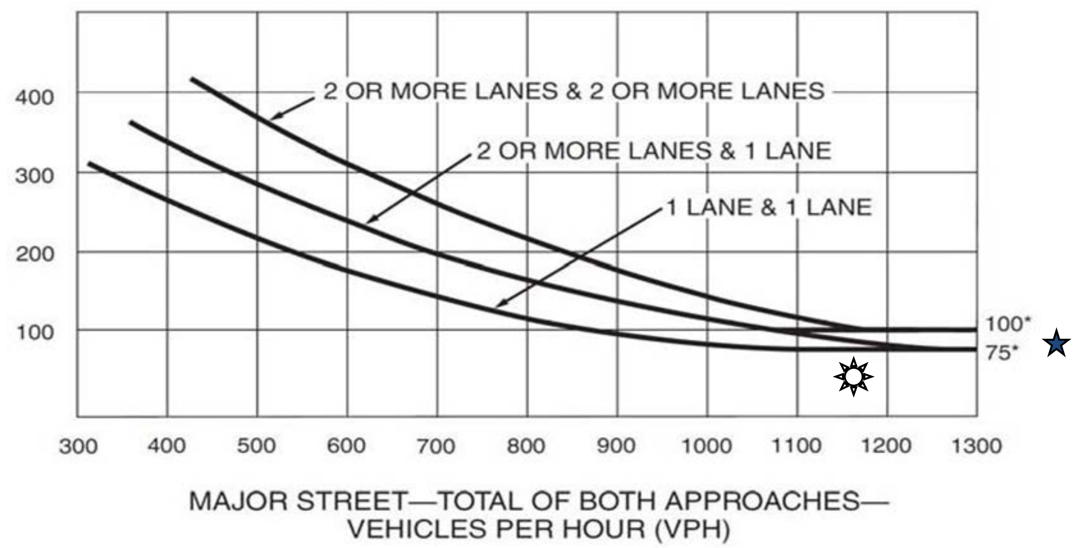
Peak Hour Warrant (Rural Areas)

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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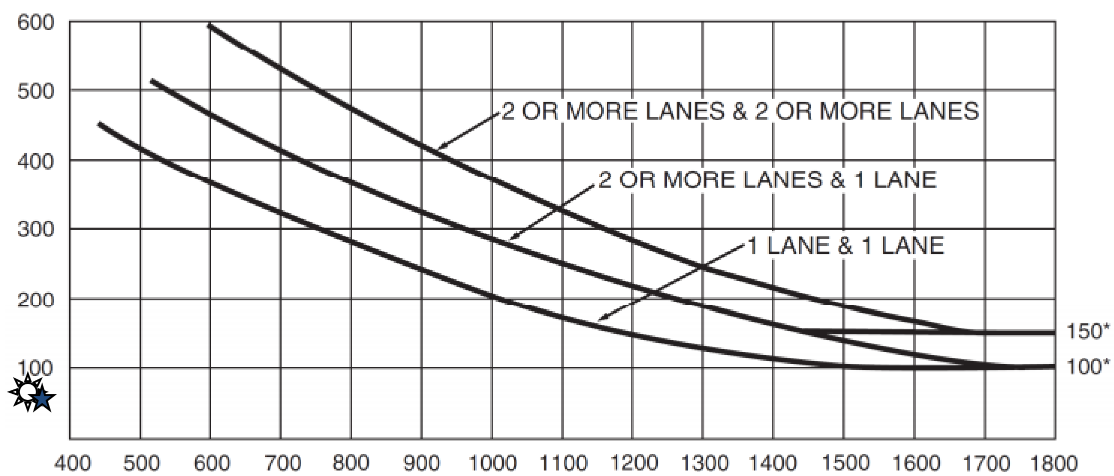
Peak Hour Warrant (Urban Areas)

Existing + Project Phase 1 – AM (PM) Peak Hour
Intersection: Medical Center Drive at Coventry Avenue

Figure 4C-3. Warrant 3, Peak Hour

Minor Street Highest Approach Volume = 73(72) VPH



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (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.

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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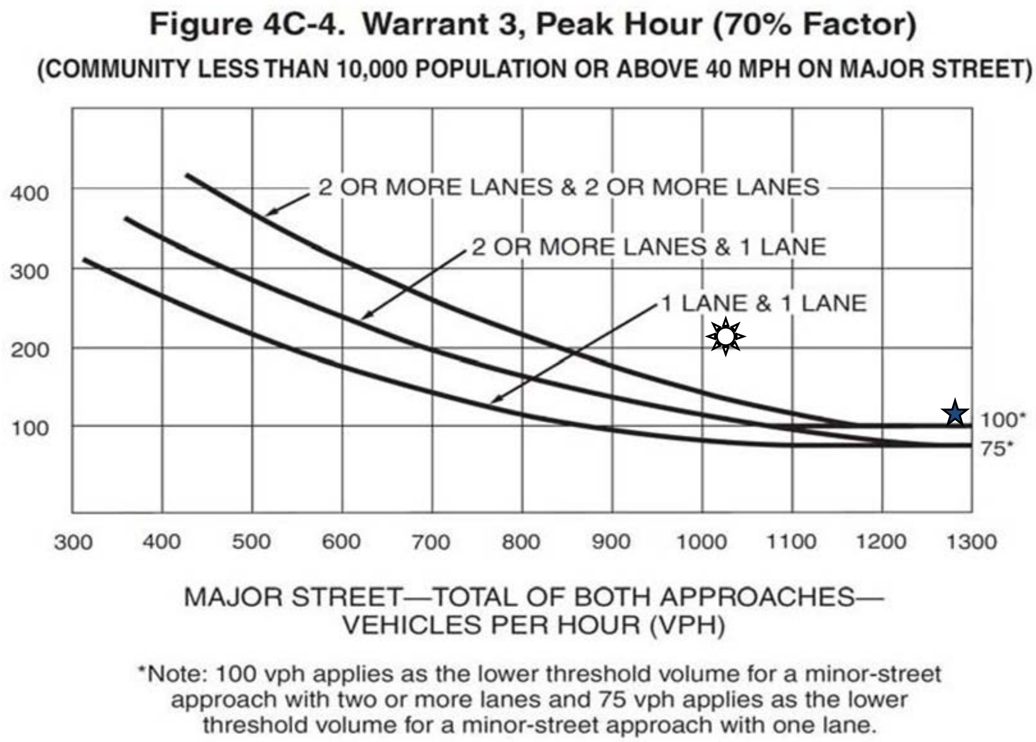
Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour
Intersection: Locan Avenue at Herndon Avenue

Locan Ave
Highest Approach
Volume = 210(124) VPH



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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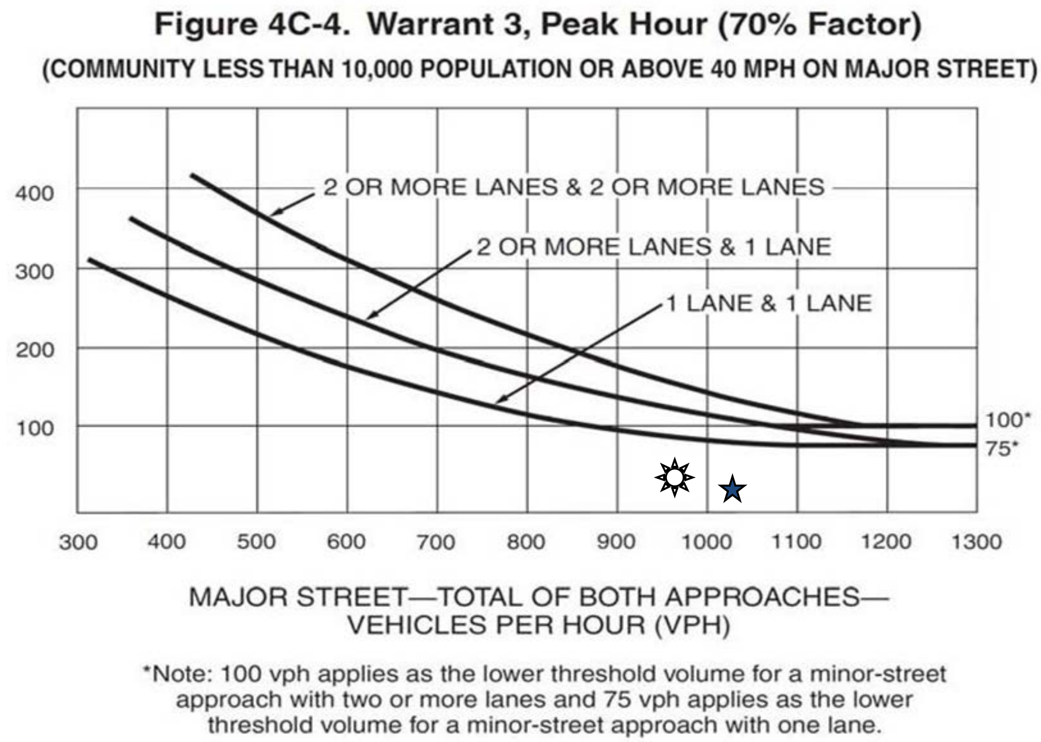
Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour
Intersection: De Wolf Avenue (NL) at Herndon Avenue

De Wolf Ave (NL)
Highest Approach
Volume = 44(33) VPH



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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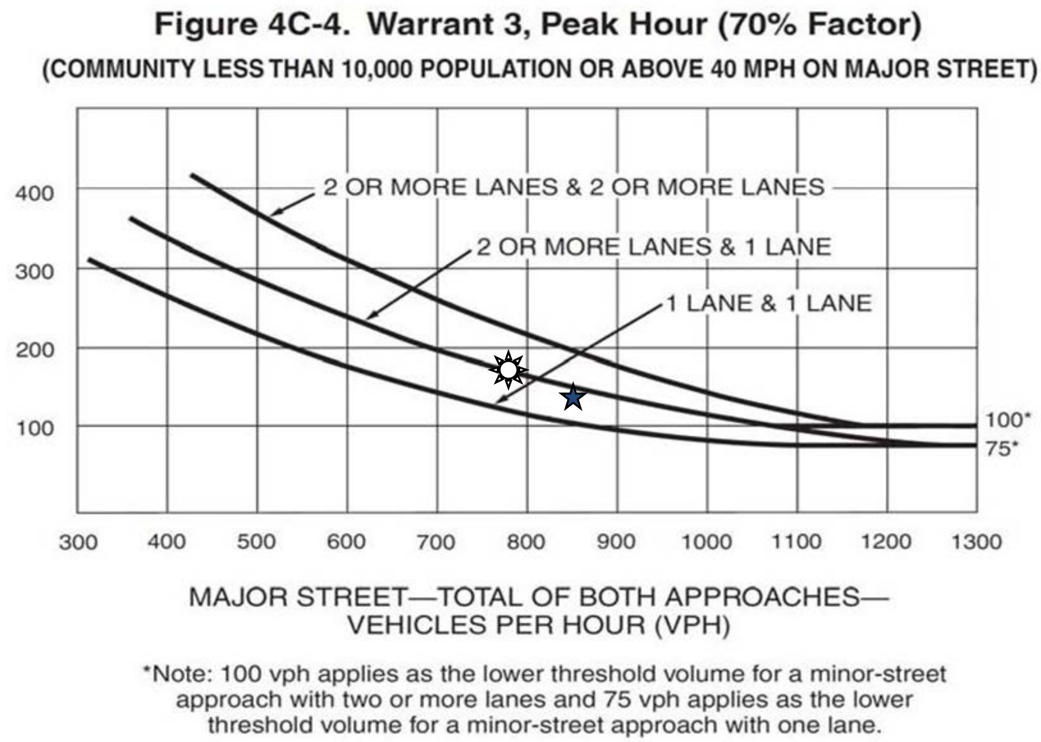
Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour
Intersection: De Wolf Avenue (SL) at Herndon Avenue

De Wolf Ave (SL)
Highest Approach
Volume = 166(137) VPH



Herndon Ave Total Volume = 788(851) 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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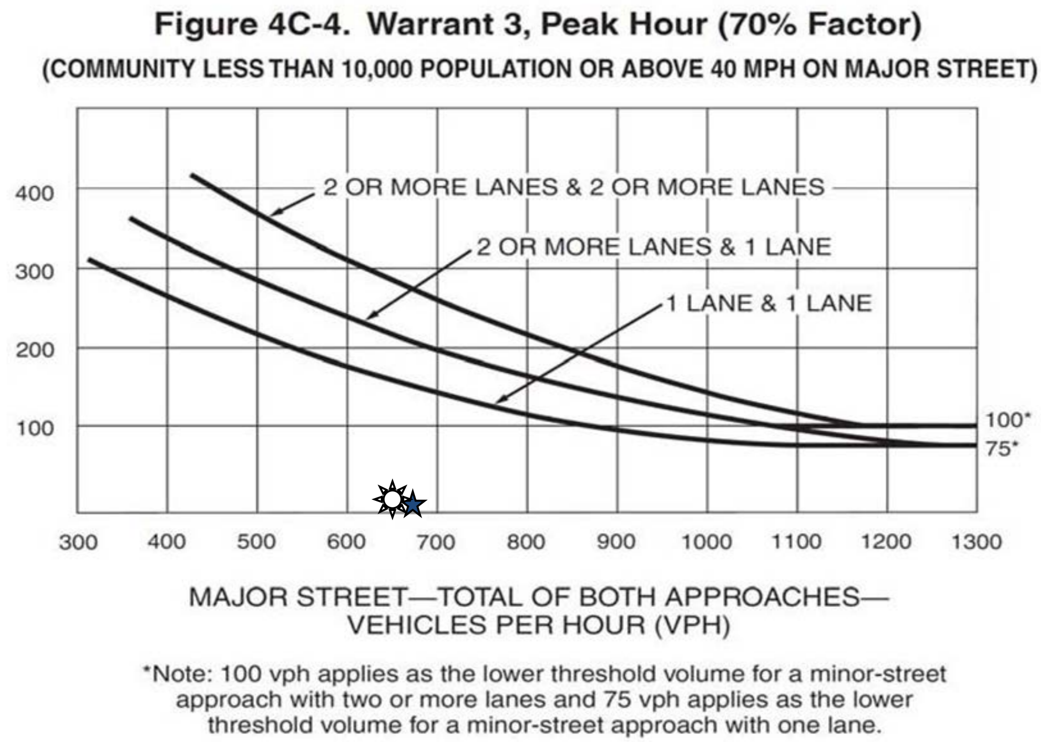
Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour
Intersection: Leonard Avenue at Herndon Avenue

Leonard Ave
Highest Approach
Volume = 15(10) VPH



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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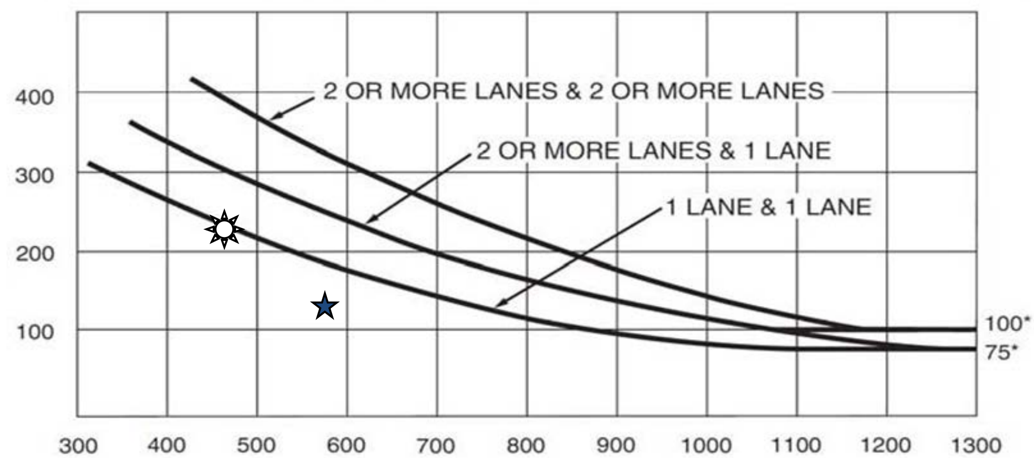
Peak Hour Warrant (Rural Areas)

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



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (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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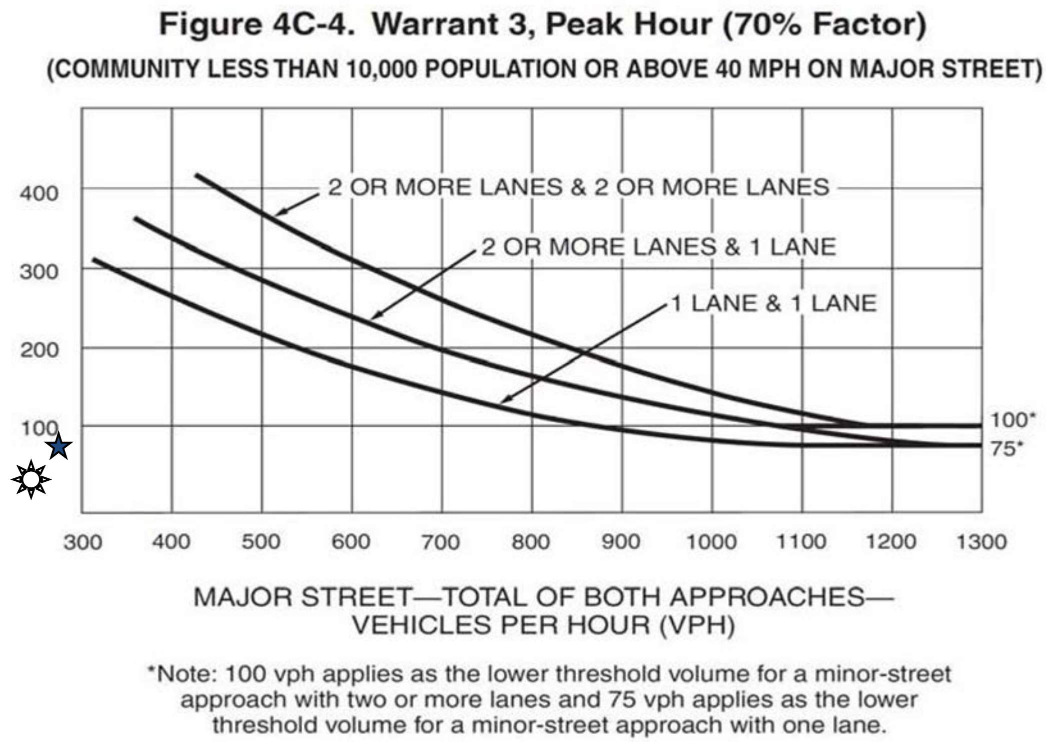
Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour
Intersection: Academy Avenue at Herndon Avenue

Herndon Ave Highest Approach Volume = 42(88) VPH



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**

***Source:** California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition) Part 4: Highway Traffic Signals, November 7, 2014*

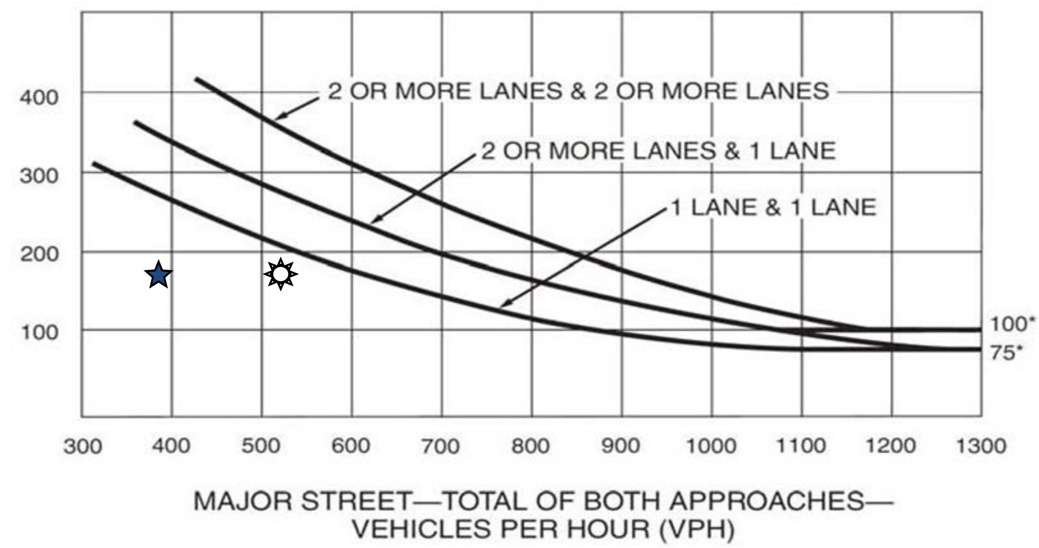
Peak Hour Warrant (Rural Areas)

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

Source: ***California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)***
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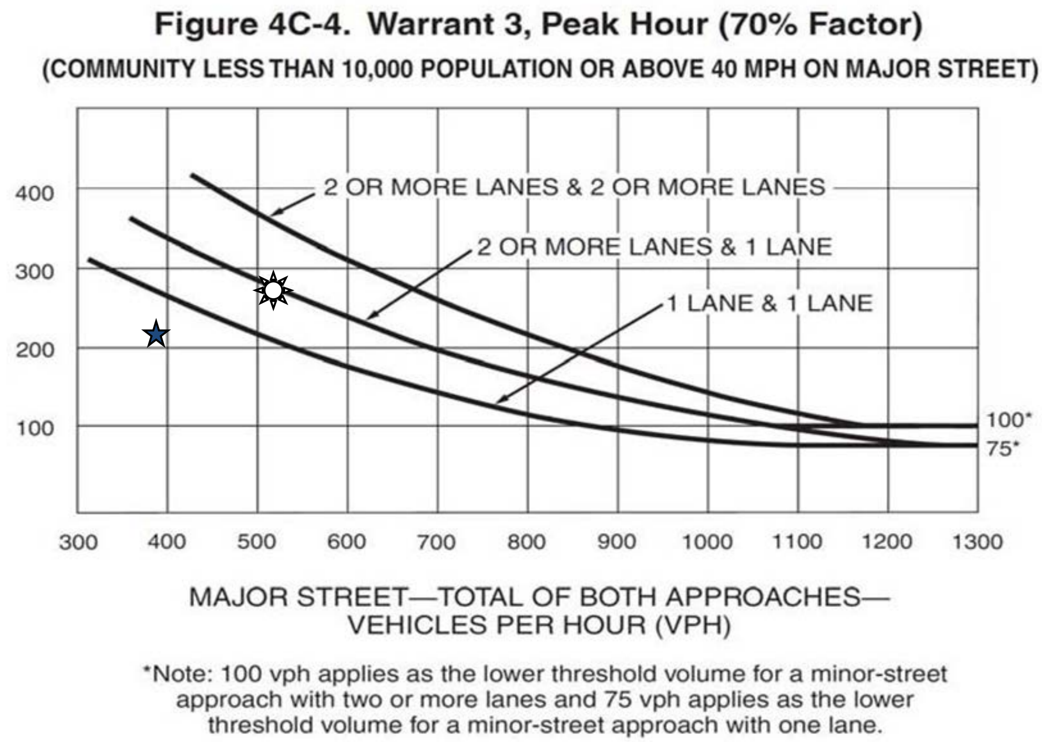
Peak Hour Warrant (Rural Areas)

Existing + Project Phase 1 - AM (PM) Peak Hour
Intersection: DeWolf Avenue at Bullard Avenue

DeWolf Ave
Highest Approach
Volume = 268(215) VPH



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)***
Part 4: Highway Traffic Signals, November 7, 2014

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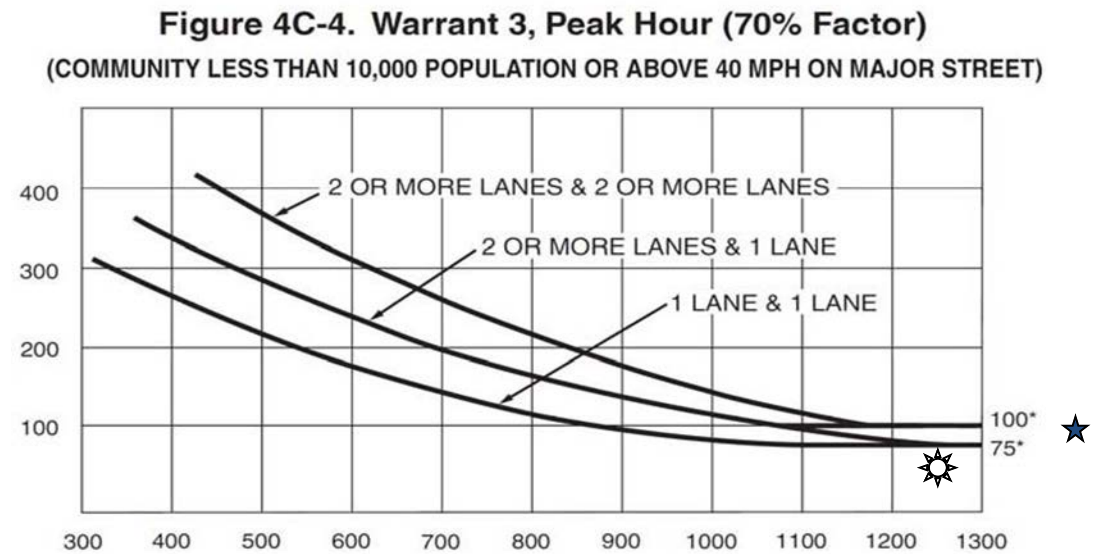
Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour
Intersection: Tollhouse Road at Herndon Avenue

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**

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
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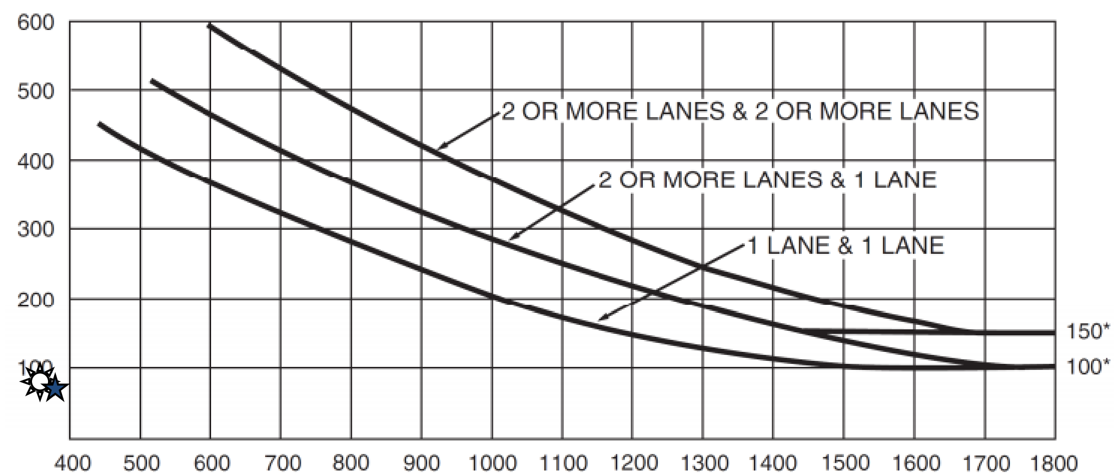
<u>**Peak Hour Warrant (Urban Areas)**</u>

NT + Project Phase 1 – AM (PM) Peak Hour
Intersection: Medical Center Drive at Coventry Avenue

Minor Street Highest Approach Volume = 75(72) VPH

Figure 4C-3. Warrant 3, Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (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.

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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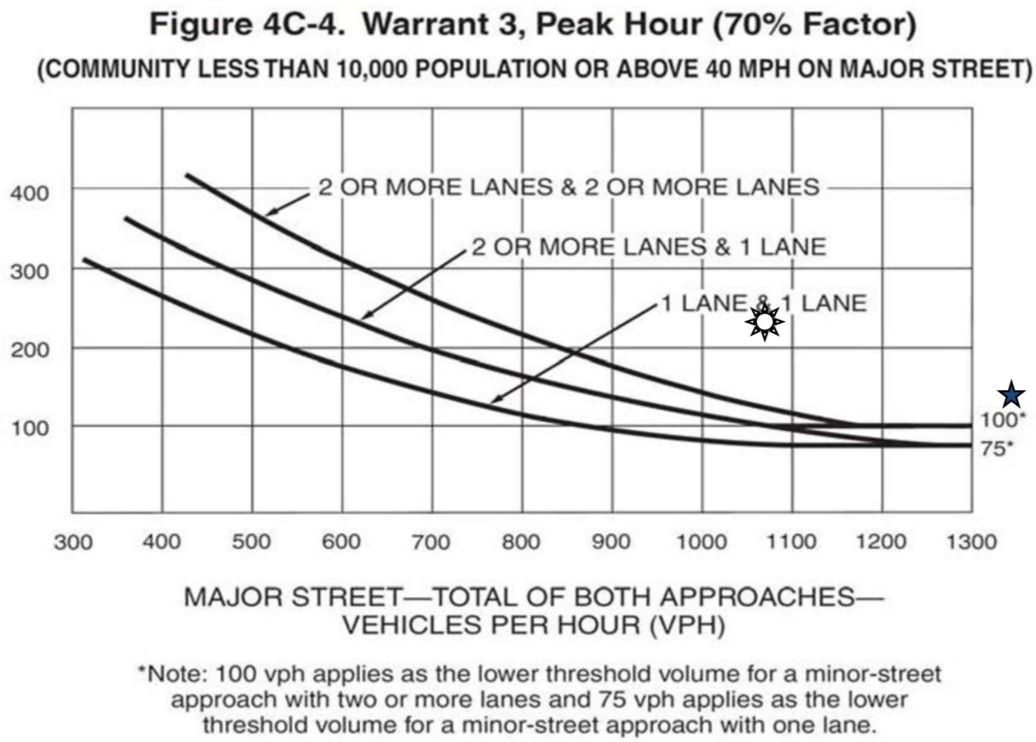
Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour
Intersection: Locan Avenue at Herndon Avenue

Locan Ave Highest Approach Volume = 216(131) VPH



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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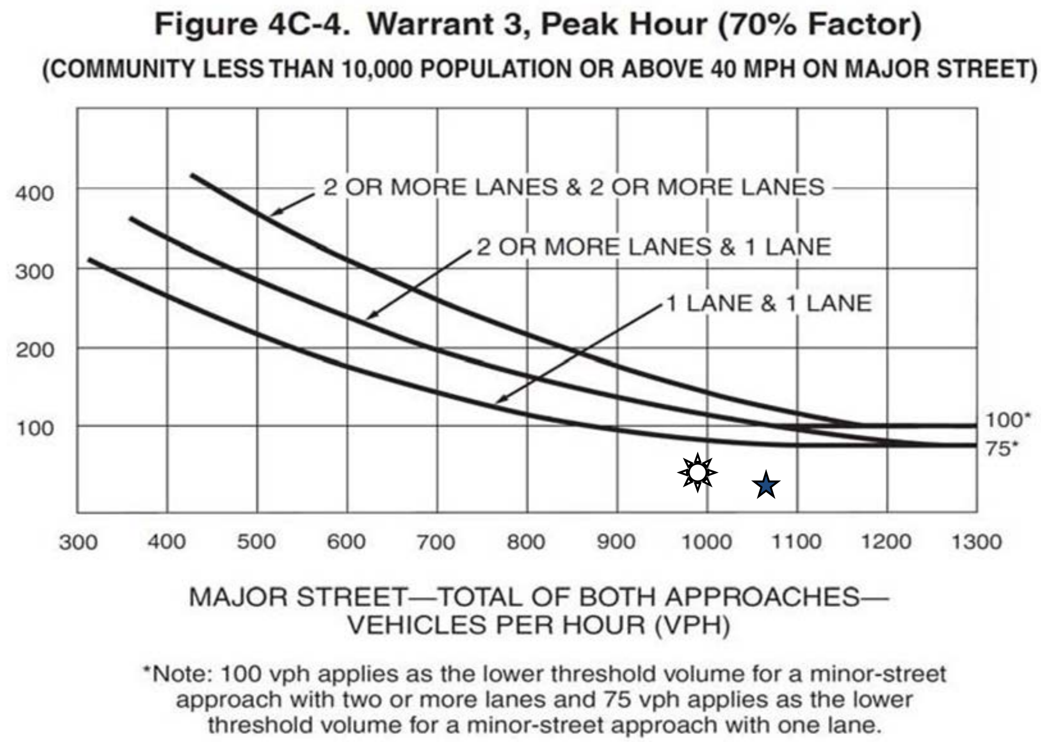
Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour
Intersection: De Wolf Avenue (NL) at Herndon Avenue

De Wolf Ave (NL)
Highest Approach
Volume = 47(39) VPH



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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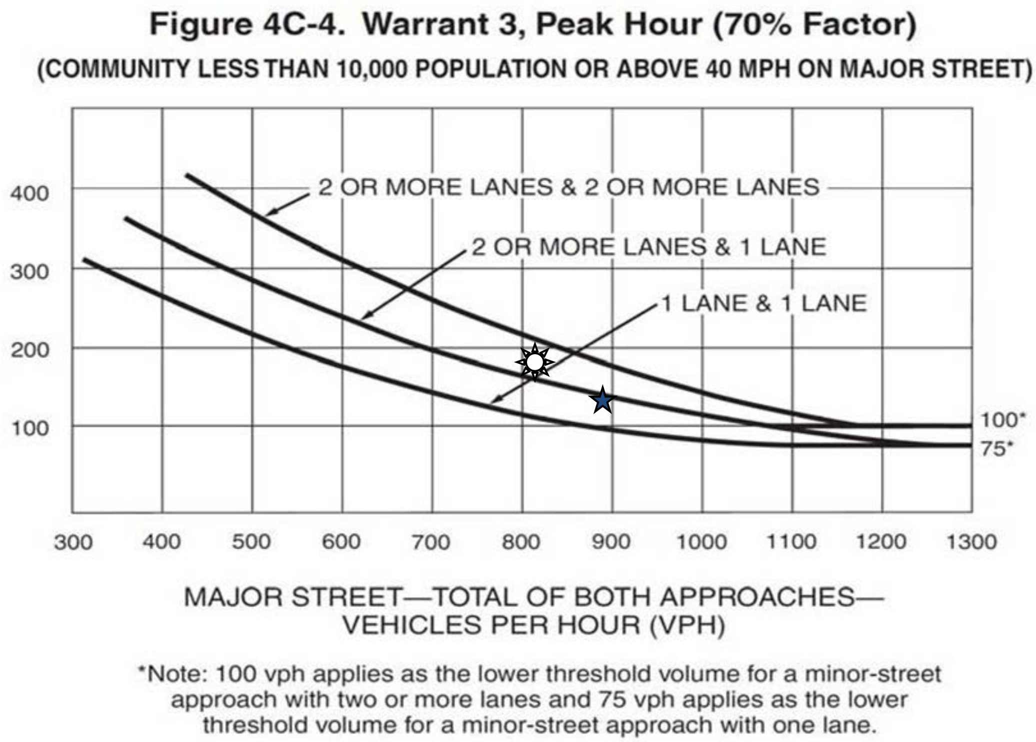
Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour
Intersection: De Wolf Avenue (SL) at Herndon Avenue

De Wolf Ave (SL)
Highest Approach
Volume = 170(141) VPH



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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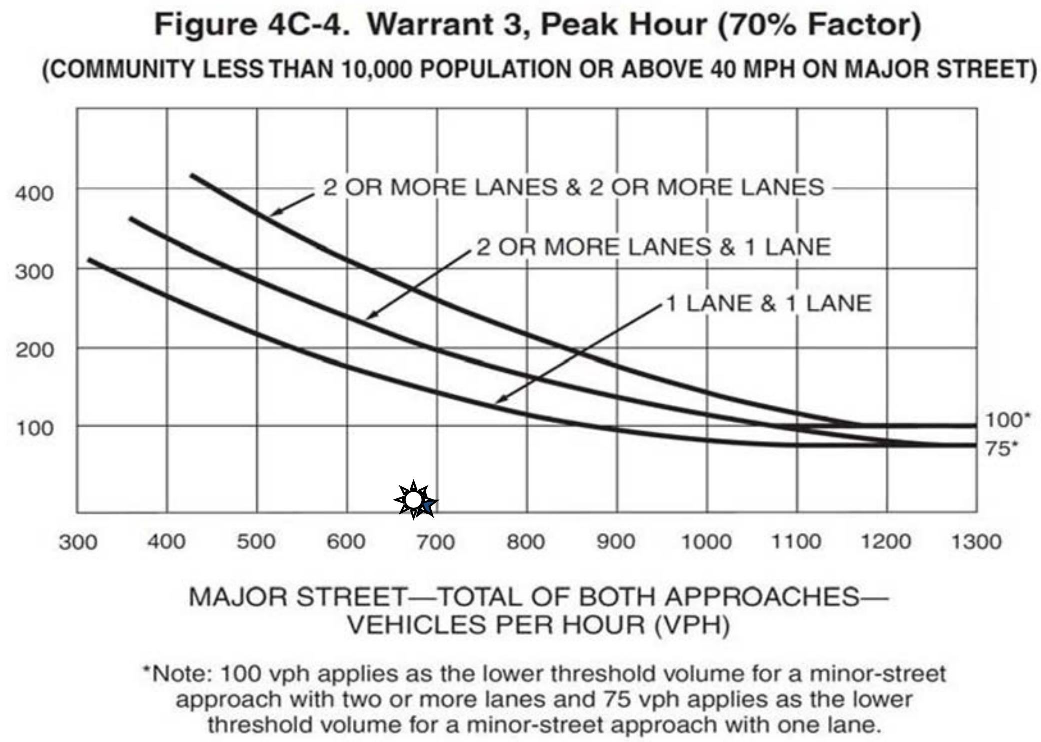
Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour
Intersection: Leonard Avenue at Herndon Avenue

Leonard Ave Highest Approach Volume = 17(11) VPH



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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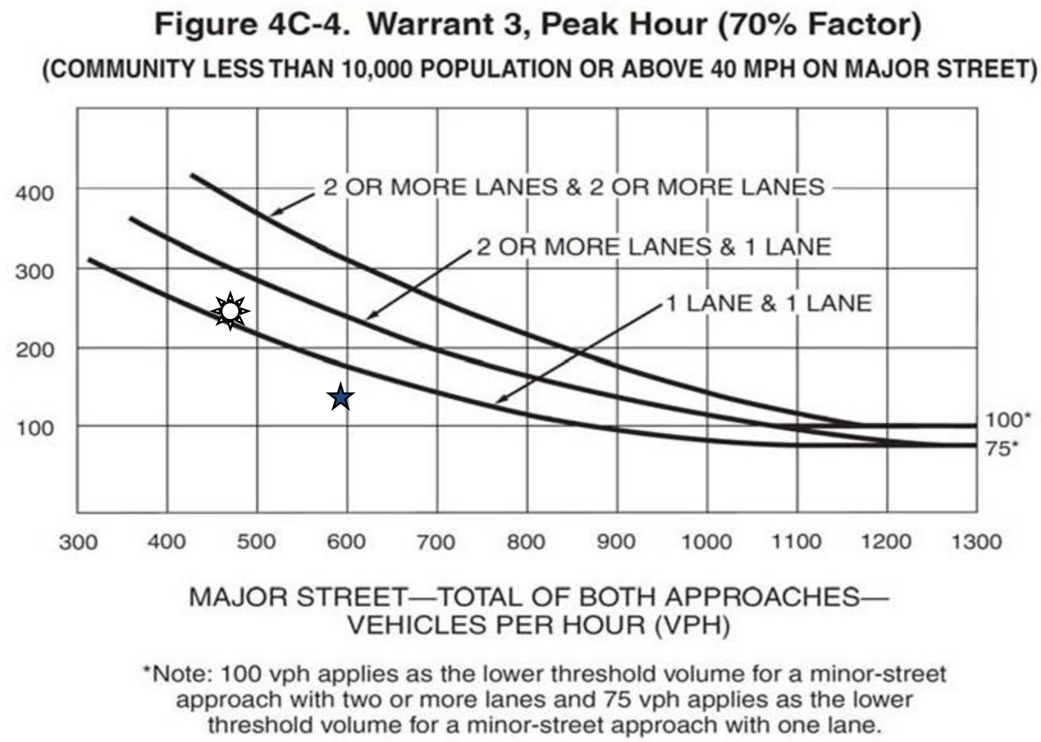
Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour
Intersection: McCall Avenue at Herndon Avenue

McCall Ave Highest Approach Volume = 239(136) VPH



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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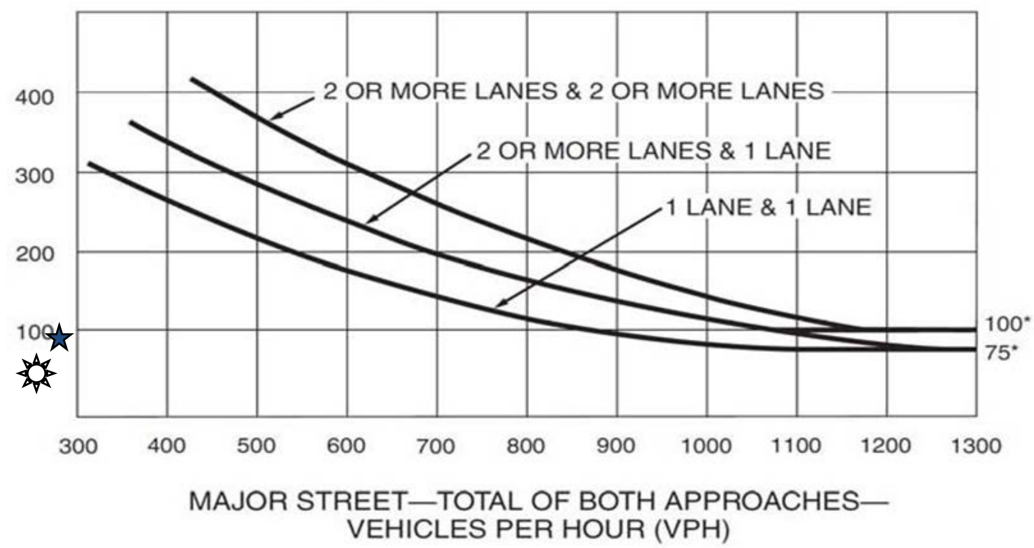
Peak Hour Warrant (Rural Areas)

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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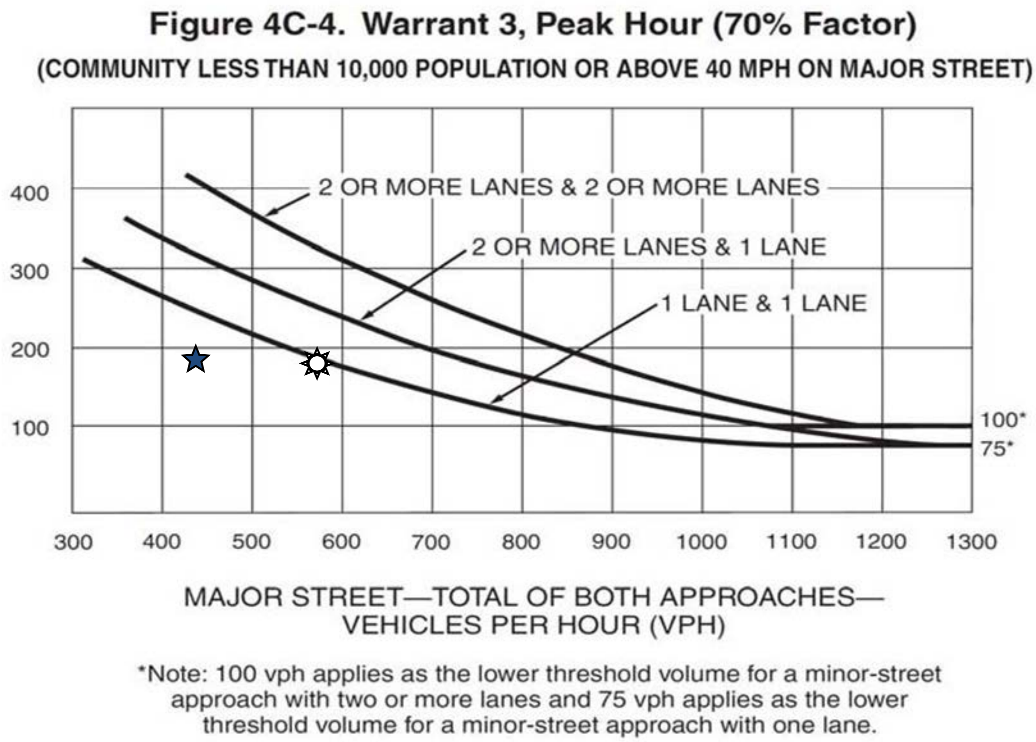
Peak Hour Warrant (Rural Areas)

NT + Project Phase 1 - AM (PM) Peak Hour
Intersection: Locan Avenue at Bullard Avenue

Locan Ave
Highest Approach
Volume = 181(180) VPH



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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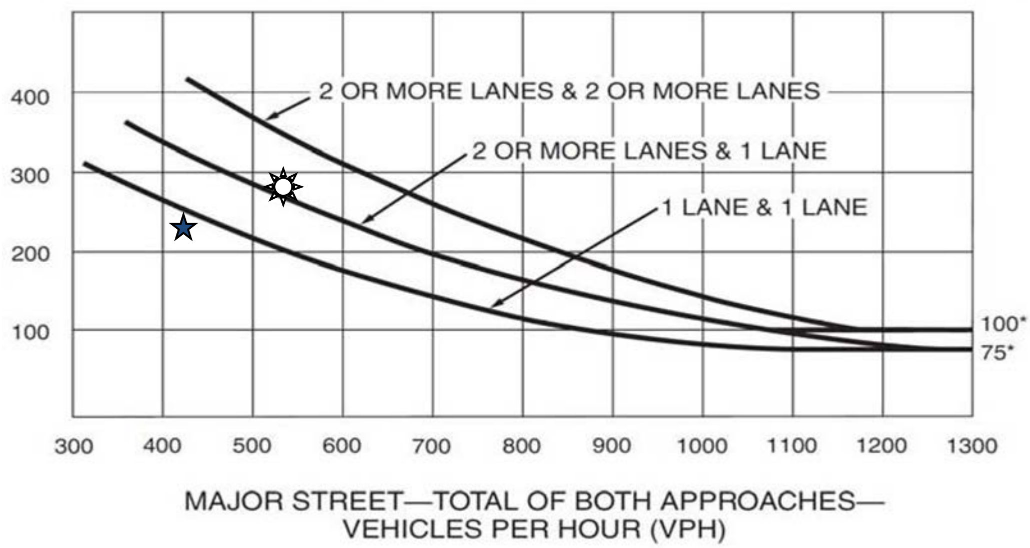
Peak Hour Warrant (Rural Areas)

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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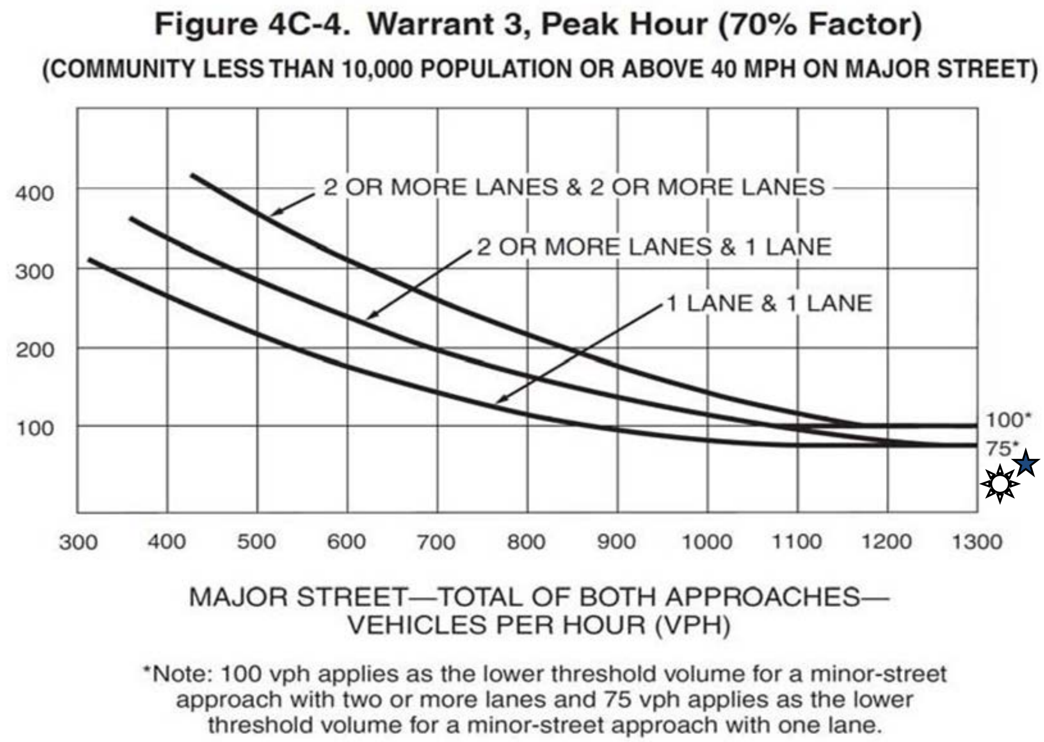
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: Tollhouse Road at Herndon Avenue

Tollhouse Rd
Highest Approach
Volume = 40 (68) VPH



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**

Source: ***California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)***
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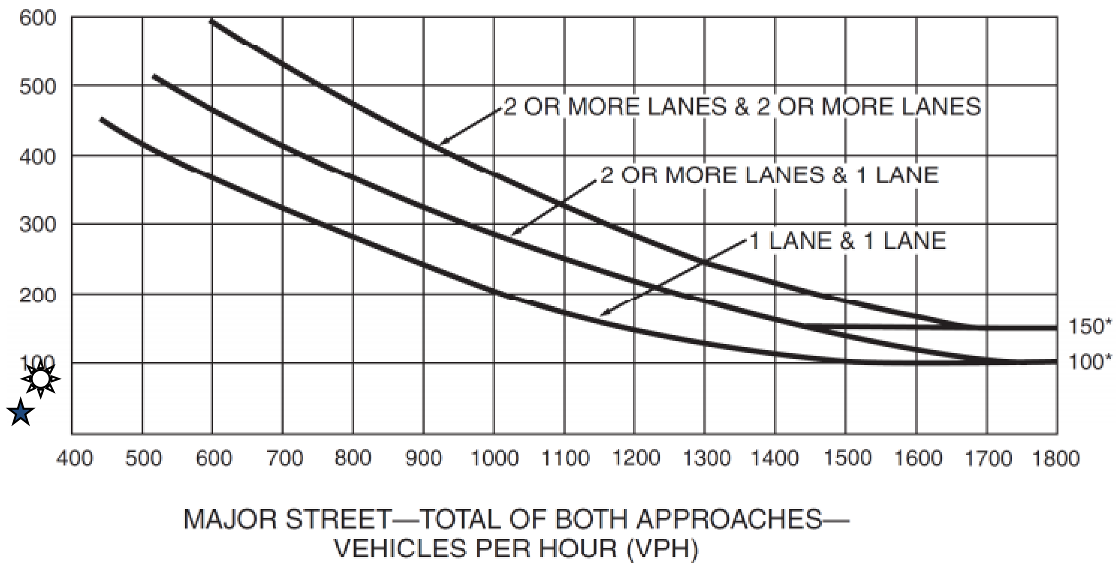
Peak Hour Warrant (Urban Areas)

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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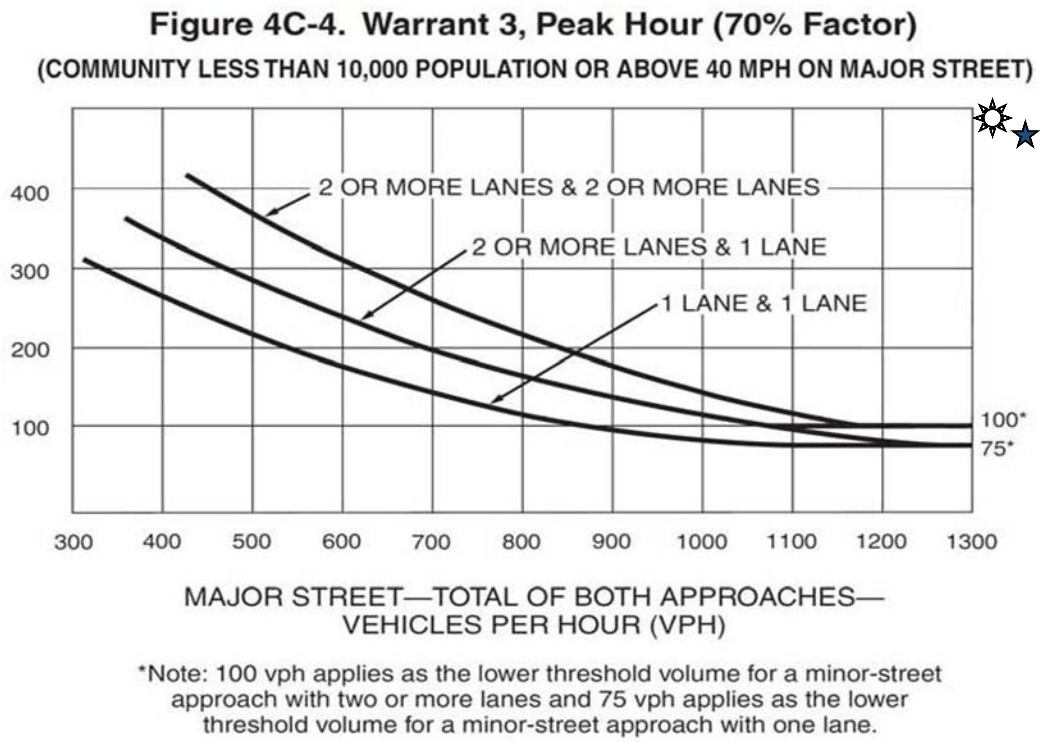
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: Locan Avenue at Herndon Avenue

Locan Ave
Highest Approach
Volume = 715(530) VPH



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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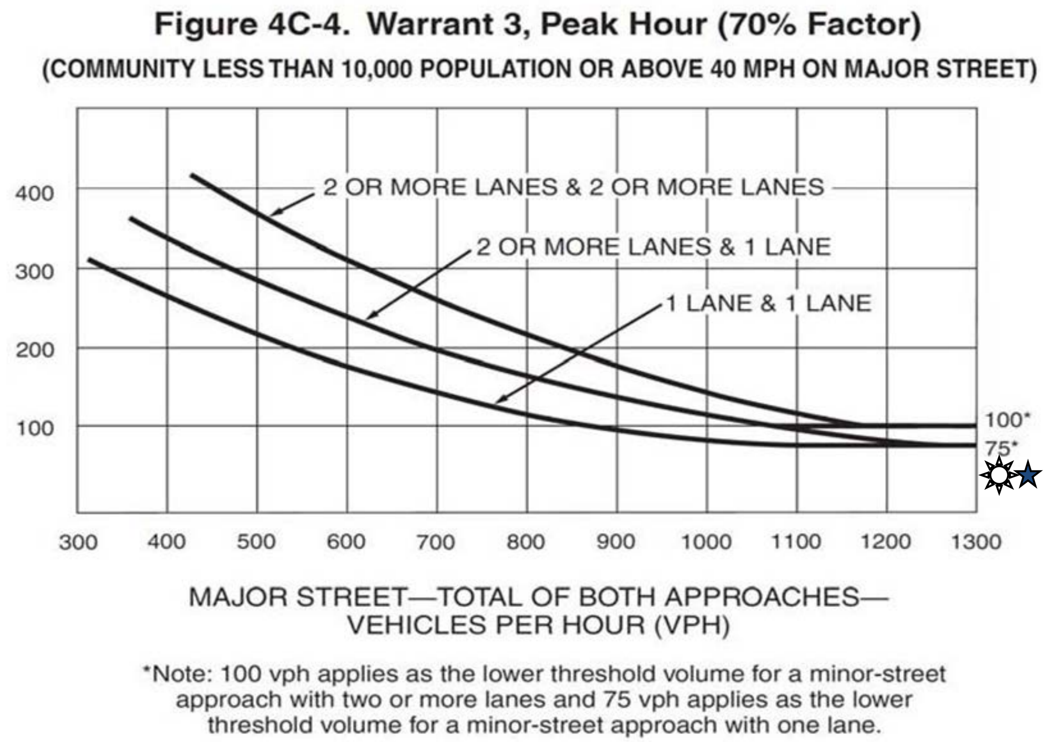
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: De Wolf Avenue (NL) at Herndon Avenue

De Wolf Ave (NL)
Highest Approach
Volume = 52(51) VPH



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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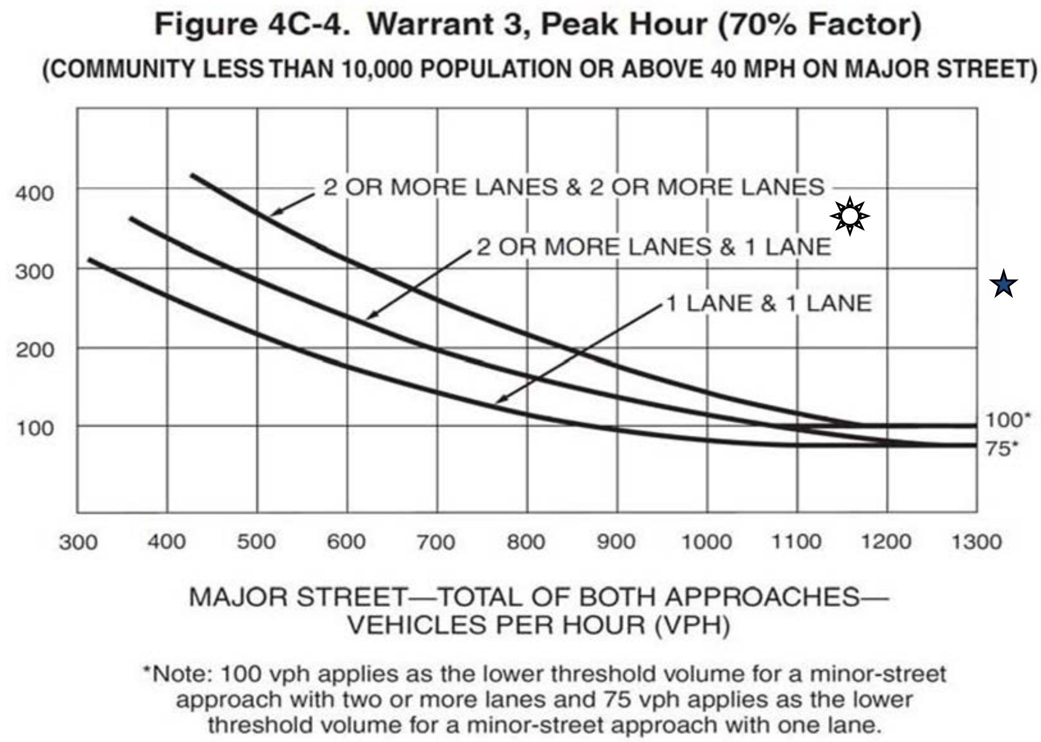
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: De Wolf Avenue (SL) at Herndon Avenue

De Wolf Ave (SL)
Highest Approach
Volume = 346(281) VPH



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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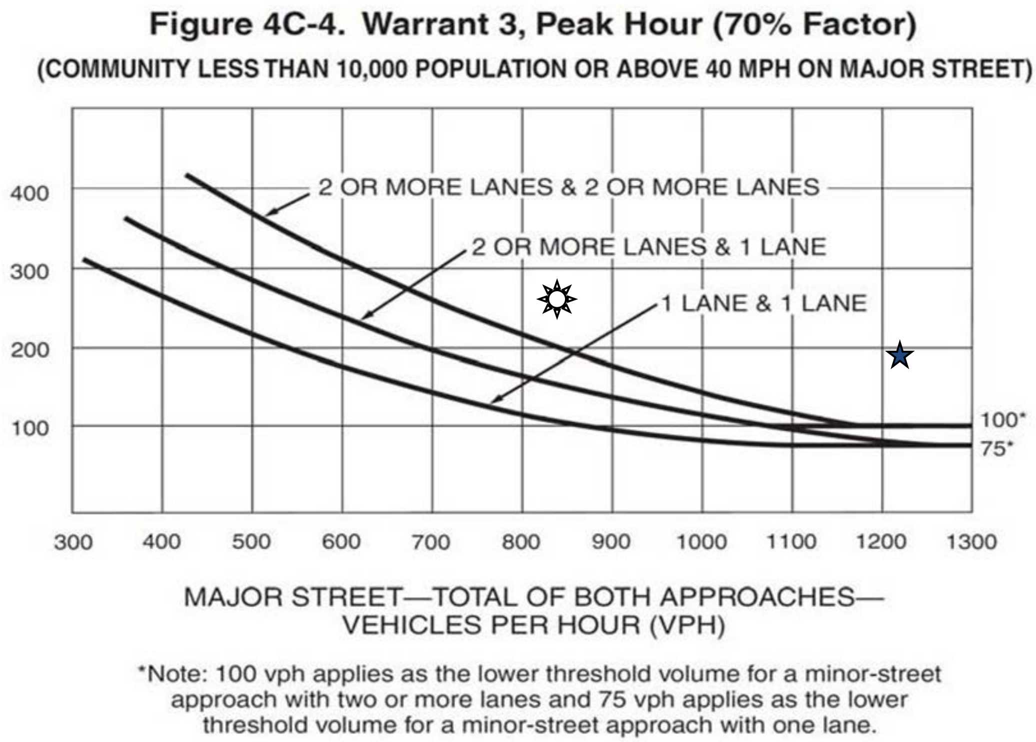
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: Leonard Avenue at Herndon Avenue

Leonard Ave Highest Approach Volume = 259(195) VPH



Herndon Ave Total Volume = 844(1219) 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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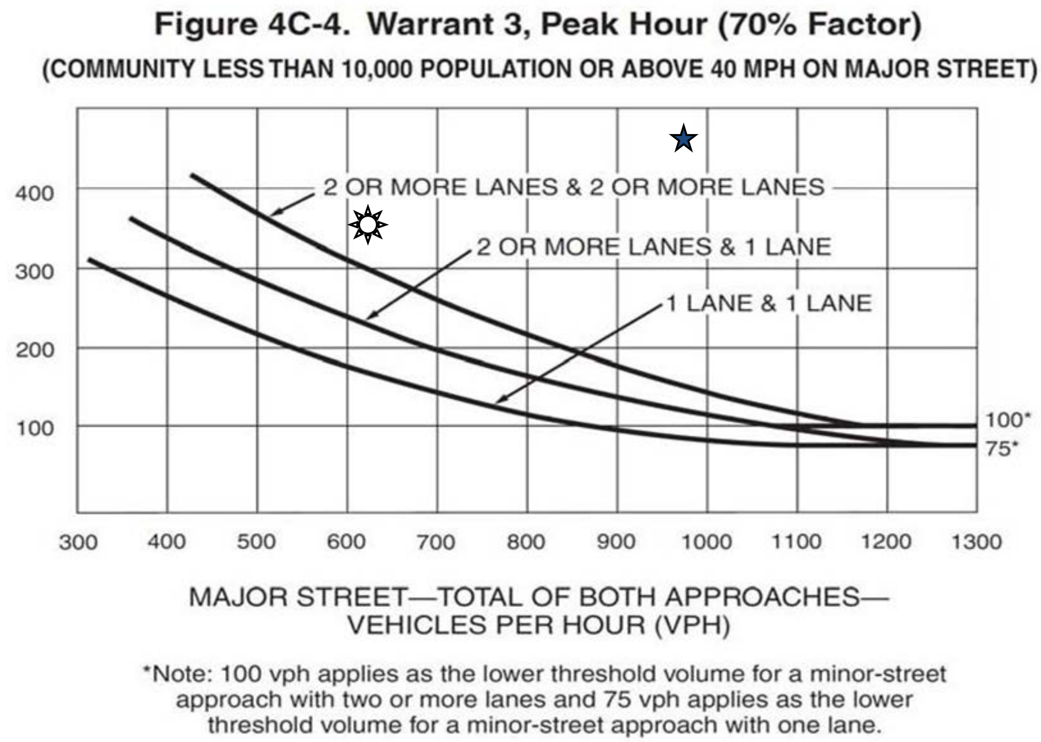
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: McCall Avenue at Herndon Avenue

McCall Ave
Highest Approach
Volume = 349(451) VPH



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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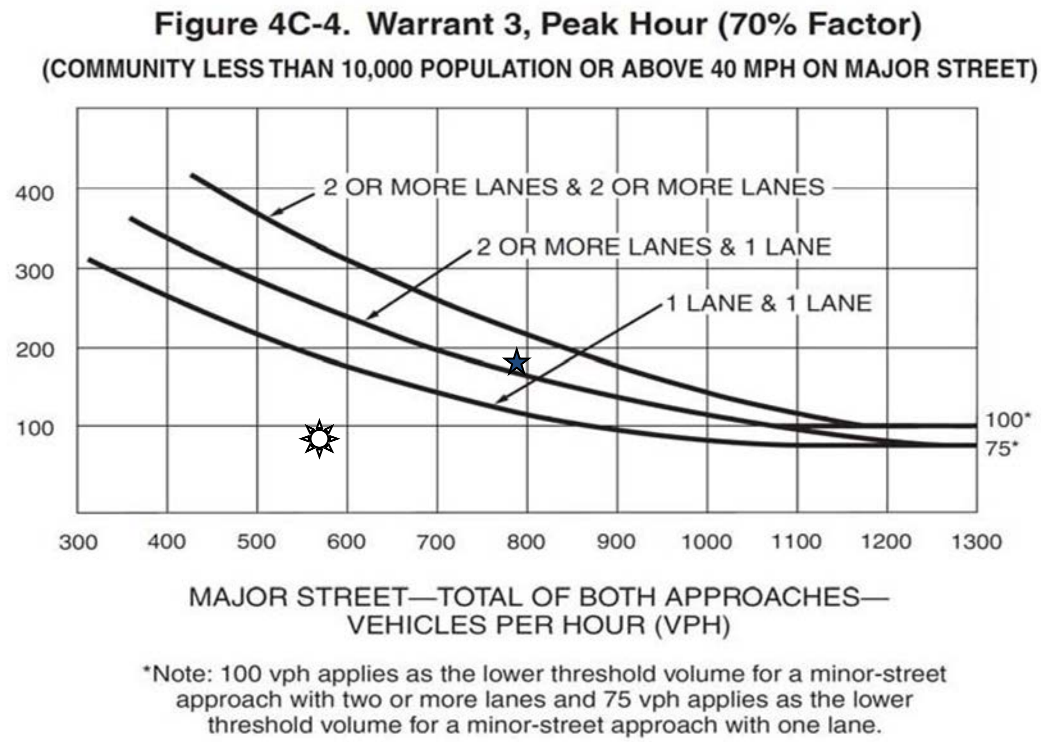
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: Academy Avenue at Herndon Avenue

Herndon Ave
Highest Approach
Volume = 83(182) VPH



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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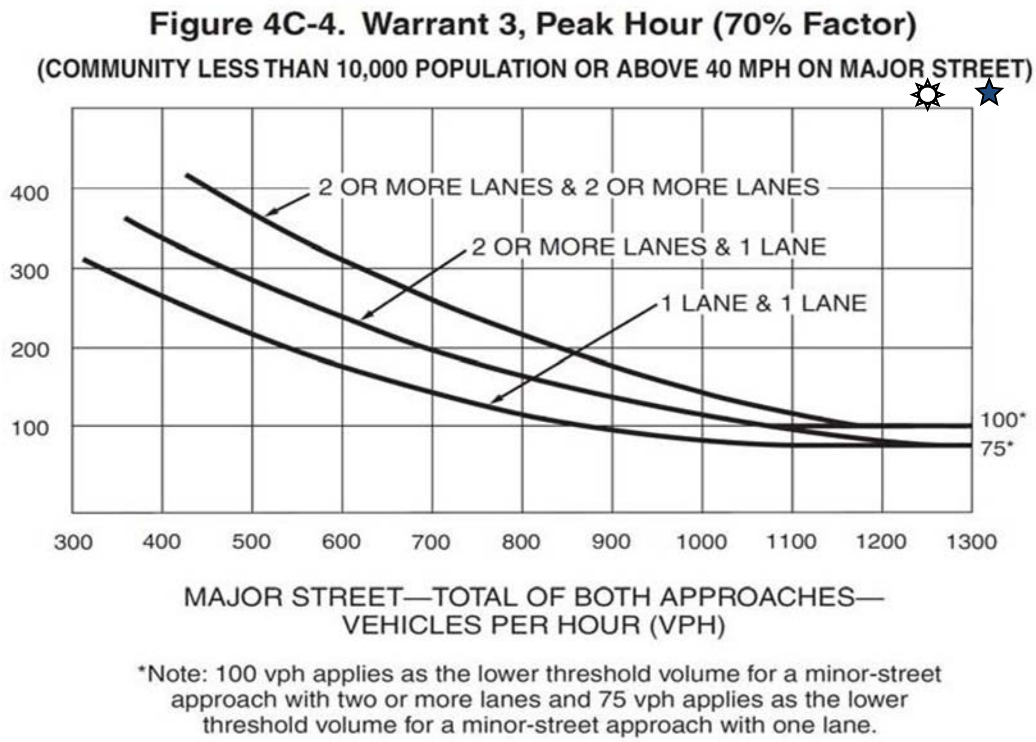
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: Locan Avenue at Bullard Avenue

Locan Ave
Highest Approach
Volume = 643(659) VPH



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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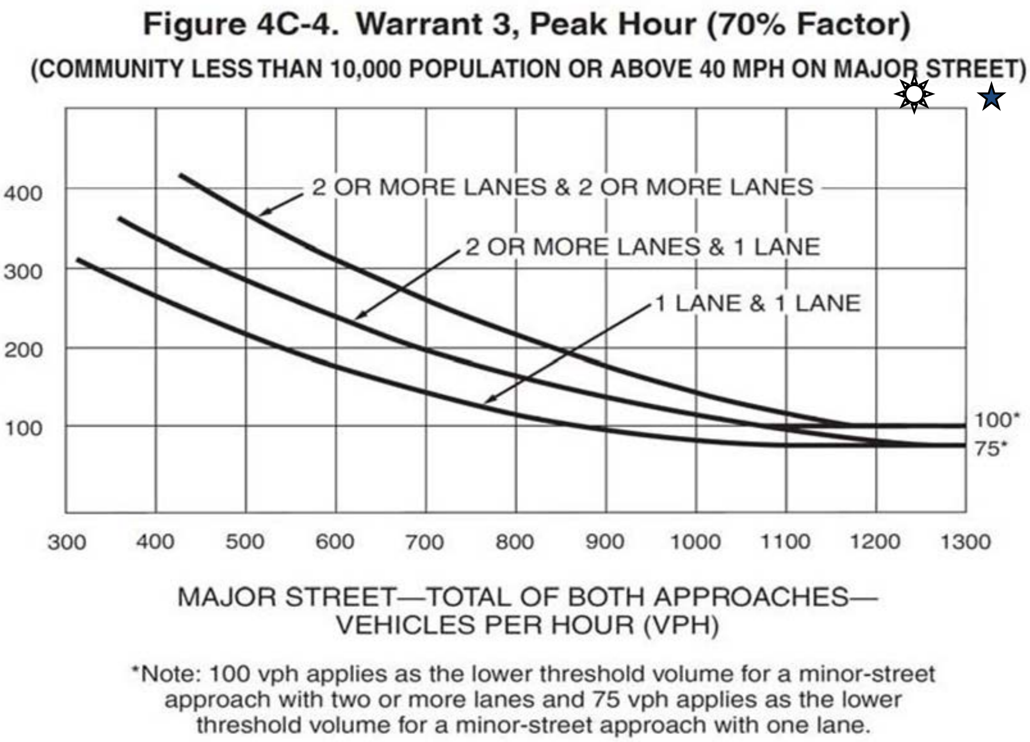
Peak Hour Warrant (Rural Areas)

2035 No Project – AM (PM) Peak Hour
Intersection: DeWolf Avenue at Bullard Avenue

DeWolf Ave
Highest Approach
Volume = 689(518) VPH



Bullard Ave Total Volume = 1245(1413) VPH

AM Peak Hour Volume – Signal Warrant is Met

PM Peak Hour Volume – Signal Warrant is Met

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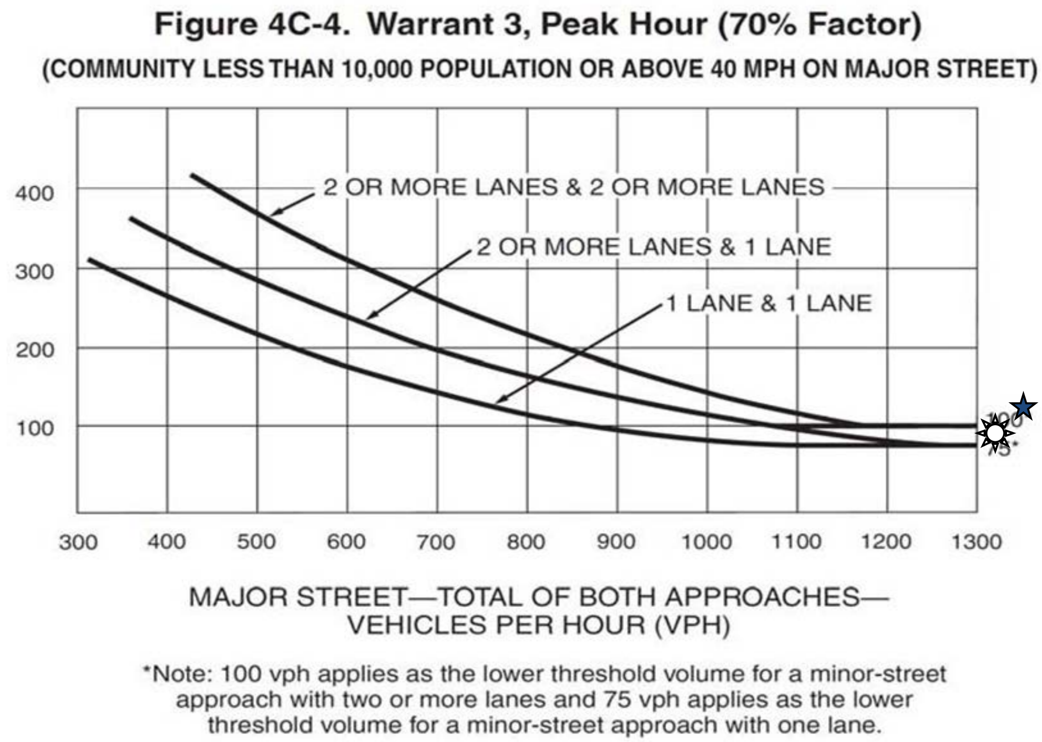
Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: Tollhouse Road at Herndon Avenue

Tollhouse Rd
Highest Approach
Volume = 83 (110) VPH



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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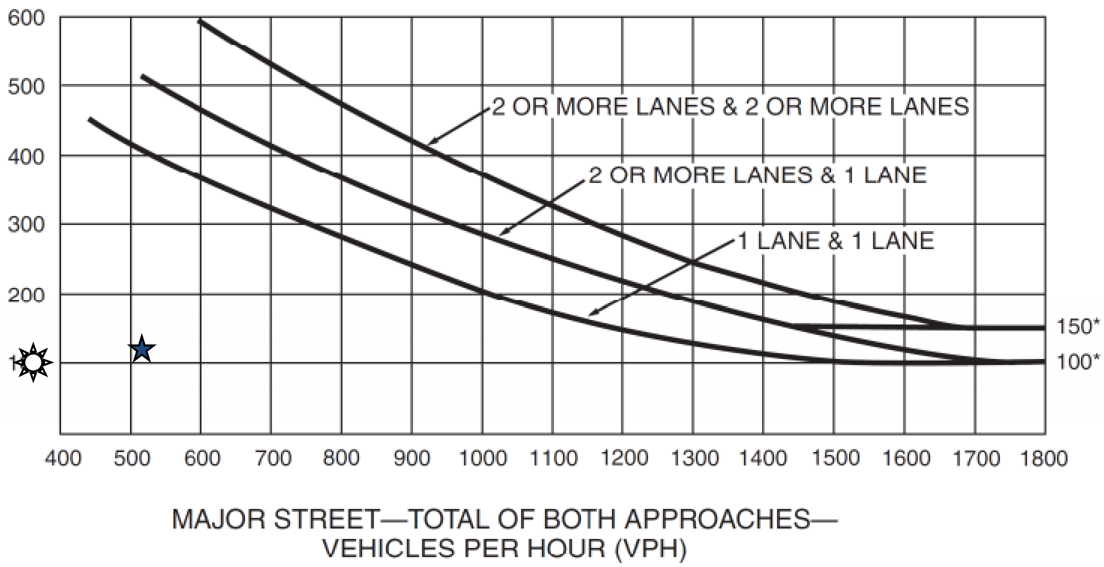
Peak Hour Warrant (Urban Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: Medical Center Drive at Coventry Avenue

Figure 4C-3. Warrant 3, Peak Hour

Minor Street
Highest Approach Volume = 100(119) 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.

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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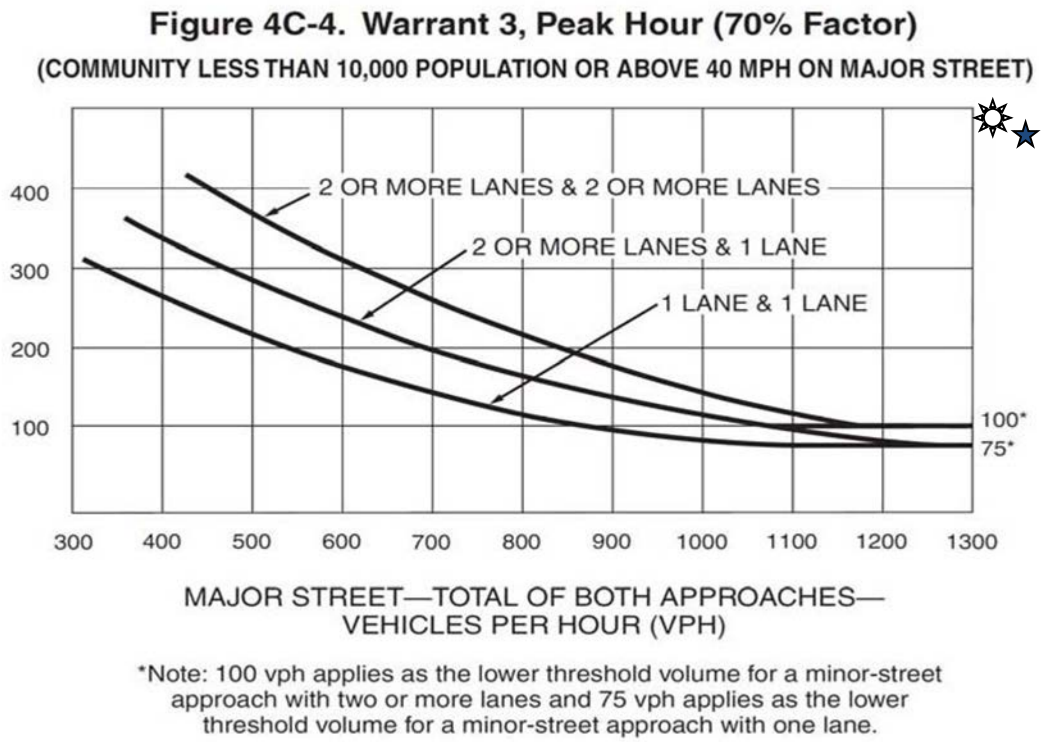
Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: Locan Avenue at Herndon Avenue

Locan Ave
Highest Approach
Volume = 792(587) VPH



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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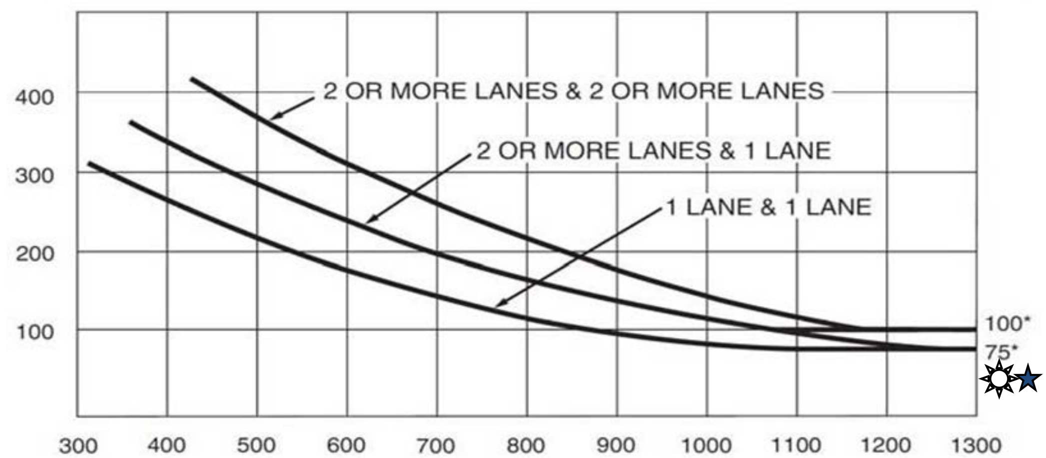
Peak Hour Warrant (Rural Areas)

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



MAJOR STREET—TOTAL OF BOTH APPROACHES—VEHICLES PER HOUR (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**

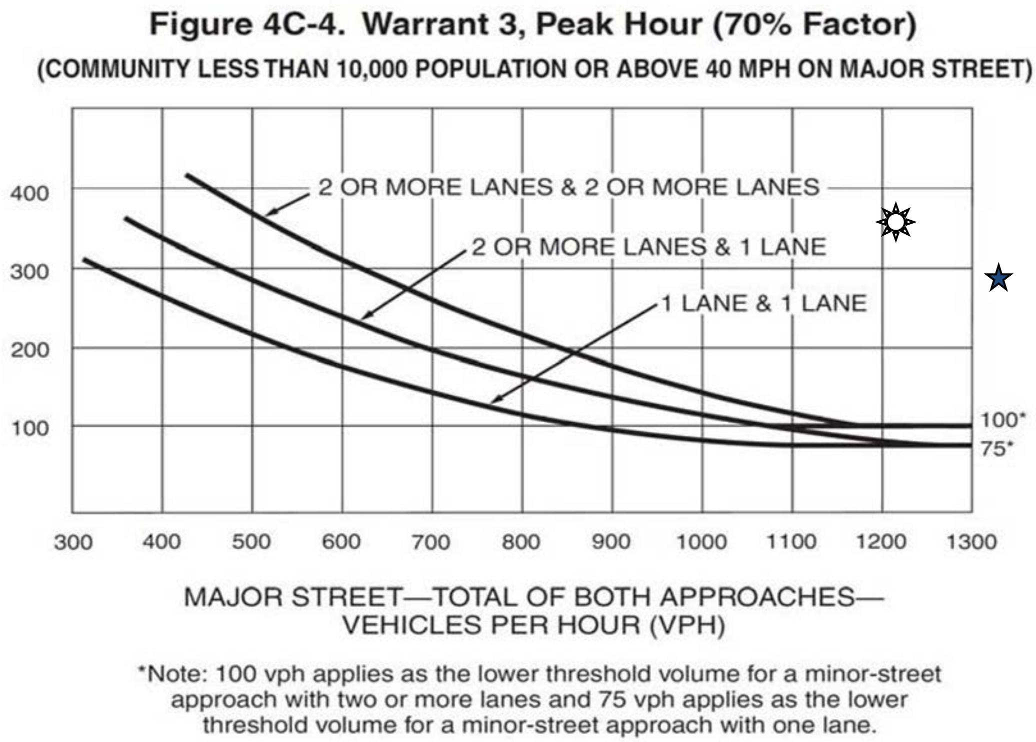
★ **PM Peak Hour Volume – Signal Warrant is Not Met**

Source: ***California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition) Part 4: Highway Traffic Signals, November 7, 2014***

Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: De Wolf Avenue (SL) at Herndon Avenue

De Wolf Ave (SL) Highest Approach Volume = 369(291) VPH



Herndon Ave Total Volume = 1215(1900) 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) Part 4: Highway Traffic Signals, November 7, 2014***

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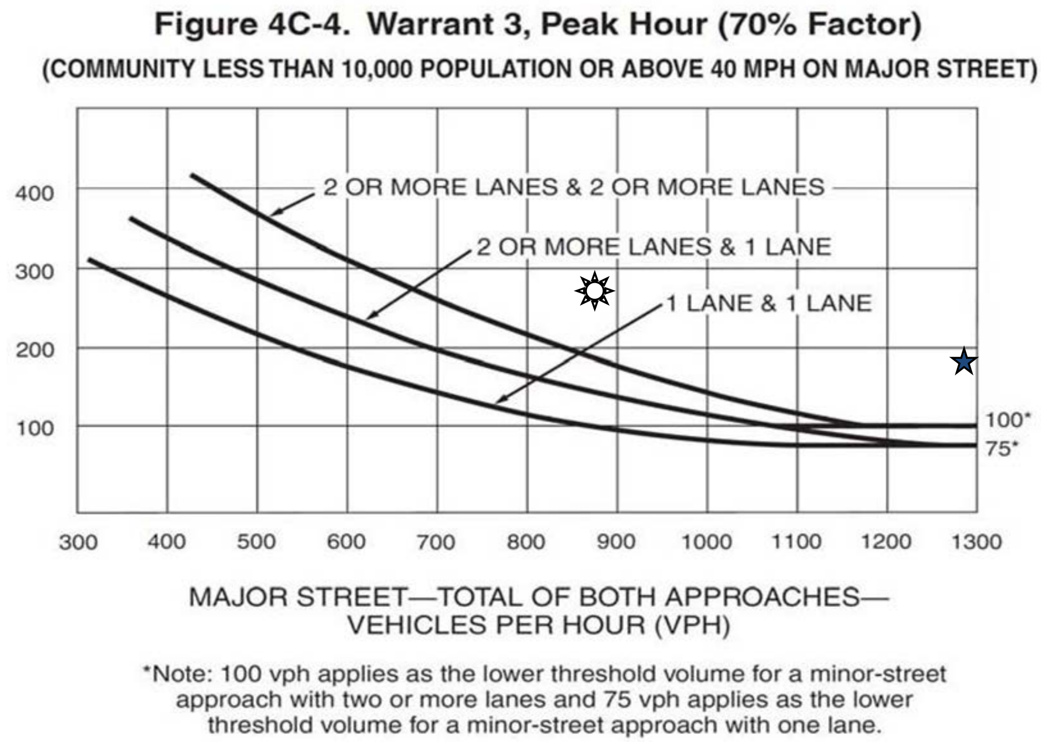
Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: Leonard Avenue at Herndon Avenue

Leonard Ave Highest Approach Volume = 271(199) VPH



Herndon Ave Total Volume = 882(1299) 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)***
Part 4: Highway Traffic Signals, November 7, 2014

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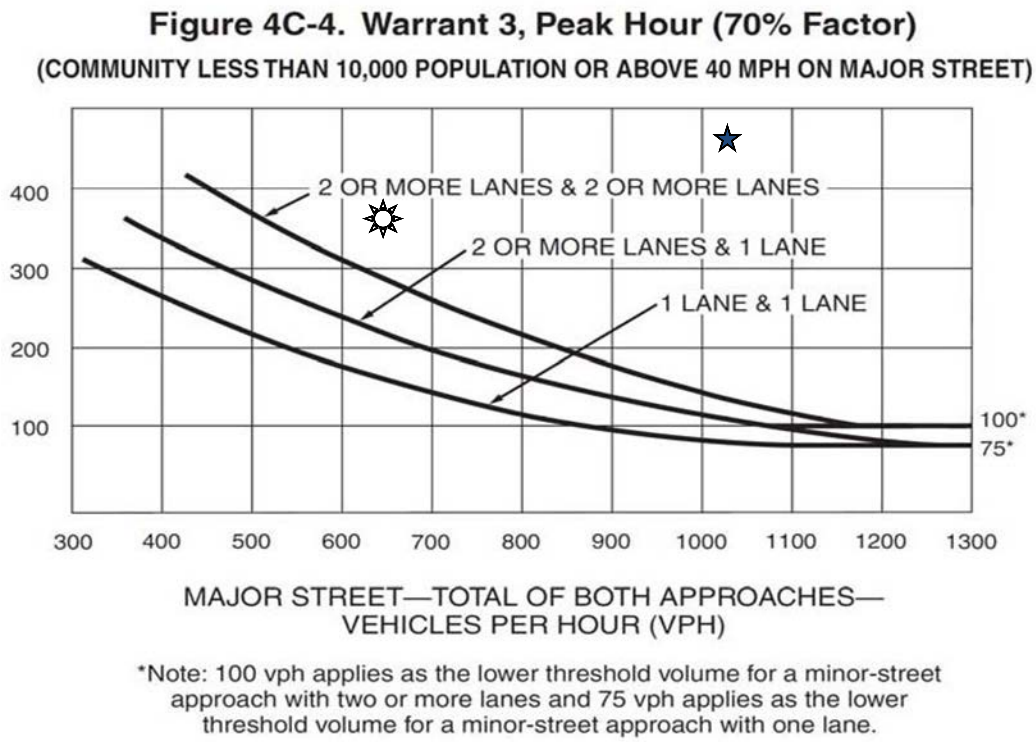
Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: McCall Avenue at Herndon Avenue

McCall Ave
Highest Approach
Volume = 357(457) VPH



Herndon Ave Total Volume = 651(1038) 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)***
Part 4: Highway Traffic Signals, November 7, 2014

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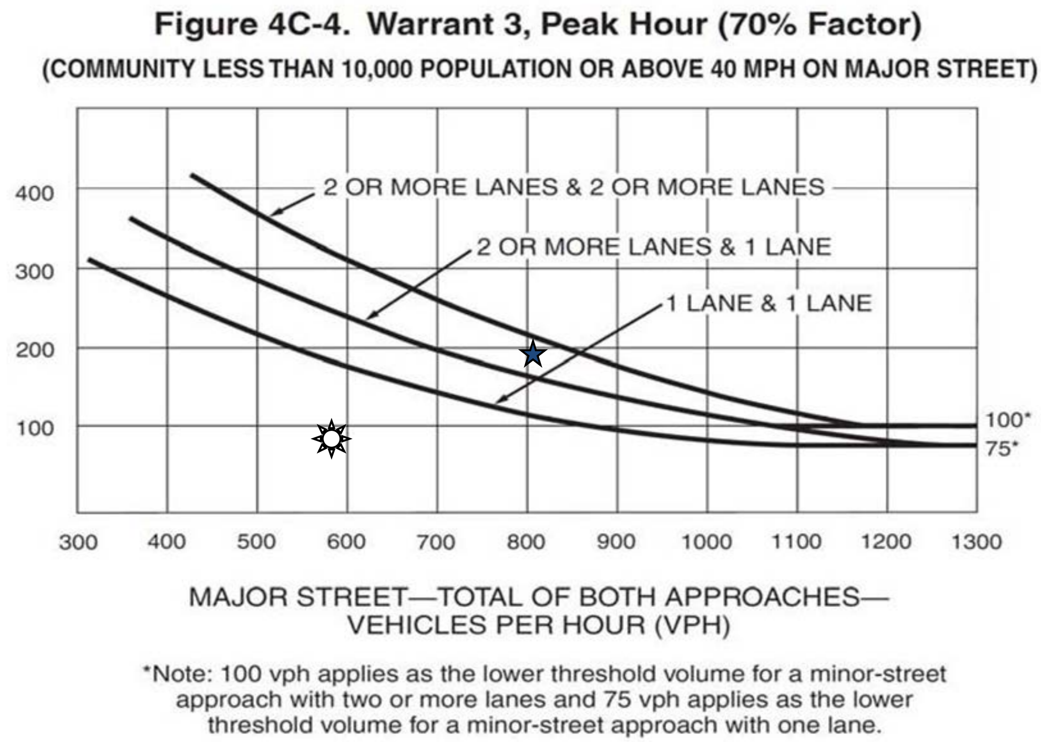
Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: Academy Avenue at Herndon Avenue

Herndon Ave
Highest Approach
Volume = 85(195) VPH



Academy Ave Total Volume = 578(804) VPH

☼ **AM Peak Hour Volume – Signal Warrant is Not 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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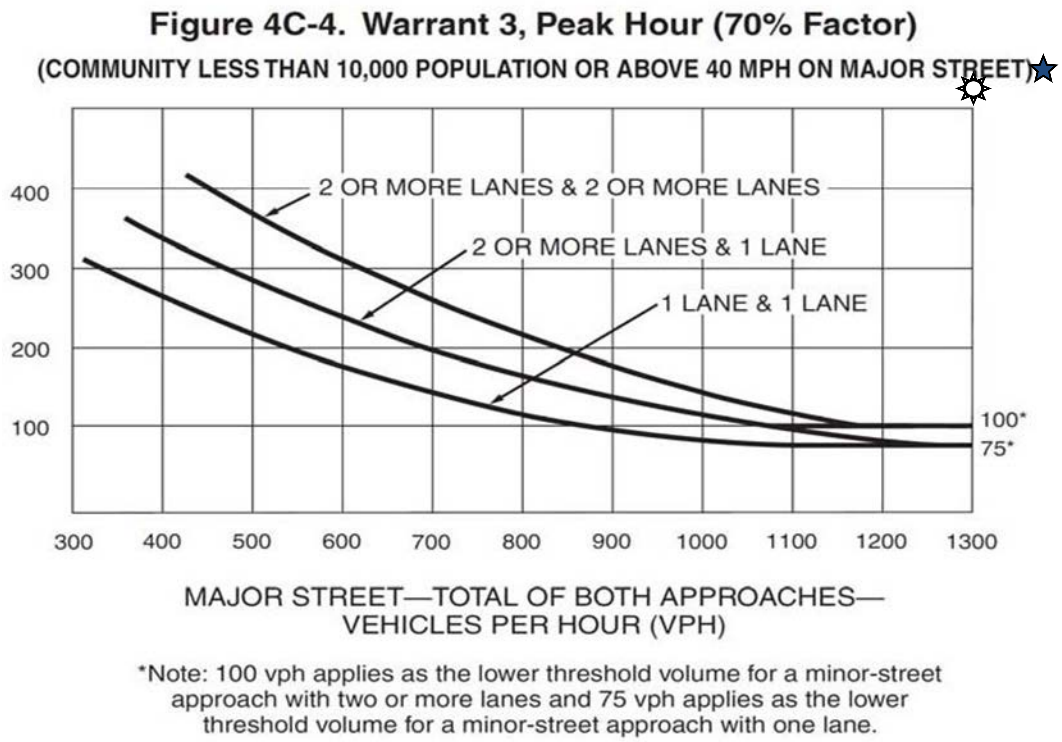
Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: Locan Avenue at Bullard Avenue

Locan Ave
Highest Approach
Volume = 673(763) VPH



Bullard Ave Total Volume = 1303(1699) 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)
Part 4: Highway Traffic Signals, November 7, 2014

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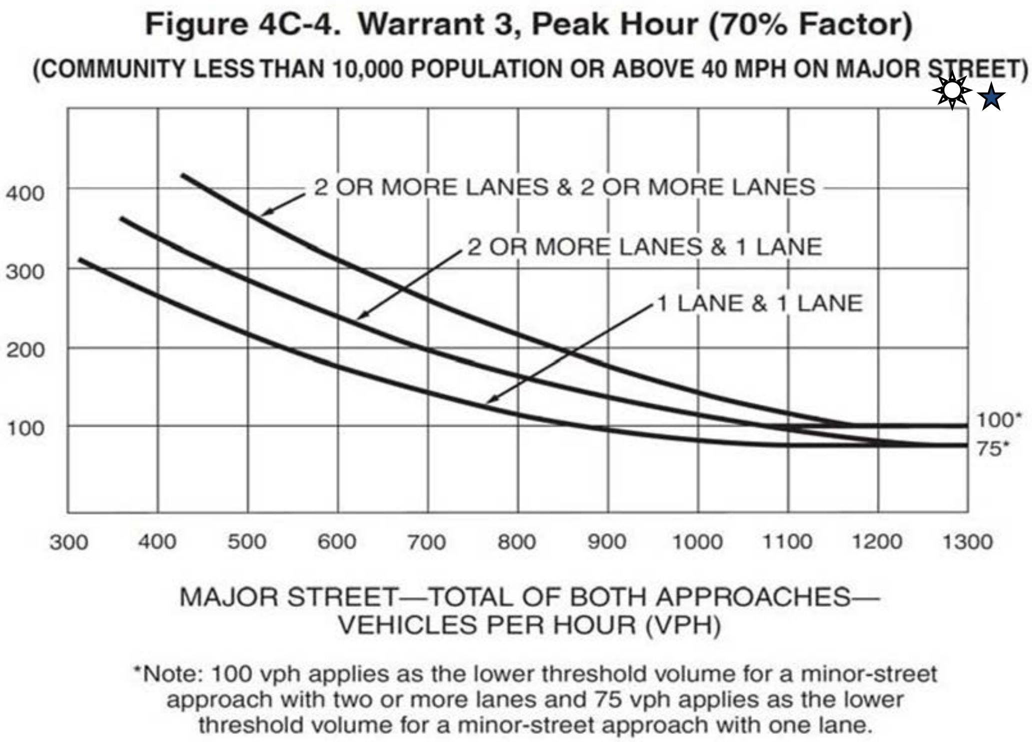
Peak Hour Warrant (Rural Areas)

2035 + Project – AM (PM) Peak Hour
Intersection: DeWolf Avenue at Bullard Avenue

DeWolf Ave
Highest Approach
Volume = 728(549) VPH



Bullard Ave Total Volume = 1297(1508) 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)***
Part 4: Highway Traffic Signals, November 7, 2014

Prepared By:

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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:
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Report Prepared for:

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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[1]	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.

[1] 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 "Pubic 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.

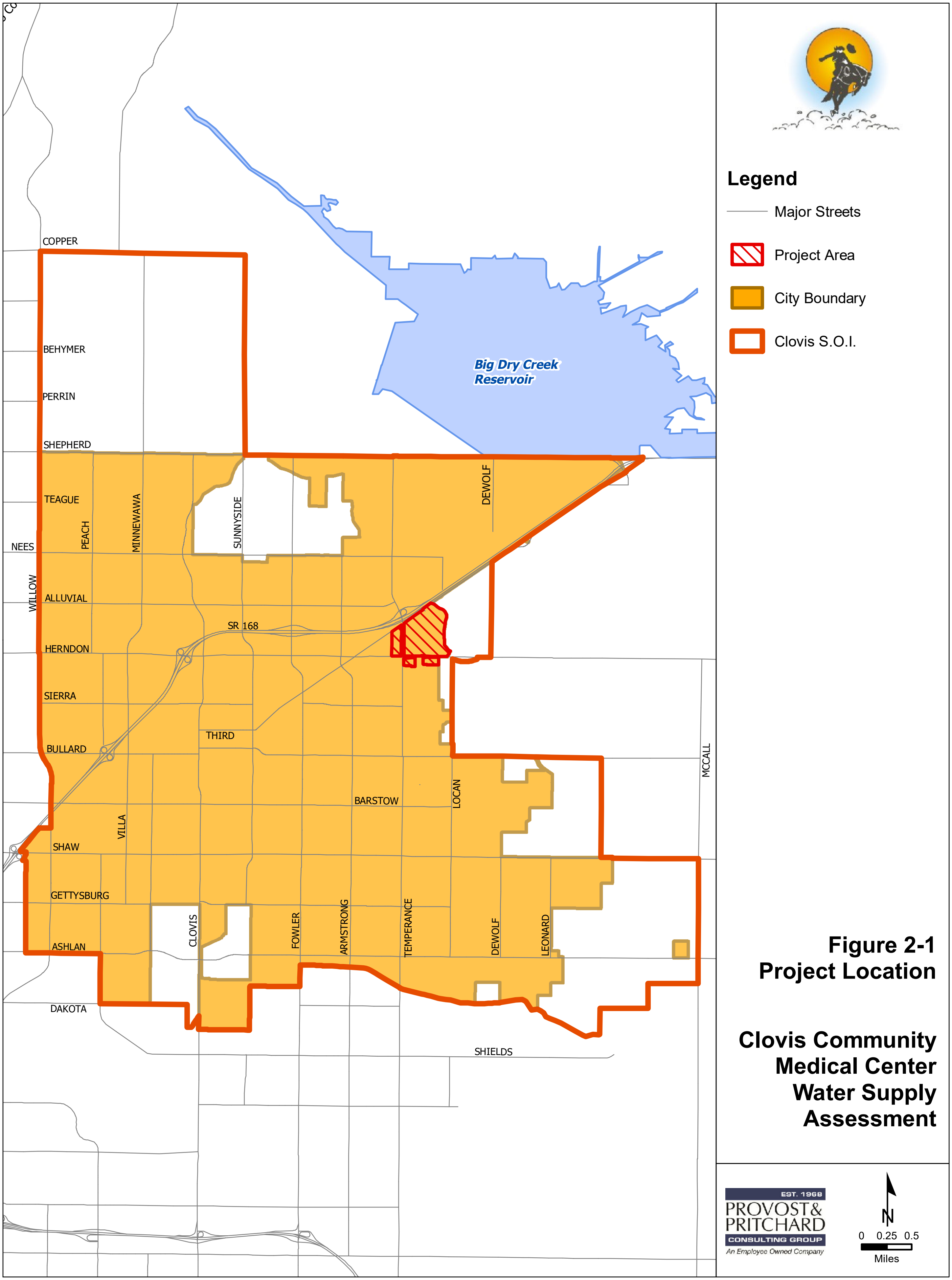

Figure 2-1
Project Location

Clovis Community Medical Center Water Supply Assessment

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.

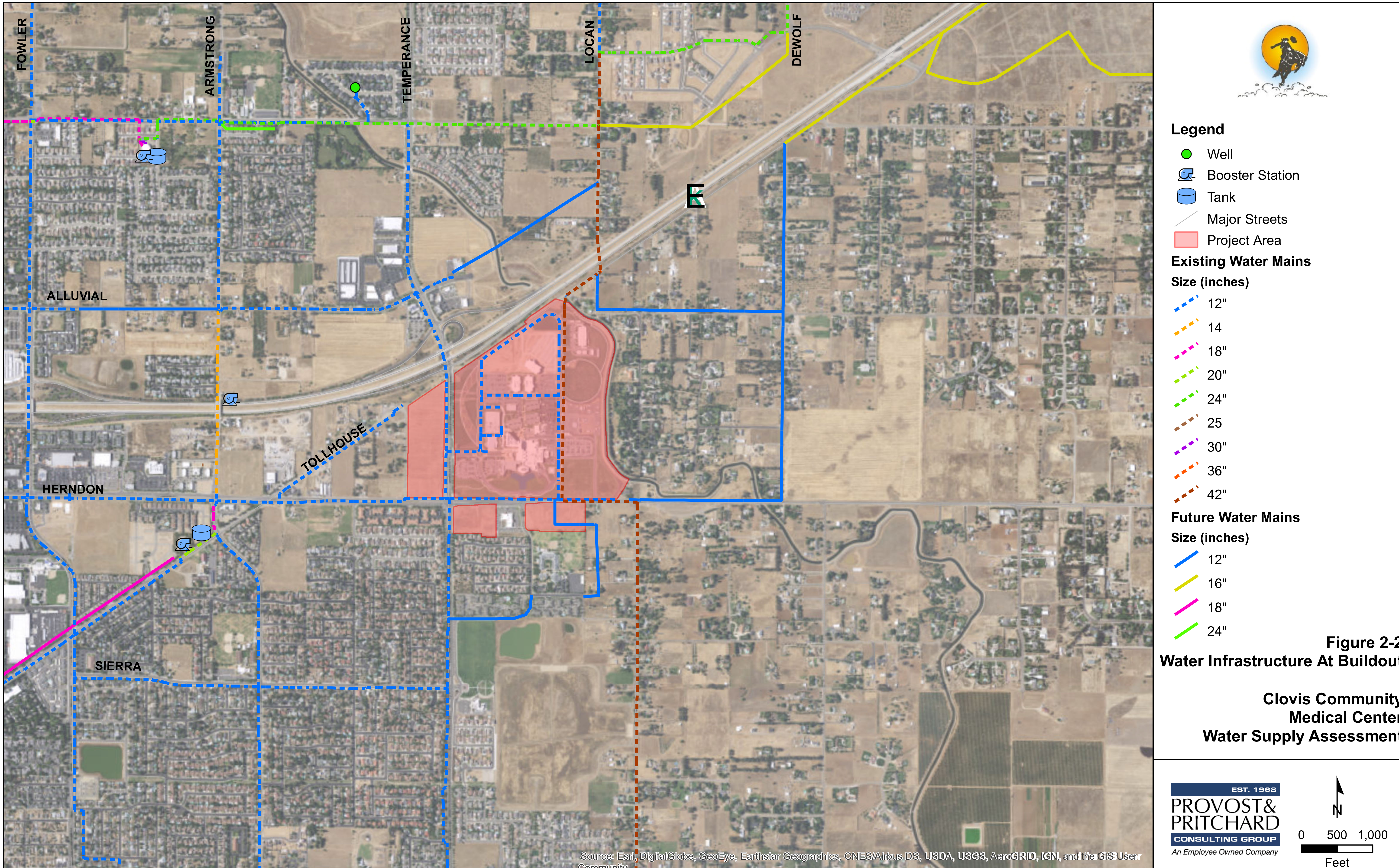

Figure 2-2
Water Infrastructure At Buildout

Clovis Community
Medical Center
Water Supply Assessment

12/28/2017: G:\Clovis_City of - 1017\GIS\1017OG01\2017\CCMC\Map\Report\water -facilities.mxd

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 MWELO. 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 (2015)	Year 5 (2020)	Year 10 (2025)	Year 15 (2030)	Year 30 (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
Total Water Demands	**21,972**	**39,213**	**43,082**	**49,448**	**54,755**

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**.

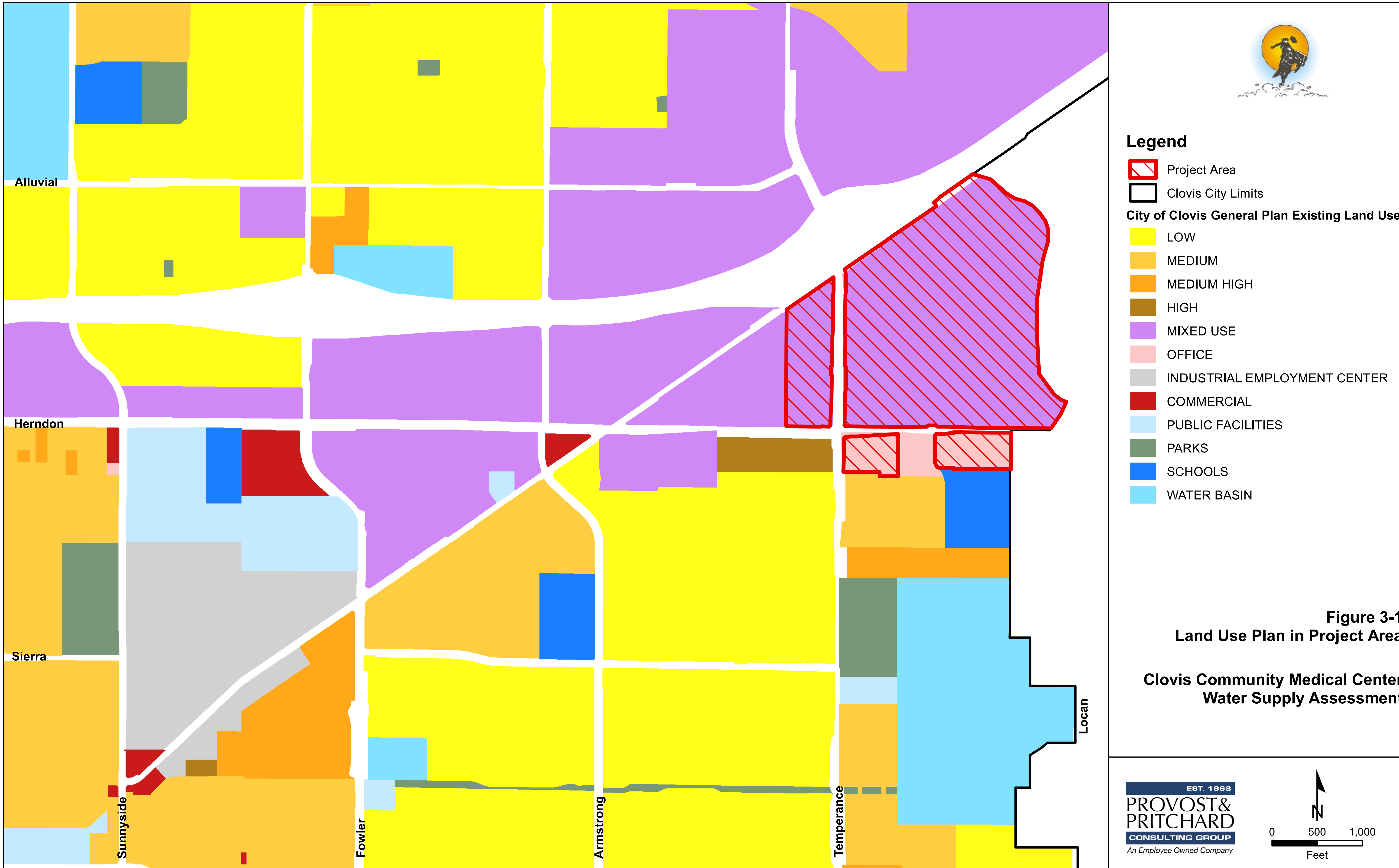

Figure 3-1
Land Use Plan in Project Area

Clovis Community Medical Center
Water Supply Assessment

12/28/2017: G:\Clovis_City of - 1017\GIS\1017OG01\2017\CCMC\Map\Report\land use plan.mxd

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

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.

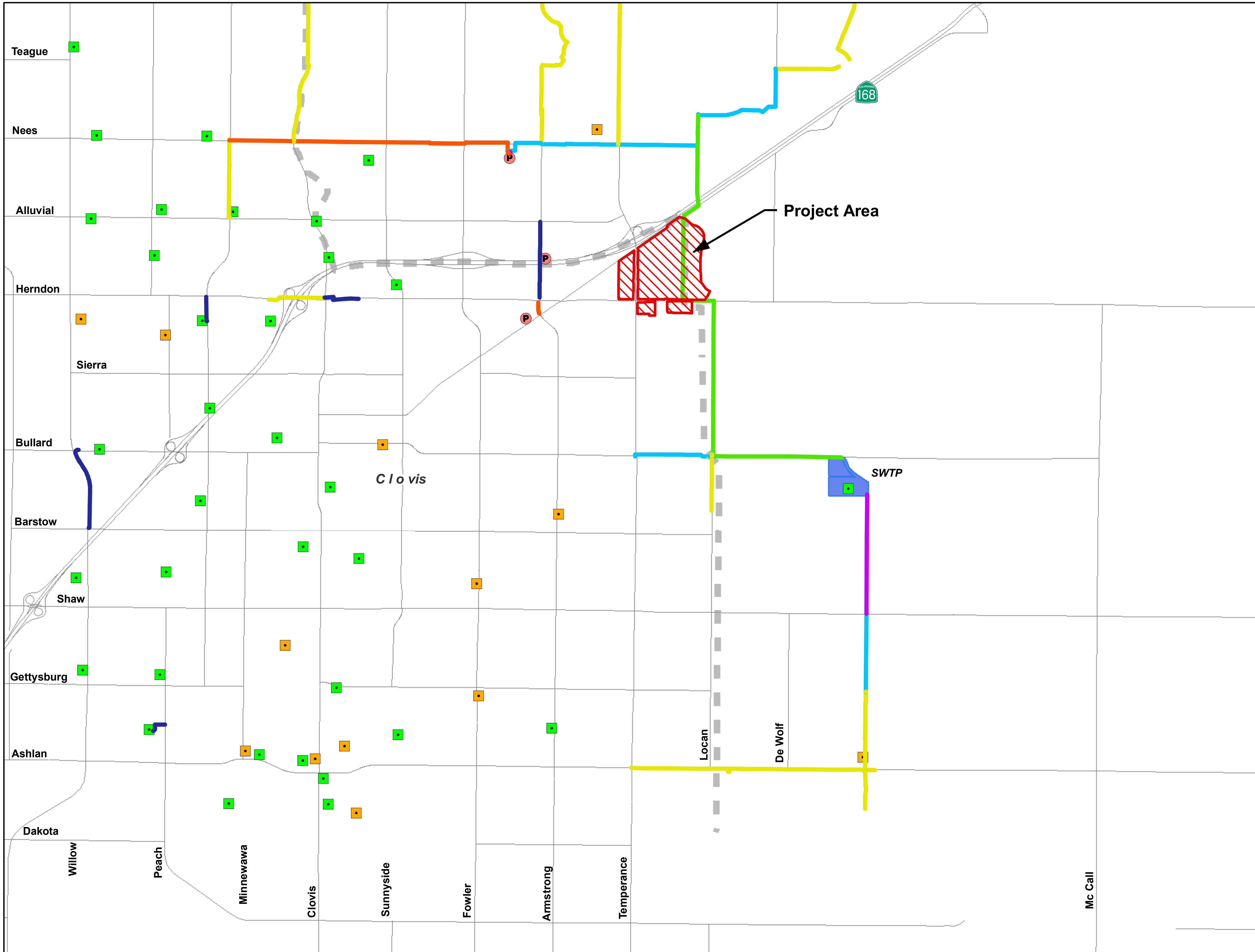

Figure 4-1
Major Existing Infrastructure

Clovis Community Medical Center Water Supply Assessment

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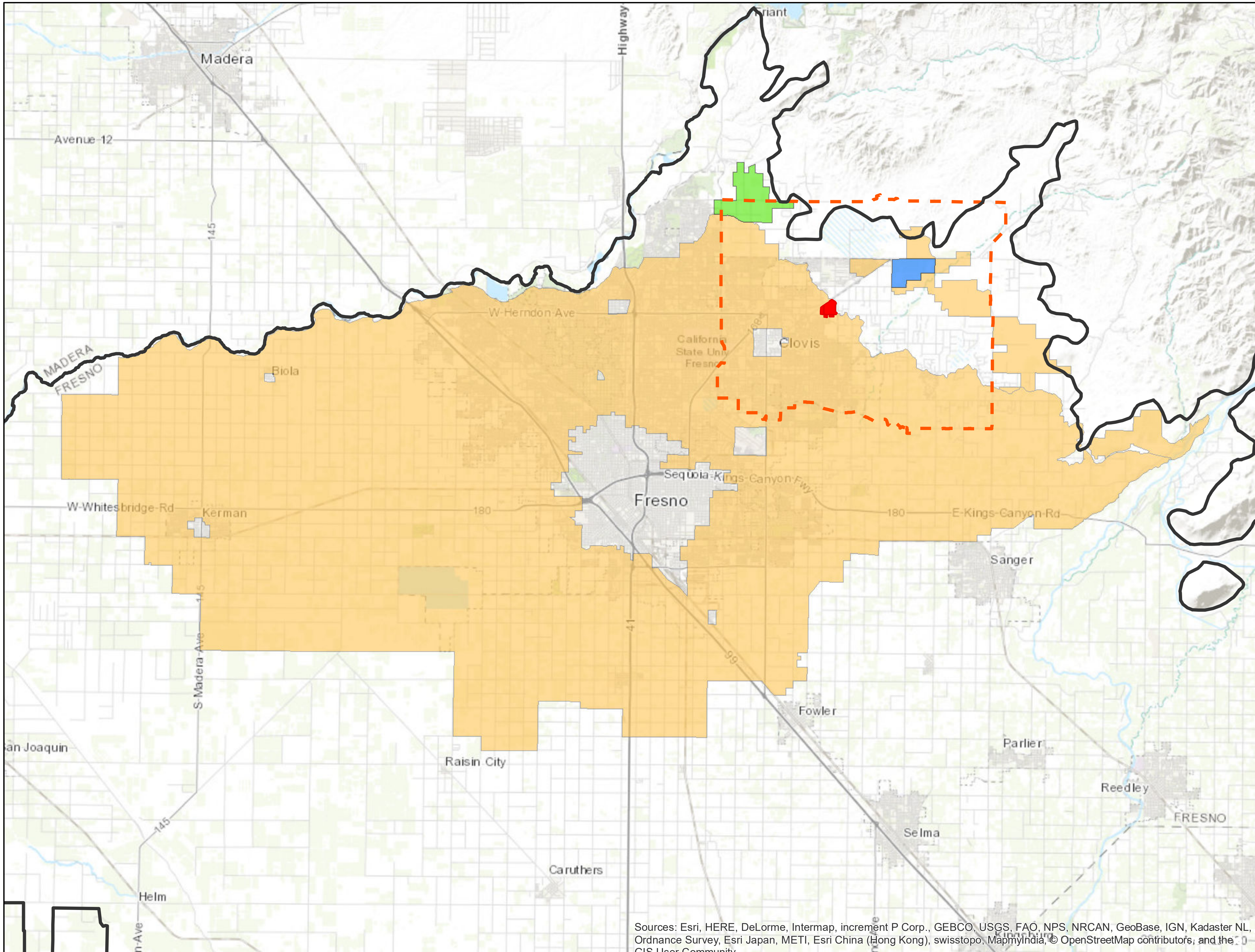

Legend

- Project Area
- Kings Groundwater Subbasin
- General Plan Boundary
- Garfield Water District
- International Water District
- Fresno Irrigation District

Figure 4-2
Irrigation and Water Districts

Clovis Community Medical Center Water Supply Assessment

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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 delivers 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.

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
Total		**33,139**	

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
Total		**56,095**	**63,194**	**64,354**	**67,952**

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
Total:	**33,139**	**54,343**	**58,601**	**63,791**	**64,703**

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[2].

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

2 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
Total:	**33,139**	**54,343**	**58,601**	**63,791**	**64,703**

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.

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
Total demand	**21,972**	**39,213**	**43,082**	**49,448**	**54,756**
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
Total supply	**33,139**	**54,343**	**58,601**	**63,791**	**64,703**
Difference between supply and demand	**11,167**	**15,130**	**15,519**	**14,343**	**9,948**

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 19th 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' 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.

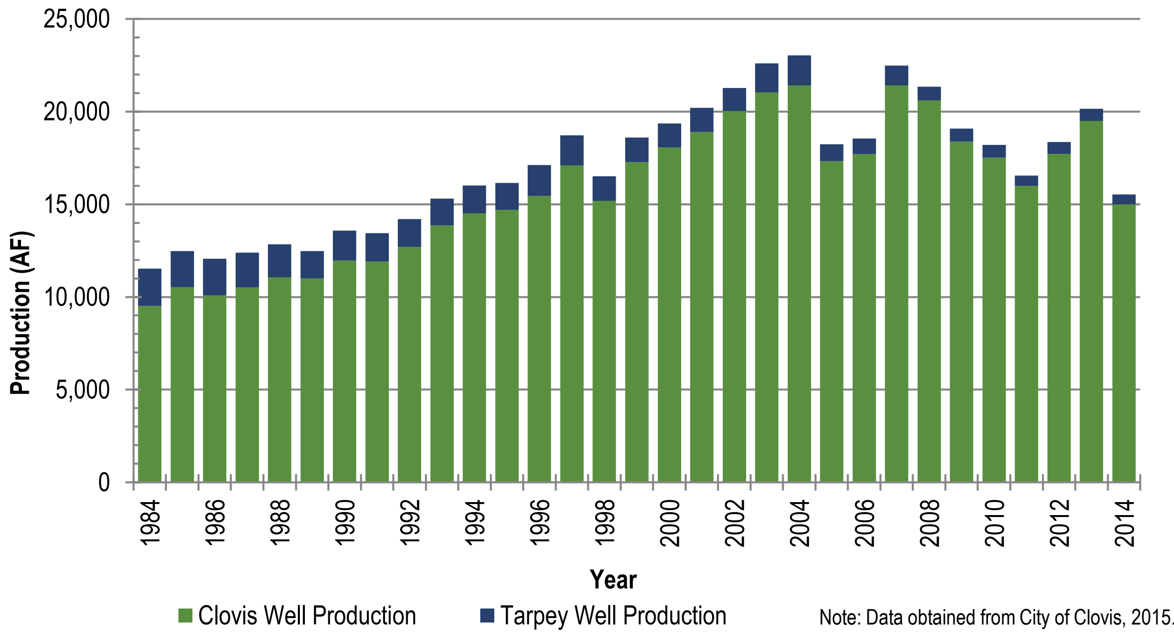

Figure 6-1. City Groundwater Production (1984-2014)

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.

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
Total demand	**54,756**	**54,756**	**54,756**	**54,756**
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
Total Supply	**39,551**	**62,958**	**48,560**	**39,551**
Excess/<Deficit> in Supply	<15,205>	8,202	<6,196>	<15,205>
Percent Excess/<Deficit> versus Demand	<27.8>	15.0	<11.3>	<27.7>

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.

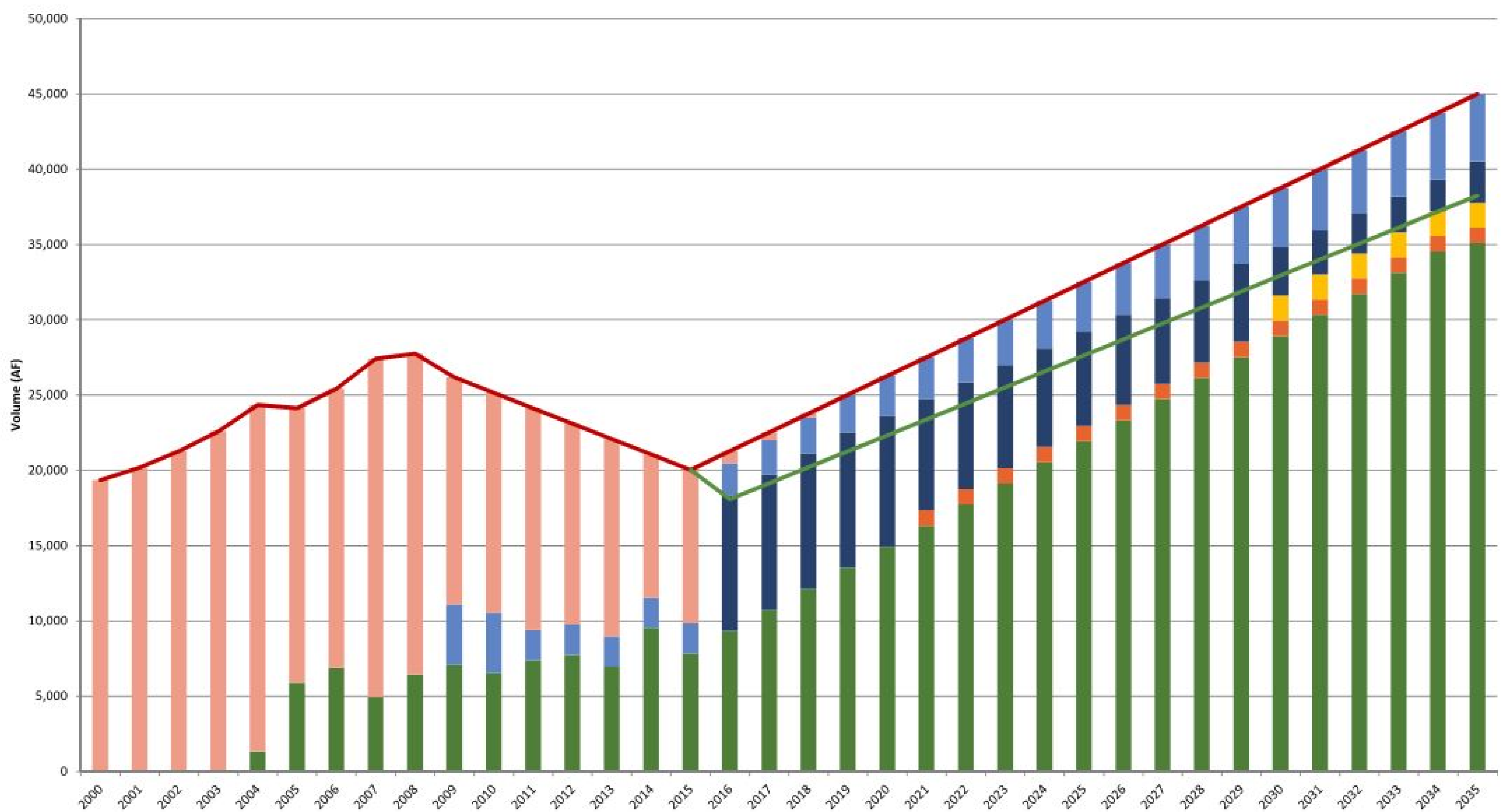

Figure 6-2
Mix of Water Supplies Graph

Clovis Community Medical Center Water Supply Assessment

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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
Total demand	**21,972**	**39,213**	**43,082**	**49,448**	**54,756**	**54,756**	**54,756**	**54,756**	**54,756**
Total Demand less GW Recharge						46,356	46,356	46,356	46,356
Water Conservation Savings						6,953	6,953	6,953	6,953
Total Adjusted Demand						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
Total supply	33,139	54,343	58,601	63,791	64,703	39,551	62,958	48,560	39,551
Difference between Supply and Demand	**11,167**	**15,130**	**15,519**	**14,343**	**9,948**	**(15,204)**	**8,203**	**(6,195)**	**(15,204)**
Percent of excess/ shortage versus Demand	**50.8%**	**38.6%**	**36.0%**	**29.0%**	**18.2%**	**<27.8%>**	**15.0%**	**<11.3%>**	**<27.8%>**
Difference between Supply and Adjusted Demand						**148**	**23,555**	**9,157**	**148**
Percent of excess/shortage versus Adjusted Demand						0.4%	59.8%	23.2%	0.4%

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

CITY of CLOVIS

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

CITY of CLOVIS

Clovis Community Medical Center Expansion and Herndon Avenue Widening Project Final Program Environmental Impact Report

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CHAPTER 1
Introduction

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

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 than 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
GH-1 **Greenhouse Gas Emissions**	**Impact:** The project would increase the generation of greenhouse gas emissions. **Level of Significance without Mitigation:** Potentially significant **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 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.
GH-2 **Greenhouse Gas Emissions**	**Impact:** The project may conflict with an applicable greenhouse gas reduction plan, policy or regulation. **Level of Significance:** Potentially Significant **Mitigation Measures:** Implement Mitigation Measure GH-1. **Level of Significance with Mitigation:** 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.
NO-2 **Noise**	**Impact:** The project would result in an increase in long-term ambient noise levels from traffic sources. **Level of Significance:** Potentially Significant **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:** 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.

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
AE-1 **Aesthetics**	**Impact:** Clearing and construction activity would temporarily degrade the visual quality of the project site. **Level of Significance without Mitigation:** Potentially significant **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. **Level of Significance with Mitigation:** Less than significant
AE-2 **Aesthetics**	**Issue and Threshold of Significance:** The project would increase in illumination and glare due to project lighting, building surfaces and parking areas. **Level of Significance without Mitigation:** Potentially significant **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. **Level of Significance with Mitigation:** Less than significant
AQ-1 **Air Quality**	**Impact:** The project would increase long-term operational emissions of particulate matter and ozone precursor emissions. **Level of Significance without Mitigation:** 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:

Table 1.2
Significant Impacts and Mitigation Measures

	(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)~~ 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

Table 1.2
Significant Impacts and Mitigation Measures

	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). **Level of Significance with Mitigation:** Less than significant
AQ-2 **Air Quality**	**Impact:** Impacts to sensitive receptors may occur due to localized PM concentrations from construction activities and air emissions from stationary sources. **Level of Significance without Mitigation:** Potentially significant **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 expose 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 and ww.arb.ca.gov/regact/2007/ordiesl07/frooal.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.

Table 1.2
Significant Impacts and Mitigation Measures

	• 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 with Mitigation:** Less than significant
AQ-3 **Air Quality**	**Impact:** The project may be inconsistent with the applicable air quality plan. **Level of Significance without Mitigation:** Potentially significant **Mitigation Measures:** Implement Measures AQ-1.1 through AQ-2. **Level of Significance with Mitigation:** Less than significant
BR-1 **Biological Resources**	**Impact:** The project would potentially impact Special Status Species including Vernal Pool Fairy Shrimp (VPFS), Burrowing Owl, Swainson's Hawk and other bird species. **Level of Significance without Mitigation:** Potentially significant **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

Table 1.2
Significant Impacts and Mitigation Measures

	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. ***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:

Table 1.2
Significant Impacts and Mitigation Measures

	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." **Level of Significance with Mitigation:** Less than significant
BR-2 **Biological Resources**	**Impact:** The widening of Herndon Avenue would impact 0.204 acres of wetlands. **Level of Significance without Mitigation:** Potentially 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. **Level of Significance with Mitigation:** Less than significant
BR-3 **Biological Resources**	**Impact:** The widening of Herndon Avenue would impact a small wetland swale riparian habitat. **Level of Significance without Mitigation:** Potentially significant **Mitigation Measures:** Implement Mitigation Measures BR-2.1 and BR-2.2. **Level of Significance with Mitigation:** Less than significant
CR-1 **Cultural Resources**	**Impact:** Potential disturbance of subsurface cultural and/or paleontological resources may result from project construction activities. **Level of Significance without Mitigation:** Potentially significant

Table 1.2
Significant Impacts and Mitigation Measures

	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. **Level of Significance with Mitigation:** Less than significant
NO-1 **Noise**	**Impact:** Temporary or periodic increases in ambient noise levels would result from construction activities. **Level of Significance without Mitigation:** 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:** Less than significant
NO-3 **Noise**	**Impact:** An increase in long-term ambient noise levels from operational features would result from the project. **Level of Significance without Mitigation**: Potentially 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.

Table 1.2
Significant Impacts and Mitigation Measures

	Level of Significance with Mitigation: Less than significant
TT-1 **Transportation and Traffic**	**Impact:** The "Existing Conditions plus Project" Scenario would result in unacceptable levels of service at the following intersection: • SR 168 EB Ramps at Temperance Avenue **Level of Significance without Mitigation:** Potentially 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. **Level of Significance with Mitigation:** Less than significant
TT-2 **Transportation and Traffic**	**Impact:** 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) **Level of Significance without Mitigation:** Potentially 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 [see Chapter 19, Transportation and Traffic]. **Level of Significance with Mitigation:** Less than significant
TT-3 **Transportation and Traffic**	**Impact:** 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 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 • Bullard Avenue at De Wolf Avenue • Alluvial Avenue at Temperance Avenue • Herndon Avenue at Tollhouse Road • New Access Road/Temperance Avenue

Table 1.2
Significant Impacts and Mitigation Measures

	Level of Significance without Mitigation: Potentially significant **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 [see Chapter 19, Transportation and Traffic]. **Level of Significance with Mitigation:** Less than significant
TT-4 **Transportation and Traffic**	**Impact:** 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 **Level of Significance without Mitigation:** Potentially significant **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). **Level of Significance with Mitigation:** Less than significant
TR-1 **Tribal Cultural Resources**	**Impact:** Disturbance of subsurface tribal cultural resources would potentially result from construction activities. **Level of Significance without Mitigation:** Potentially significant **Mitigation Measures:** Incorporate Mitigation Measures CR-1.1 through 1.3. **Level of Significance with Mitigation:** Less than significant

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

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

IMPACT	MITIGATION MEASURES	TIMING	MONITORING AGENCY	SIGN OFF
AE-1: Clearing and construction activity would temporarily degrade the visual quality of the project site.	***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.	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.	***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.	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	

	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.			
AIR QUALITY				
IMPACT	**MITIGATION MEASURES**	**TIMING**	**MONITORING AGENCY**	**SIGN OFF**
AQ-1: The project would increase long-term operational emissions of particulate matter and ozone precursor emissions.	***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.	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	

	(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 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 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).			
AQ-2: Impacts to sensitive receptors may occur due to localized PM concentrations from construction activities and air emissions from stationary sources.	***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 expose 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	Ongoing during grading, construction, and operation.	San Joaquin Valley Air Pollution Control District (SJVAPCD) City of Clovis Planning and Development Services Department – Building Division	

	be reviewed at the following web sites: www.arb.ca.gov/msprog/truck-idling/2485.pdf and ww.arb.ca.gov/regact/2007/ordiesl07/frooal.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.			
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	
BIOLOGICAL RESOURCES				
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.	***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	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	

	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. ***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."			

BR-2: The widening of Herndon Avenue would impact 0.204 acres of wetlands.	***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.	Prior to the commencement of grading activities and ongoing during grading, construction, and operation.	City of Clovis Planning and Development Services Department – Engineering Division	
BR-3: The widening of Herndon Avenue would impact a small wetland swale riparian habitat.	Implement Mitigation Measures BR-2.1 and BR-2.2.	See BR-2.1 and BR 2.2	See BR-2.1 and BR 2.2	

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.	***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.	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.	***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.	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)	

	(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.)			
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)	
NOISE				
IMPACT	**MITIGATION MEASURES**	**TIMING**	**MONITORING AGENCY**	**SIGN OFF**
NO-1: Temporary or periodic increases in ambient noise levels would result from construction activities.	***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.	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.	***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.	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.	***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	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	

	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.			
TRANSPORTATION AND TRAFFIC				
IMPACT	**MITIGATION MEASURES**	**TIMING**	**MONITORING AGENCY**	**SIGN OFF**
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-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.	Prior to completion of first building in the 2-10 year phase of project	City of Clovis Planning and Development Services Department – Engineering Division	
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	***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 [see Chapter 19, Transportation and Traffic].	Appropriate timing to be determined by Engineering Division during the 2-10 year phase of the project.	City of Clovis Planning and Development Services Department – Engineering Division	

• 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 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	***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 [see Chapter 19, Transportation and Traffic].	Appropriate timing to be determined by Engineering Division	City of Clovis Planning and Development Services Department – Engineering Division	

• Bullard Avenue at Locan Avenue • Bullard Avenue at De Wolf Avenue • Alluvial Avenue at Temperance Avenue • Herndon Avenue at Tollhouse Road • New Access Road/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	***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).	Appropriate timing to be determined by Engineering Division	City of Clovis Planning and Development Services Department – Engineering Division	

• 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				

TRIBAL CULTURAL RESOURCES				
IMPACT	**MITIGATION MEASURES**	**TIMING**	**MONITORING AGENCY**	**SIGN OFF**
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

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.

Comment No.	Agency or Person	Comment Date	Page No.
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 (Caltrans)	April 5, 2018	4-31
6	Mitchell Chadwick/Suburban Propane	April 6, 2018	4-36
7	Fresno Metropolitan Flood Control District (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.

1-1

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.

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.

1-2

Sincerely,

Bryan Araki
City Planner

City of Clovis Planning Division
1033 Fifth Street
Clovis, California 93612
Ph. (559) 324-2346
bryana@cityofclovis.com

[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.

1-3

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

[MESSAGE 4]

On Feb 21, 2018, at 2:41 PM, Bryan Araki
<BryanA@ci.clovis.ca.us> wrote:

Hi Jan:

1-4 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

Hi Bryan,

1-5 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 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 and 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 be 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.

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 -07'00'

Kevin Tsuda, R.E.H.S.
Environmental Health Specialist II (559) 600-3271

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cc: Steven Rhodes- Environmental Health Division (CT. 59.07)
Ryan Burnett- Management Analyst (RyanB@ci.clovis.ca.us)
Scott B. Odell- Consultant (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 Bride 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,

George Leighton Allen, Jr.

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 SO2, 8.0 for PM10, and 3.2 for PM2.5. 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.

OFFICE OF
FRESNO IRRIGATION DISTRICT
TELEPHONE (559) 233-7161
FAX (559) 233-8227
2907 S. MAPLE AVENUE
FRESNO, CALIFORNIA 93725-2208

YOUR MOST VALUABLE RESOURCE - WATER

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

4-1

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.

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.

4-1

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:

4-1

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:

4-1

   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

4-2

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.

4-3

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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4-7

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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.

4-14

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.

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.

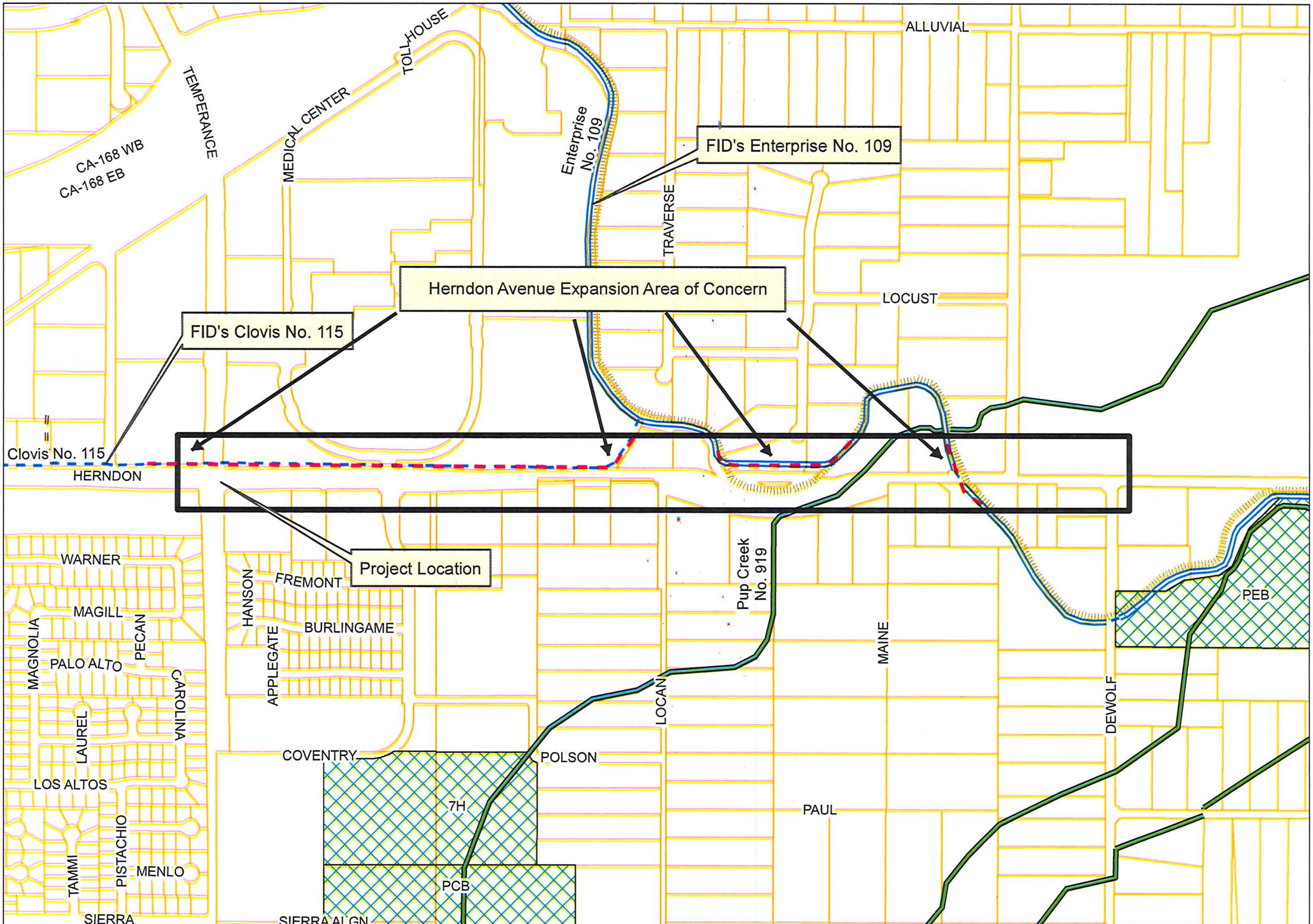
8. As with most developer projects, there will be considerable time and effort required of FID's staff to plan, coordinate, engineer, review plans, prepare agreements, and inspect the project. FID's cost for associated plan review will vary and will be determined at the time of the plan review.

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.

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	FID Pipeline	Stream Group	FID Boundary	Parcel
Private Canal	Private Pipeline	Other-Creek\River	Railroad	FMFCD Acquired Basins
Abandoned Canal	Abandoned Pipeline	Other-Pipeline	Streets & Hwys	FMFCD Proposed Basins

0 365 730 Feet

1 inch = 721.28 feet

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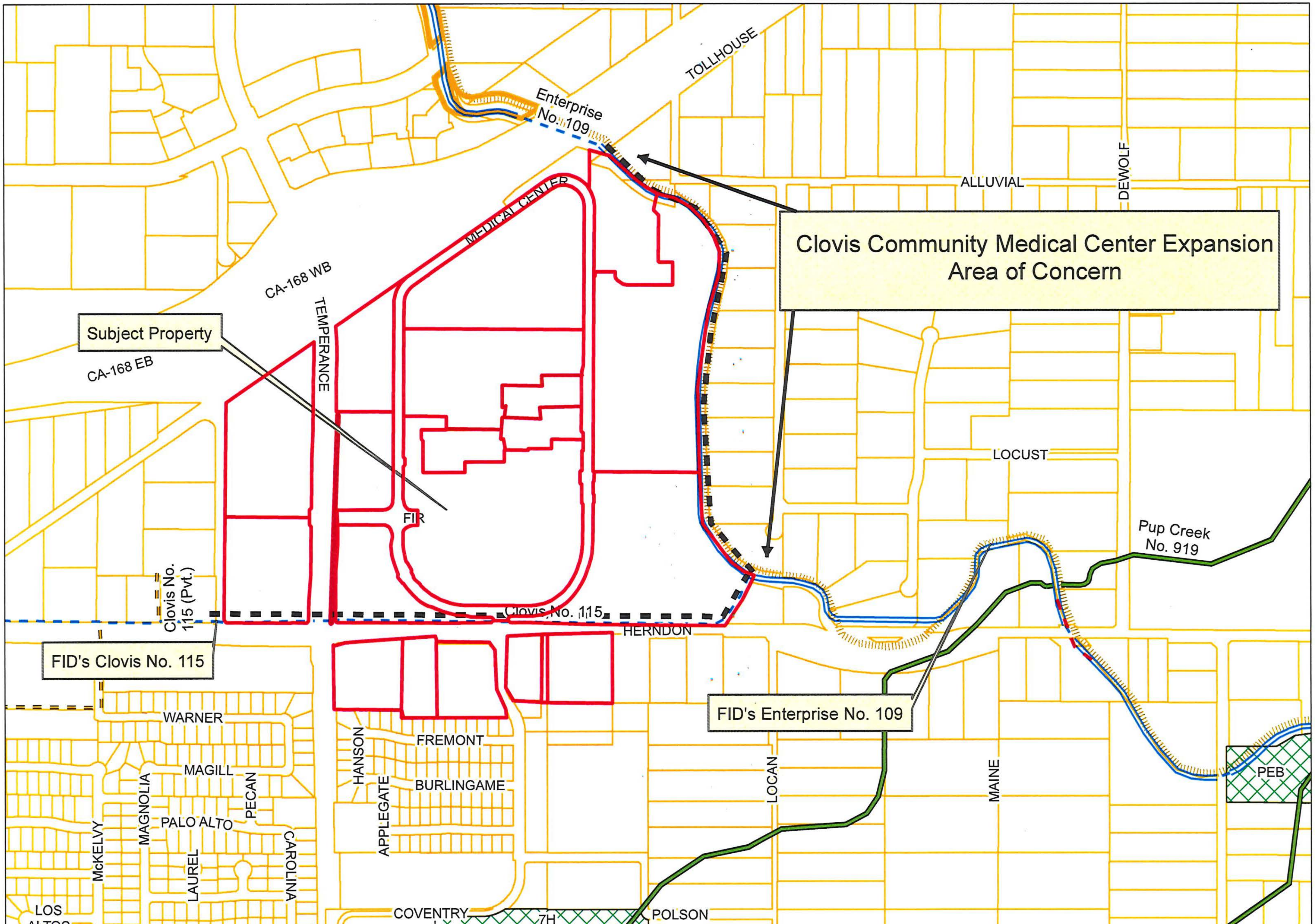

FRESNO IRRIGATION DISTRICT

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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

0 365 730 Feet

1 inch = 721.28 feet

N E S W

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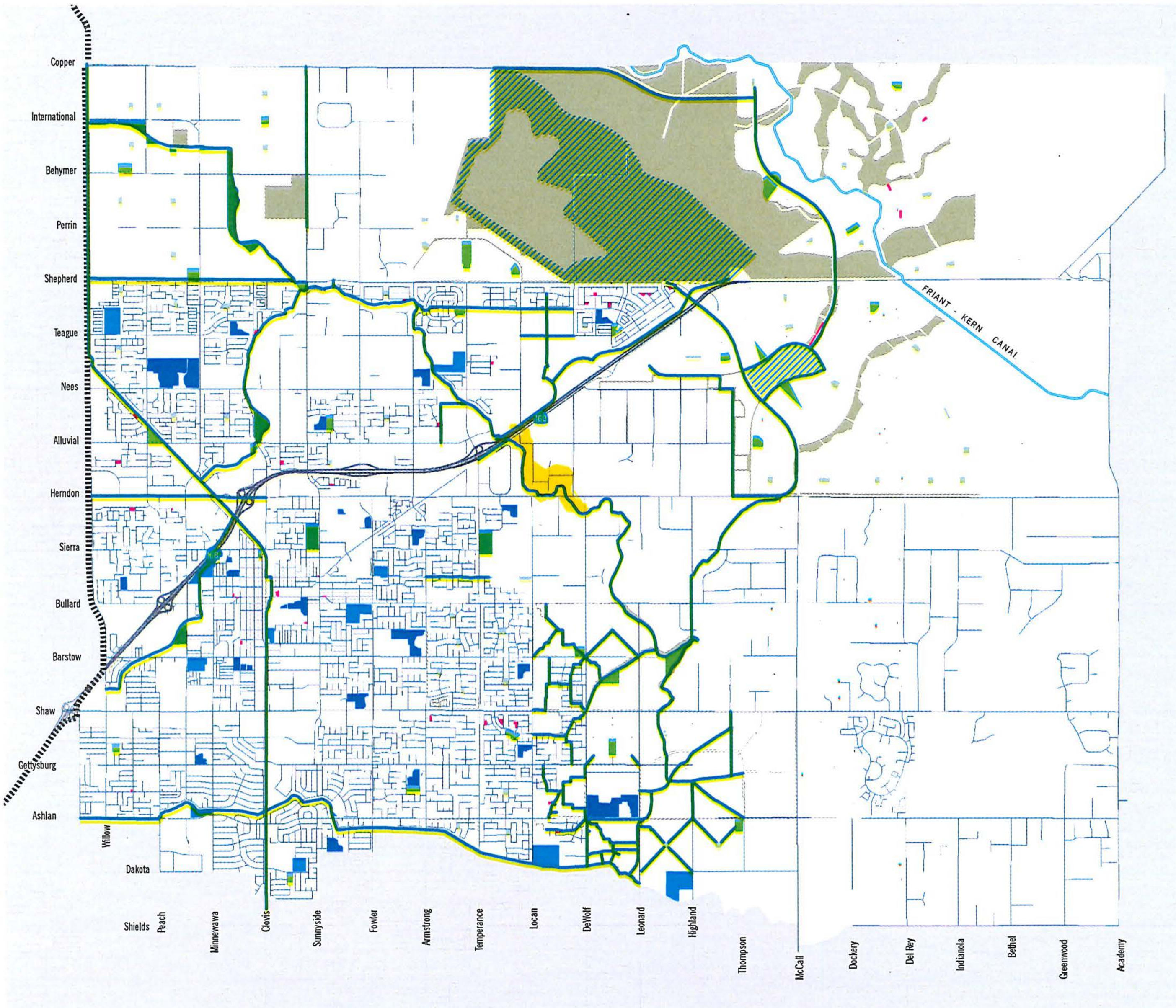
Figure OS-1
Parks & Open Space



Source: City of Clovis, 2014

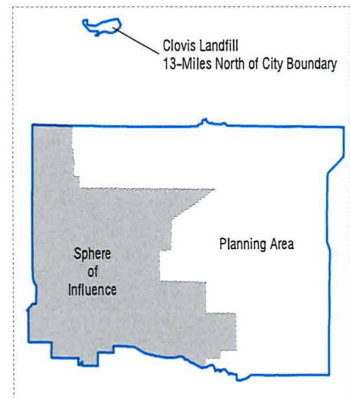
Document Name: OS-1 Parks_and_OpenSpace_120814.MXD

Pocket
Neighborhood
Area
Community
Regional
Dual Basin; Future Dual Basin
School Park/Playfield
Open Space

Class I - Multipurpose Trail

City of Fresno - Trail Alignment

Note:
For complete bike and trail network refer to Figure C-2 - Bicycle and Trails System.

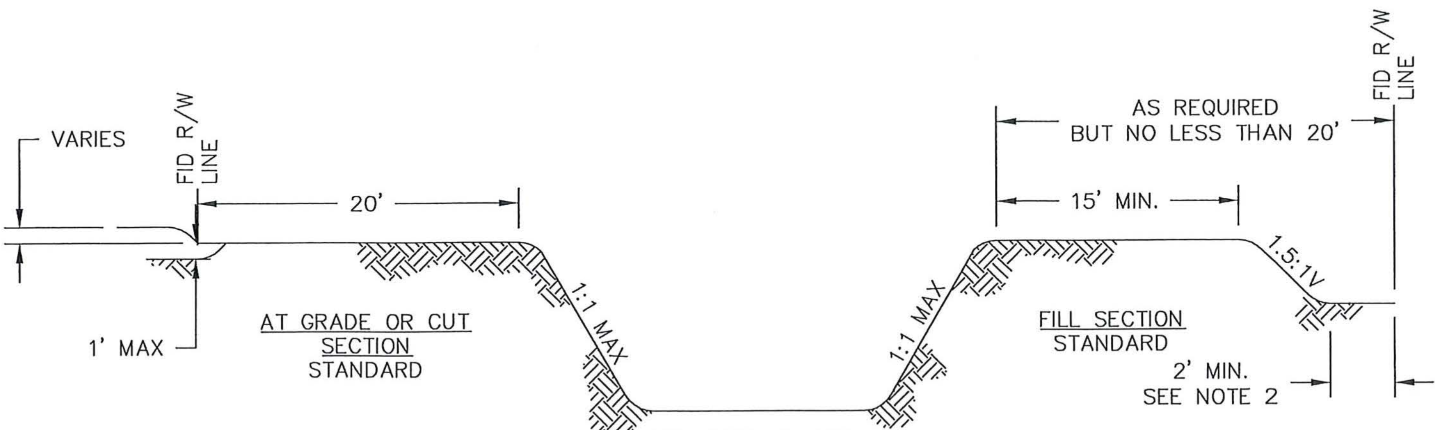


CLOVIS
GENERAL PLAN

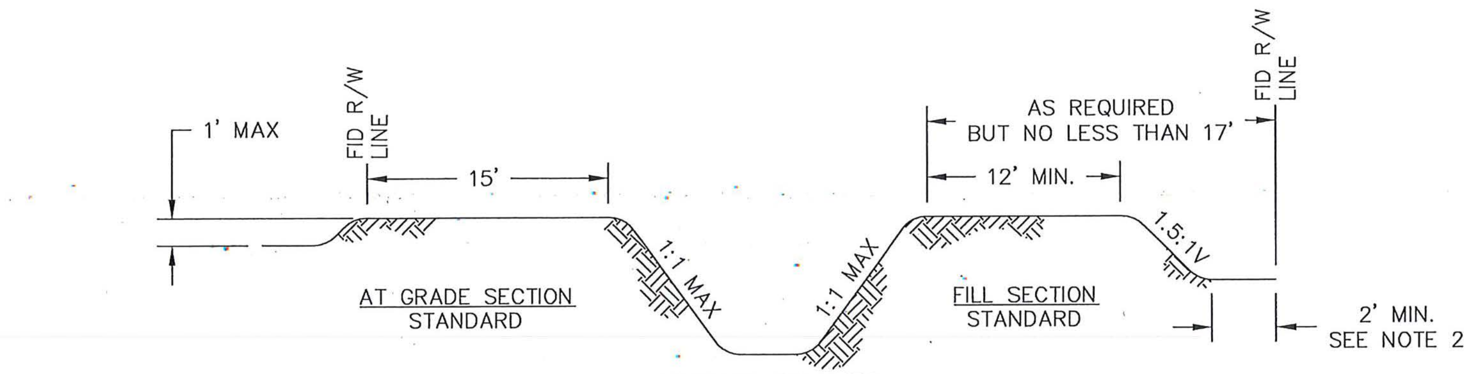
CLO - 14.0 12/9/2014

0 0.5 1 Miles

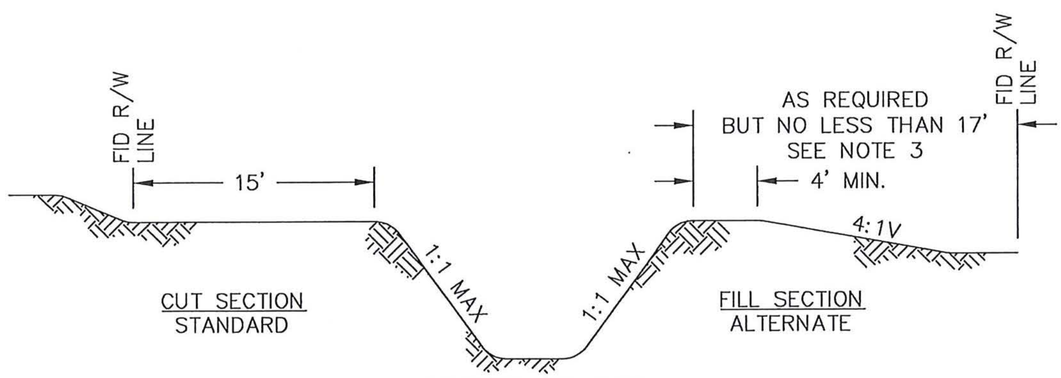
PLACEWORKS



50 CFS & UP



UNDER 50 CFS



UNDER 50 CFS

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# 2016101005

Mr. 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

5-1

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.

5-2

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.

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

Patrick G. Mitchell
pmitchell@mitchellchadwick.com
916-462-8887
916-788-0290 Fax

Comment Letter 6

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:

6-1

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

Suburban
Propane
Storage
Tank

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.

5469 E. OLIVE • FRESNO, CA 93727 • (559) 456-3292 • FAX (559) 456-3194

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

5469 E. Olive Ave. • Fresno, CA 93727 • (559) 456-3292
FAX (559) 456-3194 • www.fresnofloodcontrol.org

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.

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. Contract 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

k:\letters\environmental impact report letters\deir ccmc expansion- herndon widening.docx

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. <u>Voluntary Emissions Reduction Agreement (VERA)</u>

8-1

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)....*"

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

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
8-3 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.

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

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

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 ~~strikethrough~~ 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 be 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

ATTACHMENT 2

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 5th 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, COMMECIAL 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."

* * * * * *

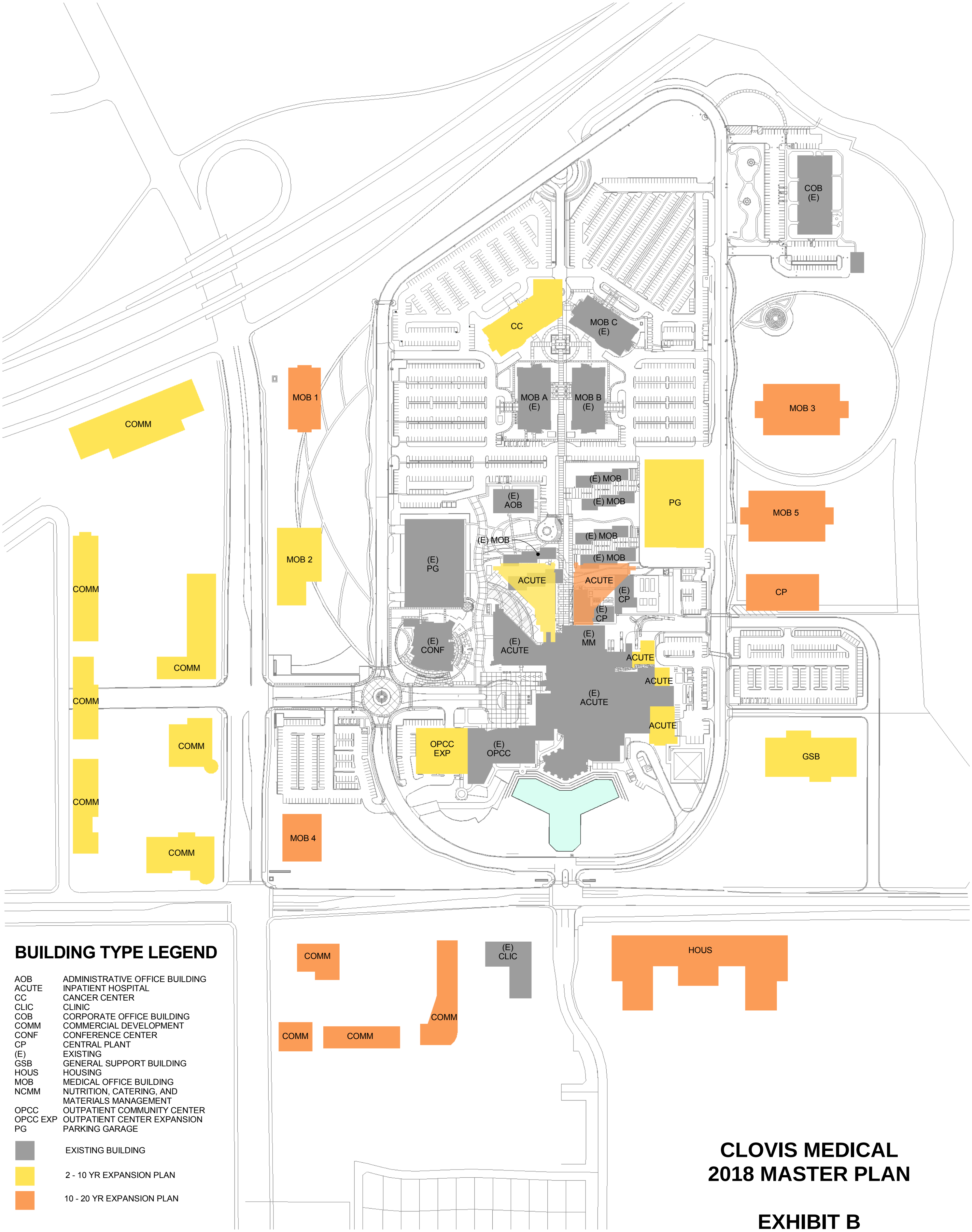
The foregoing resolution was adopted by the Clovis Planning Commission at its regular meeting on May 31, 2018, upon a motion by Commissioner __________, seconded by Commissioner ______________, and passed by the following vote, to wit:

AYES:
NOES:
ABSENT:
ABSTAIN:

PLANNING COMMISSION RESOLUTION 18-___
CONDITIONAL USE PERMIT NO. CUP85-18A11
DATED: May 31, 2018

____
Paul Hinkle, Chairperson

ATTEST: ______________________________
Dwight Kroll, Secretary



BUILDING TYPE LEGEND

AOB	ADMINISTRATIVE OFFICE BUILDING
ACUTE	INPATIENT HOSPITAL
CC	CANCER CENTER
CLIC	CLINIC
COB	CORPORATE OFFICE BUILDING
COMM	COMMERCIAL DEVELOPMENT
CONF	CONFERENCE CENTER
CP	CENTRAL PLANT
(E)	EXISTING
GSB	GENERAL SUPPORT BUILDING
HOUS	HOUSING
MOB	MEDICAL OFFICE BUILDING
NCMM	NUTRITION, CATERING, AND MATERIALS MANAGEMENT
OPCC	OUTPATIENT COMMUNITY CENTER
OPCC EXP	OUTPATIENT CENTER EXPANSION
PG	PARKING GARAGE

EXISTING BUILDING

2 - 10 YR EXPANSION PLAN

10 - 20 YR EXPANSION PLAN

CLOVIS MEDICAL 2018 MASTER PLAN

EXHIBIT B