Lennar Homes
TM6375
Initial Study and Mitigated Negative Declaration

October 2024

PREPARED BY:

Liz Salazar
Assistant Planner
Planning & Development Services
(559) 324-2305
lizs@clovisca.gov

CITY of CLOVIS
PLANNING & DEVELOPMENT
1033 FIFTH STREET • CLOVIS, CA 93612

INITIAL STUDY

This Initial Study was prepared pursuant to the California Environmental Quality Act (CEQA) Public Resources Code Sections 21000 *et seq*., CEQA Guidelines Title 14, Section 15000 et seq. of the California Code of Regulations.

PROJECT TITLE:	Lennar Homes (TM6375)
LEAD AGENCY NAME AND ADDRESS:	City of Clovis Planning & Development Services 1033 Fifth Street Clovis, CA 93612
CONTACT PERSON AND PHONE NUMBER:	Liz Salazar, Assistant Planer (559) 324-2305 lizs@clovisca.gov
PROJECT LOCATION:	South of East Behymer Avenue, between North Minnewawa Avenue and the Enterprise Canal and north of East Shepherd Avenue Clovis, CA
PROJECT SPONSOR'S NAME AND ADDRESS:	Jeff Callaway, Project Manger Lennar Homes of California 8080 North Palm Avenue, Suite 110 Clovis, CA 93711
LAND USE DESIGNATION:	See page 7 of this Initial Study
ZONING DESIGNATION:	See page 7 of this Initial Study
SURROUNDING CONDITIONS AND LAND USES:	See page 6 of this Initial Study
PROJECT DESCRIPTION:	See page 7 of this Initial Study
REQUIRED APPROVALS:	See page 9 of this Initial Study
HAVE CALIFORNIA NATIVE AMERICAN TRIBES REQUESTED CONSULTATION? IF SO, HAS CONSULTATION BEGUN?	Yes, consultation meeting held September 30, 2024, see discussion in H5.

TABLE OF CONTENTS

A. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED 5
B. PROJECT OVERVIEW 6
C. PROJECT LOCATION 6
D. EXISTING SETTING 6
1. Existing Conditions 6
2. Surrounding Conditions 6
3. Land Use Designation 7
4. Zoning Designation 7
E. PROJECT DESCRIPTION 7
1. Project Construction 7
2. Site Preparation 7
3. Project Components 7
F. REQUIRED PROJECT APPROVALS 9
G. TECHNICAL STUDIES 9
H. ENVIRONMENTAL CHECKLIST 17
1. Aesthetics 17
2. Agriculture and Forestry Resources 19
3. Air Quality 22
4. Biological Resources 26
5. Cultural Resources 32
6. Energy 35
7. Geology and Soils 36
8. Greenhouse Gas Emissions 38
9. Hazards and Hazardous Materials 42
10. Hydrology and Water Quality 44
11. Land Use and Planning 48
12. Mineral Resources 49
13. Noise 50
14. Population and Housing 52
15. Public Services 53
16. Recreation 55
17. Transportation 56
18. Tribal Cultural Resources 60

19. Utilities and Service Systems 62
20. Wildfire 65
21. Mandatory Findings of Significance 66
I. REPORT PREPARATION 68

LIST OF FIGURES

FIGURE 1: PROJECT LOCATION 10
FIGURE 2: AERIAL OF PROJECT SITE 10
FIGURE 3: LAND USE DESIGNATION 12
FIGURE 4: ZONING DISTRICT 13
FIGURE 5: PROPOSED SITE PLAN 14
FIGURE 6: PROPOSED DEVELOPMENT STANDARDS 15
FIGURE 7: CONCEPTUAL ELEVATIONS 16

LIST OF TABLES

TABLE 1: SURROUNDING LAND USES 6
TABLE 2: AMBIENT AIR QUALITY STANDARDS 24

A. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, as indicated by the checklist and corresponding discussion in this Initial Study.

☐ Aesthetics	☒ Agriculture & Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Energy
☒ Geology & Soils	☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials
☐ Hydrology & Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☒ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☒ Transportation	☒ Tribal Cultural Resources
☐ Utilities & Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

Determination

On the basis of this initial evaluation:

☐ I find that the proposed Project COULD NOT have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared.

☒ I find that, although the proposed Project could have a significant effect on the environment, three will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponents. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed Project MAY have a significant effect on the environmental, and an ENVIRONMENTAL IMPACT REPORT (EIR) will be prepared.

☐ I find that the proposed Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environmental, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately analyzed in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.

Prepared By:

Liz Salazar, Assistant Planner — Date
City of Clovis Planning & Development Services

Approved By:

2024.10.17 15:44:05-07'00'

Renee Mathis, Director — Date
City of Clovis Planning & Development Services

B. PROJECT OVERVIEW

The Project consists of the annexation (Reorganization (RO) 310 and Rezone (R) 2024-005) of ±201 acres by the City of Clovis (City) and the development of 385 residential lots (Vesting Tentative Tract Map 6375, Planned Development Permit 2024-001) and associated site improvements (i.e., landscaping, parking, sidewalks, and utilities infrastructure) on a ±58.9-acre Project site herein referred to throughout the document as "proposed Project" and/or "Project". Approximately 40 acres of the Project site will be included in the current annexation boundary and the remaining ±20 acres were included in a separate annexation project that was previously approved. A remainder of the Project site Assessor's Parcel Number (APN) 556-050-35S is planned for a future park and it not included as part of the development site. A separate proposed single-family residential project on ±15 acres is included within the annexation boundary; however, is not a part of this Project. The remaining ±146 acres located within the annexation boundary surrounding the Project site do not propose development at this time. The annexation boundary land use designations are proposed as consistent with the 2014 General Plan Land Use designations. Any future development occurring within the annexation area would require a separate project-specific analysis.

C. PROJECT LOCATION

As shown in Figure 1 below, the annexation boundary is located south of East Behymer Avenue, between North Minnewawa Avenue and the Enterprise Canal and north of East Shepherd Avenue totaling ±201 acres. The Project boundary of the 385-lot single-family planned residential development is located east of North Minnewawa Avenue between East Behymer and East Shepherd Avenues within APN(s) 556-030-10S, 12S, 556-050-01, 35S.

The Project site is located within the City's Sphere of Influence (SOI) and within the Northwest Urban Center area identified in the 2014 Clovis General Plan, now referred to as Heritage Grove. The Heritage Grove area is planned and designated for urban development and is a key component to carrying forward City growth. As such, the Heritage Grove area was evaluated at the programmatic level in the City's General Plan Environmental Impact Report (EIR). This document is intended to evaluate the specific elements of the proposed Project.

D. EXISTING SETTING

This section describes the existing conditions, surrounding conditions, as well as the 2014 General Plan land use and zoning designations.

1. EXISTING CONDITIONS

As shown in Figure 2 below, the existing site consists of active almond orchards, disked fields, and several previously occupied residential sites from which the structures and most of the trees were removed at some point in the past. The site is generally flat and includes internal dirt roads. The existing site does not include any pedestrian or other vehicle circulation infrastructure.

2. SURROUNDING CONDITIONS

As referenced in Table 1 below, the Project site is partially surrounded by existing development consisting of single-family residential uses at varying densities to the east. To the north and south of the Project site are existing rural residential homes and to the west is agriculture.

Table 1: Surrounding Land Uses of Project Site

	Land Use Designation*	Existing Land Use
North	Medium and Medium High Density Residential	Rural Residential & Agricultural
East	Medium Density Residential and General Commercial	Single-Family Residential
South	Mixed Use Village and Medium Density Residential	Rural Residential & Single-Family Residential

West	Medium Density Residential	Agricultural
Notes: *Medium Density Residential (4.1-7.0 Dwelling Units/Acre (DU/AC), Medium-High Density Residential (7.1-20.0 DU/AC)		

3. LAND USE DESIGNATION

As shown on Figure 3, the Project site has the General Plan Land Use designations of Medium Density Residential and Park. The residential land use designation allows for a density range of 4.1 to 7.0 DU/AC. According to the 2014 Clovis General Plan, the Medium Density Residential designation is intended for detached and attached single family homes, patio homes, or zero lot lines. The area with the Park land use designation will be a remainder of the Project and is planned to be developed in the future as a park.

4. ZONING DESIGNATION

The Project site is currently within the County of Fresno jurisdiction and zoned AE20 (Exclusive Agricultural). However, the Project site is proposed to be prezoned to the R-1-PRD (Single-Family Planned Residential Development) Zone District. According to Section 9.10.010(B)(5) of the Clovis Municipal Code (CMC), the R-1-PRD Zone District identifies areas appropriate for single-family small lot uses, including attached and detached single-family structures on small lots.

E. PROJECT DESCRIPTION

This section describes the components of the proposed Project in more detail, including site preparation, proposed structures, and on- and off-site improvements.

1. PROJECT CONSTRUCTION

The Project is anticipated to begin construction in April 2025, with full buildout by April 2029. However, first occupancy is assumed to occur by June 2027. This schedule is an estimation only and is contingent upon entitlements, and the market, among other factors.

2. SITE PREPARATION

Site preparation would include removal of exisitng agricultural fields and typical grading activities to ensure a level surface. Part of the preparation would include removal of vegetation, such as grasses, shrubs, and weeds. Other site preparation activities would include excavation for the installation of utility infrastructure, for coneyance of water, sewer, stormwater, and irrigation.

3. PROJECT COMPONENTS

This section describes the overall components of the Project, such as the proposed buildings, landscaping, vehicle and pedestrian circulation, and utilities.

DEMOLITION

As described in existing conditions the former residential structures have been removed; therefore, no demolition of structures is required. The site will require removal of existing almond orchards.

SITE LAYOUT AND CIRCULATION

As shown in Figure 5, the Project proposes 385 individual single-family residential lots ranging in sizes from approximately 2,112 square-feet to 17,087 square-feet, with an average lot size of approximately 3,698 square-feet under Vesting Tentative Tract Map 6375 (TM6375). The Project also proposes two pocket parks. The northern pocket park is approximately 0.57 acres and the southern pocket part is approximately 0.50 acres.

The Project also includes a network of public roadways throughout the neighborhood, which includes ingress/egress off of North Minnewawa Avenue to the west and Clovis Avenue to the east. According to the

Circulation Element of the 2014 Clovis General Plan,[1] the roadways bordering the Project along its western and eastern frontages are designated as arterials.

PLANNED RESIDENTIAL DEVELOPMENT

The Project site proposes to change from the County of Fresno AE20 (Exclusive Agricultural) Zone District to the R-1-PRD (Single-Family Planned Residential Development) Zone District. Approximately 20 acres of the Project site are included in a separate annexation (RO310) and prezoning (R2024-005). Chapter 9.66, Planned Development Permits, of the CMC provides a method whereby land may be designed and developed taking advantage of modern site planning techniques resulting in a more efficient use of land and better living environment than otherwise possible through strict application of the development standards. In general, this section of the CMC provides a mechanism to afford some relief to typical development standards, subject to an approved prezone to the R-1-PRD Zone District.

As part of the requirements for consideration of approval of a Planned Development Permit, the applicant has provided a draft of the proposed development standards, such as height limit, lot coverage, front, rear, and side setbacks that would apply to the proposed TM6375. These development standards are provided as Figure 6.

PARKING

Each single-family home would have a two-car garage. The CMC requires that residential planned unit developments provide a minimum of two (2) covered spaces plus one (1) covered or uncovered guest space for each dwelling unit.[2] Each garage would be required to have an interior dimension of 20 feet by 20 feet.

PROJECT DESIGN

Conceptual elevation designs of the homes are shown in Figure 7; however, it is important to note that at this stage of the process, these designs are conceptual only. The overall footprint, height limit, and placement of the structures, described above, would generally remain the same, however, the color palette and design details are subject to change throughout the Residential Site Plan Review Process (RSPR), which typically occurs later on in the entitlement process.

LANDSCAPE

The Project would include landscape throughout the site. Landscaped areas would generally be located along the perimeter of the site where a variety of ornamental shrubs, plants, and trees would be planted, as well as landscape in areas in the perceived front yard area of each home. Landscape plans are typically provided at a later date at which time the proposed landscape would be reviewed for compliance with the City's water efficient landscape regulations and guidelines.

UTILITIES

Utilities for the site would consist of water, sewer, electric, cable, gas, and stormwater infrastructure. Trenching and digging activities would be required for the installation of necessary pipelines typical of residential development. All utility plans would be required to be reviewed and approved by the appropriate agency, and/or department to ensure that installation occurs to pertinent codes and regulations. Other infrastructure would include new fire hydrants as required by the City of Clovis Fire Department.

Utilities are provided by and managed by a combination of agencies, including the Fresno Irrigation District (FID) which provides the City's water supply, Fresno Metropolitan Flood Control District (FMFCD) which has responsibility for storm water management, and the City's Public Utilities Department which provides for solid

1 2014 Clovis General Plan, Circulation Element, Figure C-1, Circulation Diagram.

2 City of Clovis Municipal Code, Chapter, 9.32, Parking and Loading, Section 9.32.040, Number of Parking Spaces Requires, Table 3-12, Parking Requirements by Land Use.

waste collection, and sewer collection services. Pacific Gas & Electric (PG&E) provides electricity and natural gas within the City of Clovis.

F. REQUIRED PROJECT APPROVALS

The City of Clovis requires the following review, permits, and/or approvals for the proposed Project; however, other approvals not listed below may be required as identified throughout the entitlement process:

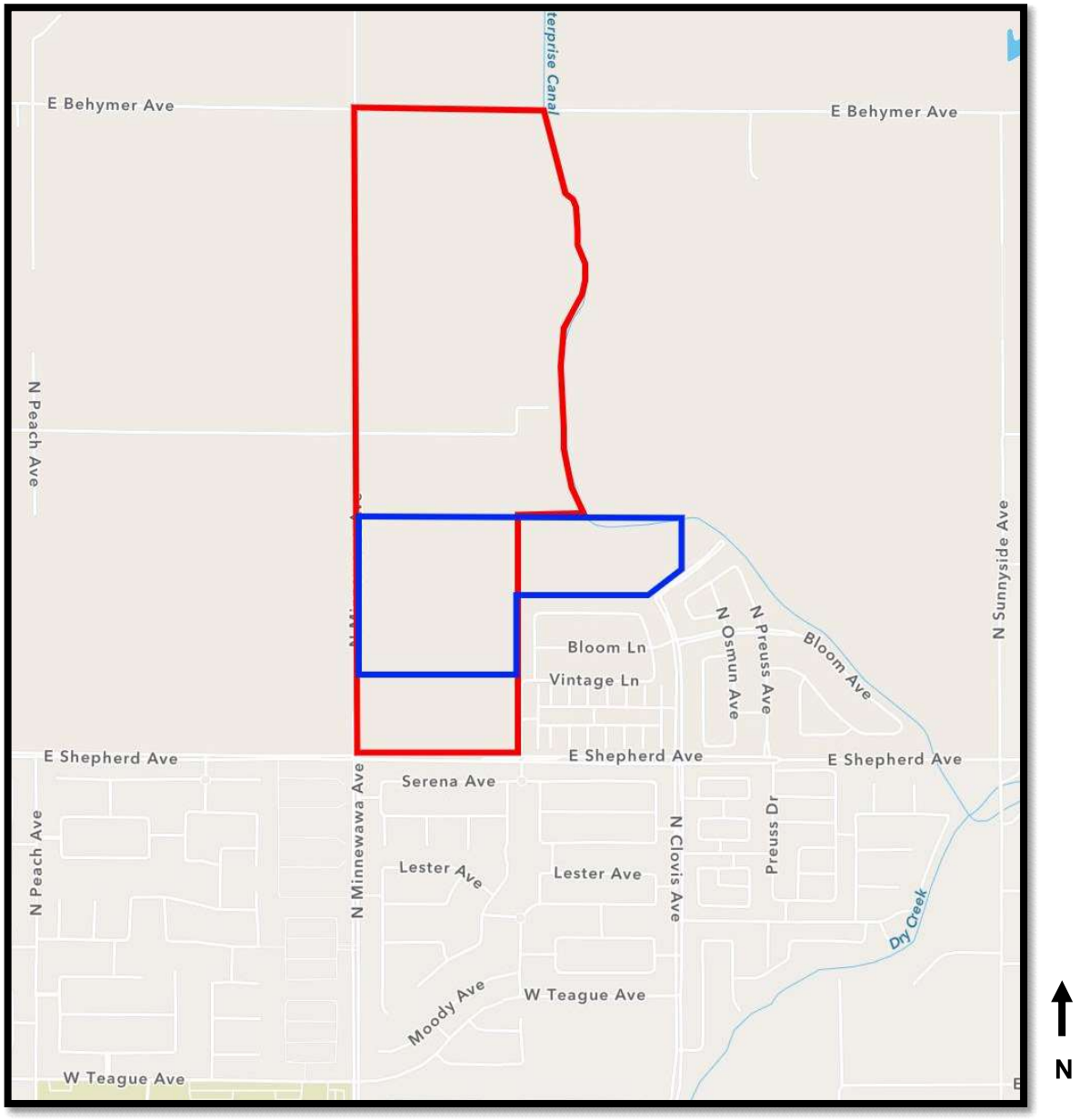
- Annexation
- Rezone
- Vesting Tentative Tract Map
- Planned Development Permit
- Residential Site Plan Review
- Grading Permit(s)
- Building Permit(s)

G. TECHNICAL STUDIES

The analysis of the Project throughout this Initial Study relied in part on the technical studies listed below prepared for the Project, as well as other sources, including, but not limited to, the 2014 Clovis General Plan EIR, departmental staff, California Department of Conservation, and the California Department of Toxic Control Substances.

- **Appendix A:** Air Quality and Greenhouse Gas Impact Assessment dated January 2024
- **Appendix B:** Biological Evaluation Report dated August 2023, revised October 2024
- **Appendix C:** Cultural Resource Study dated November 2023
- **Appendix D:** Acoustical Analysis dated March 2024
- **Appendix E:** Transportation Impact Analysis dated December 2023

Figure 1: Project Location



= Annexation Boundary

= Project Site TM6375

Figure 2: Aerial of Project Site

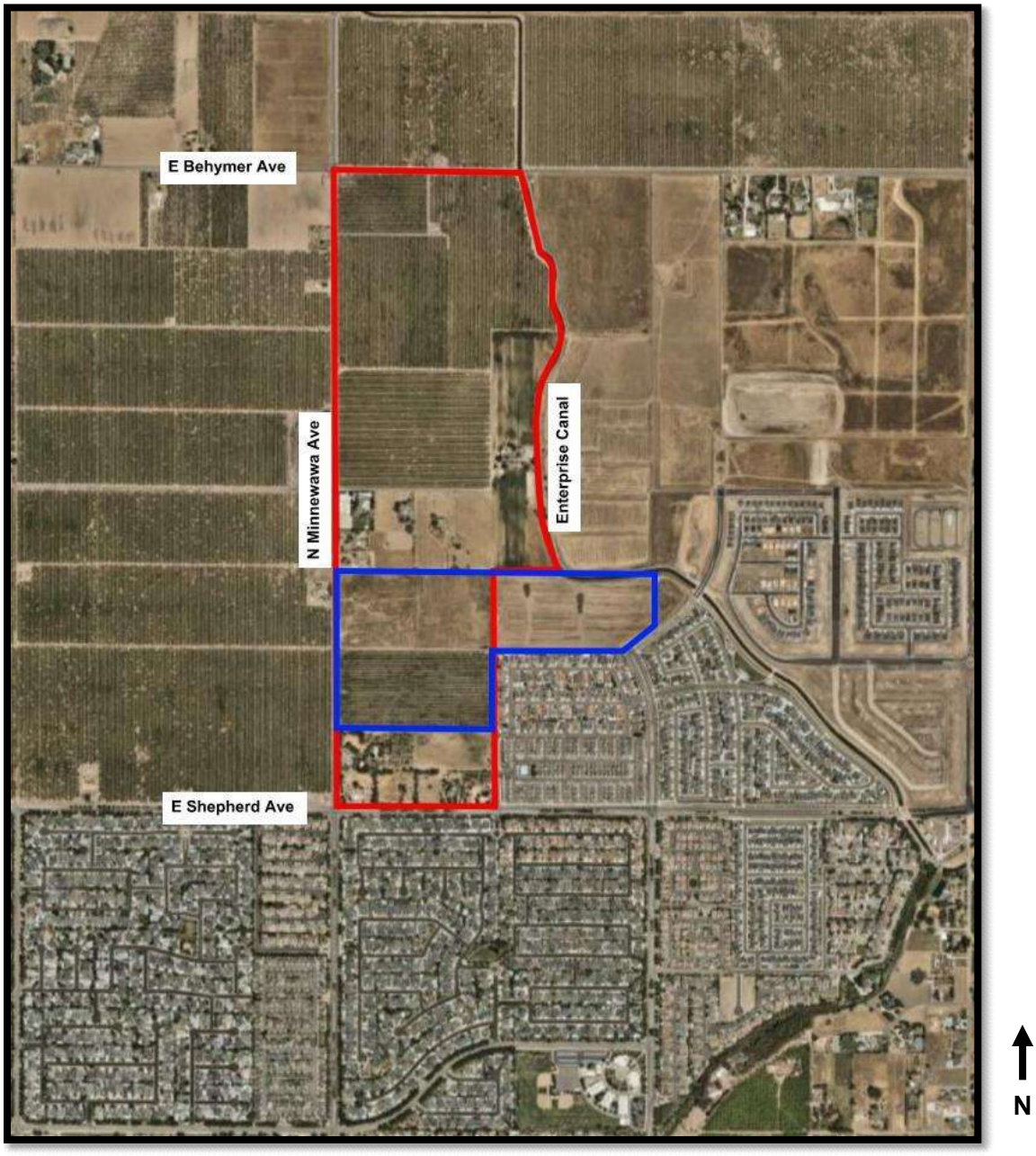


Figure 3: Land Use Designation

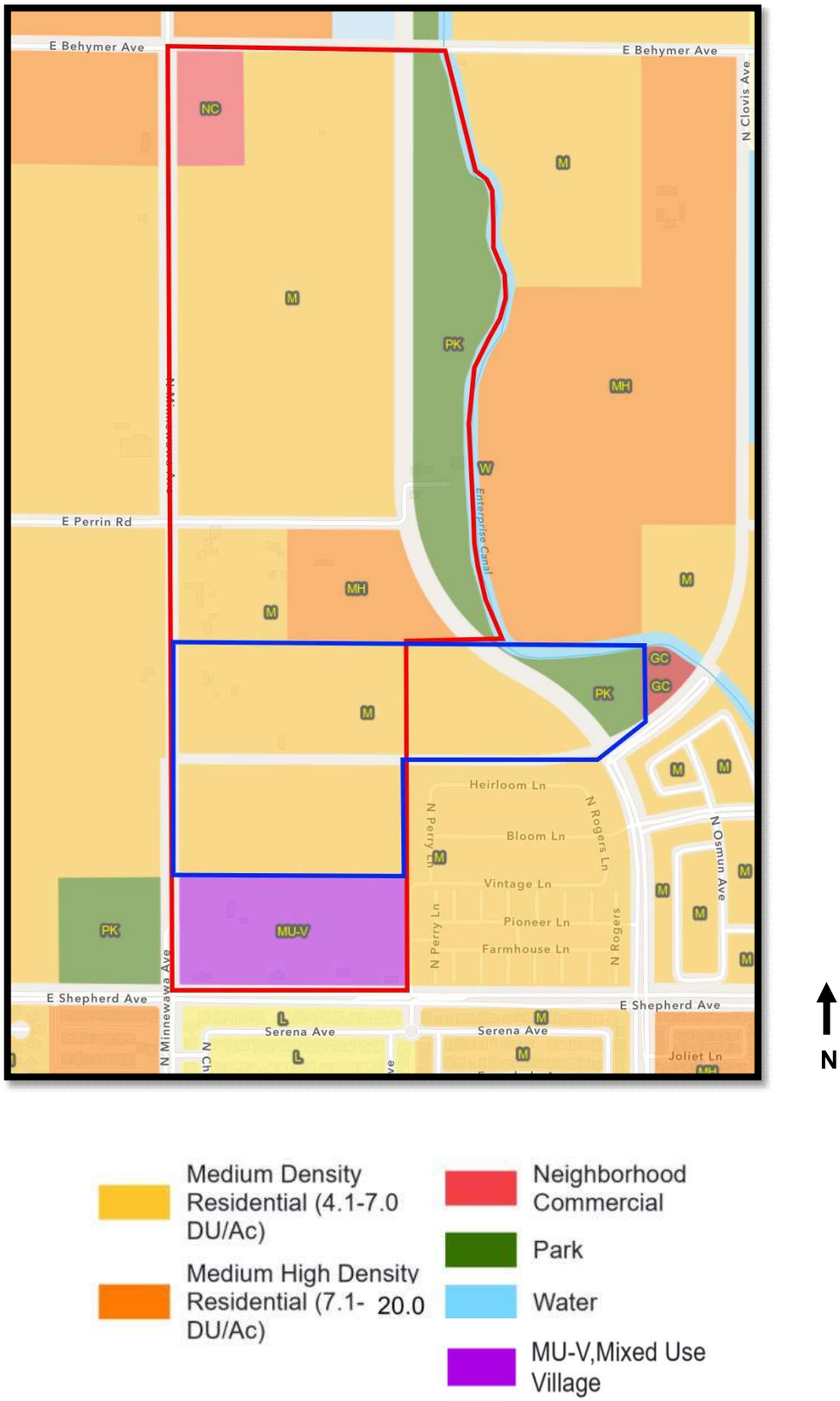


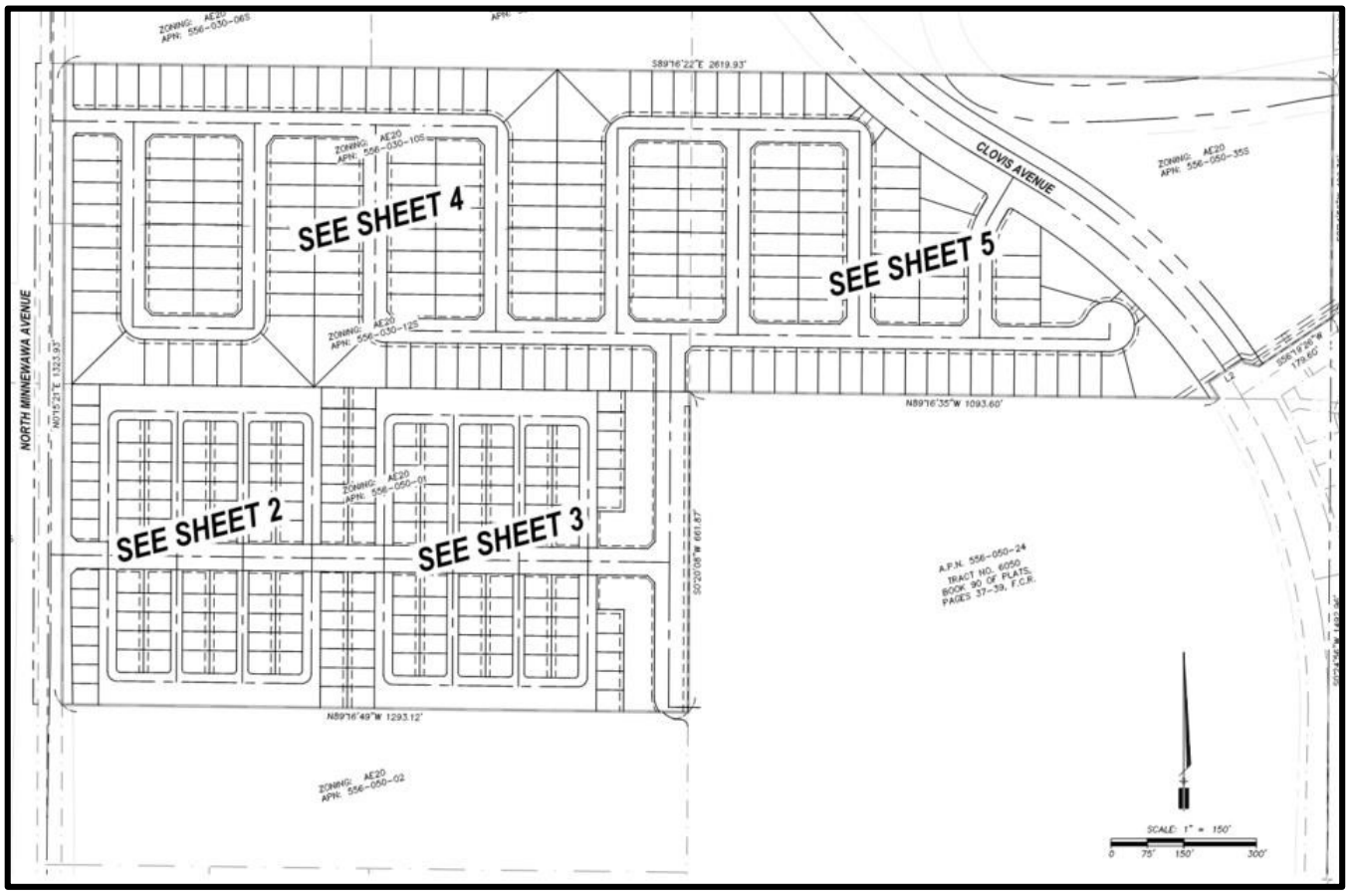
Figure 4: Zoning District



EXISTING ZONING:
AE20 – Exclusive Agricultural (Fresno County)

PROPOSED ZONING:
Various

Figure 5: Proposed Site Plan



Approximate layout

Figure 6: Proposed Development Standards

Designation		
Zone District	R-1 PRD	
GP Density Range	Meduim Density and very low density (8.39 DU/AC)	
Dwelling Units	45	
BUILDING INTENSITY		
Minimum Lot Area	4,230	
Minimum Lot Width	45'	
Minimum Lot Depth	94'	
Maximum Coverage	32%	
Maximum Height	26'3"	
Curved Cul-de-Sac or Corner Lot	N/A	
Permitted Density		
Residential Density	1 Dwelling	
Set Backs (Minimum)		
Front:	16'	
Side:	5'	
Rear:	20 ft. min from property line	
Garages/Street/Parking	2-car	20x20 min
Street (Interior)	36 ft min.	curb-to curb
Parking	Standard city street parking/ Driveway	
Accessory Uses		
Walls/Fences	4'min.-7'	
Pools and Spas	3'min	
Equiptment	N/A	
Covered Structures	12'High max.	

Designation		
Zone District	R-1 PRD	
GP Density Range	Meduim Density and very low density (8.39 DU/AC)	
Dwelling Units	154	
BUILDING INTENSITY		
Minimum Lot Area	4,230	
Minimum Lot Width	45	
Minimum Lot Depth	94	
Maximum Coverage	52%	
Maximum Height	18'11"	
Curved Cul-de-Sac or Corner Lot	N/A	
Permitted Density		
Residential Density	1 Dwelling	
Set Backs (Minimum)		
Front:	12ft. from property line	
Side:	5ft. min from property line	
Rear:	14 ft. min from property line	
Garages/Street/Parking	2-car	20'x20'min
Street (Interior)	36 ft. min	curb-to curb
Parking	Per city standard/Driveway	
Accessory Uses		
Walls/Fences	4'min.-7'	
Pools and Spas	3'min	
Equiptment	N/A	

Designation		
Zone District	R-1 PRD	
GP Density Range	Meduim Density and very low density (8.39 DU/AC)	1 unit per lot
Dwelling Units	188	
BUILDING INTENSITY		
Minimum Lot Area	2,106	
Minimum Lot Width	39'	
Minimum Lot Depth	56'	
Maximum Coverage	62%	
Maximum Height	26'7"	
Curved Cul-de-Sac or Corner Lot	N/A	
Permitted Density		
Residential Density	1 Dwelling	
Set Backs (Minimum)		
Rear Entry:	9'from property line	
Side:	0'ft. Non Patio/7ft. Patio Side	
Front:	4ft. Min from property line to garage	
Garages/Street/Parking	2-car	20x20 min
Street (Interior)	24 ft. min	curb-to curb
Parking	258 Spaces	
Accessory Uses		
Walls/Fences	4'min.-7'	
Pools and Spas	3'min	
Equiptment	N/A	
Covered Structures	12'High max.	

Proposed development standards only. Actual standards may change during the Planned Development Permit and Residential Site Plan Review process.

Figure 7: Conceptual Elevations



Conceptual elevations only. Final product may change during the review process.

H. ENVIRONMENTAL CHECKLIST

This section provides an evaluation of the potential environmental impacts of the proposed project and are based on CEQA Guidelines Appendix G. For each issue area, one of four conclusions is made:

- **No Impact**: No project-related impact to the environment would occur with project development.
- **Less Than Significant Impact:** The proposed project would not result in a substantial and adverse change in the environment. This impact level does not require mitigation measures.
- **Less Than Significant with Mitigation Incorporated**: The proposed project would result in an environmental impact or effect that is potentially significant, but the incorporation of mitigation measure(s) would reduce the project-related impact to a less than significant level.
- **Potentially Significant Impact**: The proposed project would result in an environmental impact or effect that is potentially significant, and no mitigation can be identified that would reduce the impact to a less than significant level.

1. AESTHETICS

Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial effect on a scenic vista?				X
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c. Substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?				X
d. Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?			X	

ENVIRONMENTAL SETTING

The City of Clovis is located within the San Joaquin Valley. Thus, much of the City and its surrounding areas are predominantly flat. As a result, on clear days, the Sierra Nevada Mountains are visible to the east depending on your location. Aside from the Sierra Nevada Mountains, there are no officially designated focal points or viewsheds within the City. Policy 2.3, Visual Resources, of the Open Space Element of the 2014 Clovis General Plan, requires maintaining public views of open spaces, parks, and natural features and to preserve Clovis' viewshed of the surrounding foothills.

In general, the Project site is located in the fringes of Clovis and is situated adjacent to a mix of neighboring agricultural lands, rural residential, and medium density residential housing.

DISCUSSION

a) *Would the project have a substantial effect on a scenic vista?*

No Impact. As mentioned above, there are no officially designated scenic vistas or focal points in the City of Clovis other than the Sierra Nevada Mountains which can be viewed on clear days. The Project would allow structures to be constructed at a maximum height of 26 feet-7 inches. The Project site is located within the southern portion of the Heritage Grove area, which is adjacent to the existing urbanized areas south of Shepherd Avenue. Therefore, because the Project would be constructed at a reduced maximum height in comparison to the standard single family residential zone districts and because the Project site is within the southern portion of the Heritage Grove area, the Sierra Nevada would be preserved and **no impact** would occur with regards to the project having a substantial effect on a scenic vista. As a result, no mitigation measures are required.

b) *Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?*

No Impact. As stated in the 2014 Clovis General Plan EIR, there are no Caltrans-designated scenic highways within the City of Clovis.[3] Further, there are no existing historical structures or rock outcroppings located on or within the immediate vicinity of the site; therefore, the Project would result in **no impact** with regards to substantially damaging scenic resources within a State scenic highway, and no mitigation measures are required.

c) *Would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

No Impact. As mentioned previously, the existing site is currently surrounded by residential uses of various densities and agricultural. Thus, as a proposed medium density residential project, the homes would fit within the character of the surrounding area. Furthermore, the Heritage Grove Master Plan includes a planned linear neighborhood park along the Enterprise Canal to the east of the Project site which will provide quality public views.

Policy 3.6 of the Land Use Element of the Clovis General Plan encourages a mix of housing types, unit sizes, and densities. The Project, being of a similar scale as surrounding development immediately to the east and further south, would comply with Policy 3.6 by resulting in a housing product that adds to the variety of housing stock within the City.

Further, the Project would undergo RSPR which would ensure that the overall design and character is consistent and/or complements the surrounding areas. The RSPR process will ensure the Project complies with relevant design policies, such as in the Heritage Grove Master Plan, the CMC, and the 2014 Clovis General Plan. During the review, the height, color and materials are reviewed for consistency with these plans and guidelines. Consequently, **no impact** would occur with regards to substantially degrading the existing visual character of the site and its surroundings, and no mitigation measures are required.

3 2014 Clovis General Plan EIR, June 2014, Page 5.1-1.

d) *Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?*

Less-Than-Significant Impact. The Project consists of 385 single-family homes. As a result of the existing site being agricultural, the Project would result in new sources of light and glare. Light and glare from the Project would be typical of residential development, including but not limited to, sources such as exterior lighting for safety, light and glare from vehicles or from light reflecting off of surfaces such as windshields. Other sources of light would be the interior lighting of the homes at night. These sources of light and glare are not typically associated with causing significant effects on the environment, especially given that the surrounding developed area to the east and further south already emits similar sources of light and glare and are part of the existing conditions present in the vicinity. Further, the 2014 Clovis General Plan designates the surrounding vicinity as residential and mixed use land uses; therefore, would result in similar sources and intensities of light and glare. Sources of future light and glare are comprised of streetlights, and light and glare from vehicles going to and from home.

Although the Project would introduce new sources of light and glare, the RSPR process would ensure that the design and placement of lighting is appropriate to minimize potential light and glare impacts to surrounding properties. Further, the Project would be required to comply with Section 9.22.050, Exterior Light and Glare, of the CMC, which requires light sources to be shielded and that lighting does not spillover to adjacent properties.

Overall, through the City's design review process and compliance with Section 9.22.050 of the CMC, the Project would result in a **less-than-significant impact** with regard to lighting adversely affecting day or nighttime views in the area. No mitigation measures are required.

2. AGRICULTURE AND FORESTRY RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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.		X		
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?		X		
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220 (g)) or timberland (as defined in Public Resources Code section 4526)?				X
d. Result in the loss of forest land or conversion of forest land to non-forest use?				X
e. Involve other changes in the existing environment which, due to their location or nature, could result in		X		

conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?				

ENVIRONMENTAL SETTING

The Project annexation area is bounded by Behymer to the north, Shepherd to the south, Minnewawa to the east, and generally the Enterprise Canal to the west. The Project site proposes to develop ±58.9 acres into a 385-lot single-family residential development. The site is within the fringe of the City and is surrounded by existing residential to the east and further south.

DISCUSSION

a) *Would the project 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?*

Less Than Significant Impact with Mitigation. According to the California Important Farmland finder interactive map from the California Department of Conservation,[4] the Project site contains Prime Farmland and Farmland of Statewide Importance (2020 data). The proposed Project would develop ±58.9 acres into a 385-lot single-family residential development. Therefore, development of the proposed Project would result in the conversion of Prime Farmland and Farmland of Statewide Importance to a non-agricultural use.

The City of Clovis 2014 General Plan identifies that the 2035 buildout of the General Plan would result in significant unavoidable impacts related to conversion of Prime Farmland, Unique Farmland, and Farmland of Statewide importance. Thus, the potential impacts associated with the conversion of farmlands as described above were evaluated in conjunction with the General Plan EIR. This initial study relies on the General Plan EIR through the tiering concept (Section 15152 of the CEQA Guidelines) with regard to the analysis of potential farmland conversion impacts associated with the Project. As stated in the General Plan EIR, City policies seek to preserve the agricultural legacy of Clovis by facilitating thoughtful conversion of farmland, and supporting "right to farm" and regional conservation efforts. Therefore, with the inclusion of the following Mitigation Measure, impacts in this category will be reduced to a **less than significant impact with mitigation**.

> Mitigation Measure AGR-1: The Project applicant shall prepare or fund an agricultural resource evaluation prior to project approval. The resource evaluation shall be use generally accepted methodologies (such as the Land Evaluation and Site Assessment Model) to identify the potentially significant impact of the loss of agricultural land. If the loss of agricultural land is determined to be a potentially significant impact, the resource evaluation shall consider the economic viability of future agricultural use of the property. If the agricultural resource is considered significant and future agricultural use is considered economically viable, the conversion will be deemed significant. The City shall require mitigation by one of the following methods:
>
> - Mitigation at a 1:1 ration of converted to preserved acreage through a regional conservation easement, or payment of its valuation equivalent if a fee mitigation program is established. If 1:1 mitigation is determined to be economically infeasible, based upon all of the evidence, the ratio may be reduced to an economically feasible ratio or no further mitigation shall be required. This

4 Farmland Mapping, California Department of Conservation, Interactive mapping tool, https://maps.conservation.ca.gov/DLRP/CIFF/ accessed October 1, 2024.

determination shall be made by the City's Director of Planning and Development Services based upon substantial evidence in the record; or

- Other potential mitigation which achieves the same mitigating effect as the measures identified above, consistent with the CEQA Statutes and Guidelines. This determination shall be made by the City's Director of Planning and Development Services based upon substantial evidence in the record.

The Project site is not designated for farming-related activities under the 2014 General Plan as such would be consistent with the planned growth of the Heritage Grove area and as identified in the General Plan EIR the conversion of farmlands of importance cannot be mitigated. Consequently, because the Project would not result in unplanned impacts to important farmland, a **less than significant impact with mitigation** would occur.

b) *Would the project conflict with existing zoning for agricultural use, or a Williamson Act Contract?*

Less Than Significant Impact with Mitigation. The Project includes annexation of the ±201-acre area from Fresno County jurisdiction to the City of Clovis with development of ±58.9-acres for a 385-unit single family residential subdivision. The annexation area is currently zoned within the Exclusive Agricultural Zoning District (AE-20) of Fresno County. As previously discussed, the Project is located within the Heritage Grove area. The City of Clovis has identified Heritage Grove for development, and as such plans on annexing land within Heritage Grove into the City of Clovis. Once annexation has been completed, the parcels within the Project area will be zoned in accordance with Chapter 9.08, Zoning District, of the CMC and consistent with designated land uses outlined in the City's General Plan. All parcels within the Project annexation area will not be zoned for agricultural uses.

Assessor's Parcel Number 556-030-17S is currently under a Williamson Act contract; however, does not currently propose development. When APN 556-030-17S is identified for development, a Williamson Act cancellation process for the parcel would be required to take place prior to the issuance of building permits for such future project. As such, Mitigation Measure AG-1 would be implemented to ensure compliance with the required procedure for cancellation of the Williamson Act contract for APN 556-030-17S. As a result, with implementation of Mitigation Measure AG-1, the proposed Project would not conflict with zoning for agriculture or a Williamson Act contract, and the impact would be **less-than-significant impact with mitigation**.

Mitigation Measure AGR-2: Prior to issuance of building permits for development of APN 556-030-17S, the project applicant would be required to petition for cancellation of the Williamson Act contract for APN 556-030-17S. The applicant would have to meet circumstances and conditions set forth in Government Code Section 51280. After approval of the cancellation petition, the applicant would be able to develop uses that comply with the zoning designation of the parcel per the Clovis Municipal Code.

c) *Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220 (g)) or timberland (as defined in Public Resources Code section 4526)?*

No Impact. The Project site does not contain forest land and is not zoned for forestry or other forestry related uses. Further, the General Plan EIR states that there is no land within the existing SOI that is zoned as forest land or timberland. As a result, **no impact** would occur with regards to conflicts with zoning for, or cause rezoning of, forest land. No mitigation measures are required.

d) *Would the project result in the loss of forest land or conversion of forest land to non-forest use?*

No Impact. See discussion under Section 2c.

e) *Would the project 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 Impact with Mitigation. Although the Project site for development of 385-single family homes contains Prime Farmland and Farmland of Statewide Importance according to the Department of Conservation, the site is not designated for agricultural uses, see discussion in Section 2a. The 2014 Clovis General Plan designates the Project site for residential uses. The Project annexation area is located within the Heritage Grove area which is planned to be converted to non-agricultural land pursuant to the 2014 General Plan. However, given that the development within the annexation area would be phased over time, some adjacent agricultural uses would continue to operate until other projects are proposed to be constructed. The City's General Plan contains policies to aid in the preservation of agricultural land, including Policies 2.4 and 2.5 of the General Plan's Open Space and Conservation Element. As such Mitigation Measure AG-2 would be implemented to ensure notification of Right-To Farm to future residents of the Project site, such that residents would be prepared to accept inconveniences and discomfort associated with normal farm activities on parcels adjacent to the Project site. Issuance of Right-to-Farm notifications would prevent agricultural operations from being the subject of nuisance complaints and being forced to cease or curtail operations. The Project site is not designated for forest or timberland. With implementation of Mitigation Measure AG-2, the proposed Project would not result in conversion of farmland to non-agricultural use, and the impact would be **less-than-significant impact with mitigation**.

Mitigation Measure AGR-3: Pursuant to Clovis Municipal Code Section 9.40.170 and the California Civil Code Section 3482.5, prior to approval of building occupancy permits the Project developer shall provide residents of the Project site Right-To-Farm notifications. The Right-To-Farm notification would advise future occupants of the Project site that they are residing adjacent to agricultural land that has been active for three or more years and that they should expect continued activities associated with agricultural production.

3. AIR QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?			X	
b. 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?			X	
c. Expose sensitive receptors to substantial pollutant concentrations?			X	
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?				X

ENVIRONMENTAL SETTING

An Air Quality and Greenhouse Gas Impact Assessment (AQ/GHG Report) was prepared by VRPA Technologies, Inc. in January 2024 (see Appendix A). Information in this AQ/GHG Report is used for the analysis included in both the Air Quality and Greenhouse Gas Emissions section of this Initial Study.

San Joaquin Valley Air Basin

The City of Clovis (City) is in the central portion of the San Joaquin Valley Air Basin (SJVAB). SJVAB consists of eight counties: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare. Air pollution from significant activities in the SJVAB includes a variety of industrial-based sources as well as on- and off-road mobile sources. These sources, coupled with geographical and meteorological conditions unique to the area, stimulate the formation of unhealthy air.

The SJVAB is approximately 24,840 square miles and is the second largest air basin in California. It is bordered by the Sierra Nevada to the east, the Coast Ranges to the west, and the Tehachapi mountains to the south. The SJVAB is open to the north extending to the Sacramento Valley Air Basin.

Topography[5]

The topography of a region is important for air quality because mountains can block airflow that would help disperse pollutants and can channel air from upwind areas that transports pollutants to downwind areas. Wind patterns within the SJVAB generally flow into the basin from the San Joaquin River Delta. The mountain ranges from the west hinder wind access into the SJVAB while the Sierra Nevada Mountain Range provides a barrier to the east. As mentioned above, these topographic features result in weak airflow that becomes restricted vertically by high barometric pressure over the SJVAB.

Climate[6]

The SJVAB is in a Mediterranean climate zone. Mediterranean climates are characterized by hot, dry summers with sparse rainfall, which occurs mainly in winter. Summertime maximum temperatures often exceed 100°F while winter low temperatures range between 40-50 degrees and is not uncommon to drop below freezing.

In addition to the topographic conditions, the climate can contribute to air quality problems. Temperature inversions can trap air within the SJVAB, thereby preventing the vertical dispersal of air pollutants.
Any emissions of pollutants can be trapped below the inversion.

Ozone often afflicts aeras downwind of the original source and can be easily transported by winds. Peak ozone tends to be higher in the southern portion of the SJVAB. Other primary pollutants such as carbon monoxide may form in high concentrations when wind speed is low, during winder cooler temperatures and calm conditions increase the likelihood of carbon monoxide concentrations.

Ambient Air Quality Standards

The Clean Air Act (CAA) was passed in 1963 by the US Congress and has been amended several times. The 1970 Clean Air Act amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including nonattainment requirements for areas not meeting National AAQS and the Prevention of Significant Deterioration program. The 1990 amendments represent the latest in a series of federal efforts to regulate the protection of air quality

5 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 18, January 2024.

6 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 18-19, January 2024.

in the United States. The CAA allows states to adopt more stringent standards or to include other pollution species. The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the state to achieve and maintain the California AAQS by the earliest practical date. The California AAQS tend to be more restrictive than the National AAQS, based on even greater health and welfare concerns.

These National and California AAQS are the levels of air quality considered to provide a margin of safety in the protection of the public health and welfare. They are designed to protect "sensitive receptors," those most susceptible to further respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both California and the federal government have established health-based AAQS for seven air pollutants. As shown in Table 4, Ambient Air Quality Standards for Criteria Pollutants, these pollutants are ozone (O3), nitrogen dioxide (NO2), carbon monoxide (CO), sulfur dioxide (SO2), coarse inhalable particulate matter (PM10), fine inhalable particulate matter (PM2.5), and lead (Pb). In addition, the state has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to the criteria pollutants, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are injurious in small quantities and are regulated despite the absence of criteria documents. The identification, regulation and monitoring of TACs is relatively recent compared to that for criteria pollutants. Unlike criteria pollutants, TACs are regulated on the basis of risk rather than specification of safe levels of contamination.

Table 2: Ambient Air Quality Standards[7]

Pollutant	Averaging Time	State Standard	Federal Primary Standard
Ozone	1-Hour 8-Hour	0.09 ppm 0.07 ppm	-- 0.07 ppm
Carbon Monoxide	1-Hour 8-Hour	20 ppm 9 ppm	35 ppm 9 ppm
Nitrogen Dioxide	1-Hour Annual	0.18 ppm 0.030 ppm	100 ppb 0.053 ppm
Sulfur Dioxide	1-Hour 3-Hour 24-Hour Annual	0.25 ppm -- 0.04 ppm --	75 ppb -- 0.14 ppm 0.030 ppm
PM_{10}	24-Hour Annual	50 ug/m^3 20 ug/m^3	150 ug/m^3 --
$PM_{2.5}$	24-Hour Annual	-- 12 ug/m^3	35 ug/m^3 12 ug/m^3
Lead	30-Day Avg. Calendar Quarter 3-Month Avg.	1.5 ug/m^3 -- --	-- 1.5 ug/m^3 0.15 ug/m^3
Sulfates	24 Hour	25 ug/m^3	--
Hydrogen Sulfide	1 Hour	0.03 ppm	--

7 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 9, January 2024.

Vinyl Chloride	24 Hour	0.01 ppm	--
Notes: ppm = parts per million; ppb = parts per billion; ug/m3 = micrograms per cubic meter.			
Source: Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 10, January 2024.			

Attainment Status[8]

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the responsible agency for monitoring and regulating air pollutant emissions from stationary, area, and indirect sources within Fresno County and throughout the SJVAB. The SJVAPCD prepares plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, issuance of permits for stationary sources of air pollution, inspection of stationary sources of air pollution and response to citizen complaints, monitoring of ambient air quality and meteorological conditions, and implementation of programs and regulations required by FCAA and CCAA. The SJVAPCD adopted the San Joaquin Valley Air Quality Attainment Plan (AQAP), in response to the requirements of the State CCAA.

The SJVAPCD and the California Air Resources Board (CARB) maintain numerous air quality monitoring sites throughout each County to measure ozone, PM2.5, and PM10. The SJVAB is nonattainment for ozone (1 hour and 8 hour) and PM. The EPA uses standard classifications to reflect the severity of the nonattainment problem; classifications range from marginal nonattainment to extreme nonattainment. The SJVAB was classified as extreme nonattainment for ozone by the EPA (2004). The federal 1 hour ozone standard was revoked on June 6, 2005.

DISCUSSION

a) *Would the project conflict with or obstruct implementation of the applicable air quality plan?*

Less-Than-Significant Impact. The primary way of determining consistency with the air quality plan's assumptions is determining consistency with the General Plan to ensure that the Project's density and land use are consistent with the growth assumption used in the air quality plan. The Project is consistent with the currently adopted 2014 Clovis General Plan; therefore, is consistent with the growth assumptions under the applicable air quality plan and per the AQ/GHG Report, the Project will not conflict with or obstruct implementation of any air quality plans. [9]

The SJVAPCD provided a comment letter, dated October 8, 2024 indicating that the Project may exceed thresholds for criteria pollutants. However, the Project would be subject to compliance with District Rule 9510 which is intended to reduce a project's impact through project design elements or payment of off-site fees. The Project applicant would be required to submit to the SJVAPCD an Air Impact Assessment (AIA). Further, the Project would be required to submit a Dust Control Plan (DCP) to the SJVAPCD for review and approval. Consequently, a **less-than-significant** impact would occur and no mitigation measures are required.

b) *Would the project 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?*

Less-Than-Significant Impact. The Fresno County area is nonattainment for Federal and State air quality standards for ozone and PM2.5 and nonattainment for State standards for PM10. The SJVAPCD has prepared the 2016 and 2013 Ozone Plans, 2007 PM10 Maintenance Plan, and 2012 PM2.5 Plan to achieve Federal and

8 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 14, January 2024.

9 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 52-53, January 2024.

State standards for improved air quality in the SJVAB regarding ozone and PM[10]. The Project is consistent with the 2014 Clovis General Plan; therefore, the population growth associated with the Project was evaluated with the adopted General Plan EIR. Air pollution is largely a cumulative impact of both past and future development. Future attainment of State and Federal ambient air quality standards relies on implementation of SJVAPCDs attainment plans. Results of the analysis based on the AQ/GHG Report show that emissions generated from construction and operation of the Project will be **less-than-significant**; therefore, no mitigation measures are required.

c) *Would the project expose sensitive receptors to substantial pollutant concentrations?*

Less-Than-Significant Impact. Sensitive receptors are generally considered to include children, the elderly, and persons with pre-existing respiratory and cardiovascular illness. A sensitive receptor is a location that houses or attracts children, the elderly, or people with illnesses. Examples of these receptors are considered to be hospitals, residences, schools and school facilities, daycare facilities, and convalescent facilities. The Project proposes development of residences; therefore, will potentially house sensitive receptors. Based the AQ/GHG Report, an evaluation of nearby land uses considering CARB's Pollution Mapping Tool shows that the Project will not place sensitive receptors in the vicinity of exiting toxic sources and is located more than 2.5 miles from the State Route 168 freeway[11]; therefore, a **less-than-significant** impact would occur and no mitigation measures are needed.

d) *Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*

No Impact. Generally, sources considered to emit odors are associated with wastewater treatment facilities, sanitary landfills, petroleum refineries, chemical manufacturing, and other industrial/manufacturing related uses. The Project is a residential use, thus, the odors associated with such use would be similar to that of the surrounding area which includes and is planned for residential uses. Overall, because the Project is a residential use, similar to existing residential uses, the types of odors that could result from the Project would not be considered an objectionable odor source. Thus, a **no impact** would occur.

4. BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?		X		
b. Have a substantial adverse effect on any riparian habitat or other				X

10 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 53, January 2024.

11 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 53-54, January 2024.

	sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?				
c.	Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
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?				X
e.	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
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?				X

ENVIRONMENTAL SETTING

A program-level evaluation of biological resources was completed by LSA in the fall of 2021 and winter of 2022 for an area encompassing the entire annexation boundary. A project-level Biological Evaluation Report (Biological Report) was prepared by Live Oak Associates, Inc. (LOA) in August 2023 (see Appendix B). This Biological Report included an investigation of the biotic resources of the ±58.9 acre Project site and assessed potential project-related impacts pursuant to CEQA. Any future development occurring within the annexation area would require a sperate project-specific analysis.

With regard to the program-level evaluation, LSA biologists conducted a literature review and records search to identify the existence and potential for occurrence of sensitive or special-status plant and animal species in the vicinity of the Project and associated annexation area. Federal and State lists of sensitive species were also examined. Electronic database records reviewed included the California Natural Diversity Database (CNDDB), California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants, and United States Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI). Historic and current aerial imagery, existing environmental reports for developments in the project vicinity, regional habitat conservation plans, and local land use policies related to biological resources were also reviewed. A field survey covering the study area was conducted on December 6, 2021.

With the exception of the Enterprise No. 109 Canal, the area evaluated in the programmatic evaluation was found to be strictly upland in nature with well-drained soils and vegetation consisting of disturbed annual grassland with patches of mixed herbaceous ruderal/invasive species and bare ground in several areas. Other areas of the study area are primarily developed or used for agricultural purposes. Ongoing soil disturbance and the resulting competitive exclusion by invasive non-native plants limit the potential for native flora to occur within the study area. No native or special-status vegetation communities were found to exist in the study area. No special-status plant species were observed during the December 2021 field survey; however, the field survey was conducted outside of the typical blooming season for several regionally-occurring special-status plant species.

Habitat in the area is considered low quality with respect to most of the regionally-occurring special-status animal species, and no special-status species were observed during the field survey. However, three special-status animal species— burrowing owl (*Athene cunicularia*), Swainson's hawk (*Buteo swainsoni*), and California horned lark (*Eremophila alpestris actia*)—have at least a low potential to occur in the general area due to the presence of suitable habitat and known occurrence records in the vicinity. The study area also contains suitable foraging habitat for special status bird species, such as Swainson's hawk and golden eagle (*Aquila chrysaetos*), among many other common resident and migratory bird species.

As part of the project-specific Biological Report, the Project site was surveyed in July 2023 for habitat, plants, and animals. The existing Project site is vacant and undeveloped with of active almond orchards, disked fields, and several previously occupied residential sites from which the structures and most of the trees were removed at some point in the past. The following analysis is informed by the programmatic evaluation described above, but is primarily based on information provided by the project-level Biological Report prepared by LOA, due to its focus on the Project area and its more recent preparation.

DISCUSSION

a) *Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

Less-Than-Significant Impact With Mitigation. As described in the Biological Report, a reconnaissance-level field survey of the Project site was conducted July 12, 2023 and October 16, 2024 by LOA. The survey consisted of driving and walking throughout the site to identify habitats, plant, and animal species. During the field survey, three biotic habitats were identified within the Project site: orchard, ruderal, and artificial pond[12].

As part of the Biological Report, a search of the California Natural Diversity Database (CNDDB) was conducted to determine the possible presence of special-status species (plants and animals) in the vicinity of the Project. According to the search and field survey sixteen special status plant species were found within the Project vicinity, one of these species, the Stanford's arrowhead (Sagittaria sanfordii), has some potential to occur on the Project site. During LOA's survey, several Sanford's arrowhead populations were identified immediately adjacent to the project site in the Enterprise Canal, and a different member of the same genus, S. montevidensis, was noted in one of the site's ponded areas. If the Sanford's arrowhead were to colonize any of the site's ponded areas prior to residential buildout, individuals and populations of this species would be lost.[13] The remaining fifteen special status plants are considered absent from or unlikely to occur on the Project site. With

12 Biological Evaluation Report for Lennar Homes Tract 6375 prepared by Live Oak Associates, Inc., page 6, August 2023, revised October 2024.

13 Biological Evaluation Report for Lennar Homes Tract 6375 prepared by Live Oak Associates, Inc., page 29, August 2023, revised October 2024.

implementation of Mitigation Measure BIO-1, 2, and 3 the proposed Project would not result a substantial effect on the Stanford's arrowhead, thus resulting in a **less-than-significant impact with mitigation**.

Mitigation Measure BIO-1: **Sanford's arrowhead.** Prior to the start of construction, a qualified biologist will conduct protocol-level rare plant surveys following California Department of Fish and Wildlife's 2018 Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities, or most current agency guidance. Surveys will target all habitats of the Project site that could potentially support the Sanford's arrowhead, and will be conducted when local populations of the Sanford's arrowhead are in bloom and readily identifiable.

Mitigation Measure BIO-2: **Sanford's arrowhead.** If Sanford's arrowhead populations are identified on site, project design will be modified, if at all feasible, to avoid the plants. A qualified biologist will identify an appropriate buffer around the plants, and no developments or other project-related activities will be permitted within.

Mitigation Measure BIO-3: **Sanford's arrowhead.** If it is not feasible to avoid Sanford's arrowhead populations, the affected populations will be salvaged in accordance with a plan prepared by a qualified biologist that will include contingencies for an unsuccessful salvage effort. Salvage methods may include seed collection and dispersal, transplanting rootstock, and/or topsoil collection and redispersal, as appropriate. The relocation area(s) will be located in alternative on-site emergent wetland habitat to be established and maintained for this species, and protected through a deed restriction, conservation easement, or similar mechanism. Relocation areas will be monitored by a qualified biologist for a period of five years to ensure successful establishment.

According to the CNDDB search 22 special status animal species have been documented in the general vicinity of the Project site. Of these, 16 are considered absent or unlikely to occur on the Project site due to absence of suitable habitat, the site's urban setting, or other landscape features.[14] The Project site has the potential to be used by the monarch butterfly, Swainson's hawk, and various nesting birds or raptors.[15] The following mitigation measures will reduce the impacts to the monarch butterfly, Swainson's hawk, and various nesting birds or raptors to **less-than-significant level with mitigation**.

Mitigation Measure BIO-4: **Monarch butterfly.** Prior to the start of construction, a qualified biologist will survey all proposed work areas for milkweed plants. The survey will be conducted at a time of year when milkweed is readily identifiable. The objective of the survey will be to tally and map all milkweed plants that could potentially be impacted by project activities (Milkweed Survey).

Mitigation Measure BIO-5: **Monarch butterfly.** If feasible, any removal of milkweed plants required for residential buildout will take place entirely outside of the period in which monarchs are most likely to breed in the project vicinity, March 1-August 31 (Construction Timing).

Mitigation Measure BIO-6: **Monarch butterfly.** If removal of milkweed plants cannot be avoided between March 1 and August 31, a qualified biologist will conduct pre-construction surveys for non-volant life stages of monarchs on those milkweed plants that will be removed, within 10 days prior to the start of construction. If any non-volant life stages are identified, then those plants will be avoided until it is confirmed by a qualified biologist that a monarch is no longer present (Preconstruction Surveys and Avoidance).

14 Biological Evaluation Report for Lennar Homes Tract 6375 prepared by Live Oak Associates, Inc., pages 34, August 2023, revised October 2024.

15 Biological Evaluation Report for Lennar Homes Tract 6375 prepared by Live Oak Associates, Inc., pages 31-34, August 2023, revised October 2024.

Mitigation Measure BIO-7: **Monarch butterfly.** Impacted milkweed plants will be replaced on site in accordance with a revegetation plan prepared by a qualified biologist. A minimum of 50 replacement plantings will be provided, or three times the number of milkweed plants identified at the time of the milkweed survey (see Mitigation Measure BIO-4), whichever is greater. Replacement plantings must be locally native; preferred species are narrowleaf milkweed (A. fascicularis) and showy milkweed (A. speciosa). The planting site(s) must be in area(s) that will not be mowed or treated with pesticides or herbicides, to be guaranteed via a deed restriction or similar protective mechanism. Revegetation areas will be monitored by a qualified biologist for a period of five years to ensure successful establishment. (Compensatory Mitigation).

Mitigation Measure BIO-8: **Swainson's hawk.** If feasible, project activities will take place entirely outside of the Swainson's hawk nesting season, defined here as March 1 to September 15. If Mitigation Measure BIO-8 is implemented, no further mitigation for this species is required. (Construction Timing).

Mitigation Measure BIO-9: **Swainson's hawk.** If project activities must occur between March 1 and September 15, a qualified biologist will conduct nest surveys for Swainson's hawks on and within ¼ mile of the Project site within the survey periods prescribed by Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (SHTAC 2000). Three nest surveys will be conducted in each of two survey periods, with the survey periods defined as follows: Period I – January 1 to March 20, Period II – March 20 to April 5, Period III – April 5 to April 20, Period IV – April 21 to June 10, and Period V – June 10 to July 30. Surveys will take place in the two survey periods immediately prior to the anticipated start of construction activities during the nesting season, with the exception of Period III, when no surveys should take place per the SHTAC guidelines. The surveys will consist of inspecting all accessible, suitable trees of the survey area for the presence of nests and hawks. (Nesting Surveys).

Mitigation Measure BIO-10: **Swainson's hawk.** If active Swainson's hawk nests are detected during the surveys or observed incidentally, a minimum ¼-mile no-disturbance buffer will be delineated and maintained around each nest, to remain in place until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival. (No-Disturbance Buffers).

Mitigation Measure BIO-11: **Swainson's hawk.** If an active Swainson's hawk nest is detected, and a ¼-mile no-disturbance buffer is not feasible, the project applicant will consult with CDFW to discuss how to implement the project and avoid take. If take cannot be avoided, take authorization will be obtained through the acquisition of a State Incidental Take Permit (ITP), pursuant to Fish and Game Code section 2081 subdivision (b). (CDFW Consultation).

Mitigation Measure BIO-12: **Other nesting birds and raptors.** If feasible, project activities will take place entirely outside of the avian nesting season, defined here as February 1 to September 15. If Mitigation Measure BIO-12 is implemented, no further mitigation for nesting birds or raptors is required. (Construction Timing).

Mitigation Measure BIO-13: **Other nesting birds and raptors.** If project activities must occur between February 1 and September 15, a qualified biologist will conduct surveys for active bird nests within 10 days prior to the start of work during this period. The survey area will encompass the site and accessible surrounding lands within 250 feet for nesting birds and 500 feet for nesting raptors (Preconstruction Surveys).

Mitigation Measure BIO-14: **Other nesting birds and raptors.** Should any active nests be discovered in or near the work area, a qualified biologist will conduct an additional survey to establish a behavioral baseline of these nests. (Behavioral Baseline).

Mitigation Measure BIO-15: **Other nesting birds and raptors.** If feasible, a qualified biologist will continuously monitor active nests during project activities to detect behavioral changes resulting from the project. If behavioral changes occur, the activities that appear to be causing the changes (as determined by the qualified biologist) will be discontinued. At the biologist's discretion, activities may be resumed (1) in a modified form, with lower levels of visual or sound disturbance, (2) following the implementation of measures designed to reduce perceived disturbance, e.g. visual buffers, and/or (3) at a later nesting stage, when the affected birds are less sensitive to disturbance. (Continuous Monitoring).

Mitigation Measure BIO-16: **Other nesting birds and raptors.** If continuous monitoring of active nests is not feasible, or if nesting birds have behavioral changes that persist following the implementation of one or more of the corrective actions identified above under Mitigation Measure 4.1.4d, a minimum no-disturbance buffer of 250 feet will be established around active bird nests and 500 feet around active raptor nests. These buffers will remain in place until after the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or on-site parental care for survival. Variance from these no-disturbance buffers is possible when there is compelling biological or ecological reason to do so. A qualified biologist will advise and support any variance from these buffers. (No-Disturbance Buffers).

Implementation of mitigation measures BIO-1 though BIO-16 would reduce potential impact on special status species ensuring that a **less-than-significant impact with mitigation** occurs.

b) *Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?*

No Impact. As mentioned previously, the Project site is characterized as vacant and undeveloped with active almond orchards, disked fields, and several previously occupied residential sites from which the structures and most of the trees were removed at some point in the past. California contains a wide range of natural communities, or unique assemblages of plants and animals. These communities have largely been classified and mapped by Californina Department of Fish and Wildlife (CDFW) as part of their Vegetation Classification and Mapping Program (VegCAMP). Natural communities are assigned state and global ranks according to their rarity and the magnitude and trend of the threats they face. Any natural community with a state rank of 3 or lower (on a 1 to 5 scale) is considered "sensitive" and must be considered in CEQA review. The Project site does not contain or adjoin any sensitive natural communities.[16] Therefore, **no impact** would occur and no mitigation measures are required.

c) *Would the project have a substantial adverse effect on state or federally protected wetlands as (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

Less-Than-Significant Impact. At the time of LOA's field survey, the Project site contained five areas of significant ponded water, all but one of which appeared to be fed by irrigation leaks. The remaining pond wasn't obviously being irrigated but is situated close to the almond orchard and has poorly-drained clay soils, suggesting it may capture and hold excess irrigation from the orchard. The ponds were inundated to varying degrees during the survey, with water depths ranging from roughly two to six inches. All were vegetated, and

16 Biological Evaluation Report for Lennar Homes Tract 6375 prepared by Live Oak Associates, Inc., page 20, August 2023, revised October 2024.

most supported vegetation typical of wetland environments.[17] Per the Biological Report while the ponds may meet the technical criteria of a wetland, the U.S. Army Corps of Engineers and CDFW are unlikely to assert jurisdiction over these features regardless of their wetland status. The features also do not appear to fit into any of the categories of artificial wetlands regulated by the Regional Water Quality Control Board (RWQCB), in that they are not (1) used as compensatory mitigation for impacts to other waters, (2) identified in a water quality control plan, (3) a relatively permanent part of the natural landscape, even in the absence of ongoing operation and maintenance, or (4) greater than or equal to one acre in size (SWRCB 2021). No other aquatic resources will be impacted by proposed residential buildout. Project impacts to state or federally protected wetland waters are therefore considered a **less-than-significant** impact and no mitigation measures are required.

d) *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?*

No Impact. Wildlife corridors are typically considered to be valleys, ridgelines, and rivers and creeks supporting riparian vegetation that animals regularly travel or follow. According to the Biological Report, the Project site does not contain or adjoin any features likely to function as wildlife movement corridors.[18] Thus, **no impact** would occur and no mitigation measures are required.

e) *Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

Less-Than-Significant Impact. The 2014 General Plan and CMC support reduction of potential biological impacts with the Plan Area. Policy 2.6 of the Open Space and Conservation Element of the General Plan calls for the protection of biological resources; however, the Biological Evaluation did not identify the Project site as a high-quality habitat area. While trees will be removed from the Project site, the CMC includes tree protection standards for tree removal. Compliance with CMC tree removal requirements would result in a **less-than-significant** impact no mitigation measures are required.

f) *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?*

No Impact. There are no known Habitat Conservation Plans or Natural Community Conservation Plans for the Project vicinity[19]; thus, **no impact** would occur and no mitigation measures are required.

5. CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?				X

17 Biological Evaluation Report for Lennar Homes Tract 6375 prepared by Live Oak Associates, Inc., page 9, August 2023, revised October 2024.

18 Biological Evaluation Report for Lennar Homes Tract 6375 prepared by Live Oak Associates, Inc., page 19, August 2023

19 Biological Evaluation Report for Lennar Homes Tract 6375 prepared by Live Oak Associates, Inc., page 34, August 2023

b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		X		
c. Disturb any human remains, including those interred outside of formal cemeteries?		X		

ENVIRONMENTAL SETTING

The Project proposes to construct 385 single-family homes on a ±58.9 acre site. The Project site is vacant and undeveloped with active almond orchards, disked fields, and several previously occupied residential sites from which the structures and most of the trees were removed at some point in the past. The site is surrounded by existing and future residential development at varying densities. Any future development occurring within the annexation area would require a sperate project-specific analysis.

A Cultural Resource Study (Cultural Report) was prepared by Applied EarthWorks, Inc. dated November 2023 (see Appendix C). This Cultural Report included a records search at the California Historical Resources Information System (CHRIS) Southern San Joaquin Valley Information Center (SSJVIC), Native American Hertiage Commission's (NAHC) Sacred Lands File, desktop archival research, as well as a pedestrian survey of the Project site.

In addition to the Cultural Report, City staff conducted Native American Consultation in compliance with Assembly Bill 52 (AB52). In compliance with AB52, invitations for consultation were mailed on July 2, 2024 which affords Native tribes thirty (30) days to respond and to request consultation. During that time, one (1) tribe requested consultation. On September 30, 2024 a representative from Table Mountain Rancheria met with City staff via virtual call to discuss the potential for cultural resources at the Project annexation area. Following the meeting the representative from Table Mountain Rancheria voiced concerns for the potential sites of tribal significance. Based on the conversation while potential sites were within the annexation area, they were outside of the Project development site. However, mitigation measures are included in the following analysis to ensure protection of such resources if any are discovered inadvertently. With the incorporation of the mitigation measures, the consultation ended.

DISCUSSION

a) *Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?*

No Impact. As part of the Cultural Report, the SSJVIC of the CHRIS at the California State University, Bakersfield preformed a records search on June 31, 2023, to identify previously recorded resources and prior surveys within the Project area and surrounding 0.25 mile search radius.[20] According to the results, there were four previous cultural resource investigations within the Project area and one previous investigation with the 0.25 mile radius site, the previous studies date from 1993 to 2018.[21] Additionally, as part of the Cultural Report historical topographic maps and aerial photographs were reviewed and a requested search of the Sacred Lands File was conducted by the NAHC on August 17, 2023.[22] According to Cultural Report no cultural resource sites

20 Cultural Resource Study for the Clovis Tract 6375 prepared by Applied Earthworks, Inc., page 14, November 2023.

21 Cultural Resource Study for the Clovis Tract 6375 prepared by Applied Earthworks, Inc., page 16, November 2023.

22 Cultural Resource Study for the Clovis Tract 6375 prepared by Applied Earthworks, Inc., page 17, November 2023.

were identified in the Project site.[23] Further, compliance with Policy 2.9 of the 2014 Clovis General Plan, which calls for the preservation of historical sites and buildings of state or national significance, would ensure that if there were historical resources present, they would be protected. Therefore, **no impact** would occur with regard to the Project causing a substantial adverse change in the significance of a historical resource and no mitigation measures are required.

b) *Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?*

Less-Than-Significant Impact With Mitigation. The site is undeveloped with the site's only have previously disturbed as a result of agriculture and previous rural residential structures. Further, the Cultural Report concluded that there were no cultural resources including potential historical resources were identified in the Project site. As mentioned above, City staff and a representative from Table Mountain Rancheria conducted a consultation where the tribal representative voiced concerns for cultural resources within the annexation boundary but not the Project site. However, the potential remains that archeological resources could be inadvertently or accidentally uncovered during ground-disturbing activities such as trenching, digging, and the installation of utilities and other infrastructure.

Because there is the slight possibility for the accidental or inadvertent uncovering of archaeological resources during construction, Mitigation Measure CULT-1 would serve to reduce those potential impacts by requiring the stopping of any work until any found artifacts can be properly removed and inventoried by a qualified archaeologist. Therefore, the Project would result in a **less-than-significant impact with mitigation**.

> Mitigation Measure CULT-1: If archaeological or tribal resources or materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified professional archaeologist, can evaluate the significance of the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants.
>
> If the qualified professional archaeologist determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation.
>
> If a potentially-eligible resource is encountered, then the qualified professional archaeologist, the Lead Agency, and the project proponent shall arrange for either 1) total avoidance of the resource or 2) test excavations to evaluate eligibility and, if eligible, total data recovery. The determination shall be formally documented in writing and submitted to the Lead Agency as verification that the provisions for managing unanticipated discoveries have been met.

c) *Would the project disturb any human remains, including those interred outside of formal cemeteries?*

Less-Than-Significant Impact With Mitigation. As mentioned in the discussion for Section 5a the site is undeveloped with the site's only have previously disturbed as a result of agriculture and previous rural residential structures. The Cultural Report concluded no cultural resource sites were identified in the Project site. Nevertheless, the potential remains that human remains could be inadvertently or accidentally uncovered during ground-disturbing activities such as trenching, digging, and the installation of utilities and other infrastructure.

23 Cultural Resource Study for the Clovis Tract 6375 prepared by Applied Earthworks, Inc., page 23, November 2023.

Because there is the slight possibility for the accidental or inadvertent uncovering of human remains during construction, Mitigation Measure CULT-2 would serve to reduce those potential impacts by requiring the stopping of any work until any found human remains can be properly removed by the County coroner and/or tribes. Therefore, the Project would result in a **less-than-significant impact with mitigation**.

> Mitigation Measure CULT-2: If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code and Project shall follow the procedures and protocols set for un CEQA Guidelines Section 15064.4(e)(1). If human remains are identified to be those of Native American, California Health and Safety Code 7050.5 requires the County coroner notify the California Native American Heritage Commission within 24 hours of discovery. All reports, correspondence, and determinations regarding the discovery of human remains on the Project site shall be submitted to the Lead Agency.

6. ENERGY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

ENVIRONMENTAL SETTING

The existing Project site is vacant and undeveloped with active almond orchards, disked fields, and several previously occupied residential sites from which the structures and most of the trees were removed at some point in the past.. The site is surrounded by existing and future residential development at varying densities.

DISCUSSION

a) *Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?*

Less-Than-Significant Impact. The Project proposes the construction of 385 single-family homes on ±58.9 acres, along with associated landscaping, hardscape, and infrastructure (i.e., drive aisles, utilities, etc.). The Project would include construction activities typical of residential development, thus, is not generally considered the type of use or intensity that would result in the unnecessary consumption of energy. The homes themselves would comply with Title 24 Green Building Standards for energy efficiency, as well as be required to comply with the latest water efficient landscape policy regulations, and California Building Code. Further, the Project would be required to comply with the2014 Clovis General Plan Policies 3.4, and 3.7 of the Open Space and Conservation Element, which call for the use of water conserving and drought tolerant landscape, as well as energy efficient buildings. Consequently, compliance with these measures would ensure that the Project does not result in a significant impact due to the unnecessary consumption of energy and **less-than-significant** impact would occur.

b) *Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?*

Less-Than-Significant Impact. See discussion under Section 6a above.

7. GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Directly or indirectly cause 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?				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?				X
b. Result in substantial soil erosion or the loss of topsoil?			X	
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?				X
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				X
e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater?				X
f. Directly or indirectly destroy a unique paleontological resource or unique geologic feature?		X		

ENVIRONMENTAL SETTING

The 2014 Clovis General Plan EIR identified no geologic hazards or unstable soil conditions known to exist on the Project site.

DISCUSSION

a) *Would the project directly or indirectly cause 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?; ii) Strong seismic ground shaking?; iii) Seismic-related ground failure, including liquefaction?; iv) Landslides?*

No Impact. Pursuant to the California Department of Conservation, the California Earthquake Hazards Zone Application mapping tool identifies the Project site as not within an Earthquake Fault Zone.[24] Additionally, adherence to the most current California Building Codes would ensure that the structures are constructed safely and in compliance with the appropriate Building Codes. With regards to liquefaction, the 2014 Clovis General Plan EIR states that the soil types in the area are not considered conducive to liquefaction due to their high clay content or from being too coarse.[25] Further, the site is generally flat and therefore landslides would not occur at the Project site. Overall, due to the Project site not being located within an earthquake fault zone, adherence to the most recent California Building Codes, and the flat topography, **no impact** would occur with regards to potential impacts from seismic activity and no mitigation measures are required.

b) *Would the project result in substantial soil erosion or the loss of topsoil?*

Less-Than-Significant Impact. Although the site is relatively flat, grading activities would be required to ensure a flat and graded surface prior to construction, which may result in the soil erosion and loss of topsoil. However, as part of the Project, grading plans are required to be submitted and approved by the City Engineering Division to ensure appropriate grading of the site. Thus, this review and approval process would ensure that a **less-than-significant** impact occur and no mitigation measures are required.

c) *Would the project 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?*

No Impact and no mitigation measures are required. See discussion under Section 7a.

d) *Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating direct or indirect substantial risks to life or property?*

No Impact. According to the 2014 Clovis General Plan EIR, expansive soils are mostly present in areas along the northern edge of the non- SOI and the easternmost part of the Clovis non-SOI plan area.[26] Because the Project site is within the City's SOI; therefore, not within the vicinity of those areas, there would be no potential for creating direct or indirect substantial risks to life or property with regards to expansive soils. As a result, **no impact** would occur and no mitigation measures are required.

24 California Department of Conservation, the California Earthquake Hazards Zone Application mapping tool, https://maps.conservation.ca.gov/cgs/EQZApp/app/ Accessed October 7, 2024

25 2014 Clovis General Plan EIR, Chapter 5: Geology and Soils, page 5.6-3.

26 2014 Clovis General Plan EIR, Chapter 5: Geology and Soils, page 5.6-4.

e) *Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste disposal systems where sewers are not available for the disposal of wastewater?*

No Impact. The Project does not propose the use of septic tanks; therefore, **no impact** would occur and no mitigation measures are required.

f) *Would the project directly or indirectly destroy a unique paleontological resource or unique geologic feature?*

Less-Than-Significant Impact With Mitigation. The Project site is vacant and undisturbed and the Cultural Report concluded that there are no cultural resources including potential historical resources identified in the Project site. Nevertheless, the possibility remains that the inadvertent or accidental discovery could occur during ground disturbing construction activities. However, Mitigation Measure GEO-1, below, would serve to protect the accidental discovery of paleontological resources. As such, a **less-than-significant with mitigation** impact would occur.

> Mitigation Measure GEO-1: If prehistoric or historic-era cultural materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified professional archaeologist and/or paleontologist, can evaluate the significance of the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants.
>
> If the qualified professional determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation.
>
> If a potentially-eligible resource is encountered, then the qualified professional archaeologist and/or paleontologist, the Lead Agency, and the project proponent shall arrange for either 1) total avoidance of the resource or 2) test excavations to evaluate eligibility and, if eligible, total data recovery. The determination shall be formally documented in writing and submitted to the Lead Agency as verification that the provisions for managing unanticipated discoveries have been met.

8. GREENHOUSE GAS EMISSIONS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?			X	

ENVIRONMENTAL SETTING

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHG's has been implicated as a driving force for global climate change. Definitions of climate change vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and anthropogenic activities which alter the composition of the global atmosphere.

Individual Projects contribute to the cumulative effects of climate change by emitting GHGs during construction and operational phases. The principal GHGs are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. While the presence of the primary GHGs in the atmosphere are naturally occurring, carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) are largely emitted from human activities, accelerating the rate at which these compounds occur within earth's atmosphere. Carbon dioxide is the "reference gas" for climate change, meaning that emissions of GHGs are typically reported in "carbon dioxide-equivalent" measures. Emissions of carbon dioxide are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. Other GHGs, with much greater heat-absorption potential than carbon dioxide, include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes.

There is international scientific consensus that human-caused increases in GHGs have and will continue to contribute to global warming, although there is uncertainty concerning the magnitude and rate of the warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of greenhouse gases (GHG) would be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. In 2006, California passed the California Global Warming Solutions Act of 2006 (AB 32), which requires the CARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020.

In December 2009, the SJVAPCD adopted guidance for addressing GHG impacts in its *Guidance for Valley Land Use Agencies in Addressing GHG Impacts for New Projects Under* CEQA. The guidance relies on performance-based standards, otherwise known as Best Performance Standards (BPS), to assess significance of project-specific GHG emissions on global climate change during the environmental review process.

Projects can reduce their GHG emission impacts to a less than significant level by implementing BPS. Projects can also demonstrate compliance with the requirements of AB 32 by demonstrating that their emissions achieve a 29% reduction below "business as usual" (BAU) levels. BAU is a projected GHG emissions inventory assuming no change in existing business practices and without considering implementation of any GHG emission reduction measures.

Significance Criteria

The SJVAPCDs *Guidance for Valley Land Use Agencies in Addressing GHG Impacts for New Projects Under CEQA* provides initial screening criteria for climate change analyses, as well as draft guidance for the determination of significance.

The effects of project-specific GHG emissions are cumulative, and therefore climate change impacts are addressed as a cumulative, rather than a direct, impact. The guidance for determining significance of impacts has been developed from the requirements of AB 32. The guideline addresses the potential cumulative impacts that a project's GHG emissions could have on climate change. Since climate change is a global phenomenon, no direct impact would be identified for an individual land development project. The following criteria are used to evaluate whether a project would result in a significant impact for climate change impacts:

- Does the project comply with an adopted statewide, regional, or local plan for reduction or mitigation of GHG emissions? If no, then
- Does the project achieve 29% GHG reductions by using approved Best Performance Standards? If no, then
- Does the project achieve AB 32 targeted 29% GHG emission reductions compared with BAU?

Projects that meet one of these guidelines would have less than significant impact on the global climate.

In December 2022 the 2022 Scoping Plan was approved by the CARB which assesses progress toward achieving carbon neutrality by 2045. Because neither the City of Clovis or the SJVAPCD have developed or adopted numerical GHG significance threshold, the proposed Project was analyzed for consistency with the 2022 Scoping Plan consistent with statewide climate goals. The 2022 Scoping Plan includes key project attributes that reduce operational GHG emissions.

DISCUSSION

a) *Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*

The Project would include the construction and operation of 385 single-family homes and associated infrastructure (i.e., sewer and water infrastructure, roadways, sidewalks, etc.). As such, GHG emissions would be produced through the construction and operational phases of the Project. As a result, an estimate of the Project's operational emissions in 2005 were compared to the operational emission in 2020 in order to determine if the Project meets the 29% emission reduction. Results of the analysis show that the Project's GHG emission in the year 2020 is 6253.23 MTCO2eq./year, which represents an achievement of 15% GHG emission reduction on the basis of BAU, which does not meet the 29% GHG emission reduction target.[27] Although, the Project does not meet the 29% GHG emission reduction, the 2022 Scoping Plan recommends that for determining whether a proposed residential or mixed-use residential development would align with the State's climate goals is to examine whether the project includes key project attributes that reduce operational GHG emissions while simultaneously advancing fair housing. With the implementation of recommended mitigation, the proposed Project is generally consistent with the key project attributes recommended in the 2022 Scoping Plan, as further discussed below.

The 2022 Scoping Plan recommends that project attributes consistent with specific priority strategies would accommodate growth in a manner consistent with State GHG reduction. The 2022 Scoping Plan recommends that a residential or mixed-use project provide EV charging infrastructure that, at minimum, meets the most ambitious voluntary standard in the California Green Building Standards Code at the time of project approval. CALGreen requires provision of infrastructure to accommodate EV chargers for new single family and attached dwelling units/town houses. It is not yet known whether the proposed project would include electric vehicle

27 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 56, January 2024.

charging; therefore, implementation of Mitigation Measure GHG-1 would be required to ensure the proposed Project would provide electric vehicle charging.

The 2022 Scoping Plan further recommends that a proposed project be located on infill sites that are surrounded by existing urban uses and reuses or redevelops previously undeveloped or underutilized land that is presently served by existing utilities and essential public services (e.g., transit, streets, water, sewer). The proposed Project is located in close proximity to other single-family residential uses that are presently served by existing utilities and essential public services (e.g., transit, streets, water, sewer). The Project site and adjacent parcels have been identified for future development in the 2014 Clovis General Plan. CARB guidance recommends that, to be consistent with State goals, a proposed project should not result in the loss or conversion of natural and working lands. The Project site is not designated for farming-related activities under the 2014 Clovis General Plan as such would be consistent with the planned growth of the Heritage Grove area and as identified in the General Plan EIR; therefore, the proposed Project would be consistent with this key project attribute.

The proposed Project would also be generally consistent with the transit density criteria recommended in the 2022 Scoping Plan. The proposed Project would include an approximately 18-foot-wide parkway containing an approximately 5-foot-wide pedestrian sidewalk and a total of 13 feet of landscaping along North Minnewawa Avenue. Along Clovis Avenue the Project would include an approximately 20-foot-wide parkway containing an approximately 6-foot-wide pedestrian sidewalk and a total of 14 feet of landscaping. Additionally, the Project includes multiple direct pedestrian connections into the proposed Project that would support the ability to use alternative modes of transportation. As such, the project would promote initiatives to reduce vehicle trips and VMT and would increase the use of alternate means of transportation.

The 2022 Scoping Plan recommends that a proposed project reduce parking requirements by eliminating parking requirements or including maximum allowable parking ratios (i.e., the ratio of parking spaces to residential units or square feet); or providing residential parking supply at a ratio of less than one parking space per dwelling unit. The proposed Project would consist of 385 residential lots with construction of approximately 124 dedicated off-street parking spaces. Based on the minimal parking spaces when compared to the number of residential units, the proposed project would be consistent with this key project attribute. An additional State goal is to advance the availability of fair housing. The proposed project would help to address the California housing shortage and would increase the number of residences available to residents of the San Joaquin Valley. Finally, consistent with the recommendations in the 2022 Scoping Plan, the proposed Project would be all electric and not include natural gas connections.

With implementation of Mitigation Measures GHG-1 the Project would result in **less-than-significant impact with mitigation.**

> Mitigation Measure GHG-1: In order to meet the 2022 Scoping Plan GHG requirements, consistent with State GHG reduction and equity prioritization goals, each residential unit shall provide electric vehicle charging capabilities as part of the final project design.

b) *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?*

Less-Than-Significant Impact. Based on the AQ/GHG Report,[28] as required by California law General Plans contain land use elements that detail types and quantities of land uses needed for future growth assumptions. Therefore, determination of consistency with a county/city's General Plan can be used to confirm that the Project's density and land use are consistent with the growth assumption used in the air quality plan. The Project

28 Air Quality and Greenhouse Gas Analysis Report, VRPA Technologies, Inc, page 58-59, January 2024.

is consistent with the currently adopted 2014 Clovis General Plan; therefore, is consistent with the growth assumptions under the applicable air quality plan and per the AQ/GHG Report, the Project will not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHG. As indicated in the discussion above under Section 8a, the Project would be required to comply with the latest energy efficient standards, and water conservation. Consequently, the AQ/GHG Report found this potential impact to be **less than significant**.

9. HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
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?				X
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 or excessive noise for people residing or working in the project area?				X
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?			X	

ENVIRONMENTAL SETTING

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 "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.

The nearest school to the Project site is Woods Elementary School, located approximately one (1) mile southeast of the site at its closest point.

DISCUSSION

a) *Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

Less-Than-Significant Impact. The Project consists of the construction of 385 single-family homes on ±58.9 acres. The type of hazardous materials that would be associated with the Project are those typical of residential uses, such as the use of household cleaners, landscape maintenance products, soaps, and potential pesticides (for pest control). These materials, when used and applied properly, would not necessarily create a significant hazard to the public or the environment. Further, these materials are not anticipated to be stored in large quantities that could pose a threat. Overall, the Project would not routinely transport, use, or dispose of hazardous materials other than those typical of residential development, which are not generally considered of the type or quantity that would pose a significant hazard to the public when used as directed. During construction, typical equipment and materials would be used that are associated with residential construction; however, any chemicals or materials would be handled, stored, disposed of, and/or transported according to applicable laws. Consequently, because the Project is not of the type of use that would routinely transport, use, or dispose of hazardous materials a **less-than-significant** impact would occur.

b) *Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

Less-Than-Significant Impact. See discussion above under Section 9a.

c) *Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

No Impact. As mentioned above, the Project site is located approximately one (1) mile from the nearest school and there is not currently any proposed schools within the Project area. Further, the Project is not of the type of use typically associated with emitting hazardous emissions or handling the type or quantity of hazardous

materials such that it would pose a risk or threat to the school, or surrounding area. Therefore, **no impact** would occur and no mitigation measures are required.

d) *Would the project 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?*

No Impact. According the California Department of Toxic Substance Control EnviroStor Database, the Project site is not located on or within the immediate vicinity of a hazardous materials site.[29] Therefore, **no impact** would occur and no mitigation measure are required.

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 or excessive noise for people residing or working in the project area?*

No Impact. The Project is not within an airport land use plan nor is the site within two miles of a public airport. Therefore, **no impact** would occur and no mitigation measures are required.

f) *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

Less-Than-Significant Impact. The Project will develop frontage portions of North Clovis and North Minnewawa Avenues which are designated by the 2014 Clovis General Plan as arterials ultimately connecting the internal street network. Although the Project could result in temporary traffic detouring or closures during buildout, these delays would be temporary and would be coordinated with the City Planning and Development Services and other departments to ensure safe access to and from the area is maintained. Further, the site itself would reviewed by City departments to ensure adequate site access and circulation is provided in the event of an emergency. Overall, a **less-than-significant** impact would occur.

g) *Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?*

Less-Than-Significant Impact. The Project site it is not located in an area typically associated with wildfires. Although urban fires could occur, the Project would be constructed to the latest fire code standards, which would include fire sprinklers in each unit, as well as the installation of several fire hydrants throughout the site as required by the Clovis Fire Department. Further, other life safety features would be required such as smoke detectors, which would be reviewed and checked by the Fire Department to ensure proper operation prior to occupancy. Ultimately, a **less-than-significant** impact would occur.

10. HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			X	

29 California Department of Toxic Substance Control, EnviroStor Database, https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=Clovis, accessed on October 7, 2024

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: (i) result in substantial erosion or siltation on- or off-site; (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows?			X	
i) Result in substantial erosion or siltation on- or off-site?			X	
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?			X	
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X	
iv) Impede or redirect flood flows?			X	
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?			X	
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?			X	

ENVIRONMENTAL SETTING

The City is within the drainages of three streams: Dry Creek, Dog Creek, and Redbank Slough. On the north, Dry Creek discharges into the Herndon Canal in the City of Fresno west of Clovis. South of Dry Creek, Dog Creek is a tributary of Redbank Slough, which discharges into Mill Ditch south of Clovis (USGS 2012). A network of storm drains in the City and the Plan Area discharges into 31 retention basins, most of which provide drainage for a one- to two-square-mile area. Most of the Plan Area east and northeast of the City is not in drainage areas served by retention basins. Those areas drain to streams that discharge into reservoirs, including Big Dry Creek Reservoir in the north-central part of the Plan Area and Redbank Creek Dam and Reservoir in the southeast part of the Plan Area. Fancher Creek Dam and Reservoir are near the east Plan Area boundary.

The Project is located within the FMFCD boundary, and subject to its standards and regulations. Detention and retention basins in the FMFCD's flood control system are sized to accommodate stormwater from each basin's drainage area in builtout condition. The current capacity standard for FMFCD basins is to contain runoff from six inches of rainfall during a ten-day period and to infiltrate about 75 to 80 percent of annual rainfall into the groundwater basin (Rourke 2014). Basins are highly effective at reducing average concentrations of a broad range of contaminants, including several polyaromatic hydrocarbons, total suspended solids, and most metals (FMFCD 2013). Pollutants are removed by filtration through soil, and thus don't reach the groundwater aquifer (FMFCD 2014). Basins are built to design criteria exceeding statewide Standard Urban Stormwater Mitigation Plan (SUSMP) standards (FMFCD 2013). The urban flood control system provides treatment for all types of development—not just the specific categories of development defined in a SUSMP—thus providing greater water quality protection for surface water and groundwater than does a SUSMP.

In addition to their flood control and water quality functions, many FMFCD basins are used for groundwater recharge with imported surface water during the dry season through contracts with the FID and the cities of Fresno and Clovis; such recharge totaled 48,139 acre feet of water in 2020.

The pipeline collection system in the urban flood control system is designed to convey the peak flow rate from a two-year storm.

Most drainage areas in the urban flood control system do not discharge to other water bodies, and drain mostly through infiltration into groundwater. When necessary, FMFCD can move water from a basin in one such drainage area to a second such basin by pumping water into a street and letting water flow in curb and gutter to a storm drain inlet in an adjoining drainage area (Rourke 2014). Two FMFCD drainage areas discharge directly to the San Joaquin River, and three to an irrigation canal, without storage in a basin. Six drainage areas containing basins discharge to the San Joaquin River, and another 39 basins discharge to canals (FMFCD 2013).

A proposed development that would construct more impervious area on its project site than the affected detention/retention basin is sized to accommodate is required to infiltrate some stormwater onsite, such as through an onsite detention basin or drainage swales (Rourke 2014).

The Big Dry Creek Reservoir has a total storage capacity of about 30 thousand acre-feet (taf) and controls up to 230-year flood flows. Fancher Creek Dam and Reservoir hold up to 9.7 taf and controls up to 200-year flood flows. Redbank Creek Dam and Reservoir hold up to 1 taf and controls up to 200-year flood flows.

Groundwater

Clovis is underlain by the Kings Groundwater Basin that spans 1,530 square miles of central Fresno County and small areas of northern Kings and Tulare counties. Figure 5.9-4, Kings Groundwater Basin, shows that the basin is bounded on the north by the San Joaquin River, on the west by the Delta-Mendota and Westside Subbasins, the south by the Kings River South Fork and the Empire West Side Irrigation District, and on the east by the Sierra Nevada foothills. Depth to groundwater in 2016 ranged from 196.5 feet at the northwest City boundary to 69.5 feet at the southeast City boundary (Clovis 2016), 25 feet at the southeast SOI boundary, and about 20 feet at the eastern Plan Area boundary (FID 2013). The Kings Subbasin has been identified as critically overdrafted (Provost & Pritchard 2011).

In the Plan Area, groundwater levels are monitored by the City of Clovis and FID. The overall area has not experienced land subsidence due to groundwater pumping since the early 1900s (FID 2006). Subsidence occurs when underground water or natural resources (e.g., oil) are pumped to the extent that the ground elevation lowers. 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 (FID 2006). The City has identified a localized area of subsidence of 0.6 feet in the vicinity of Minnewawa and Herndon Avenues within the last 14 years (Clovis 2016). Regional ground subsidence in the Plan Area was mapped as less than one foot by the US Geological Survey in 1999 (Galloway and Riley 1999). Groundwater levels in the San Joaquin Valley are forecast to hit an all-time low in 2014 (UCCHM 2014).

New development in accordance with the 2014 Clovis General Plan would increase the amount of impervious surface in the Plan Area, potentially affecting the amount of surface water that filters into the groundwater supply. Groundwater levels are monitored in the Plan Area by the FID and the City of Clovis. As described in the 2015 City of Clovis Urban Water Management Plan (UWMP), groundwater recharge occurs both naturally and artificially throughout the City. The Kings Groundwater Basin area is recharged through a joint effort between the Cities of Clovis and Fresno and the FID (CDWR 2006). Approximately 8,400 acre-feet per year (afy) of water are intentionally recharged into the Kings Groundwater Basin by the City of Clovis, and approximately 7,700 afy of water naturally flow into groundwater in the City's boundaries (Clovis 2011).

The FMFCD urban stormwater drainage system would provide groundwater infiltration for runoff from developed land uses in detention basins in the drainage system service area.

Projects pursuant to the 2014 Clovis General Plan and developed outside of the FMFCD urban stormwater drainage system would be required to meet the requirements of NPDES regulations, including the implementation of BMPs to improve water retention and vegetation on project sites.

DISCUSSION

a) *Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?*

Less-Than-Significant Impact. The Project is located on a site that was previously anticipated for residential use. As with any development, existing policies and standards are required to be complied with, which are assessed during review of the entitlements. As such, the Engineering Division, as well as outside agencies such as the FMFCD review all plans to ensure that none of the water quality standards are violated and that waste discharge requirements are adhered to during construction and operation of the Project. Consequently, this process of Project review and approval would ensure that a **less-than-significant** impact occur.

b) *Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?*

Less-Than-Significant Impact. The Project would not deplete groundwater supplies or interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level due to the Project. The 2014 Clovis General Plan EIR identified a net decrease in ground water aquifer throughout the region, however, because the City's domestic water system is primarily served through surface water via existing water entitlements, the loss of aquifer is less than significant. The City has developed a surface water treatment plant (opened in June, 2004) that reduces the need for pumped groundwater, and has also expanded the municipal groundwater recharge facility. The Projects impacts to groundwater are **less than significant**.

c) *Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would: (i) result in substantial erosion or siltation on- or off-site; (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; (iii) create or contribute runoff water which would exceed*

the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows?

Less-Than-Significant Impact. There are no streams or rivers on the site that would be altered as a result of the Project. The site is mostly pervious since it is currently undeveloped, and as a result, the Project would increase the amount of impervious surfaces by installing paving for roadways and sidewalks. However, the drainage pattern would be constructed per existing policies and regulations through review of the plans by the City Engineering Division and the FMFCD to ensure the site is properly and adequately drained such that the stormdrain system is maintained and so that no flooding occurs. Consequently, this review and approval by City engineers and FMFCD would mean that the Project result in a **less-than-significant** impact.

d) *Would the project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?*

Less-Than-Significant Impact. Due to the Central Valley's location away from the ocean, an impact from a tsunami is unlikely. However, the majority of the Project site is designated as a Federal Emergency Management Agency (FEMA) Flood Zone "X"[30] which is considered by FEMA as a non-special flood hazard area and that the risk of a flood is low-risk. A Flood Zone X has a 0.2 percent-annual-chance of flood. The CMC Section 8.12, Floodplain Management lists standards and requirements for new construction within special flood zones; therefore, the Project would implement flood hazard management as required by the CMC. As a result of adhering to required flood hazard management, the Project would not risk the release of pollutants due to inundation and consequently, the Project would result in a **less-than-significant** impact would occur with no mitigation measures.

e) *Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*

Less-Than-Significant Impact. The City of Clovis is within the North Kings County Groundwater Sustainability Agency (GSA). Pursuant to the Sustainable Groundwater Management Act of 2014 (SGMA), certain regions in California are required to develop and implement a groundwater management plan that sustainably manages groundwater resources. The proposed Project would comply with the 2020 City of Clovis UWMP which promotes programs and policies to manage water supplies. Nevertheless, the Project would derive the majority of its water from surface water sources and does not propose or include plans for groundwater use. With regards to water quality control, the Project would be required to adhere to appropriate storm drain conveyance and the protection of water resources which would include the installation of backflow preventers. Consequently, the Project would result in a **less-than-significant** impact with no mitigation measures.

11. LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Physically divide an existing community?			X	
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding			X	

30 FEMA Flood Map Service Center: Search By Address, https://msc.fema.gov/portal/search?AddressQuery=clovis, accessed on October 8, 2024

or mitigating an environmental effect?				

ENVIRONMENTAL SETTING

The Project site consists of active almond orchards, disked fields, and several previously occupied residential sites from which the structures and most of the trees were removed at some point in the past. and is surrounded by residential development in varying densities.

DISCUSSION

a) *Would the project physically divide an existing community?*

Less-Than-Significant Impact. Although the Project site is currently undeveloped, the general area to the south and east is urbanized with residential uses of varying densities. Typically, physically dividing existing communities is associated with the construction of a new road intersecting an established area or introducing uses that are not necessarily in line with the existing uses and planned land uses of the area. However, the Project site has been previously designated in the 2014 Clovis General Plan for residential use.

Consequently, because the proposed Project is the type of use previously planned for this site and the general areas, it would not physically divide an existing community. Rather, it seeks to add new housing stock to the City with installation of a new public sidewalk and roadway infrastructure. Therefore, a **less-than-significant** impact would occur and no mitigation measures are required.

b) *Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?*

Less-Than-Significant Impact. As mentioned in the Existing Setting Section above, the Project site is currently within the County of Fresno jurisdiction and zoned AE20 (Exclusive Agricultural). However, the Project site will be prezoned to the R-1-PRD (Single-Family Planned Residential Development) Zone District. According to Section 9.10.010(B)(5) of the CMC, the R-1-PRD Zone District identifies areas appropriate for single-family small lot uses, including attached and detached single-family structures on small lots. If approved, the Project will be required to go through the RSPR entitlement process for review for compliance with relevant design policies, such as in the Heritage Grove Master Plan, the CMC, and the 2014 General Plan. During the review, the height, color and materials are reviewed for consistency with these plans and guidelines. As a result of the Project in complying with the land use and zoning designation upon approval, as well as the review process ensuring General Plan and other applicable policies are adhered to, the Project would result in a **less-than-significant** impact with regards to conflicting with a land use plan.

12. MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?				X
b. Result in the loss of availability of a locally important mineral resource recovery site delineated				X

on a local general plan, specific plan or other land use plan?				

ENVIRONMENTAL SETTING

The City of Clovis 2014 General Plan EIR defines minerals as any naturally occurring chemical elements or compounds formed from inorganic processes and organic substances.[31] The 2014 Clovis General Plan EIR indicates that there are no active mines or inactive mines within the Plan Area of the City of Clovis.

DISCUSSION

a) *Would the project 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?*

No Impact. As stated above, the City of Clovis does not have any active mines or inactive mines. Further, the Project site is not designated, or otherwise mapped for mineral resource extraction, or for having mineral resources of value to the region present on or below the surface of the site. Therefore, **no impact** would occur and no mitigation measures are required.

b) *Would the project 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. Please refer to the discussion under Section 12.a.

13. NOISE

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b. Generation of excessive groundborne vibration or groundborne noise levels?			X	
c. For a project located within the vicinity of a private airstrip or 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?				X

31 2014 Clovis General Plan EIR, Chapter 5: Mineral Resources, page 5.11-1.

ENVIRONMENTAL SETTING

The Project site is undeveloped and surrounded by residential development, including existing residential to the south and east with residential development under entitlement processing to the north. As such, existing ambient noise levels are typical of those associated with residential development, such as the sound of vehicles passing by, the sound of talking, and recreating could be expected within the Project vicinity. As a result of construction to the south, existing ambient noise levels may be slightly elevated as a result of the use of construction equipment, such as large trucks, tractors, and other construction tools associated with residential development. These increases would be temporary, however, and would cease upon completion of the neighborhood.

An acoustical analysis (Noise Study) was prepared for the Project by WJV Acoustics on March 14, 2024 and the analysis below is based, in part, on the study. As part of the Noise Study, noise exposure from traffic on North Minnewawa Avenue was calculated for future (2046) conditions using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model. The Noise Study can be found in Appendix D of this Initial Study.

DISCUSSION

a) *Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Less-Than-Significant Impact With Mitigation. The Project would include development of 385 single-family homes on an undeveloped site. Thus, the Project would result in a temporary and permanent increase in ambient noise levels as a result of construction and operation. However, as mentioned above, the Project site will be surrounded by residential development of varying densities. The Project would introduce new ambient noise from the construction and operation of the homes, these noises would represent the typical type of noise levels that is expected for a planned residential land use. While increases in ambient noise would occur due to the construction of the Project, this increase would be temporary and would be required to adhere to local regulations limiting the hours of construction.

The CMC Section 9.22.080, Noise, sets forth noise standards for development which would need to be complied with. For example, construction would only be permitted between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, and between 9:00 a.m. and 5:00 p.m. on weekends. However, between June 1 and September 15, construction may begin at 6:00 a.m. on weekdays.

The Noise Study indicated that exterior traffic noise exposure at the closest proposed lots to Minnewawa Avenue would be approximately 65.3 dB CNEL for existing conditions and 63.1 dB CNEL for future (2046) traffic conditions.[32] As such, the existing exterior noise exposure would exceed the City's exterior noise level of 65 dB CNEL. The Noise Study indicated that the worst-case interior noise exposure within the proposed Project would be approximately 65 dB CNEL, which exceeds the City's standard of 45 dB CNEL for interior noise; however, the mitigation measures below would reduce these impacts sufficiently to meet the City standards for noise. Consequently, a **less-than-significant impact with mitigation** would occur.

> Mitigation Measure NOISE-1: Exterior Noise. A sound wall shall be constructed to a minimum height of six (6) feet above Project-side grade along North Minnewawa Avenue. In order for the sound wall to effectively shield noise, where there will be access to the development from North Minnewawa Avenue, the sound walls will need to be turned inward (eastward) for a distance of approximately twenty (20) feet

32 Acoustical Analysis Tract 6452, VJV Acoustics, Inc, page 9, March 2024.

at roadway access points. Other Project design features that satisfy the City's exterior noise exposure noise level may fulfill this mitigation.

Mitigation Measure NOISE-2: Interior Noise. Mechanical ventilation or air conditioning shall be provided for all homes to enable windows and doors to remain closed for sound insulation purposes.

b) *Would the project result in generation of excessive groundborne vibration or groundborne noise levels?*

Less-Than Significant Impact. The Project includes development of 385 single-family homes and associated infrastructure (i.e., sidewalks, roadways, curb, gutter, stormdrains, etc.). Therefore, construction equipment typical of the development of residential homes would be utilized temporarily. This equipment could include the use of heavy tractors, trucks, and other equipment; however, this type of equipment isn't typically associated with excessive groundborne vibration. If any vibration were to occur, it's likely that it would be temporary in nature and not at levels that would significantly impact the surrounding area. Further, the Project would be required to comply with the provisions of Section 9.22.090 of the CMC which requires that vibration not be perceptible along property lines and that it shall not interfere with operations or facilities on adjoining parcels. It's important to note also that temporary construction vibration and noise is exempt from these provisions due to the fact that construction is temporary. Overall, because the type of equipment likely to be used in the development of the Project is not considered to be of the type and intensity to result in substantial vibration or groundborne noise, the impact would be **less-than-significant** and no mitigation measures are required.

c) *For a project located within the vicinity of a private airstrip or 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?*

No Impact. The Project is not located within the vicinity of a private airstrip or within an airport land use plan nor is the site within two miles a public airport. Therefore, **no impact** would occur and no mitigation measures are required.

14. POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example through extension of roads or other infrastructure)?			X	
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

ENVIRONMENTAL SETTING

The Project is located on an undeveloped site that is planned for residential use in the 2014 Clovis General Plan. The Project site is ±58.9 acres and proposes 385 single family homes. As previously mentioned, the site will be prezoned to the R-1-PRD (Single-Family Planned Residential Development) Zone District. According to

Section 9.10.010(B)(5) of the CMC, the R-1-PRD Zone District identifies areas appropriate for single-family small lot uses, including attached and detached single-family structures on small lots.

DISCUSSION

a) *Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example through extension of roads or other infrastructure)?*

Less-Than-Significant Impact. The Project would result in 385 single family homes. The Project site has the General Plan Land Use designation of Medium Density Residential, which allows for a density range of 4.1 to 7.0 DU/AC. According to the 2014 Clovis General Plan, the Medium Density Residential designation is intended for detached and attached single family homes, patio homes, or zero lot lines. Calculated with net acres the Project site would allow a range of 242 to 412 dwelling units. Thus, the Project is consistent with the planned land use designation. Further, the Project includes residential use on a site that is planned for the type of use being proposed. Unplanned population growth is typically associated with providing new services in remote areas of the City or other infrastructure that was not previously identified in the General Plan. Although the Project would result in new housing units and population to the site, this growth was previously planned and anticipated under the 2014 Clovis General Plan. Thus, a **less-than-significant** impact would occur and no mitigation measures are required.

b) *Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?*

No Impact. The Project site is undeveloped; therefore, **no impact** would occur and no mitigation measure are required.

15. PUBLIC SERVICES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project result in substantial 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:				
a. Fire protection?			X	
b. Police protection?			X	
c. Schools?			X	
d. Parks?			X	
e. Other public facilities?			X	

ENVIRONMENTAL SETTING

The Project would be served by the Clovis Fire Department, Clovis Police Department, with mutual aid from the City of Fresno, when needed. The Project site would also be within the Clovis Unified School District.

The nearest fire station is Fire Station #3, located approximately three (3) miles south of the site. The other closest fire station is Fire Station #5, located approximately four (4) miles to southwest of the site.

DISCUSSION

a) *Would the project result in substantial 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 fire protection services?*

Less-Than-Significant Impact. Although the Project would result in 385 new residential homes, the site is located adjacent to the City which is already served by the Clovis Fire Department. Upon annexation the Project will then be located in an area the City will be able to serve. Also, the site itself is in close proximity to Fire Station's #3 and #5, which would mean that response times should be able to be maintained during calls for service. As part of the entitlement process for the Project, the Clovis Fire Department will review the design and site layout to ensure adequate fire safety measures and site circulation are achieved. This would include placement of new fire hydrants in certain locations throughout the site, adequate drive widths for fire truck and emergency vehicle access, and the appropriate application of fire codes, such as installation of sprinkler systems, fire alarms, and smoke detectors. Overall, with the site's close proximity to numerous fire stations, construction that would meet the latest fire code standards, and review by the Clovis Fire Department, impacts related to effects on the performance of the Fire Department would be **less-than-significant** and no mitigation measures are required.

b) *Would the project result in substantial 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 police protection services?*

Less-Than-Significant Impact. Although the Project would result in 385 new residential homes, the site is located adjacent to the City which is already served by the Clovis Police Department. Upon annexation the Project will then located in an area the City will able to serve. The Clovis Police Department headquarters are located at 1233 Fifth Street, which is approximately five (5) miles from the site. As part of the entitlement process for the Project, the Clovis Police Department will review the design and site layout to ensure adequate safety measures are achieved. Consequently, a **less-than-significant** impact would occur and no mitigation measures are required.

c) *Would the project result in substantial 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 schools?*

Less-Than-Significant Impact. As part of the review process, CUSD is provided the opportunity to comment and work closely with the City as development is proposed. As mentioned previously, the Project site was previously planned for residential development, as indicated in the 2014 Clovis General Plan. As such, the CUSD has been aware of the potential for this type of development at this location. As part of the process, the Project would be required to pay school fees which typically go towards the improvement and/or construction of new schools or expanding existing schools if and when needed, as determined by the CUSD. Therefore, because the Project is consistent with what was previously planned for at this site in addition to payment of appropriate school fees set by the CUSD, a **less-than-significant** impact would occur and no mitigation measures are required.

d) *Would the project result in substantial 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 parks?*

Less-Than-Significant Impact. Although the Project proposes two (2) pocket parks for a total of approximately 46,637 square feet of park space, these parks would not cause significant environmental impacts in order to maintain acceptable service ratios, response times or other performance objectives for parks. Consequently, a **less-than-significant** impact would occur and no mitigation measures are required.

e) *Would the project result in substantial 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 other public facilities?*

Less-Than-Significant Impact. Although the Project would result in 385 new residential homes, residential uses have been previously planned for in the 2014 Clovis General Plan in this area. Also, through the entitlement process, the Project would undergo review by several departments and agencies for compliance with appropriate regulations and policies. This could result in various impact fees that are intended to maintain and enhance public facilities as appropriate to be able to accommodate the Project. As such, payment of the typical development fees, as well as project review by the different department and agencies, would result in the Project having a **less-than-significant** impact to public facilities. No mitigation measures are required.

16. RECREATION

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			X	
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?			X	

ENVIRONMENTAL SETTING

The nearest existing recreational site is Dry Creek Trailhead, located at the corner of Shepherd and Sunnyside Avenues. A future community park is planned approximately one (1) mile southwest of the Project site.

DISCUSSION

a) *Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*

Less-Than-Significant Impact. As mentioned in the Population and Housing section of this Initial Study, the Project is of the type previously planned and accounted for in the 2014 Clovis General Plan. Although 385 new housing units would be constructed, therefore, adding new population to the area that may utilize parks within the surrounding area, this growth was planned for with regards to park usage throughout the City. Further, the Project itself would include landscaped and open space areas on-site for its residents, as well as two (2) pocket parks within the neighborhood, thereby, providing areas of recreation within the site itself. The Project would also be required to comply with 2014 Clovis General Plan Policy 2.2 of the Open Space and Conservation Element which encourages the incorporation of on-site natural resources.

Overall, the Project is not likely to increase the use of existing parks such that physical deterioration would occur. Therefore, the impact would be **less-than-significant** and no mitigation measures are required.

b) *Does the project 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 Impact. The Project site itself would construct two (2) on-site pocket parks. The Project itself would not require the construction or expansion of new recreational facilities elsewhere that would have an adverse physical effect on the environment. The Project would also be required to contribute a proportionate share towards the acquisition and development of future parks in order for the City to maintain its adopted ratio of providing four (4) acres of parkland per 1,000 residents, as stated in Policy 1.1 in the Open Space and Conservation Element of the 2014 Clovis General Plan, and Section 3.4.03 of the CMC. As such, a **less-than-significant** impact would occur and no mitigation measures are required.

17. TRANSPORTATION

Would the project:	Significant and Unavoidable	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?			X	
b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	X			
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
d. Result in inadequate emergency access?			X	

ENVIRONMENTAL SETTING

The Project site is bounded by North Minnewawa Avenue to the west and North Clovis Avenue to the east. The circulation network serving the site including internal site circulation will be constructed as part of the Project.

According to the 2014 Clovis General Plan Circulation Diagram in the Circulation Element (Figure C-1 of the Circulation Element), North Minnewawa and North Clovis Avenues are classified as “arterial” streets. Arterials

are generally defined as major streets designed to carry relatively heavy volumes of traffic through an urban area.

A Transportation Impact Analysis (TIA) was prepared by Peters Engineering Group on December 21, 2023 (included as Appendix E of this Initial Study). The information and analysis in the following sections is based in part on the results of the TIA.

DISCUSSION

a) *Would the project conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?*

Less-Than-Significant Impact. As mentioned above, the Project site is on land that was previously planned for residential use in the 2014 Clovis General Plan. As described in the Population and Housing section above, the Project will be consistent with the planned medium density.

The TIA studied the following eight (8) intersections for existing conditions, existing-plus-project conditions, near term with project conditions, and cumulative conditions to the year 2045:

1) Willow Avenue / International Avenue
2) Minnewawa Avenue / International Avenue
3) Willow Avenue / Behymer Avenue
4) Minnewawa Avenue / Behymer Avenue
5) Minnewawa Avenue / Shepherd Avenue
6) DeWitt Avenue / Shepherd Avenue
7) Clovis Avenue / Shepherd Avenue
8) Clovis Avenue / Site Access Street (left turn in)

A discussion of each of these scenarios is included below. Based on the TIA, existing traffic volumes were determined during morning peak hours of 7:00 a.m. to 9:00 a.m., and between evening peak hours of 4:00 p.m. and 6:00 p.m. on a weekday. Each scenario is based on the Projects a.m. and p.m. peak hour trips as determined in the TIS. According to the TIS, the Project would result in 271 trips in the a.m. peak hours of between 7:00 a.m. and 9:00 a.m. and 364 trips in the p.m. peak hours between 4:00 p.m. and 6:00 p.m., as well as a total of 3,650 daily vehicle trips.

Existing Traffic Conditions

According to the TIA, most study intersections are operating at acceptable levels of service (LOS) except for Minnewawa and Behymer Avenues which is not currently operating at an acceptable LOS based on City of Clovis standards.[33]

Existing-Plus-Project Conditions

Existing-Plus-Project conditions represent existing conditions plus buildout of the Project if none of the pending and approved project in the vicinity were constructed. According to the TIA, all intersections currently operating at an acceptable LOS are not expected to operate below the City LOS standard.[34] Delays are expected to increase at the intersection of Minnewawa and Behymer Avenues.

33 Transportation Impact Analysis, Proposed Tract No. 6452, Peters Engineering Group, December 21, 2023 page 16.
34 Transportation Impact Analysis, Proposed Tract No. 6452, Peters Engineering Group, December 21, 2023 page 17.

In order for the intersection of Minnewawa and Behymer Avenues to operate at an acceptable LOS, the intersection may be signalized or at a minimum a dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization this intersection is expected to operate at LOS B during a.m. and p.m. peak hours. [35]

Near-Term-With-Project Conditions

These conditions are based on buildout of the Project plus the near term planned or entitled projects that are reasonably foreseeable. The following projects were considered in the near-term analyses TM6205 605 single family homes (NE of Shepherd and Sunnyside), TM6343 590 single family homes (NE of Behymer and Baron), TM6406 51 single family homes (SW of Perrin and Baron), TM6452 153 single family homes (NE of Perrin and Baron), and Heritage Grove, 18-acre mixed use development (SE of Willow and Shepherd). Under this scenario, the intersections of Minnewawa and Behymer Avenues, Minnewawa and International Avenues, and Minnewawa and Shepherd Avenues would not meet acceptable LOS thresholds per City standards during peak hours.[36]

In order for the intersection of Minnewawa and Behymer Avenues to operate at an acceptable LOS the same improved condition as outlined above in the Existing-Plus-Project Conditions summary is recommended. In order for the intersection of Minnewawa and International Avenues to operate at an acceptable LOS, all-way stop control may be installed. With all-way stop the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours. In order for the intersection of Minnewawa and Shepherd Avenues to operate at an acceptable LOS, the westbound, northbound, and southbound approaches may be widened. With widening of the intersection of Minnewawa and Shepherd Avenues is expected to operate at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour.[37]

Cumulative 2045 Traffic Conditions

These conditions represent anticipated traffic volumes for the year 2045 using the Fresno Council of Governments (Fresno COG) travel model. As described in the TIS, four (4) of the study intersections would operate at an acceptable LOS for the year 2045; however, with incorporation of improved conditions for intersections that fall below the recommended LOS each intersection will operate at an acceptable LOS. [38]

Bicycle Facilities

With regards to bicycle facilities, Figure C-2 of the 2014 Clovis General Plan indicates a planned Class II bicycle systems fronting the Project along N. Minnewawa and N. Clovis Avenues. The Project would install the planned Class II bicycle systems along their frontages which would help to facilitate improved circulation.

The traffic conditions above recommend improvements for each study intersection. With incorporation of improvements recommended for each scenario all study intersections will operate at satisfactory LOS levels thus, the Project, will not conflict with the Circulation Element of the 2014 Clovis General Plan. Consequently, a **less-than-significant** impact would occur. No mitigation measures are required.

35 Transportation Impact Analysis, Proposed Tract No. 6452, Peters Engineering Group, December 21, 2023 page 17.

36 Transportation Impact Analysis, Proposed Tract No. 6452, Peters Engineering Group, December 21, 2023 page 18-19.

37 Transportation Impact Analysis, Proposed Tract No. 6452, Peters Engineering Group, December 21, 2023 page 20-21.

38 Transportation Impact Analysis, Proposed Tract No. 6452, Peters Engineering Group, December 21, 2023 page 20-22

b) *Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?*

Significant and Unavoidable Impact. Senate Bill 743 (SB 743) requires that relevant CEQA analysis of transportation impacts be conducted using a metric known as vehicle miles traveled (VMT) instead of LOS. VMT measures how much actual auto travel (additional miles driven) a proposed project would create on California roads. If the proposed project adds excessive car travel onto our roads, the proposed project may cause a significant transportation impact. Per CEQA Guidelines Section 15064.3(b)(4) a lead agency has discretion to choose the most appropriate methodology to evaluate a project's VMT, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's VMT, and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate VMT and any revisions to model outputs should be documented and explained in the environmental document prepared for the project.

On October 17, 2022, the City of Clovis adopted the Transportation Impact Analysis Guidelines (Guidelines), dated September 15, 2022. Consistent with CEQA Guidelines Section 15064.3, the City of Clovis has adopted thresholds of significance to determine when a project will have a significant transportation impact based on VMT. The City has developed screening criteria to streamline the analysis for projects that meet certain criteria. A project will require a detailed VMT analysis unless it meets at least one of the City's five screening criteria[39]:

- Small Projects that generate less than 500 vehicle trips per day (i.e., Single-Family Residential developments with less than 53 dwelling units).
- Provision of affordable housing
- Local-serving retail projects with areas of 100,000 square feet and below
- Projects located in a High-Quality Transit Area (HQTA) as defined on page 8 of the City's Transportation Impact Analysis Guidelines
- Project located in low VMT area

The Project does not qualify for the screening criteria; therefore, shall be evaluated per Guidelines thresholds. The significance thresholds and specific VMT metrics are described on page 10 of the City's Transportation Impact Analysis Guidelines. Per the City's Transportation Impact Analysis Guidelines, the residential land use impact threshold is 14.1 VMT per capita. The Project will generate 16.6 VMT per capita which is greater than the threshold of 14.1 VMT per capita; therefore, the Project would create a significant transportation impact. Feasible mitigation measures must be identified to avoid or substantially reduce a significant impact under CEQA. Mitigation of VMT impacts typically requires changes in habits and behaviors of residents. Project design features that encourage mode shift from automobiles to transit or nonmotorized modes can potentially reduce project-specific VMT. The potential VMT reduction was estimated using the California Air Pollution Control Officers Association's (CAPCOA) *"Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity – Designed for Local Governments, Communities, and Project Developers"* dated December 2021.

The Project will implement feasible mitigation measures such as constructing approximately three and a quarter miles of sidewalks and approximately a half mile of Class II Bike Lanes on North Minnewawa and North Clovis Avenues; however, implementation of the Project design features described above only reduces the calculated Project VMT by up to approximately 3.3 percent. While the described mitigation measures can help offset a

39 Transportation Impact Analysis Guidelines, City of Clovis, September 15, 2022 page 4.

portion of the VMT impact, it will not reduce the impact to less than significant; therefore, the Project will have a **significant and unavoidable** transportation impact.

The City adopted a Supplemental Environmental Impact Report (SEIR) for the 2014 Clovis General Plan Circulation Element Update on October 17, 2022. The SEIR evaluated potential land uses consistent with the General Plan and their associated VMT impacts. The SEIR finds that implementation of the 2014 Clovis General Plan may result in VMT metrics that are greater than the applicable thresholds. Mitigation measures include policies to reduce VMT. Because the City cannot demonstrate that the implementation of these policies would achieve VMT reductions to meet the VMT thresholds, the impacts would remain significant and unavoidable. Therefore, following approval of the SEIR, individual land use development projects that are consistent with the 2014 Clovis General Plan have the opportunity to tier their environmental review from the General Plan SEIR pursuant to section 15152 of the CEQA Guidelines. The SEIR has disclosed the VMT impacts of land use development consistent with the General Plan. Therefore, significant and unavoidable VMT impacts associated with the General Plan have already been disclosed. Because the proposed Project is consistent with the 2014 Clovis General Plan, the Project's significant transportation impact does not require the preparation of a project specific EIR. Although the Project, has been determined to be consistent with the 2014 Clovis General Plan and is tiering from the SEIR, it would remain a **significant and unavoidable** impact.

c) *Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

Less-Than-Significant Impact. The Project would result in a significant impact if it would include features that would create a hazard such as a sharp curve in a new roadway, or create a blind corner or result in sight distance issues from entryways. Through the entitlement process, the Project would undergo review by multiple City divisions, such as Planning and Engineering, to ensure that the site layout conforms to existing regulations, such as the CMC, and other applicable codes, such as the fire code and building code. During this review, the Project would need to make the necessary corrections to ensure that no hazardous design features would result from the Project. Further, all public roadways will be constructed to City roadway standards. Therefore, because the Project would undergo site plan and design review to ensure consistency and adherence to applicable design and site layout guidelines, a **less-than-significant** impact would occur.

d) *Would the project result in inadequate emergency access?*

Less-Than-Significant Impact. The Project would include three (3) ingress/egress access points to the proposed development, from North Minnewawa and North Clovis Avenues. As part of the Project review, the Clovis Fire Department would review all plans to ensure adequate emergency access is provided. This review includes review for adequate roadway widths, turning radii, as well as adequate access to units and accessibility to water. Consequently, because the Project plans would be required by the CMC to be reviewed and approved by Clovis Fire Department and Police Department prior to construction, this impact would be **less than significant** and no mitigation measures are required.

18. TRIBAL CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. 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)?				X

b. 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. In applying the criteria set forth in subdivision (c) of Public Resources Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American Tribe?		X		

ENVIRONMENTAL SETTING

On September 25, 2014, Governor Jerry Brown signed Assembly Bill (AB52), which intends to protect a new class of recourse under CEQA. This new class is Tribal Cultural Resources and provides an avenue to identify Tribal Cultural resources through a consultation process. AB52 applies to all projects where a Notice of Determination is filed. Furthermore, the consultation process is required to be complete prior to filing a Notice of Intent.

City staff conducted Native American Consultation in compliance with AB52. In compliance with AB52, invitations for consultation were mailed on July 2, 2024 which affords Native tribes thirty (30) days to respond and to request consultation. During that time, one (1) tribe requested consultation. On September 30, 2024 a representative from Table Mountain Rancheria met with City staff via virtual call to discuss the potential for cultural resources at the Project annexation area. Following the meeting the representative from Table Mountain Rancheria voiced concerns for the potential sites of tribal significance. Based on the conversation while potential sites were within the annexation area, they were outside of the Project development site. However, mitigation measures are included in the following analysis to ensure protection of such resources if any are discovered inadvertently. With the incorporation of the mitigation measures, the consultation ended.

The Cultural Report prepared for the Project included a records search at the CHRIS SSJVIC, as well as desktop archival research.

DISCUSSION

a) *Would the project cause a substantial adverse change to a 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)?*

No Impact. See discussion under Section 5a.

b) *Would the project cause a substantial adverse change to 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. In applying the criteria set forth in subdivision (c) of Public Resources Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American Tribe?*

Less-Than-Significant Impact With Mitigation. The site's ground has been minimally disturbed as a result of previous rural residential structures. Further, the Cultural Report concluded that there was no evidence of

prehistoric archaeological sites, isolated artifacts, or other archaeological features.[40] However, the potential remains that tribal cultural resources could be inadvertently or accidentally uncovered during ground-disturbing activities such as trenching, digging, and the installation of utilities and other infrastructure.

Because there is the slight possibility for the accidental or inadvertent uncovering of tribal cultural resources during construction, Mitigation Measures TCR-1 and TCR-2 would serve to reduce those potential impacts by requiring the stopping of any work until any found artifacts can be properly removed and inventoried by a qualified archaeologist. Therefore, the Project would result in a **less-than-significant impact with mitigation**.

Mitigation Measure TCR-1: If archaeological or tribal resources or materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified professional archaeologist, can evaluate the significance of the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants.

If the qualified professional archaeologist determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation.

If a potentially-eligible resource is encountered, then the qualified professional archaeologist, the Lead Agency, and the project proponent shall arrange for either 1) total avoidance of the resource or 2) test excavations to evaluate eligibility and, if eligible, total data recovery. The determination shall be formally documented in writing and submitted to the Lead Agency as verification that the provisions for managing unanticipated discoveries have been met.

Mitigation Measure TCR-2: If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code and Project shall follow the procedures and protocols set for un CEQA Guidelines Section 15064.4(e)(1). If human remains are identified to be those of Native American, California Health and Safety Code 7050.5 requires the County coroner notify the NAHC within 24 hours of discovery. All reports, correspondence, and determinations regarding the discovery of human remains on the project site shall be submitted to the Lead Agency.

19. UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			X	

40 Cultural Resource Study for the Clovis Tract 6452 prepared by Applied Earthworks, Inc., page 23, November 2023.

b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			X	
c. Result in a determination by the wastewater treatment provider that 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?			X	
d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			X	
e. Comply with federal, state, and local management reduction statutes and regulations related to solid waste?			X	

ENVIRONMENTAL SETTING

Pacific Gas & Electric (PG&E) provides electricity and natural gas services in the City of Clovis. AT&T/SBC provides telephone service to the City.

The City's water supply sources include groundwater drawn from the Kings Sub-basin of the San Joaquin Valley Groundwater Basin and treated surface water from the FID. Surface water is treated at the City of Clovis Surface Water Treatment Facility.

The City of Clovis provides sewer collection service to its residents and businesses. Treatment of wastewater occurs at the Fresno-Clovis Regional Wastewater Treatment Plant (RWTP). The Fresno-Clovis RWTP is operated and maintained by the City of Fresno and operates under a waste discharge requirement issued by the Central Valley Regional Water Quality Control Board. Additionally, the City of Clovis has completed a 2.8 mgd wastewater treatment/water reuse facility, which will service the City's new growth areas.

The FMFCD has the responsibility for storm water management within the Fresno-Clovis metropolitan area of the Project site. Stormwater runoff that is generated by land development is controlled through a system of pipelines and storm drainage detention basins.

DISCUSSION

a) *Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?*

Less-Than-Significant Impact. The Project includes construction of 385 residential homes. As mentioned above, the site is a use previously accounted for in the 2014 Clovis General Plan. Further, as part of the review process for the Project, the wastewater impacts will be evaluated by the City Engineer to ensure compliance with the City's Wastewater Master Plan, as well as FMFCD, so that the Project would not exceed wastewater treatment requirements such that a new facility would be required nor would the existing treatment facility need to be expanded. While the Project would introduce new homes at this site, the type of development would be

consistent with the land use designation and Zone District. Upon review and approval by the City Engineer, the Project would result in a **less-than-significant** impact and no mitigation measures are required.

b) *Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?*

Less-Than-Significant Impact. The Project is of the type of development previously accounted for the in 2014 Clovis General Plan and is adjacent to the south and east with existing urban uses which are served adequately with City water. Therefore, the Project is anticipated to be adequately served by City water. Further, the Project would comply with current Green Building Codes, as well as the water efficient landscape policies with regards to water conserving features. Lastly, the Project would be required to comply several water conserving policies, such as Policies 3.4 and 3.5 of the Open Space and Conservation Element. Overall, a **less-than-significant** impact would occur no mitigation measures are required.

c) *Would the project result in a determination by the wastewater treatment provider that 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?*

Less-Than-Significant Impact. Because the Project is of the type previously planned and accounted for in the 2014 Clovis General Plan, it is not likely that the Project would result in a demand that would exceed the capacity of the wastewater treatment facility. Further, the Project is reviewed by the appropriate departments and agencies to ensure compliance and adequate capacity with regard to infrastructure, such as the ability to provide adequate wastewater treatment. Consequently, the impact would be **less-than-significant** no mitigation measures are required.

d) *Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?*

Less-Than-Significant. The Project would introduce new solid waste throughout construction and operation of the Project. However, the Project would be required to comply with Chapter 6.3.1, Recycling and Diversion of Construction and Demolition Debris, of the CMC during construction. This section of the CMC requires that a minimum of fifty percent (50%) of waste tonnage from a project be diverted from disposal, and that all new residential (and commercial) construction within the City shall submit and obtain approval for a waste management plan prior to construction activities. Compliance with these measures would ensure that the Project does not result in a significant impact during the construction phase of the Project. Further, compliance with policies in the General Plan for the reduction and recycling of solid waste would serve to reduce impacts of solid waste by promoting and encouraging the recycling of materials. Lastly, according to the California Department of Resources Recycling and Recovery (CalRecycle) the City of Clovis has exceeded their target per resident disposal rate of 4.7 pounds per day per resident, meaning that Clovis residents are actually producing less solid waste than the target set by the State.[41] Consequently, a **less-than-significant** impact would occur no mitigation measures are required.

e) *Would the project comply with federal, state, and local management reduction statutes and regulations related to solid waste?*

Less-Than-Significant. See discussion 19d above.

41 Calrecycle, City of Clovis, https://www2.calrecycle.ca.gov/LGCentral/DiversionProgram/JurisdictionDiversionPost2006, accessed October 8, 2024.

20. WILDFIRE

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?			X	
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?			X	
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?			X	
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?			X	

ENVIRONMENTAL SETTING

The Project site is located on an undeveloped site surrounded by existing residential homes at various densities to the south and east. The site's topography is generally flat and characterized primarily by low lying shrubs and grasses.

DISCUSSION

a) *Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?*

Less-Than-Significant Impact. The Project is located at a site that is surrounded by existing residential development to the south and east. Further, the road network will be construed as part of the Project. Although the Project could result in temporary traffic detouring or closures during buildout, these delays would be temporary and would be coordinated with the City Engineering Division and other departments to ensure safe access to and from the area is maintained. Further, the site itself would reviewed by City departments to ensure adequate site access and circulation is provided in the event of an emergency. Overall, a **less-than-significant** impact would occur and no mitigation measures are required.

b) *Would the project, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?*

Less-Than-Significant Impact. The general vicinity of the site is flat, therefore, is not of the type of topography nor in a location likely to exacerbate wildfire risks. Additionally, the Project site is located in an area mapped by CAL FIRE as "unzoned" per the Fire Hazard Severity Zone Viewer[42], indicating the area is not located in an area within State Responsibility Areas into Fire Hazard Severity Zones. Further, the Project would be required to comply with the latest fire codes and would be required to include sprinklers on the interior of the homes and require installation of several hydrants throughout the site. Lastly, the site plans would undergo review by the Clovis Fire Department to ensure that all fire safety regulations are met. Project site is Therefore, a **less-than-significant** impact would occur no mitigation measures are required.

c) *Would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?*

Less-Than-Significant Impact. As a new development, the Project requires the installation of a public and private roadway network, water lines, and power lines; however, these utilities and infrastructure are typical of residential development and would be constructed to standards of the respective agencies and departments which oversee them, as well as be required to comply all necessary plan review and permitting requirements of such departments and agencies. As such, a **less-than-significant** impact would occur no mitigation measures are required.

d) *Would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?*

No Impact. The City of Clovis is generally flat topography, and the site itself is in an area that is not in close proximity to hillsides such that it would expose people or structures to significant risks associates with downstream flooding or landslides as a result of runoff or post-fire slope instability. As such, **no impact** would occur no mitigation measures are required.

21. MANDATORY FINDINGS OF SIGNIFICANCE

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Does the project have the potential to substantially degrade the quality of the environment, 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, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?			X	
b. Does the project have impacts that are individually limited, but cumulatively			X	

42 Fire Hazard Severity Zones, https://osfm.fire.ca.gov/what-we-do/community-wildfire-preparedness-and-mitigation/fire-hazard-severity-zones, accessed October 8, 2024

considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				
c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?			X	

ENVIRONMENTAL SETTING

The Project is located within the City of Clovis, substantially surrounded by existing development to the south and east.

DISCUSSION

a) *Does the project have the potential to substantially degrade the quality of the environment, 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, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?*

Less-Than-Significant Impact. As discussed above throughout the Initial Study, the Project would not result in any significant impacts with implementation of mitigation measures prescribed above. Therefore, the Project would have a **less-than-significant** impact as it would not substantially degrade the quality of the environment.

b) *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*

Less-Than-Significant Impact. The Project includes mitigation measures in certain topic areas identified throughout this Initial Study which would reduce potential impacts to a less-than-significant level. None of these impacts would be cumulatively considerable since most are either temporary impacts from construction or site specific. With the exception of GHG that is generally considered measurable cumulatively and VMT which has been determined to be consistent with the 2014 General Plan and is tiering from the SEIR. The Project was found to have a less-than-significant impact as discussed in this Initial Study. As such, this Project would be required to comply with those same regulations, ensuring adequate mitigation as development occurs. Lastly, while the Project would introduce 385 new residential homes to an existing undeveloped site, the type of use was previously accounted for in the 2014 Clovis General Plan buildout. Thus, a **less-than-significant** impact would occur.

c) *Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?*

Less-Than-Significant Impact. As discussed throughout the document, the Project would not result in an impact that could not be mitigated to a less-than-significant level. Therefore, a **less-than-significant** impact would occur.

I. Report Preparation

LEAD AGENCY

Liz Salazar
Assistant Planner
City of Clovis

Planning & Development Services

TECHNICAL STUDIES

Air Quality and Greenhouse Impact Assessment
Tract 6375 Residential Development
Georgiena Vivian, Project Manager
VRPA Technologies, Inc.
January 2024

Biological Evaluation Report
Lennar Homes Tract 6375
Austin Pearson, Vice President
Rebekah Jenson, Senior Project Manager and Ecologist
Live Oak Associates, Inc.
August 2023, revised October 2024

Cultural Resource Study
Clovis Tract 6375 Residential Development, City of Clovis, Fresno County, California
Nicole Saenz
Applied EarthWorks, Inc.
November 2023

Acoustical Analysis
Tract 6375
WJV Acoustics, Inc.
March 2024

Traffic Impact Analysis
Proposed Tract 6375
Peters Engineering Group
December 2023

MITIGATION MONITORING AND REPORTING PROGRAM
TM6452

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
Agriculture and Forestry Resources				
AGR-1	The Project applicant shall prepare or fund an agricultural resource evaluation prior to project approval. The resource evaluation shall be use generally accepted methodologies (such as the Land Evaluation and Site Assessment Model) to identify the potentially significant impact of the loss of agricultural land. If the loss of agricultural land is determined to be a potentially significant impact, the resource evaluation shall consider the economic viability of future agricultural use of the property. If the agricultural resource is considered significant and future agricultural use is considered economically viable, the conversion will be deemed significant. The City shall require mitigation by one of the following methods: • Mitigation at a 1:1 ration of converted to preserved acreage through a regional conservation easement, or payment of its valuation equivalent if a fee mitigation program is established. If 1:1 mitigation is determined to be economically infeasible, based upon all of the evidence, the ratio may be reduced to an economically feasible ratio or no further mitigation shall be required. This determination shall be made by the City's Director of Planning and Development	City of Clovis Planning	*Prior to Permits*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	Services based upon substantial evidence in the record; or • Other potential mitigation which achieves the same mitigating effect as the measures identified above, consistent with the CEQA Statutes and Guidelines. This determination shall be made by the City's Director of Planning and Development Services based upon substantial evidence in the record.			
ARG-2	Prior to issuance of building permits for development of APN 556-030-17S, the project applicant would be required to petition for cancellation of the Williamson Act contract for APN 556-030-17S. The applicant would have to meet circumstances and conditions set forth in Government Code Section 51280. After approval of the cancellation petition, the applicant would be able to develop uses that comply with the zoning designation of the parcel per the Clovis Municipal Code.	City of Clovis Planning	*Prior to Permits*	
ARG-3	Pursuant to Clovis Municipal Code Section 9.40.170 and the California Civil Code Section 3482.5, prior to approval of building occupancy permits the Project developer shall provide residents of the Project site Right-To-Farm notifications. The Right-To-Farm notification would advise future occupants of the Project site that they are residing adjacent to agricultural land that has been active for three or	City of Clovis Planning	*Prior to Permits*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	more years and that they should expect continued activities associated with agricultural production.			
Biological Resources				
BIO-1	**Sanford's arrowhead.** Prior to the start of construction, a qualified biologist will conduct protocol-level rare plant surveys following California Department of Fish and Wildlife's 2018 Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities, or most current agency guidance. Surveys will target all habitats of the Project site that could potentially support the Sanford's arrowhead, and will be conducted when local populations of the Sanford's arrowhead are in bloom and readily identifiable.	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-2	**Sanford's arrowhead.** If Sanford's arrowhead populations are identified on site, project design will be modified, if at all feasible, to avoid the plants. A qualified biologist will identify an appropriate buffer around the plants, and no developments or other project-related activities will be permitted within.	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-3	**Sanford's arrowhead.** If it is not feasible to avoid Sanford's arrowhead populations, the affected populations will be salvaged in accordance with a plan prepared by a qualified biologist that will include contingencies for an unsuccessful salvage effort. Salvage methods may include seed collection and dispersal, transplanting rootstock, and/or	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	topsoil collection and redispersal, as appropriate. The relocation area(s) will be located in alternative on-site emergent wetland habitat to be established and maintained for this species, and protected through a deed restriction, conservation easement, or similar mechanism. Relocation areas will be monitored by a qualified biologist for a period of five years to ensure successful establishment.			
BIO-4	**Monarch butterfly**. Prior to the start of construction, a qualified biologist will survey all proposed work areas for milkweed plants. The survey will be conducted at a time of year when milkweed is readily identifiable. The objective of the survey will be to tally and map all milkweed plants that could potentially be impacted by project activities (Milkweed Survey).	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-5	**Monarch butterfly.** If feasible, any removal of milkweed plants required for residential buildout will take place entirely outside of the period in which monarchs are most likely to breed in the project vicinity, March 1-August 31 (Construction Timing).	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-6	**Monarch butterfly.** If removal of milkweed plants cannot be avoided between March 1 and August 31, a qualified biologist will conduct pre-construction surveys for non-volant life stages of monarchs on those milkweed plants that will be removed, within 10 days prior to the start of construction. If any non-volant life stages are identified, then those plants	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	will be avoided until it is confirmed by a qualified biologist that a monarch is no longer present (Preconstruction Surveys and Avoidance).			
BIO-7	**Monarch butterfly.** Impacted milkweed plants will be replaced on site in accordance with a revegetation plan prepared by a qualified biologist. A minimum of 50 replacement plantings will be provided, or three times the number of milkweed plants identified at the time of the milkweed survey (see Mitigation Measure BIO-4), whichever is greater. Replacement plantings must be locally native; preferred species are narrowleaf milkweed (A. fascicularis) and showy milkweed (A. speciosa). The planting site(s) must be in area(s) that will not be mowed or treated with pesticides or herbicides, to be guaranteed via a deed restriction or similar protective mechanism. Revegetation areas will be monitored by a qualified biologist for a period of five years to ensure successful establishment. (Compensatory Mitigation).	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-8	**Swainson's hawk.** If feasible, project activities will take place entirely outside of the Swainson's hawk nesting season, defined here as March 1 to September 15. If Mitigation Measure BIO-8 is implemented, no further mitigation for this species is required. (Construction Timing).	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
BIO-9	**Swainson's hawk.** If project activities must occur between March 1 and September 15, a qualified biologist will conduct nest surveys for Swainson's hawks on and within ¼ mile of the Project site within the survey periods prescribed by Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (SHTAC 2000). Three nest surveys will be conducted in each of two survey periods, with the survey periods defined as follows: Period I – January 1 to March 20, Period II – March 20 to April 5, Period III – April 5 to April 20, Period IV – April 21 to June 10, and Period V – June 10 to July 30. Surveys will take place in the two survey periods immediately prior to the anticipated start of construction activities during the nesting season, with the exception of Period III, when no surveys should take place per the SHTAC guidelines. The surveys will consist of inspecting all accessible, suitable trees of the survey area for the presence of nests and hawks. (Nesting Surveys).	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-10	**Swainson's hawk.** If active Swainson's hawk nests are detected during the surveys or observed incidentally, a minimum ¼-mile no-disturbance buffer will be delineated and maintained around each nest, to remain in place until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	longer reliant upon the nest or parental care for survival. (No-Disturbance Buffers).			
BIO-11	**Swainson's hawk.** If an active Swainson's hawk nest is detected, and a ¼-mile no-disturbance buffer is not feasible, the project applicant will consult with CDFW to discuss how to implement the project and avoid take. If take cannot be avoided, take authorization will be obtained through the acquisition of a State Incidental Take Permit (ITP), pursuant to Fish and Game Code section 2081 subdivision (b). (CDFW Consultation).	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-12	**Other nesting birds and raptors.** If feasible, project activities will take place entirely outside of the avian nesting season, defined here as February 1 to September 15. If Mitigation Measure BIO-12 is implemented, no further mitigation for nesting birds or raptors is required. (Construction Timing).	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-13	**Other nesting birds and raptors.** If project activities must occur between February 1 and September 15, a qualified biologist will conduct surveys for active bird nests within 10 days prior to the start of work during this period. The survey area will encompass the site and accessible surrounding lands within 250 feet for nesting birds and 500 feet for nesting raptors (Preconstruction Surveys).	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-14	**Other nesting birds and raptors.** Should any active nests be discovered in or near the work area, a qualified biologist will conduct an additional survey	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	to establish a behavioral baseline of these nests. (Behavioral Baseline).			
BIO-15	**Other nesting birds and raptors.** If feasible, a qualified biologist will continuously monitor active nests during project activities to detect behavioral changes resulting from the project. If behavioral changes occur, the activities that appear to be causing the changes (as determined by the qualified biologist) will be discontinued. At the biologist's discretion, activities may be resumed (1) in a modified form, with lower levels of visual or sound disturbance, (2) following the implementation of measures designed to reduce perceived disturbance, e.g. visual buffers, and/or (3) at a later nesting stage, when the affected birds are less sensitive to disturbance. (Continuous Monitoring).	City of Clovis Planning	*Prior to Permits and During Construction*	
BIO-16	**Other nesting birds and raptors.** If continuous monitoring of active nests is not feasible, or if nesting birds have behavioral changes that persist following the implementation of one or more of the corrective actions identified above under Mitigation Measure 4.1.4d, a minimum no-disturbance buffer of 250 feet will be established around active bird nests and 500 feet around active raptor nests. These buffers will remain in place until after the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or on-site parental care for survival. Variance from these no-	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	disturbance buffers is possible when there is compelling biological or ecological reason to do so. A qualified biologist will advise and support any variance from these buffers. (No-Disturbance Buffers).			
Cultural Resources				
CULT-1	If archaeological or tribal resources or materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified professional archaeologist, can evaluate the significance of the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants. If the qualified professional archaeologist determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation. If a potentially-eligible resource is encountered, then the qualified professional archaeologist, the Lead Agency, and the project proponent shall arrange for either 1) total avoidance of the resource	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	or 2) test excavations to evaluate eligibility and, if eligible, total data recovery. The determination shall be formally documented in writing and submitted to the Lead Agency as verification that the provisions for managing unanticipated discoveries have been met.			
CULT-2	If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code and Project shall follow the procedures and protocols set for un CEQA Guidelines Section 15064.4(e)(1). If human remains are identified to be those of Native American, California Health and Safety Code 7050.5 requires the County coroner notify the California Native American Heritage Commission within 24 hours of discovery. All reports, correspondence, and determinations regarding the discovery of human remains on the Project site shall be submitted to the Lead Agency.	City of Clovis Planning	*Prior to Permits and During Construction*	
Geological Resources				
GEO-1	If prehistoric or historic-era cultural materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified professional archaeologist and/or paleontologist, can evaluate the significance of the find and make recommendations. Cultural resource	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants. If the qualified professional determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation. If a potentially-eligible resource is encountered, then the qualified professional archaeologist and/or paleontologist, the Lead Agency, and the project proponent shall arrange for either 1) total avoidance of the resource or 2) test excavations to evaluate eligibility and, if eligible, total data recovery. The determination shall be formally documented in writing and submitted to the Lead Agency as verification that the provisions for managing unanticipated discoveries have been met.			
Greenhouse Gas Emissions				
GHG-1	In order to meet the 2022 Scoping Plan GHG requirements, consistent with State GHG reduction and equity prioritization goals, each residential unit shall provide electric vehicle charging capabilities as part of the final project designs.	City of Clovis Planning	*Prior to Permits and During Construction*	
Noise				

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
NOISE-1	Exterior Noise. A sound wall shall be constructed to a minimum height of six (6) feet above Project-side grade along North Minnewawa Avenue. In order for the sound wall to effectively shield noise, where there will be access to the development from North Minnewawa Avenue, the sound walls will need to be turned inward (eastward) for a distance of approximately twenty (20) feet at roadway access points. Other Project design features that satisfy the City's exterior noise exposure noise level may fulfill this mitigation.	City of Clovis Planning	*During Construction and Prior to Occupancy*	
NOISE-2	Interior Noise. Mechanical ventilation or air conditioning shall be provided for all homes to enable windows and doors to remain closed for sound insulation purposes.	City of Clovis Planning	*During Construction and Prior to Occupancy*	
Tribal Cultural Resources				
TCR-1	If archaeological or tribal resources or materials are encountered during construction activities, all work in the immediate vicinity of the find shall halt until a qualified professional archaeologist, can evaluate the significance of the find and make recommendations. Cultural resource materials may include prehistoric resources such as flaked and ground stone tools and debris, shell, bone, ceramics, and fire-affected rock as well as historic resources such as glass, metal, wood, brick, or structural remnants.	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	If the qualified professional archaeologist determines that the discovery represents a potentially significant cultural resource, additional investigations may be required to mitigate adverse impacts from project implementation. These additional studies may include avoidance, testing, and evaluation or data recovery excavation. If a potentially-eligible resource is encountered, then the qualified professional archaeologist, the Lead Agency, and the project proponent shall arrange for either 1) total avoidance of the resource or 2) test excavations to evaluate eligibility and, if eligible, total data recovery. The determination shall be formally documented in writing and submitted to the Lead Agency as verification that the provisions for managing unanticipated discoveries have been met.			
TCR-2	If human remains are discovered during construction or operational activities, further excavation or disturbance shall be prohibited pursuant to Section 7050.5 of the California Health and Safety Code and Project shall follow the procedures and protocols set for un CEQA Guidelines Section 15064.4(e)(1). If human remains are identified to be those of Native American, California Health and Safety Code 7050.5 requires the County coroner notify the NAHC within 24 hours of discovery. All reports, correspondence, and determinations regarding the discovery of human	City of Clovis Planning	*Prior to Permits and During Construction*	

Proposed Mitigation	Summary of Measure	Monitoring Responsibility	Timing	Verification (Date and Initials)
	remains on the project site shall be submitted to the Lead Agency.			

Tract 6375 Residential Development

Air Quality & Greenhouse Gas Impact Assessment
January, 2024

Prepared by:
VRPA Technologies, Inc.
4630 W. Jennifer, Suite 105
Fresno, CA 93722
Project Manager: Georgiena Vivian

Table of Contents

Section	Description	Page
1.0	Introduction	1
1.1	Description of the Region/Project	1
1.2	Regulatory	1
1.2.1	Federal Agencies	1
1.2.2	Federal Regulations	5
1.2.3	State Agencies	6
1.2.4	State Regulations	11
1.2.5	Regional Agencies	14
1.2.6	Regional Regulations	15
1.2.7	Local Plans	17
2.0	Environmental Setting	18
2.1	Geographical Locations	18
2.2	Topographic Conditions	18
2.3	Climate Conditions	18
2.4	Anthropogenic (Man-made) Sources	20
2.4.1	Motor Vehicles	21
2.4.2	Agricultural and Other Miscellaneous	22
2.4.3	Industrial Plants	22
2.5	San Joaquin Valley Air Basin Monitoring	22
2.6	Air Quality Standards	25
2.6.1	Ozone (1-hour and 8-hour)	25
2.6.2	Suspended PM (PM10 and PM2.5)	27
2.6.3	Carbon Monoxide (CO)	28
2.6.4	Nitrogen Dioxide (NO2)	29
2.6.5	Sulfur Dioxide (SO2)	31
2.6.6	Lead (Pb)	31
2.6.7	Toxic Air Contaminants (TAC)	31
2.6.8	Odors	34
2.6.9	Naturally Occurring Asbestos (NOA)	35
2.6.10	Greenhouse Gas Emissions	35

3.0 Air Quality Impacts 37
3.1 Methodology 37
3.1.1 CalEEMod 37
3.2 Short-Term Impacts 38
3.3 Long Term Emissions 39
3.3.1 Localized Operational Emissions 39
Ozone/Particulate Matter 39
3.3.2 Other Localized Operational Emissions 39
3.3.3 Indirect Source Review 50

4.0 Impact Determinations and Recommended Mitigation 51
4.1 Air Quality 51
4.1.1 Conflict with or obstruct implementation of the applicable air quality plan 51
4.1.2 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 52
4.1.3 Expose sensitive receptors to substantial pollutant concentrations 52
4.1.4 Result in other emissions such as those leading to odors adversely affecting a substantial number of people 54
4.2 Greenhouse Gas Emissions 55
4.2.1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment 55
4.2.2 Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases 57

Appendices

Appendix A – CalEEMod Worksheets
Appendix B– ISR FEE Estimate

List of Tables

1	Ambient Air Quality Standards	9
2	Maximum Pollutant Levels at Fresno Garland Monitoring Station	23
3	Kings County Attainment Status	24
4	Recommendations on Siting New Sensitive Land Uses Such As Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities	33
5	Screening Levels for Potential Odor Sources	35
6	SJVAPCD Air Quality Thresholds of Significance	37
7	Project Construction Emissions	39
8	Project Operational Emissions (tons/year)	39
9	2005/2020 Operational Greenhouse Gas Emissions (tons/year)	50
10	Project Operational Greenhouse Gas Emissions (tons/year)	50

List of Figures

1	Regional Location	3
2	Project Location	4
3	San Joaquin Valley Air Basin	8

1.0 Introduction

1.1 Description of the Region/Project

The proposed project aims to develop 398 single-family residential units in the northeast section of Shepherd and Minnewawa Avenue in the City of Clovis. The project site spans approximately 54.3 acres of land and is situated between Minnewawa and Clovis Avenue. It is positioned 2 miles north of State Route (SR) 168 within the City of Clovis, which is located in Fresno County.

This Air Quality & Greenhouse Gas Impact Assessment has been prepared for the purpose of identifying potential project-specific or site-specific air quality impacts that may result from the Project. Figures 1 and 2 show the location of the Project long with major roadways and highways.

The City of Clovis is located in Fresno County one of the most polluted air basins in the country – the San Joaquin Valley Air Basin (SJVAB). The surrounding topography includes foothills and mountains to the east and west. These mountain ranges direct air circulation and dispersion patterns. Temperature inversions can trap air within the Valley, thereby preventing the vertical dispersal of air pollutants. In addition to topographic conditions, the local climate can also contribute to air quality problems. Climate in Fresno is characterized by hot, dry summers and cool winters with the notable presence of Tule fog.

1.2 Regulatory

Air quality within the Project area is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policymaking, education, and a variety of programs. The agencies primarily responsible for improving the air quality within the City of Clovis and Fresno County are discussed below along with their individual responsibilities.

1.2.1 *Federal Agencies*

- ✓ **U.S. Environmental Protection Agency (EPA)**

  The Federal Clean Air Bill first adopted in 1967 and periodically amended since then, established federal ambient air quality standards. A 1987 amendment to the Bill set a deadline for the attainment of these standards. That deadline has since passed. The other Clean Air Act (CAA) Bill Amendments, passed in 1990, share responsibility with the State in reducing emissions from mobile sources. The U.S. Environmental Protection Agency (EPA) is responsible for enforcing the 1990 amendments.

  The CAA and the national ambient air quality standards identify levels of air quality for six "criteria" pollutants, which are considered the maximum levels of ambient air pollutants considered safe, with an adequate margin of safety, to protect public health and welfare. The six criteria pollutants include ozone, carbon monoxide (CO), nitrogen dioxide, sulfur dioxide,

particulate matter, and lead.

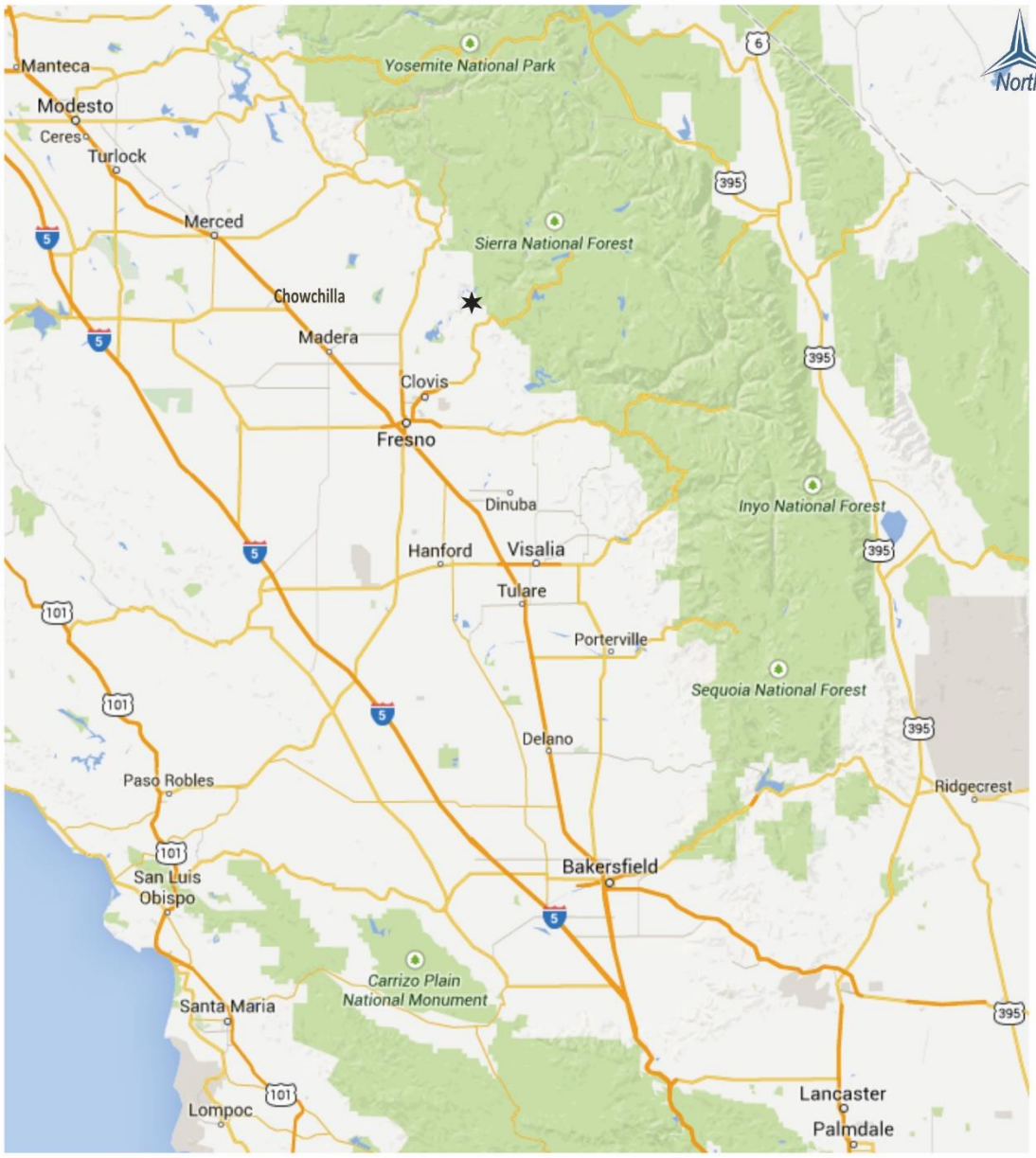
CAA Section 176(c) (42 U.S.C. 7506(c)) and EPA transportation conformity regulations (40 CFR 93 Subpart A) require that each new RTP and Transportation Improvement Program (TIP) be demonstrated to conform to the State Implementation Plan (SIP) before the RTP and TIP are approved by the Metropolitan planning organization (MPO) or accepted by the U.S. Department of Transportation (DOT). The conformity analysis is a federal requirement designed to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS). However, because the State Implementation Plan (SIP) for particulate matter 10 microns or less in diameter (PM10), particulate matter 2.5 microns or less in diameter (PM2.5), and Ozone address attainment of both the State and federal standards, for these pollutants, demonstrating conformity to the federal standards is also an indication of progress toward attainment of the State standards. Compliance with the State air quality standards is provided on the pages following this federal conformity discussion.

The EPA approved San Joaquin Valley reclassification of the ozone (8-hour) designation to extreme nonattainment in the Federal Register on May 5, 2010, even though the San Joaquin Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard. In accordance with the CAA, EPA uses the design value at the time of standard promulgation to assign nonattainment areas to one of several classes that reflect the severity of the nonattainment problem; classifications range from marginal nonattainment to extreme nonattainment. In the Federal Register on October 26, 2015, the EPA revised the primary and secondary standard to 0.070 parts per million (ppm) to provide increased public health protection against health effects associated with long- and short-term exposures. The previous ozone standard was set in 2010 at 0.075 ppm.

Fresno County is located in a nonattainment area for the 8-hour ozone standard, PM2.5 standard, and PM10 standard.

Tract 6375 Residential Development AQ/GHG
Regional Location

Figure 1

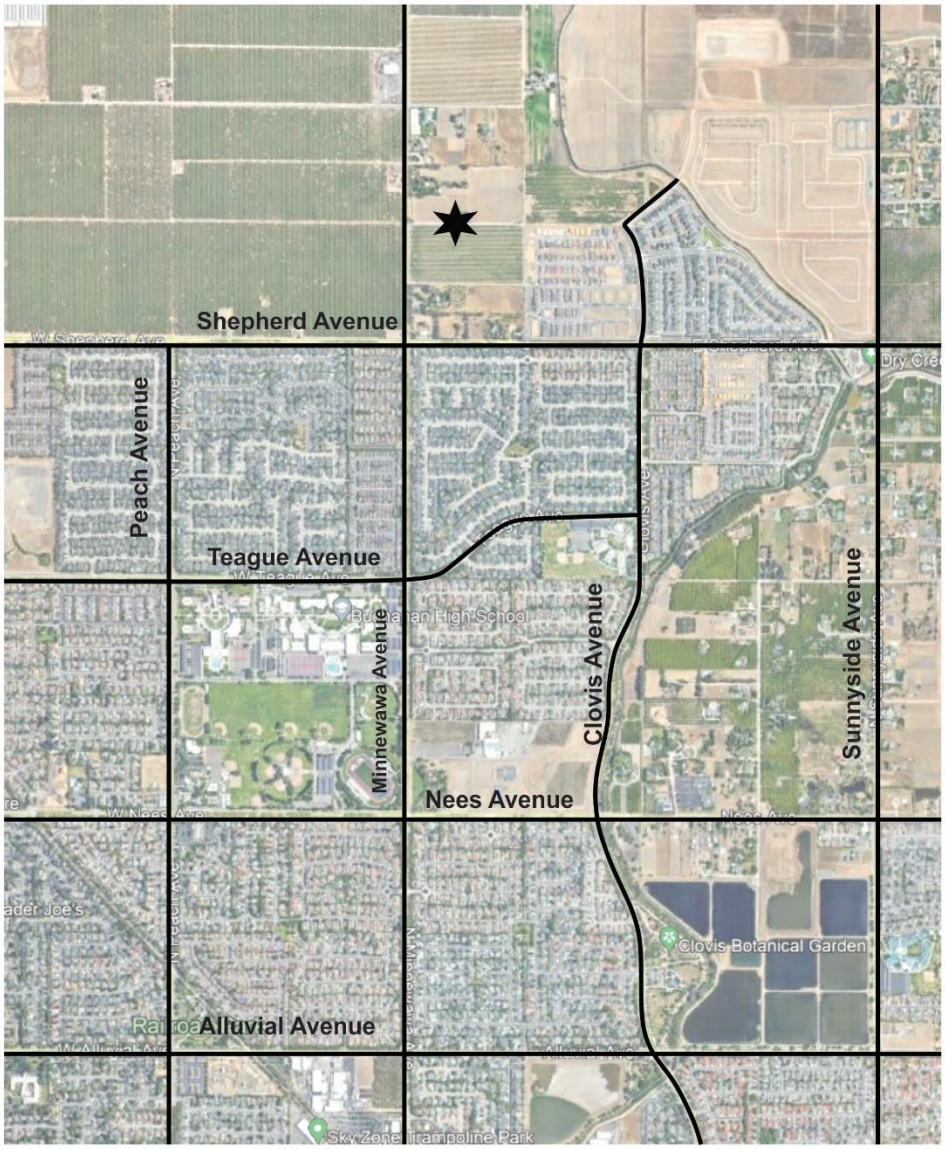


LEGEND

★ Project Location

VRPA TECHNOLOGIES, INC.

Tract 6375 Residential Development AQ/GHG Project Location — **Figure 2**



1.2.2 *Federal Regulations*

✓ **National Environmental Policy Act (NEPA)**

NEPA provides general information on the effects of federally funded projects. The Act was implemented by regulations included in the Code of Federal Regulations (40CFR6). The code requires careful consideration concerning environmental impacts of federal actions or plans, including projects that receive federal funds. The regulations address impacts on land uses and conflicts with state, regional, or local plans and policies, among others. They also require that projects requiring NEPA review seek to avoid or minimize adverse effects of proposed actions and to restore and enhance environmental quality as much as possible.

✓ **State Implementation Plan (SIP)/ Air Quality Management Plans (AQMPs)**

To ensure compliance with the NAAQS, EPA requires states to adopt SIP aimed at improving air quality in areas of nonattainment or a Maintenance Plan aimed at maintaining air quality in areas that have attained a given standard. New and previously submitted plans, programs, district rules, state regulations, and federal controls are included in the SIPs. Amendments made in 1990 to the federal CAA established deadlines for attainment based on an area's current air pollution levels. States must enact additional regulatory programs for nonattainment's areas in order to adhere with the CAA Section 172. In California, the SIPs must adhere to both the NAAQS and the California Ambient Air Quality Standards (CAAQS).

To ensure that State and federal air quality regulations are being met, Air Quality Management Plans (AQMPs) are required. AQMPs present scientific information and use analytical tools to identify a pathway towards attainment of NAAQS and CAAQS. The San Joaquin Valley Air Pollution Control District (SJVAPCD) develops the AQMPs for the region where the Fresno Council of Governments(FCOG) operates. The regional air districts begin the SIP process by submitting their AQMPs to the California Air Resources Board (CARB). CARB is responsible for revising the SIP and submitting it to EPA for approval. EPA then acts on the SIP in the Federal Register. The items included in the California SIP are listed in the Code of Federal Regulations Title 40, Chapter 1, Part 52, Subpart 7, Section 52.220.

✓ **Transportation Control Measures**

One particular aspect of the SIP development process is the assessment of available transportation control measures (TCMs) as a part of making progress towards clean air goals. TCMs are defined in Section 108(f)(1) of the CAA and are strategies designed to reduce vehicle miles traveled, vehicle idling, and associated air pollution. These goals are generally achieved by developing attractive and convenient alternatives to single-occupant vehicle use. Examples of TCMs include ridesharing programs, transportation infrastructure improvements such as adding bicycle and carpool lanes, and expansion of public transit.

✓ **Energy Policy Act of 1992 (EPAct)**

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of alternative fueled vehicles (AFVs). States are also required by the act to consider a variety of incentive programs to help promote AFVs.

1.2.3 *State Agencies*

✓ **California Air Resources Board (CARB)**

CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing its own air quality legislation called the California Clean Air Act (CCAA), adopted in 1988. CARB was created in 1967 from the merging of the California Motor Vehicle Pollution Control Board and the Bureau of Air Sanitation and its Laboratory.

CARB has primary responsibility in California to develop and implement air pollution control plans designed to achieve and maintain the NAAQS established by the EPA. Whereas CARB has primary responsibility and produces a major part of the SIP for pollution sources that are statewide in scope, it relies on the local air districts to provide additional strategies for sources under their jurisdiction. CARB combines its data with all local district data and submits the completed SIP to the EPA. The SIP consists of the emissions standards for vehicular sources and consumer products set by CARB, and attainment plans adopted by the Air Pollution Control Districts (APCDs) and Air Quality Management District's (AQMDs) and approved by CARB.

States may establish their own standards, provided the State standards are at least as stringent as the NAAQS. California has established California Ambient Air Quality Standards (CAAQS) pursuant to California Health and Safety Code (CH&SC) [§39606(b)] and its predecessor statutes.

The CH&SC [§39608] requires CARB to "identify" and "classify" each air basin in the State on a pollutant-by-pollutant basis. Subsequently, CARB designated areas in California as nonattainment based on violations of the CAAQSs. Designations and classifications specific to the SJVAB can be found in the next section of this document. Areas in the State were also classified based on severity of air pollution problems. For each nonattainment class, the CCAA specifies air quality management strategies that must be adopted. For all nonattainment categories, attainment plans are required to demonstrate a five percent-per-

year reduction in nonattainment air pollutants or their precursors, averaged every consecutive three-year period, unless an approved alternative measure of progress is developed. In addition, air districts in violation of CAAQS are required to prepare an Air Quality Attainment Plan (AQAP) that lays out a program to attain and maintain the CCAA mandates.

CARB, in consultation with MPOs, has provided each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. For the Fresno Council of Governments (FCOG) region, CARB set targets at six(6) percent per capita decrease in 2020 and a thirteen (13) percent per capita decrease in 2035 from a base year of 2005. FCOG's 2022 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which was adopted in July 2022, projects that the Fresno County region would achieve the prescribed emissions targets.

Other CARB duties include monitoring air quality. CARB has established and maintains, in conjunction with local APCDs and AQMDs, a network of sampling stations (called the State and Local Air Monitoring [SLAMS] network), which monitor the present pollutant levels in the ambient air.

Fresno County is in the CARB-designated, SJVAB. A map of the SJVAB is provided in Figure 3. In addition to Fresno County, the SJVAB includes Kings, Kern, Madera, Merced, San Joaquin, Stanislaus, and Tulare Counties. Federal and State standards for criteria pollutants are provided in Table 1.

Tract 6375 Residential Development AQ/GHG
San Joaquin Valley Air Basin

Figure 3

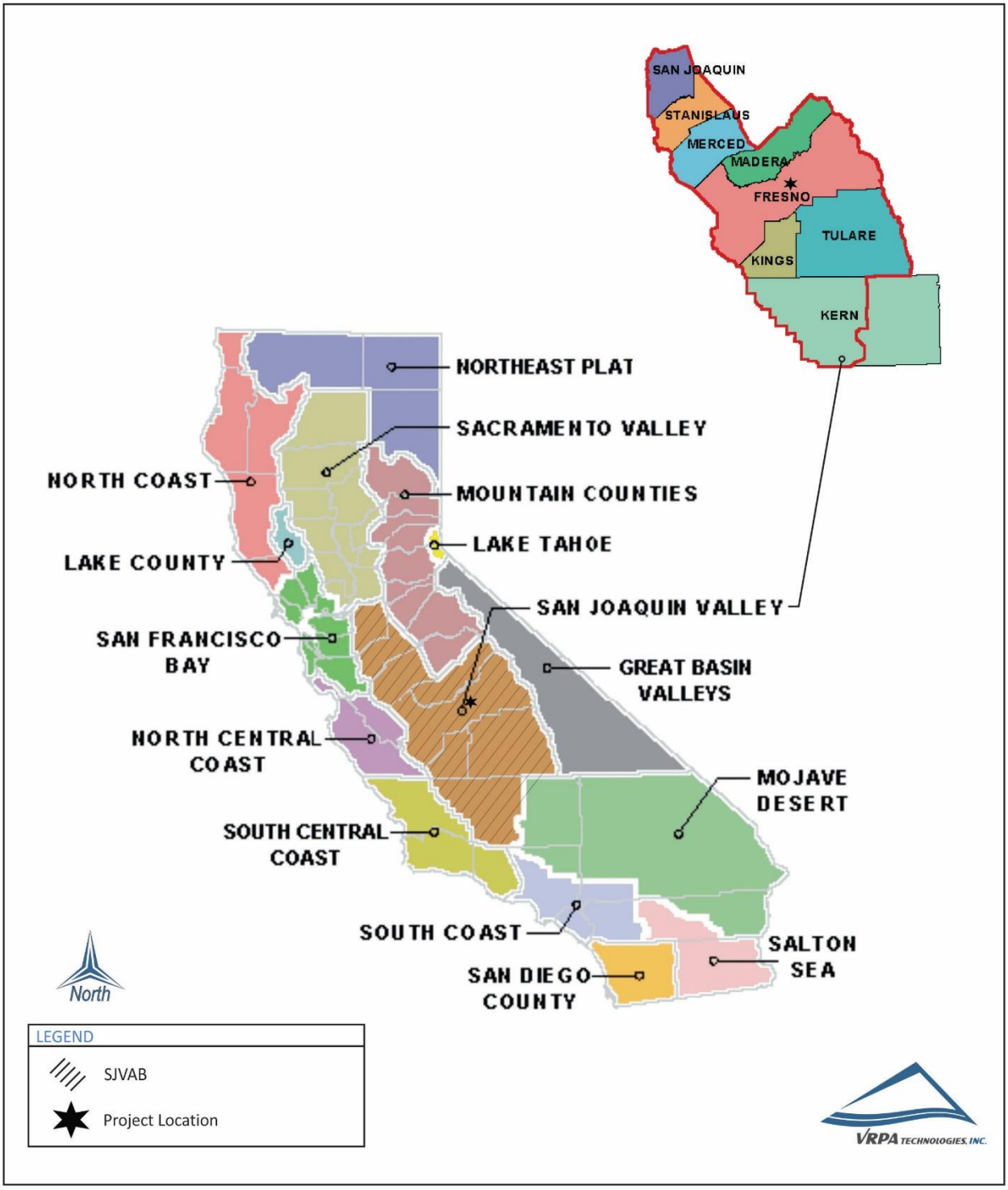


Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3) [8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	--	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM10) [9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		--		
Fine Particulate Matter (PM2.5) [9]	24 Hour	--	--	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	--	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	--	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		--	--	
Nitrogen Dioxide (NO_2) [10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	--	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2) [11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	--	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	--		--	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for cetain areas) [11]	--	
	Annual Arithmetic Mean	--		0.030 ppm (for cetain areas) [11]	--	
Lead [12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	--	--	High Volume Sampler and Atomic Absorption
	Calendar Quarter	--		1.5 µg/m^3 (for certain areas) [11]	Same as Primary Standard	
	Rolling 3-Month Average	--		0.15 µg/m^3		
Visibility Reducing Particles [14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride [12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page ...

Footnotes:

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m3 to 12.0 µg/m3. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

1.2.4 *State Regulations*

✓ **CARB Mobile-Source Regulation**

The State of California is responsible for controlling emissions from the operation of motor vehicles in the State. Rather than mandating the use of specific technology or the reliance on a specific fuel, CARB's motor vehicle standards specify the allowable grams of pollutant per mile driven. In other words, the regulations focus on the reductions needed rather than on the manner in which they are achieved.

✓ **California Clean Air Act**

The CCAA was first signed into law in 1988. The CCAA provides a comprehensive framework for air quality planning and regulation, and spells out, in statute, the state's air quality goals, planning and regulatory strategies, and performance. The CCAA establishes more stringent ambient air quality standards than those included in the Federal CAA. CARB is the agency responsible for administering the CCAA. CARB established ambient air quality standards pursuant to the CH&SC [§39606(b)], which are similar to the federal standards. The SJVAPCD is one of 35 AQMDs that have prepared air quality management plans to accomplish a five percent (5%) annual reduction in emissions documenting progress toward the State ambient air quality standards.

✓ **Tanner Air Toxics Act**

California regulates Toxic Air Contaminants (TACs) 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. This includes research, public participation, and scientific peer review before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and has adopted EPA's list of Hazardous Air Pollutants (HAPs) as TACs. Once a TAC is identified, CARB then adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate Best Available Control Technology (BACT) to minimize emissions.

AB 2588 requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures. CARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators).

These rules and standards provide for:

- More stringent emission standards for some new urban bus engines, beginning with 2002 model year engines.
- Zero-emission bus demonstration and purchase requirements applicable to transit agencies
- Reporting requirements under which transit agencies must demonstrate compliance with the urban transit bus fleet rule.

✓ **AB 1493 (Pavley)**

AB 1493 (Pavley) enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Regulations adopted by CARB would apply to 2009 and later model year vehicles. CARB estimated that the regulation would reduce climate change emissions from light duty passenger vehicles by an estimated 18 percent in 2020 and by 27 percent in 2030 [Association of Environmental Professionals (AEP) 2007)]. In 2005, the CARB requested a waiver from U.S. EPA to enforce the regulation, as required under the CAA. Despite the fact that no waiver had ever been denied over a 40-year period, the then Administrator of the EPA sent Governor Schwarzenegger a letter in December 2007, indicating he had denied the waiver. On March 6, 2008, the waiver denial was formally issued in the Federal Register. Governor Schwarzenegger and several other states immediately filed suit against the federal government to reverse that decision. On January 21, 2009, CARB requested that EPA reconsider denial of the waiver. EPA scheduled a re-hearing on March 5, 2009. On June 30, 2009, EPA granted a waiver of CAA preemption to California for its greenhouse gas emission standards for motor vehicles beginning with the 2009 model year.

✓ **Assembly Bill 32 (California Global Warming Solutions Act of 2006)**

California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 required that statewide GHG emissions be reduced to 1990 levels by 2020. December 31, 2020 is the deadline for achieving the 2020 GHG emissions cap. To effectively implement the cap, AB 32 directs CARB 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 CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state reduces GHG emissions enough to meet the cap. AB 32 also includes guidance on instituting emissions reductions in an economically efficient manner, along with conditions

to ensure that businesses and consumers are not unfairly affected by the reductions. Using these criteria to reduce statewide GHG emissions to 1990 levels by 2020 would represent an approximate 25 to 30 percent reduction in current emissions levels. However, CARB has discretionary authority to seek greater reductions in more significant and growing GHG sectors, such as transportation, as compared to other sectors that are not anticipated to significantly increase emissions.

CARB's 2017 Climate Change Scoping Plan builds on the efforts and plans encompassed in the initial Scoping Plan adopted in December of 2008. The current plan has identified new policies and actions to accomplish the State's 2030 GHG limit.

✓ **Senate Bill 375**

SB 375, signed in September 2008 (Chapter 728, Statutes of 2008), aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will prescribe land use allocation in that MPO's regional transportation plan. CARB, in consultation with MPOs, has provided each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. For the Fresno Council of Governments(FCOG), CARB set targets at six (6) percent per capita decrease in 2020 and a thirteen (13) percent per capita decrease in 2035 from a base year of 2018. FCOG 2022 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which was adopted in July 2022, projects that the Fresno County region would achieve the prescribed emissions targets.

This law also extends the minimum time period for the regional housing needs allocation cycle from five years to eight years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the regional transportation plan (and associated SCS or APS). However, new provisions of CEQA incentivize (through streamlining and other provisions) qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

✓ **Executive Order B-30-15**

Executive Order B-30-15, which was signed by Governor Brown in 2016, establishes a California greenhouse gas reduction target of 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050. Executive Order B-30-15 requires MPO's to implement measures that will achieve reductions of greenhouse gas emissions to meet the 2030 and 2050 greenhouse gas emissions reductions targets.

✓ **California Global Warming Solutions Act of 2006: emissions limit, or SB 32**

SB 32 is a California Senate bill expanding upon AB 32 to reduce greenhouse gas (GHG) emissions. SB 32 was signed into law on September 8, 2016, by Governor Brown. SB 32 sets into law the mandated reduction target in GHG emissions as written into Executive Order B-30-15. SB 32 requires that there be a reduction in GHG emissions to 40% below the 1990 levels by 2030. Greenhouse gas emissions include carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons. The California Air Resources Board (CARB) is responsible for ensuring that California meets this goal. The provisions of SB 32 were added to Section 38566 of the Health and Safety Code subsequent to the bill's approval. The bill went into effect January 1, 2017. SB 32 builds onto Assembly Bill (AB) 32 written by Senator Fran Pavley and Assembly Speaker Fabian Nunez passed into law on September 27, 2006. AB 32 required California to reduce greenhouse gas emissions to 1990 levels by 2020 and SB 32 continues that timeline to reach the targets set in Executive Order B-30-15. SB 32 provides another intermediate target between the 2020 and 2050 targets set in Executive Order S-3-05.

1.2.5 *Regional Agencies*

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

The SJVAPCD is the agency responsible for monitoring and regulating air pollutant emissions from stationary, area, and indirect sources within Fresno County and throughout the SJVAB. The District also has responsibility for monitoring air quality and setting and enforcing limits for source emissions. CARB is the agency with the legal responsibility for regulating mobile source emissions. The District is precluded from such activities under State law.

The District was formed in mid-1991 and prepared and adopted the San Joaquin Valley Air Quality Attainment Plan (AQAP), dated January 30, 1992, in response to the requirements of the State CCAA. The CCAA requires each non-attainment district to reduce pertinent air contaminants by at least five percent (5%) per year until new, more stringent, 1988 State air quality standards are met.

Activities of the SJVAPCD include the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, issuance of permits for stationary sources of air pollution, inspection of stationary sources of air pollution and response to citizen complaints, monitoring of ambient air quality and meteorological conditions, and implementation of programs and regulations required by the FCAA and CCAA.

The SJVAPCD has prepared the following State Implementation Plans to address ozone, PM-10 and PM2.5 that currently apply to non-attainment areas:

- The 2016 Ozone Plan (2008 standard) was adopted by SJVAPCD on June 16, 2016 and subsequently adopted by ARB on July 21, 2016.

- The 2013 1-Hour Ozone Plan (revoked 1997 standard) was adopted by the SJVAPCD on September 19, 2013. EPA withdrew its approval of the plan due to litigation. The District plans to submit a "redesignation substitute" to EPA to maintain its attainment status for this revoked ozone standard.
- The 2007 PM-10 Maintenance Plan (as revised in 2015) was approved by EPA on July 8, 2016 (effective September 30, 2016).
- The 2012 PM2.5 Plan (as revised in 2015) was approved by EPA on August 16, 2016 (effective September 30, 2016).

The SJVAPCD Plans identified above represent SJVAPCD's plan to achieve both state and federal air quality standards. The regulations and incentives contained in these documents must be legally enforceable and permanent. These plans break emissions reductions and compliance into different emissions source categories.

The SJVAPCD also prepared the *Guide for Assessing and Mitigation Air Quality Impacts* (GAMAQI), dated March 19, 2015. The GAMAQI is an advisory document that provides Lead Agencies, consultants, and project applicants with analysis guidance and uniform procedures for addressing air quality impacts in environmental documents. Local jurisdictions are not required to utilize the methodology outlined therein. This document describes the criteria that SJVAPCD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for determining whether or not projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts.

1.2.6 *Regional Regulations*

The SJVAPCD has adopted numerous rules and regulations to implement its air quality plans. Following, are significant rules that will apply to the Project.

✓ **Regulation VIII – Fugitive PM10 Prohibitions**

Regulation VIII is comprised of District Rules 8011 through 8081, which are designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, landfill operations, etc. The proposed Project will be required to comply with this regulation. Regulation VIII control measures are provided below:

1. *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.*
2. *All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.*

3. *All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.*
4. *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.*
5. *All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets 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.*
6. *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.*
7. *Within urban areas, track out shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.*

✓ **Rule 8021 – Construction, Demolition, Excavation, and Other Earthmoving Activities**

District Rule 8021 requires owners or operators of construction projects to submit a Dust Control Plan to the District if at any time the project involves non-residential developments of five or more acres of disturbed surface area or moving, depositing, or relocating of more than 2,500 cubic yards per day of bulk materials on at least three days of the project or residential projects which include 10 or more acres of disturbed surface area. The proposed Project will meet these criteria and will be required to submit a Dust Control Plan to the District in order to comply with this rule.

✓ **Rule 4641 – Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations**

If asphalt paving will be used, then paving operations of the proposed Project will be subject to Rule 4641. This rule applies to the manufacture and use of cutback asphalt, slow cure asphalt and emulsified asphalt for paving and maintenance operations.

✓ **Rule 9510 – Indirect Source Review (ISR)**

The purpose of this rule is to fulfill the District's emission reduction commitments in the PM10 and Ozone Attainment Plans, achieve emission reductions from construction activities, and to provide a mechanism for reducing emissions from the construction of and use of development projects through off-site measures. The rule is expected to reduce nitrogen oxides and particulates throughout the San Joaquin Valley by more than 10 tons per day.

1.2.7 *Local Plans*

✓ **City of Clovis General Plan**

California State Law requires every city and county to adopt a comprehensive General Plan to guide its future development. The General Plan essentially serves as a "constitution for development"— the document that serves as the foundation for all land use decisions. The City of Clovis 2035 General Plan Update (2014) includes various elements, including air quality and greenhouse gases, that address local concerns and provides goals and policies to achieve its development goals.

2.0 Environmental Setting

This section describes existing air quality within the San Joaquin Valley Air Basin and in Fresno County, including the identification of air pollutant standards, meteorological and topological conditions affecting air quality, and current air quality conditions. Air quality is described in relation to ambient air quality standards for criteria pollutants such as, ozone, carbon monoxide, and particulate matter. Air quality can be directly affected by the type and density of land use change and population growth in urban and rural areas.

2.1 Geographical Location

The SJVAB is comprised of eight counties: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare. Encompassing 24,840 square miles, the San Joaquin Valley is the second largest air basin in California. Cumulatively, counties within the Air Basin represent approximately 16 percent of the State's geographic area. The Air Basin is bordered by the Sierra Nevada Mountains on the east (8,000 to 14,492 feet in elevation), the Coastal Range on the west (4,500 feet in elevation), and the Tehachapi Mountains on the south (9,000 feet elevation). The San Joaquin Valley is open to the north extending to the Sacramento Valley Air Basin.

2.2 Topographic Conditions

Fresno County is located within the San Joaquin Valley Air Basin [as determined by the California Air Resources Board (CARB)]. Air basins are geographic areas sharing a common "air shed." A description of the Air Basin in the County, as designated by CARB, is provided in the paragraph below. Air pollution is directly related to the region's topographic features, which impact air movement within the Basin.

Wind patterns within the SJVAB result from marine air that generally flows into the Basin from the San Joaquin River Delta. The Coastal Range hinders wind access into the Valley from the west, the Tehachapi's prevent southerly passage of airflow, and the high Sierra Nevada Mountain Range provides a significant barrier to the east. These topographic features result in weak airflow that becomes restricted vertically by high barometric pressure over the Valley. As a result, the SJVAB is highly susceptible to pollutant accumulation over time. Most of the surrounding mountains are above the normal height of summer inversion layers (1,500-3,000 feet).

2.3 Climate Conditions

Fresno is located in one of the most polluted air basins in the country. Temperature inversions can trap air within the Valley, thereby preventing the vertical dispersal of air pollutants. In addition to topographic conditions, the local climate can also contribute to air quality problems. Climate in Fresno is characterized by warm, dry summers and cool winters with significant Tule fog.

Ozone, classified as a "regional" pollutant, often afflicts areas downwind of the original source of precursor emissions. Ozone can be easily transported by winds from a source area. Peak ozone levels tend to be higher in the southern portion of the Valley, as the prevailing summer winds sweep precursors downwind of northern source areas before concentrations peak. The separate designations reflect the fact that ozone precursor transport depends on daily meteorological conditions.

Other primary pollutants, carbon monoxide (CO), for example, may form high concentrations when wind speed is low. During the winter, Fresno experiences cold temperatures and calm conditions that increase the likelihood of a climate conducive to high CO concentrations.

Precipitation and fog tend to reduce or limit some pollutant concentrations. Ozone needs sunlight for its formation, and clouds and fog block the required radiation. CO is slightly water-soluble, so precipitation and fog tends to "reduce" CO concentrations in the atmosphere. PM10 is somewhat "washed" from the atmosphere with precipitation. Precipitation in the San Joaquin Valley is strongly influenced by the position of the semi-permanent subtropical high-pressure belt located off the Pacific coast. In the winter, this high- pressure system moves southward, allowing Pacific storms to move through the San Joaquin Valley. These storms bring in moist, maritime air that produces considerable precipitation on the western, upslope side of the Coast Ranges. Significant precipitation also occurs on the western side of the Sierra Nevada. On the valley floor, however, there is some down slope flow from the Coast Ranges and the resultant evaporation of moisture from associated warming results in a minimum of precipitation. Nevertheless, the majority of the precipitation falling in the San Joaquin Valley is produced by those storms during the winter. Precipitation during the summer months is in the form of convective rain showers and is rare. It is usually associated with an influx of moisture into the San Joaquin Valley through the San Francisco area during an anomalous flow pattern in the lower layers of the atmosphere. Although the hourly rates of precipitation from these storms may be high, their rarity keeps monthly totals low.

Precipitation on the San Joaquin Valley floor and in the Sierra Nevada decreases from north to south. Stockton in the north receives about 20 inches of precipitation per year, Fresno in the center, receives about 10 inches per year, and Bakersfield at the southern end of the valley receives less than 6 inches per year. This is primarily because the Pacific storm track often passes through the northern part of the state while the southern part of the state remains protected by the Pacific High. Precipitation in the San Joaquin Valley Air Basin (SJVAB) is confined primarily to the winter months with some also occurring in late summer and fall. Average annual rainfall for the entire San Joaquin Valley is approximately 5 to 16 inches. Snowstorms, hailstorms, and ice storms occur infrequently in the San Joaquin Valley and severe occurrences of any of these are very rare.

The winds and unstable air conditions experienced during the passage of storms result in periods of low pollutant concentrations and excellent visibility. Between winter storms, high pressure and light winds allow cold moist air to pool on the San Joaquin Valley floor. This creates strong

low-level temperature inversions and very stable air conditions. This situation leads to the San Joaquin Valley's famous Tule Fogs. The formation of natural fog is caused by local cooling of the atmosphere until it is saturated (dew point temperature). This type of fog, known as radiation fog, is more likely to occur inland. Cooling may also be accomplished by heat radiation losses or by horizontal movement of a mass of air over a colder surface. This second type of fog, known as advection fog, generally occurs along the coast.

Conditions favorable to fog formation are also conditions favorable to high concentrations of CO and PM10. Ozone levels are low during these periods because of the lack of sunlight to drive the photochemical reaction. Maximum CO concentrations tend to occur on clear, cold nights when a strong surface inversion is present and large numbers of fireplaces are in use. A secondary peak in CO concentrations occurs during morning commute hours when a large number of motorists are on the road and the surface inversion has not yet broken.

The water droplets in fog, however, can act as a sink for CO and nitrogen oxides (NOx), lowering pollutant concentrations. At the same time, fog could help in the formation of secondary particulates such as ammonium sulfate. These secondary particulates are believed to be a significant contributor of winter season violations of the PM10 and PM2.5 standards.

2.4 Anthropogenic (Man-made) Sources

In addition to climatic conditions (wind, lack of rain, etc.), air pollution can be caused by anthropogenic or man-made sources. Air pollution in the SJVAB can be directly attributed to human activities, which cause air pollutant emissions. Human causes of air pollution in the Valley consist of population growth, urbanization (gas-fired appliances, residential wood heaters, etc.), mobile sources (i.e., cars, trucks, airplanes, trains, etc.), oil production, agriculture, and other socioeconomic activities. The most significant factors, which are accelerating the decline of air quality in the SJVAB, are the Valley's rapid population growth and its associated increases in traffic, urbanization, and industrial activity.

Carbon monoxide emissions overwhelmingly come from mobile sources in the San Joaquin Valley; on-road vehicles contributed 34 percent, while other mobile vehicles, such as trains, planes, and off-road vehicles, contribute another 20 percent in 2012 according to emission projections from the CARB. Motor vehicles account for significant portions of regional gaseous and particulate emissions. Local large employers such as industrial plants can also generate substantial regional gaseous and particulate emissions. In addition, construction and agricultural activities can generate significant temporary gaseous and particulate emissions (dust, ash, smoke, etc.).

Ozone is the result of a photochemical reaction between Oxides of nitrogen (NOx) and Reactive Organic Gases (ROG). Mobile sources contribute 84 percent of all NOx emitted from anthropogenic sources based on data provided in Appendix B of the Air District's 2016 Ozone

Plan. In addition, mobile sources contribute 26 percent of all the ROG emitted from sources within the San Joaquin Valley.

The principal factors that affect air quality in and around Fresno are:

1. The sink effect, climatic subsidence and temperature inversions and low wind speeds
2. Automobile and truck travel
3. Increases in mobile and stationary pollutants generated by local urban growth

Automobiles, trucks, buses and other vehicles using hydrocarbon (HC) fuels release exhaust products into the air. Each vehicle by itself does not release large quantities; however, when considered as a group, the cumulative effect is significant.

Other sources may not seem to fit into any one of the major categories or they may seem to fit in a number of them. These could include agricultural uses, dirt roads, animal shelters; animal feed lots, chemical plants and industrial waste disposal, which may be a source of dust, odors, or other pollutants. For Fresno County, this category includes several agriculturally related activities, such as plowing, harvesting, dusting with herbicides and pesticides and other related activities. Finally, industrial contaminants and their potential to produce various effects depend on the size and type of industry, pollution controls, local topography, and meteorological conditions. Major sources of industrial emissions in Fresno County consist of agricultural production and processing operations.

The primary contributors of PM10 emissions in the San Joaquin Valley are farming activities (22%) and road dust, both paved and unpaved (35%) in 2020 according to emission projections from the CARB. Fugitive windblown dust from “open” fields contributed 14 percent of the PM10.

The four major sources of air pollutant emissions in the SJVAB include industrial plants, motor vehicles, construction activities, and agricultural activities. Industrial plants account for significant portions of regional gaseous and particulate emissions. Motor vehicles, including those from large employers, generate substantial regional gaseous and particulate emissions. Finally, construction and agricultural activities can generate significant temporary gaseous and particulate emissions (dust, ash, smoke, etc.). In addition to these primary sources of air pollution, urban areas upwind from Fresno County including areas north and west of the San Joaquin Valley, can cause or generate emissions that are transported into Fresno County. All four of the major pollutant sources affect ambient air quality throughout the Air Basin.

2.4.1 *Motor Vehicles*

Automobiles, trucks, buses and other vehicles using hydrocarbon fuels release exhaust products into the air. Each vehicle by itself does not release large quantities; however, when considered as a group, the cumulative effect is significant.

2.4.2 *Agricultural and Other Miscellaneous Activities*

Other sources may not seem to fit into any one of the major categories or they may seem to fit in a number of them. These could include agricultural uses, dirt roads, animal shelters, animal feed lots, chemical plants and industrial waste disposal, which may be a source of dust, odors, or other pollutants. For Fresno, this category includes several agriculturally related activities, such as plowing, harvesting, dusting with herbicides and pesticides and other related activities.

2.4.3 *Industrial Plants*

Industrial contaminants and their potential to produce various effects depend on the size and type of industry, pollution controls, local topography, and meteorological conditions. Major sources of industrial emissions in Fresno County consist of agricultural production and processing operations.

2.5 San Joaquin Valley Air Basin Monitoring

SJVAPCD and the CARB maintain numerous air quality monitoring sites throughout each County in the Air Basin to measure ozone, PM2.5, and PM10. It is important to note that the federal ozone 1-hour standard was revoked by the EPA and is no longer applicable for federal standards. The closest monitoring station to the Project is located at Clovis-N Villa Avenue Monitoring Station. The station monitors particulates, ozone, carbon monoxide, and nitrogen dioxide. Monitoring data for the past three years is summarized in Table 2.

Table 3 identifies the Fresno County's attainment status. As indicated, the SJVAB is nonattainment for Ozone (1 hour and 8 hour) and PM. In accordance with the FCAA, EPA uses the design value at the time of standard promulgation to assign nonattainment areas to one of several classes that reflect the severity of the nonattainment problem; classifications range from marginal nonattainment to extreme nonattainment. The FCAA contains provisions for changing the classifications using factors such as clean air progress rates and requests from States to move areas to a higher classification.

On April 16, 2004 EPA issued a final rule classifying the SJVAB as extreme nonattainment for Ozone, effective May 17, 2004 (69 FR 20550). The (federal) 1-hour ozone standard was revoked on June 6, 2005. However, many of the requirements in the 1-hour attainment plan (SIP) continue to apply to the SJVAB. The current ozone plan is the (federal) 8-hour ozone plan adopted in 2007. The SJVAB was reclassified from a "serious" nonattainment area for the 8-hour ozone standard to "extreme" effective June 4, 2010.

Table 2
Maximum Pollutant Levels at Clovis
Clovis-N Villa Monitoring Station

Pollutant	Time Averaging	2020 Maximums	2021 Maximums	2022 Maximums	Standards National	Standards State
Ozone (O_3)	1 hour	0.142 ppm	0.123 ppm	0.109 ppm	0.119 ppm	0.114 ppm
Ozone (O_3)	8 hour	0.108ppm	0.1 ppm	0.084 ppm	0.070 ppm	0.070 ppm
Nitrogen Dioxide (NO_2)	1 hour	54 ppm	49 ppm	51 ppm	51 ppm	60 ppm
Nitrogen Dioxide (NO_2)	Annual Average	9 ppm	8 ppm	9 ppm	8 ppm	8 ppm
Particulates (PM_{10})	24 hour	296.4 µg/m^3	281.0 µg/m^3	116.1 µg/m^3	42 µg/m^3	48 µg/m^3
Particulates (PM_{10})	Federal Annual Arithmetic Mean	45.8 µg/m^3	37.6 µg/m^3	35.5 µg/m^3	-	18 µg/m^3
Particulates ($PM_{2.5}$)	24 hour	193.7 µg/m^3	104.6 µg/m^3	41.9 µg/m^3	15.5 µg/m^3	-
Particulates ($PM_{2.5}$)	Federal Annual Arithmetic Mean	18.4 µg/m3	15.1 µg/m3	10.5 µg/m3	-	18 µg/m3

Source: California Air Resources Board (ADAM) Air Pollution Summaries

"-"represents insufficient data available to determine the value.

Table 3
Fresno County Attainment Status

Pollutant	Designation/Classification	
	Federal Standards	State Standards
Ozone - 1 Hour	Revoked in 2005	Nonattainment
Ozone - 8 Hour	Nonattainment/Extreme	No State Standard
PM10	Attainment	Nonattainment
PM2.5	Nonattainment	Nonattainment
Carbon Monoxide	Unclassified/Attainment	Unclassified
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Sulfur Dioxide	Unclassified/Attainment	Attainment
Lead (Particulate)	Unclassified/Attainment	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified

Source: CARB Website, 2023

a. Though the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).
Notes:
National Designation Categories
Non-Attainment Area: Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Unclassified/Attainment Area: Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant or meets the national primary or secondary ambient air quality standard for the pollutant.

State Designation Categories
Unclassified: A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or non-attainment.

Attainment: A pollutant is designated attainment if the State standard for that pollutant was not violated at any site in the area during a three-year period.

Non-attainment: A pollutant is designated non-attainment if there was at least one violation of a State standard for that pollutant in the area.

Non-Attainment/Transitional: A subcategory of the non-attainment designation. An area is designated non-attainment/transitional to signify that the area is close to attaining the standard for the pollutant.

2.6 Air Quality Standards

The FCAA, first adopted in 1963, and periodically amended since then, established National Ambient Air Quality Standards (NAAQS). A set of 1977 amendments determined a deadline for the attainment of these standards. That deadline has since passed. Other CAA amendments, passed in 1990, share responsibility with the State in reducing emissions from mobile sources.

In 1988, the State of California passed the CCAA (State 1988 Statutes, Chapter 568), which set forth a program for achieving more stringent California Ambient Air Quality Standards. The CARB implements State ambient air quality standards, as required in the CCAA, and cooperates with the federal government in implementing pertinent sections of the FCAA Amendments (FCAAA). Further, CARB regulates vehicular emissions throughout the State. The SJVAPCD regulates stationary sources, as well as some mobile sources. Attainment of the more stringent State PM10 Air Quality Standards is not currently required.

The EPA uses six "criteria pollutants" as indicators of air quality and has established for each of them a maximum concentration above which adverse effects on human health may occur. These threshold concentrations are called the NAAQS.

The SJVAPCD operates regional air quality monitoring networks that provide information on average concentrations of pollutants for which State or federal agencies have established ambient air quality standards. Descriptions of nine pollutants of importance in Fresno County follow.

2.6.1 *Ozone (1-hour and 8-hour)*

The most severe air quality problem in the Air Basin is the high level of ozone. Ozone occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. Here, ground level, or "bad" ozone, is an air pollutant that damages human health, vegetation, and many common materials. It is a key ingredient of urban smog. The troposphere extends to a level about 10 miles up, where it meets the second layer, the stratosphere. The stratospheric, or "good" ozone layer, extends upward from about 10 to 30 miles and protects life on earth from the sun's harmful ultraviolet rays.

"Bad" ozone is what is known as a photochemical pollutant. It needs reactive organic gases (ROG), NOx, and sunlight. ROG and NOx are emitted from various sources throughout Fresno County. In order to reduce ozone concentrations, it is necessary to control the emissions of these ozone precursors.

Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. High ozone concentrations can form over large regions when emissions from motor vehicles and stationary

sources are carried hundreds of miles from their origins.

Ozone is a regional air pollutant. It is generated over a large area and is transported and spread by wind. Ozone, the primary constituent of smog, is the most complex, difficult to control, and pervasive of the criteria pollutants. Unlike other pollutants, ozone is not emitted directly into the air by specific sources. Ozone is created by sunlight acting on other air pollutants (called precursors), specifically NOx and ROG. Sources of precursor gases to the photochemical reaction that form ozone number in the thousands. Common sources include consumer products, gasoline vapors, chemical solvents, and combustion products of various fuels. Originating from gas stations, motor vehicles, large industrial facilities, and small businesses such as bakeries and dry cleaners, the ozone-forming chemical reactions often take place in another location, catalyzed by sunlight and heat. High ozone concentrations can form over large regions when emissions from motor vehicles and stationary sources are carried hundreds of miles from their origins. Approximately 50 million people lived in counties with air quality levels above the EPA's health-based national air quality standard in 1994. The highest levels of ozone were recorded in Los Angeles, closely followed by the San Joaquin Valley. High levels also persist in other heavily populated areas, including the Texas Gulf Coast and much of the Northeast.

While the ozone in the upper atmosphere absorbs harmful ultraviolet light, ground-level ozone is damaging to the tissues of plants, animals, and humans, as well as to a wide variety of inanimate materials such as plastics, metals, fabrics, rubber, and paints. Societal costs from ozone damage include increased medical costs, the loss of human and animal life, accelerated replacement of industrial equipment, and reduced crop yields.

- ✓ ***Health Effects***

  While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground-level ozone can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems, such as: forests and foothill communities; agricultural crops; and some man-made materials, such as rubber, paint, and plastic. High levels of ozone may negatively affect immune systems, making people more susceptible to respiratory illnesses, including bronchitis and pneumonia. Ozone accelerates aging and exacerbates pre-existing asthma and bronchitis and, in cases with high concentrations, can lead to the development of asthma in active children. Active people, both children and adults, appear to be more at risk from ozone exposure than those with a low level of activity. Additionally, the elderly and those with respiratory disease are also considered sensitive populations for ozone.

  People who work or play outdoors are at a greater risk for harmful health effects from ozone. Children and adolescents are also at greater risk because they are more likely than adults to spend time engaged in vigorous activities. Research indicates that children under 12 years of age spend nearly twice as much time outdoors daily than adults. Teenagers spend at least

twice as much time as adults in active sports and outdoor activities. In addition, children inhale more air per pound of body weight than adults, and they breathe more rapidly than adults. Children are less likely than adults to notice their own symptoms and avoid harmful exposures.

Ozone is a powerful oxidant—it can be compared to household bleach, which can kill living cells (such as germs or human skin cells) upon contact. Ozone can damage the respiratory tract, causing inflammation and irritation, and it can induce symptoms such as coughing, chest tightness, shortness of breath, and worsening of asthmatic symptoms. Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. Exposure to levels of ozone above the current ambient air quality standard leads to lung inflammation and lung tissue damage and a reduction in the amount of air inhaled into the lungs.

The CARB found ozone standards in Fresno County nonattainment of Federal and State standards.

2.6.2 *Suspended PM (PM10 and PM2.5)*

Particulate matter pollution consists of very small liquid and solid particles that remain suspended in the air for long periods. Some particles are large or concentrated enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter is emitted from stationary and mobile sources, including diesel trucks and other motor vehicles; power plants; industrial processes; wood-burning stoves and fireplaces; wildfires; dust from roads, construction, landfills, and agriculture; and fugitive windblown dust. PM10 refers to particles less than or equal to 10 microns in aerodynamic diameter. PM2.5 refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset of PM10. Particulates of concern are those that are 10 microns or less in diameter. These are small enough to be inhaled, pass through the respiratory system and lodge in the lungs, possibly leading to adverse health effects.

In the western United States, there are sources of PM10 in both urban and rural areas. Because particles originate from a variety of sources, their chemical and physical compositions vary widely. The composition of PM10 and PM2.5 can also vary greatly with time, location, the sources of the material and meteorological conditions. Dust, sand, salt spray, metallic and mineral particles, pollen, smoke, mist, and acid fumes are the main components of PM10 and PM2.5. In addition to those listed previously, secondary particles can also be formed as precipitates from chemical and photochemical reactions of gaseous sulfur dioxide (SO2) and NOx in the atmosphere to create sulfates (SO4) and nitrates (NO3). Secondary particles are of greatest concern during the winter months where low inversion layers tend to trap the precursors of secondary particulates.

The District's 2008 PM2.5 Plan built upon the aggressive emission reduction strategy adopted in the 2007 Ozone Plan and strives to bring the valley into attainment status for the 1997 NAAQS for PM2.5. The District's 2012 PM2.5 Plan provides multiple control strategies to reduce emissions of PM2.5 and other pollutants that form PM2.5. The plan's comprehensive control strategy includes regulatory actions, incentive programs, technology advancement, policy and legislative positions, public outreach, participation and communication, and additional strategies.

✓ ***Health Effects***

PM10 and PM2.5 particles are small enough—about one-seventh the thickness of a human hair, or smaller—to be inhaled and lodged in the deepest parts of the lung where they evade the respiratory system's natural defenses. Health problems begin as the body reacts to these foreign particles. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non-health-related effects include reduced visibility and soiling of buildings. PM10 can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. PM10 and PM2.5 can aggravate respiratory disease and cause lung damage, cancer, and premature death.

Although particulate matter can cause health problems for everyone, certain people are especially vulnerable to adverse health effects of PM10. These "sensitive populations" include children, the elderly, exercising adults, and those suffering from chronic lung disease such as asthma or bronchitis. Of greatest concern are recent studies that link PM10 exposure to the premature death of people who already have heart and lung disease, especially the elderly. Acidic PM10 can also damage manmade materials and is a major cause of reduced visibility in many parts of the United States.

The CARB found PM10 standards in Fresno County in attainment of Federal standards and nonattainment for State standards. The CARB found PM2.5 standards in Fresno County nonattainment of Federal and State standards.

2.6.3 *Carbon Monoxide (CO)*

Carbon monoxide (CO) is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. CO is an odorless, colorless, poisonous gas that is highly reactive. CO is a byproduct of motor vehicle exhaust, contributes more than two thirds of all CO emissions nationwide. In cities, automobile exhaust can cause as much as 95 percent of all CO emissions. These emissions can result in high concentrations of CO, particularly in local areas with heavy traffic congestion. Other sources of CO emissions include industrial

processes and fuel combustion in sources such as boilers and incinerators. Despite an overall downward trend in concentrations and emissions of CO, some metropolitan areas still experience high levels of CO.

✓ ***Health Effects***

CO enters the bloodstream and binds more readily to hemoglobin than oxygen, reducing the oxygen-carrying capacity of blood and thus reducing oxygen delivery to organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected but only at higher levels of exposure. At high concentrations, CO can cause heart difficulties in people with chronic diseases and can impair mental abilities. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, difficulty performing complex tasks, and in prolonged, enclosed exposure, death.

The adverse health effects associated with exposure to ambient and indoor concentrations of CO are related to the concentration of carboxyhemoglobin (COHb) in the blood. Health effects observed may include an early onset of cardiovascular disease; behavioral impairment; decreased exercise performance of young, healthy men; reduced birth weight; sudden infant death syndrome (SIDS); and increased daily mortality rate.

Most of the studies evaluating adverse health effects of CO on the central nervous system examine high-level poisoning. Such poisoning results in symptoms ranging from common flu and cold symptoms (shortness of breath on mild exertion, mild headaches, and nausea) to unconsciousness and death.

The CARB found CO standards in Fresno County as unclassified/attainment of Federal standards and attainment for State standards.

2.6.4 *Nitrogen Dioxide (NO2)*

Nitrogen oxides (NOx) is a family of highly reactive gases that are primary precursors to the formation of ground-level ozone and react in the atmosphere to form acid rain. NOx is emitted from combustion processes in which fuel is burned at high temperatures, principally from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. A brownish gas, NOx is a strong oxidizing agent that reacts in the air to form corrosive nitric acid, as well as toxic organic nitrates. EPA regulates only nitrogen dioxide (NO2) as a surrogate for this family of compounds because it is the most prevalent form of NOx in the atmosphere that is generated by anthropogenic (human) activities.[1]

1 United States Environmental Protection Agency (EPA), Nitrogen Oxides (NOx). Why and How They Are Controlled, 456/F-99-006R, November 2019

✓ ***Health Effects***

NOx is an ozone precursor that combines with Reactive Organic Gases (ROG) to form ozone. See the ozone section above for a discussion of the health effects of ozone.

Direct inhalation of NOx can also cause a wide range of health effects. NOx can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. Short-term exposures (e.g., less than 3 hours) to low levels of nitrogen dioxide (NO2) may lead to changes in airway responsiveness and lung function in individuals with preexisting respiratory illnesses. These exposures may also increase respiratory illnesses in children. Long-term exposures to NO2 may lead to increased susceptibility to respiratory infection and may cause irreversible alterations in lung structure. Other health effects associated with NOx are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO2 may lead to eye and mucus membrane aggravation, along with pulmonary dysfunction. NOx can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to production of particulate nitrates. Airborne NOx can also impair visibility. NOx is a major component of acid deposition in California. NOx may affect both terrestrial and aquatic ecosystems. NOx in the air is a potentially significant contributor to a number of environmental effects such as acid rain and eutrophication in coastal waters. Eutrophication occurs when a body of water suffers an increase in nutrients that reduce the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life.

NO2 is toxic to various animals as well as to humans. Its toxicity relates to its ability to combine with water to form nitric acid in the eye, lung, mucus membranes, and skin. Studies of the health impacts of NO2 include experimental studies on animals, controlled laboratory studies on humans, and observational studies.

In animals, long-term exposure to NOx increases susceptibility to respiratory infections, lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO2, can suffer lung irritation and, potentially, lung damage. Epidemiological studies have also shown associations between NO2 concentrations and daily mortality from respiratory and cardiovascular causes as well as hospital admissions for respiratory conditions.

NOx contributes to a wide range of environmental effects both directly and when combined with other precursors in acid rain and ozone. Increased nitrogen inputs to terrestrial and wetland systems can lead to changes in plant species composition and diversity. Similarly, direct nitrogen inputs to aquatic ecosystems such as those found in estuarine and coastal waters can lead to eutrophication as discussed above. Nitrogen, alone or in acid rain, also can acidify soils and surface waters. Acidification of soils causes the loss of essential plant nutrients and increased levels of soluble aluminum, which is toxic to plants. Acidification of surface waters creates conditions of low pH and levels of aluminum that are toxic to fish and other aquatic organisms.

The CARB found NO2 standards in Fresno County as unclassified/attainment of Federal standards and attainment for State standards.

2.6.5 *Sulfur Dioxide (SO2)*

The major source of sulfur dioxide (SO2) is the combustion of high-sulfur fuels for electricity generation, petroleum refining and shipping. High concentrations of SO2 can result in temporary breathing impairment for asthmatic children and adults who are active outdoors. Short-term exposures of asthmatic individuals to elevated SO2 levels during moderate activity may result in breathing difficulties that can be accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Other effects that have been associated with longer-term exposures to high concentrations of SO2, in conjunction with high levels of PM, include aggravation of existing cardiovascular disease, respiratory illness, and alterations in the lungs' defenses. SO2 also is a major precursor to PM2.5, which is a significant health concern and a main contributor to poor visibility. In humid atmospheres, sulfur oxides can react with vapor to produce sulfuric acid, a component of acid rain.

The CARB found SO2 standards in Fresno County as unclassified for Federal standards and attainment for State standards.

2.6.6 *Lead (Pb)*

Lead, a naturally occurring metal, can be a constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used until recently to increase the octane rating in automobile fuel. Since the 1980s, lead has been phased out in gasoline, reduced in drinking water, reduced in industrial air pollution, and banned or limited in consumer products. Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels; however, the use of leaded fuel has been mostly phased out. Since this has occurred the ambient concentrations of lead have dropped dramatically.

Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children. Effects on the nervous systems of children are one of the primary health risk concerns from lead. In high concentrations, children can even suffer irreversible brain damage and death. Children 6 years old and under are most at risk, because their bodies are growing quickly.

The CARB found Lead standards in Fresno County as unclassified/attainment of Federal standards and attainment for State standards.

2.6.7 *Toxic Air Contaminants (TAC)*

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TAC) are another group of pollutants of concern. TAC are injurious in small quantities and are regulated despite the absence of criteria documents. The identification, regulation and monitoring of TAC is relatively recent compared to that for criteria pollutants. Unlike criteria pollutants, TAC are regulated on the basis of risk rather than specification of safe levels of contamination. The ten TAC are acetaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel particulate matter (diesel PM). Caltrans' guidance for transportation studies references the Federal Highway Administration (FHWA) memorandum titled "Interim Guidance on Air Toxic Analysis in NEPA Documents" which discusses emissions quantification of six "priority" compounds of 21 Mobile Source Air Toxics (MSAT) identified by the United States Environmental Protection Agency (USEPA). The six "priority" compounds are diesel exhaust (particulate matter and organic gases), benzene, 1,3-butadiene, acetaldehyde, formaldehyde, and acrolein.

Some studies indicate that diesel PM poses the greatest health risk among the TAC listed above. A 10-year research program (California Air Resources Board 1998) demonstrated that diesel PM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to diesel PM poses a chronic health risk. In addition to increasing the risk of lung cancer, exposure to diesel exhaust can have other health effects. Diesel exhaust can irritate the eyes, nose, throat, and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. Diesel exhaust is a major source of fine particulate pollution as well, and studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems.

Diesel PM differs from other TAC in that it is not a single substance but a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled, internal combustion engines, the composition of the emissions varies, depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TAC, however, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. The CARB has made preliminary concentration estimates based on a diesel PM exposure method. This method uses the CARB emissions inventory's PM10 database, ambient PM10 monitoring data, and the results from several studies to estimate concentrations of diesel PM. Table 4 depicts the CARB Handbook's recommended buffer distances associated with various types of common sources.

Existing air quality concerns within Fresno and the entire SJVAB are related to increases of regional criteria air pollutants (e.g., ozone and particulate matter), exposure to toxic air contaminants, odors, and increases in greenhouse gas emissions contributing to climate change. The primary source of ozone (smog) pollution is motor vehicles. Particulate matter is caused by dust, primarily dust generated from construction and grading activities, and smoke which is emitted from fireplaces, wood-burning stoves, and agricultural burning.

TABLE 4
Recommendations on Siting New Sensitive Land Uses Such As Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities*

SOURCE CATEGORY	ADVISORY RECOMMENDATIONS
Freeways and High-Traffic Roads [1]	- Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.
Distribution Centers	- Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). - Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points.
Rail Yards	- Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. - Within one mile of a rail yard, consider possible siting limitations and mitigation approaches.
Ports	- Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the ARB on the status of pending analyses of health risks.
Refineries	- Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	- Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.
Dry Cleaners Using Perchloroethylene	- Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air district. - Do not site new sensitive land uses in the same building with perchloroethylene dry cleaning operations.
Gasoline Dispensing Facilities	- Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50 foot separation is recommended for typical gas dispensing facilities.

1: The recommendation to avoid siting new sensitive land uses within 500 feet of a freeway was identified in CARB's Air Quality and Land Use Handbook published in 2005. CARB recently published a technical advisory to the Air Quality and Land Use Handbook indicating that new research has demonstrated promising strategies to reduce pollution exposure along transportation corridors.

*Notes:
• These recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues.
• Recommendations are based primarily on data showing that the air pollution exposures addressed here (i.e., localized) can be reduced as much as 80% with the recommended separation.
• The relative risk for these categories varies greatly (see Table 1-2). To determine the actual risk near a particular facility, a site-specific analysis would be required. Risk from diesel PM will decrease over time as cleaner technology phases in.
• These recommendations are designed to fill a gap where information about existing facilities may not be readily available and are not designed to substitute for more specific information if it exists. The recommended distances take into account other factors in addition to available health risk data (see individual category descriptions).
• Site-specific project design improvements may help reduce air pollution exposures and should also be considered when siting new sensitive land uses.
• This table does not imply that mixed residential and commercial development in general is incompatible. Rather it focuses on known problems like dry cleaners using perchloroethylene that can be addressed with reasonable preventative actions.
• A summary of the basis for the distance recommendations can be found in the ARB Handbook: Air Quality and Land Use Handbook: A Community Health Perspective.

Source: SJVAPCD 2022

2.6.8 *Odors*

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

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell 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; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to 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.

The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions. The SJVAPCD has identified some common types of facilities that have been known to produce odors in the SJVAB. The types of facilities that are known to produce odors are shown in Table 5 along with a reasonable distance from the source within which, the degree of odors could possibly be significant. The Project does not propose any uses that would be potential odor sources; however, the information presented in Table 5 will be used as a screening level analysis to determine if the Project would be impacted by existing odor sources in the study area. Such information is presented for informational purposes, but it is noted that the environment's effect on the Project, including exposure to potential odors, would not be an impact for CEQA purposes.

TABLE 5
Screening Levels for Potential Odor Sources

Type of Facility	Distance
Wastewater Treatment Facilities	2 miles
Sanitary Landfill	1 mile
Transfer Station	1 mile
Compositing Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	1 mile
Chemical Manufacturing	1 mile
Fiberglass Manufacturing	1 mile
Painting/Coating Operations (e.g. auto body shops)	1 mile
Food Processing Facility	1 mile
Feed Lot/Dairy	1 mile
Rendering Plant	1 mile

Source: SJVAPCD 2022

2.6.9 *Naturally Occurring Asbestos (NOA)*

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. Asbestos is commonly found in ultramafic rock and near fault zones. The amount of asbestos that is typically present in these rocks' ranges from less than 1% up to approximately 25% and sometimes more. It is released from ultramafic 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. Asbestos 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. Asbestos is hazardous and can cause lung disease and cancer dependent upon the level of exposure. The longer a person is exposed to asbestos and the greater the intensity of the exposure, the greater the chances for a health problem.

The proposed Project's construction phase may cause asbestos to become airborne due to the construction activities that will occur on site. The Project would be required to submit a Dust Control Plan under the SJVAPCD's Rule 8021.

2.6.10 *Greenhouse Gas Emissions*

Gases that trap heat in the atmosphere are often called greenhouse gases. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the

atmosphere because of human activities are:

- ✓ **Carbon Dioxide (CO2):** Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement, asphalt paving, truck trips). Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- ✓ **Methane (CH4):** Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- ✓ **Nitrous Oxide (N2O):** Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- ✓ **Fluorinated Gases:** Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

3.0 Air-Quality Impacts

3.1 Methodology

The impact assessment for air quality focuses on potential effects the Project might have on air quality within the Fresno region. The SJVAPCD has established thresholds of significance for determining environmental significance. These thresholds separate a project's short-term emissions from its long-term emissions. The short-term emissions are mainly related to the construction phase of a project, which are recognized to be short in duration. The long-term emissions are primarily related to the activities that will occur indefinitely as a result of Project operations. Impacts will be evaluated both on the basis of CEQA Appendix G criteria and SJVAPCD significance criteria. The impacts to be evaluated will be those involving construction and operational emissions of criteria pollutants. The SJVAPCD has established thresholds for certain pollutants shown in Table 6.

Table 6
SJVAPCD Air Quality Thresholds of Significance

Project Type	Ozone Precursor Emissions (tons/year)					
	CO	NO_X	ROG	SO_X	PM_{10}	$PM_{2.5}$
Construction Emissions	100	10	10	27	15	15
Operational Emissions (Permitted Equipment and Activities)	100	10	10	27	15	15
Operational Emissions (Non-Permitted Equipment and Activities)	100	10	10	27	15	15

Source: SJVAPCD 2023

3.1.1 *CalEEMod*

CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects. The model quantifies direct emissions from construction and operations (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use.

The model is an accurate and comprehensive tool for quantifying air quality impacts from land use projects throughout California. The model can be used for a variety of situations where an air quality analysis is necessary or desirable such as CEQA and NEPA documents, pre-project planning, compliance with local air quality rules and regulations, etc.

3.2 Short-Term Impacts

Short-term impacts are mainly related to the construction phase of a project and are recognized to be short in duration. Construction air quality impacts are generally attributable to dust and exhaust pollutants generated by equipment and vehicles. Fugitive dust is emitted both during construction activity and as a result of wind erosion over exposed earth surfaces. Clearing and earth moving activities do comprise major sources of construction dust emissions, but traffic and general disturbances of soil surfaces also generate significant dust emissions. Further, dust generation is dependent on soil type and soil moisture. Exhaust pollutants are the non-useable gaseous waste products produced during the combustion process. Engine exhaust contains CO, HC, and NOx pollutants which are harmful to the environment.

Adverse effects of construction activities cause increased dust-fall and locally elevated levels of total suspended particulate. Dust-fall can be a nuisance to neighboring properties or previously completed developments surrounding or within the Project area and may require frequent washing during the construction period.

PM10 emissions can result from construction activities of the Project. The SJVAPCD has determined that compliance with Regulation VIII and other control measures will constitute sufficient mitigation to reduce PM10 impacts to a level considered less-than significant for most development projects. Even with implementation of District Regulation VIII and District Rule 9510, large development projects may not be able to reduce project specific construction impacts below District thresholds of significance.

Ozone precursor emissions are also an impact of construction activities and can be quantified through calculations. Numerous variables factored into estimating total construction emission include: level of activity, length of construction period, number of pieces and types of equipment in use, site characteristics, weather conditions, number of construction personnel, and amount of materials to be transported onsite or offsite. Additional exhaust emissions would be associated with the transport of workers and materials. Because the specific mix of construction equipment is not presently known for this Project, construction emissions were estimated using CalEEMod Model defaults for construction equipment.

Table 7 shows the CalEEMod estimated construction emissions that would be generated from construction of the Project. Results of the analysis show that emissions generated from construction of the Project will not exceed the SJVAPCD emission thresholds.

Table 7
Project Construction Emissions (tons/year)

Summary Report	CO	NO_X	ROG	SO_x	PM_{10}	$PM_{2.5}$	CO2e
Project Construction Emissions	3.04	3.35	6.77	0.01	1.09	0.54	590.95
SJVAPCD Level of Significance	100	10	10	27	15	15	None
Does the Project Exceed Standard?	No	No	No	No	No	No	No

Source: CalEEMod

3.3 Long-Term Emissions

Long-Term emissions from the Project would be generated primarily by mobile source (vehicle) emissions from the Project site and area sources such as lawn maintenance equipment.

3.3.1 *Localized Operational Emissions – Ozone/Particulate Matter*

The Fresno County area is nonattainment for Federal and State air quality standards for ozone, attainment of Federal standards for PM10 and nonattainment for State standards, and nonattainment for Federal and State standards for PM2.5. Nitrogen oxides and reactive organic gases are regulated as ozone precursors. Significance criteria have been established for criteria pollutant emissions as documented in Section 3.1. Operational emissions have been estimated for the Project using the CalEEMod Model and detailed results are included in Appendix A of this report.

Results of the CalEEMod analysis are shown in Table 8. Results indicate that the annual operational emissions from the Project will be less than the SJVAPCD emission thresholds for criteria pollutants.

Table 8
Project Operational Emissions (tons/year)

Summary Report	CO	NO_X	ROG	SO_x	PM_{10}	$PM_{2.5}$	CO2e
Project Opeational Emissions	43.52	3.90	7.99	0.12	8.07	5.08	5674.55
SJVAPCD Level of Significance	100	10	10	27	15	15	None
Does the Project Exceed Standard?	No	No	No	No	No	No	No

Source: CalEEMod

3.3.2 *Localized Operational Emissions*

✓ **Carbon Monoxide**

The SJVAPCD is currently in unclassified/attainment for Federal standards and unclassified

for State standards for CO. An analysis of localized CO concentrations is typically warranted to ensure that standards are maintained. Also, an analysis is required to ensure that localized concentrations don't reach potentially unhealthful levels that could affect sensitive receptors (residents, school children, hospital patients, the elderly, etc.).

Typically, high CO concentrations are associated with roadways or intersections operating at an unacceptable Level of Service (LOS). CO "Hot Spot" modeling is required if a traffic study reveals that the project will reduce the LOS on one or more streets to E or F or if the project will worsen an existing LOS F.

To analyze the Cumulative Year 2046 Plus Project "worst case" CO concentrations at study roadway segments, the analysis methodology considered the highest annual maximum CO concentration reported in 2013, using 1.0 PPM as an estimate of the background concentration for the 8-hour standard and 2.2 PPM for the 1-hour standard (source: CARB annual publications). Other modeling assumptions include a wind speed of .5 m/s, flat topography, 1,000-meter mixing height, and a 5 degree wind deviation.

✓ **Toxic Air Contaminants (TAC)**

The SJVAPCD's Guidance Document, Guidance for Assessing and Mitigating Air Quality Impacts – 2015, identifies the need for projects to analyze the potential for adverse air quality impacts to sensitive receptors. Sensitive receptors refer to those segments of the population most susceptible to poor air quality (i.e., children, the elderly, and those with pre-existing serious health problems affected by air quality). Land uses that have the greatest potential to attract these types of sensitive receptors include schools, parks, playgrounds, daycare centers, nursing homes, hospitals, and residential communities. From a health risk perspective, the Project is a Type B Project in that it may potentially place sensitive receptors in the vicinity of existing sources.

The first step in evaluating the potential for impacts to sensitive receptors for TAC's from the Project is to perform a screening level analysis. For Type B Projects, one type of screening tool is found in the CARB Handbook: Air Quality and Land Use Handbook: A Community Perspective. This handbook includes a table (depicted in Table 4) with recommended buffer distances associated with various types of common sources. The screening level analysis for the Project shows that TAC's are not a concern based upon the recommendations provided in Table 4. An evaluation of nearby land uses considering CARB's Pollution Mapping Tool shows that the Project will not place sensitive receptors in the vicinity of existing toxic sources. The Project is located a 2.5 mile from the State Route (SR) 168 freeway. Table 4 indicates that new sensitive land uses shouldn't be sited within 500 feet of a freeway/urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. The Project is located more than 2.5 miles from the SR 168 freeway. As a result, a health risk assessment is not needed at this time.

✓ **Odors**

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

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.

While offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and the SJVAPCD. Any project with the potential to frequently expose members of the public to objectionable odors should be deemed to have a significant impact.

The SJVAPCD requires that an analysis of potential odor impacts be conducted for the following two situations:

- Generators – projects that would potentially generate odorous emissions proposed to be located near existing sensitive receptors or other land uses where people may congregate, and
- Receivers – residential or other sensitive receptor projects or other projects built for the intent of attracting people locating near existing odor sources.

The Project will not generate odorous emissions given the nature or characteristics of the Project. The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions. The SJVAPCD has identified some common types of facilities that have been known to produce odors in the SJV Air Basin. The types of facilities that are known to produce odors are shown in Table 5 above along with a reasonable distance from the source within which, the degree of odors could possibly be significant. None of the facilities shown in Table 5 are located within two (2) miles of the Project.

✓ **Naturally Occurring Asbestos (NOA)**

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. Construction of the Project may cause asbestos to become airborne due to the construction activities that will occur on site. The Project would be required to submit a Dust Control Plan under the SJVAPCD's Rule 8021. Compliance with Rule 8021 would limit fugitive dust emissions from construction, demolition, excavation, extraction, and other earthmoving activities associated with the Project.

The Dust Control Plan may include the following measures:

1. Water wetting of road surfaces
2. Rinse vehicles and equipment
3. Wet loads of excavated material, and
4. Cover loads of excavated material

✓ **Greenhouse Gas Emissions**

CARB, in consultation with MPOs, has provided each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. For the Fresno Council of Governments(FCOG) region, CARB set targets at six (6) percent per capita decrease in 2020 and a thirteen (13) percent per capita decrease in 2035 from a base year of 2005. FCOG's 2018 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which was adopted in July 2022, projects that the Fresno County region would achieve the prescribed emissions targets.

In 2009, the SJVAPCD adopted the following guidance documents applicable to projects within the San Joaquin Valley:

- ✓ Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA (SJVAPCD 2009), and
- ✓ District Policy: Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency (SJVAPCD 2009).

This guidance and policy are the reference documents referenced in the SJVAPCD's Guidance for Assessing and Mitigating Air Quality Impacts adopted in March 2015 (SJVAPCD 2015). Consistent with the District Guidance and District Policy above, SJVAPCD (2015) acknowledges the current absence of numerical thresholds, and recommends a tiered approach to establish the significance of the GHG impacts on the environment:

i. If a project complies 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, then the project would be determined to have a less than significant individual and cumulative impact for GHG emissions;
ii. If a project does not comply with an approved GHG emission reduction plan or mitigation program, then it would be required to implement Best Performance

Standards (BPS); and

iii. If a project is not implementing BPS, then it should demonstrate that its GHG emissions would be reduced or mitigated by at least 29 percent compared to Business as Usual (BAU).

As shown in Table 9, the Project would generate 7366.31 Metric Tons of Carbon Dioxide Equivalent per year (MTCO2eq./year) using an operational year of 2005, which includes area, energy, mobile, waste, and water sources. "Business as usual" (BAU) is referenced in CARB's AB 32 Scoping Plan as emissions projected to occur in 2020 if the average baseline emissions during the 2002-2004 period grew to 2020 levels, without control or Best Performance Standards (BPS) offsets. As a result, an estimate of the Project's operational emissions in 2005 were compared to operational emissions in 2020 in order to determine if the Project meets the 29% emission reduction. The SJVAPCD has reviewed relevant scientific information related to GHG emissions and has determined that they are not able to determine a specific quantitative level of GHG emissions increase, above which a project would have a significant impact on the environment, and below which would have an insignificant impact. As a result, the SJVAPCD has determined that projects achieving at least a 29% GHG emission reduction compared to BAU would be determined to have a less than significant individual and cumulative impact for GHG. Results of the analysis show that the Project's GHG emissions in the year 2020 is 6253.23 MTCO2eq./year. This represents an achievement of 15% GHG emission reduction on the basis of BAU, which does not meet the 29% GHG emission reduction target.

In the event that a local air district's guidance for addressing GHG impacts does not use numerical GHG emissions thresholds, at the lead agency's discretion, a neighboring air district's GHG threshold may be used to determine impacts. In December 2008, the South Coast Air Quality Management District (SCAQMD) Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where the SCAQMD is lead agency. The SCAQMD guidance identifies a threshold of 10,000 MTCO2eq./year for GHG for construction emissions amortized over a 30-year project lifetime, plus annual operation emissions. This threshold is often used by agencies, such as the California Public Utilities Commission, to evaluate GHG impacts in areas that do not have specific thresholds (CPUC 2015)[2]. Therefore, because this threshold has been established by the SCAQMD in an effort to control GHG emissions in the largest metropolitan area in the State of California, this threshold is considered a conservative approach for evaluating the significance of GHG emissions in a more rural area, such as Fresno County. Though the Project is under SJVAPCD jurisdiction, the SCAQMD GHG threshold provides some perspective on the GHG emissions generated by the Project. Table 10 shows the yearly GHG emissions generated by the Project as determined by the CalEEMod model, which is approximately 43% less than the threshold identified by the SCAQMD. Though the Project is under SJVAPCD jurisdiction, the SCAQMD

2 California Public Utilities Commission (CPUC). 2015. Section 4.7, "Greenhouse Gases." Final Environmental Impact Report for the Santa Barbara County Reliability Project. May 2015. Accessed January 18, 2018. http://www.cpuc.ca.gov/environment/info/ene/sbcrp/SBCRP_FEIR.html.

GHG threshold provides some perspective on the GHG emissions generated by the Project. Table 10 shows the yearly GHG emissions generated by the Project as determined by the CalEEMod model.

Table 9
2005/2020 Operational greenhouse Gas Emissions

Summary Report	CO_2e
Operational Emissions Per Year (2005)	7368.31 MT/yr
Operational Emissions Per Year (2020)	6253.23 MT/yr
SJVAPCD Level of Significance	29% Reduction Compared to BAU
Does the Project Meet the Standard	No

Source: CalEEMod Emissions Model

Table 10
Project Operational Greenhouse Gas Emissions

Summary Report	CO_2e
Project Operational Emissions Per Year(Plus amortized construction emissions)	5694.25 MT/yr

Source: CalEEMod

3.3.3 *Indirect Source Review*

The proposed Project is subject to the SJVAPCD's ISR program since there are more than 250 residential units, which is also known as Rule 9510. Rule 9510 and the Administrative ISR Fee Rule (Rule 3180) are the result of state requirements outlined in the California Health and Safety Code, Section 40604 and the State Implementation Plan (SIP). The purpose of the SJVAPCD's ISR program is to reduce emissions of NOx and PM10 from new projects. In general, new development contributes to the air-pollution problem in the Valley by increasing the number of vehicles and vehicle miles traveled.

Utilizing the ISR Fee Estimator calculator available on the SJVAPCD website, it was determined that the Project's total cost for emission reductions is $484,057.60 without implementation of emission reduction measures. After the application of ISR rule No_x will be reduced by 10.42 MT/yr and PM_{10} will be reduced by 40.84 MT/ yr during construction phase. The ISR Fee Estimator

worksheets are included in Appendix B. The fee noted above may be reduced dependent upon the formal ISR review process.

4.0 Impact Determinations and Recommended Mitigation

In accordance with CEQA, when a proposed project is consistent with a General Plan for which an EIR has been certified, the effects of that project are evaluated to determine if they will result in project-specific significant adverse impacts on the environment. The criteria used to determine the significance of an air quality or greenhouse gas impact are based on the following thresholds of significance, which come from Appendix G of the CEQA Guidelines and the General Plan EIR. Accordingly, air quality or greenhouse gas impacts resulting from the Project are considered significant if the Project would:

Air Quality

a) Conflict with or obstruct implementation of the applicable air quality plan?
b) 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?
c) Expose sensitive receptors to substantial pollutant concentrations?
d) Result in other emissions such as those leading to odors adversely affecting a substantial number of people?

Greenhouse Gas Emissions

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

4.1 Air Quality

4.1.1 *Conflict with or obstruct implementation of the applicable air quality plan*

The primary way of determining consistency with the air quality plan's (AQP's) assumptions is determining consistency with the applicable General Plan to ensure that the Project's population density and land use are consistent with the growth assumptions used in the AQPs for the air basin.

As required by California law, city and county General Plans contain a Land Use Element that details the types and quantities of land uses that the city or county estimates will be needed for future growth, and that designate locations for land uses to regulate growth. FCOG uses the growth projections and land use information in adopted general plans to estimate future average daily trips and then VMT, which are then provided to SJVAPCD to estimate future emissions in

the AQPs. Existing and future pollutant emissions computed in the AQP are based on land uses from area general plans. AQPs detail the control measures and emission reductions required for reaching attainment of the air standards.

The applicable General Plan for the project is the City of Clovis 2035 General Plan Update, which was adopted in 2014. The Project is consistent with the currently adopted General Plan for the City of Clovis and is therefore consistent with the population growth and VMT applied in the plan. Therefore, the Project is consistent with the growth assumptions used in the applicable AQPs. As a result, the Project will not conflict with or obstruct implementation of any air quality plans. Therefore, no mitigation is needed.

4.1.2 *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*

The Fresno County area is nonattainment for Federal and State air quality standards for ozone, in attainment of Federal standards and nonattainment for State standards for PM10, and nonattainment for Federal and State standards for PM2.5. The SJVAPCD has prepared the 2016 and 2013 Ozone Plans, 2007 PM10 Maintenance Plan, and 2012 PM2.5 Plan to achieve Federal and State standards for improved air quality in the SJVAB regarding ozone and PM. Inconsistency with any of the plans would be considered a cumulatively adverse air quality impact. As discussed in Section 4.1.1, the Project is consistent with the currently adopted General Plan for the City of Clovis and is therefore consistent with the population growth and VMT applied in the plan. Therefore, the Project is consistent with the growth assumptions used in the 2016 and 2013 Ozone Plan, 2007 PM10 Maintenance Plan, and 2012 PM2.5 Plan.

Project specific emissions that exceed the thresholds of significance for criteria pollutants would be expected to result in a cumulatively considerable net increase of any criteria pollutant for which the County is in non-attainment under applicable federal or state ambient air quality standards. It should be noted that a project is not characterized as cumulatively insignificant when project emissions fall below thresholds of significance. As discussed in Section 3.1, the SJVAPCD has established thresholds of significance for determining environmental significance which are provided in Table 6.

As discussed above in Section 3.2 and 3.3, results of the analysis show that emissions generated from construction and operation of the Project will be less than the applicable SJVAPCD emission thresholds for criteria pollutants. Therefore, no mitigation is needed.

4.1.3 *Expose sensitive receptors to substantial pollutant concentrations*

Sensitive receptors refer to those segments of the population most susceptible to poor air quality (i.e., children, the elderly, and those with pre-existing serious health problems affected by air quality). Land uses that have the greatest potential to attract these types of sensitive receptors

include schools, parks, playgrounds, daycare centers, nursing homes, hospitals, and residential communities. From a health risk perspective, the Project is a Type B project in that it may potentially place sensitive receptors in the vicinity of existing sources.

The first step in evaluating the potential for impacts to sensitive receptors for TAC's from the Project is to perform a screening level analysis. For Type B Projects, one type of screening tool is found in the CARB Handbook: Air Quality and Land Use Handbook: A Community Perspective. This handbook includes a table (depicted in Table 4) with recommended buffer distances associated with various types of common sources. The screening level analysis for the Project shows that TAC's are not a concern based upon the recommendations provided in Table 4. An evaluation of nearby land uses considering CARB's Pollution Mapping Tool shows that the Project will not place sensitive receptors in the vicinity of existing toxic sources. The Project is located a 2.5 mile from the State Route (SR) 168 freeway. Table 4 indicates that new sensitive land uses shouldn't be sited within 500 feet of a freeway/urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. The Project is located more than 2.5 miles from the SR 168 freeway. Therefore, no mitigation is needed.

Short-Term Impacts

The annual emissions from the construction phase of the Project will be less than the applicable SJVAPCD emission thresholds for criteria pollutants as shown in Table 8. The construction emissions are therefore considered less than significant with the implementation of the SJVAPCD applicable Regulation VIII control measures, which are provided below.

1. *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.*
2. *All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.*
3. *All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.*
4. *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.*
5. *All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets 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.*
6. *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.

7. *Within urban areas, track out shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.*

Naturally Occurring Asbestos (NOA)

The proposed Project's construction phase may cause asbestos to become airborne due to the construction activities that will occur on site. In order to control naturally-occurring asbestos dust, the Project will be required to submit a Dust Control Plan under the SJVAPCD's Rule 8021. The Dust Control Plan may include the following measures:

1. Water wetting of road surfaces
2. Rinse vehicles and equipment
3. Wet loads of excavated material, and
4. Cover loads of excavated material

Long-Term Impacts

Long-Term emissions from the Project are generated primarily by mobile source (vehicle) emissions from the project site and area sources such as lawn maintenance equipment. Emissions from long-term operations generally represent a project's most substantial air quality impact. Table 8 summarizes the Project's operational impacts by pollutant. Results indicate that operational emissions from the Project will not exceed the SJVAPCD emissions threshold for any emissions, hence no mitigations are required.

4.1.4 *Result in other emissions such as those leading to odors adversely affecting a substantial number of people*

The SJVAPCD requires that an analysis of potential odor impacts be conducted for the following two situations:

- ✓ Generators – projects that would potentially generate odorous emissions proposed to be located near existing sensitive receptors or other land uses where people may congregate, and

- ✓ Receivers – residential or other sensitive receptor projects or other projects built for the intent of attracting people located near existing odor sources.

The proposed Project will not generate odorous emissions given the nature or characteristics of residential developments. The intensity of an odor source's operations and its proximity to

sensitive receptors influences the potential significance of odor emissions. The SJVAPCD has identified some common types of facilities that have been known to produce odors in the SJV Air Basin. The types of facilities that are known to produce odors are shown in Table 5 above along with a reasonable distance from the source within which, the degree of odors could possibly be significant. None of the facilities shown in Table 5 are located within two (2) miles of the Project. Therefore, no mitigation is needed.

4.2 Greenhouse Gas Emissions

4.2.1 *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment*

In 2009, the SJVAPCD adopted the following guidance documents applicable to projects within the San Joaquin Valley:

- ✓ Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA (SJVAPCD 2009), and
- ✓ District Policy: Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency (SJVAPCD 2009).

As shown in Table 9, the Project would generate 7368.53 Metric Tons of Carbon Dioxide Equivalent per year (MTCO2eq./year) using an operational year of 2005, which includes area, energy, mobile, waste, and water sources. "Business as usual" (BAU) is referenced in CARB's AB 32 Scoping Plan as emissions projected to occur in 2020 if the average baseline emissions during the 2002-2004 period grew to 2020 levels, without control or Best Performance Standards (BPS) offsets. As a result, an estimate of the Project's operational emissions in 2005 were compared to operational emissions in 2020 in order to determine if the Project meets the 29% emission reduction. The SJVAPCD has reviewed relevant scientific information related to GHG emissions and has determined that they are not able to determine a specific quantitative level of GHG emissions increase, above which a project would have a significant impact on the environment, and below which would have an insignificant impact. As a result, the SJVAPCD has determined that projects achieving at least a 29% GHG emission reduction compared to BAU would be determined to have a less than significant individual and cumulative impact for GHG. Results of the analysis show that the Project's GHG emissions in the year 2020 is 6253.23 MTCO2eq./year. This represents an achievement of 15% GHG emission reduction on the basis of BAU, which does not meet the 29% GHG emission reduction target.

In the event that a local air district's guidance for addressing GHG impacts does not use numerical GHG emissions thresholds, at the lead agency's discretion, a neighboring air district's GHG threshold may be used to determine impacts. In December 2008, the South Coast Air Quality Management District (SCAQMD) Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where the SCAQMD is lead

agency. The SCAQMD guidance identifies a threshold of 10,000 MTCO2eq./year for GHG for construction emissions amortized over a 30-year project lifetime, plus annual operation emissions. This threshold is often used by agencies, such as the California Public Utilities Commission, to evaluate GHG impacts in areas that do not have specific thresholds (CPUC 2015)[3]. Therefore, because this threshold has been established by the SCAQMD in an effort to control GHG emissions in the largest metropolitan area in the State of California, this threshold is considered a conservative approach for evaluating the significance of GHG emissions in a more rural area, such as Fresno County. Though the Project is under SJVAPCD jurisdiction, the SCAQMD GHG threshold provides some perspective on the GHG emissions generated by the Project. Table 10 shows the yearly GHG emissions generated by the Project as determined by the CalEEMod model, which is approximately 43% less than the threshold identified by the SCAQMD.

CARB's California GHG Emissions Inventory provides estimates of anthropogenic GHG emissions within California, as well as emissions associated with imported electricity; natural sources are not included in the inventory. California's GHG emissions for 2020 totaled approximately 358.76 million MTCO2eq. The proposed Project's GHG emissions represents less than 0.001% of the total GHG emissions for the state of California when compared to year 2018 emissions data.

Based on the assessment above, the Project will not generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. Therefore, any impacts would be less than significant.

4.2.2 *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases*

California passed the California Global Warming Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. Under AB 32, CARB must adopt regulations by January 1, 2011 to achieve reductions in GHGs to meet the 1990 emission cap by 2020. On December 11, 2008, CARB adopted its initial Scoping Plan, which functions as a roadmap of CARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. CARB's 2017 Climate Change Scoping Plan builds on the efforts and plans encompassed in the initial Scoping Plan.

SB 375 requires MPOs to adopt a SCS or APS that will prescribe land use allocation in that MPO's regional transportation plan. CARB, in consultation with MPOs, has provided each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region

3 California Public Utilities Commission (CPUC). 2015. Section 4.7, "Greenhouse Gases." Final Environmental Impact Report for the Santa Barbara County Reliability Project. May 2015. Accessed January 18, 2018. http://www.cpuc.ca.gov/environment/info/ene/sbcrp/SBCRP_FEIR.html.

for the years 2020 and 2035. For the FCOF region, CARB set targets at six (6) percent per capita decrease in 2020 and a thirteen (13) percent per capita decrease in 2035 from a base year of 2005. FCOG's 2022 RTP/SCS, which was adopted in July 2022, projects that the Fresno County region would achieve the prescribed emissions targets.

Executive Order B-30-15 establishes a California greenhouse gas reduction target of 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050. Executive Order B-30-15 requires MPO's to implement measures that will achieve reductions of greenhouse gas emissions to meet the 2030 and 2050 greenhouse gas emissions reductions targets.

As required by California law, city and county General Plans contain a Land Use Element that details the types and quantities of land uses that the city or county estimates will be needed for future growth, and that designate locations for land uses to regulate growth. FCOG uses the growth projections and land use information in adopted general plans to estimate future average daily trips and then VMT, which are then provided to SJVAPCD to estimate future emissions in the AQPs. The applicable General Plan for the project is City of Clovis 2035 General Plan Update, which was adopted in 2014.

The Project is consistent with the currently adopted General Plan for the City of Clovis and the adopted FCOG 2022 RTP/SCS and is therefore consistent with the population growth and VMT applied in those plan documents. Therefore, the Project is consistent with the growth assumptions used in the applicable AQP. It should also be noted that yearly GHG emissions generated by the Project (Table 9) are approximately 43% less than the threshold identified by the SCAQMD (see the discussion for Impact 4.2.1 above).

CARB's 2017 Climate Change Scoping Plan builds on the efforts and plans encompassed in the initial Scoping Plan. The current plan has identified new policies and actions to accomplish the State's 2030 GHG limit. Below is a list of applicable strategies in the Scoping Plan and the Project's consistency with those strategies.

- ✓ California Light-Duty Vehicle GHG Standards – Implement adopted standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs for long-term climate change goals.
    - The Project is consistent with this reduction measure. This measure cannot be implemented by a particular project or lead agency since it is a statewide measure. When this measure is implemented, standards would be applicable to light-duty vehicles that would access the Project. The Project would not conflict or obstruct this reduction measure.
- ✓ Energy Efficiency – Pursuit of comparable investment in energy efficiency from all retail providers of electricity in California. Maximize energy efficiency building and appliance standards.

- The Project is consistent with this reduction measure. Though this measure applies to the State to increase its energy standards, the Project would comply with this measure through existing regulation. The Project would not conflict or obstruct this reduction measure.

✓ Low Carbon Fuel – Development and adoption of the low carbon fuel standard.

- The Project is consistent with this reduction measure. This measure cannot be implemented by a particular project or lead agency since it is a statewide measure. When this measure is implemented, standards would be applicable to the fuel used by vehicles that would access the Project. The Project would not conflict or obstruct this reduction measure.

Based on the assessment above, the Project will not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Therefore, any impacts would be less than significant.

Appendix-A
CalEEMod Worksheets

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Tract 000

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	153.00	Dwelling Unit	18.63	275,400.00	438

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - project description

Table Name	Column Name	Default Value	New Value
tblLandUse	LotAcreage	49.68	18.63
tblWoodstoves	NumberCatalytic	18.63	0.00
tblWoodstoves	NumberNoncatalytic	18.63	0.00

2.0 Emissions Summary

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2024	0.2460	2.2201	2.4298	4.8400e-003	0.2939	0.0962	0.3901	0.1209	0.0899	0.2107	0.0000	424.6752	424.6752	0.0960	5.4300e-003	428.6945
2025	2.6768	0.7936	1.0828	2.0400e-003	0.0307	0.0328	0.0635	8.3000e-003	0.0308	0.0391	0.0000	178.9658	178.9658	0.0358	2.8400e-003	180.7065
Maximum	**2.6768**	**2.2201**	**2.4298**	**4.8400e-003**	**0.2939**	**0.0962**	**0.3901**	**0.1209**	**0.0899**	**0.2107**	**0.0000**	**424.6752**	**424.6752**	**0.0960**	**5.4300e-003**	**428.6945**

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					
2024	0.2460	2.2201	2.4298	4.8400e-003	0.2939	0.0962	0.3901	0.1209	0.0899	0.2107	0.0000	424.6748	424.6748	0.0960	5.4300e-003	428.6941
2025	2.6768	0.7936	1.0828	2.0400e-003	0.0307	0.0328	0.0635	8.3000e-003	0.0308	0.0391	0.0000	178.9656	178.9656	0.0358	2.8400e-003	180.7063
Maximum	**2.6768**	**2.2201**	**2.4298**	**4.8400e-003**	**0.2939**	**0.0962**	**0.3901**	**0.1209**	**0.0899**	**0.2107**	**0.0000**	**424.6748**	**424.6748**	**0.0960**	**5.4300e-003**	**428.6941**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	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	**1-10-2024**	**4-9-2024**	0.9567	0.9567
2	**4-10-2024**	**7-9-2024**	0.5160	0.5160
3	**7-10-2024**	**10-9-2024**	0.5218	0.5218
4	**10-10-2024**	**1-9-2025**	0.5195	0.5195
5	**1-10-2025**	**4-9-2025**	0.4761	0.4761
6	**4-10-2025**	**7-9-2025**	1.7410	1.7410
7	**7-10-2025**	**9-30-2025**	1.2065	1.2065
		Highest	1.7410	1.7410

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	1.3748	0.0703	1.1593	4.3000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	68.1364	68.1364	3.0500e-003	1.2200e-003	68.5747
Energy	0.0198	0.1695	0.0721	1.0800e-003		0.0137	0.0137		0.0137	0.0137	0.0000	309.1390	309.1390	0.0220	5.8100e-003	311.4214
Mobile	0.6651	1.1272	6.3070	0.0153	1.5673	0.0126	1.5799	0.4193	0.0118	0.4311	0.0000	1,452.2520	1,452.2520	0.0731	0.0778	1,477.2689
Waste						0.0000	0.0000		0.0000	0.0000	32.0076	0.0000	32.0076	1.8916	0.0000	79.2975
Water						0.0000	0.0000		0.0000	0.0000	3.1626	7.0259	10.1884	0.3260	7.8100e-003	20.6642
Total	**2.0598**	**1.3669**	**7.5384**	**0.0169**	**1.5673**	**0.0372**	**1.6045**	**0.4193**	**0.0364**	**0.4557**	**35.1702**	**1,836.5532**	**1,871.7234**	**2.3158**	**0.0927**	**1,957.2267**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	1.3748	0.0703	1.1593	4.3000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	68.1364	68.1364	3.0500e-003	1.2200e-003	68.5747
Energy	0.0198	0.1695	0.0721	1.0800e-003		0.0137	0.0137		0.0137	0.0137	0.0000	309.1390	309.1390	0.0220	5.8100e-003	311.4214
Mobile	0.6651	1.1272	6.3070	0.0153	1.5673	0.0126	1.5799	0.4193	0.0118	0.4311	0.0000	1,452.2520	1,452.2520	0.0731	0.0778	1,477.2689
Waste						0.0000	0.0000		0.0000	0.0000	32.0076	0.0000	32.0076	1.8916	0.0000	79.2975
Water						0.0000	0.0000		0.0000	0.0000	3.1626	7.0259	10.1884	0.3260	7.8100e-003	20.6642
Total	**2.0598**	**1.3669**	**7.5384**	**0.0169**	**1.5673**	**0.0372**	**1.6045**	**0.4193**	**0.0364**	**0.4557**	**35.1702**	**1,836.5532**	**1,871.7234**	**2.3158**	**0.0927**	**1,957.2267**

	ROG	NOx	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	Demolition	Demolition	1/10/2024	2/6/2024	5	20	
2	Site Preparation	Site Preparation	2/7/2024	2/20/2024	5	10	
3	Grading	Grading	2/21/2024	4/2/2024	5	30	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4	Building Construction	Building Construction	4/3/2024	5/27/2025	5	300	
5	Paving	Paving	5/28/2025	6/24/2025	5	20	
6	Architectural Coating	Architectural Coating	6/25/2025	7/22/2025	5	20	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 0

Residential Indoor: 557,685; Residential Outdoor: 185,895; 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
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
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
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

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
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
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	55.00	16.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	11.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2024

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	0.0224	0.2088	0.1971	3.9000e-004		9.6000e-003	9.6000e-003		8.9200e-003	8.9200e-003	0.0000	33.9961	33.9961	9.5100e-003	0.0000	34.2338
Total	**0.0224**	**0.2088**	**0.1971**	**3.9000e-004**		**9.6000e-003**	**9.6000e-003**		**8.9200e-003**	**8.9200e-003**	**0.0000**	**33.9961**	**33.9961**	**9.5100e-003**	**0.0000**	**34.2338**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2024

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3000e-004	2.7000e-004	3.2800e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	0.9308	0.9308	3.0000e-005	3.0000e-005	0.9390
Total	**4.3000e-004**	**2.7000e-004**	**3.2800e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2000e-003**	**3.2000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**0.9308**	**0.9308**	**3.0000e-005**	**3.0000e-005**	**0.9390**

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	0.0224	0.2088	0.1971	3.9000e-004		9.6000e-003	9.6000e-003		8.9200e-003	8.9200e-003	0.0000	33.9960	33.9960	9.5100e-003	0.0000	34.2338
Total	**0.0224**	**0.2088**	**0.1971**	**3.9000e-004**		**9.6000e-003**	**9.6000e-003**		**8.9200e-003**	**8.9200e-003**	**0.0000**	**33.9960**	**33.9960**	**9.5100e-003**	**0.0000**	**34.2338**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2024

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3000e-004	2.7000e-004	3.2800e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2000e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	0.9308	0.9308	3.0000e-005	3.0000e-005	0.9390
Total	**4.3000e-004**	**2.7000e-004**	**3.2800e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2000e-003**	**3.2000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**0.9308**	**0.9308**	**3.0000e-005**	**3.0000e-005**	**0.9390**

3.3 Site Preparation - 2024

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					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0133	0.1359	0.0917	1.9000e-004		6.1500e-003	6.1500e-003		5.6600e-003	5.6600e-003	0.0000	16.7285	16.7285	5.4100e-003	0.0000	16.8638
Total	**0.0133**	**0.1359**	**0.0917**	**1.9000e-004**	**0.0983**	**6.1500e-003**	**0.1044**	**0.0505**	**5.6600e-003**	**0.0562**	**0.0000**	**16.7285**	**16.7285**	**5.4100e-003**	**0.0000**	**16.8638**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2024

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	1.6000e-004	1.9700e-003	1.0000e-005	7.2000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5585	0.5585	2.0000e-005	2.0000e-005	0.5634
Total	**2.6000e-004**	**1.6000e-004**	**1.9700e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5585**	**0.5585**	**2.0000e-005**	**2.0000e-005**	**0.5634**

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					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0133	0.1359	0.0917	1.9000e-004		6.1500e-003	6.1500e-003		5.6500e-003	5.6500e-003	0.0000	16.7285	16.7285	5.4100e-003	0.0000	16.8638
Total	**0.0133**	**0.1359**	**0.0917**	**1.9000e-004**	**0.0983**	**6.1500e-003**	**0.1044**	**0.0505**	**5.6500e-003**	**0.0562**	**0.0000**	**16.7285**	**16.7285**	**5.4100e-003**	**0.0000**	**16.8638**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2024

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	1.6000e-004	1.9700e-003	1.0000e-005	7.2000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5585	0.5585	2.0000e-005	2.0000e-005	0.5634
Total	**2.6000e-004**	**1.6000e-004**	**1.9700e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5585**	**0.5585**	**2.0000e-005**	**2.0000e-005**	**0.5634**

3.4 Grading - 2024

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					0.1381	0.0000	0.1381	0.0548	0.0000	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0483	0.4857	0.4158	9.3000e-004		0.0200	0.0200		0.0184	0.0184	0.0000	81.7793	81.7793	0.0265	0.0000	82.4405
Total	**0.0483**	**0.4857**	**0.4158**	**9.3000e-004**	**0.1381**	**0.0200**	**0.1581**	**0.0548**	**0.0184**	**0.0732**	**0.0000**	**81.7793**	**81.7793**	**0.0265**	**0.0000**	**82.4405**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2024

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.6000e-004	5.3000e-004	6.5500e-003	2.0000e-005	2.4000e-003	1.0000e-005	2.4100e-003	6.4000e-004	1.0000e-005	6.5000e-004	0.0000	1.8616	1.8616	5.0000e-005	5.0000e-005	1.8780
Total	**8.6000e-004**	**5.3000e-004**	**6.5500e-003**	**2.0000e-005**	**2.4000e-003**	**1.0000e-005**	**2.4100e-003**	**6.4000e-004**	**1.0000e-005**	**6.5000e-004**	**0.0000**	**1.8616**	**1.8616**	**5.0000e-005**	**5.0000e-005**	**1.8780**

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					0.1381	0.0000	0.1381	0.0548	0.0000	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0483	0.4857	0.4158	9.3000e-004		0.0200	0.0200		0.0184	0.0184	0.0000	81.7792	81.7792	0.0265	0.0000	82.4404
Total	**0.0483**	**0.4857**	**0.4158**	**9.3000e-004**	**0.1381**	**0.0200**	**0.1581**	**0.0548**	**0.0184**	**0.0732**	**0.0000**	**81.7792**	**81.7792**	**0.0265**	**0.0000**	**82.4404**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2024

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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.6000e-004	5.3000e-004	6.5500e-003	2.0000e-005	2.4000e-003	1.0000e-005	2.4100e-003	6.4000e-004	1.0000e-005	6.5000e-004	0.0000	1.8616	1.8616	5.0000e-005	5.0000e-005	1.8780
Total	**8.6000e-004**	**5.3000e-004**	**6.5500e-003**	**2.0000e-005**	**2.4000e-003**	**1.0000e-005**	**2.4100e-003**	**6.4000e-004**	**1.0000e-005**	**6.5000e-004**	**0.0000**	**1.8616**	**1.8616**	**5.0000e-005**	**5.0000e-005**	**1.8780**

3.5 Building Construction - 2024

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	0.1435	1.3108	1.5763	2.6300e-003		0.0598	0.0598		0.0563	0.0563	0.0000	226.0529	226.0529	0.0535	0.0000	227.3893
Total	**0.1435**	**1.3108**	**1.5763**	**2.6300e-003**		**0.0598**	**0.0598**		**0.0563**	**0.0563**	**0.0000**	**226.0529**	**226.0529**	**0.0535**	**0.0000**	**227.3893**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2024

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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6300e-003	0.0685	0.0201	3.1000e-004	0.0103	4.4000e-004	0.0108	2.9900e-003	4.2000e-004	3.4100e-003	0.0000	29.4908	29.4908	1.5000e-004	4.4400e-003	30.8175
Worker	0.0154	9.4900e-003	0.1171	3.6000e-004	0.0429	2.0000e-004	0.0431	0.0114	1.8000e-004	0.0116	0.0000	33.2767	33.2767	9.2000e-004	9.0000e-004	33.5692
Total	**0.0170**	**0.0780**	**0.1372**	**6.7000e-004**	**0.0532**	**6.4000e-004**	**0.0539**	**0.0144**	**6.0000e-004**	**0.0150**	**0.0000**	**62.7675**	**62.7675**	**1.0700e-003**	**5.3400e-003**	**64.3867**

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	0.1435	1.3108	1.5763	2.6300e-003		0.0598	0.0598		0.0563	0.0563	0.0000	226.0526	226.0526	0.0535	0.0000	227.3890
Total	**0.1435**	**1.3108**	**1.5763**	**2.6300e-003**		**0.0598**	**0.0598**		**0.0563**	**0.0563**	**0.0000**	**226.0526**	**226.0526**	**0.0535**	**0.0000**	**227.3890**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2024

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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6300e-003	0.0685	0.0201	3.1000e-004	0.0103	4.4000e-004	0.0108	2.9900e-003	4.2000e-004	3.4100e-003	0.0000	29.4908	29.4908	1.5000e-004	4.4400e-003	30.8175
Worker	0.0154	9.4900e-003	0.1171	3.6000e-004	0.0429	2.0000e-004	0.0431	0.0114	1.8000e-004	0.0116	0.0000	33.2767	33.2767	9.2000e-004	9.0000e-004	33.5692
Total	**0.0170**	**0.0780**	**0.1372**	**6.7000e-004**	**0.0532**	**6.4000e-004**	**0.0539**	**0.0144**	**6.0000e-004**	**0.0150**	**0.0000**	**62.7675**	**62.7675**	**1.0700e-003**	**5.3400e-003**	**64.3867**

3.5 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	0.0718	0.6547	0.8444	1.4200e-003		0.0277	0.0277		0.0261	0.0261	0.0000	121.7577	121.7577	0.0286	0.0000	122.4733
Total	**0.0718**	**0.6547**	**0.8444**	**1.4200e-003**		**0.0277**	**0.0277**		**0.0261**	**0.0261**	**0.0000**	**121.7577**	**121.7577**	**0.0286**	**0.0000**	**122.4733**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.6000e-004	0.0368	0.0106	1.6000e-004	5.5700e-003	2.4000e-004	5.8100e-003	1.6100e-003	2.3000e-004	1.8400e-003	0.0000	15.5744	15.5744	8.0000e-005	2.3400e-003	16.2749
Worker	7.6900e-003	4.5500e-003	0.0587	1.9000e-004	0.0231	1.0000e-004	0.0232	6.1400e-003	9.0000e-005	6.2300e-003	0.0000	17.4866	17.4866	4.5000e-004	4.5000e-004	17.6328
Total	**8.5500e-003**	**0.0413**	**0.0692**	**3.5000e-004**	**0.0287**	**3.4000e-004**	**0.0290**	**7.7500e-003**	**3.2000e-004**	**8.0700e-003**	**0.0000**	**33.0610**	**33.0610**	**5.3000e-004**	**2.7900e-003**	**33.9077**

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	0.0718	0.6547	0.8444	1.4200e-003		0.0277	0.0277		0.0261	0.0261	0.0000	121.7576	121.7576	0.0286	0.0000	122.4731
Total	**0.0718**	**0.6547**	**0.8444**	**1.4200e-003**		**0.0277**	**0.0277**		**0.0261**	**0.0261**	**0.0000**	**121.7576**	**121.7576**	**0.0286**	**0.0000**	**122.4731**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 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	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.6000e-004	0.0368	0.0106	1.6000e-004	5.5700e-003	2.4000e-004	5.8100e-003	1.6100e-003	2.3000e-004	1.8400e-003	0.0000	15.5744	15.5744	8.0000e-005	2.3400e-003	16.2749
Worker	7.6900e-003	4.5500e-003	0.0587	1.9000e-004	0.0231	1.0000e-004	0.0232	6.1400e-003	9.0000e-005	6.2300e-003	0.0000	17.4866	17.4866	4.5000e-004	4.5000e-004	17.6328
Total	**8.5500e-003**	**0.0413**	**0.0692**	**3.5000e-004**	**0.0287**	**3.4000e-004**	**0.0290**	**7.7500e-003**	**3.2000e-004**	**8.0700e-003**	**0.0000**	**33.0610**	**33.0610**	**5.3000e-004**	**2.7900e-003**	**33.9077**

3.6 Paving - 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	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0193	20.0193	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0193**	**20.0193**	**6.4700e-003**	**0.0000**	**20.1811**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-004	2.4000e-004	3.0500e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2000e-003	3.2000e-004	0.0000	3.2000e-004	0.0000	0.9084	0.9084	2.0000e-005	2.0000e-005	0.9160
Total	**4.0000e-004**	**2.4000e-004**	**3.0500e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2000e-003**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**0.0000**	**0.9084**	**0.9084**	**2.0000e-005**	**2.0000e-005**	**0.9160**

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	9.1500e-003	0.0858	0.1458	2.3000e-004		4.1900e-003	4.1900e-003		3.8500e-003	3.8500e-003	0.0000	20.0192	20.0192	6.4700e-003	0.0000	20.1811
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.1500e-003**	**0.0858**	**0.1458**	**2.3000e-004**		**4.1900e-003**	**4.1900e-003**		**3.8500e-003**	**3.8500e-003**	**0.0000**	**20.0192**	**20.0192**	**6.4700e-003**	**0.0000**	**20.1811**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-004	2.4000e-004	3.0500e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2000e-003	3.2000e-004	0.0000	3.2000e-004	0.0000	0.9084	0.9084	2.0000e-005	2.0000e-005	0.9160
Total	**4.0000e-004**	**2.4000e-004**	**3.0500e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2000e-003**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**0.0000**	**0.9084**	**0.9084**	**2.0000e-005**	**2.0000e-005**	**0.9160**

3.7 Architectural Coating - 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					
Archit. Coating	2.5849					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**2.5866**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	1.7000e-004	2.2300e-003	1.0000e-005	8.8000e-004	0.0000	8.8000e-004	2.3000e-004	0.0000	2.4000e-004	0.0000	0.6662	0.6662	2.0000e-005	2.0000e-005	0.6717
Total	**2.9000e-004**	**1.7000e-004**	**2.2300e-003**	**1.0000e-005**	**8.8000e-004**	**0.0000**	**8.8000e-004**	**2.3000e-004**	**0.0000**	**2.4000e-004**	**0.0000**	**0.6662**	**0.6662**	**2.0000e-005**	**2.0000e-005**	**0.6717**

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	2.5849					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7100e-003	0.0115	0.0181	3.0000e-005		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	2.5533	2.5533	1.4000e-004	0.0000	2.5567
Total	**2.5866**	**0.0115**	**0.0181**	**3.0000e-005**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.4000e-004**	**0.0000**	**2.5567**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 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	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	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	1.7000e-004	2.2300e-003	1.0000e-005	8.8000e-004	0.0000	8.8000e-004	2.3000e-004	0.0000	2.4000e-004	0.0000	0.6662	0.6662	2.0000e-005	2.0000e-005	0.6717
Total	**2.9000e-004**	**1.7000e-004**	**2.2300e-003**	**1.0000e-005**	**8.8000e-004**	**0.0000**	**8.8000e-004**	**2.3000e-004**	**0.0000**	**2.4000e-004**	**0.0000**	**0.6662**	**0.6662**	**2.0000e-005**	**2.0000e-005**	**0.6717**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.6651	1.1272	6.3070	0.0153	1.5673	0.0126	1.5799	0.4193	0.0118	0.4311	0.0000	1,452.2520	1,452.2520	0.0731	0.0778	1,477.2689
Unmitigated	0.6651	1.1272	6.3070	0.0153	1.5673	0.0126	1.5799	0.4193	0.0118	0.4311	0.0000	1,452.2520	1,452.2520	0.0731	0.0778	1,477.2689

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,444.32	1,459.62	1308.15	4,180,793	4,180,793
Total	1,444.32	1,459.62	1,308.15	4,180,793	4,180,793

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
Single Family Housing	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
Single Family Housing	0.521458	0.053308	0.175656	0.151963	0.025001	0.006656	0.014407	0.022718	0.000702	0.000287	0.023515	0.001463	0.002865

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.0000	112.8805	112.8805	0.0183	2.2100e-003	113.9967
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	112.8805	112.8805	0.0183	2.2100e-003	113.9967
NaturalGas Mitigated	0.0198	0.1695	0.0721	1.0800e-003		0.0137	0.0137		0.0137	0.0137	0.0000	196.2585	196.2585	3.7600e-003	3.6000e-003	197.4248
NaturalGas Unmitigated	0.0198	0.1695	0.0721	1.0800e-003		0.0137	0.0137		0.0137	0.0137	0.0000	196.2585	196.2585	3.7600e-003	3.6000e-003	197.4248

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
Single Family Housing	3.67775e+006	0.0198	0.1695	0.0721	1.0800e-003		0.0137	0.0137		0.0137	0.0137	0.0000	196.2585	196.2585	3.7600e-003	3.6000e-003	197.4248
Total		**0.0198**	**0.1695**	**0.0721**	**1.0800e-003**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**196.2585**	**196.2585**	**3.7600e-003**	**3.6000e-003**	**197.4248**

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					
Single Family Housing	3.67775e+006	0.0198	0.1695	0.0721	1.0800e-003		0.0137	0.0137		0.0137	0.0137	0.0000	196.2585	196.2585	3.7600e-003	3.6000e-003	197.4248
Total		**0.0198**	**0.1695**	**0.0721**	**1.0800e-003**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**196.2585**	**196.2585**	**3.7600e-003**	**3.6000e-003**	**197.4248**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	1.22002e+006	112.8805	0.0183	2.2100e-003	113.9967
Total		**112.8805**	**0.0183**	**2.2100e-003**	**113.9967**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	1.22002e+006	112.8805	0.0183	2.2100e-003	113.9967
Total		**112.8805**	**0.0183**	**2.2100e-003**	**113.9967**

6.0 Area Detail

6.1 Mitigation Measures Area

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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	1.3748	0.0703	1.1593	4.3000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	68.1364	68.1364	3.0500e-003	1.2200e-003	68.5747
Unmitigated	1.3748	0.0703	1.1593	4.3000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	68.1364	68.1364	3.0500e-003	1.2200e-003	68.5747

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	0.2585					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.0756					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	6.7000e-003	0.0572	0.0244	3.7000e-004		4.6300e-003	4.6300e-003		4.6300e-003	4.6300e-003	0.0000	66.2807	66.2807	1.2700e-003	1.2200e-003	66.6746
Landscaping	0.0341	0.0131	1.1350	6.0000e-005		6.3000e-003	6.3000e-003		6.3000e-003	6.3000e-003	0.0000	1.8557	1.8557	1.7800e-003	0.0000	1.9001
Total	**1.3748**	**0.0703**	**1.1593**	**4.3000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**	**0.0000**	**68.1364**	**68.1364**	**3.0500e-003**	**1.2200e-003**	**68.5747**

Tract 000 - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.2585					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.0756					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	6.7000e-003	0.0572	0.0244	3.7000e-004		4.6300e-003	4.6300e-003		4.6300e-003	4.6300e-003	0.0000	66.2807	66.2807	1.2700e-003	1.2200e-003	66.6746
Landscaping	0.0341	0.0131	1.1350	6.0000e-005		6.3000e-003	6.3000e-003		6.3000e-003	6.3000e-003	0.0000	1.8557	1.8557	1.7800e-003	0.0000	1.9001
Total	**1.3748**	**0.0703**	**1.1593**	**4.3000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**	**0.0000**	**68.1364**	**68.1364**	**3.0500e-003**	**1.2200e-003**	**68.5747**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	10.1884	0.3260	7.8100e-003	20.6642
Unmitigated	10.1884	0.3260	7.8100e-003	20.6642

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	9.96857 / 6.28453	10.1884	0.3260	7.8100e-003	20.6642
Total		**10.1884**	**0.3260**	**7.8100e-003**	**20.6642**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	9.96857 / 6.28453	10.1884	0.3260	7.8100e-003	20.6642
Total		**10.1884**	**0.3260**	**7.8100e-003**	**20.6642**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	32.0076	1.8916	0.0000	79.2975
Unmitigated	32.0076	1.8916	0.0000	79.2975

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	157.68	32.0076	1.8916	0.0000	79.2975
Total		**32.0076**	**1.8916**	**0.0000**	**79.2975**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	157.68	32.0076	1.8916	0.0000	79.2975
Total		**32.0076**	**1.8916**	**0.0000**	**79.2975**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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-B
ISR Fee Estimate

Emissions Estimator Worksheet

1/12/2024

Applicant/Business Name:	**Lennar Central Valley California**
Project Name:	**Tract 6375**
Project Location:	**Northeast Portion of Shepherd and Minnewawa Ave, Clovis, Fresno County**
District Project ID No.:	

Project Construction Emissions

If applicant selected Construction Clean Fleet Mitigation Measure - Please select "Yes" from dropdown menu: No

			NOx					PM10					
Project Phase Name	ISR Phase	Construction Start Date	Unmitigated Baseline[1] (TPY)	Mitigated Baseline[2] (TPY)	Achieved On-site Reductions[3] (tons)	Required Off-site Reductions[4] (tons)	Emission Reductions Required by Rule[5]	Unmitigated Baseline[1] (TPY)	Mitigated Baseline[2] (TPY)	Achieved On-site Reductions[3] (tons)	Required Off-site Reductions[4] (tons)	Emission Reductions Required by Rule[5]
Tract 6375	1	1/10/2025	3.3500	3.3500	0.0000	0.6700	0.6700	1.0900	1.0900	0.0000	0.4905	0.4905
	2				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
	3				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
	4				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
	5				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
	6				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
	7				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
	8				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
	9				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
	10				0.0000	0.0000	0.0000			0.0000	0.0000	0.0000
		Total	**3.3500**	**3.3500**	**0.0000**	**0.6700**	0.6700	**1.0900**	**1.0900**	**0.0000**	**0.4905**	0.4905

Total Achieved On-Site Reductions (tons)

ISR Phase	NOx	PM10
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
Total	**0.0000**	**0.0000**

Project Operations Emissions (Area + Mobile)

			NOx						PM10					
Project Phase Name	ISR Phase	Operation Start Date	Unmitigated Baseline[1] (TPY)	Mitigated Baseline[2] (TPY)	Achieved On-site Reductions[3] (tons)	Required Off-site Reductions[4] (tons)	Total Emission Reductions Required by Rule[6]	Average Annual Emission Reductions Required by Rule[7]	Unmitigated Baseline[1] (TPY)	Mitigated Baseline[2] (TPY)	Achieved On-site Reductions[3] (tons)	Required Off-site Reductions[4] (tons)	Total Emission Reductions Required by Rule[6]	Average Annual Emission Reductions Required by Rule[7]
Tract 6375	1	9/8/2025	3.9000	3.9000	0.0000	9.7500	9.7500	0.9750	8.0700	8.0700	0.0000	40.3500	40.3500	4.0350
	2				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	3				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	4				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	5				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	6				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	7				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	8				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	9				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
	10				0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
		Total	**3.9000**	**3.9000**	**0.0000**	**9.7500**	**9.7500**	**0.9750**	**8.0700**	**8.0700**	**0.0000**	**40.3500**	**40.3500**	**4.0350**

Total Required Off-Site Reductions (tons)

ISR Phase	NOx	PM10
1	10.4200	40.8405
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
Total	**10.4200**	**40.8405**

Notes:

TPY: Tons Per Year

[1] **Unmitigated Baseline:** The project's baseline emissions generated with no on-site emission reduction measures.

[2] **Mitigated Baseline:** The project's baseline emissions generated after on-site emisison reduction measures have been applied.

[3] **Achieved On-site Reductions:** The project's emission reductions achieved after on-site emission reduction measures have been applied.

[4] **Required Off-site Reductions:** The project's remaining emission reductions required by Rule 9510 if on-site emission reduction measures did not achieive the required rule reductions.

[5] **Emission Reductions Required by Rule:** The project's emission reductions required (20% NOx and 45% PM10) for construction from the unmitigated baseline.

[6] **Total Emission Reductions Required by Rule:** The project's emission reductions required (33.3% NOx and 50% PM10) for operations from the unmitigated baseline over a 10-year period.

[7] **Average Annual Emission Reductions Required by Rule:** The project's total emission reduction for operations required by Rule 9510 divided by 10 years.

Fee Estimator Worksheet

1/12/2024

Applicant/Business Name:	**Lennar Central Valley California**
Project Name:	**Tract 6375**
Project Location:	**Northeast Portion of Shepherd and Minnewawa Ave, Clovis, Fresno County**
District Project ID No.:	

NOTES:

(1) The start date for each ISR phase is shown in TABLE 1.

(2) If you have chosen a **ONE-TIME** payment for the project, then the total amount due for ALL PHASES is shown under TABLE 2.

(3) If you have chosen a **DEFERRED** payment schedule or would like to propose a **DEFERRED** payment schedule for the project, the total amount due for a specific year is shown in TABLE 3 according to the schedule in TABLE 1.

***** If you have not provided a proposed payment date, the District sets a default invoice date of 60 days prior to start of the ISR phase.

If applicant selected Fee Deferral Schedule - Please select "Yes" from dropdown menu	Yes ▼

TABLE 1 - PROJECT INFORMATION

Project Phase Name	ISR Phase	Start Date per Phase	Scheduled Payment Date*
0	1	1/10/25	FALSE
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
TOTAL (tons)			

TABLE 2 - No Fee Deferral Schedule (FDS)

Pollutant	Required Offsite Reductions (tons)
NOx	10.4200
PM10	40.8405
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	0.0000
PM10	0.0000
NOx	10.4200
PM10	40.8405

TABLE 2 - NO FDS

2022
10.4200
40.8405
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
0.0000
10.4200
40.8405

TABLE 3 - APPROVED FEE DEFERRAL SCHEDULE (FDS) BY PAYMENT YEAR

2022	2023	2024	2025	2026	2027	2028	2029	2030
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Offsite Fee by Pollutant ($)	NOx	$97,427
	PM10	$368,013
Administrative Fee ($)		$18,617.60
Offsite Fee ($)		$465,440.00
Total Project Offsite Fee ($)		$484,057.60

$0	$0	$0	$0	$0	$0	$0	$0	$0
$0	$0	$0	$0	$0	$0	$0	$0	$0
$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	$0.00	$0.00
			$0.00					

Rule 9510 Fee Schedule ($/ton)

Year	Nox	PM10
2022 and Beyond	$9,350	$9,011

LIVE OAK
ASSOCIATES, INC.

BIOLOGICAL EVALUATION
LENNAR HOMES TRACT 6375
FRESNO COUNTY, CALIFORNIA

Prepared by:

LIVE OAK ASSOCIATES, INC.

Austin Pearson, Vice President
Rebekah Jensen, Senior Project Manager and Ecologist

Prepared for:

Jeff Callaway
Lennar Homes of California, Inc.
8080 North Palm Avenue, Suite 110
Fresno, CA 93711

August 14, 2023, Rev. Oct. 16, 2024 PN 2798-02

EXECUTIVE SUMMARY

Live Oak Associates, Inc. (LOA) investigated the biological resources of an approximately 59-acre site proposed for a residential development, and evaluated potential project-related impacts to such resources pursuant to the California Environmental Quality Act (CEQA). The site is located immediately north of Clovis city limits, in unincorporated Fresno County, California. The project would subdivide the existing parcel into 369 single-family lots, annex the development into the City of Clovis, and change the zoning to accommodate medium-density residential housing. Full buildout of the site is anticipated.

LOA's analysis was based on a reconnaissance-level field survey conducted on July 12, 2023 and follow-up site visit conducted on October 16, 2024. As of the 2024 survey, the site consisted of an active almond orchard, disked fields, and several former residential sites from which the structures and trees had been removed. It also contained five areas of significant ponded water that appeared to have resulted from unintentional irrigation, and supported wetland vegetation and/or animal species adapted to aquatic environments. These ponds are isolated, artificial features that are unlikely to be regulated by the U.S. Army Corps of Engineers, Regional Water Quality Control Board, or California Department of Fish and Wildlife as Waters of the U.S. or State.

The project site has the potential to support one special status plant species, the Sanford's arrowhead. Several populations of this species were observed in the nearby Enterprise Canal at the time of LOA's 2023 survey, and a member of the same genus, the giant arrowhead, was observed in one of the site's artificial ponds. The project site could also be used to varying degrees by six special status animal species: the monarch butterfly, Swainson's hawk, tricolored blackbird, pallid bat, spotted bat, and western mastiff bat. Monarchs migrating through the project vicinity may reproduce on the site's milkweed plants, roost in its orchard trees, and forage on its nectar resources. Swainson's hawks may nest in large trees adjacent to the site and forage in the site's ruderal areas. The remaining four species may forage on or over the site from time to time.

The project has the potential to significantly impact the Sanford's arrowhead, monarch butterfly, and Swainson's hawk through construction-related mortality or disturbance and, in the case of monarch, loss of reproductive habitat. These impacts can be mitigated to a less than significant level by limiting construction activities to lower-risk times of year, avoiding any protected resources identified during focused surveys, salvaging any Sanford's arrowhead populations that must be impacted, and providing replacement milkweed plantings for monarch reproduction.

No other biological resources would be significantly impacted by project implementation. Impacts are considered less than significant for 15 regionally-occurring special status plant species, 19 regionally-occurring special status animal species, wildlife movement corridors, sensitive natural communities, jurisdictional waters, and designated critical habitat. The project appears to be consistent with City of Clovis and County of Fresno General Plan policies related to biological resources, and there are no known Habitat Conservation Plans or Natural Community Conservation Plans in the area.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **ii**
1.0 INTRODUCTION **1**
1.1 PROJECT DESCRIPTION **1**
1.2 REPORT OBJECTIVES **1**
1.3 STUDY METHODOLOGY **4**
2.0 EXISTING CONDITIONS **5**
2.1 REGIONAL SETTING **5**
2.2 PROJECT SITE **5**
2.3 LAND USES / BIOTIC HABITATS **6**
2.3.1 Orchard 6
2.3.2 Ruderal 8
2.3.3 Artificial Pond 9
2.4 SPECIAL STATUS PLANTS AND ANIMALS **10**
2.5 EXPANDED DISCUSSIONS FOR SPECIAL STATUS SPECIES **16**
2.5.1 Crotch Bumble Bee 16
2.5.2 California Tiger Salamander 18
2.5.3 Burrowing Owl 18
2.6 JURISDICTIONAL WATERS **20**
2.7 SENSITIVE NATURAL COMMUNITIES **20**
2.8 WILDLIFE MOVEMENT CORRIDORS **21**
2.9 DESIGNATED CRITICAL HABITAT **21**
3.0 RELEVANT GOALS, POLICIES, AND LAWS **22**
3.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT **22**
3.2 OTHER RELEVANT LAWS AND POLICIES **23**
3.2.1 Fresno County and Clovis General Plans 23
3.2.2 Threatened and Endangered Species 24
3.2.3 Migratory Birds 25
3.2.4 Birds of Prey 25
3.2.5 Nesting Birds 26
3.2.6 Habitat Conservation Plans and Natural Community Conservation Plans 26
3.2.7 Wetlands and Other Jurisdictional Waters 26
4.0 IMPACTS AND MITIGATIONS **29**
4.1 POTENTIALLY SIGNIFICANT PROJECT IMPACTS/MITIGATION **29**
4.1.1 Potential Project Impacts to Special Status Plants 29
4.1.2 Potential Project Impacts to Monarch Butterfly 30
4.1.3 Potential Project Impacts to Nesting Swainson's Hawks 31
4.1.4 Potential Project Impacts to Other Nesting Birds and Raptors 33
4.2 LESS THAN SIGNIFICANT PROJECT IMPACTS **34**
4.2.1 Project Impacts to Special Status Animal Species Absent from or Unlikely to Occur on the Project Site 34
4.2.2 Project Impacts to Special Status Animal Species that Would Use the Site for Foraging Only 35
4.2.3 Project Impacts to Wildlife Movement Corridors 35
4.2.4 Project Impacts to Sensitive Natural Communities and Critical Habitat 35
4.2.5 Project Impacts to Jurisdictional Waters 36
4.2.6 Consistency with Local Policies and Ordinances 36
4.2.7 Consistency with Habitat Conservation Plans and Natural Community Conservation Plans 37
APPENDIX A: VASCULAR PLANT LIST **40**
APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR ON THE PROJECT SITE **44**
APPENDIX C: REPRESENTATIVE PHOTOS OF THE PROJECT SITE **49**

1.0 INTRODUCTION

This technical report, prepared by Live Oak Associates, Inc. (LOA) in support of California Environmental Quality Act (CEQA) review, describes the biological resources of an approximately 59-acre site ("project site") proposed for a residential development ("project"), and evaluates the potential impacts to biological resources associated with project implementation. The project is located immediately north of Clovis city limits in unincorporated Fresno County, California (Figure 1). It may be found on the *Clovis* U.S. Geological Survey (USGS) 7.5-minute quadrangle, in Section 20 of Township 12 South, Range 21 East, Mount Diablo Base and Meridian (Figure 2).

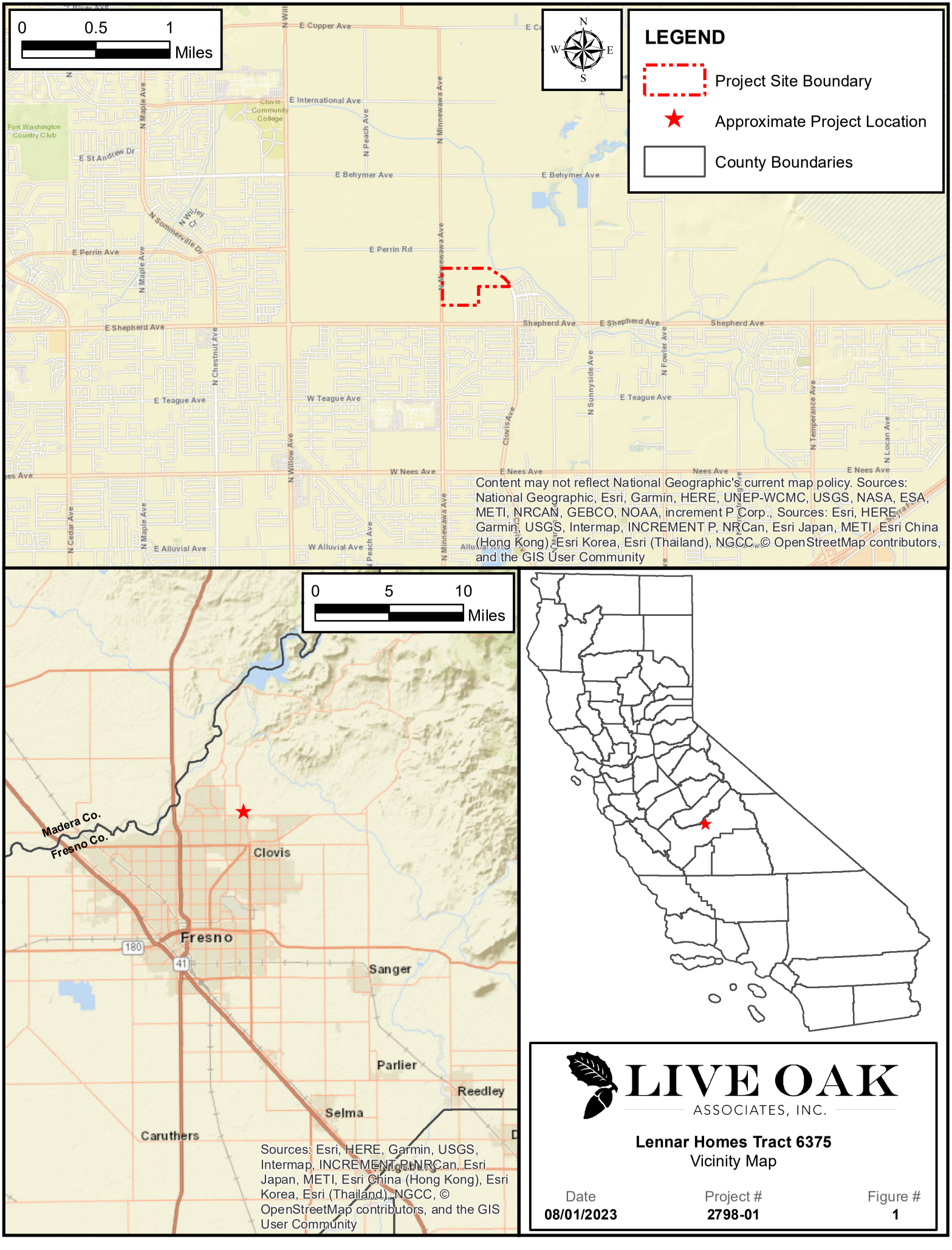
1.1 PROJECT DESCRIPTION

Lennar Homes of California, Inc. proposes a residential development on approximately 59 acres located north of East Shepherd Avenue, between North Minnewawa Avenue and the Clovis Avenue alignment. The existing Tract 6375 will be subdivided into 369 single-family lots and annexed into the City of Clovis. Current County of Fresno zoning is Single Family Residential-Agricultural (R-A), which provides for estate homes in a semi-rural environment; proposed City of Clovis zoning is Medium Density Residential (R-1-MD). The residential development will be located within the City of Clovis Heritage Grove Master Plan and will be subject to design development standards of the plan.

1.2 REPORT OBJECTIVES

This report summarizes a biological study conducted by LOA to facilitate environmental review pursuant to CEQA. As such, the report's objectives are to:

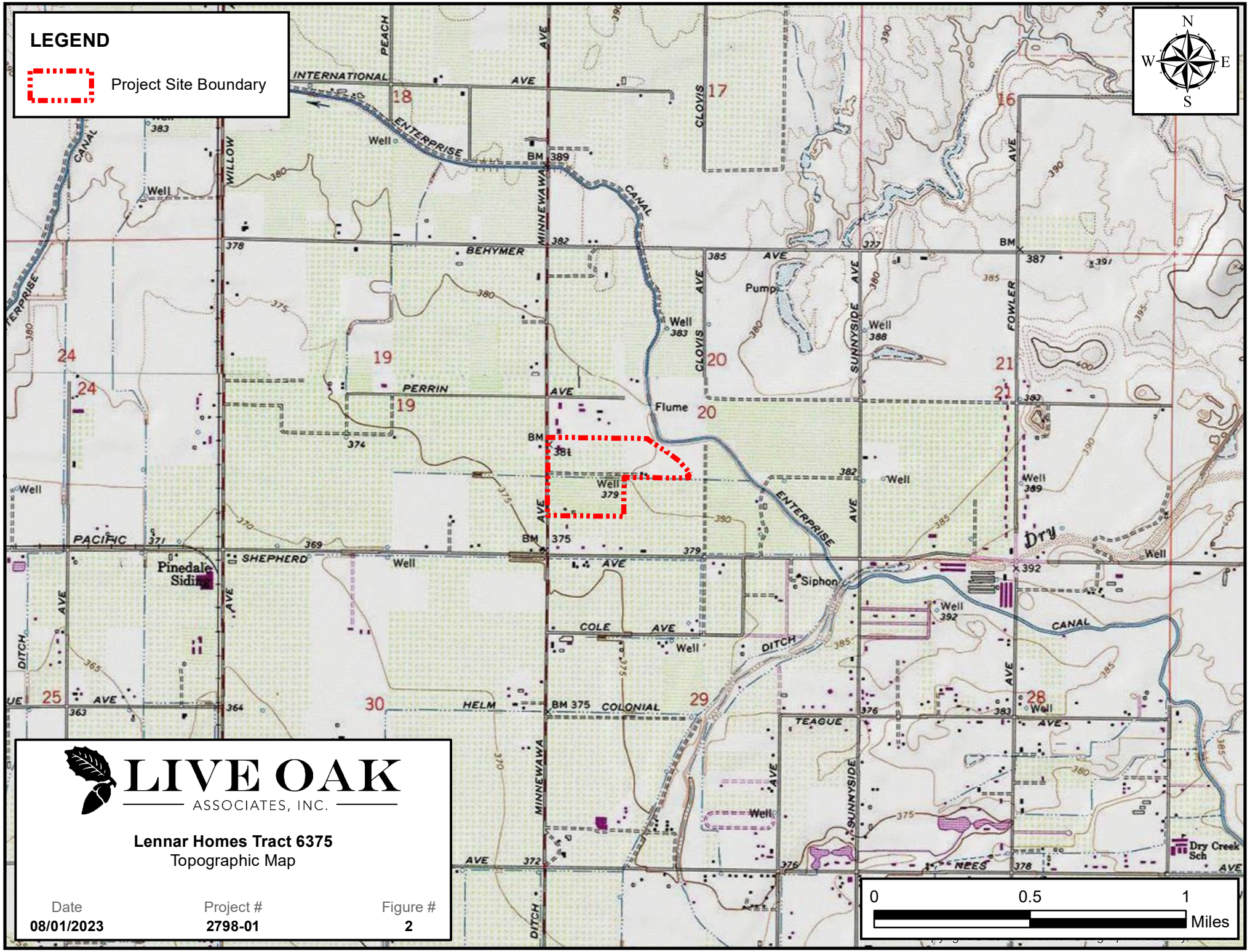
- Characterize the project site's existing biological resources, including biotic habitats, flora and fauna, soils, and aquatic resources
- Evaluate the project site's potential to support sensitive resources such as special status species, sensitive natural communities, and jurisdictional waters and wetlands
- Summarize all state and federal natural resource protection laws that may be relevant to project implementation



LIVE OAK ASSOCIATES, INC.

Lennar Homes Tract 6375
Vicinity Map

Date	Project #	Figure #
08/01/2023	**2798-01**	**1**



LIVE OAK ASSOCIATES, INC.

Lennar Homes Tract 6375
Topographic Map

Date	Project #	Figure #
08/01/2023	**2798-01**	**2**

- Identify and discuss potential project-related impacts to biological resources within the context of CEQA and other state and federal laws
- Identify avoidance and mitigation measures that would reduce the magnitude of project-related impacts in a manner consistent with CEQA and species-specific guidelines

1.3 STUDY METHODOLOGY

A reconnaissance-level field survey of the project site was conducted on July 12, 2023 by LOA ecologist Colleen Del Vecchio. The survey consisted of walking and driving through the project site while identifying its principal land uses, biotic habitats, flora, and fauna, and assessing its potential to support special status species and other sensitive resources. A follow-up site visit took place on October 16, 2024, following removal of the site's former residential trees and one of its two almond orchards. LOA ecologist Austin Pearson assessed these areas to characterize current land use.

LOA's survey effort did not include a formal aquatic resources delineation or focused surveys for special status species. The surveys were sufficient to assess the significance of possible biological impacts associated with project implementation, and to assess the need for more detailed studies that could be warranted if sensitive resources were identified in this initial survey.

LOA conducted an analysis of potential project impacts based on the known and potential biotic resources of the project site. Sources of information used in the preparation of this analysis included the *California Natural Diversity Data Base* (CDFW 2024), *Online Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2024), and manuals, reports, and references related to plants and animals of the project vicinity.

2.0 EXISTING CONDITIONS

2.1 REGIONAL SETTING

The project site is located near the eastern margin of the San Joaquin Valley, about four miles southwest of the lowest Sierra foothills. The San Joaquin Valley is a large, nearly flat alluvial plain bordered by the Sierra Nevada to the east, the Tehachapi Mountains to the south, the California coast ranges to the west, and the Sacramento-San Joaquin Delta to the north.

Like most of California, the San Joaquin Valley experiences a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures commonly exceed 90 degrees Fahrenheit, and the relative humidity is generally very low. Winter temperatures rarely exceed 70 degrees Fahrenheit, with daytime highs often below 60 degrees Fahrenheit. Annual precipitation in the project vicinity varies considerably from year to year, but averages approximately 11 inches, almost all of which falls between the months of October and March (Western Regional Climate Center 2018). Nearly all precipitation falls in the form of rain.

The principal drainage of the project vicinity is Dry Creek, which originates in the Sierra Nevada foothills and flows past the project site approximately ½ mile to the southeast at its closest point. Like many other natural drainages in Fresno County, Dry Creek in the project vicinity is heavily modified, having been channelized, realigned, dammed, and diverted to prevent flooding and to convey flows around developed areas.

The project site is located in the outskirts of Clovis, at the interface of urban and rural land uses. It is situated in a mosaic of agricultural lands, rural residences, and low- to medium-density residential subdivisions; however, relatively undisturbed foothill grasslands and associated drainages and wetlands are located several miles to the north and northeast. Any such habitats that may have once occurred on the project site itself would have been eliminated with the site's conversion to agricultural uses.

2.2 PROJECT SITE

The project site has level topography and sits at an elevation of approximately 380 feet above sea level. At the time of LOA's 2023 field survey, it consisted of active almond orchards, disked fields,

and several former residential sites from which the structures and most of the trees had recently been removed. At the time of the 2024 site visit, it contained one remaining almond orchard and was otherwise characterized by ruderal fields.

The site contains six soil mapping units. These are: Visalia sandy loam, 0 to 3 percent slopes; Visalia sandy loam, clay loam substratum, 0 to 3 percent slopes; Tujunga loamy sand, 0 to 3 percent slopes; Exeter sandy loam; Ramona sandy loam; and Alamo clay (NRCS 2023). All but two of these mapping units are classified as hydric (NRCS 2011), meaning they have the propensity to pond water and support the growth of wetland vegetation. However, after decades of agricultural cultivation, the site no longer supports its native soil characteristics.

Lists of the vascular plant species observed within the project site and the terrestrial vertebrates using, or potentially using, the site are provided in Appendices A and B, respectively. Representative photographs are presented in Appendix C.

2.3 LAND USES / BIOTIC HABITATS

Three biotic habitats / land uses were identified within the project site: orchard, ruderal, and artificial pond. These habitats / land uses are depicted in Figure 3 and described in more detail in the following sections.

2.3.1 Orchard

As of LOA's 2024 site visit, the project site contained one active almond orchard, approximately 20 acres in size, in its southwestern corner. The orchard was highly maintained, with little vegetation in the understory. Where vegetation was present, it consisted of low growth of common agricultural weeds such as Canada horseweed (*Erigeron canadensis*), mallow (*Malva parviflora*), whitestem filaree (*Erodium moschatum*), and Bermuda grass (*Cynodon dactylon*). It was extensively irrigated as evidenced by a network of ditches and both flowing and ponded water observed during LOA's 2023 survey.

The site's orchard may be used by a few reptile species, including the western fence lizard (*Sceloporus occidentalis*), common kingsnake (*Lampropeltis californiae*), and Pacific gopher snake (*Pituophis catenifer catenifer*). Common amphibians such as the western toad (*Bufo boreas*)



LIVE OAK ASSOCIATES, INC.

Lennar Homes Tract 6375
Biotic Habitats / Land Uses

Date	Project #	Figure #
10/16/2024	**2798-01**	**3**

and Sierran treefrog (*Pseudacris sierra*) may disperse through orchards, particularly when frequent irrigation maintains areas of standing water or saturated soils for extended periods of time.

Orchards provide foraging and nesting habitat for a number of birds and raptors. Mature orchard trees may be used for nesting by the American robin (*Turdus migratorius*) and mourning dove (*Zenaida macroura*), among other species. Winter migrants such as the white-crowned sparrow (*Zonotrichia leucophrys*) may forage on dormant buds in the site's orchard, while resident birds such as the house finch (*Haemorhous mexicanus*) and non-native European starling (*Sturnus vulgaris*) may forage on ripening fruit. The Cooper's hawk (*Accipiter cooperii*) and sharp-shinned hawk (*Accipiter striatus*) are both adapted to woodland foraging, and may hunt for small birds in the site's orchard land.

Small mammal species with the potential to occur in the site's orchard include the Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), house mouse (*Mus musculus*), and deer mouse (*Peromyscus maniculatus*). At the time of the 2023 survey, gopher burrows were observed throughout the orchard. Mammalian predators potentially occurring in the orchards include the raccoon (*Procyon lotor*) and striped skunk (*Mephitis mephitis*). Various species of bat may forage over orchard habitat for flying insects or glean insects from the leaves of trees.

2.3.2 Ruderal

Outside of the orchard, the site is characterized primarily by ruderal (disturbed) upland habitats. At the time of LOA's 2024 site visit, these areas included the former location of an almond orchard in the northeastern corner of the site, former residential sites in the northwestern corner, dirt roads, disked fields, and the margins of these and other uses. The former residential sites had all of their structures and trees removed as of LOA's 2024 site visit, save a small patch of tree-of-heaven (*Ailanthus altissima*) at the western boundary, and were characterized by rough terrain with small dirt mounds and mowed vegetation. The former orchard location had been scraped and graded and contained scattered soil stockpiles. The roads were characterized by compacted dirt and were barren of vegetation. The disked fields appeared to have at one time supported a hay crop based on LOA's observations during the 2023 survey, but were unplanted during both site visits. Vegetation in the site's ruderal areas generally consisted of common weeds such as prickly lettuce

(*Lactuca serriola*), ripgut brome (*Bromus diandrus*), barley (*Hordeum marinum*), Coulter's horseweed (*Laennecia coulteri*), and shortpod mustard (*Hirschfeldia incana*).

The project site's ruderal lands are of relatively low value to native wildlife due to their degraded nature and generally limited vegetative cover; however, certain common species are likely to occur here. Expected reptile species include the western fence lizard and Pacific gopher snake, while expected amphibians include the western toad and Sierran treefrog. A few avian species could nest on the ground in the site's ruderal areas; these include the mourning dove, which may nest in ground vegetation, and the killdeer (*Charadrius vociferus*), which typically nests in barren areas. Avian species expected to forage in these areas include Brewer's blackbirds (*Euphagus cyanocephalus*), American crows (*Corvus brachyrhynchos*), and western kingbirds (*Tyrannus verticalis*). Mammalian use of the site's ruderal lands would include the species discussed above for the remaining almond orchard, and may also include the coyote (*Canis latrans*).

2.3.3 Artificial Pond

At the time of LOA's 2023 survey, the project site contained five areas of significant ponded water, all but one of which appeared to be fed by irrigation leaks. The remaining pond (Pond No. 1 on Figure 3) wasn't obviously being irrigated, but was situated close to the almond orchard and had poorly-drained clay soils, suggesting it may have captured and held excess irrigation from the orchard. Most of the ponded areas appear on one or more Google Earth aerial images from previous years, indicating they are recurrent and may have become, to some extent, a naturalized part of the landscape. One pond (Pond No. 5 on Figure 3) appeared newly-formed, and may have resulted from recent demolition activities on the site.

The ponds were inundated to varying degrees during the survey, with water depths ranging from roughly 2 to 6 inches. All were vegetated, and most supported vegetation typical of wetland environments, such as variable flatsedge (*Cyperus difformis*), giant arrowhead (*Sagittaria montevidensis*), cattails (*Typha latifolia*), and Mexican rush (*Juncus mexicanus*).

The project site's ponded areas may support a variety of animal species adapted to aquatic environments. At the time of the 2023 survey, aquatic invertebrates were observed in Pond Nos. 4 and 5 and juvenile western toads were observed in Pond Nos. 2, 3, and 4. Western toads are

assumed to breed in the ponds, as are Sierran treefrogs. The presence of these and other potential prey species may attract wading birds such as the great blue heron (*Ardea herodias*) and great egret (*Ardea alba*). Black phoebes (*Sayornis nigricans*) may use the ponds as a source of mud for nest-building. Rodents may burrow on the banks of the ponds, as was observed at Pond Nos. 3 and 4. Various mammalian species may utilize the ponds as a source of drinking water; for example, raccoon tracks were observed in Pond No. 5 at the time of LOA's 2023 survey.

2.4 SPECIAL STATUS PLANTS AND ANIMALS

Many species of plants and animals within the state of California have low populations, limited distributions, or both. Such species may be considered "rare" and are vulnerable to extirpation as the state's human population grows and the habitats these species occupy are converted to agricultural and urban uses. As described more fully in Section 3.3, state and federal laws have provided CDFW and the U.S. Fish and Wildlife Service (USFWS) with a mechanism for conserving and protecting the diversity of plant and animal species native to the state. A sizable number of native plants and animals have been formally designated as threatened or endangered under state and federal endangered species legislation. Others have been designated as "candidates" for such listing. Still others have been designated as "species of special concern" by the CDFW. The California Native Plant Society (CNPS) has developed its own set of lists of native plants considered rare, threatened or endangered (CNPS 2024). Collectively, these plants and animals are referred to as "special status species."

The California Natural Diversity Data Base (CNDDB) (CDFW 2024) was queried for special status species occurrences in the nine USGS 7.5-minute quadrangles containing and immediately surrounding the project site *(Clovis, Lanes Bridge, Friant, Academy, Round Mountain, Sanger, Malaga, Fresno South,* and *Fresno North*). These species, and their potential to occur on site, are listed in Table 1 on the following pages. Sources of information for Table 1 included *California's Wildlife, Volumes I, II, and III* (Zeiner et. al 1988), *The Jepson Manual: Vascular Plants of California, second edition* (Baldwin et al. 2012), CNPS's *Online Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2024), Calflora.org, and eBird.org.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

PLANTS

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	Occurrence on the Project Site
Succulent owl's clover (*Castilleja campestris var. succulenta*)	FT, CE, CRPR 1B	Occurs in freshwater wetlands, and occasionally in non-wetlands in Valley grassland and foothill woodlands, between 130 and 2,000 ft. in elevation. Blooms April-May.	**Absent**. Suitable vernal pool habitat for this species is absent from the project site and adjacent lands.
California jewelflower (*Caulanthus californicus*)	FE, CE, CRPR 1B	Occurs in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland in sandy soils. Elevations between 200 and 3,300 feet. Blooms February-May.	**Absent**. Suitable habitat for this species is absent from the project site and adjacent lands. Any habitat that may have once been present would have been eliminated with the site's historic conversion to agricultural and residential uses.
San Joaquin Valley orcutt grass (*Orcuttia inaequalis*)	FT, CE CRPR 1B	Occurs in Central Valley vernal pools between 130 and 820 ft. in elevation. Requires deep pools with prolonged periods of inundation. Blooms April-Sept.	**Absent**. Suitable vernal pool habitat for this species is absent from the project site and adjacent lands.
Hairy orcutt grass (*Orcuttia pilosa*)	FE, CE CRPR 1B	Occurs in Central Valley vernal pools between 65 and 1,215 ft. in elevation. Requires deep pools with prolonged periods of inundation. Blooms May-Sept.	**Absent**. Suitable vernal pool habitat for this species is absent from the project site and adjacent lands.
Hartweg's golden sunburst (*Pseudobahia bahiifolia*)	FE, CE CRPR 1B	Occurs in grasslands of the western foothills of the Sierra Nevada in heavy clay soils of the Porterville, Cibo, Mt. Olive and Centerville soil series, between 230 and 525 ft. in elevation. Blooms March-April.	**Absent**. Suitable habitat and soils for this species are absent from the project site and adjacent lands.
San Joaquin adobe sunburst (*Pseudobahia peirsonii*)	FT, CE, CRPR 1B	Annual sunflower occurs in grasslands of the Sierra Nevada foothills in heavy clay soils of the Porterville and Centerville series, between 300 and 2,625 ft. in elevation. Blooms March-April.	**Absent**. Suitable habitat and soils for this species are absent from the project site and adjacent lands.
Greene's tuctoria (*Tuctoria greenei*)	FE, CR CRPR 1B	Occurs in vernal pools between 130 and 3,740 ft. in elevation. Requires deep pools with prolonged periods of inundation. Blooms May-Sept.	**Absent**. Suitable vernal pool habitat for this species is absent from the project site and adjacent lands.

CNPS-ranked Species

Hoover's calycadenia (*Calycadenia hooveri*)	CRPR 1B	Occurs in valley grasslands and foothill woodlands between 200 and 980 ft. in elevation. Blooms June-September.	**Absent**. Suitable habitat for this species is absent from the project site and adjacent lands. Any habitat that may have once been present would have been eliminated with the site's historic conversion to agricultural and residential uses.
Bristly sedge (*Carex comosa*)	CRPR 2B	Found at the margins of lakes and other marsh habitats within valley and foothill grassland and coastal prairie ecosystems. Elevations up to 2,000 ft. Blooms May-September.	**Absent**. Suitable habitat for this species is absent from the project site and adjacent lands.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

PLANTS (cont'd)

CNPS-Listed Species

Species	Status	Habitat	Occurrence on the Project Site
Dwarf downingia (*Downingia pusilla*)	CRPR 2B	Occurs in vernal pools in valley and foothill grassland habitats up to 1,460 ft. in elevation. Blooms March-May.	**Absent**. Suitable vernal pool habitat for this species is absent from the project site and adjacent lands.
Spiny-sepaled button-celery (*Eryginum spinosepalum*)	CRPR 1B	Occurs in vernal pools in valley and foothill grasslands of the San Joaquin Valley and the Tulare Basin, between 330 and 840 ft. in elevation. Blooms April-May.	**Absent**. Suitable vernal pool habitat for this species is absent from the project site and adjacent lands.
California satintail (*Imperata brevifolia*)	CRPR 2B	Found in wetland seeps and riparian areas within various types of scrub, chaparral, and desert communities up to 4,000 feet in elevation. Blooms September-May.	**Absent.** Suitable habitat for this species is absent from the project site and adjacent lands.
Forked hare-leaf (*Lagophylla dichotoma*)	CRPR 1B	Occurs in woodland and valley and foothill grassland habitats, sometimes in clay soils, at elevations from 165 to 3,150 ft. Blooms April-May.	**Absent**. Suitable habitat for this species is absent from the project site. Any habitat that may have once been present would have been eliminated with the site's historic conversion to agricultural and residential uses.
Madera leptosiphon (*Leptosiphon serrulatus*)	CRPR 1B	Occurs in openings in cismontane woodland between 980 and 1,400 ft. in elevation. Blooms April-May	**Absent**. Habitat for the Madera leptosiphon is absent from the project site and adjacent lands, and the site is situated below this species' elevational distribution.
Pincushion navarretia (*Navarretia myersii ssp. myersii*)	CRPR 1B	Found in vernal pools within annual grassland habitats at elevations up to 1,000 ft. Blooms April-May.	**Absent**. Suitable vernal pool habitat for this species is absent from the project site and adjacent lands.
Sanford's arrowhead (*Sagittaria sanfordii*)	CRPR 1B	Occurs in shallow freshwater marshes, ponds, sloughs, and ditches of the Central Valley and Sierra Nevada foothills up to 2,100 ft. in elevation. Blooms May-October.	**Possible.** During LOA's 2023 survey, this species was observed at five locations in the Enterprise Canal immediately adjacent to the project site, and has some potential to colonize the site's ponded areas. A different member of the same genus, *S. montevidensis*, was observed in Pond No. 4 at the time of LOA's 2023 survey.

ANIMALS (adapted from CDFW 2022 and USFWS 2022)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Monarch butterfly (*Danaus plexippus*)	FC	Overwinters in coastal California and Baja California and breeds throughout California in the spring and summer along its annual migration north and east. The adult monarch lays its eggs on milkweed host plants, which the larvae feed on before pupating and emerging as adults. In addition to milkweed, this species requires abundant nectar resources to nourish migrating adults, and trees for roosting during migratory stopovers.	**Possible.** Monarchs may forage or roost on site during migration, and may potentially also breed on site. At the time of LOA's 2023 survey, approximately 10-15 narrowleaf milkweed (*Asclepias fascicularus*) plants were observed near the margin of one of the disked fields.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS (cont'd)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	Occurrence on the Project Site
Crotch bumblebee (*Bombus crotchii*)	CCE	Once common in the Central Valley, this species is now absent from most of it, particularly in the central portion of its historic range. Where present, it is associated with open grassland and scrub habitats, where it relies on food plants of the *Asclepias, Chaenactis, Lupinus, Medicago, Phacelia,* and *Salvia* genera (Williams et al. 2014).	**Unlikely.** Habitat and landscape factors make it extremely unlikely that this species would occur on site. See expanded discussion below.
Valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of California's Central Valley and Sierra foothills, generally along waterways and in floodplains.	**Absent.** The USFWS has revised its understanding of VELB distribution to exclude the San Joaquin Valley south of Merced County. Purported VELB sightings in this part of the Valley are now believed to represent the more common *D. californicus californicus*.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Occurs in vernal pools, clear to tea-colored water in grass or mud-bottomed swales, and basalt depression pools.	**Absent.** Suitable vernal pool habitat for this species is absent from the project site and surrounding lands.
California tiger salamander (CTS) (*Ambystoma californiense*)	FT, CT	Found primarily in annual grasslands; requires vernal pools for breeding and rodent burrows for aestivation. Although most CTS aestivate within 0.4 mile of their breeding pond, outliers may aestivate up to 1.3 miles away (Orloff 2011).	**Unlikely.** Habitat and landscape factors make it extremely unlikely that this species would occur on site. See expanded discussion below.
Western spadefoot (*Spea hammondii*)	FPT, CSC	Occurs in grasslands of San Joaquin Valley, where it breeds in vernal pools or other seasonal wetlands and aestivates in underground refugia such as rodent burrows. Baumberger et al. (2019) recorded a maximum distance of around 890 feet between breeding and aestivation sites.	**Unlikely.** The western spadefoot has been documented in grassland habitats approximately 3 miles north of the project site, and likely also occurs in the contiguous grassland that extends to within 1.2 miles east of the site. It is highly unlikely to have persisted in the anthropogenic landscape that characterizes the immediate project vicinity, and the site is well outside of the distance from suitable habitat that this species is capable of dispersing.
Western pond turtle (*Actinemys marmorata*)	FPT, CSC	Occurs in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with abundant vegetation, and either rocky or muddy bottoms in woodland, forest, and grasslands. Logs, rocks, cattail mats, and exposed banks are required for basking.	**Unlikely.** The project site lacks suitable aquatic habitat for the western pond turtle. Although this species has been documented in the Enterprise Canal approximately 2 miles downstream of the project site, the reach of the canal that flows past the site is unlikely to support this species because it is cement-lined, supports minimal vegetation, and lacks basking habitat.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS (cont'd)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	Occurrence on the Project Site
Swainson's hawk (*Buteo swainsoni*)	CT	This breeding migrant to California nests in mature trees in riparian areas and oak savannah, and in lone trees at the margins of agricultural fields. Requires adjacent suitable foraging areas such as grasslands or alfalfa fields supporting rodent populations.	**Possible.** The project site is situated in the outskirts of Clovis, in a landscape dominated by residential development, orchards, and other uses incompatible with Swainson's hawk foraging and nesting ecology. Nevertheless, this species is occasionally sighted in the project vicinity (eBird 2024), and there is some potential for Swainson's hawks to forage in the site's ruderal areas from time to time. Nesting habitat is absent from the project site, but trees structurally suitable for Swainson's hawk nesting are found on adjacent lands.
Burrowing owl (*Athene cunicularia*)	CCE	Found in grassland, desert, and scrub habitats characterized by low growing vegetation. Dependent upon burrowing mammals, most notably the California ground squirrel, for nest burrows.	**Unlikely.** Habitat and landscape factors make it extremely unlikely that this species would occur on site. See expanded discussion below.
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	FT, CE	Found in valley foothill and desert riparian habitats in scattered locations in California.	**Absent**. This species has been extirpated from the project vicinity.
Least Bell's vireo (*Vireo bellii pusillus*)	FE, CE	Found in riparian habitat, especially dense, low-growing thickets of willow and mesquite, often with a taller overstory of willows, cottonwoods, and sycamores. Forages in chaparral and scrub.	**Absent.** Suitable habitat for this species is absent from the project vicinity.
Tricolored blackbird (*Agelaius tricolor)*	CT	Nests colonially near fresh water in dense cattails or tules, in thickets of willows or shrubs, and increasingly in grain fields. Forages in grassland and cropland areas.	**Possible.** Tricolored blackbirds may occasionally forage in the project site's ruderal areas. The site does not contain habitat that could support colonial nesting by this species.
Fresno kangaroo rat (*Dipodomys nitratoides exilis*)	FE, CE	Historically occupied chenopod scrub and grassland communities on the San Joaquin Valley floor east of the wetlands of the San Joaquin River and Fresno Slough, but no populations are presently known. Associated with bare alkaline clay-based soils in level terrain.	**Absent**. The project site does not contain suitable habitat for the Fresno kangaroo rat, and no known populations of this species remain in Fresno County.
San Joaquin kit fox (SJKF) (*Vulpes macrotis mutica*)	FE, CT	Frequents desert alkali scrub and annual grasslands and may forage in adjacent agricultural habitats. Utilizes enlarged ground squirrel burrows as denning habitat.	**Unlikely.** The highly disturbed habitats of the project site and surrounding lands are marginal, at best, for this species. Moreover, there are no natural occurrences of the SJKF in the project vicinity. There is only one record of this species within a 10-mile radius, recorded in Friant in the early 1990s. That sighting has since been characterized by the observer as a kit fox that had been domesticated and transported from

			another part of the state (D. Mitchell, pers. comm.).

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS (cont'd)

California Species of Special Concern or Fully Protected

Hardhead (*Mylopharadon conocephalus*)	CSC	Occurs in clear deep streams with a slow but present flow, in a low to mid-elevation environment. May also inhabit lakes or reservoirs. Spawns in pools, runs, or rifles with a gravel and rocky substrate.	**Absent.** Suitable aquatic habitat is absent from the project site.
Northern California legless lizard (*Anniella pulchra*)	CSC	Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Requires moist soils.	**Absent.** The only CNDDB record for the northern California legless lizard in the Fresno/Clovis area is from the 1880s. Any habitat for this species that may have once been present in the project vicinity would have been lost with the area's conversion to intensive agriculture and other anthropogenic uses.
Coast horned lizard (*Phrynosoma blainvillii*)	CSC	Ranges from the central and southern California coast inland through the western Sierra Nevada, where it is found in grassland and open areas within woodland and forest habitats. Often found in sandy areas including washes and floodplains.	**Absent.** The only CNDDB record for the coast horned lizard in the Fresno/Clovis area is from 1893. Any habitat for this species that may have once been present in the project vicinity would have been lost with the area's conversion to intensive agriculture and other anthropogenic uses.
California glossy snake (*Arizona elegans occidentalis*)	CSC	Inhabits arid scrub, rocky washes, grasslands, and chaparral, where it forages nocturnally, hiding in underground burrows during the day. Prefers loose, sandy soils.	**Absent.** The only CNDDB record for the California glossy snake in the Fresno/Clovis area is from 1893. Any habitat for this species that may have once been present in the project vicinity would have been lost with the area's conversion to intensive agriculture and other anthropogenic uses.
Pallid bat (*Antrozous pallidus*)	CSC	Found in grasslands, chaparral, and woodlands, where it feeds on ground- and vegetation-dwelling arthropods, and occasionally takes insects in flight. Prefers to roost in rock crevices, but many also use tree cavities, caves, bridges, and buildings.	**Possible**. The pallid bat could potentially forage on or over the site, but roosting habitat is absent.
Spotted bat (*Euderma maculatum*)	CSC	Typically associated with prominent rocky habitats where it roosts in crevices, but is known to occur in a wide range of habitats. Forages in large open habitats, including Ponderosa pine forests and marshlands.	**Possible.** The spotted bat could forage over the site, but roosting habitat is absent.
Western mastiff bat (*Eumops perotis* ssp. *californicus*)	CSC	Frequents open, semi-arid to arid habitats, including conifer, and deciduous woodlands, coastal scrub, grasslands, palm oasis, chaparral and urban. Roosts in cliff faces, high buildings, and tunnels.	**Possible.** The western mastiff bat could forage over the site, but roosting habitat is absent.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS (cont'd)

California Species of Special Concern or Fully Protected

Species	Status	Habitat	Occurrence on the Project Site
American badger (*Taxidea taxus*)	CSC	Found in drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Utilize subterranean burrows, usually self-dug, for rest and reproduction.	**Unlikely.** The site's disturbed nature and urban setting make it highly unlikely to be occupied or utilized by American badgers.

OCCURRENCE DESIGNATIONS AND STATUS CODES

Present: Species observed on the site at time of field surveys or during recent past.
Likely: Species not observed on the site, but it may reasonably be expected to occur there on a regular basis.
Possible: Species not observed on the site, but it could occur there from time to time.
Unlikely: Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient.
Absent: Species not observed on the site and precluded from occurring there because habitat requirements not met.

STATUS CODES

FE	Federally Endangered
FT	Federally Threatened
FC	Federal Candidate
CE	California Endangered
CT	California Threatened
CCE	California Candidate Endangered
CFP	California Fully Protected
CSC	California Species of Special Concern
CR	California Rare

CNPS LISTING

1A	Plants Presumed Extinct in California
1B	Plants Rare, Threatened, or Endangered in California and elsewhere
2	Plants Rare, Threatened, or Endangered in California, but more common elsewhere

2.5 EXPANDED DISCUSSIONS FOR SPECIAL STATUS SPECIES

2.5.1 Crotch Bumble Bee

Ecology of the Species. A species of open grassland and scrub habitats, the Crotch bumble bee (*Bombus crotchii*) historically ranged throughout central and southern California, from the coast and coastal ranges through the Central Valley and adjacent foothills. It has experienced sharp declines in terms of both range extent and abundance. It has largely been extirpated from the Central Valley following widespread conversion of grassland habitats to agricultural and urban uses (CDFW 2019, The Xerces Society 2018).

Like all bumble bees, the Crotch bumble bee has three basic habitat requirements: suitable nesting sites, suitable overwintering sites, and suitable foraging habitat. Crotch bumble bee nesting and overwintering sites are not well understood but are likely to reflect general bumble bee preferences,

with nesting taking place in animal burrows and other underground refugia, and overwintering taking place in soft, disturbed soil or under leaf litter or other debris (The Xerces Society 2018). This species feeds only on nectar and pollen from flowering plants, and requires a constant supply of flowers in bloom throughout its active season. Its preferred plant families in California are Fabaceae, Apocynaceae (Ascelpiadaceae), Asteraceae, Laminaceae, Hydrophyllaceae, and Boraginaceae; however, as a generalist forager, it may utilize families beyond this list (The Xerces Society 2018).

Potential to Occur on Site. At the time of LOA's surveys, the project site contained habitat features that could theoretically be used by the Crotch bumble bee, if this species were to occur in the vicinity. These included California ground squirrel and gopher burrows, soft soils associated with home demolition sites and disked fields, and various flowering plant species, including members of the Fabaceae, Apocynaceae (Asclepiadaceae), and Asteraceae families. However, the project site is situated in the outskirts of Clovis, in an area devoid of the open natural habitats with which this species is associated. Lands surrounding the project site are characterized by the very uses thought to be associated with the Crotch bumble bee's near-extirpation from the Central Valley; namely, intensive agriculture and urban developments (CDFW 2019, The Xerces Society 2018). That, combined with the disturbed and degraded nature of the project site itself, suggest an extremely low potential for this species to occur on site.

This conclusion is supported by our review of publicly-available occurrence datasets. The only CNDDB occurrence in the vicinity is historical in nature, an April 1899 collection made in the general vicinity of Fresno. In fact, there are no modern (1980 or later) CNDDB occurrences of this species on the valley floor within 100 miles of the project site (CDFW 2024). Similarly, iNaturalist and Bumble Bee Watch sightings of the Crotch's bumble bee are overwhelmingly in the foothills of the Sierra Nevada and coast ranges, rather than on the valley floor. When on the valley floor, sightings tend to be located in or immediately adjacent to grassland habitat; for example, Bumble Bee Watch sightings at the Merced National Wildlife Refuge, San Luis National Wildlife Refuge, and grassland along Madera County Road 400 at the valley's eastern margin (Bumble Bee Watch 2024). There are occasional sightings in backyard gardens; for example, a 2019 iNaturalist sighting in the Old Fig Garden neighborhood of Fresno (iNaturalist 2024). The latter must be considered

outliers in light of the preponderance of occurrences, however, and do not point to any appreciable potential for this species to occur on site.

2.5.2 California Tiger Salamander

Ecology of the Species. The California tiger salamander (*Ambystoma californiense*) is found in grasslands and open woodlands of California's Central Valley and coast ranges that contain vernal pools, stock ponds, or other seasonal aquatic habitat for breeding and rodent burrows for aestivation. It spends most of the year aestivating underground in rodent burrows or other suitable refugia. Following the first significant winter rains, CTS leave their aestivation sites and travel to the pools or ponds in which they breed. Eggs hatch within approximately 3 weeks, and the resultant larvae develop into adults within 10 to 12 weeks. For the larvae to survive, development must be complete before the ponds dry; typically, an inundation duration of four months or more is required. As the pools dry, all CTS return to upland burrows. CTS have been documented traveling up to 2.2 kilometers (1.37 miles) from breeding pools to aestivate (Orloff 2011). Typical migration distances are much shorter; for example, 10,042 individual CTS on the Jepson Prairie had a median migration distance of 556 meters (0.35 mile) from their breeding ponds (Searcy et al. 2013).

Potential to Occur on Site. CTS were historically common in the project vicinity; the CNDDB lists 13 occurrences within 5 miles of the project site (CDFW 2024). All extant occurrences in the project vicinity are associated with contiguous grassland habitats. The closest such grassland is about 1.2 miles east of the project site at its nearest point. The closest extant CTS occurrences are in this same grassland area, at about 1.5 and 1.7 miles east of site boundaries. While CTS associated with this block of natural land may be physiologically capable of accessing the project site, it is extremely unlikely that individuals of this species would forgo suitable habitat in favor of the anthropogenic landscape that characterizes the project vicinity. To reach the project site, CTS individuals would have to traverse residential developments, roads, and the Enterprise Canal, which are collectively expected to represent a significant barrier to movement by this species.

2.5.3 Burrowing Owl

Ecology of the Species. The burrowing owl (*Athene cunicularia*) is associated with open, dry annual or perennial grasslands, deserts, and scrublands, and some agricultural lands. The primary

indicators of suitable habitat appear to be burrows for roosting and nesting and relatively short vegetation, with only sparse areas of shrubs or taller vegetation. Burrowing owls roost and nest in the burrows of California ground squirrels, and occasionally also badger, coyote, or fox. The burrowing owl diet includes a broad array of arthropods, small rodents, birds, reptiles, and amphibians. In California, burrowing owl survival and reproductive success appears linked to rodent populations, particularly California vole (*Microtus californicus*) (Gervais et al. 2006). In agricultural areas of the San Joaquin Valley, burrowing owls primarily forage within 600 meters of their nest burrows (Gervais et al. 2003). Burrowing owls are unlikely to persist in agricultural landscapes dominated by vineyards and orchards (Gervais et al. 2008).

Potential to Occur on Site. Although the project site contains marginally suitable habitat for this species in the form of ruderal open areas with scattered rodent burrows, it is situated in a landscape dominated by residential developments, orchards, and other uses incompatible with burrowing owl ecology, making it unlikely that this species would occur in the vicinity and be able to access the project site.

The closest known burrowing owl occurrences are approximately 3 miles to the east of project boundaries, in contiguous grassland habitat associated with Dry Creek and the Big Dry Creek Reservoir (eBird 2024). The closest CNDDB occurrence is approximately 5.5 miles south of the project site at the Fresno Yosemite International Airport, where burrowing owls were historically known to occur (CDFW 2024), and may still have some presence based on a 2018 eBird sighting (eBird 2024). The nearest unobscured[1] iNaturalist sightings are more than 15 miles southwest of the site at the Fresno-Clovis Regional Wastewater Treatment Facility. Although the latter two observation locations highlight this species' ability to become naturalized in certain types of urban open space, they do not indicate any real potential for burrowing owls to occur in the predominantly unsuitable landscape that characterizes the immediate project vicinity.

[1] iNaturalist obscures observation locations when requested by the observer, or categorically for certain imperiled species. As of the writing of this report, burrowing owl observations are not obscured across the board, but some San Joaquin Valley records have had their coordinates randomized at the observers' request.

2.6 JURISDICTIONAL WATERS

Jurisdictional waters are those rivers, creeks, drainages, lakes, ponds, reservoirs, and wetlands that are subject to the authority of the USACE, CDFW, and/or the RWQCB. In general, the USACE regulates navigable waters, tributaries to navigable waters, and wetlands with a continuous surface connection to these waters, where wetlands are defined by the presence of hydric soils, hydrophytic vegetation, and wetland hydrology. All waters under USACE jurisdiction are also regulated by the RWQCB as waters of the State. Additionally, the RWQCB asserts jurisdiction over certain isolated features disclaimed by the USACE. The CDFW has jurisdiction over waters that have a defined bed and bank. The regulation of jurisdictional waters is discussed in more detail in Section 3.2.7.

As discussed, at the time of LOA's 2023 survey the project site contained several areas of ponded water that appeared to have resulted from unintentional irrigation. Although a formal aquatic resources delineation (ARD) was not conducted, the ponds were generally mapped, and totaled approximately ¼ acre. Most of the ponds supported wetland vegetation, suggesting prolonged inundation. One of the ponds (Pond No. 5 on Figure 3) appeared to have formed in the year prior to the 2023 survey; all others are visible on one or more Google Earth aerial images from previous years.

In the absence of an ARD, it is uncertain whether these ponds meet the technical criteria of wetlands. However, regardless of their wetland status, the ponds are isolated features that would not be regulated by the USACE, and do not appear to fit into any of the categories of waters regulated by the RWQCB (SRWCB 2021). CDFW is also not expected to assert jurisdiction over the ponded areas.

2.7 SENSITIVE NATURAL COMMUNITIES

California contains a wide range of natural communities, or unique assemblages of plants and animals. These communities have largely been classified and mapped by CDFW as part of their Vegetation Classification and Mapping Program (VegCAMP). Natural communities are assigned state and global ranks according to their rarity and the magnitude and trend of the threats they face. Any natural community with a state rank of 3 or lower (on a 1 to 5 scale) is considered "sensitive" and must be considered in CEQA review.

The project site does not contain or adjoin any sensitive natural communities.

2.8 WILDLIFE MOVEMENT CORRIDORS

Wildlife movement corridors are routes that animals regularly and predictably follow during seasonal migration, dispersal from native ranges, daily travel within home ranges, and inter-population movements. Movement corridors in California are typically associated with valleys, ridgelines, and rivers and creeks supporting riparian vegetation.

The project site does not contain or adjoin any features likely to function as wildlife movement corridors. The Enterprise Canal is not expected to function in this capacity because it is a highly maintained artificial waterway, lacks vegetation for hiding cover, and does not interconnect blocks of natural land.

2.9 DESIGNATED CRITICAL HABITAT

The USFWS often designates areas of "critical habitat" when it lists species as threatened or endangered. Critical habitat is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Designated critical habitat is absent from the project site and immediate vicinity. The nearest unit of critical habitat is located approximately 3.3 miles northeast of the project site at its closest point, and is designated for the protection of the succulent owl's-clover (*Castilleja campestris var. succulenta*). Critical habitat for the San Joaquin Valley orcutt grass (*Orcuttia inaequalis*) and vernal pool fairy shrimp (*Branchinecta lynchi*) is located in the same general area, approximately 3.5 miles northeast of the project site.

3.0 RELEVANT GOALS, POLICIES, AND LAWS

3.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

In California, any project carried out or approved by a public agency that will result in a direct or reasonably foreseeable indirect physical change in the environment must comply with CEQA. The purpose of CEQA is to ensure that a project's potential impacts on the environment are evaluated and methods for avoiding or reducing these impacts are considered before the project is allowed to move forward. A secondary aim of CEQA is to provide justification to the public for the approval of any projects involving significant impacts on the environment.

According to Section 15382 of the CEQA Guidelines, a 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 interest." Although the lead agency may set its own CEQA significance thresholds, project impacts to biological resources are generally considered to be significant if they would meet any of the following criteria established in Appendix G of the CEQA Guidelines:

- 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 CDFW or USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS.
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- 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.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Furthermore, CEQA Guidelines Section 15065(a) requires the lead agency to make "mandatory findings of significance" if there is substantial evidence that a project may:

- Substantially degrade the quality of the environment, 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, or substantially reduce the number or restrict the range of an endangered, rare or threatened species.
- Achieve short-term environmental goals to the detriment of long-term environmental goals.
- Produce environmental effects that are individually limited but cumulatively considerable, meaning that the incremental effects of the project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects.

3.2 OTHER RELEVANT LAWS AND POLICIES

3.2.1 Fresno County and Clovis General Plans

Cities and counties adopt general plans to guide future development and to protect and/or enhance natural and cultural resources. In general, projects must be consistent with the goals and policies of these general plans. Because the proposed residential development will be annexed into the City of Clovis, it is assumed that it is subject to both the County of Fresno and City of Clovis general plans. The City of Clovis's general plan was adopted in 2014, and has a planning horizon extending through 2035. The County of Fresno's general plan was adopted in 2000, and has a planning horizon of 15 to 25 years.

The Open Space and Conservation Element of the Clovis General Plan includes goals concerning preservation of natural resources and protection of water quality. These goals are supported by numerous policies and implementation programs. Policies relevant to the project include: 1) encourage new development to incorporate on-site natural resources and low impact development techniques, 2) support the protection of biological resources through the conservation of high quality habitat, 3) encourage the use of native plant species and prohibit the use of invasive species, and 4) minimize the use of non-point source pollutants and storm water runoff.

The Open Space and Conservation Element of the Fresno County General Plan includes a number of goals, policies, and implementation programs concerning biological resources. Policies of

particular relevance to the project are summarized as follows: 1) the County shall support the "no-net-loss" wetlands policies of the USACE, USFWS, and CDFW, and shall require new development to fully mitigate the loss of regulated wetlands, 2) the County shall require new development to be designed in such a manner that pollutants and siltation do not significantly degrade the area, value, or function of wetlands, 3) the County shall require new developments to preserve and enhance native riparian habitat unless public safety concerns require removal of habitat, and shall require riparian protection zones around natural watercourses, 4) the County shall identify and conserve remaining upland habitat areas adjacent to wetland and riparian areas that are critically important to wildlife species associated with those wetland and riparian areas, 5) where practicable, the County shall support efforts to avoid the "net" loss of important wildlife habitat, and should preserve in a natural state those areas defined as habitats for rare and endangered animal and plant species, 6) if loss of important habitat for special status species or other valuable wildlife resources cannot be avoided, the County shall impose adequate mitigation, 7) the County shall require adequate buffer zones between construction activities and significant wildlife resources, 8) the County shall support the preservation of significant areas of natural vegetation, e.g. oak woodlands, riparian areas, and vernal pools, and 9) the County shall require that new developments preserve natural woodlands to the maximum extent possible.

3.2.2 Threatened and Endangered Species

In California, imperiled plants and animals may be afforded special legal protections under the California Endangered Species Act (CESA) and/or Federal Endangered Species Act (FESA). Species may be listed as "threatened" or "endangered" under one or both Acts, and/or as "rare" under CESA. Under both Acts, "endangered" means a species is in danger of extinction throughout all or a significant portion of its range, and "threatened" means a species is likely to become endangered within the foreseeable future. Under CESA, "rare" means a species may become endangered if their present environment worsens. Both Acts prohibit "take" of listed species, defined under CESA as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (California Fish and Game Code, Section 86), and more broadly defined under FESA to include "harm" (16 USC, Section 1532(19), 50 CFR, Section 17.3). The USFWS commonly interprets "take" to include the loss of habitat utilized by a listed species.

When state and federally listed species have the potential to be impacted by a project, the USFWS and CDFW must be included in the CEQA process. These agencies review the environmental document to determine the adequacy of its treatment of endangered species issues and to make project-specific recommendations for the protection of listed species. Projects that may result in the "take" of listed species must generally enter into consultation with the USFWS and/or CDFW pursuant to FESA and CESA, respectively. In some cases, incidental take authorization(s) from these agencies may be required before the project can be implemented.

3.2.3 Migratory Birds

The Federal Migratory Bird Treaty Act (FMBTA: 16 USC 703-712) prohibits killing, possessing, or trading in any bird species covered in one of four international conventions to which the United States is a party, except in accordance with regulations prescribed by the Secretary of the Interior. The name of the act is misleading, as it actually covers almost all birds native to the United States, even those that are non-migratory. The FMBTA encompasses whole birds, parts of birds, and bird nests and eggs.

Native birds are also protected under California state law. The California Fish and Game Code makes it unlawful to take or possess any non-game bird covered by the FMBTA (Section 3513), as well as any other native non-game bird (Section 3800), even if incidental to lawful activities.

3.2.4 Birds of Prey

Birds of prey are also protected in California under provisions of the State Fish and Game Code, Section 3503.5, 1992), which states that 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 "taking" by the CDFW.

3.2.5 Nesting Birds

In California, protection is afforded to the nests and eggs of all birds. California Fish and Game Code (Section 3503) states that it is "unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Breeding-season disturbance that causes nest abandonment and/or loss of reproductive effort is considered a form of "take" by the CDFW.

3.2.6 Habitat Conservation Plans and Natural Community Conservation Plans

Section 10 of the federal Endangered Species Act establishes a process by which non-federal projects can obtain authorization to incidentally take listed species, provided take is minimized and thoroughly mitigated. A Habitat Conservation Plan (HCP), developed by the project applicant in collaboration with the USFWS and/or NMFS, ensures that such minimization and mitigation will occur, and is a prerequisite to the issuance of a federal incidental take permit. Similarly, a Natural Community Conservation Plan (NCCP), developed by the project applicant in collaboration with CDFW, provides for the conservation of biodiversity within a project area, and permits limited incidental take of state-listed species.

3.2.7 Wetlands and Other Jurisdictional Waters

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), defined in the CWA as "the waters of the United States, including the territorial seas" (33 U.S.C. §1362(7)). The CWA does not supply a definition for waters of the U.S., and that has been the subject of considerable debate since the CWA's passage in 1972. A variety of regulatory definitions have been promulgated by the two federal agencies responsible for implementing the CWA, the Environmental Protection Agency (EPA) and USACE. These definitions have been interpreted, and in some cases, invalidated, by federal courts.

Waters of the U.S. are presently defined by the EPA and USACE's joint 2023 Revised Definition of 'Waters of the U.S.' Rule (2023 WOTUS Rule), issued in January 2023 and amended in August 2023. Generally speaking, waters of the U.S. include:

- 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
- The territorial seas
- Interstate waters
- Impoundments of waters otherwise defined as waters of the United States under the definition
- Tributaries to other waters of the U.S. that are relatively permanent, standing or continuously flowing bodies of water
- Wetlands adjacent to other waters of the U.S. that have a continuous surface connection to those waters

The 2023 WOTUS Rule also defines a number of exclusions from the definition of waters of the U.S., many of which are longstanding exclusions from earlier regulatory regimes. These generally include:

- Waste treatment systems
- Prior converted cropland
- Ditches excavated wholly in and draining only dry land that do not carry a relatively permanent flow of water
- Certain artificial features, e.g. irrigation basins, swimming pools, borrow pits, and artificially irrigated areas
- Swales and erosional features characterized by low volume, infrequent, or short duration flow

All activities that involve the discharge of dredge or fill material into waters of the U.S. are subject to the permit requirements of the USACE. Such permits are typically issued on the condition that the applicant agrees to provide mitigation that result in no net loss of wetland functions or values.

Under the Porter-Cologne Water Quality Control Act of 1969, the State Water Resources Control Board (SWRCB) has regulatory authority to protect the water quality of all surface water and groundwater in the State of California. In practice, however, not all such waters are considered jurisdictional "waters of the State." Broadly, waters of the State include all waters of the U.S., all natural wetlands, certain artificial wetlands, and various other features. Nine RWQCBs, each

corresponding to a different region of the state, regulate discharges of fill and pollutants into waters of the State through the issuance of various permits and orders. Discharges into waters of the State that are also waters of the U.S. require a Section 401 Water Quality Certification from the RWQCB as a prerequisite to obtaining a Section 404 Clean Water Act permit. Discharges into waters of the State that are not also waters of the U.S. require Waste Discharge Requirements (WDRs), or waivers of WDRs, from the RWQCB.

The SWRCB and RWQCBs also administer the federal National Pollution Discharge Elimination System (NPDES) program, which is concerned with the discharge of stormwater and other pollutants into water bodies. Projects that disturb one or more acres of soil must obtain coverage under the SWRCB's current NPDES Construction Stormwater General Permit. A prerequisite for permit coverage is the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Other types of pollutant discharges into waters of the U.S., such as wastewater, may require coverage under a different NPDES general permit, and in some cases an individual permit.

CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. Activities that may substantially modify such waters through the diversion or obstruction of their natural flow, change or use of any material from their bed or bank, or the deposition of debris require a Notification of Lake or Streambed Alteration. If CDFW determines that the activity may adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. Such an agreement typically stipulates that certain measures will be implemented to protect the habitat values of the lake or drainage in question.

4.0 IMPACTS AND MITIGATIONS

The following discussions address the potential impacts to biological resources associated with future residential buildout of Tract 6375. For the purposes of these analyses, it is assumed that the full 59 acres will be developed.

4.1 POTENTIALLY SIGNIFICANT PROJECT IMPACTS/MITIGATION

4.1.1 Potential Project Impacts to Special Status Plants

Potential Impacts. Of the 16 special status plant species known from the project vicinity, one species, the Sanford's arrowhead (*Sagittaria sanfordii*), has some potential to occur on the project site. During LOA's 2023 survey, several Sanford's arrowhead populations were identified immediately adjacent to the project site in the Enterprise Canal, and a different member of the same genus, *S. montevidensis*, was noted in one of the site's ponded areas. If the Sanford's arrowhead were to colonize any of the site's ponded areas prior to residential buildout, individuals and populations of this species would be lost. Project impacts to these special status plant species are considered potentially significant under CEQA.

The remaining 15 special status plant species are considered absent from or unlikely to occur on the project site due to an absence of suitable habitat and/or soils, the site's being situated outside of the species' distribution, or a combination thereof (see Table 1). The project is not expected to adversely affect these species, either directly or indirectly, and impacts are considered less than significant under CEQA.

Mitigation. The following measures will be implemented to reduce the magnitude of potential project impacts to the Sanford's arrowhead.

> ***Mitigation Measure 4.1.1a.*** Prior to the start of construction, a qualified biologist will conduct protocol-level rare plant surveys following CDFW's 2018 *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities*, or most current agency guidance. Surveys will target all habitats of the project site that could potentially support the Sanford's arrowhead, and will be conducted when local populations of the Sanford's arrowhead are in bloom and readily identifiable.
>
> ***Mitigation Measure 4.1.1b.*** If Sanford's arrowhead populations are identified on site, project design will be modified, if at all feasible, to avoid the plants. A qualified biologist

will identify an appropriate buffer around the plants, and no developments or other project-related activities will be permitted within.

Mitigation Measure 4.1.1c. If it is not feasible to avoid Sanford's arrowhead populations, the affected populations will be salvaged in accordance with a plan prepared by a qualified biologist that will include contingencies for an unsuccessful salvage effort. Salvage methods may include seed collection and dispersal, transplanting rootstock, and/or topsoil collection and redispersal, as appropriate. The relocation area(s) will be located in alternative on-site emergent wetland habitat to be established and maintained for this species, and protected through a deed restriction, conservation easement, or similar mechanism. Relocation areas will be monitored by a qualified biologist for a period of five years to ensure successful establishment.

Compliance with the above mitigation measures would reduce impacts to the Sanford's arrowhead to a less than significant level under CEQA.

4.1.2 Potential Project Impacts to Monarch Butterfly

Potential Impacts. The project site is located in an area where monarch butterflies (*Danaus plexippus*) are known to occur, and habitats of the site provide breeding, foraging, and roosting opportunities for this species. The potential for direct effects to monarchs is greatest during the spring and summer, when migrating monarchs may breed in the project vicinity. Monarch eggs, larvae, and pupae would be particularly vulnerable to construction-related mortality, as these life stages are relatively immobile and unable to leave their milkweed host plants. Monarch adults are volant and would presumably have the ability to avoid construction disturbance while foraging or roosting on site.

The project may also indirectly impact monarchs through the removal of breeding, foraging, and roosting habitat in the form of milkweed, nectar resources, and orchard trees, respectively. Loss of milkweed habitat has been cited as a major factor in monarch population declines (USFWS 2020). While any project-related removal of milkweed is likely to be minor, it would incrementally contribute to a habitat trend that is substantially affecting this species, and potential impacts associated with milkweed loss are therefore considered significant. The project is not expected to adversely affect monarchs through the loss of other plants that could be used for foraging by this species, or by loss of orchard trees. Following project-related vegetation removal, considerable alternative foraging and roosting habitat will remain available to monarchs, both on- and off-site.

Mitigation. The following measures will be implemented to reduce the magnitude of potential project impacts to the monarch butterfly.

> ***Mitigation Measure 4.1.2a (Milkweed Survey).*** Prior to the start of construction, a qualified biologist will survey all proposed work areas for milkweed plants. The survey will be conducted at a time of year when milkweed is readily identifiable. The objective of the survey will be to tally and map all milkweed plants that could potentially be impacted by project activities.
>
> ***Mitigation Measure 4.1.2b (Construction Timing).*** If feasible, any removal of milkweed plants required for residential buildout will take place entirely outside of the period in which monarchs are most likely to breed in the project vicinity, March 1-August 31.
>
> ***Mitigation Measure 4.1.2c (Preconstruction Surveys and Avoidance).*** If removal of milkweed plants cannot be avoided between March 1 and August 31, a qualified biologist will conduct pre-construction surveys for non-volant life stages of monarchs on those milkweed plants that will be removed, within 10 days prior to the start of construction. If any non-volant life stages are identified, then those plants will be avoided until it is confirmed by a qualified biologist that a monarch is no longer present.
>
> ***Mitigation Measure 4.1.2d (Compensatory Mitigation).*** Impacted milkweed plants will be replaced on site in accordance with a revegetation plan prepared by a qualified biologist. A minimum of 50 replacement plantings will be provided, or three times the number of milkweed plants identified at the time of the milkweed survey (see *Mitigation Measure 4.1.2a*), whichever is greater. Replacement plantings must be locally native; preferred species are narrowleaf milkweed (*A. fascicularis*) and showy milkweed (*A. speciosa*). The planting site(s) must be in area(s) that will not be mowed or treated with pesticides or herbicides, to be guaranteed via a deed restriction or similar protective mechanism. Revegetation areas will be monitored by a qualified biologist for a period of five years to ensure successful establishment.

Implementation of the above measures will reduce impacts to the monarch butterfly to a less than significant level under CEQA.

4.1.3 Potential Project Impacts to Nesting Swainson's Hawks

Potential Impacts. As noted in Table 1, Swainson's hawks (*Buteo swainsoni*) are occasionally sighted in the project vicinity (eBird 2024), and trees adjacent to the project site have some potential to support nesting by individuals of this California Threatened species. If Swainson's hawks are nesting near the site at the time of future residential buildout, individuals could be disturbed such that they would abandon their nests. Construction-related disturbance leading to Swainson's hawk nest abandonment is a potentially significant impact of the project.

Swainson's hawks would not be adversely affected by project-related loss of habitat. Residential buildout will eliminate approximately 40 acres of ruderal land that could potentially be used for foraging by this species, but is unlikely to represent an important part of any individual's foraging range given its disturbed nature and urban setting.

Mitigation. The following measures will be implemented for the protection of nesting Swainson's hawks.

> ***Mitigation Measure 4.1.3a (Construction Timing).*** If feasible, project activities will take place entirely outside of the Swainson's hawk nesting season, defined here as March 1 to September 15. If *Mitigation Measure 4.1.3a* is implemented, no further mitigation for this species is required.
>
> ***Mitigation Measure 4.1.3b (Nesting Surveys*).** If project activities must occur between March 1 and September 15, a qualified biologist will conduct nest surveys for Swainson's hawks on and within ¼ mile of the project site within the survey periods prescribed by *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (SHTAC 2000). Three nest surveys will be conducted in each of two survey periods, with the survey periods defined as follows: Period I – January 1 to March 20, Period II – March 20 to April 5, Period III – April 5 to April 20, Period IV – April 21 to June 10, and Period V – June 10 to July 30. Surveys will take place in the two survey periods immediately prior to the anticipated start of construction activities during the nesting season, with the exception of Period III, when no surveys should take place per the SHTAC guidelines. The surveys will consist of inspecting all accessible, suitable trees of the survey area for the presence of nests and hawks.
>
> ***Mitigation Measure 4.1.3c (No-Disturbance Buffers*).** If active Swainson's hawk nests are detected during the surveys or observed incidentally, a minimum ¼-mile no-disturbance buffer will be delineated and maintained around each nest, to remain in place until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival.
>
> ***Mitigation Measure 4.1.3c (CDFW Consultation*).** If an active Swainson's hawk nest is detected, and a ¼-mile no-disturbance buffer is not feasible, the project applicant will consult with CDFW to discuss how to implement the project and avoid take. If take cannot be avoided, take authorization will be obtained through the acquisition of a State Incidental Take Permit (ITP), pursuant to Fish and Game Code section 2081 subdivision (b).

Implementation of the above measures will reduce potential project impacts to nesting Swainson's hawks to a less than significant level under CEQA.

4.1.4 Potential Project Impacts to Other Nesting Birds and Raptors

Potential Impacts. The project site has the potential to be used for various nesting birds, and large trees adjacent to the site could support nesting by birds or raptors. If birds or raptors are nesting on or near the site at the time of future residential buildout, individual birds could be killed or disturbed such that they would abandon their nests. Construction-related mortality of native nesting birds and construction-related disturbance leading to nest abandonment are potentially significant impacts of the project and would constitute violations of the Migratory Bird Treaty Act and California Fish and Game Code.

Mitigation. The following measures will be implemented for the protection of nesting birds and raptors.

> ***Mitigation Measure 4.1.4a (Construction Timing).*** If feasible, project activities will take place entirely outside of the avian nesting season, defined here as February 1 to September 15. If *Mitigation Measure 4.1.4a* is implemented, no further mitigation for nesting birds or raptors is required.
>
> ***Mitigation Measure 4.1.4b (Preconstruction Surveys*).** If project activities must occur between February 1 and September 15, a qualified biologist will conduct surveys for active bird nests within 10 days prior to the start of work during this period. The survey area will encompass the site and accessible surrounding lands within 250 feet for nesting birds and 500 feet for nesting raptors.
>
> ***Mitigation Measure 4.1.4c (Behavioral Baseline*).** Should any active nests be discovered in or near the work area, a qualified biologist will conduct an additional survey to establish a behavioral baseline of these nests.
>
> ***Mitigation Measure 4.1.4d (Continuous Monitoring).*** If feasible, a qualified biologist will continuously monitor active nests during project activities to detect behavioral changes resulting from the project. If behavioral changes occur, the activities that appear to be causing the changes (as determined by the qualified biologist) will be discontinued. At the biologist's discretion, activities may be resumed (1) in a modified form, with lower levels of visual or sound disturbance, (2) following the implementation of measures designed to reduce perceived disturbance, e.g. visual buffers, and/or (3) at a later nesting stage, when the affected birds are less sensitive to disturbance.
>
> ***Mitigation Measure 4.1.4e (No-Disturbance Buffers).*** If continuous monitoring of active nests is not feasible, or if nesting birds have behavioral changes that persist following the implementation of one or more of the corrective actions identified above under *Mitigation Measure 4.1.4d,* a minimum no-disturbance buffer of 250 feet will be established around active bird nests and 500 feet around active raptor nests. These buffers will remain in place

until after the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or on-site parental care for survival. Variance from these no-disturbance buffers is possible when there is compelling biological or ecological reason to do so. A qualified biologist will advise and support any variance from these buffers.

Implementation of the above measures will reduce potential project impacts to nesting birds and raptors to a less than significant level under CEQA and facilitate compliance with state and federal laws protecting these species.

4.2 LESS THAN SIGNIFICANT PROJECT IMPACTS

4.2.1 Project Impacts to Special Status Animal Species Absent from or Unlikely to Occur on the Project Site

Potential Impacts. Twenty-two special status animal species have been documented in the general vicinity of the project site, or are known to occur regionally (Table 1). Of these, 16 are considered absent from or unlikely to occur on the site due to the absence of suitable habitat, the site's urban setting and other landscape factors, and/or the site's being situated outside of the species' known distribution. These comprise the Crotch bumblebee, valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool fairy shrimp (*Branchinecta lynchi*), California tiger salamander, western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), least Bell's vireo (*Vireo bellii pusillus*), Fresno kangaroo rat (*Dipodomys nitratoides exilis*), San Joaquin kit fox (*Vulpes macrotis mutica*), hardhead (*Mylopharadon conocephalus*), western spadefoot (*Spea hammondii*), western pond turtle (*Actinemys marmorata*), northern California legless lizard (*Anniella pulchra*), coast horned lizard (*Phrynosoma blainvillii*), California glossy snake (*Arizona elegans occidentalis*), burrowing owl, and American badger (*Taxidea taxus*). Because these species have no appreciable potential to occur on site, they are not expected to be affected by the project, directly or indirectly. Project impacts are considered less than significant under CEQA.

Mitigation. Mitigation measures are not warranted.

4.2.2 Project Impacts to Special Status Animal Species that Would Use the Site for Foraging Only

Potential Impacts. Four special status animal species, the tricolored blackbird (*Agelaius tricolor*), pallid bat (*Antrozous pallidus*), spotted bat (*Euderma maculatum*), and western mastiff bat (*Eumops perotis* ssp. *californicus*), have the potential to forage on the site from time to time but would not utilize the site for breeding, roosting, or other activities in which they would be vulnerable to construction-related injury or mortality (see Table 1). Individuals of these species are unlikely to be injured or killed by construction activities because they are highly mobile while foraging and would be expected to simply avoid active work areas.

The project would not adversely affect any of these species through loss of foraging habitat. The site does not offer unique habitat for any of these species, nor is it likely to represent an important part of any individual foraging range, given its disturbed nature and urban setting. Similar and higher quality habitats are abundant in the project vicinity and elsewhere in the region. For these reasons, impacts to the tricolored blackbird, pallid bat, spotted bat, and western mastiff bat are considered less than significant under CEQA.

Mitigation. Mitigation is not warranted.

4.2.3 Project Impacts to Wildlife Movement Corridors

Potential Impacts. The project site does not contain or adjoin features likely to function as a wildlife movement corridor. No impacts to such corridors are anticipated.

4.2.4 Project Impacts to Sensitive Natural Communities and Critical Habitat

Potential Impacts. The project site does not contain or adjoin any sensitive natural communities or designated critical habitat. There will be no impact to such resources.

Mitigation. Mitigation is not warranted.

4.2.5 Project Impacts to Jurisdictional Waters

Potential Impacts. As discussed, the project site contains five areas of ponded water that appear to have resulted from unintentional irrigation. Based on LOA's observations in the field, some of these ponds may meet the technical criteria of a wetland. The USACE and CDFW are unlikely to assert jurisdiction over these features regardless of their wetland status. The features also do not appear to fit into any of the categories of artificial wetlands regulated by the RWQCB, in that they are not (1) used as compensatory mitigation for impacts to other waters, (2) identified in a water quality control plan, (3) a relatively permanent part of the natural landscape, even in the absence of ongoing operation and maintenance, or (4) greater than or equal to one acre in size (SWRCB 2021). For item number 3 in this list, even though some of the features appear to hold water each year and thus may be considered "relatively permanent," the fact that they are maintained through irrigation presumably disqualifies them as waters of the State.

It is assumed that the site's ponds are not jurisdictional. No other aquatic resources will be impacted by proposed residential buildout. The Enterprise Canal will be completely avoided by project activities, and has a raised levee at this location that inherently protects it against stormwater runoff and construction-related erosion. Moreover, it is assumed that a SWPPP will be developed and implemented and coverage obtained under the SWRCB's current Construction Stormwater General Permit, as is required for projects that disturb an acre or more of soil; these compliance steps will further prevent unforeseen impacts to the Enterprise Canal.

For these reasons, project impacts to jurisdictional waters are considered less than significant under CEQA.

Mitigation. Mitigation is not warranted.

4.2.6 Consistency with Local Policies and Ordinances

Potential Impacts. The project appears consistent with Clovis and Fresno County General Plan policies related to biological resources.

Mitigation. Mitigation measures are not warranted.

4.2.7 Consistency with Habitat Conservation Plans and Natural Community Conservation Plans

Potential Impacts. There are no known HCPs or NCCPs in effect for the project vicinity.

Mitigation. Mitigation measures are not warranted.

5.0 LITERATURE REFERENCED

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D. G. Wilken, editors. 2012. The Jepson Manual: Vascular Plants of California, second edition. University of California Press, Berkeley.

Baumberger, K. L., M. V. Eitzel, M. E. Kirby, and M. H. Horn. 2019. Movement and habitat selection of the western spadefoot (*Spea hammondii*) in southern California. PLoS ONE 14(10): e0222532. Available at: https://doi.org/10.1371/journal.pone.0222532

Bumble Bee Watch. 2024. Available at: https://www.bumblebeewatch.org/

Calflora. 2024. Calflora: An online database of plant identification and distribution [web application]. Calflora, Berkeley, California. Available online at: http://www.calflora.org.

California Department of Fish and Wildlife (CDFW). 2024. California Natural Diversity Database. The Resources Agency, Sacramento, CA.

CDFW. 2019. Report to the Fish and Game Commission: Evaluation of the Petition from The Xerces Society, Defenders of Wildlife, and the Center for Food Safety to List Four Species of Bumble Bees as Endangered under the California Endangered Species Act. April 4, 2019.

California Native Plant Society. 2024. Inventory of Rare and Endangered Vascular Plants of California. Available online at: http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi.

eBird. 2024. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Available: http://www.ebird.org.

Gervais, J. A., D. K. Rosenburg, and L. A. Comrack. 2008. Burrowing owl (*Athene cunicularia*). *In* 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.

Gervais, J. A., D. K. Rosenburg, and R. G. Anthony. 2003. Space use and pesticide exposure risk of male burrowing owls in an agricultural landscape. Journal of Wildlife Management 67:156-165.

iNaturalist. 2024. Available at: https://www.inaturalist.org/

Natural Resources Conservation Service (NRCS). 2023. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

NRCS. 2011. National Hydric Soils List by State, California. U.S. Department of Agriculture.

Orloff, S. G. 2011. Movement patterns and migration distances in an upland population of California tiger salamander (*Ambystoma californiense*). Herpetological Conservation and Biology 6(2):266-276.

Searcy, C. A., E. G., and H. B. Shaffer. 2013. Microhabitat use and migration distance of an endangered grassland amphibian. Biological Conservation 158(2013):80-87.

State Water Resources Control Board (SWRCB). 2019. State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. Adopted April 2, 2019.

The Xerces Society. 2018. A Petition to the State of California Fish and Game Commission to list the Crotch Bumble Bee (*Bombus crotchii*), Franklin's Bumble Bee (*Bombus franklini*), Suckley Cuckoo Bumble Bee (*Bombus suckleyi*), and Western Bumble Bee (*Bombus occidentalis occidentalis*) as Endangered under the California Endangered Species Act. Submitted by The Xerces Society for Invertebrate Conservation, Defenders of Wildlife, and Center for Food Safety, October 2018.

U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers wetlands delineation manual. Department of the Army.

Zeiner, David C., William F. Laudenslayer, Kenneth E. Mayer and Marshal White. Ed. 1988. California's wildlife, volume I, amphibians and reptiles, volume II, birds, and volume III, mammals. Department of Fish and Game. Sacramento, CA. (Online: http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx).

APPENDIX A: VASCULAR PLANT LIST

APPENDIX A
VASCULAR PLANTS OF THE PROJECT SITE

The plants species listed below were observed on the project site during LOA's July 12, 2023 and/or October 16, 2024 surveys. The wetland indicator status of each plant, derived from the USACE-administered National Wetland Plant List for the Arid West Region, has been shown following its common name if available. Please note that, as of the October 16, 2024 survey, the only trees remaining on site are almond and tree-of-heaven.

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland

ALISMATACEAE		
Sagittaria montevidensis	Giant Arrowhead	OBL
AMARANTHACEAE – Amaranth Family		
Amaranthus albus	Pigweed Amaranth	FACU
Amaranthus palmeri	Palmer's Amaranth	FACU
ANACARDIACEAE – Cashew Family		
Pistacia chinensis	Chinese Pistache	
APOCYNACEAE – Dogbane Family		
Asclepias fascicularis	Narrowleaf Milkweed	FAC
Nerium oleander	Oleander	UPL
ARALIACEAE		
Hedera canariensis	Canary Ivy	
ARECACEAE – Palm Family		
Washingtonia robusta	Mexican Fan Palm	FACW
ASTERACEAE – Sunflower Family		
Anthemis cotula	Chamomile	FACU
Centaurea solstitialis	Yellow Starthistle	UPL
Cirsium vulgare	Bull Thistle	FACU
Erigeron bonariensis	Flax-leaved Horseweed	FACU
Erigeron canadensis	Canada Horseweed	FACU
Laennecia coulteri	Coulter's Horseweed	FAC
Lactuca serriola	Prickly Lettuce	FACU
Taraxacum sp.	Dandelion	
BRASSICACEAE – Mustard Family		
Hirschfeldia incana	Mustard	UPL
CHENOPODIACEAE – Goosefoot Family		
Chenopodium sp.	Goosefoot	
CYPERACEAE –Umbrella Sedge Family		
Carex sp.	Sedge	
Cyperus esculentus	Nut Grass	FACW

Cyperus difformis	Variable Flatsedge	OBL
EUPHORBIACEAE – Spurge Family		
Croton setiger	Turkey Mullein	UPL
Euphorbia maculata	Spotted Spurge	UPL
Euphorbia prostrata	Prostrate Sandmat	FACU
Ricinus communis	Castor Bean	FACU
FABACEAE – Legume Family		
Acmispon americanus	Spanish Clover	UPL
Lotus corniculatus	Bird's Foot Trefoil	FAC
Trifolium repens	White Clover	FACU
FAGACEAE – Beech Family		
Quercus agrifolia	Coast Live Oak	UPL
Quercus palustris	Pin Oak	
GERANIACEAE – Geranium Family		
Erodium cicutarium	Redstem Filaree	UPL
Erodium moschatum	Whitestem Filaree	UPL
JUGLANDACEAE – Walnut Family		
Juglans regia	English Walnut	
JUNCACAEAE – Rush Family		
Juncus mexicanus	Mexican Rush	FACW
MALVACEAE—Mallow Family		
Malva parviflora	Cheeseweed	UPL
MELICAEAE – Mahogany Family		
Melia azedarach	Chinaberry Tree	UPL
MORACEAE – Mulberry Family		
Morus sp.	Mulberry	
MYRTACEAE – Myrtle Family		
Eucalyptus globulus	Blue Gum	UPL
Eucalyptus camaldulensis	Red River Gum	FAC
OLEACEAE – Olive Family		
Ligustrum sp.	Privet	
Olea europaea	European olive	
PINACEAE – Pine Family		
Pinus aleppo	Aleppo Pine	
Pinus sp.	Unknown Pine	
PLATANACEAE – Sycamore Family		
Platanus orientalis	Old World Sycamore	
POACEAE – Grass Family		
Avena fatua	Wild Oats	UPL
Bromus diandrus	Ripgut Brome	UPL
Bromus hordeaceus	Soft Chess	FACU
Cynodon dactylon	Bermuda Grass	FAC
Echinochloa colona	Jungle Rice	FAC
Echinochloa crus-galli	Barnyard Grass	FACW
Festuca myuros	Rattail Sixweeks Grass	UPL
Hordeum marinum	Barley	FAC

Panicum capillare	Witchgrass	FACU
Setaria pumila	Yellow Bristlegrass	FAC
Sorghum halepense	Johnsongrass	FACU
PODOCARPACEAE – Yellow-wood Family		
Podocarpus macrophyllus	Yew Plum Pine	
POLYGONACEAE – Smartweed Family		
Polygonum aviculare	Prostrate Knotweed	FAC
Rumex crispus	Curly Dock	FAC
PORTULACACAE – Purslane Family		
Portulaca oleracea	Common Purslane	FAC
ROSACEAE – Rose Family		
Prunus dulcis	Almond	UPL
Prunus sp.	Stone Fruit	
Rosa sp.	Cultivated Rose	
RUBIACEAE – Madder Family		
Galium sp.	Bedstraw	
SALICACEAE – Willow Family		
Populus fremontii	Fremont Cottonwood	UPL
SIMAROUBACEAE – Tree-of-Heaven Family		
Ailanthus altissima	Tree-of-Heaven	FACU
SOLANACEAE – Nightshade Family		
Physalis acutifolia	Sharp Leaf Groundcherry	UPL
TYPHACEAE – Cattail Family		
Typha latifolia	Broadleaf Cattail	OBL
ZYGOPHYLLACEAE – Puncture Vine Family		
Tribulus terrestris	Puncture Vine	UPL

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR ON THE PROJECT SITE

APPENDIX B
TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR ON THE PROJECT SITE

The species listed below are those that may be expected to routinely and predictably use or pass through the project site during some or all of the year. An asterisk denotes a species observed on or immediately adjacent to the site during LOA's July 12, 2023 survey.

CLASS: AMPHIBIA
ORDER: ANURA (Frogs and Toads)
FAMILY: BUFONIDAE (True Toads)
*Western Toad (*Bufo boreas*)
FAMILY: HYLIDAE (Treefrogs and Relatives)
Pacific Tree Frog (*Pseudacris regilla*)
FAMILY: RANIDAE (True Frogs)
American Bullfrog (*Lithobates catesbeianus*)
CLASS: REPTILIA
ORDER: SQUAMATA (Lizards and Snakes)
SUBORDER: SAURIA (Lizards)
FAMILY: PHRYNOSOMATIDAE
Side-blotched Lizard (*Uta stansburiana*)
*Western Fence Lizard (*Sceloporus occidentalis*)
FAMILY: TEIIDAE (Whiptails and relatives)
Western Whiptail (*Cnemidophorus tigris*)
SUBORDER: SERPENTES (Snakes)
FAMILY: COLUBRIDAE (Colubrids)
Pacific Gopher Snake (*Pituophis catenifer catenifer*)
Common Kingsnake (*Lampropeltis californiae*)
FAMILY: VIPERIDAE (Vipers)
Western Rattlesnake (*Crotalus viridis*)

CLASS: AVES
ORDER: CICONIIFORMES (Herons, Storks, Ibises and Relatives)
FAMILY: ARDEIDAE (Bitterns, Herons, and Egrets)
Great Blue Heron (*Ardea herodi*as)
Great Egret (*Ardea alba*)
Snowy Egret (*Egretta thula*)
Cattle Egret (*Bubulcus ibis*)
FAMILY: CATHARTIDAE (New World Vultures)
Turkey Vulture (*Cathartes aura*)
ORDER: FALCONIFORMES (Vultures, Hawks, and Falcons)
FAMILY: ACCIPITRIDAE (Hawks, Old World Vultures, and Harriers)
Swainson's Hawk (*Buteo swainsoni*)
*Red-tailed Hawk (*Buteo jamaicensis*)
Red-shouldered Hawk (*Buteo lineatus*)
FAMILY: FALCONIDAE (Caracaras and Falcons)
American Kestrel (*Falco sparverius*)

ORDER: GALLIFORMES (Megapodes, Currassows, Pheasants, and Relatives)
FAMILY: ODONTOPHORIDAE (New World Quails)
California Quail (*Callipepla californica*)
ORDER: GRUIFORMES (Cranes and Rails)
FAMILY: RALLIDAE (Rails, Gallinules, and Coots)
American Coot (*Fulica americana*)
ORDER: CHARADRIIFORMES (Shorebirds, Gulls, and relatives)
FAMILY: CHARADRIIDAE (Plovers and relatives)
Killdeer (*Charadrius vociferus*)
FAMILY: RECURVIROSTRIDAE (Stilts and Avocets)
Black-necked Stilt (*Himantopus mexicanus*)
FAMILY: SCOLOPACIDAE (Sandpipers and Allies)
Greater Yellowlegs (*Tringa melanoleuca*)
Lesser Yellowlegs (*Tringa flavipes*)
Least Sandpiper (*Calidris minutilla*)
ORDER: COLUMBIFORMES (Pigeons and Doves)
FAMILY: COLUMBIDAE (Pigeons and Doves)
Rock Pigeon (*Columba livia*)
*Mourning Dove (*Zenaida macroura*)
*Eurasian Collared Dove (*Streptopelia decaocto*)
ORDER: STRIGIFORMES (Owls)
FAMILY: TYTONIDAE (Barn Owls)
Barn Owl (*Tyto alba*)
FAMILY: STRIGIDAE (Typical Owls)
Great Horned Owl (*Bubo virginianus*)
ORDER: PICIFORMES (Woodpeckers and relatives)
FAMILY: PICIDAE (Woodpeckers)
Northern Flicker (*Colaptes auratus*)
*Nuttall's Woodpecker (*Picoides nuttallii*)
ORDER: APODIFORMES (Swifts and Hummingbirds)
FAMILY: TROCHILIDAE (Hummingbirds)
Black-chinned Hummingbird (*Archilochus alexandri*)
*Anna's Hummingbird (*Calypte anna*)
ORDER: PASSERIFORMES (Perching Birds)
FAMILY: TYRANNIDAE (Tyrant Flycatchers)
*Black Phoebe (*Sayornis nigricans*)
Say's Phoebe (*Sayornis saya*)
*Western Kingbird (*Tyrannus verticalis*)
FAMILY: CORVIDAE (Jays, Magpies, and Crows)
*California Scrub Jay (*Aphelocoma coerulescens*)
American Crow (*Corvus brachyrhynchos*)
Common Raven (*Corvus corax*)
FAMILY: ALAUDIDAE (Larks)
Horned Lark (*Eremophila alpestris*)
FAMILY: HIRUNDINIDAE (Swallows)
Cliff Swallow (*Petrochelidon pyrrhonota*)

Barn Swallow (*Hirundo rustica*)
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
FAMILY: AEGITHALIDAE (Bushtits)
*Bushtit (*Psaltriparus minimus*)
FAMILY: TROGLODYTIDAE (Wrens)
House Wren (*Troglodytes aedon*)
FAMILY: REGULIDAE (Kinglets)
Ruby-crowned Kinglet (*Regulus calendula*)
FAMILY: TURDIDAE (Thrushes)
Western Bluebird (*Sialia mexicana*)
American Robin (*Turdus migratorius*)
FAMILY: MIMIDAE (Mockingbirds and Thrashers)
*Northern Mockingbird (*Mimus polyglottos*)
FAMILY: PARULIDAE (Wood Warblers and Relatives)
Yellow-rumped Warbler (*Dendroica coronata*)
FAMILY: STURNIDAE (Starlings and Allies)
*European Starling (*Sturnus vulgaris*)
FAMILY: MOTACILLIDAE (Wagtails and Pipits)
American Pipit (*Anthus rubrescens*)
FAMILY: EMBERIZIDAE (Sparrows)
Savannah Sparrow (*Passerculus sandwichensis*)
White-crowned Sparrow (*Zonotrichia leucophrys*)
Golden-crowned Sparrow (*Zonotrichia atricapilla*)
*California Towhee (*Pipilo crissalis*)
FAMILY: ICTERIDAE (Blackbirds, Orioles and Allies)
Western Meadowlark (*Sturnella neglecta*)
Red-winged Blackbird (*Agelaius phoeniceus*)
Great-tailed Grackle (*Quiscalus mexicanus*)
Brewer's Blackbird (*Euphagus cyanocephalus*)
Brown-headed Cowbird (*Molothrus ater*)
Bullock's Oriole (*Icterus bullockii*)
FAMILY: FRINGILLIDAE (Finches)
*House Finch (*Carpodacus mexicanus*)
*Lesser Goldfinch (*Carduelis psaltria*)
FAMILY: PASSERIDAE (Old World Sparrows)
*House Sparrow (*Passer domesticus*)

CLASS: MAMMALIA
ORDER: DIDELPHIMORPHIA (Marsupials)
FAMILY: DIDELPHIDAE (Opossums)
Virginia Opossum (*Didelphis virginiana*)
ORDER: INSECTIVORA (Shrews and Moles)
FAMILY: TALPIDAE (Moles)
Broad-footed Mole (*Scapanus latimanus*)
ORDER: CHIROPTERA (Bats)
FAMILY: VESPERTILIONIDAE (Vespertilionid Bats)
Yuma Myotis (*Myotis yumanensis*)

California Myotis (*Myotis californicus*)
Western Pipistrelle (*Pipistrellus hesperus*)
Big Brown Bat (*Eptesicus fuscus*)
Pale Big-eared Bat (*Corynorhinus townsendii pallescens*)

FAMILY: MOLOSSIDAE (Free-tailed Bat)

Brazilian Free-tailed Bat (*Tadarida brasiliensis*)

ORDER: LAGOMORPHA (Rabbits, Hares, and Pikas)

FAMILY: LEPORIDAE (Rabbits and Hares)

Audubon's Cottontail (*Sylvilagus audubonii*)
Black-tailed Jackrabbit (*Lepus californicus*)

ORDER: RODENTIA (Rodents)

FAMILY: SCIURIDAE (Squirrels, Chipmunks, and Marmots)

*California Ground Squirrel (*Otospermophilus beecheyi*)

FAMILY: GEOMYIDAE (Pocket Gophers)

*Botta's Pocket Gopher (*Thomomys bottae*)

FAMILY: MURIDAE (Mice, Rats and Voles)

Western Harvest Mouse (*Reithrodontomys megalotis*)
Deer Mouse (*Peromyscus maniculatus*)
Norway Rat (*Rattus norvegicus*)
House Mouse (*Mus musculus*)
California Vole (*Microtus californicus*)

FAMILY: HETEROMYIDAE (Kangaroo Rats)

Heermann's Kangaroo Rat (*Dipodomys heermanni*)

ORDER: CARNIVORA (Carnivores)

FAMILY: CANIDAE (Foxes, Wolves, and Relatives)

Red Fox (*Vulpes vulpes*)
Coyote (*Canis latrans*)
Domestic Dog (*Canis familiaris*)

FAMILY: PROCYONIDAE (Raccoons and Relatives)

*Raccoon (*Procyon lotor*)

FAMILY: MUSTELIDAE (Weasels and Relatives)

*Striped Skunk (*Mephitis mephitis*)

FAMILY: FELIDAE (Cats)

*Feral Cat (*Felis cattus*)

APPENDIX C: REPRESENTATIVE PHOTOS OF THE PROJECT SITE



Photo 1 (above). The site's remaining almond orchard, facing north along Minnewawa Avenue. Photo taken during 2023 survey. **Photo 2 (below).** Ruderal area associated with former residential site, facing south along Minnewawa Avenue. Photo taken during 2024 site visit.





Photo 3 (above). Disked fields and ruderal field margin. Photo taken during 2023 survey. **Photo 4 (below).** Location of the recently-removed almond orchard, facing southwest. Photo taken during 2024 site visit.





Photo 5 (above). Location of the recently-removed almond orchard, facing north toward off-site Enterprise Canal. Photo taken during 2024 survey. **Photo 6 (below).** Pond No. 1; two inches of standing water at time of 2023 survey.





Photo 7 (above). Pond No. 2; 4-6 inches of standing water at time of 2023 survey. **Photo 8 (below).** Juvenile western toad in Pond No. 2, one of many observed at this location during 2023 survey.





Photo 9 (above). Pond No. 3; contained open water and juvenile western toads at the time of the 2023 survey. **Photo 10 (below).** Pond No. 4; contained open water and various aquatic invertebrates at the time of the 2023 survey.





Photo 11 (above). Pond No. 5; contained open water and aquatic invertebrates at the time of the 2023 survey.

Cultural Resource Study for the Clovis Tract 6375 Residential Development, City of Clovis, Fresno County, California

Nicole Saenz

Prepared By

Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

Prepared For
Lennar Central Valley
8080 N. Palm Ave., Suite 110
Fresno, CA 93711

November 2023

USGS Clovis, CA 7.5′ quadrangle, T12S, R21E, Sec. 20
58.9 Project Area; 53.9 acres surveyed
Resources: None

MANAGEMENT SUMMARY

Applied EarthWorks, Inc. (Æ) conducted a cultural resource study to support Lennar Central Valley's 58.9-acre Tract 6375 Residential Development Project (Project) in the city of Clovis within Fresno County, California. The proposed Project is directly east of North Minnewawa Avenue between East Shepherd Avenue and Perrin Road.

The proposed development requires a permit issued by the City of Clovis, therefore the Project is subject to the California Environmental Quality Act (CEQA), which mandates that public agencies determine whether a proposed project will cause a significant change to the environment, including cultural resources. To assist the Lennar Central Valley in fulfilling their responsibility under CEQA, Æ conducted a cultural resource study to identify whether there are historical resources (i.e., cultural resources listed or eligible for listing in the California Register of Historical Resources [CRHR]) within the Project area.

To meet the requirements under CEQA, Æ conducted: (1) a records search at the Southern San Joaquin Valley Information Center (SSJVIC) of the California Historical Resources Information System (CHRIS); (2) desktop research to better understand the history of land use in the Project area; (3) a search of the Native American Heritage Commission's (NAHC) Sacred Lands File, and nongovernmental outreach to local tribes and individuals; and (4) an intensive pedestrian survey of the 58.9-acre Project area to identify archaeological and/or historical built environment cultural resources.

The SSJVIC records search identified no cultural resources within the Project area and only one cultural resource within the 0.25-mile search radius—the Enterprise Canal (P-10-005934/ CA-FRE-3564H)—which runs adjacent to the northeast border of the Project area. There have been four previous cultural resource investigations that overlap the Project area and one within the 0.25-mile search radius. A search of the NAHC's Sacred Lands File did not identify Native American cultural resources within or near the Project area and no specific information was gleaned from outreach with local tribal representatives.

Æ's intensive pedestrian survey of the Project area, conducted on August 25, 2023, covered 53.9 acres of the 58.9-acre Project area. The recent removal of a house and surrounding vegetation in the northwest corner of the Project area resulted in large piles of debris and shredded vegetation piles masking the ground surface. Æ archaeologists noted a concentration of historical glass fragments and ceramics near the rear of the former residence. Because the deposit was not in situ and likely associated with the removal of the house, it was noted but not formally recorded as a cultural resource.

Æ's inventory efforts found no historical resources within the Project area. However, if cultural resources are discovered during Project activities, all work should halt until a qualified archaeologist can assess the find. Additionally, if human remains are uncovered during construction, the Project operator shall immediately halt work within 50 feet of the find, contact the Fresno County Coroner to evaluate the remains, and follow the procedures and protocols set forth in CEQA Guidelines Section 15064.4(e)(1). If the remains are identified on the basis of archaeological context, age, cultural associations, or biological traits to be those of a Native

American, then the California Health and Safety Code 7050.5 and Public Resource Code 5097.98 require that the county coroner notify the NAHC within 24 hours of discovery. The NAHC will then identify the Most Likely Descendant, who will be afforded the opportunity to recommend treatment of the human remains following protocols in California Public Resources Code 5097.98.

Field notes and photographs for this Project are on file at Æ's office in Fresno, California. A copy of this report will be transmitted to the SSJVIC at California State University, Bakersfield, for inclusion in the CHRIS.

CONTENTS

1 INTRODUCTION....1
1.1 PROJECT DESCRIPTION....1
1.2 REGULATORY CONTEXT....1
1.3 PROJECT PERSONNEL....5
1.4 REPORT ORGANIZATION....5

2 NATURAL AND CULTURAL SETTING....6
2.1 PHYSICAL ENVIRONMENT....6
2.2 PREHISTORY AND ARCHAEOLOGY....6
2.3 ETHNOGRAPHY....8
2.4 HISTORIC CONTEXT....9
2.4.1 Early Settlement in the Clovis Area (1853–1874)....9
2.4.2 Initial Development of Agriculture in the Fresno-Clovis Area (1875–1900)....10
2.4.3 Diversification and Water Issues (1900–1950)....12
2.4.4 Modern Water Management (1950–Present)....13

3 METHODS....14
3.1 RECORDS SEARCH....14
3.2 BACKGROUND RESEARCH....14
3.3 NATIVE AMERICAN OUTREACH....14
3.4 PEDESTRIAN SURVEY....15

4 FINDINGS....16
4.1 RECORDS SEARCH....16
4.1.1 Previously Recorded Resources....16
4.1.2 Previous Studies in the Project Area....16
4.2 BACKGROUND RESEARCH....17
4.3 NATIVE AMERICAN OUTREACH....17
4.4 PEDESTRIAN SURVEY....19

5 CONCLUSIONS AND RECOMMENDATIONS....23
5.1 RECOMMENDATIONS....23
5.1.1 Inadvertent Discovery of Archaeological Resources....23
5.1.2 Inadvertent Discovery of Human Remains....24

6 REFERENCES....25

APPENDICES

A Personnel Qualifications
B Records Search Results
C Native American Outreach

FIGURES AND TABLES

Figure 1-1 Project vicinity in Fresno County, California. 2
Figure 1-2 Project area on USGS Clovis 7.5-minute topographic quadrangle. 3
Figure 1-3 Aerial view of the Project area. 4
Figure 4-1 1856 GLO map showing transport routes and Big Dry Creek. 17
Figure 4-2 Survey coverage and findings within the Project area. 20
Figure 4-3 Recent ground disturbance associated with demolition and debris clearing, facing east. 21
Figure 4-4 Large spoil piles covering ground surface, facing east. 21
Figure 4-5 Overview of the eastern almond orchard, facing south. 22
Figure 4-6 Sample of glass fragments found in the debris associated with the house removal. 22

Table 4-1 Previous Investigations in the Project area and Surrounding 0.25-Mile Radius 16

1
INTRODUCTION

Applied EarthWorks, Inc. (Æ) conducted a cultural resource study in support of Lennar Central Valley's proposed Tract 6375 Residential Development Project (Project) in the city of Clovis, Fresno County, California (Figure 1-1). The Project is directly east of North Minnewawa Avenue between East Shepherd Avenue and Perrin Road within Section 20 of Township 12 South, Range 21 East, as depicted on the U.S. Geological Survey (USGS) Clovis (1981), California 7.5-minute topographic quadrangle (Figures 1-2).

1.1 PROJECT DESCRIPTION

Lennar Central Valley proposes to construct 387 single-family lots on approximately 58.9 acres of vacant land north of East Shepherd Avenue, south of Perrin Road and between North Minnewawa Avenue and the Clovis Avenue alignment, in the city of Clovis (Figure 1-3). The proposed zoning for the project will be R-1-MD–Medium Density Residential. The property is currently within the County of Fresno and zoning is R-A, though it will be annexed into the City of Clovis. This single-family residential project will be within the City of Clovis (City) Heritage Grove Master Plan and will be subject to design development standards of the plan.

1.2 REGULATORY CONTEXT

The Project is subject to the California Environmental Quality Act (CEQA), with guidelines for implementation codified in the California Code of Regulations (CCR), Title 14, Chapter 3, Section 15000 et seq. Historical resources are considered part of the environment and are subject to review under CEQA. Per CEQA, the lead agency, in this case the City, is required to determine whether a project may have a significant effect on historical resources, and therefore cause a significant effect on the environment (Public Resources Code [PRC] Section 5024.1[b]). CEQA defines a substantial adverse change to a historical resource as the "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired" (14 CCR Section 15064.5[b][1]). Where substantial adverse change is unavoidable and the historical resource cannot be preserved in an undisturbed state, the lead agency shall require mitigation measures to minimize substantial adverse changes to the resource's significance (PRC Section 21083.2[c]). It is further stipulated that the "lead agency shall ensure that any adopted measures to mitigate or avoid significant adverse changes are fully enforceable through permit conditions, agreements, or other measures" (14 CCR Section 15064.5[b][4]; PRC Section 5020.1[q]).

For the purposes of this report, a cultural resource is defined as a prehistoric or historical archaeological site or a historical building, structure, or object. Consistent with Title 36, Code of Federal Regulations, Part 60.4 (36 CFR 60.4), the term "historical" applies to cultural resources that are 45 years old or older. The importance or significance of a cultural resource depends on whether it qualifies for inclusion in the California Register of Historical Resources (CRHR). Cultural resources determined eligible for listing in the CRHR are called "historical resources"



Figure 1-1 Project vicinity in Fresno County, California.

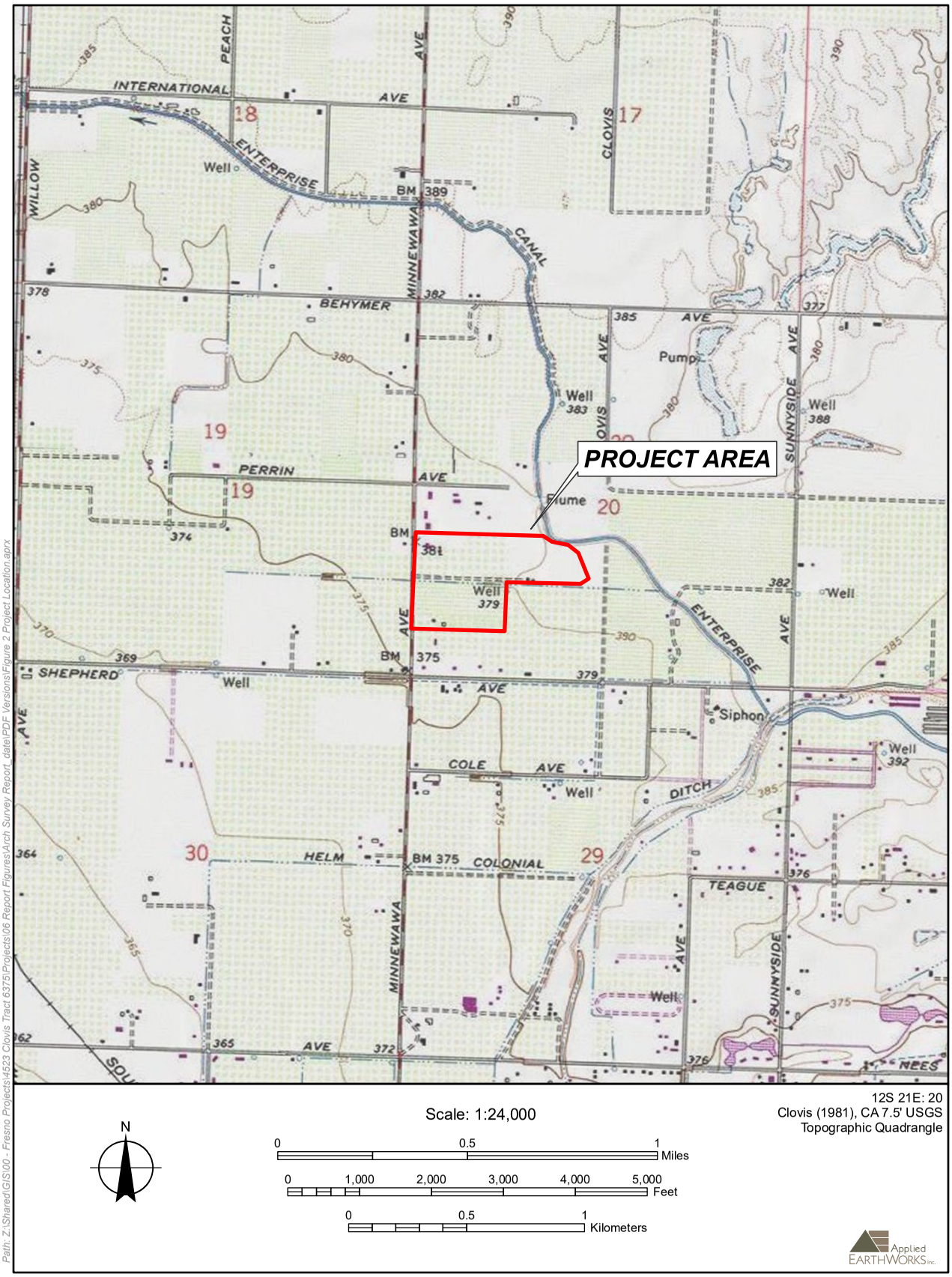


Figure 1-2 Project area on USGS Clovis 7.5-minute topographic quadrangle.



Figure 1-3 Aerial view of the Project area.

(Title 14, Chapter 3, Article 5, Section 15064.5 of the CCR). The determination of eligibility is based on a set of significance criteria (14 CCR 15064.5).

1.3 PROJECT PERSONNEL

Æ Managing Principal Archaeologist Erin Enright (M.A. Registered Professional Archaeologist [RPA] 16575) served as principal investigator and provided quality assurance and quality control for the project. Æ Principal Archaeologist Anna Hoover (M.S., RPA 28576661) served as project manager overseeing the inventory efforts and technical reporting. Staff Archaeologist Gabriel Granado (B.A.) and Field Technician Charles Pansarosa (B.A.) conducted the pedestrian survey. This report was prepared by Staff Anthropologist Nicole Saenz (M.S.). Principal Archaeologist Emerita Mary Baloian (Ph.D., RPA 15189) reviewed the report for technical accuracy. Résumés for key personnel are provided in Appendix A.

1.4 REPORT ORGANIZATION

This document consists of six chapters. Following this introduction, Chapter 2 describes the environmental and cultural context of the Project area. Chapter 3 presents Æ's methods for the study including the records search, background research, Native American outreach, and pedestrian surveys, while Chapter 4 discusses the study results. Chapter 5 contains a summary and provides recommendations. A complete listing of references cited is in Chapter 6. Appendix A contains résumés of Project personnel. Appendix B presents results of the records search and Appendix C contains documentation of communication with the NAHC and local tribal representatives.

Field notes, maps, and a complete set of photographs from the current investigation are on file at Æ's office in Fresno, California. A copy of the final version of this report will be submitted to the SSJVIC of the CHRIS at California State University, Bakersfield.

2
NATURAL AND CULTURAL SETTING

2.1 PHYSICAL ENVIRONMENT

The Project area lies on the eastern margin of the San Joaquin Valley near the base of the Sierra Nevada foothills. In general, the valley is bordered on the east by the Sierra Nevada, on the west by the Coast Ranges, and on the south by the Tehachapi Range. The north–south orientation of the Sierra Nevada greatly influences the general hydrology of the region by directing the flow of rivers and streams westward into the San Joaquin Valley.

The complex geology of the adjacent foothills and the Sierra Nevada is reflected in the primary and secondary soils in the valley. Primary soils are developed by weathering the underlying granitic parent material. Secondary soils are formed by a combination of eolian and alluvial forces transporting a variety of granitic and assorted metamorphic and metavolcanic materials from mountain streams (Weir 1956). Quaternary and recent alluvium covers most of the valley basin.

The natural vegetation of the San Joaquin Valley has been severely compromised as a result of farming and ranching. Originally, the area was covered with native annual and perennial grasses such as needlegrass (*Stipa* spp.), bluegrass (*Poa* spp.), and three awn (*Aristida divaricata)* commonly found in the Valley Grassland Community (Munz and Keck 1973). Prior to Euro-American colonization, the valley floor was occupied by a diverse population of resident and migratory mammals and birds, which along with fish and other aquatic species provided a rich resource base for aboriginal subsistence. Historical and modern land use has greatly reduced the size and number of native habitats, eliminating numerous indigenous species. Most commonly found in the study vicinity today are jackrabbits, ground squirrels, field mice, snakes, and frogs, along with jays, mourning doves, crows, and red-tailed hawks.

The San Joaquin Valley lies within the Mediterranean climate zone typified by hot, dry summers and cool, wet winters. Temperatures range from highs of 90–100°F in the summer months to lows of 40–50°F in the winter (Weir 1956), although temperatures exceeding 100°F in the summer and dropping below freezing in the winter are not uncommon. Annual precipitation averages 10 inches per year, with most of the rain falling between October and March. Thick "tule" fog is common in the valley during December and January.

The natural topography of the proposed development is flat at 400 feet above mean sea level. The natural watercourse closest to the Project area is Dry Creek, which flows directly southeast of the Project area.

2.2 PREHISTORY AND ARCHAEOLOGY

Archaeological evidence suggests that the valley's initial occupants settled mostly in lakeshore and streamside environments and used the foothills seasonally. Early ("Paleo Indian") sites are typified by fluted points, stemmed dart points, scrapers, and flaked stone crescents. The middle and late Holocene witnessed mobile hunters and gatherers. As compared with their predecessors,

Archaic groups utilized a broad resource base, including both large and small game and hard seeds. Manos, milling slabs, mortars, and pestles are common in Archaic assemblages, as are atlatl dart points. Favorable climatic conditions between 3,000 and 3,500 years ago fostered widespread settlement along the Sierran west slope. The late Holocene witnessed various technological and social changes, including the adoption of the bow and arrow, expansion of trade, increasing use of acorns, and improved food storage techniques. As populations grew, social relations became more complex. Economic stress and social instability became more pronounced during a period of xeric climates between circa A.D. 450 and 1250. Thereafter, new levels of population growth were achieved, resulting in part from movement of new Sierran groups. By circa A.D. 1600–1700, most groups claimed the territories that would identify them ethnographically. The Project lies in the territory of the Gashowu, a tribelet of the Foothill Yokuts (see Section 3.3).

A number of prehistoric sites have been identified in Gashowu territory (Price 1992). Located in the foothills northeast of Clovis, these sites are primarily either extensive midden deposits found along both small ephemeral drainages and larger permanent watercourses or multiple bedrock milling features, sometimes with numerous individual stations.

Investigations at CA-FRE-1671, which may have formed the core of the *Pohoniu* village community, yielded radiocarbon dates showing that Yokuts settlement of the area extended from A.D. 1300 well into the historic period. An earlier occupation phase at the site was dated between circa 700 B.C. and A.D. 300 but could not be linked directly to the Gashowu or any other Yokuts group (Moratto 1988).

At CA-FRE-64, investigations showed that the Yokuts may have occupied the area as early as A.D. 1100–1200, with continuing occupation to around A.D. 1600. An even earlier component lacked the data to attribute it to the Gashowu but suggested that the steatite industry in the area may have begun as early as A.D. 800 Wallace et al. (1989).

CA-FRE-1154 and -1155 are in the foothills east of the Project area. CA-FRE-1154, the Sharer Site, lies “along an abandoned oxbow bend associated with a channelized-stream” (Langenwalter et al. 1989). This site, interpreted as a seasonal procurement campsite, appears to have been used during a long temporal span from 850 B.C. to A.D. 1850. It consists of a midden ranging from 60 to 160 centimeters deep and a large bedrock boulder containing 76 mortars, cups, cupules, and slicks. Artifacts included ground and flaked stone tools, steatite bowl fragments, ornaments, crystals, daub, and ochre. Additionally, the remains of a juvenile burial were encountered.

CA-FRE-1155, the Harlan Site, contains a small but well-developed midden with thickness varying between 80 and 190 centimeters as well as five bedrock features. Artifacts similar to those from CA-FRE-1154 indicate that CA-FRE-1155 was used as a seasonal procurement site. It appears to have been sporadically occupied between 850 B.C. and A.D. 300, with intensive occupation from A.D. 300 to 1500 (Langenwalter et al. 1989).

Surveys east of the current Project area have shown that many small processing stations and temporary camps occur along seasonal channels near the lower foothills (Meighan and Dillon 1987), suggesting a pattern of widespread but relatively ephemeral use of the area during the late Holocene (McGuire 1992).

In the first half of the nineteenth century, the Gashowu population was decimated by disease, missionization, and military action. This led to a radical change in settlement: the surviving peoples abandoned the residential sites that they had occupied prehistorically and congregated at a small number of locations. Glass trade beads and other historic artifacts recovered from CA-FRE-687 and CA-FRE-1671 may be evidence of these postcontact settlements (Price 1992:32-33).

2.3 ETHNOGRAPHY

At the time of first contact with the Spanish missionaries, the Yokuts people collectively inhabited the San Joaquin Valley as well as the eastern foothills of the Sierra Nevada from the Calaveras River southward to the Kern River. The Yokuts language belongs to the broader Penutian family, which subsumes a relatively diverse assemblage of languages that also includes Miwok, Costanoan, Maiduan, and Wintuan (Silverstein 1978). Compared to other Penutian languages, however, Yokuts shows considerable internal linguistic homogeneity, especially given its relatively wide geographic distribution. Dialects differed minimally and were mutually intelligible, at least among speakers of contiguous groups. This relative lack of linguistic differentiation suggests that ancestors of the Yokuts entered California after the arrival and subsequent radiation of the more linguistically diverse Penutian groups such as the Miwok and Costanoan (Moratto 1984:554).

Linguists and ethnographers have traditionally divided the Yokuts into Northern Valley, Southern Valley, and Foothill categories based primarily on linguistic similarities and differences. Yet such broad groupings were not mirrored in the larger structure of Yokuts society. Instead, the Yokuts were organized into relatively small autonomous tribes or tribelets, which maintained a fluid territory containing multiple semipermanent settlements.

Gayton (1945, 1948), Kroeber (1976), Spier (1978), and Wallace (1978, 1987) have produced primary source material on Yokuts ethnography. Secondary works on this subject include those authored by Langenwalter et al. (1989), Moratto (1984, 1988), and Wallace et al. (1989). The following discussion about Yokuts lifeways is drawn from these sources.

The Gashowu, a tribelet of the Kings River Group of the Foothill Division, occupied the drainages of Big Dry Creek and Little Dry Creek. Two major settlements are attributed to the Gashowu: *Pohoniu*, below Letcher on Big Dry Creek, and *Yokau*, on Little Dry Creek in Auberry Valley (Kroeber 1976:481,plate 47). These villages appear to have been central year-round settlements that were occupied more densely in the winter. At these locations, the Gashowu built conical structures 15–20 feet tall over excavated pits, each with a central rock-lined hearth. Other structures probably included acorn granaries, sweat houses, roofed ramadas, sunshades, and large communal houses. During the summer, residents moved with extended families or family groups to base camps within a day's walk of the central village. These stations served as summer villages and temporary storage places for food until it was transferred to the main village. Summer villages contained smaller structures and are most commonly recognized archaeologically by midden deposits and multiple bedrock milling features. Seed-gathering forays in the spring or summer expanded the Gashowu range to the lowlands of present-day Clovis and Fresno.

Acorns were a Gashowu staple, with additional nutrition culled from other nuts and seeds, berries, fruit, and game. These dietary items as well as tool stone and a variety of other resources were gathered at summer camps. Procurement loci survive today as scatters of lithic artifacts and as bedrock milling stations where plants and seeds were processed. In addition to these features, artifacts used to process procured resources (such as mortars, pestles, and manos) and the remains of resources gathered (such as bone and acorn shell) also may be found.

Steatite is available locally, and items made from this material (including cooking bowls, beads, and ornaments) are often found at Yokuts sites. Steatite goods also were traded with neighbors for obsidian, pine nuts, shell beads and ornaments, and other exotic commodities.

2.4 HISTORIC CONTEXT

2.4.1 Early Settlement in the Clovis Area (1853–1874)

The first Euro-American settlements in the greater Clovis area occurred not within the swampy "hog wallows" that once dotted the landscape of the present city limits but in the grassy plains around Dry Creek where the stream flows down from the foothills into the valley (Clough and Secrest 1984). A small outpost was established at the current intersection of Shepherd and Thompson avenues in 1853 and later became a stop along the Stockton to Los Angeles stage route (Smith 1991). For many years the lonely station, which eventually became known as Collins Corner, stood by itself with no other buildings in sight. After the Civil War, sheepherders, many from the southern United States, began to trickle into the area.

During the 1860s, homesteaders came to the valley to graze their herds or flocks in the pastures around the San Joaquin River and its drainages. The local cattle industry continued to grow until at least 1870, when, according to Vandor (1919), it reached its peak. There were, however, some bumps along the way. The erratic climate patterns of the 1860s—a decade that experienced alternating periods of severe flooding and drought—had considerable impact on the make up of the Central Valley's agrarian base. In particular, the 2-year-long drought that followed the great flood of 1862 decimated remaining old Spanish cattle that had escaped the deluge (Byron 1951). In response, cattlemen restocked their herds with other varieties, including longhorns that had been driven from Texas Vandor (1919). For their part, shepherds adopted the annual cycle of Old World pastoralists: during the summer months they drove their flocks into the Sierra Nevada high country to conserve the lowland grasses for fall and winter grazing. The floods and droughts similarly wreaked havoc on production of agricultural goods, causing dramatic swings in commodity values. In the wake of the 1864 drought, crop failures depleted the supply of grain as the price of wheat on the San Francisco Market soared to $5.00 per cental (100 pounds) in March 1865 (Elliott 1883). By comparison, the price rarely breeched the $3.00 mark during the entire 1870s.

Along with the climate, political factors had a major hand in shaping the economic landscape. Although the 1874 enactment of the "no fence" laws did not necessarily deal a death blow to valley ranching, the statute greatly curtailed the influence and importance of this industry. The law had both operational and monetary repercussions:

> The "no fence" law obligated the stock owner to herd his cattle and sheep, whereas before the stock roamed at will and was not assembled except for the annual rodeo. He

> was also made responsible for damage done by his beasts. The farmer was not required to fence his holdings, though... he occasionally did so (Vandor 1919:163).

Without the entire extent of the San Joaquin Valley at his disposal and burdened by the continual task of containing his herds and flocks, the rancher found himself increasingly marginalized in the developing valley economy.

2.4.2 Initial Development of Agriculture in the Fresno-Clovis Area (1875–1900)

In addition to pro-agriculture legislation and the arrival of the Southern Pacific Railroad in 1872, the development of irrigation systems greatly contributed to the growth of agriculture in Fresno County. Built in the early and mid-1870s, the first major water conveyance systems in the Fresno-Clovis area included the canals of the Fresno Canal and Irrigation Company (FCIC), the Kings River and Fresno Canal Company (KRFCC), and the Enterprise Canal Company (ECC). These same systems, which use the waters of the Kings River, remain essential parts of the area's agricultural industry today.

In local history, Moses Church—a former sheepherder from Napa County—is considered the chief developer of water conveyance in Fresno County. As early as 1870, Church began acquiring water rights along the Kings River; in February 1871, he and two business associates incorporated the FCIC (Elliott 1882; Willison 1980). His first objective was to deliver appropriated water to the farm of A. Y. Easterby, located in the present-day Sunnyside neighborhood of Fresno (Vandor 1919). In 1872, the company completed construction of the first main head gate on the Kings River that allowed 2,000 feet of water to be diverted into the irrigation system (Elliott 1882). The Fresno Canal was the FCIC's primary channel. Although it runs a relatively short 12 miles, the Fresno Canal is the source of numerous large branch canals that still irrigate the fields south, west, and east of the Fresno-Clovis metropolitan area.

The KRFCC, also established in 1871, intended to build a similar system, although the project was not completed until 1873 when L.A. Gould purchased interest in the company (Clough and Secrest 1984; Willison 1980). By August of the same year, Gould's farm was receiving irrigation water from the KRFCC Gould Canal, which taps the Kings River about 1.5 miles above the head gate of the Fresno Canal. The Gould Canal and its primary branch, the Helm Canal, irrigated the former agricultural lands in what is today the heart of the Fresno-Clovis metropolitan area.

While local sources are not specific about the incorporation of the ECC or the dates of its major conveyance, the Enterprise Canal, circumstantial evidence suggests that construction began sometime after 1875 and continued episodically until the early twentieth century when the canal appears to have reached it present-day length of 36.5 miles. According to Willison's (1980) account, the KRFCC agreed to supply water to the ECC following the completion of the Gould Canal in 1873. This agreement was the basis for the eventual creation of the Enterprise Canal. Although the Enterprise Canal is not represented on an 1875 map of the county, construction may have begun shortly after (Willison 1980). Moreover, Hall's (1885) serial maps depicting irrigation in Fresno County as well as later county atlases suggest that the canal was built in stages. Whereas the first 15 miles of the Enterprise Canal (or "Enterprise Ditch") as well as its head gate on the Gould Canal are shown and labeled on the Centerville and Kingsburg Sheet of the series, the lower reaches of the canal do not appear on the Fresno Sheet. Taken at face value,

Hall's (1885) maps indicate that in 1885 the Enterprise Canal terminated at Frolic Creek (present-day Dog Creek), southeast of the Project area. By the time of the 1891 Fresno County atlas, the canal had been lengthened another 9.5 miles through the Clovis area (just east of the Project area) to its northernmost extent (in Section 18 of Township 12 South, Range 21 East); however, the canal's existing southwesterly leg through what is today north Fresno had not been built yet (Thompson 1891).

Whatever the specific date(s) of the canal's construction, the ECC's dependence on the KRFCC and its Gould Canal clearly proved to be its undoing. In 1875, the KRFCC won a court battle with the FCIC that left KRFCC's water rights intact (Willison 1980:77-83). Ten years later, however, the companies faced-off again, but this time the FCIC succeeded in enjoining the KRFCC by drawing water from the Kings River (Mead 1901:277; Willison 1980:84). Without access to water from the river, the KRFCC and ECC were forced to sell their canals to the FCIC. The court decision thus left the FCIC in control of all three canal systems.

Under the ownership of the FCIC, the Enterprise Canal continued to irrigate the farmlands north and east of the Fresno-Clovis area. It gave rise to several secondary canals along its route, including such Clovis-area branches as the Maupin Ditch, the Jefferson Canal, the Clovis Ditch, the Teague Ditch, and Helm Colonial Ditch as well as numerous unnamed laterals (Willison 1980). As early as 1900, the canal and its branches irrigated about 15,000 acres. By 1913, the lower portion of the canal appears to have been completed, bringing irrigation water to the area historically known as Forkner's Fig Gardens (Progressive Map Service 1913:19). The Enterprise Canal, along with the rest of the FCIC's system, was acquired by the Fresno Irrigation District in 1920 (Willison 1980).

For Church and other land promoters, the intended effect of irrigation was to increase the value of their properties so that they could be subdivided and sold to newly arriving homesteaders at a hefty profit. While this primary purpose was certainly achieved, the advent of intensive irrigation additionally led to a shift in both the types of crops grown and the size of a typical farm. Grain farming generally requires substantial acreage, but as irrigation water became more readily available, individual farmers realized that premium crops like grapes, citrus, and tree fruit could be profitably grown on lots as small as 20 acres.

Vandor's history includes a commentary from (probably Charles) Nordoff, who describes how, with irrigation, bigger is not necessarily better.

> Big ranches there are yet but they are hazardous ventures, and the fact is that in the big valley the twenty, forty and eighty-acre farmers brought the lasting and real agricultural prosperity. There, where wheat was once the big and only crop, the man with less than 320 acres classed himself as a humble small farmer. Slowly but gradually the conviction forced itself that eighty acres with water on a good location was a little too much, forty a liberal plenty with which to make a fair start in life, and twenty just enough for one man on which to make a comfortable living for self and family and have something over with industry and health for the proverbial rainy day. Wonders have been accomplished with ten acres by men who were not overambitious, not overburdened with money and hesitated not to combine brain and brawn in the labor in the field. Intelligent twenty-acre men are laying up what eastern farmers would consider a fortune... (Vandor 1919:261).

Much like the "no fence" laws, the 1887 Wright Act, which provides for the creation of irrigation districts, is also seen as an important step in solidifying the interests of agriculture. In practice, it took some years before newly formed districts could gain the necessary legal and financial traction for operation, and these public cooperatives did not begin replacing private irrigation companies until the early twentieth century. At its passage, the Wright Act was, nevertheless, another legislative expression of the growing need for appropriated water. Another important development in the late nineteenth century was construction of the San Francisco and San Joaquin Valley Railroad in 1896, which provided Fresno with another rail line. Before then, farmers had complained about the Southern Pacific Railroad's "ruinous" rates and were continually looking for alternative ways to ship their products to the Bay Area. This second railroad was acquired by the Atchison, Topeka, and Santa Fe Railway around 1900.

Agricultural growth in the San Joaquin Valley generally was accompanied by consistent population growth and urbanization, and with the rise in residential, commercial, and infrastructural development came an increase in demand for building materials. The one-man milling operations of the gold rush era had given way to late nineteenth-century lumber companies with the financial and technological means to harvest vast stands of timber in the nearby Sierra Nevada. It was primarily in this context that the town of Clovis arose.

Clovis originated in 1891 as a stop along the San Joaquin Valley Railroad, which extended from Fresno to the aspiring community of Pollasky (formerly called Hamptonville and later renamed Friant), located on the south bank of the San Joaquin River (Clough and Secrest 1984). Although Pollasky never fully materialized and the railroad was eventually sold off to the Southern Pacific Railroad, the new transportation link had opened the area northeast of Fresno for settlement and other ventures. Shortly afterward, the Fresno Flume and Irrigation Company, a combination lumber and irrigation venture, located its sawmill on a 60-acre parcel at the current site of Clark Intermediate School and the Clovis Rodeo Grounds. The mill was the end point of a 45-mile-long wooden flume from Shaver Lake. By its second year of operation in 1895, between 300 and 500 employees worked at the mill (Clough and Secrest 1984; Johnston 1997).

2.4.3 Diversification and Water Issues (1900–1950)

The trend toward smaller farms continued well into the new century. Between 1900 and 1920, 45,000 new farms were established in California, of which about 85 percent were less than 50 acres (Hall 1986). Yet whether a farm is small or large, the decision of which crop(s) to grow from year to year has historically been a speculative one for valley farmers. Given the decentralized nature of the industry, the market for a particular product was capable of unpredictable and dramatic changes. Oversupply of the previous year's crop and the prospect of low prices have often compelled growers to look for other, more profitable alternatives. Out of this instability, many new fruit and vegetable varieties have been introduced to the valley.

The steady growth of the San Joaquin Valley's agricultural base and its reliance on irrigation were beginning to erode the state's water supply. In the period between 1909 and 1919, newly irrigated lands were placed under production at a rate of 155,000 acres per year (Hall 1986). Established in 1920, the Fresno Irrigation District acquired the aging conveyance system of the FCIC, and immediately set out to revamp and add to the existing canals and structures (Willison 1980). Technological improvements to electric water pump technology allowed wells to extend

even deeper into the aquifer, and by the mid-1920s the proliferation of wells had caused the water table to drop to alarmingly low levels. Among the most threatened were farmers who relied solely on wells for irrigation water. Along with a falling water table, California's water issues included reducing the danger of flooding along the major rivers, providing for more dependable navigation on the Sacramento River, and improving the water quality in the East Bay area (Jackson 1977).

The solution was the Central Valley Project (CVP), a statewide multicomponent water conveyance system to control and redistribute the tremendous supply of water flowing from the Sierra Nevada. The CVP, which began at the state level, became part of the New Deal project in the mid-1930s because of the massive financing required for the project. Partially due to labor shortages created by World War II, the entire system was not completed until the early 1950s. The Friant-Kern Canal, an original component of the CVP, flows about 5.5 miles east of the Project area.

In many ways, the Dry Creek drainage was a microcosm of the water issues facing the state during the 1920s and 1930s. Winding southwest from the foothills, Dry Creek disappears into a natural sink near the Old Fig Garden area in north-central Fresno. The natural flow from the creek raises the underground water table, which has been an important source of well irrigation water. Since the earliest days of Fresno, however, the annual flooding of the waterway caused traffic hazards, material damage, and even loss of life (Wilson 1932).

2.4.4 Modern Water Management (1950–Present)

Beginning in the mid-twentieth century, water management methods became more diverse and presently involve the storage of runoff in reservoirs for hydroelectric power and flood control and maintenance of underground water tables for such uses as irrigation and drinking water. As part of this larger process, the Dry Creek Project has sought to control the stream's natural runoff by channeling the water into reservoirs (Fresno Bee 1948). Since beginning operation in 1948, the Dry Creek Project has expanded its scope to prevent flooding while managing the groundwater level (Clovis Unified School District 1984; Fresno Metropolitan Flood Control District 2004).

When it reached fruition in the 1950s, the CVP sparked a new wave of agricultural growth by providing an ample supply of federally subsidized water across the valley floor. The Friant-Kern Canal flows through the Dry Creek District and its primary function is to convey irrigation water to the counties of the southern San Joaquin Valley. Nevertheless, water from the channel does not pass through the greater Fresno area completely untouched; along with the City of Fresno, the Garfield Irrigation District and Harlan Ranch established the right to divert water from the Friant-Kern Canal (Clovis Unified School District 1984).

3
METHODS

This chapter describes methods used to complete the cultural resource study of the Project area. This includes a records search to identify previous resources and studies within and adjacent to the Project area, background research, a search of the NAHC Sacred Lands File and contact with Native Americans who may have knowledge about the area, and an intensive pedestrian survey.

3.1 RECORDS SEARCH

At Æ's request, the SSJVIC of the CHRIS at California State University, Bakersfield, performed a records search on June 31, 2023, to identify previously recorded resources and prior surveys within the Project area and surrounding 0.25-mile search radius. SSJVIC staff consulted cultural resource location and survey base maps, reports of previous investigations, and cultural resource records (Appendix B).

3.2 BACKGROUND RESEARCH

Prior to conducting a pedestrian archaeological survey, Æ conducted background research to identify areas within the Project area where extant historic-aged buildings, structures, or objects might be present, or where archaeological deposits might exist. Desktop and online library research focused on historical maps, aerial images, atlases, and photographs. Æ reviewed and compiled information from various sources including:

- General Land Office (GLO) maps (https://glorecords.blm.gov/default.aspx; 1856);
- HistoricAerials.com administered by NETRonline topographic maps (https://www.historicaerials.com/viewer; T1922, T1923, T1946, T1955, T1965, T1974, T1975, T1982, T1995, T2012, T2015, T2018, and T2021);
- Fresno County Property Atlases, accessed through the Map and Aerial Photograph Collections by California State University, Fresno (https://guides.library.fresnostate.edu/c.php?g=288931&p=1928720); and
- HistoricAerials.com administered by NETRonline (1957, 1962, 1972, 1984, 1998, 2002, 2005, 2009, 2010, 2012, 2014, 2016, 2018, and 2020).

The results of Æ's background research is discussed in Section 4.2.

3.3 NATIVE AMERICAN OUTREACH

Pursuant to California PRC Section 5097.9, state and local agencies cooperate with and assist the NAHC in its efforts to preserve and protect locations of sacred or special cultural and spiritual significance to Native Americans. On June 6, 2023, Æ contacted the NAHC to request a search of its Sacred Lands File to identify Native American resources in the Project area and obtain the names and contact information for individuals knowledgeable of such resources.

The NAHC responded on August 17, 2023, with its findings and attached a list of Native American tribes and individuals culturally affiliated with the Project area. On September 14, 2023, Æ mailed a letter to each of the contacts identified by the NAHC. The letter summarized the Project and requested information about known cultural resources within the Project area and surrounding region. Æ telephoned each contact on October 19, 2023 to ensure they received the letter and solicit information. Outreach with the Native American tribes and individuals is standard best practices to complete a cultural resource study and is not part of formal government-to-government consultation under Assembly Bill (AB) 52. Æ's record of tribal outreach is included in Appendix C.

3.4 PEDESTRIAN SURVEY

On August 25, 2023, Æ Staff Archaeologist Gabriel Granado and Field Technician Charles Pansarosa performed an intensive pedestrian survey of the Project area utilizing interval transects spaced 10 meters apart. Æ archaeologists collected locational information and documented survey coverage with an Arrow 100 GNSS and ArcGIS Field Maps and took representative photographs of the Project area, varying ground visibility, and other conditions. Methods and observations were recorded on digital Survey123 Field Record forms. All field records and photographs are archived at Æ's office in Fresno, California.

4
FINDINGS

This chapter provides results of the SSJVIC records search, Æ's background research, the NAHC's search of the Sacred Lands File and Native American outreach, and describes the pedestrian survey, including observations of field conditions and findings within the Project area.

4.1 RECORDS SEARCH

On July 31, 2023, the SSJVIC responded to Æ's records search request (Records Search File No. 23-288). In their response, they identified one previously recorded cultural resource within the 0.25-mile records search radius and no cultural resources within the Project area. In addition, the records search identified four previous cultural resource investigations within the Project area and one previous investigation in the 0.25-mile search radius.

4.1.1 Previously Recorded Resources

The records search identified no previously recorded resources within the Project area, and only one resource, the Enterprise Canal (P-10-005934) within the 0.25-mile records search radius (Appendix B). As discussed in Section 2.4.2, the Enterprise Canal, was constructed in the mid-to-late 1870s to provide bulk irrigation water to the greater Clovis and North Fresno areas. The entire canal is 36.5 miles long.

4.1.2 Previous Studies in the Project Area

There have been four studies previously conducted within the Project area and one previous study in the 0.25-mile radius (Table 4-1; Appendix B). The entirety of the Project area has been previously surveyed, portions of which were surveyed most recently in 2018. All other previous studies were conducted more than 10 years ago.

Table 4-1
Previous Investigations in the Project area and Surrounding 0.25-Mile Radius

CHRIS Report No.	Author(s)	Year	Title
Within the Project Area			
FR-01219	Bissonnette, L.D.	1993	*Fresno Metropolitan Flood Control District Drainage Area "BY" Facilities*
FR-02203	Varner, D.M.	2006	*A Cultural Resource Study of the Battlin Brooks Property, Fresno County, California*
FR-02289	Nettles, W.M. and Baloian, R.	2006	*Cultural Resources Reconnaissance Survey of the City of Clovis Northwest Urban Center Specific Plan Area, Fresno County, California*
FR-03067	Stanley, W., Baloian, M., and Baloian, R.	2018	*Cultural Resource Inventory and Evaluation for the Tract 6200 Development in the City of Clovis, Fresno County, California*
Within the 0.25-Mile Radius			
FR-02062	Thal, S.	2004	*Request for SHPO Review of FCC Undertaking (Shepherd/CA-1202A)*

4.2 BACKGROUND RESEARCH

Æ's review of historical topographic maps and aerial photographs revealed moderate development in the area over the last 100 years. An 1856 map from the GLO depicts Big Dry Creek running southeast of the Project area (Figure 4-1). Big Dry Creek was present on the 1923 topographic map, but by the 1947 map had been replaced with "Colonial Ditch." The 1856 GLO shows "Road from Stockton to Kings River" and "Old Road" on either side of the Project area. There were no remnants of these roads on the 1923 topographic map; all roads depicted reflect their current state. Three houses had been built in the Project area by 1891, according to the Fresno County Property Atlas. Only one of these houses, designated to H. Griffin on the 1891 Property Atlas, was still present on the 1923 topographic map (Thompson 1891). This house appeared extant on arial photographs dating to 2012 but was no longer present on the 2014 aerial photograph.



Figure 4-1 1856 GLO map showing transport routes and Big Dry Creek.

The Project area and vicinity was used primarily for agricultural purposes up to about 1984. A singular house was present in the northwest portion of the Project area prior to 1957. This single-family home was rebuilt in 1968. Large, isolated buildings began appearing in the surrounding area in 1998, followed by housing developments east of Sunnyside Avenue between 1984 and 1998 and south of Shephard Avenue between 2005 and 2009. A significant portion of the neighboring area remains agricultural land.

4.3 NATIVE AMERICAN OUTREACH

On August 17, 2023, the NAHC stated that its search of the Sacred Lands File was negative for the presence of cultural resources in the Project area. The NAHC also supplied a list of individuals to be contacted for information regarding locations of sacred or special sites of cultural or spiritual significance in the Project area.

On September 14, 2023, Æ sent a letter describing the Project and its location to:

- Chairperson Elizabeth Kipp of Big Sandy Rancheria of Western Mono Indians;
- Tribal Administrator Tom Zizzo of Big Sandy Rancheria of Western Mono Indians;
- Vice Chairperson Joel Marvin of Big Sandy Rancheria of Western Mono Indians;
- Jared Aldern of Cold Springs Rancheria of Mono Indians;
- Chairperson Carol Bill of Cold Springs Rancheria of Mono Indians;
- Chairperson Robert Ledger of Dumna Wo-Wah Tribal Government;
- Chairperson Ron Goode of North Fork Mono Tribe;
- Tribal Secretary Anna Phipps of North Fork Mono Tribe;
- Council Member and Archaeological Director Jesse Valdez of North Fork Mono Tribe;
- Timothy Perez of North Valley Yokuts Tribe;
- Chairperson Katherine Perez of North Valley Yokuts Tribe;
- Tribal Administrator Michael Wynn of Picayune Rancheria of the Chukchansi Indians;
- Tribal Historic Preservation Officer Heather Airey of the Picayune Rancheria of the Chukchansi Indians;
- Chairperson Janet Bill of the Picayune Rancheria of the Chukchansi Indians;
- Cultural Resource Director Bob Pennell of Table Mountain Rancheria;
- Chairperson Brenda Lavell of Table Mountain Rancheria;
- Chairperson David Alvarez of the Traditional Choinumni Tribe;
- Chairperson Neil Peyron of the Tule River Indian Tribe;
- Environmental Department Kerri Vera of the Tule River Indian Tribe;
- Tribal Archaeologist Joey Garfield of the Tule River Indian Tribe; and
- Chairperson Kenneth Woodrow of the Wuksachi Indian Tribe/Eshom Valley Band.

Æ also distributed these letters via email on September 13, 2023 and followed up with all tribes by telephone on October 19, 2023. To date, Æ has received six responses from their outreach:

- Big Sandy Rancheria of Mono Indians requested to be informed of any discoveries.
- The North Fork Mono Tribe requested that work crews remain cognizant of the fact that there are several sites known through oral history in the area that have not yet been located.
- Table Mountain Rancheria requested a copy of the cultural resources report and a meeting to discuss the project; this communication is being conducted by Lennar Central Valley.
- Picayune Rancheria of the Chukchansi Indians, Traditional Choinumni Tribe, and Tule River Indian Tribe all declined interest in the project.

A log detailing the outreach efforts and responses is provided in Appendix C. *Æ* did not facilitate government-to-government consultation on behalf of the City.

4.4 PEDESTRIAN SURVEY

An intensive archaeological pedestrian survey was conducted on August 23, 2023, encompassing 53.9 acres of the 58.9-acre Project area (Figure 4-2), or 91.5 percent. *Æ* field staff was unable to survey the remaining 5 acres in the northwest corner of the Project area. This area had been recently disturbed as a result of removing the residence at 9328 N. Minnewawa Avenue and large spoil piles of debris and soil remained on the ground surface (Figure 4-3). Heavy equipment and piles of masticated vegetation associated with vegetation removal efforts were also present (Figure 4-4). The Project area is bordered to the west by North Minnewawa Avenue, starting approximately 0.1 mile north of East Shepard Avenue and continuing 0.2 miles north. The southern border of the Project area is formed by the fence of the Windsor-Heritage Grove subdivision, while the northeastern border abuts the south bank of the Enterprise Canal. The Project's eastern border lies just west of the North Clovis Avenue alignment and the Enterprise Canal. Ground visibility averaged 70 percent across the Project area, though some areas were limited by leaf litter, almond trees, and grasses. Approximately two-thirds of the Project area is currently covered by almond orchards affording fair visibility of the ground surface (Figure 4-5).

Æ field staff identified a single, large concentration of historic-era glass fragments (Figure 4-6) in the vicinity of the recent demolition of the 1960s home in the northwest corner of the Project area at 9328 N. Minnewawa Avenue. These fragments were a variety of colors, including green, blue, cobalt, opaque white, amethyst, and clear. A single bottle neck with hand-applied cork closure was observed, along with several blue mason jar bases. The glass fragments appear to be associated with the removal of the structure and not an in situ historical deposit. Thus, the deposit is noted in this report but was not formally recorded as a cultural resource.

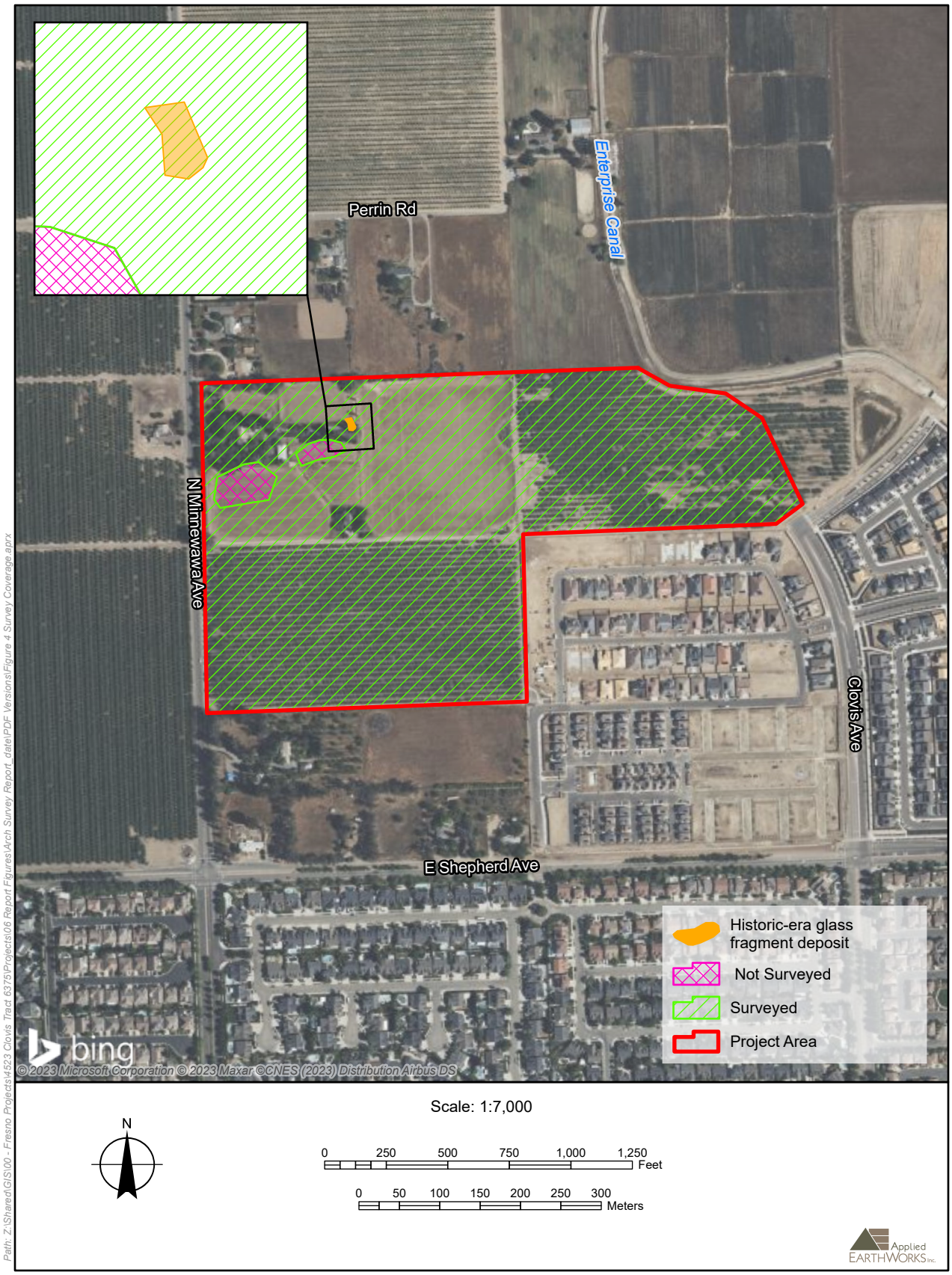


Figure 4-2 Survey coverage and findings within the Project area.



Figure 4-3 Recent ground disturbance associated with demolition and debris clearing, facing east.



Figure 4-4 Large spoil piles covering ground surface, facing east.



Figure 4-5 Overview of the eastern almond orchard, facing south.



Figure 4-6 Sample of glass fragments found in the debris associated with the house removal.

5
CONCLUSIONS AND RECOMMENDATIONS

Æ provided cultural resource services for the Lennar Central Valley proposed Tract 6375 Residential Development Project in Fresno County, California. The Project proposes to construct 387 single-family lots on approximately 58.9 acres on vacant land north of East Shepherd Avenue, between North Minnewawa Avenue and the Clovis Avenue alignment in the city of Clovis. The proposed Project is within the City of Clovis Heritage Grove Master Plan and will be subject to design development standards of the plan.

Æ conducted a cultural resource study of the Project area to determine if archaeological or historical built environment cultural resources are present within the Project area. Accordingly, Æ performed background research, obtained a records search from the SSJVIC of the CHRIS, requested a search of the NAHC Sacred Lands File, contacted local tribal representatives, and performed an intensive pedestrian survey of the Project area.

The SSJVIC records search identified no previously recorded cultural resources within the Project area and one previously recorded cultural resource within the 0.25-mile records search radius. In addition, the records search reported four previous cultural resource investigations within the Project area and one previous investigation in the 0.25-mile search radius. A search of the NAHC's Sacred Lands File did not identify Native American cultural resources within or near the Project area and no specific information was gleaned from outreach with local tribal representatives. No cultural resource were identified in the Project area as a result of Æ's inventory efforts.

5.1 RECOMMENDATIONS

This study concludes that there are no historical resources within the Project area. Based on the results of this cultural resource study, Æ recommends the following management practices be adopted for the proposed Project.

5.1.1 Inadvertent Discovery of Archaeological Resources

If unknown prehistoric or historic-era cultural resources are encountered during Project activities, all ground-disturbing activities within 50 feet of the find shall cease until a qualified archaeologist can evaluate the significance of the resource and recommend appropriate treatment measures. If necessary, per CEQA Guidelines Section 15126.4(b)(3)(A), project redesign and preservation in place shall be the preferred means to avoid impacts to significant cultural resources (i.e., historical resources). Consistent with CEQA Guidelines Section 15126.4(b)(3)(C), if it is demonstrated that a historical resource cannot be avoided, the qualified archaeologist shall develop mitigation practices in consultation with the City, which may include data recovery or other appropriate measures. The City also shall consult with interested Native American representatives in determining appropriate mitigation for unearthed cultural resources if the resources are prehistoric or Native American in nature. If preservation in place is not possible and additional studies or data recovery mitigation is necessary, the qualified archaeologist shall prepare a report documenting these studies and/or additional mitigation of the

resource. A copy of the report shall be provided to the City and to the SSJVIC. Construction can recommence based on the direction of the qualified archaeologist and with concurrence from the City.

5.1.2 Inadvertent Discovery of Human Remains

Æ advises that in the event human remains are uncovered during Project activities, the Fresno County Coroner is to be notified to evaluate the remains, and follow the procedures and protocols set forth in CEQA Guidelines Section 15064.4 (e)(1). If the remains are identified to be those of a Native American, California Health and Safety Code 7050.5 requires that the county coroner notify the NAHC within 24 hours of discovery. The NAHC will then identify the Most Likely Descendant, who will be afforded the opportunity to recommend means for treatment of the human remains following protocols in California PRC 5097.98.

6
REFERENCES

Byron, William G.
1951 *A Geographic Analysis of the Porterville Area, California*. Master's thesis, University of California, Los Angeles.

Clough, Charles W., and William B. Secrest, Jr.
1984 *Fresno County—the Pioneer Years: From the Beginnings to 1900*, edited by Bobbye Sisk Temple. Panorama West Books, Fresno, California.

Clovis Unified School District
1984 *Images of an Age*. Pacific Printing Press, Fresno, California.

Elliott, Wallace W.
1882 *History of Fresno County, California, with Illustrations*. Wallace W. Elliott & Co., San Francisco, California. Reprinted 1973, Valley Publishers, Fresno, California.

Elliott, Wallace W.
1883 *History of Kern County, California*. Wallace W. Elliott & Co., San Francisco, California.

Fresno Bee
1948 Water Flows into Reservoir of Dry Creek Flood Project. 14 April:17. Fresno, California.

Fresno Metropolitan Flood Control District
2004 Flood Control System. www.fresnofloodcontrol.org/flood_control_system, accessed June 2004.

Gayton, Anna H.
1945 Yokuts and Western Mono Social Organization. *American Anthropologist* 47(3):409–426.

1948 *Yokuts and Western Mono Ethnography II: Northern Foothill Yokuts and Western Mono*. Anthropological Records Vol. 10(2). Berkeley and Los Angeles.

Hall, Richard D.
1986 Agriculture and Water. In *Fresno County in the 20th Century: From 1900 to the 1980s*, edited by Bobbye Sisk Temple, pp. 169–202. Panorama West Books, Fresno, California.

Hall, William Hammond
1885 *Detail Irrigation Map: Fresno Sheet*. California Department of Engineering, Sacramento, California.

Jackson, W. Turrentine
1977 *The Sacramento–San Joaquin Delta: The Evolution and Implementation of Water Policy: A Historical Perspective*. Water Resources Center Project. California Water Resources Center, University of California, Davis, 163.

Johnston, Hank
1997 *The Whistles Blow No More: Railroad Logging in the Sierra Nevada*. Stauffer Publishing, Fish Camp, California.

Kroeber, Alfred L.
1976 *Handbook of the Indians of California*. Dover Publications, New York. Originally published 1925, Bureau of American Ethnology Bulletin 78. Smithsonian Institution, Washington, D.C.

Langenwalter, Paul E., II, Adella Schroth, Philip de Barros, and Franklin Fenenga
1989 *Redbank and Fancher Creeks Archaeological Data Recovery Program, Final Report*. MITECH, Inc., Santa Ana, California. Prepared for the U.S. Army Corps of Engineers, Sacramento District, Sacramento, California, Contract DACW05-87-C-0099, Report No. FR-01140.

McGuire, Kelly R.
1992 *Rural Route 180, Fowler to Cove Avenues (06-FRE-180-R64.6/84.0 06-250-342500); Test Excavations at CA-FRE-61 and Extended Survey at CA-FRE-2851: A Preliminary Report*, with contributions by R. Bethard, H. McCarthy, K. Tate, and E. Wohlgemuth. Far Western Anthropological Research Group, Inc., Davis, California. Submitted to Woodward-Clyde Consultants, Oakland, California, and California Department of Transportation, District 6, Fresno.

Mead, Elwood
1901 *Irrigation Investigations in California*. U.S. Department of Agriculture Office of Experiment Stations Bulletin No. 100. Government Printing Office, Washington, D.C.

Meighan, Clement W., and Brian D. Dillon
1987 *Redbank and Fancher Creeks Intensive Cultural Resources Survey*. MITECH, Inc., Santa Ana, California. Submitted to U.S. Army Corps of Engineers, Sacramento District.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, Orlando, Florida.

1988 *Archaeological Excavations at Site CA-FRE-1671, Fresno County, California*. 2 vols. INFOTEC Research, Inc., Sonora, California. Submitted to the California Department of Transportation, District 6, Fresno, California. California Department of Transportation, Publications Unit, Sacramento, California.

Munz, Phillip A., and David D. Keck, contributor
1973 *A California Flora with Supplement*. University of California Press, Berkeley.

Price, Barry A.
1992 *Archaeological Survey Report of Route 168 Study Areas*, with contributions by Michael J. Moratto and Clayton G. Lebow. INFOTEC Research, Inc., Fresno, California. Prepared for CH2M Hill, Emeryville, California.

Progressive Map Service
1913 *Progressive Atlas of Fresno County*. Progressive Map Service, Fresno, California.

Silverstein, Michael
1978 Yokuts: Introduction. In *California*, edited by Robert F. Heizer, pp. 446–447. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Smith, Ephraim K
1991 *Historical Architectural Survey Report for Route 168 Rural Project, 6-Fre-168 R9.0/R14.75, EA #06-342700*. California State University, Fresno Foundation. Submitted to INFOTEC Research, Inc., Fresno, California.

Spier, Robert F. G.
1978 Monache. In *California*, edited by Robert F. Heizer, pp. 426–436. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Thompson, Thomas H.
1891 *Official Historical Atlas Map of Fresno County*. Thos. H. Thompson, Tulare, California.

Vandor, Paul E.
1919 *History of Fresno County, California, with Biographical Sketches*. 2 vols. Historic Record Company, Los Angeles, California.

Wallace, William J.
1978 Southern Valley Yokuts. In *California*, edited by Robert F. Heizer, pp. 448–461. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

1987 Ethnohistory of the Redbank-Fancher Area: The Gashowu, a Little-Known Foothill Yokuts Tribelet. In *Redbank and Fancher Creeks Intensive Cultural Resources Survey*, edited by Clement W. Meighan and Brian D. Dillon, pp. 133–149. Institute of Archaeology, University of California, Los Angeles. Submitted to the U.S. Army Corps of Engineers, Sacramento District.

Wallace, William J., Adella Schroth, and Philip de Barros
1989 *Archaeological Data Recovery at Prehistoric Archaeological Site CA-FRE-64*. Chambers Group, Inc., Santa Ana, California. Submitted to and on file at the California Department of Transportation, District 6, Fresno, California.

Weir, Walter W.
1956 *Soils of Madera County, California*. Soil Survey No. 12. Department of Soils and Plant Nutrition, University of California, Berkeley.

Willison, Paul H.
1980 Past, Present, & Future of the Fresno Irrigation District. Fresno Irrigation District, Fresno, California.

Wilson, L. H.
1932 Deaths, Injuries, Illness Caused by Dry Creek; Elimination Suggested. *Fresno Morning Republican* 19 January:7. Fresno, California.

APPENDIX A

Personnel Qualifications

ERIN ENRIGHT

Vice President/Principal Archaeologist/Project Manager

Areas of Expertise

- Cultural resource management
- Project management
- Archaeological field work/ Supervision
- GIS analysis and desktop site assessments
- Faunal analysis
- Prehistory and history of California and the Southwest

Years of Experience

- 22

Education

M.A., Anthropology and Applied Archaeology, Eastern New Mexico University, Portales, 2008

B.A., Classical and Near Eastern Archaeology, Bryn Mawr College, Pennsylvania, 2000

Registrations/Certifications

- Register of Professional Archaeologists 16575 (2009)
- OSHA 40-hour HAZWOPER (2019)

Permits/Licensure

- Principal Investigator, California BLM Statewide Cultural Resources Use Permit CA-21-21

Professional Affiliations

- Society for American Archaeology
- Society for California Archaeology

Professional Experience

2021–	Vice President/Managing Principal/Principal Archaeologist, Applied EarthWorks, Inc., San Luis Obispo and Fresno, California
2019–2021	Managing Principal/Principal Archaeologist, Applied EarthWorks, Inc., San Luis Obispo, California
2014–2018	Senior Archaeologist/Project Manager, Applied EarthWorks, Inc., San Luis Obispo, California
2008–2014	Associate Archaeologist/Faunal Analyst, Applied EarthWorks, Inc., Lompoc, California
2004–2008	Faunal Analyst/Student Supervisor/ Educational Outreach, Blackwater Draw Archaeological Site and Museum, Eastern New Mexico University, Portales
2001–2004	Staff Archaeologist, Cultural Resource Management Services, Paso Robles, California
2000	Field Archaeologist, Princeton Expedition, Polis Chrysochous, Cyprus
1999	Archaeological Field School, Anathica Field School, Petras, Crete, Greece

Technical Qualifications

Ms. Enright is an experienced professional archaeologist, principal investigator, project manager, and field supervisor/director who has managed projects throughout California and the Southwest. She has participated at all levels within the cultural resource management industry with projects ranging from survey and site recording; testing and data recovery; National Register eligibly excavations; buried site testing (backhoe trenching); development of monitoring plans; database creation and maintenance; curation management; GIS; technical report production; and compliance assistance for NHPA and CEQA projects. Ms. Enright has developed close relationships with tribal groups and individuals throughout the Central Coast and Central Valley. She has played a critical role in providing consultation support between agencies and Native American groups for AB 52, CEQA, and Section 106. Additionally, she has experience managing large on-call contracts and complicated cultural resource management efforts with complex regulatory requirements. Several of these efforts have been in support of energy projects. Ms. Enright has authored or co-authored more than 70 technical reports and other NHPA, NEPA, and CEQA compliance documents, and presented research at state and national archaeological meetings.

ANNA HOOVER

Principal Archaeologist

Areas of Expertise

- Cultural resources management
- Prehistoric archaeology of southern California
- Indigenous archaeology and Native American/descendant community coordination
- Federal, state, local environmental laws and regulations
- Training, capacity building
- Traditional Cultural Property and Landscape analysis

Years of Experience

- 24

Education

M.S., Anthropology, focus Archaeology, 2003, University of California, Riverside

B.S., Anthropology, 2000, University of California, Riverside

B.A., Linguistics, 2000, University of California, Riverside

A.A., English, 1996, Long Beach City College

Registrations/Certifications

- Registered Professional Archaeologist 28576661 (current)
- Cultural Consultant, Riverside County #171 (current)

Permits/Licensure

- Field Director, California BLM Statewide Cultural Resources Use Permit CA-21-21

Professional Associations

- Society of California Archaeology

Professional Experience

2023–	Principal Archaeologist, Applied EarthWorks, Inc.
2020–2022	Senior Archaeologist, Applied EarthWorks, Inc.
2017–2023	Senior Ethnoarchaeologist, Cultural Geographics Consulting
2007–2017	Deputy Tribal Historic Preservation Officer, Pechanga Band of Luiseño Mission Indians
2001–2015	Archaeological Assistant, San Bernardino County Coroner
2002–2007	Senior Archaeologist, L&L Environmental, Inc.

Technical Qualifications

Ms. Hoover has more than 24 years of experience in archaeological, cultural, and tribal resource management in southern California, Alta and Baja California, and Yucatan, Mexico. Ms. Hoover has collaborated with governmental agencies, environmental consultants, and indigenous communities to develop sustainable and practical applications for the identification and preservation of archaeological and tribal cultural resources, including landscapes and large, geographical features. As a capable Project Manager, she has coordinated dozens of CRM projects during all phases of development, including managing logistics and communications with various clients, lead agencies, Tribal communities, and project staff. Ms. Hoover is the designated archaeologist of record for three Native American Tribal Historic Preservation Offices (THPOs) in southern California.

Ms. Hoover has authored, co-authored, reviewed, and contributed to hundreds of California Environmental Quality Act (CEQA), Section 106 of the National Historic Preservation Act (NHPA), and National Environmental Policy Act (NEPA) technical reports; Programmatic, Memoranda, and Master Agreements; THPO development applications and associated tribal ordinances and historic preservation guidance; ethnographic studies and National Register of Historic Places eligibility forms; and other compliance and mitigation documents.

Ms. Hoover has presented collaborative projects, personal research, cultural resources education, and environmental regulation guidance trainings to a wide variety of audiences, including topics such as AB 52, SB 18 and CEQA guidance, cultural and tribal consultation best practices, and Tribal Monitoring Program trainings. She has contributed to CalTHPO organizational committees, participated in development of California and Federal archaeological and tribal consultation policies, and contributed to a published book on Tribal GIS applications.

MARY CLARK BALOIAN

Principal Archaeologist

Areas of Expertise

- Cultural resource management
- Prehistoric archaeology
- Project management

Years of Experience

- 30

Education

Ph.D., Anthropology, Southern Methodist University, 2003

M.A., Anthropology, Southern Methodist University, 1995

B.A., Anthropology, University of California, Davis, 1989

Registrations/Certifications

- Registered Professional Archaeologist 15189

Permits/Licensure

- Principal Investigator, California BLM Statewide Cultural Resources Use Permit CA-18-22

Professional Affiliations

- Society for American Archaeology
- Society for California Archaeology

Professional Experience

2021–2023	Principal Archaeologist, subconsultant for Applied EarthWorks, Inc., Fresno, California
2000–2020	President (2015–2020), Managing Principal (2015–2020), Regional Manager (2012–2014), Assistant Division Manager (2010–2011), Principal Archaeologist/Project Manager (2016–present), Senior Archaeologist/Project Manager (2000–2015), Applied EarthWorks, Inc., Fresno, California
1998–2001	Adjunct Faculty Member, Fresno City College, Fresno, California
1995–1996	Staff Archaeologist, Applied EarthWorks, Inc., Fresno, California
1994–1995	Staff Archaeologist, INFOTEC Research, Inc., Fresno, California
1992–1994	Teaching Assistant, Southern Methodist University, Dallas, Texas
1989–1991	Archaeological Project Leader, California Department of Transportation, Sacramento

Technical Qualifications

Dr. Clark Baloian has been involved in archaeology in California and the western United States since 1987. Her areas of expertise include the prehistory of the San Joaquin Valley, Sierra Nevada, Great Basin, central California coast, and the Iron Age of West Africa. Dr. Baloian has served as Principal Investigator/Project Manager, Field Supervisor, Crew Chief, or Field Technician for projects throughout California, Oregon, Nevada, New Mexico, Texas, Hawaii, and West Africa. Her experience in cultural resource management includes research design, data acquisition, laboratory analysis, and preparation of technical reports and compliance documents; she also has completed the Advisory Council on Historic Preservation course in National Historic Preservation Act (NHPA) Section 106 compliance policies and procedures. Her analytic skills include lithic and ceramic analyses as well as settlement pattern studies and spatial analysis, which were the foci of her doctoral research. As a Principal Archaeologist and subconsultant for Applied EarthWorks, Dr. Baloian provides quality assurance, high-level technical review, CEQA and Section 106 oversight, and overall professional guidance for project work, as needed.

NICOLE SAENZ

Staff Anthropologist

Areas of Expertise

- Forensic anthropology
- Human osteology
- Faunal analysis/zooarchaeology
- Project administration

Years of Experience

- 6

Education

M.S., Forensic Anthropology, Boston University Chobanian & Avedisian School of Medicine, 2023

B.A., Anthropology, University of California, Santa Cruz, 2012

Professional Experience

2023–	Staff Anthropologist, Applied EarthWorks, Inc.
2022–	Forensic Anthropology Consultant and Peer Reviewer, Puerto Rico Institute of Forensic Sciences
2022–2023	Field Technician, Applied EarthWorks, Inc.
2008–2012	Zooarchaeology Preparations and Curation Intern, University of California, Santa Cruz

Technical Qualifications

Ms. Saenz is a Staff Anthropologist at Applied EarthWorks, Inc. She received her Bachelor of Arts degree in Anthropology from the University of California Santa Cruz and her Master of Science degree in Forensic Anthropology from the Boston University Chobanian & Avedisian School of Medicine. In addition, Ms. Saenz has completed internships in zooarchaeological preparation and curation, thermally altered scene analysis and remains recovery, and currently serves as a forensic anthropological consultant and peer reviewer for the Puerto Rico Institute of Forensic Sciences. Ms. Saenz's professional responsibilities include project administration, osteological assessments, outreach in accordance with the Native American Heritage Council, pre-field project preparations, writing technical reports, completing California Department of Parks and Recreation 523-series forms, and assisting with project proposals.

CONFIDENTIAL—Not for Public Distribution*

APPENDIX B

Records Search Results

*Archaeological site locations are exempt from the California Public Records Act, as specified in Government Code 6254.10, and from the Freedom of Information Act (Exemption 3), under the legal authority of both the NHPA (PL 89-665, as amended, Section 304[a]) and the Archaeological Resources Protection Act (PL 96-95, Section 9[a]).

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

7/31/2023

Milo Honsberger
Applied EarthWorks, Inc.
1391 W. Shaw Ave.
Fresno, CA 93711

Re: Clovis Tract 6375
Records Search File No.: 23-288

The Southern San Joaquin Valley Information Center received your record search request for the project area referenced above, located on the Clovis & Friant USGS 7.5' quads. The following reflects the results of the records search for the project area and the 0.25 mile radius:

As indicated on the data request form, the locations of resources and reports are provided in the following format: ☐ custom GIS maps ☒ GIS data

Resources within project area:	None
Resources within 0.25 mile radius:	P-10-005934
Reports within project area:	FR-01219, 02203, 02289, 03067
Reports within 0.25 mile radius:	FR-02062

Resource Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Digital Database Records:	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Report Digital Database Records:	☒ enclosed	☐ not requested	☐ nothing listed
Resource Record Copies:	☒ enclosed	☐ not requested	☐ nothing listed
Report Copies:	☒ enclosed	☐ not requested	☐ nothing listed
OHP Built Environment Resources Directory:	☐ enclosed	☒ not requested	☐ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☒ not requested	☐ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☒ not requested	☐ nothing listed

Caltrans Bridge Survey: Not available at SSJVIC; please see https://dot.ca.gov/programs/environmental-analysis/cultural-studies/california-historical-bridges-tunnels

Ethnographic Information: Not available at SSJVIC

Historical Literature: Not available at SSJVIC

Historical Maps: Not available at SSJVIC; please see http://historicalmaps.arcgis.com/usgs/

Local Inventories: Not available at SSJVIC

GLO and/or Rancho Plat Maps: Not available at SSJVIC; please see http://www.glorecords.blm.gov/search/default.aspx#searchTabIndex=0&searchByTypeIndex=1 and/or http://www.oac.cdlib.org/view?docId=hb8489p15p;developer=local;style=oac4;doc.view=items

Shipwreck Inventory: Not available at SSJVIC; please see https://www.slc.ca.gov/shipwrecks/

Soil Survey Maps: Not available at SSJVIC; please see http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

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. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Invoices for Information Center services will be sent under separate cover from the California State University, Bakersfield Accounting Office.

Thank you for using the California Historical Resources Information System (CHRIS).

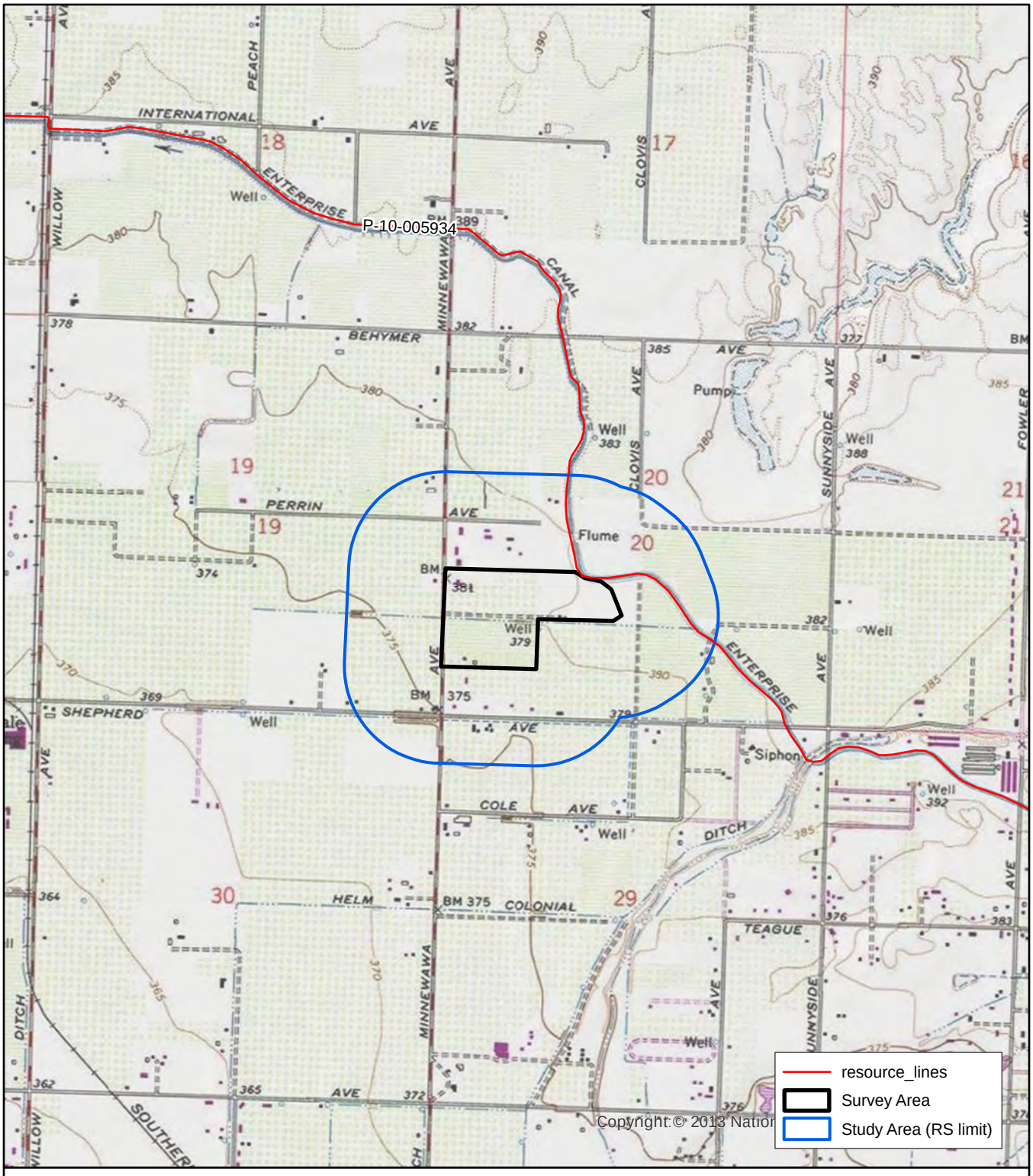
Sincerely,

Celeste M. Thomson
Coordinator

Resource List

SSJVIC Record Search 23-288

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-10-005934	CA-FRE-003564H	Resource Name - Enterprise Canal; OTIS Resource Number - 534499; OHP Property Number - 163775	Structure	Historic	HP20	2007 (R. Baloian, Applied EarthWorks, Inc.); 2013 (Randy Baloian, Applied EarthWorks, Inc.); 2017 (Ward Stanley and Randy Baloian, Applied EarthWorks, Inc.)	FR-02615, FR-02919, FR-03067



Scale: 1:24,000

N

0 0.5 1 Miles

0 1,000 2,000 3,000 4,000 5,000 Feet

0 0.5 1 Kilometers

12S 21E 19, 20, 29, 30
Friant (1964), CA 7.5' USGS Topographic Quadrangle
Clovis (1964-1981), CA 7.5' USGS Topographic Quadrangle

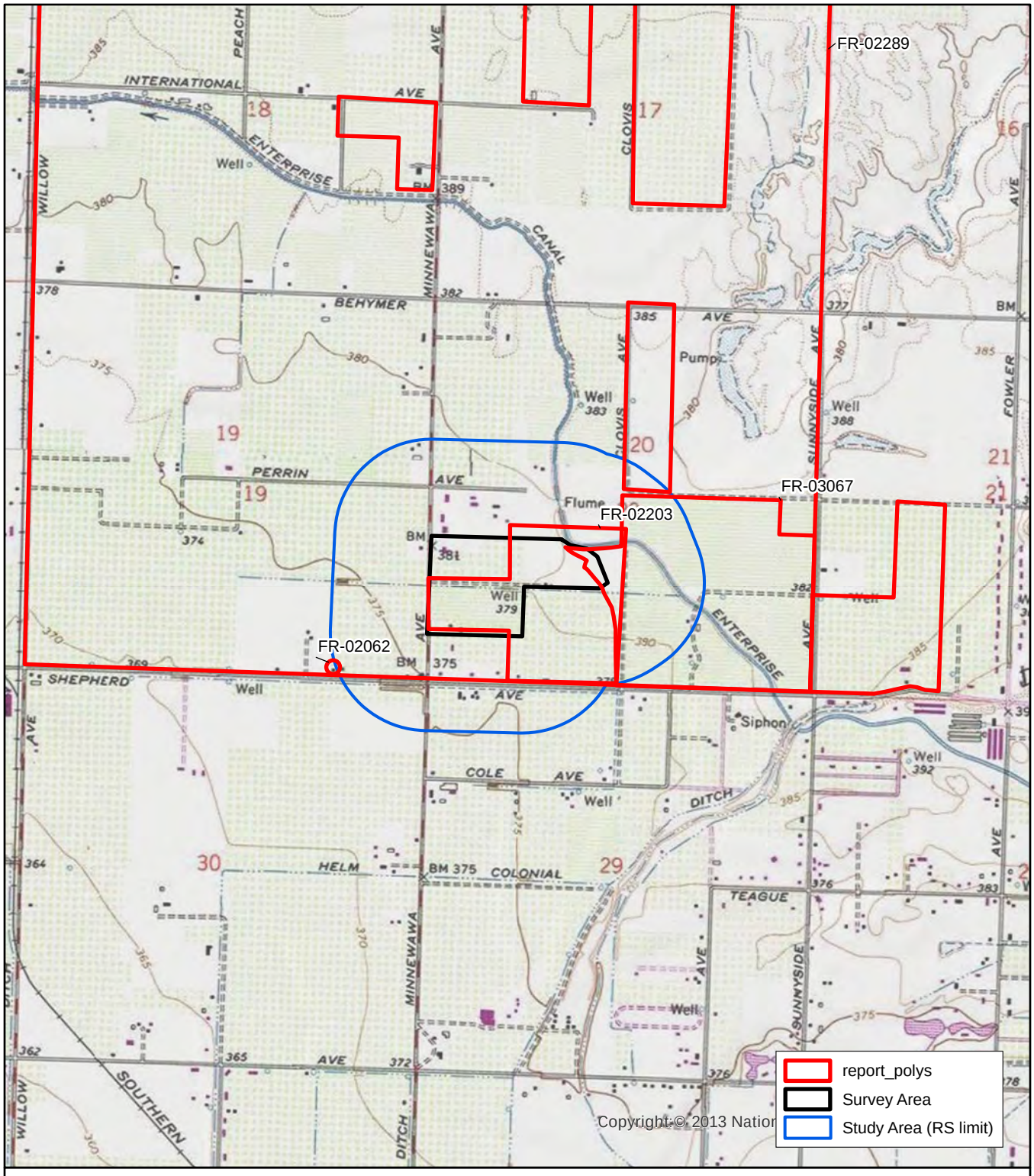
Applied EARTHWORKS, Inc.

Record Search Results Map: Resources

Report List

SSJVIC Record Search 23-288

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
FR-01219		1993	Bissonnette, Linda Dick	Fresno Metropolitan Flood Control District Drainage Area "BY" Facilities	Cultural Resources Consulting	
FR-02062		2004	Thal, Sean	Request for SHPO Review of FCC Undertaking (Shepherd/CA-1202A)	EarthTouch, Inc.	
FR-02203		2006	Varner, Dudley M.	A Cultural Resource Study of the Battlin Brooks Property, Fresno County, California	Varner Associates	
FR-02289		2006	Nettles, Wendy M. and Baloian, Randy	Cultural Resources Reconnaissance Survey of the City of Clovis Northwest Urban Center Specific Plan Area, Fresno County, California	Applied EarthWorks, Inc.	10-006109
FR-03067		2018	Stanley, Ward, Baloian, Randy, and Baloian, Mary	Cultural Resource Inventory and Evaluation for the Tract 6200 Development in the City of Clovis, Fresno County, California	Applied EarthWorks, Inc.	10-005934



Scale: 1:24,000

0 0.5 1 Miles

0 1,000 2,000 3,000 4,000 5,000 Feet

0 0.5 1 Kilometers

12S 21E 19, 20, 29, 30
Friant (1964), CA 7.5' USGS Topographic Quadrangle
Clovis (1964-1981), CA 7.5' USGS Topographic Quadrangle

Applied EARTHWORKS, Inc.

Record Search Results Map: Reports

APPENDIX C

Native American Outreach

Sacred Lands File & Native American Contacts List Request

Native American Heritage Commission
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
916-373-3710
916-657-5390 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Date: 7/19/23

Project: 4523 Clovis tract 6375

County: Fresno

USGS Quadrangle Name: Clovis & Friant

Township: 12S 21E 19, 20, 29, 30

Company/Firm/Agency: Applied EarthWorks, Inc.

Contact Person: Milo Honsberger

Street Address: 1391 W. Shaw Ave., Suite C

City: Fresno **Zip:** 93711

Phone: (559) 229-1856 x

Fax: (559) 229-2019

Email: mhonsberger@appliedearthworks.com

Project Description:

Applied earthworks will be conducting a survey at Tract 6375 in Fresno County.

NATIVE AMERICAN HERITAGE COMMISSION

ACTING CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Sara Dutschke
Miwok

COMMISSIONER
Isaac Bojorquez
Ohlone-Costanoan

COMMISSIONER
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

COMMISSIONER
Wayne Nelson
Luiseño

COMMISSIONER
Stanley Rodriguez
Kumeyaay

COMMISSIONER
Vacant

COMMISSIONER
Vacant

COMMISSIONER
Vacant

EXECUTIVE SECRETARY
Raymond C.
Hitchcock
Miwok, Nisenan

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

August 17, 2023

Milo Honsberger
Applied EarthWorks, Inc.

Via Email to: mhonsberger@appliedearthworks.com

Re: 4523 Clovis tract 6375 Project, Fresno County

Dear Mr. Honsberger:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Cameron.vela@nahc.ca.gov.

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst
Attachment

Native American Heritage Commission
Native American Contact List
Fresno County
8/17/2023

Tribe Name	Fed (F) Non-Fed (N)	Contact Person	Contact Address	Phone #	Email Address	Cultural Affiliation
Big Sandy Rancheria of Western Mono Indians	F	Elizabeth Kipp, Chairperson	P.O. Box 337 37387 Auberry Mission Road Auberry, CA, 93602	(559) 374-0066	Lkipp@bsrnation.com	Western Mono
Big Sandy Rancheria of Western Mono Indians	F	Tom Zizzo, Tribal Administrator	P.O. Box 337 37387 Auberry Mission Road Auberry, CA, 93602	(559) 374-0066	Tzizzo@bsrnation.com	Western Mono
Big Sandy Rancheria of Western Mono Indians	F	Joel Marvin, Vice Chairperson	P.O. Box 337 37387 Auberry Mission Road Auberry, CA, 93602	(559) 374-0066	Jmarvin@bsrnation.com	Western Mono
Cold Springs Rancheria of Mono Indians	F	Jared Aldern,	P. O. Box 209 Tollhouse, CA. 93667	(559) 855-5043	csrepa@netptc.net	Mono
Cold Springs Rancheria of Mono Indians	F	Carol Bill, Chairperson	P.O. Box 209 Tollhouse, CA, 93667	(559) 855-5043	coldsprgstribe@netptc.net	Mono
Dumna Wo-Wah Tribal Government	N	Robert Ledger, Chairperson	2191 West Pico Ave. Fresno, CA, 93705	(559) 540-6346	ledgerrobert@ymail.com	Foothill Yokut Mono
North Fork Mono Tribe	N	Ron Goode, Chairperson	13396 Tollhouse Road Clovis, CA, 93619	(559) 355-1774	rwgoode911@hotmail.com	Mono
North Fork Mono Tribe	N	Anna Phipps, Tribal Secretary	6051 Bear Creek Rd. Garden Valley, CA, 95633	(916) 765-4784	aphipps01@att.net	Mono
North Fork Mono Tribe	N	Jesse Valdez, Council Member - Archaeological Dir	120 Monte Vista St. Lindsey, CA, 93247	(559) 350-9113	ariesgoathead@gmail.com	Mono
North Valley Yokuts Tribe	N	Timothy Perez,	P.O. Box 717 Linden, CA, 95236	(209) 662-2788	huskanam@gmail.com	Costanoan Northern Valley Yokut
North Valley Yokuts Tribe	N	Katherine Perez, Chairperson	P.O. Box 717 Linden, CA, 95236	(209) 887-3415	canutes@verizon.net	Costanoan Northern Valley Yokut
Picayune Rancheria of the Chukchansi Indians	F	Michael Wynn, Tribal Administrator	P.O. Box 2226 Oakhurst, CA, 93644	(559) 795-4228	mwynn@chukchansi-nsn.gov	Foothill Yokut
Picayune Rancheria of the Chukchansi Indians	F	Heather Airey, Tribal Historic Preservation Officer	P.O. Box 2226 Oakhurst, CA, 93644	(559) 795-5986	hairey@chukchansi-nsn.gov	Foothill Yokut
Picayune Rancheria of the Chukchansi Indians	F	Janet Bill, Chairperson	P.O. Box 2226 Oakhurst, CA, 93644	(559) 580-4457	council@chukchansi-nsn.gov	Foothill Yokut
Table Mountain Rancheria	F	Bob Pennell, Cultural Resource Director	P.O. Box 410 Friant, CA, 93626	(559) 325-0351	rpennell@tmr.org	Yokut
Table Mountain Rancheria	F	Brenda Lavell, Chairperson	P.O. Box 410 Friant, CA, 93626	(559) 822-2587		Yokut
Traditional Choinumni Tribe	N	David Alvarez, Chairperson	2415 E. Houston Avenue Fresno, CA, 93720	(559) 217-0396	davealvarez@sbcglobal.net	Foothill Yokut
Tule River Indian Tribe	F	Neil Peyron, Chairperson	P.O. Box 589 Porterville, CA, 93258	(559) 781-4271	neil.peyron@tulerivertribe-nsn.gov	Yokut
Tule River Indian Tribe	F	Kerri Vera, Environmental Department	P. O. Box 589 Porterville, CA, 93258	(559) 783-8892	kerri.vera@tulerivertribe-nsn.gov	Yokut
Tule River Indian Tribe	F	Joey Garfield, Tribal Archaeologist	P. O. Box 589 Porterville, CA, 93258	(559) 783-8892	joey.garfield@tulerivertribe-nsn.gov	Yokut
Wuksachi Indian Tribe/Eshom Valley Band	N	Kenneth Woodrow, Chairperson	1179 Rock Haven Ct. Salinas, CA, 93906	(831) 443-9702	kwood8934@aol.com	Foothill Yokut Mono

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 4523 Clovis tract 6375 Project, Fresno County.

Applied EARTHWORKS Inc.

1391 W. Shaw Ave., Suite C
Fresno, CA 93711-3600
O: (559) 229-1856 | F: (559) 229-2019
www.appliedearthworks.com

September 13, 2023

Joel Marvin, Vice Chairperson
Big Sandy Rancheria of Western Mono Indians
P.O. Box 337
Auberry, CA, 93602
(559) 374-0066
Transmitted via USPS and email (jmarvin@bsrnation.com)

RE: Clovis Tracts 6375 and 6452 Housing Development Projects in Clovis, Fresno County, California

Dear Joel Marvin,

Applied EarthWorks, Inc. (*Æ*) is providing cultural resource services, including archaeological survey, in support of proposed housing development. The development includes two separate projects on adjacent plots of land, the boundaries of which are just north of the City of Clovis.

The project areas are a combined 77 acres, one 18.23-acre parcel and one 58.9-acre parcel, as shown on the Friant and Clovis 7.5-minute U.S. Geological Survey topographic quadrangles (see enclosed maps). The project does involve new construction, including multiple ground-breaking activities related to construction and development. Therefore, a cultural resource study is required.

On behalf of the City of Clovis, *Æ* is conducting Native American outreach and performing other tasks related to cultural resource management. The project is subject to the requirements of the California Environmental Quality Act and, as lead agency, the City of Clovis is responsible for any formal government-to-government consultation required. This communication is not intended to initiate Assembly Bill 52 consultation.

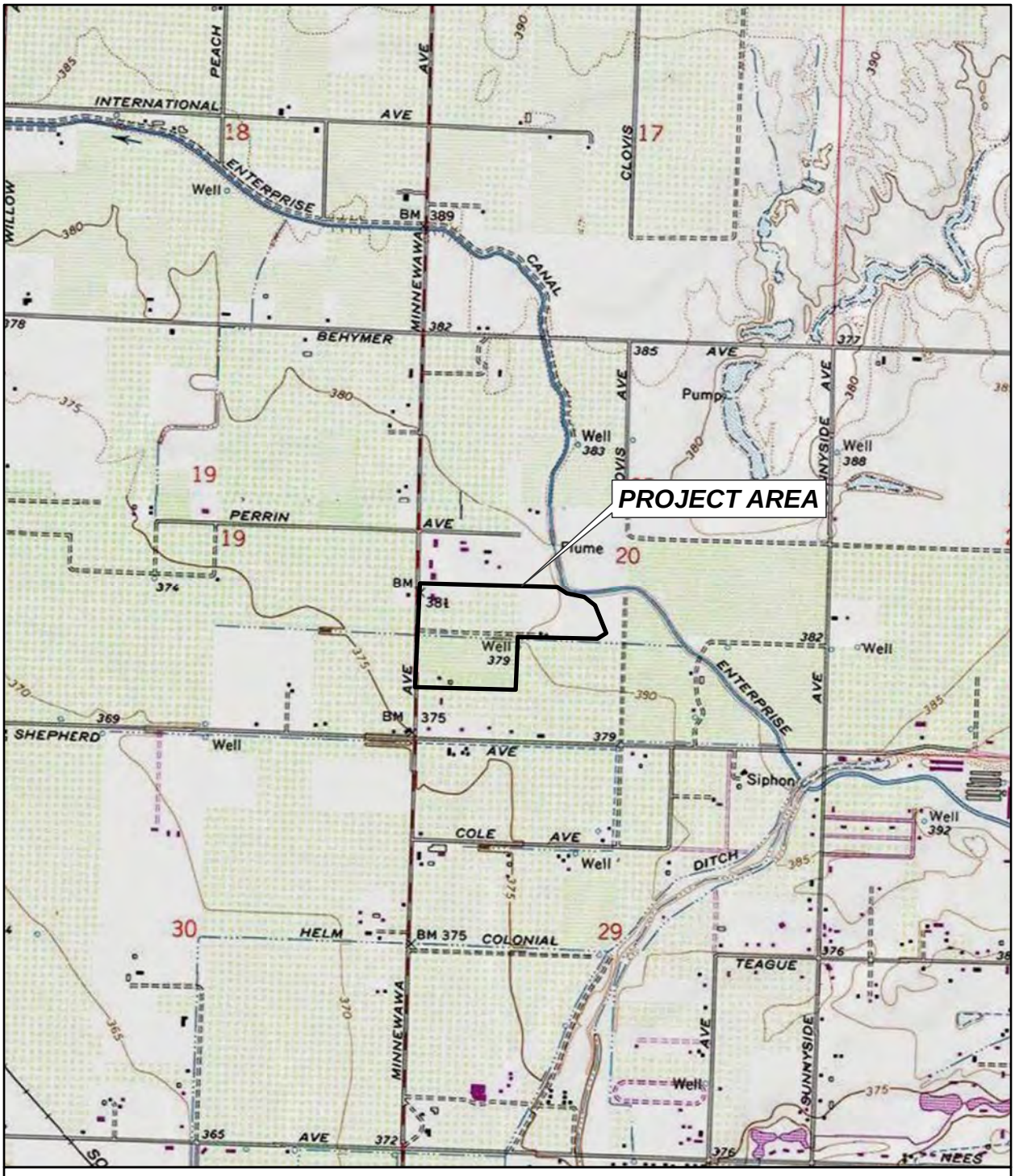
Æ has requested a sacred lands file search from the Native American Heritage Commission. The results were received on September 12, 2023 and indicated a negative result. Your name and address were provided to us by the NAHC as someone who may have additional information and/or concerns about the project.

If you have information about tribal or cultural resources in the area or if you have any interest in the project, please email/phone me or send a letter to my attention. Your comments will be included in our cultural resource report unless noted otherwise. You can contact me during normal business hours (559-229-1856 ext. 121) or via email at nsaenz@appliedearthworks.com if you have any questions or need additional information.

Sincerely,

Nicole Saenz, M.S.
Project Administrator, Fresno Office
Applied EarthWorks, Inc.

encl.: Project Maps



Project location map for the *Project - AE4523*.

TABLE MOUNTAIN RANCHERIA
TRIBAL GOVERNMENT OFFICE

CERTIFIED 4066 1535

October 18, 2023

Nicole Saenz, M.S., Project Administrator, Fresno Office
Applied EarthWorks Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

RE: Clovis Tracts 6375 and 6452 Housing Development Projects

Dear: Nicole Saenz

Table Mountain Rancheria is responding to your letter dated September 13, 2023, regarding Clovis Tracts 6375 and 6452 Housing Development Projects. Thank you for notifying Table Mountain Rancheria of the potential development and request for consultation. The Rancheria is very interested in this project as it lies within our cultural area of interest.

If you have already conducted a record search, please provide Table Mountain Rancheria with copies of any cultural resource report you may have.

At this time, please contact our office at (559) 325-0351 or rpennell@tmr.org to coordinate a discussion and meeting date regarding your project.

Sincerely,

Robert Pennell
Tribal Cultural Resources Director

23736
Sky Harbour Road
Post Office
Box 410
Friant
California
93626
(559) 822-2587
Fax
(559) 822-2693

Nicole Saenz <nsaenz@appliedearthworks.com>

City of Clovis Archaeology Project

2 messages

Nicole Saenz <nsaenz@appliedearthworks.com> Wed, Sep 13, 2023 at 3:40 PM
To: "lkipp@bsrnation.com" <lkipp@bsrnation.com>
Cc: Anna Hoover <ahoover@appliedearthworks.com>

Dear Elizabeth Kipp

Applied EarthWorks, Inc. is providing archaeological services for two projects in Clovis, Fresno County, CA. As a result of a recent Native American Heritage Commission (NAHC) Sacred Lands Search for these projects, your name and contact information was provided by the NAHC as someone who may have additional information and/or concerns about this project.

Please kindly review the attached letter and project area map and respond with any comments or concerns you may have. Please note that our outreach is not formal government to government consultation, but an opportunity for you to provide information for the archaeological report.

We appreciate your time and consideration.

--

Nicole Saenz M.S. | **Applied EarthWorks, Inc.**
Project Administrator - Osteologist - Field Technician | (She/Her)

1391 W. Shaw Ave., Suite C
Fresno, CA 93711-3600
Office 559-229-1856 x121
www.appliedearthworks.com

Archaeology | Paleontology | Historical Architecture | GIS

2 attachments

NAHC_Map_4522.pdf
725K

Big Sandy Rancheria Chairperson.pdf
139K

Liz Kipp <LKipp@bsrnation.com> Thu, Sep 14, 2023 at 2:51 PM
To: Nicole Saenz <nsaenz@appliedearthworks.com>
Cc: Anna Hoover <ahoover@appliedearthworks.com>

On behalf of Big Sandy Rancheria, we have no comments or concerns with the City of Clovis Archaeology Project. If at any time anything of cultural significance is discovered, we request to be notified. Thank you and have a great day.

Respectfully,

Elizabeth D. Hutchins-Kipp

Tribal Chairperson

Big Sandy Rancheria

PO Box 337

37387 Auberry Mission Rd.

Auberry, California 93602

559-374-0066 ext. 212

559-374-0055 fax

Lkipp@bsrnation.com



This message and any attachments are intended only for the use of the individual or entity to which they are addressed. If the reader of this message or an attachment is not the intended recipient or the employee or agent responsible for delivering the message or attachment to the intended recipient you are hereby notified that any dissemination, distribution or copying of this message or any attachment is strictly prohibited. If you have received this communication in error, please notify us immediately by replying to the sender. The information transmitted in this message and any attachments may be privileged, is intended only for the personal and confidential use of the intended recipients, and is covered by the Electronic Communications Privacy Act, 18 U.S.C. §2510-2521.

Native American Outreach

Clovis Tract 6375 Project

Organization	Name	Letter	Email	Phone	Summary of Contact
Big Sandy Rancheria of Western Mono Indians	Elizabeth Kipp	09/14/23	09/13/23	Message left 10/19/2023	No response to date
Big Sandy Rancheria of Western Mono Indians	Tom Zizzo	9/14/2023	9/13/2023	Message left 10/19/2023	No response to date
Big Sandy Rancheria of Western Mono Indians	Joel Marvin	9/14/2023	9/13/2023	10/19/2023	Requested to be informed of any discoveries
Cold Springs Rancheria of Mono Indians	Jared Aldern	09/14/23	09/13/23	10/19/23	No longer affiliated with tribal management
Cold Springs Rancheria of Mono Indians	Carol Bill	09/14/23	09/13/23	10/19/23	No longer affiliated with tribal management
Dumna Wo-Wah Tribal Government	Robert Ledger	09/14/23	09/13/23	Called 10/19/23; voicemail not set up	No response to date
North Fork Mono Tribe	Ron Goode	09/14/23	09/13/23	10/19/23	Requested that crews remain cognisant of the fact that there are several known sites in the area that have not been located.
North Fork Mono Tribe	Anna Phipps	09/14/23	09/13/23	Message left 10/19/2023	No response to date
North Fork Mono Tribe	Jesse Valdez	09/14/23	09/13/23	Message left 10/19/2023	No response to date
North Valley Yokuts Tribe	Timothy Perez	09/14/23	09/13/23	Message left 10/19/2023	No response to date
North Valley Yokuts Tribe	Katherine Perez	09/14/23	09/13/23	Message left 10/19/2023	No response to date
Picayune Rancheria of the Chukchansi Indians	Michael Wynn	09/14/23	09/13/23	Message left 10/19/2023	No response to date
Picayune Rancheria of the Chukchansi Indians	Heather Airey	09/14/23	09/13/23	10/19/23	Declined interest in the project
Picayune Rancheria of the Chukchansi Indians	Janet Bill	09/14/23	09/13/23	–	–
Table Mountain Rancheria	Bob Pennell	09/14/23	09/13/23	10/19/23	Received e-mail response on 10/19, 2023 expressing interest and requesting a copy of the cultural resources report and meeting to discuss the project
Table Mountain Rancheria	Brenda Lavell	09/14/23	no email address	–	–
Traditional Choinumni Tribe	David Alvarez	09/14/23	09/13/23	10/19/23	Declined interest in the project
Tule River Indian Tribe	Neil Peyron	09/14/23	09/13/23	Message left 10/19/2023	No response to date
Tule River Indian Tribe	Kerri Vera	09/14/23	09/13/23	10/19/23	Deferred interest to Table Mountain Rancheria
Tule River Indian Tribe	Joey Garfield	09/14/23	09/13/23	–	–
Wuksachi Indian Tribe/Eshom Valley Band	Kenneth Woodrow	09/14/23	09/13/23	Message left 10/19/2023	No response to date

ACOUSTICAL ANALYSIS

TRACT 6375
CLOVIS, CALIFORNIA

WJVA Project No. 23-25

PREPARED FOR

LENNAR HOMES OF CALIFORNIA, INC.
8080 NORTH PALM AVENUE, SUITE 110
FRESNO, CALIFORNIA 93711

PREPARED BY

WJV ACOUSTICS, INC.
VISALIA, CALIFORNIA

wjv acoustics

MARCH 14, 2024

INTRODUCTION

The project, Tract 6375, is a proposed 385-lot single-family residential development to be located in Clovis, California. The project site is located west of (and adjacent to) N. Minnewawa Avenue, north of E. Shepherd Avenue. The City of Clovis has requested an acoustical analysis to quantify project site noise exposure and determine noise mitigation requirements. This analysis, prepared by WJV Acoustics, Inc. (WJVA), is based upon a project site plan prepared by Yamabe & Horn Engineering (dated 8-8-23), traffic data provided by the Fresno Council of Governments (Fresno COG) and the findings of on-site noise level measurements. Revisions to the site plan may affect the findings and recommendations of this report. The site plan is provided as Figure 1.

Appendix A provides a description of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported are in A-weighted decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighting, as it provides a high degree of correlation with human annoyance and health effects. Appendix B provides typical A-weighted sound levels for common noise sources.

NOISE EXPOSURE CRITERIA

General Plan

The Noise Element of the City of Clovis General Plan establishes noise level standards for both transportation and non-transportation (stationary) noise sources. Table I provides the maximum interior and exterior noise level standards for various land use categories, in terms of the CNEL. The CNEL (Community Noise Equivalent Level) is the time-weighted average noise level for a 24-hour day with penalties of 4.77 dB added to noise levels occurring during the evening hours (7:00 p.m-10:00 p.m.) and 10 dB added to noise levels occurring during the nighttime hours (10:00 p.m-7:00 a.m.). Table II provides the Land Use Compatibility Matrix. The City of Clovis applies Table II as guidance to approve development and require mitigation measures to ensure existing and future land use compatibility.

The noise element establishes an exterior noise standard of 65 dB CNEL for exterior noise exposure within outdoor activity areas of residential land uses. Outdoor activity areas include backyards of single-family residences, individual patios or decks of multi-family developments and common outdoor recreation areas of multi-family developments. The intent of the exterior noise level requirement is to provide an acceptable noise environment for outdoor activities and recreation. There is no applicable exterior noise level standard for commercial or office land uses provided in the General Plan Noise Element.

The Noise Element also requires that interior noise levels attributable to exterior noise sources not exceed 45 dB CNEL. The intent of the interior noise level standard is to provide an acceptable noise environment for indoor communication and sleep.

TABLE I

MAXIMUM NOISE STANDARDS
CITY OF CLOVIS GENERAL PLAN NOISE ELEMENT

Land Use Categories		Energy Average (CNEL)	
Primary Land Use	**Additional Uses Allowed**	**Interior[1]**	**Exterior[2]**
Residential	Single Family, Multi Family	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	--
	Hospital, School Classroom	45	65
Institutional	Church Library	45	--
Open Space	Parks	--	65

Source: City of Clovis General 2-12 Plan Environmental and Safety Element, 2014.
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 II

LAND USE AND NOISE COMPATABILITY MATRIX
CITY OF CLOVIS GENERAL PLAN NOISE ELEMENT

LAND USES	ENERGY AVERAGE (CNEL)						
Example Land Uses	**<**	**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, multi-family	A	A	B	B	C	D	D
Parks	A	A	A	B	C	D	D
Office buildings, research & development, professional office, city office building	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.

Municipal Code

Additionally, the City of Clovis Municipal Code provides noise level standards applicable to the project. Section 9.22.080 (Noise) of the City's Municipal Code provides maximum allowable exterior and interior noise level standards for specific land use types. Noise level standards are provided as energy average (L_{eq}) noise levels and apply to any 15-minute interval of time. Table III provides the maximum allowable exterior noise level standards and Table IV provides the maximum allowable interior noise level standards. The Municipal Code also states that *"If the ambient noise level exceeds the resulting standard, the ambient shall be the standard".*

TABLE III

MAXIMUM EXTERIOR NOISE STANDARDS
CITY OF CLOVIS MUNICIPAL CODE

Noise Zone	Type of Land Use	A-Weighted Decibels, L_{eq} dBA Sources	
		7:00 a.m. to 10:00 p.m.	10:00 p.m. to 7:00 a.m.
I	Single-, two- or multi-family residential	55	50
II	Commercial	65	60
III	Residential portions of mixed-use properties	60	50
IV	Industrial or manufacturing	70	70

Source: City of Clovis Municipal Code

TABLE IV

MAXIMUM INTERIOR NOISE STANDARDS
CITY OF CLOVIS MUNICIPAL CODE

Noise Zone	Type of Land Use	A-Weighted Decibels, L_{eq} dBA Sources	
		7:00 a.m. to 10:00 p.m.	10:00 p.m. to 7:00 a.m.
I	Residential	45	40
II	Administrative/professional office	50	--
III	Residential portions of mixed-use properties	45	40

Source: City of Clovis Municipal Code

PROJECT SITE NOISE EXPOSURE

The project site is located west of (and adjacent to) N. Minnewawa Avenue, north of E. Shepherd Avenue, in Clovis, California. The project site is exposed traffic noise associated with vehicles on N. Minnewawa Avenue. The distance from center of the backyards of the closest proposed lots to the centerline of N. Minnewawa Avenue is approximately 60 feet.

Traffic Noise Exposure

Noise exposure from traffic on N. Minnewawa Avenue was calculated for existing and future (2046) conditions using the FHWA Traffic Noise Model and traffic data obtained from Fresno COG. A description of the noise model, applied data, methodology and findings is provided below.

WJVA utilized the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA Model is a standard analytical method used for roadway traffic noise calculations. The model is based upon reference energy emission levels for automobiles, medium trucks (2 axles) and heavy trucks (3 or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions, and is generally considered to be accurate within ±1.5 dB. To predict CNEL values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Noise level measurements and concurrent traffic counts were conducted by WJVA staff within the project site on July 25, 2023. The purpose of the measurement was to evaluate the accuracy of the FHWA Model in describing traffic noise exposure within the project site. The traffic noise measurement site was located at a setback distance of approximately 35 feet from the centerline of N. Minnewawa Avenue. The posted speed limit was 45 mph (miles per hour). The project vicinity and noise monitoring site location are provided as Figure 2. A photograph showing the N. Minnewawa Avenue noise measurement site is provided as Figure 3.

Noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL-820 sound level analyzer equipped with a B&K Type 4176 1/2" microphone. The equipment complies with the specifications of the American National Standards Institute (ANSI) for Type I (Precision) sound level meters. The meter was calibrated in the field prior to use with a B&K Type 4230 acoustic calibrator to ensure the accuracy of the measurements. The microphone was located on a tripod at 5 feet above the ground. The project site presently consists of undeveloped land and a portion is currently used for industrial purposes.

Noise measurements were conducted in terms of the equivalent energy sound level (L_{eq}). Measured L_{eq} values were compared to L_{eq} values calculated (predicted) by the FHWA Model using as inputs the traffic volumes, truck mix and vehicle speed observed during the noise measurements. The results of the comparison are shown in Table IV.

From Table IV it may be determined that the traffic noise levels predicted by the FHWA Model were 0.2 dB higher than those measured for the conditions observed at the time of the noise measurements for N. Minnewawa Avenue. This is considered to be excellent agreement with the model and therefore no adjustments to the model are necessary.

TABLE IV

COMPARISON OF MEASURED AND PREDICTED (FHWA MODEL) NOISE LEVELS TRACT 6375, CLOVIS

	N. Minnewawa Ave.
Measurement Start Time	9:50 a.m.
Observed # Autos/Hr.	360
Observed # Medium Trucks/Hr.	24
Observed # Heavy Trucks/Hr.	24
Observed Speed (MPH)	45
Distance, ft. (from center of roadway)	35
L_{eq}, dBA (Measured)	68.2
L_{eq}, dBA (Predicted)	68.4
Difference between Predicted and Measured L_{eq}, dBA	**0.2**

Note: FHWA "soft" site assumed for calculations.
Source: WJV Acoustics, Inc.

Annual Average Daily Traffic (AADT) data for N. Minnewawa Avenue in the project vicinity was obtained from Fresno COG. Truck percentages and the day/night distribution of traffic were estimated by WJVA, based upon previous studies conducted in the project vicinity since project-specific data were not available from government sources. A speed limit of 55 mph was assumed for the roadway. Table V summarizes annual average traffic data used to model noise exposure within the project site.

TABLE V

TRAFFIC NOISE MODELING ASSUMPTIONS TRCT 6375, CLOVIS

	N. Minnewawa Ave	
	Existing	2046
Annual Avenue Daily Traffic (AADT)	9,058	5,474
Day/Night Split (%)	90/10	
Assumed Vehicle Speed (mph)	45	
% Medium Trucks (% AADT)	2	
% Heavy Trucks (% AADT)	2	

Sources: Fresno COG
WJV Acoustics, Inc.

Using data from Table V, the FHWA Model, annual average traffic noise exposure was calculated for the closest proposed backyards from N. Minnewawa Avenue. Table VI provides the noise exposure levels for N. Minnewawa Avenue, at the closest proposed residential lots to the roadway.

TABLE VI

MODELED TRAFFIC NOISE LEVELS, W. MINNEWAWA AVENUE, dB, CNEL
TRACT 6375, CLOVIS

Roadway	Existing Conditions	2046 Conditions
W. Minnewawa Avenue (north of Alicante Avenue)	65.3	63.1

Source: WJV Acoustics
Fresno COG

Reference to Table VI indicates that the traffic noise exposure at the closest proposed lots to N. Minnewawa Avenue would be approximately 65 dB CNEL for existing conditions and approximately 63 dB CNEL for future (2046) traffic conditions on N. Minnewawa Avenue. The noise exposure level for existing traffic conditions slightly exceeds the City's 65 dB CNEL exterior noise level standard and mitigation measures are therefore required for compliance with the City's exterior noise level standard.

Exterior Noise Mitigation:

The City of Clovis Noise Element of the General Plan establishes a 65 dB CNEL criterion within outdoor activity areas (backyards) of single-family homes. The project site traffic noise exposure for existing traffic conditions exceeds the 65 dB CNEL noise level standard at the closest proposed residential setbacks to N. Minnewawa Avenue, and mitigation measures must be incorporated into project design for project noise compliance.

To mitigate exterior traffic noise exposure along N. Minnewawa Avenue it will be necessary to construct a sound wall along the roadway. The sound walls will provide acoustical shielding of backyards located closest to the roadways.

A sound wall insertion loss program based on the FHWA Model was used to calculate the insertion loss (noise reduction) provided by the proposed sound walls. The model calculates the insertion loss of a wall of given height based on the effective height of the noise source, height of the receiver, distance from the receiver to the wall, and distance from the noise source to the wall. The standard assumptions used in the sound wall calculations are effective source heights of 8, 2 and 0 feet above the roadway for heavy trucks, medium trucks and automobiles, respectively. The standard height of a residential receiver is five feet above the ground elevation. It was assumed by WJVA that the building pad elevations at the closest proposed homes to N. Minnewawa Avenue will be approximately the same elevation as the roadway pavement.

Based upon the above-described assumptions and method of analysis, the noise level insertion loss values for sound walls of various heights were calculated. The calculations indicated that a sound wall along N. Minnewawa Avenue constructed to a minimum height of six (6) feet above project site grade would result in exterior noise levels of approximately 60 dB CNEL within the closest proposed backyards to N. Minnewawa Avenue. In order for the sound wall to effectively shield backyards where there will be access to the development from N. Minnewawa Avenue, the sound walls will need to be turned inward (eastward) for a distance of approximately twenty (20) feet at roadway access points.

With the incorporation of the above-described sound wall, the exterior noise exposure at the closest proposed setbacks along N. Minnewawa Avenue will comply with the City's 65 dB CNEL standard within individual backyards of the proposed single-family homes. It should be noted, the sound wall would be effective at first-floor elevation receivers only. The sound wall would not be effective at second-floor elevation receivers. Therefore, if two-story construction is proposed for the first row of homes adjacent to and facing N. Minnewawa Avenue, noise levels at potential second-floor balconies facing the roadway would exceed the 65 dB CNEL exterior noise level standard.

Interior Noise Exposure:

The City of Clovis interior noise level standard is 45 dB CNEL. The worst-case noise exposure within the proposed residential development would be approximately 65 dB CNEL (2046 conditions). This means that the proposed residential construction must be capable of providing a minimum outdoor-to-indoor noise level reduction (NLR) of approximately 20 dB (65-45=20).

A specific analysis of interior noise levels was not performed. However, it may be assumed that residential construction methods complying with current building code requirements will reduce exterior noise levels by approximately 25 dB if windows and doors are closed. This will be sufficient for compliance with the City's 45 dB CNEL interior standard at all proposed lots. Requiring that it be possible for windows and doors to remain closed for sound insulation means that air conditioning or mechanical ventilation will be required.

CONCLUSIONS AND RECOMMENDATIONS

The proposed 385-lot single-family residential development will comply with all City of Clovis exterior and interior noise level standards, provided the following mitigation measures are incorporated into final project design.

- A sound wall constructed to a minimum height of six (6) feet above project-side grade is constructed along the lot property lines along N. Minnewawa Avenue. In order for the sound wall to effectively shield backyards where there will be access to the development from N. Minnewawa Avenue, the sound walls will need to be turned inward (eastward), for a distance of approximately twenty (20) feet. Suitable construction materials include concrete blocks, masonry, or stucco on both sides of a wood or steel stud wall.

- Mechanical ventilation or air conditioning must be provided for all homes so that windows and doors can remain closed for sound insulation purposes.

The conclusions and recommendations of this acoustical analysis are based upon the best information known to WJV Acoustics Inc. (WJVA) at the time the analysis was prepared concerning the proposed lot layout plan, project site elevation, traffic volumes and roadway configurations. Any significant changes in these factors will require a reevaluation of the findings of this report. Additionally, any significant future changes in motor vehicle technology, noise regulations or other factors beyond WJVA's control may result in long-term noise results different from those described by this analysis.

Respectfully submitted,



Walter J. Van Groningen
President

WJV:wjv

FIGURE 1: SITE PLAN

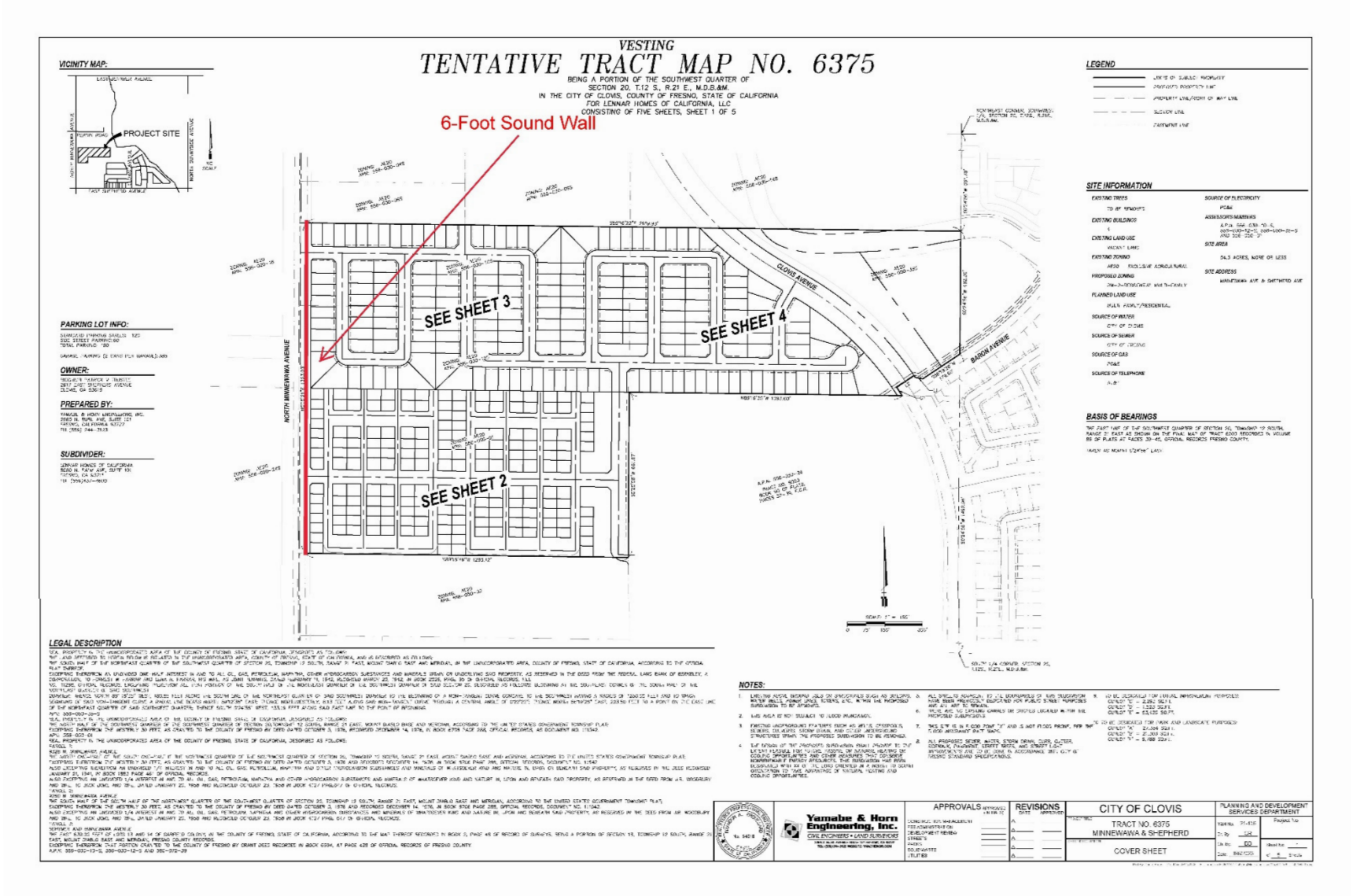


FIGURE 2: PROJECT SITE VICINITY AND NOISE MEASUREMENT LOCATION



FIGURE 3: N. MINNEWAWA AVENUE NOISE MEASUREMENT SITE



APPENDIX A

ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

DECIBEL, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

DNL/L_{dn}: Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.

NOTE: The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum noise level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval (L_{90}, L_{50}, L_{10}, etc.). For example, L_{10} equals the level exceeded 10 percent of the time.

A-2

ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

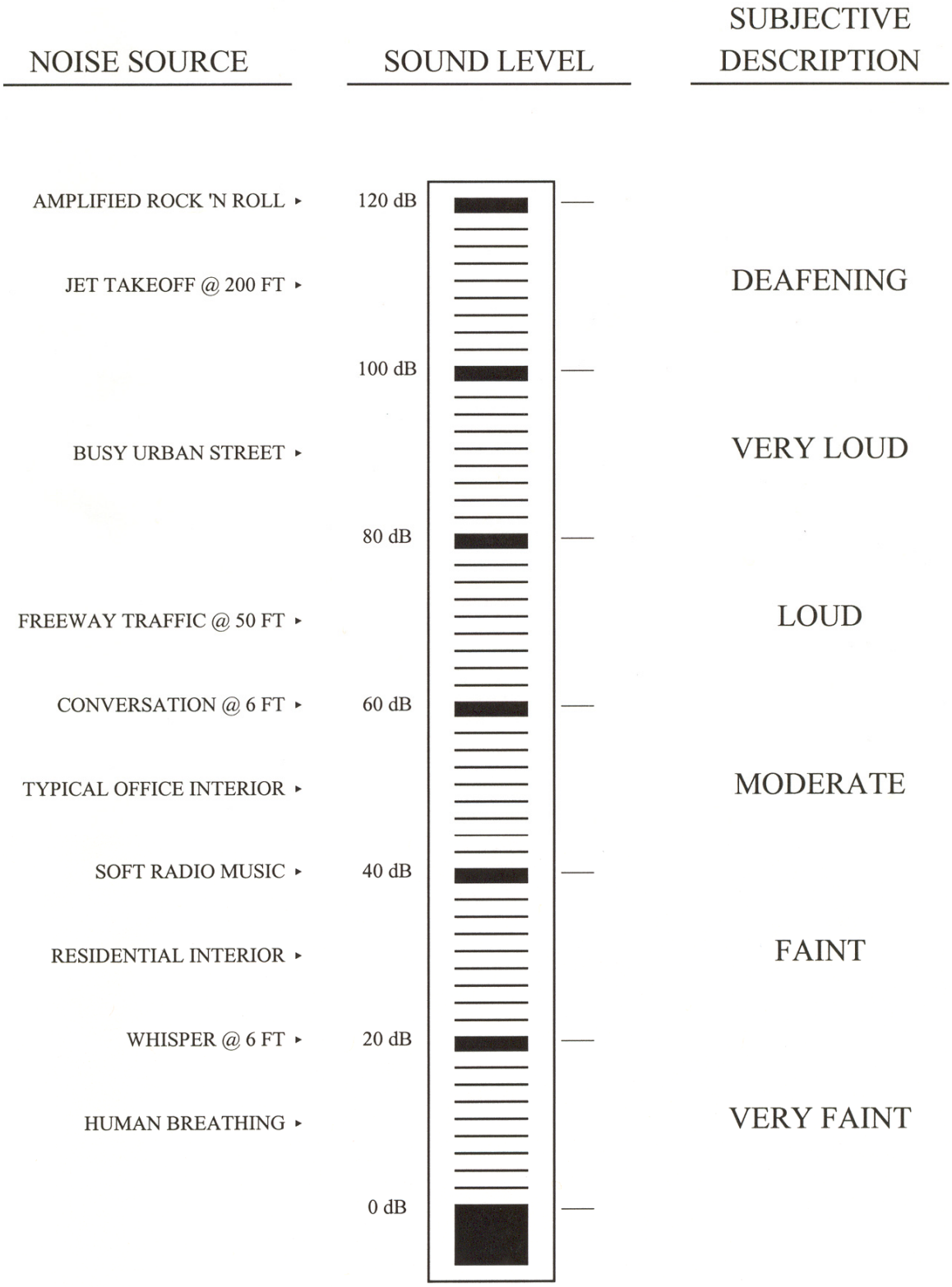
NOISE LEVEL REDUCTION (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of "noise level reduction" combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

SOUND LEVEL: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

SOUND TRANSMISSION CLASS (STC): The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

APPENDIX B
EXAMPLES OF SOUND LEVELS



TRANSPORTATION IMPACT ANALYSIS

Proposed Tract 6375

West of the Intersection of Clovis and Baron Avenues

Clovis, California

Prepared For:

Lennar Homes, Inc.
8080 North Palm Avenue, Suite 110
Fresno, California 93711

Date:

December 21, 2023

Job No.:

23-040.01

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION

EXECUTIVE SUMMARY

This report presents the results of a Transportation Impact Analysis for proposed Tract 6375 in Clovis, California. This analysis focuses on the anticipated effect of vehicle traffic resulting from the Project. The Transportation Impact Analysis was performed in general conformance with the City of Clovis *Transportation Impact Analysis Guidelines* dated September 15, 2022 (City Guidelines).

The Project site covers roughly 50 acres between Clovis and Minnewawa Avenues and generally between Shepherd Avenue and the Perrin Avenue alignment in Clovis, California. The Project will include 387 single-family residential lots. Site access is proposed via two local streets connecting to Minnewawa Avenue, one local street connecting to Clovis Avenue north of Baron Avenue, and a connection to DeWitt Avenue at Vintage Lane. It is our understanding that development along the frontage of Minnewawa Avenue will result in one northbound lane, one southbound lane, and a two-way left-turn lane on Minnewawa Avenue at the site access locations.

This report includes analysis of the following intersections:

1. Willow Avenue / International Avenue
2. Minnewawa Avenue / International Avenue
3. Willow Avenue / Behymer Avenue
4. Minnewawa Avenue / Behymer Avenue
5. Minnewawa Avenue / Shepherd Avenue
6. DeWitt Avenue / Shepherd Avenue
7. Clovis Avenue / Shepherd Avenue
8. Clovis Avenue / Site Access Street (left turn in)

This report includes analysis of the following road segments:

1. Behymer Avenue between Willow and Minnewawa Avenues
2. Minnewawa Avenue between Site Access and Behymer Avenues

The study time periods include the weekday a.m. and p.m. peak hours determined between 7:00 and 9:00 a.m. and between 4:00 and 6:00 p.m. The peak hours are analyzed for the following conditions:

- Existing Conditions;
- Existing-Plus-Project Conditions;
- Near-Term With-Project Conditions (includes pending and approved projects not yet occupied);
- Cumulative (Year 2045) With-Project Conditions.

Standard traffic engineering principles and methods were employed to establish the existing conditions, to estimate the number of trips expected to be generated by the Project, and to

analyze the traffic conditions that are expected to occur in the future. The conclusions of the study are summarized in the following sections.

Trip Generation

The Project is expected to generate approximately 3,650 vehicle trips per day (1,825 trips entering the site and 1,825 trips exiting the site). Peak-hour traffic volumes are expected to be on the order of 271 trips during the a.m. peak hour and 364 trips during the p.m. peak hour.

CEQA Impact Analysis (VMT)

Project-specific traffic modeling indicates a calculated Project VMT of 16.6 VMT per capita, which is greater than the threshold of 14.1 VMT per capita. Therefore, the Project would create a significant transportation impact.

The Project will implement feasible mitigation measures such as constructing sidewalk and trails. These Project design features can help offset a portion of the VMT impact of the Project but will not reduce the impact to less than significant. Therefore, the Project will have a significant and unavoidable transportation impact under CEQA.

It is recommended that the proposed Project, consistent with the General Plan, tier its environmental review from the General Plan SEIR, which has disclosed the VMT impacts of land use development consistent with the General Plan. Therefore, the Project's significant transportation impact does not need to be disclosed in a Project-specific EIR.

Existing Conditions

The study intersections are currently operating at acceptable levels of service with calculated 95th-percentile queues contained within the available storage capacity, with the exception that the intersection of Minnewawa and Behymer Avenues (all-way stop control) currently operates at LOS E during the a.m. peak hour and LOS F during the p.m. peak hour. The study road segments are currently operating at acceptable levels of service.

Existing-Plus-Project Conditions

The existing-plus-Project-conditions analyses represent conditions that would occur after construction of the Project if none of the pending and approved projects were constructed. This scenario isolates the specific effects of the Project. The study intersections and road segments are expected to continue to operate at levels of service similar to the existing conditions. The Project will not cause any intersections currently operating at acceptable LOS to operate worse than the target LOS, and the calculated 95th-percentile queues are within the available storage capacity.

The Project is expected to increase delays at the intersection of Minnewawa and Behymer Avenues, which operates at LOS E during the a.m. peak hour and LOS F during the p.m. peak hour.

Existing-Plus-Project Improved Conditions

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with

protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours.

Near-Term With-Project Conditions

The near-term with-Project conditions analyses represent conditions that are expected after construction of the Project and the known pending and approved projects. This scenario isolates the near-term cumulative effects of the Project and other known projects. The study intersections and road segments are expected to continue to operate at acceptable levels of service, with the following exceptions:

- Minnewawa Avenue / International Avenue: LOS E on the westbound approach during the a.m. peak hour with two-way stop control.
- Minnewawa Avenue / Behymer Avenue: LOS E during the a.m. and p.m. peak hours with all-way stop control.
- Minnewawa Avenue / Shepherd Avenue: LOS E during the a.m. peak hour and LOS F during the p.m. peak hour with traffic signals.

Calculated 95th-percentile queues are contained within the existing storage capacity, with the following exceptions:

- Minnewawa Avenue / Shepherd Avenue: left-turn lanes on the eastbound, northbound, and southbound approaches, right-turn lanes on the eastbound and southbound approaches.
- Clovis Avenue / Shepherd Avenue: left-turn lane on the northbound approach, right-turn lanes on the eastbound and northbound approaches.

Near-Term With-Project Improved Conditions

In order for the intersection of Minnewawa and International Avenues to operate at acceptable LOS, all-way stop control may be installed. With all-way stop control, the intersection is expected to operate at LOS C during the a.m. peak hour and LOS B during the p.m. peak hour.

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours.

In order for the intersection of Minnewawa and Shepherd Avenues to operate at acceptable LOS, the intersection would require modification from the existing conditions as follows:

Eastbound approach: maintain existing configuration

Westbound approach: add a second through lane; the right turn may be shared with the through lane.

Northbound approach: add a second through lane with a dedicated right-turn lane.

Southbound approach: add a second through lane with a dedicated right-turn lane.

With widening, the intersection of Minnewawa and Shepherd Avenues is expected to operate at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour.

In order to better accommodate queues at the intersection of Clovis and Shepherd Avenues, the intersection striping may be modified to open the second left-turn lane on the northbound approach. With the modification, the intersection is expected to operate at LOS C during the a.m. and p.m. peak hours.

Cumulative Year 2045 With-Project Conditions

The year 2045 cumulative with-Project conditions analyses are based on the assumption that the Project has been constructed, the pending and approved projects have been constructed, and that 20 years of growth has occurred in the Clovis, Fresno, and Fresno County region as incorporated into the adopted Fresno County travel model. The study intersections and road segments are expected to continue to operate at acceptable levels of service, with the following exceptions:

- Minnewawa Avenue / International Avenue: LOS F on the westbound approach during the a.m. peak hour and LOS F on the eastbound approach during the p.m. peak hour with two-way stop control.
- Minnewawa Avenue / Behymer Avenue: LOS F during the a.m. and p.m. peak hours with all-way stop control.
- Minnewawa Avenue / Shepherd Avenue: LOS F during the a.m. and p.m. peak hours with traffic signals.
- DeWitt Avenue / Shepherd Avenue: LOS E on the southbound approach during the a.m. and p.m. peak hours with two-way stop control.

Calculated 95th-percentile queues are contained within the existing storage capacity, with the following exceptions:

- Willow Avenue / Behymer Avenue: left-turn lane on the westbound approach.
- Minnewawa Avenue / Behymer Avenue: excessive queues on the westbound and southbound approaches.
- Minnewawa Avenue / Shepherd Avenue: excessive queues on all legs corresponding to LOS F at the intersection.
- Clovis Avenue / Shepherd Avenue: left-turn lanes on the westbound and northbound approaches, right-turn lanes on the eastbound, northbound, and southbound approaches.

Cumulative Year 2045 With-Project Improved Conditions

In order for the intersection of Minnewawa and International Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours.

EXECUTIVE SUMMARY (Continued)

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on all four approaches and a dedicated right-turn lane would be required on the westbound approach. With signalization, the intersection is expected to operate at LOS D during the a.m. and p.m. peak hours.

In order for the intersection of Minnewawa and Shepherd Avenues to operate at acceptable LOS, the intersection would require modification from the existing conditions as follows:

Eastbound approach: maintain existing configuration

Westbound approach: add a second through lane and a dedicated right-turn lane.

Northbound approach: add a second through lane with a dedicated right-turn lane.

Southbound approach: add a second through lane with a dedicated right-turn lane.

With the recommended widening, each approach to the intersection of Minnewawa and Shepherd Avenues would have one left-turn lane, two through lanes, and one right-turn lane. The intersection is expected to operate at LOS D during the a.m. and p.m. peak hours. It should be noted that long queues are calculated in the left-turn lanes on the northbound and southbound approaches. The City may consider lengthening the turn lanes or modifying the intersection to provide two left-turn lanes on the approaches in the future.

In order to better accommodate queues at the intersection of Clovis and Shepherd Avenues, the intersection striping may be modified to open the second left-turn lane on the northbound approach. With the modification, the intersection is expected to operate at LOS C during the a.m. and p.m. peak hours.

No improvements are recommended for the intersection of DeWitt Avenue and Shepherd Avenues because the LOS E is experienced by vehicles that are allowed only to make right turns and 95th-percentile queues are expected to be only three to four vehicles long. The intersection is not a candidate for signalization and it is recommended that it be maintained in its existing configuration.

The proposed median break in Clovis Avenue at the proposed site access roadway is expected to operate at acceptable LOS with reasonable queues. The median break will serve to distribute Project trips such that drivers will be able to select the most convenient route. Therefore, it is recommended that the median break and left turn into the Project site be allowed.

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION

Mr. Jeff Callaway
Lennar Homes, Inc.
8080 North Palm Avenue, Suite 110
Fresno, California 93711

December 21, 2023

Subject: Transportation Impact Analysis
Proposed Tract 6375
West of the Intersection of Clovis and Baron Avenues
Clovis, California

Dear Mr. Callaway:

1.0 INTRODUCTION

This report presents the results of a Transportation Impact Analysis for proposed Tract 6375 in Clovis, California. This analysis focuses on the anticipated effect of vehicle traffic resulting from the Project. The Transportation Impact Analysis was performed in general conformance with the City of Clovis *Transportation Impact Analysis Guidelines* dated September 15, 2022 (City Guidelines).

2.0 PROJECT DESCRIPTION

The Project site covers roughly 50 acres between Clovis and Minnewawa Avenues and generally between Shepherd Avenue and the Perrin Avenue alignment in Clovis, California. The Project will include 387 single-family residential lots. Site access is proposed via two local streets connecting to Minnewawa Avenue, one local street connecting to Clovis Avenue north of Baron Avenue, and a connection to DeWitt Avenue at Vintage Lane. It is our understanding that development along the frontage of Minnewawa Avenue will result in one northbound lane, one southbound lane, and a two-way left-turn lane on Minnewawa Avenue at the site access locations.

A site vicinity map is presented in the attached Figure 1, Site Vicinity Map, following the text of this report. A site plan is presented in Figure 2, Site Plan.

3.0 STUDY AREA AND TIME PERIOD

This report includes analysis of the following intersections:

1. Willow Avenue / International Avenue
2. Minnewawa Avenue / International Avenue
3. Willow Avenue / Behymer Avenue
4. Minnewawa Avenue / Behymer Avenue
5. Minnewawa Avenue / Shepherd Avenue
6. DeWitt Avenue / Shepherd Avenue
7. Clovis Avenue / Shepherd Avenue
8. Clovis Avenue / Site Access Street (left turn in)

This report includes analysis of the following road segments:

1. Behymer Avenue between Willow and Minnewawa Avenues
2. Minnewawa Avenue between Site Access and Behymer Avenues

This report includes an estimate of the number or Project trips that will occur at the following freeway interchanges:

1. State Route (SR) 168 interchange at Herndon Avenue
2. SR 168 interchange at Fowler Avenue

The study time periods include the weekday a.m. and p.m. peak hours determined between 7:00 and 9:00 a.m. and between 4:00 and 6:00 p.m. The peak hours are analyzed for the following conditions:

- Existing Conditions;
- Existing-Plus-Project Conditions;
- Near-Term With-Project Conditions (includes pending and approved projects not yet occupied);
- Cumulative (Year 2045) With-Project Conditions.

4.0 LANE CONFIGURATIONS AND INTERSECTION CONTROL

The existing lane configurations and intersection control at the study intersections are illustrated in Figure 3, Existing Lane Configurations and Intersection Control.

5.0 CITY OF CLOVIS GENERAL PLAN

The City of Clovis General Plan designates the streets at the study locations as follows:

- Willow Avenue: Arterial
- Minnewawa Avenue: Arterial south of Behymer Avenue and Collector north of Behymer Avenue
- DeWitt Avenue: Local
- Clovis Avenue: Arterial
- International Avenue: Collector

- Beyhmer Avenue: Arterial west of Clovis Avenue and Collector east of Clovis Avenue
- Shepherd Avenue: Arterial west of Clovis Avenue and Expressway east of Clovis Avenue

6.0 CEQA IMPACT ANALYSIS

6.1 Background and Significance Threshold

The City Guidelines provide guidance relative to analyzing vehicle miles traveled (VMT) for purposes of determining transportation impacts in accordance with the California Environmental Quality Act (CEQA).

The City Guidelines indicate that Projects that generate or attract fewer than 500 vehicle trips per day are presumed to cause a less-than-significant transportation impact. For residential projects, the City Guidelines indicate a significant transportation impact occurs if the Project VMT per capita is greater than a level of 13 percent below the existing average VMT per capita in Fresno County. The regional average is 16.1 VMT per capita, and the impact threshold is 14.1 VMT per capita.

6.2 Project-Specific VMT Analysis

The Project will generate more than 500 trips per day (see the Trip Generation section of this report) and the Project site lies within a red area on Figure B1 of the City Guidelines. Therefore, the Project is not be screened out with respect to transportation impacts and a Project-specific VMT analysis has been performed.

Project-specific traffic modeling was performed by a COG-approved traffic modeling consultant and the results are presented in Appendix A. The modeling indicates a calculated Project VMT of 16.6 VMT per capita, which is greater than the threshold of 14.1 VMT per capita. Therefore, the Project would create a significant transportation impact.

6.3 Feasible Mitigation Measures

Feasible mitigation measures must be identified to avoid or substantially reduce a significant impact under CEQA. Mitigation measures can be incorporated as a part of plans, policies, regulations, or project designs. Mitigation of VMT impacts typically requires changes in habits and behaviors of residents. Project design features that encourage mode shift from automobiles to transit or nonmotorized modes can potentially reduce project-specific VMT.

VMT reduction and benefits from project design features are typically not accounted for in the project-specific VMT calculations conducted using the regional travel demand model. Therefore, VMT reduction credit can be taken for Project design features that encourage the desired mode shift. Descriptions of such project design features and the corresponding potential VMT reduction are presented below. The potential VMT reduction was estimated using the California Air Pollution Control Officers Association's (CAPCOA) "*Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity – Designed for Local Governments, Communities, and Project Developers*" dated December 2021.

The Project proposes to provide pedestrian facilities both internal to the Project site and along the project frontage. Providing such improvements encourages people to walk instead of drive and thereby reduces VMT. CAPCOA transportation measure "T-18: Provide Pedestrian Network Improvement" provides an estimate of the VMT reduction due to project related enhancements in pedestrian access and connectivity. The Project study area includes more than five miles of existing and pending sidewalk. The Project proposes to add approximately 3¼ miles of sidewalk/pedestrian access. Utilizing the CAPCOA VMT reduction calculation, construction of sidewalk may reduce the Project's VMT by approximately 3.3 percent.

The Project proposes to construct up to ½ mile of Class II bike lane on Clovis Avenue and on Minnewawa Avenue. CAPCOA transportation measure "T-19A: Construct or Improve Bike Facility" suggests the Project bicycle design features have a potential to reduce up to 0.01 percent of the project VMT.

Implementation of the Project design features described above reduces the calculated Project VMT by up to approximately 3.3 percent. The Project design features can help offset a portion of the VMT impact of the Project but will not reduce the impact to less than significant. Therefore, the Project will have a significant and unavoidable transportation impact under CEQA.

6.4 Findings

On October 17, 2022 the Clovis City Council certified a supplemental environmental impact report (SEIR) with a statement of overriding considerations applicable to significant transportation impacts based on VMT for projects that conform to the General Plan and that have implemented feasible mitigation measures.

It is recommended that the proposed Project, consistent with the General Plan, tier its environmental review from the General Plan SEIR, which has disclosed the VMT impacts of land use development consistent with the General Plan. Therefore, the Project's significant transportation impact does not need to be disclosed in a Project-specific EIR.

7.0 LEVEL OF SERVICE

The Transportation Research Board *Highway Capacity Manual, 7th Edition,* (HCM) defines level of service (LOS) as, "A quantitative stratification of a performance measure or measures that represent quality of service, measured on an A-F scale, with LOS A representing the best operating conditions from the traveler's perspective and LOS F the worst." Automobile mode LOS characteristics for both unsignalized and signalized intersections are presented in Tables 1 and 2. LOS characteristics for road segments are presented in Table 3.

Table 1
Level of Service Characteristics for Unsignalized Intersections

Level of Service	Average Vehicle Delay (seconds)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

Table 2
Level of Service Characteristics for Signalized Intersections

Level of Service	Description	Average Vehicle Delay (seconds)
A	Volume-to-capacity ratio is no greater than 1.0. Progression is exceptionally favorable or the cycle length is very short.	<10
B	Volume-to-capacity ratio is no greater than 1.0. Progression is highly favorable or the cycle length is very short.	>10-20
C	Volume-to-capacity ratio is no greater than 1.0. Progression is favorable or cycle length is moderate.	>20-35
D	Volume-to-capacity ratio is high but no greater than 1.0. Progression is ineffective or cycle length is long. Many vehicles stop and individual cycle failures are noticeable.	>35-55
E	Volume-to-capacity ratio is high but no greater than 1.0. Progression is unfavorable and cycle length is long. Individual cycle failures are frequent.	>55-80
F	Volume-to-capacity ratio is greater than 1.0. Progression is very poor and cycle length is long. Most cycles fail to clear the queue.	>80

Table 3
Level of Service Characteristics for Road Segments

Level of Service	Description
A	Free-flow operations. High operating speeds with a small amount of platooning.
B	Reasonably free-flow operations. Speed reductions are present and platooning becomes noticeable.
C	Most vehicles traveling in platoons and freedom to maneuver noticeably restricted.
D	Platooning increases significantly and speeds begin to decline.
E	Demand approaching capacity. Speeds seriously curtailed.
F	Demand exceeds capacity and heavy congestion exists. Unstable flow.

Reference for Tables 1 through 3: *Highway Capacity Manual, 7th Edition,* Transportation Research Board, 2022

The City of Clovis General Plan requires a minimum LOS D at intersections under the City's jurisdiction. The City Guidelines state the following: *"All City intersections and roadway*

segments shall operate at a LOS D or better under the near-term conditions, unless a finding of overriding consideration was adopted in the General Plan EIR. Under long-term conditions, all City intersections and roadway segments shall operate at a LOS D or better, except for the roadway segments adopted in the General Plan EIR to operate at LOS E or F. Exceptions to this standard may be allowed on a case by case basis where lower levels of service would result in other public benefits, such as:

a) Preserving agriculture or open space land

b) Preserving the rural/historic character of a neighborhood

c) Preserving or creating a pedestrian-friendly environment in Old Town or mixed-use village districts

d) Avoiding adverse impacts to pedestrians, cyclists, and transit riders

e) Where right-of-way constraints would make capacity expansion infeasible"

For purposes of this study, a traffic issue may be identified if the addition of the traffic generated by the Project results in any one of the following:

- Triggers an intersection operating at acceptable LOS to operate at unacceptable levels of service;
- Increases the average delay for a study intersection that is already operating at unacceptable LOS.

8.0 EXISTING TRAFFIC VOLUMES

Existing traffic volumes were determined by performing manual turning movement counts between 7:00 and 9:00 a.m. and between 4:00 and 6:00 p.m. on a weekday. The traffic count data sheets are presented in Appendix B. The existing peak-hour turning movement volumes are presented in Figure 4, Existing Peak-Hour Traffic Volumes.

9.0 PROJECT TRIP GENERATION AND DISTRIBUTION

9.1 Project Trip Generation

Data provided in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition,* are typically used to estimate the number of trips anticipated to be generated by proposed projects. Table 4 presents the vehicle trip generation estimates for the Project.

Table 4
Project Trip Generation Estimate

Land Use	Units	Daily		A.M. Peak Hour					P.M. Peak Hour				
		Rate	Total	Rate	In:Out	In	Out	Total	Rate	In:Out	In	Out	Total
Single Family Detached Housing (210)	387	9.43	3,650	0.70	26:74	70	201	271	0.94	63:37	229	165	364

Reference: *Trip Generation Manual, 11th Edition,* Institute of Transportation Engineers 2021
Rates are reported in trips per dwelling unit.

9.2 Student Generation

For purposes of estimating trip distribution for students attending nearby schools, Table 5 presents the student generation estimates for the Project utilizing rates presented in the Clovis Unified School District *School Facilities Needs Analysis* by Odell Planning & Research, Inc. dated April 2023.

Table 5
Student Generation Estimate – Single-Family Homes

Grade Level	Rate	Homes	Students
Elementary School (TK-6)	0.3324 students per home	387	129
Intermediate School (7-8)	0.0766 students per home	387	30
High School (9-12)	0.1421 students per home	387	55
TOTAL:	0.5511 students per home	387	214

9.3 Project Trip Distribution and Assignment

The regional distribution of Project trips was estimated using the results of a select zone analysis utilizing the Fresno County travel model maintained by the Fresno Council of Governments (COG), engineering judgment based on our knowledge of the area, available traffic counts, the location and configuration of site access points, and available travel routes. A COG-approved traffic modeling consultant performed the Project-specific traffic modeling and the results are presented in Appendix A.

The estimated percentage distribution of Project trips is presented in Figure 5, Peak-Hour Project Traffic Distribution Percentages. The peak-hour trips presented in Table 3 were assigned to the adjacent road network in accordance with the trip distribution percentages in Figure 5. The peak-hour Project traffic volumes at the study intersections are presented in Figure 6, Peak-Hour Project Traffic Volumes.

Caltrans requested that the volume of Project trips (trip trace) expected at the SR 168 interchanges at Herndon Avenue and at Fowler Avenue be presented in the traffic study. The Project trips were assigned to the interchange and ramp locations based on the criteria described above and the results are presented in Tables 6 and 7.

Table 6
Project Trips on State Facilities – SR 168 and Herndon Avenue Interchange

Location	A.M. Peak Hour Trips	P.M. Peak Hour Trips
Westbound off ramp	3	3
Westbound on ramp from eastbound Herndon	0	0
Westbound loop on ramp from westbound Herndon	18	15
Eastbound off ramp	5	20
Eastbound loop on ramp from eastbound Herndon	0	0
Eastbound on ramp from westbound Herndon	3	3
Herndon Avenue westbound through the interchange	9	7
Herndon Avenue eastbound through the interchange	2	11

Table 7
Project Trips on State Facilities – SR 168 and Fowler Avenue Interchange

Location	A.M. Peak Hour Trips	P.M. Peak Hour Trips
Westbound off ramp	2	9
Westbound on ramp	0	0
Eastbound off ramp	1	2
Eastbound on ramp	8	4
Fowler Avenue northbound through the interchange	4	5
Fowler Avenue southbound through the interchange	8	5

10.0 EXISTING-PLUS-PROJECT TRAFFIC VOLUMES

Existing-Plus-Project traffic volumes are presented in Figure 7, Existing-Plus-Project Peak-Hour Traffic Volumes. The values in Figure 7 were determined by adding the values in Figures 4 and 6.

11.0 CUMULATIVE PROJECTS

Projects that were pending or not yet occupied when the traffic counts were performed. The following projects are considered in the near-term analyses:

- Tract 6205: 605 single-family homes northeast of the intersection of Shepherd and Sunnyside Avenues
- Tract 6343: 590 single-family homes northeast of the intersection of Behymer and Baron Avenues
- Tract 6406: 51 single-family homes southwest of the intersection of Perrin and Baron Avenues
- Tract 6452: 153 single-family homes northeast of the intersection of Perrin and Baron Avenues
- Heritage Grove: 18-acre mixed-use development southeast of the intersection of Willow and Shepherd Avenues. It is acknowledged that a master plan covering a much larger area has been proposed. However, a traffic study has not been prepared and it is unlikely that large portions of the master plan will be developed in the near-term condition.

12.0 NEAR-TERM TRAFFIC VOLUMES

Peak-hour near-term with-Project traffic volumes are presented in Figure 8, Near-Term With-Project Peak-Hour Traffic Volumes.

13.0 CUMULATIVE YEAR 2045 TRAFFIC VOLUMES

Cumulative traffic volumes for the year 2045 were estimated based on information available from the COG travel model. The base year and horizon year model output is presented in

Appendix A. Future weekday turning movements were estimated based on the methods presented in Chapter 8 of the Transportation Research Board National Cooperative Highway Research Program Report 255 entitled *"Highway Traffic Data for Urbanized Area Project Planning and Design."* Cumulative With-Project traffic volumes are presented in Figure 9, Cumulative (Year 2045) With-Project Peak-Hour Traffic Volumes.

14.0 INTERSECTION ANALYSES

The intersection levels of service were determined using the computer program Synchro 11, which incorporates HCM procedures for calculating levels of service. The intersection analysis sheets are presented in Appendix C.

Tables 8 through 11 present the results of the intersection analyses. For signalized and all-way stop-controlled intersections, the overall intersection LOS and the average delay per vehicle are presented. For one-way and two-way stop-controlled intersections, the HCM does not define an overall intersection LOS; therefore, the average delay and LOS for the approach with the greatest delay is presented. Delays and LOS worse than the target LOS are presented in bold type and are underlined.

Table 8
Intersection LOS Summary – Existing Conditions

Intersection	Control	A.M. Peak Hour		P.M. Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Willow / International	Signals	18.9	B	14.0	B
Minnewawa / International	Two-way stop	12.0	B	12.0	B
Willow / Behymer	Signals	19.0	B	16.8	B
Minnewawa / Behymer	All-way stop	**38.0**	**E**	**54.7**	**F**
Minnewawa / Shepherd	Signals	19.4	B	18.3	B
DeWitt / Shepherd	Two-way stop	16.6	C	13.7	B
Clovis / Shepherd	Signals	16.3	B	16.2	B
Clovis / Site Access	Does not exist				

Table 9
Intersection LOS Summary – Existing-Plus-Project Conditions

Intersection	Control	A.M. Peak Hour		P.M. Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Willow / International	Signals	19.1	B	14.0	B
Minnewawa / International	Two-way stop	12.0	B	12.1	B
Willow / Behymer	Signals	19.2	B	16.9	B
Minnewawa / Behymer	All-way stop	**46.9**	**E**	**62.4**	**F**
Minnewawa / Shepherd	Signals	20.8	C	20.3	C
DeWitt / Shepherd	Two-way stop	18.0	C	14.4	B
Clovis / Shepherd	Signals	16.6	B	16.7	B
Clovis / Site Access (NB left)	Yield	7.3	A	7.4	A

Table 10
Intersection LOS Summary – Near-Term With-Project Conditions

Intersection	Control	A.M. Peak Hour		P.M. Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Willow / International	Signals	20.7	C	16.3	B
Minnewawa / International	Two-way stop	**45.1**	**E**	24.9	C
Willow / Behymer	Signals	21.7	C	19.9	B
Minnewawa / Behymer	All-way stop	**106.9**	**F**	**127.5**	**F**
Minnewawa / Shepherd	Signals	**65.1**	**E**	**94.0**	**F**
DeWitt / Shepherd	Two-way stop	18.8	C	14.7	B
Clovis / Shepherd	Signals	24.2	C	26.2	C
Clovis / Site Access (NB left)	Yield	7.8	A	7.9	A

Table 11
Intersection LOS Summary – Year 2045 Cumulative With-Project Conditions

Intersection	Control	A.M. Peak Hour		P.M. Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Willow / International	Signals	28.6	C	16.8	B
Minnewawa / International	Two-way stop	**78.8**	**F**	**75.9**	**F**
Willow / Behymer	Signals	31.3	C	21.7	C
Minnewawa / Behymer	All-way stop	**>300**	**F**	**295.2**	**F**
Minnewawa / Shepherd	Signals	**146.8**	**F**	**143.4**	**F**
DeWitt / Shepherd	Two-way stop	**46.0**	**E**	**35.9**	**E**
Clovis / Shepherd	Signals	34.5	C	36.0	D
Clovis / Site Access (NB left)	Yield	10.2	B	9.3	A

The results of the intersection operational analyses include an estimate of the 95th-percentile queue lengths. The existing storage capacity (where applicable) and the calculated 95th-percentile queue lengths are presented in Tables 12 through 15. The storage capacities reported in Tables 12 through 15 are based on measurements from available aerial photographs. Calculated 95th-percentile queue lengths that exceed the storage capacity by more than 25 (approximate space required for one vehicle) or that are considered to be excessive are indicated in bold type and are underlined.

Notes and abbreviations for Tables 12 through 15:

* Storage length exceeds 1,000 feet

\+ Additional storage available – connects to a through lane or two-way left-turn lane

S: Shared movement

DNS: Does not stop

TBD: To be determined

Table 12
Intersection Queuing Summary – Existing Conditions

Intersection		Number of Lanes, Storage (feet), and Queue Length (feet)											
		EBL	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Willow/ International	Lanes	1	1	1	1	1	1	2	2	1	1	3	1
	Storage	250	920	240+	50+	*	25	250	*	240+	250	*	205
	A.M.	62	65	42	23	176	0	161	140	0	85	134	10
	P.M.	26	62	46	27	76	3	68	137	0	60	82	0
Minnewawa/ International	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		15			0			25			0	
	P.M.		15			0			10			0	
Willow/ Behymer	Lanes	1	1	1	1	1	S	1	3	1	1	3	1
	Storage	235	*	240+	88	*		250	*	105	250	*	205
	A.M.	72	99	50	30	180		125	178	0	63	126	0
	P.M.	27	73	31	35	141		141	131	0	120	128	0
Minnewawa/ Behymer	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		73			278			158			188	
	P.M.		123			290			193			308	
Minnewawa/ Shepherd	Lanes	1	2	1	1	1	1	1	1	1	1	1	1
	Storage	250	*	45	250	*	200	250	*	225+	255	*	25
	A.M.	41	158	27	137	434	41	152	159	0	139	181	0
	P.M.	40	186	31	93	379	35	143	169	7	116	183	0
DeWitt/ Shepherd	Lanes	1	2	S	1	1	1			1			1
	Storage	265	*		265	*	225+			85			500
	A.M.	3	DNS		0	DNS	DNS			3			18
	P.M.	3	DNS		0	DNS	DNS			3			8
Clovis/ Shepherd	Lanes	2	2	1	2	2	1	1	2	1	2	2	1
	Storage	250	*	50	250	*	255	235	*	65	255	*	100
	A.M.	29	118	53	47	182	0	132	20	6	16	24	0
	P.M.	26	133	40	34	130	0	134	23	16	10	16	0

Table 13
Intersection Queuing Summary – Existing-Plus-Project Conditions

Intersection		Number of Lanes, Storage (feet), and Queue Length (feet)											
		EBL	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Willow/ International	Lanes	1	1	1	1	1	1	2	2	1	1	3	1
	Storage	250	920	240+	50+	*	25	250	*	240+	250	*	205
	A.M.	62	66	42	23	183	0	161	140	0	85	134	10
	P.M.	26	64	47	28	81	3	69	139	0	61	84	0
Minnewawa/ International	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		15			0			25			0	
	P.M.		18			0			13			0	
Willow/ Behymer	Lanes	1	1	1	1	1	S	1	3	1	1	3	1
	Storage	235	*	240+	88	*		250	*	105	250	*	205
	A.M.	72	99	50	30	190		125	178	0	64	126	0
	P.M.	27	76	31	35	145		141	131	0	124	128	0
Minnewawa/ Behymer	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		80			318			200			215	
	P.M.		130			288			215			358	
Minnewawa/ Shepherd	Lanes	1	2	1	1	1	1	1	1	1	1	1	1
	Storage	250	*	45	250	*	200	250	*	225+	255	*	25
	A.M.	54	161	27	157	456	44	152	168	0	165	201	0
	P.M.	88	196	31	112	400	36	145	196	24	140	202	0
DeWitt/ Shepherd	Lanes	1	2	S	1	1	1			1			1
	Storage	265	*		265	*	225+			85			500
	A.M.	3	DNS		0	DNS	DNS			3			25
	P.M.	8	DNS		0	DNS	DNS			3			10
Clovis/ Shepherd	Lanes	2	2	1	2	2	1	1	2	1	2	2	1
	Storage	250	*	50	250	*	255	235	*	65	255	*	100
	A.M.	32	127	59	49	190	0	138	24	6	32	39	0
	P.M.	34	143	45	35	142	1	145	36	16	24	28	0
Clovis/ Site Access	Lanes			1				1	2			2	S
	Storage			250±				TBD	500±			*	
	A.M.			8				3	DNS			DNS	
	P.M.			5				5	DNS			DNS	

Table 14
Intersection Queuing Summary – Near-Term With-Project Conditions

Intersection		Number of Lanes, Storage (feet), and Queue Length (feet)											
		EBL	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Willow/ International	Lanes	1	1	1	1	1	1	2	2	1	1	3	1
	Storage	250	920	240+	50+	*	25	250	*	240+	250	*	205
	A.M.	63	69	45	28	190	0	183	180	0	87	168	10
	P.M.	29	74	56	40	92	3	91	205	0	71	128	0
Minnewawa/ International	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		23			0			33			0	
	P.M.		20			0			13			0	
Willow/ Behymer	Lanes	1	1	1	1	1	S	1	3	1	1	3	1
	Storage	235	*	240+	88	*		250	*	105	250	*	205
	A.M.	79	105	53	34	237		163	217	0	74	163	0
	P.M.	28	84	40	43	160		194	188	0	141	187	0
Minnewawa/ Behymer	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		100			653			275			278	
	P.M.		180			428			313			560	
Minnewawa/ Shepherd	Lanes	1	2	1	1	1	1	1	1	1	1	1	1
	Storage	250	*	45	250	*	200	250	*	225+	255	*	25
	A.M.	179	284	**141**	241	987	77	**299**	329	15	**294**	483	**62**
	P.M.	**351**	521	68	262	1,257	130	**363**	818	114	**329**	549	**51**
DeWitt/ Shepherd	Lanes	1	2	S	1	1	1			1			1
	Storage	265	*		265	*	225+			85			500
	A.M.	3	DNS		0	DNS	DNS			3			28
	P.M.	8	DNS		0	DNS	DNS			3			10
Clovis/ Shepherd	Lanes	2	2	1	2	2	1	1	2	1	2	2	1
	Storage	250	*	50	250	*	255	235	*	65	255	*	100
	A.M.	80	278	**82**	124	392	4	219	77	35	104	181	63
	P.M.	126	368	73	94	386	44	**261**	176	**96**	86	140	55
Clovis/ Site Access	Lanes			1				1	2			2	S
	Storage			250±				TBD	500±			*	
	A.M.			10				3	DNS			DNS	
	P.M.			8				8	DNS			DNS	

Table 15
Intersection Queuing Summary – Year 2045 Cumulative With-Project Conditions

Intersection		Number of Lanes, Storage (feet), and Queue Length (feet)											
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Willow/ International	Lanes	1	1	1	1	1	1	2	2	1	1	3	1
	Storage	250	920	240+	50+	*	25	250	*	240+	250	*	205
	A.M.	86	80	51	64	421	0	219	216	0	102	179	29
	P.M.	36	119	55	43	108	9	100	221	0	86	136	0
Minnewawa/ International	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		50			5			55			0	
	P.M.		215			3			18			0	
Willow/ Behymer	Lanes	1	1	1	1	1	S	1	3	1	1	3	1
	Storage	235	*	240+	88	*		250	*	105	250	*	205
	A.M.	128	142	70	**130**	526		209	279	0	116	213	0
	P.M.	31	92	43	**154**	182		202	179	43	177	182	0
Minnewawa/ Behymer	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		133			**>1,000**			283			**958**	
	P.M.		496			445			800			491	
Minnewawa/ Shepherd	Lanes	1	2	1	1	1	1	1	1	1	1	1	1
	Storage	250	*	45	250	*	200	250	*	225+	255	*	25
	A.M.	**255**	450	**405**	**415**	**1,494**	150	**482**	416	31	**583**	**1,497**	87
	P.M.	**400**	760	**170**	**315**	**1,578**	155	**641**	**1,204**	142	**406**	878	87
DeWitt/ Shepherd	Lanes	1	2	S	1	1	1			1			1
	Storage	265	*		265	*	225+			85			500
	A.M.	5	DNS		0	DNS	DNS			3			80
	P.M.	15	DNS		3	DNS	DNS			5			35
Clovis/ Shepherd	Lanes	2	2	1	2	2	1	1	2	1	2	2	1
	Storage	250	*	50	250	*	255	235	*	65	255	*	100
	A.M.	84	370	**110**	184	394	49	**268**	97	51	123	323	**201**
	P.M.	135	448	**82**	167	437	52	**287**	350	**289**	117	167	35
Clovis/ Site Access	Lanes			1				1	2			2	S
	Storage			250±				TBD	500±			*	
	A.M.			15				3	DNS			DNS	
	P.M.			10				10	DNS			DNS	

15.0 ROAD SEGMENT ANALYSES

Road segment levels of service were determined based on procedures outlined in the HCM utilizing tables presented in the 2020 Florida Department of Transportation (FDOT) Quality/Level of Service Handbook (Florida tables). It should be noted that the Florida tables present generalized correlations between traffic volumes and LOS based on the nationally-utilized and accepted HCM; the Florida tables are frequently utilized throughout California for road segment analyses. The Florida tables present LOS criteria based on the type of roadway being analyzed and the regional setting (i.e., urban areas or transitioning areas). Florida Table 8, Generalized Peak Hour Directional Volumes for Florida's Transitioning Areas and Areas Over 5,000 Not In Urbanized Areas, was utilized in the analysis and is presented in Appendix D. The thresholds utilized in the analyses are presented in Table 16. Tables 17 through 20 present the results of the road segment analyses

based on the Florida table. The lane configurations through the near-term conditions are assumed to be the same as existing. For the year 2045 scenario it is assumed that Minnewawa Avenue will have a two-way left-turn lane with one through lane in each direction (essentially a divided road with left-turn lanes).

Table 16
Directional Volume Thresholds for Non-State Signalized Roadway Levels of Service
Class I (40 MPH or Higher Posted Speed Limit)

Lanes	Configuration	A	B	C	D	E/F
1	Undivided with no turn lanes	*	*	≤639	640 – 720	>720
1	Divided with left-turn lanes	*	*	≤670	671 – 756	>756
2	Undivided with left-turn lanes	*	*	≤1,487	1,488 – 1,556	>1,556
2	Divided with turn lanes	*	*	≤1,566	1,567 – 1,638	>1,638

Reference: Florida Department of Transportation Table 8, Generalized Peak Hour Directional Volumes for Florida's Transitioning Areas and Areas Over 5,000 Not In Urbanized Areas (utilizing Non-State Signalized Roadway Adjustments) dated January 2020.

Table 17
Road Segment Analyses - Existing Conditions

Road and Segment	A.M. Peak Hour				P.M. Peak Hour			
	NB or EB		SB or WB		NB or EB		SB or WB	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Behymer Ave between Willow and Minnewawa (one lane undivided with no turn lanes)	230	C	313	C	253	C	250	C
Minnewawa Avenue between Site Access and Behymer Avenue (one lane undivided with no turn lanes)	331	C	298	C	295	C	246	C

Table 18
Road Segment Analyses - Existing-Plus-Project Conditions

Road and Segment	A.M. Peak Hour				P.M. Peak Hour			
	NB or EB		SB or WB		NB or EB		SB or WB	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Behymer Ave between Willow and Minnewawa (one lane undivided with no turn lanes)	232	C	319	C	260	C	255	C
Minnewawa Avenue between Site Access and Behymer Avenue (one lane undivided with no turn lanes)	353	C	306	C	314	C	271	C

Table 19
Road Segment Analyses - Near-Term With-Project Conditions

Road and Segment	A.M. Peak Hour				P.M. Peak Hour			
	NB or EB		SB or WB		NB or EB		SB or WB	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Behymer Ave between Willow and Minnewawa (one lane undivided with no turn lanes)	247	C	350	C	301	C	285	C
Minnewawa Avenue between Site Access and Behymer (one lane undivided with no turn lanes)	396	C	345	C	356	C	331	C

Table 20
Road Segment Analyses - Year 2045 Cumulative With-Project Conditions

Road and Segment	A.M. Peak Hour				P.M. Peak Hour			
	NB or EB		SB or WB		NB or EB		SB or WB	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Behymer Ave between Willow and Minnewawa (one lane undivided with no turn lanes)	289	C	683	D	500	C	414	C
Minnewawa Avenue between Site Access and Behymer Avenue (one lane divided with left-turn lanes)	438	C	753	D	626	C	401	C

16.0 DISCUSSION

16.1 Existing Conditions

The results of the analyses indicate that the study intersections are currently operating at acceptable levels of service with calculated 95th-percentile queues contained within the available storage capacity, with the exception that the intersection of Minnewawa and Behymer Avenues (all-way stop control) currently operates at LOS E during the a.m. peak hour and LOS F during the p.m. peak hour.

The study road segments are currently operating at acceptable levels of service.

16.2 Existing-Plus-Project Conditions

The existing-plus-Project-conditions analyses represent conditions that would occur after construction of the Project if none of the pending and approved projects were constructed. This scenario isolates the specific effects of the Project.

The results of the analyses indicate that the study intersections are expected to continue to operate at levels of service similar to the existing conditions. The Project will not cause any intersections currently operating at acceptable LOS to operate worse than the target LOS, and the calculated 95th-percentile queues are within the available storage capacity.

The Project is expected to increase delays at the intersection of Minnewawa and Behymer Avenues, which operates at LOS E during the a.m. peak hour and LOS F during the p.m. peak hour.

The study road segments are expected to continue to operate at acceptable levels of service.

The proposed median break in Clovis Avenue at the proposed site access roadway is expected to operate at acceptable LOS with reasonable queues. The median break will serve to distribute Project trips such that drivers will be able to select the most convenient route. Therefore, it is recommended that the median break and left turn into the Project site be allowed.

16.2.1 Existing-Plus-Project Improved Conditions

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours. The improved conditions are presented in Tables 21 and 22. The intersection analysis sheets for the improved conditions are presented in Appendix E.

Table 21
Intersection LOS Summary – Improved Existing-Plus-Project Conditions

Intersection	Control	A.M. Peak Hour		P.M. Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Minnewawa / Behymer	Signals	15.5	B	16.1	B

Table 22
Intersection Queuing Summary – Improved Existing-Plus-Project Conditions

Intersection		Number of Lanes, Storage (feet), and Queue Length (feet)											
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minnewawa/ Behymer	Lanes	S	1	S	S	1	S	1	1	S	1	1	S
	Storage		*			*		TBD	*		TBD	*	
	A.M.		100			242		88	127		105	117	
	P.M.		131			217		63	134		138	112	

TBD: To be determined based on Year 2045 analyses. S: Shared movement
*: Storage length exceeds 1,000 feet

16.3 Near-Term With-Project Conditions

The near-term with-Project conditions analyses represent conditions that are expected after construction of the Project and the known pending and approved projects. This scenario isolates the near-term cumulative effects of the Project and other known projects.

The results of the analyses indicate that the study intersections are expected to continue to operate at acceptable levels of service, with the following exceptions:

- Minnewawa Avenue / International Avenue: LOS E on the westbound approach during the a.m. peak hour with two-way stop control.
- Minnewawa Avenue / Behymer Avenue: LOS F during the a.m. and p.m. peak hours with all-way stop control.
- Minnewawa Avenue / Shepherd Avenue: LOS E during the a.m. peak hour and LOS F during the p.m. peak hour with traffic signals.

Calculated 95th-percentile queues are contained within the existing storage capacity, with the following exceptions:

- Minnewawa Avenue / Shepherd Avenue: left-turn lanes on the eastbound, northbound, and southbound approaches, right-turn lanes on the eastbound and southbound approaches.
- Clovis Avenue / Shepherd Avenue: left-turn lane on the northbound approach, right-turn lanes on the eastbound and northbound approaches.

The study road segments are expected to continue to operate at acceptable levels of service.

The proposed median break in Clovis Avenue at the proposed site access roadway is expected to operate at acceptable LOS with reasonable queues. The median break will serve to distribute Project trips such that drivers will be able to select the most convenient route. Therefore, it is recommended that the median break and left turn into the Project site be allowed.

16.3.1 Near-Term With-Project Improved Conditions

In order for the intersection of Minnewawa and International Avenues to operate at acceptable LOS, all-way stop control may be installed. With all-way stop control, the intersection is expected to operate at LOS C during the a.m. peak hour and LOS B during the p.m. peak hour. The improved conditions are presented in Tables 23 and 24. The intersection analysis sheets for the improved conditions are presented in Appendix E.

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours. The improved conditions are presented in Tables 23 and 24. The intersection analysis sheets for the improved conditions are presented in Appendix E.

In order for the intersection of Minnewawa and Shepherd Avenues to operate at acceptable LOS, the intersection would require modification from the existing conditions as follows:

Eastbound approach: maintain existing configuration

Westbound approach: add a second through lane; the right turn may be shared with the through lane.

Northbound approach: add a second through lane with a dedicated right-turn lane.

Southbound approach: add a second through lane with a dedicated right-turn lane.

With widening, the intersection of Minnewawa and Shepherd Avenues is expected to operate at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour. The improved conditions are presented in Tables 23 and 24. The intersection analysis sheets for the improved conditions are presented in Appendix E.

In order to better accommodate queues at the intersection of Clovis and Shepherd Avenues, the intersection striping may be modified to open the second left-turn lane on the northbound approach. With the modification, the intersection is expected to operate at LOS C during the a.m. and p.m. peak hours. The improved conditions are presented in Tables 23 and 24. The intersection analysis sheets for the improved conditions are presented in Appendix E.

Table 23
Intersection LOS Summary – Improved Near-Term With-Project Conditions

Intersection	Control	A.M. Peak Hour		P.M. Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Minnewawa / International	All-way stop	23.2	C	14.8	B
Minnewawa / Behymer	Signals	19.8	B	19.4	B
Minnewawa / Shepherd	Signals	28.5	C	40.1	D
Clovis / Shepherd	Signals	21.4	C	22.9	C

Table 24
Intersection Queuing Summary – Improved Near-Term With-Project Conditions

Intersection		Number of Lanes, Storage (feet), and Queue Length (feet)											
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minnewawa/ International	Lanes	S	1	S	S	1	S	S	1	S	S	1	S
	Storage		*			*			*			*	
	A.M.		18			0			265			65	
	P.M.		18			0			138			65	
Minnewawa/ Behymer	Lanes	S	1	S	S	1	S	1	1	S	1	1	S
	Storage		*			*		TBD	*		TBD	*	
	A.M.		106			336		105	143		136	131	
	P.M.		151			267		64	155		168	137	
Minnewawa/ Shepherd	Lanes	1	2	1	1	2	S	1	2	1	1	2	1
	Storage	250	*	45	250	*		250	*	TBD	255	*	TBD
	A.M.	135	255	112	243	452		224	106	2	237	144	38
	P.M.	224	367	63	212	462		253	214	50	210	155	54
Clovis/ Shepherd	Lanes	2	2	1	2	2	1	2	2	1	2	2	1
	Storage	250	*	50	250	*	255	235	*	65	255	*	100
	A.M.	70	233	83	107	324	14	100	77	30	90	154	55
	P.M.	124	331	65	93	356	41	133	195	120	84	135	53

TBD: To be determined based on Year 2045 analyses. S: Shared movement
*: Storage length exceeds 1,000 feet

16.4 Cumulative Year 2045 With-Project Conditions

The year 2045 cumulative with-Project conditions analyses are based on the assumption that the Project has been constructed, the pending and approved projects have been constructed, and that 20 years of growth has occurred in the Clovis, Fresno, and Fresno County region as incorporated into the adopted Fresno County travel model.

The results of the analyses indicate that the study intersections are expected to continue to operate at acceptable levels of service, with the following exceptions:

- Minnewawa Avenue / International Avenue: LOS F on the westbound approach during the a.m. peak hour and LOS F on the eastbound approach during the p.m. peak hour with two-way stop control.
- Minnewawa Avenue / Behymer Avenue: LOS F during the a.m. and p.m. peak hours with all-way stop control.
- Minnewawa Avenue / Shepherd Avenue: LOS F during the a.m. and p.m. peak hours with traffic signals.
- DeWitt Avenue / Shepherd Avenue: LOS E on the southbound approach during the a.m. and p.m. peak hours with two-way stop control.

Calculated 95th-percentile queues are contained within the existing storage capacity, with the following exceptions:

- Willow Avenue / Behymer Avenue: left-turn lane on the westbound approach.
- Minnewawa Avenue / Behymer Avenue: excessive queues on the westbound and southbound approaches.
- Minnewawa Avenue / Shepherd Avenue: excessive queues on all legs corresponding to LOS F at the intersection.
- Clovis Avenue / Shepherd Avenue: left-turn lanes on the westbound and northbound approaches, right-turn lanes on the eastbound, northbound, and southbound approaches.

The study road segments are expected to continue to operate at acceptable levels of service.

The proposed median break in Clovis Avenue at the proposed site access roadway is expected to operate at acceptable LOS with reasonable queues. The median break will serve to distribute Project trips such that drivers will be able to select the most convenient route. Therefore, it is recommended that the median break and left turn into the Project site be allowed.

16.4.1 Cumulative Year 2045 With-Project Improved Conditions

In order for the intersection of Minnewawa and International Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours. The improved conditions are presented in Tables 25 and 26. The intersection analysis sheets for the improved conditions are presented in Appendix E.

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on all four approaches and a dedicated right-turn lane would be required on the westbound approach. With signalization, the intersection is expected to operate at LOS D during the a.m. and p.m. peak hours. The improved conditions are presented in Tables 25 and 26. The intersection analysis sheets for the improved conditions are presented in Appendix E.

In order for the intersection of Minnewawa and Shepherd Avenues to operate at acceptable LOS, the intersection would require modification from the existing conditions as follows:

Eastbound approach: maintain existing configuration

Westbound approach: add a second through lane and a dedicated right-turn lane.

Northbound approach: add a second through lane with a dedicated right-turn lane.

Southbound approach: add a second through lane with a dedicated right-turn lane.

With the recommended widening, each approach to the intersection of Minnewawa and Shepherd Avenues would have one left-turn lane, two through lanes, and one right-turn lane. The intersection is expected to operate at LOS D during the a.m. and p.m. peak hours. The

improved conditions are presented in Tables 25 and 26. The intersection analysis sheets for the improved conditions are presented in Appendix E. It should be noted that long queues are calculated in the left-turn lanes on the northbound and southbound approaches. The City may consider lengthening the turn lanes or modifying the intersection to provide two left-turn lanes on the approaches in the future.

In order to better accommodate queues at the intersection of Clovis and Shepherd Avenues, the intersection striping may be modified to open the second left-turn lane on the northbound approach. With the modification, the intersection is expected to operate at LOS C during the a.m. and p.m. peak hours. The improved conditions are presented in Tables 25 and 26. The intersection analysis sheets for the improved conditions are presented in Appendix E.

No improvements are recommended for the intersection of DeWitt Avenue and Shepherd Avenues because the LOS E is experienced by vehicles that are allowed only to make right turns and 95th-percentile queues are expected to be only three to four vehicles long. The intersection is not a candidate for signalization and it is recommended that it be maintained in its existing configuration.

Table 25
Intersection LOS Summary – Improved Year 2045 With-Project Conditions

Intersection	Control	A.M. Peak Hour		P.M. Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
Minnewawa / International	Signals	16.0	B	14.7	B
Minnewawa / Behymer	Signals	37.7	D	39.3	D
Minnewawa / Shepherd	Signals	49.6	D	52.7	D
Clovis / Shepherd	Signals	28.2	C	33.6	C

Table 26
Intersection Queuing Summary – Improved Year 2045 With-Project Conditions

Intersection		Number of Lanes, Storage (feet), and Queue Length (feet)											
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minnewawa/ International	Lanes	S	1	S	S	1	S	1	1	S	1	1	S
	Storage		*			*		TBD	*		TBD	*	
	A.M.		53			8		344	102		5	260	
	P.M.		74			7		145	189		4	237	
Minnewawa/ Behymer	Lanes	1	1	S	1	1	1	1	1	S	1	1	S
	Storage	TBD	*		TBD	*	TBD	TBD	*		TBD	*	
	A.M.	10	213		75	512	65	187	233		189	566	
	P.M.	28	498		38	180	55	181	487		267	222	
Minnewawa/ Shepherd	Lanes	1	2	1	1	2	1	1	2	1	1	2	1
	Storage	250	*	45	250	*	TBD	250	*	TBD	255	*	TBD
	A.M.	152	339	225	279	372	49	269	132	0	386	413	38
	P.M.	251	577	98	237	433	62	400	336	53	259	273	42
Clovis/ Shepherd	Lanes	2	2	1	2	2	1	2	2	1	2	2	1
	Storage	250	*	50	250	*	255	235	*	65	255	*	100
	A.M.	81	356	132	180	375	47	125	104	54	123	311	198
	P.M.	135	448	82	167	437	52	137	350	289	117	151	58

TBD: To be designed based on City standards and 95th-percentile queues. S: Shared movement
*: Storage length exceeds 1,000 feet

17.0 CONCLUSIONS AND RECOMMENDATIONS

Standard traffic engineering principles and methods were employed to establish the existing conditions, to estimate the number of trips expected to be generated by the Project, and to analyze the traffic conditions that are expected to occur in the future. The conclusions of the study are summarized in the following sections.

Trip Generation

The Project is expected to generate approximately 3,650 vehicle trips per day (1,825 trips entering the site and 1,825 trips exiting the site). Peak-hour traffic volumes are expected to be on the order of 271 trips during the a.m. peak hour and 364 trips during the p.m. peak hour.

CEQA Impact Analysis (VMT)

Project-specific traffic modeling indicates a calculated Project VMT of 16.6 VMT per capita, which is greater than the threshold of 14.1 VMT per capita. Therefore, the Project would create a significant transportation impact.

The Project will implement feasible mitigation measures such as constructing sidewalk and trails. These Project design features can help offset a portion of the VMT impact of the Project but will not reduce the impact to less than significant. Therefore, the Project will have a significant and unavoidable transportation impact under CEQA.

It is recommended that the proposed Project, consistent with the General Plan, tier its environmental review from the General Plan SEIR, which has disclosed the VMT impacts of land use development consistent with the General Plan. Therefore, the Project's significant transportation impact does not need to be disclosed in a Project-specific EIR.

Existing Conditions

The study intersections are currently operating at acceptable levels of service with calculated 95th-percentile queues contained within the available storage capacity, with the exception that the intersection of Minnewawa and Behymer Avenues (all-way stop control) currently operates at LOS E during the a.m. peak hour and LOS F during the p.m. peak hour. The study road segments are currently operating at acceptable levels of service.

Existing-Plus-Project Conditions

The existing-plus-Project-conditions analyses represent conditions that would occur after construction of the Project if none of the pending and approved projects were constructed. This scenario isolates the specific effects of the Project. The study intersections and road segments are expected to continue to operate at levels of service similar to the existing conditions. The Project will not cause any intersections currently operating at acceptable LOS to operate worse than the target LOS, and the calculated 95th-percentile queues are within the available storage capacity.

The Project is expected to increase delays at the intersection of Minnewawa and Behymer Avenues, which operates at LOS E during the a.m. peak hour and LOS F during the p.m. peak hour.

Existing-Plus-Project Improved Conditions

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours.

Near-Term With-Project Conditions

The near-term with-Project conditions analyses represent conditions that are expected after construction of the Project and the known pending and approved projects. This scenario isolates the near-term cumulative effects of the Project and other known projects. The study intersections and road segments are expected to continue to operate at acceptable levels of service, with the following exceptions:

- Minnewawa Avenue / International Avenue: LOS E on the westbound approach during the a.m. peak hour with two-way stop control.
- Minnewawa Avenue / Behymer Avenue: LOS E during the a.m. and p.m. peak hours with all-way stop control.
- Minnewawa Avenue / Shepherd Avenue: LOS E during the a.m. peak hour and LOS F during the p.m. peak hour with traffic signals.

Calculated 95th-percentile queues are contained within the existing storage capacity, with the following exceptions:

- Minnewawa Avenue / Shepherd Avenue: left-turn lanes on the eastbound, northbound, and southbound approaches, right-turn lanes on the eastbound and southbound approaches.
- Clovis Avenue / Shepherd Avenue: left-turn lane on the northbound approach, right-turn lanes on the eastbound and northbound approaches.

Near-Term With-Project Improved Conditions

In order for the intersection of Minnewawa and International Avenues to operate at acceptable LOS, all-way stop control may be installed. With all-way stop control, the intersection is expected to operate at LOS C during the a.m. peak hour and LOS B during the p.m. peak hour.

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours.

In order for the intersection of Minnewawa and Shepherd Avenues to operate at acceptable LOS, the intersection would require modification from the existing conditions as follows:

Eastbound approach: maintain existing configuration

Westbound approach: add a second through lane; the right turn may be shared with the through lane.

Northbound approach: add a second through lane with a dedicated right-turn lane.

Southbound approach: add a second through lane with a dedicated right-turn lane.

With widening, the intersection of Minnewawa and Shepherd Avenues is expected to operate at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour.

In order to better accommodate queues at the intersection of Clovis and Shepherd Avenues, the intersection striping may be modified to open the second left-turn lane on the northbound approach. With the modification, the intersection is expected to operate at LOS C during the a.m. and p.m. peak hours.

Cumulative Year 2045 With-Project Conditions

The year 2045 cumulative with-Project conditions analyses are based on the assumption that the Project has been constructed, the pending and approved projects have been constructed, and that 20 years of growth has occurred in the Clovis, Fresno, and Fresno County region as incorporated into the adopted Fresno County travel model. The study intersections and road segments are expected to continue to operate at acceptable levels of service, with the following exceptions:

- Minnewawa Avenue / International Avenue: LOS F on the westbound approach during the a.m. peak hour and LOS F on the eastbound approach during the p.m. peak hour with two-way stop control.
- Minnewawa Avenue / Behymer Avenue: LOS F during the a.m. and p.m. peak hours with all-way stop control.
- Minnewawa Avenue / Shepherd Avenue: LOS F during the a.m. and p.m. peak hours with traffic signals.
- DeWitt Avenue / Shepherd Avenue: LOS E on the southbound approach during the a.m. and p.m. peak hours with two-way stop control.

Calculated 95th-percentile queues are contained within the existing storage capacity, with the following exceptions:

- Willow Avenue / Behymer Avenue: left-turn lane on the westbound approach.
- Minnewawa Avenue / Behymer Avenue: excessive queues on the westbound and southbound approaches.
- Minnewawa Avenue / Shepherd Avenue: excessive queues on all legs corresponding to LOS F at the intersection.
- Clovis Avenue / Shepherd Avenue: left-turn lanes on the westbound and northbound approaches, right-turn lanes on the eastbound, northbound, and southbound approaches.

Cumulative Year 2045 With-Project Improved Conditions

In order for the intersection of Minnewawa and International Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on the northbound and southbound approaches. With signalization, the intersection is expected to operate at LOS B during the a.m. and p.m. peak hours.

In order for the intersection of Minnewawa and Behymer Avenues to operate at acceptable LOS, the intersection may be signalized. At a minimum, dedicated left-turn lanes with protected left-turn phasing would be required on all four approaches and a dedicated right-turn lane would be required on the westbound approach. With signalization, the intersection is expected to operate at LOS D during the a.m. and p.m. peak hours.

In order for the intersection of Minnewawa and Shepherd Avenues to operate at acceptable LOS, the intersection would require modification from the existing conditions as follows:

Eastbound approach: maintain existing configuration

Westbound approach: add a second through lane and a dedicated right-turn lane.

Northbound approach: add a second through lane with a dedicated right-turn lane.

Southbound approach: add a second through lane with a dedicated right-turn lane.

With the recommended widening, each approach to the intersection of Minnewawa and Shepherd Avenues would have one left-turn lane, two through lanes, and one right-turn lane. The intersection is expected to operate at LOS D during the a.m. and p.m. peak hours. It should be noted that long queues are calculated in the left-turn lanes on the northbound and southbound approaches. The City may consider lengthening the turn lanes or modifying the intersection to provide two left-turn lanes on the approaches in the future.

In order to better accommodate queues at the intersection of Clovis and Shepherd Avenues, the intersection striping may be modified to open the second left-turn lane on the northbound approach. With the modification, the intersection is expected to operate at LOS C during the a.m. and p.m. peak hours.

No improvements are recommended for the intersection of DeWitt Avenue and Shepherd Avenues because the LOS E is experienced by vehicles that are allowed only to make right

turns and 95th-percentile queues are expected to be only three to four vehicles long. The intersection is not a candidate for signalization and it is recommended that it be maintained in its existing configuration.

The proposed median break in Clovis Avenue at the proposed site access roadway is expected to operate at acceptable LOS with reasonable queues. The median break will serve to distribute Project trips such that drivers will be able to select the most convenient route. Therefore, it is recommended that the median break and left turn into the Project site be allowed.

Thank you for the opportunity to perform this Transportation Impact Analysis. Please feel free to contact me if you have any questions.

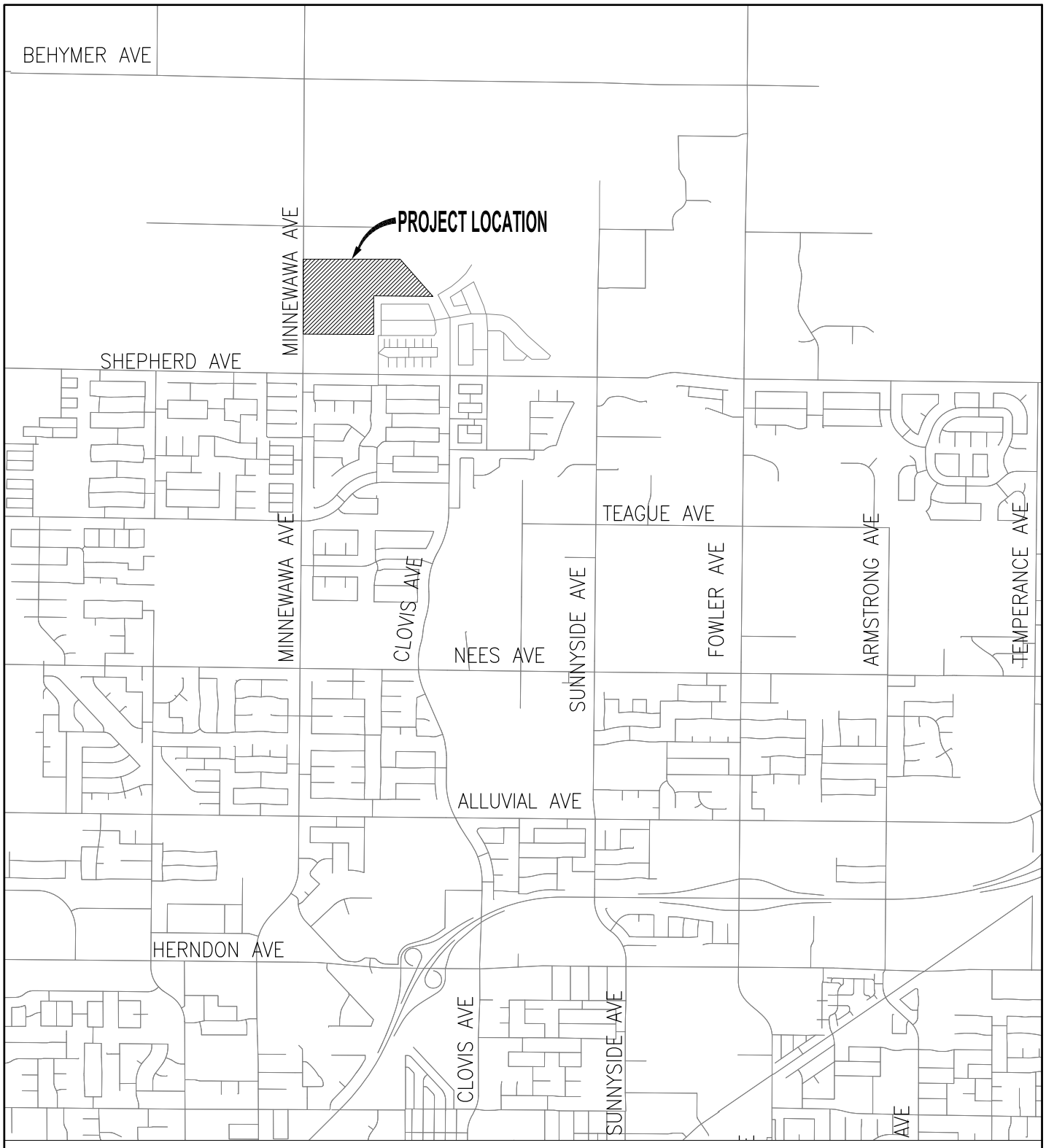
PETERS ENGINEERING GROUP

John Rowland, PE, TE



Attachments: Figures 1 through 9
Appendix A - Traffic Modeling
Appendix B - Traffic Count Data Sheets
Appendix C - Intersection Analyses
Appendix D - Florida Table
Appendix E - Improved Intersection Analyses

FIGURES



Proposed Tract 6375
Clovis, California

LEGEND

PROJECT SITE

VICINITY MAP

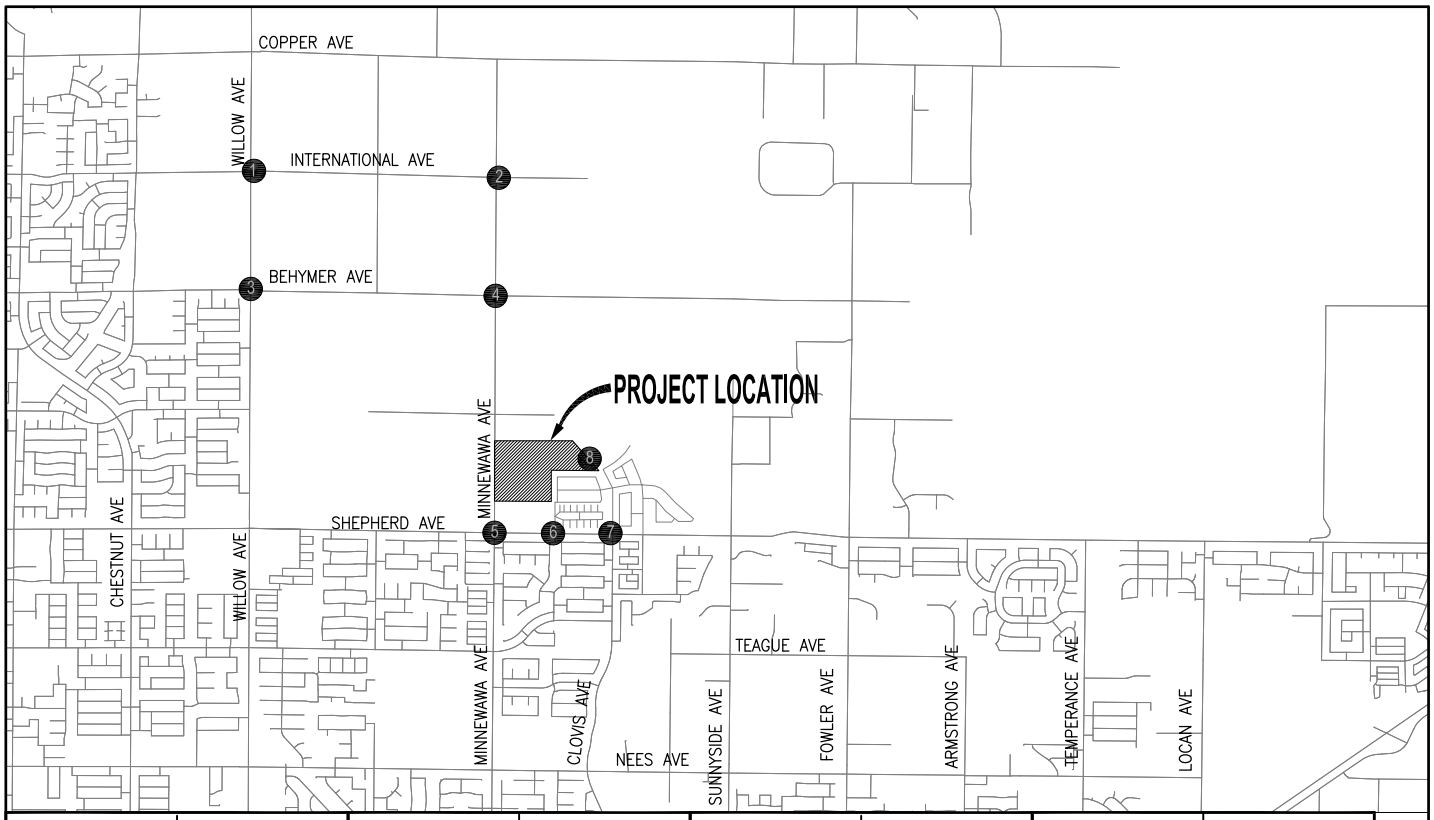
Not to Scale

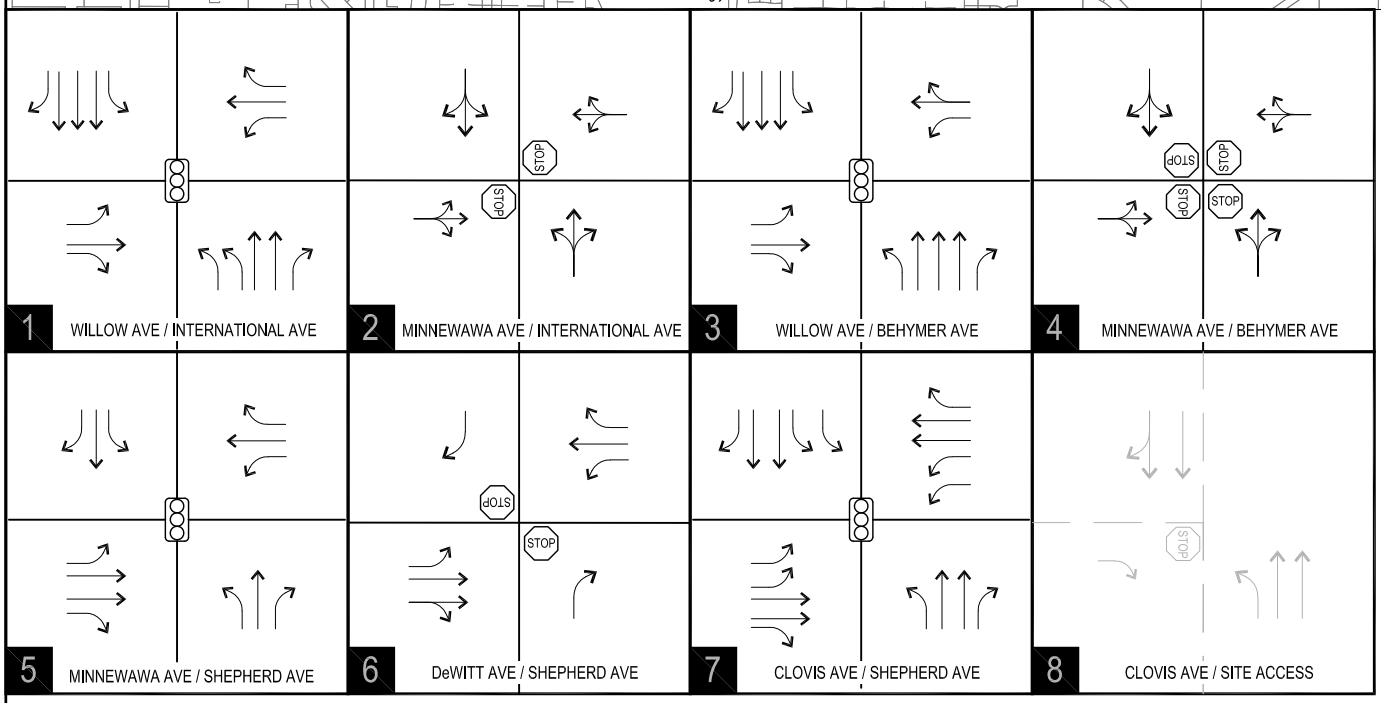


Proposed Tract 6375
Clovis, California

SITE PLAN

Not to Scale





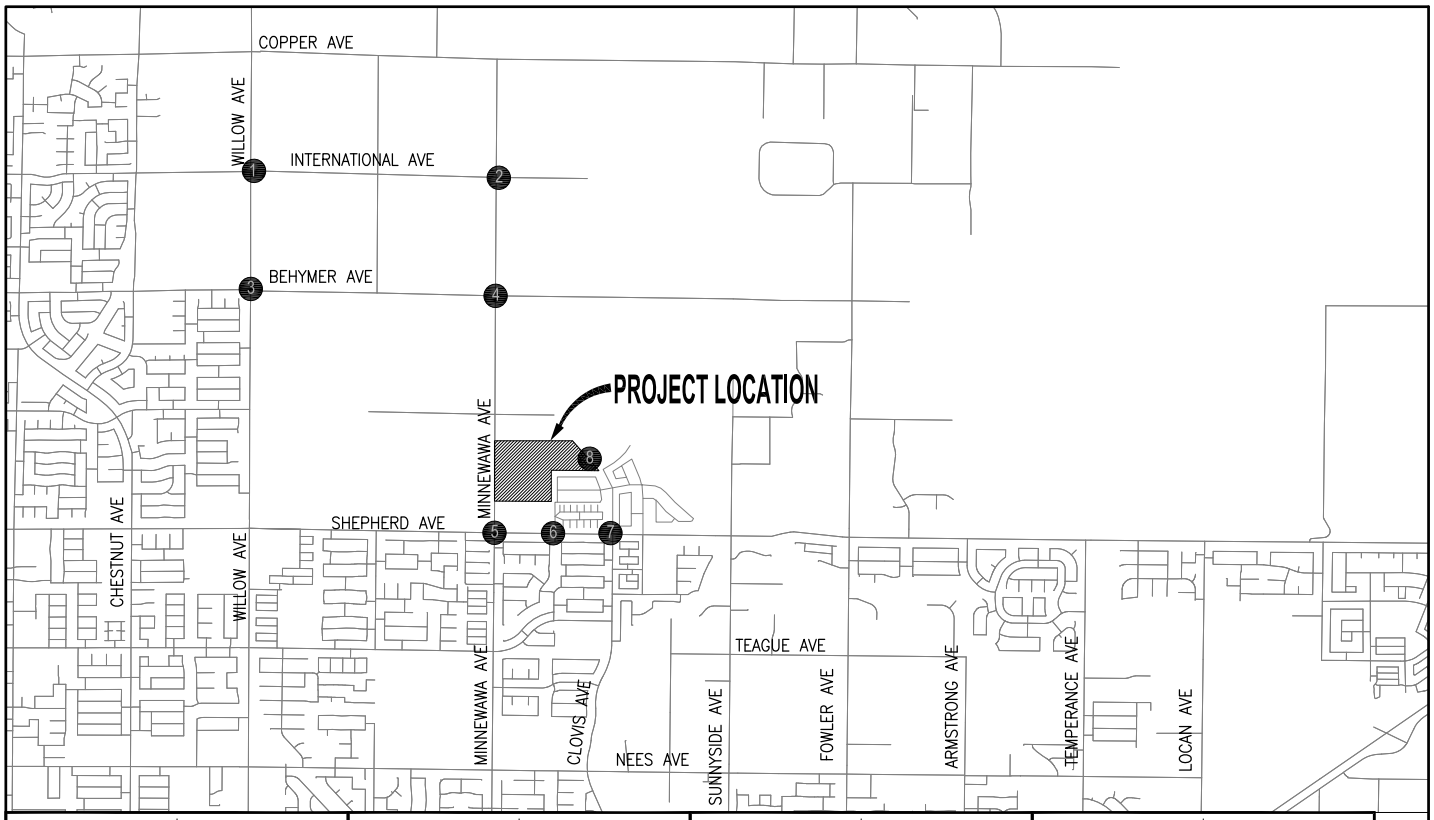
LEGEND

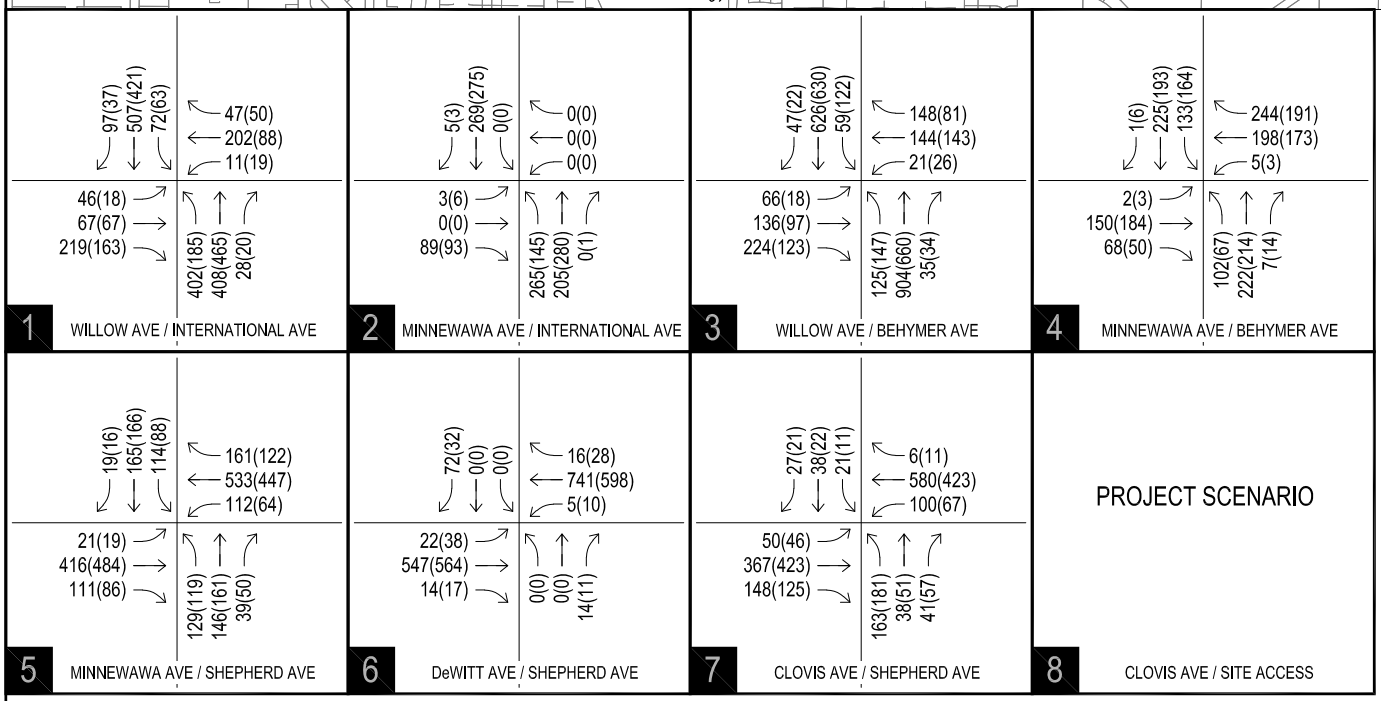
- XX STUDY AREA INTERSECTIONS
- PROJECT SITE
- SIGNALIZED INTERSECTION
- STOP STOP SIGN
- DIRECTION OF TRAVEL

Proposed Tract 6375
Clovis, California

EXISTING LANE CONFIGURATIONS AND INTERSECTION CONTROL

Not to Scale





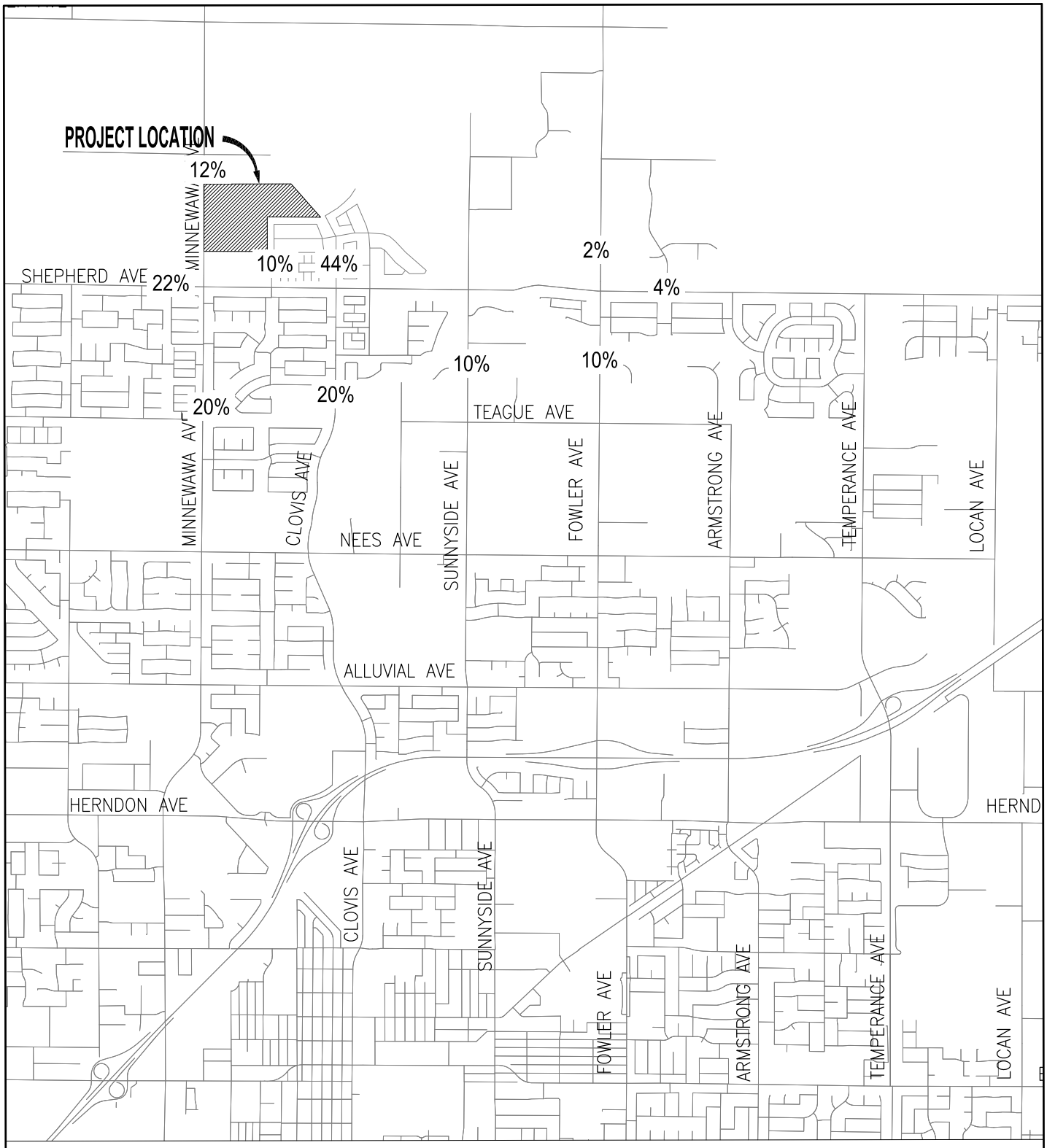
LEGEND

X	STUDY AREA INTERSECTIONS
XX (YY)	AM (PM) PEAK HOUR VOLUMES
	PROJECT SITE

Proposed Tract 6375
Clovis, California

EXISTING PEAK-HOUR TRAFFIC VOLUMES

Not to Scale



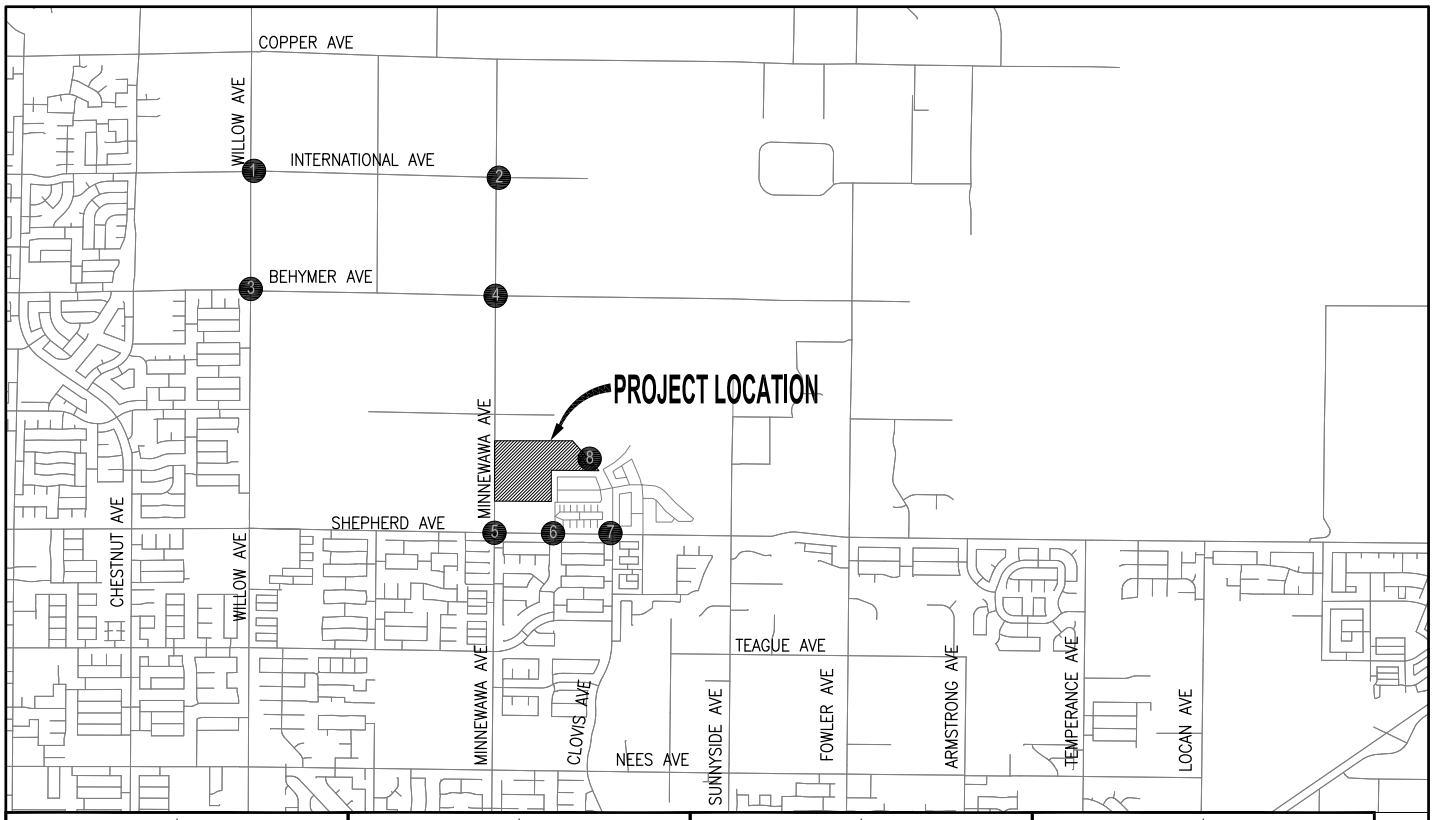
Proposed Tract 6375
Clovis, California

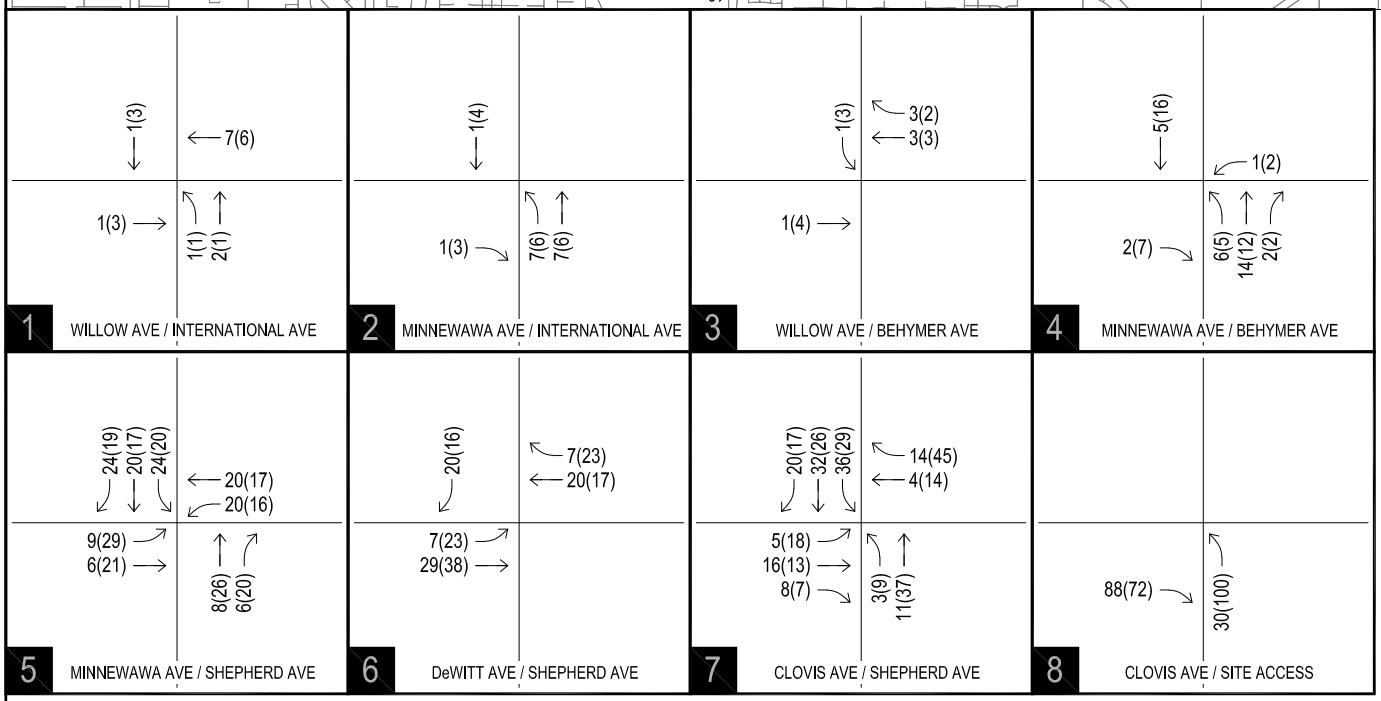
LEGEND

PROJECT SITE

PEAK HOUR PROJECT TRAFFIC TRIP DISTRIBUTION PERCENTAGES

Not to Scale





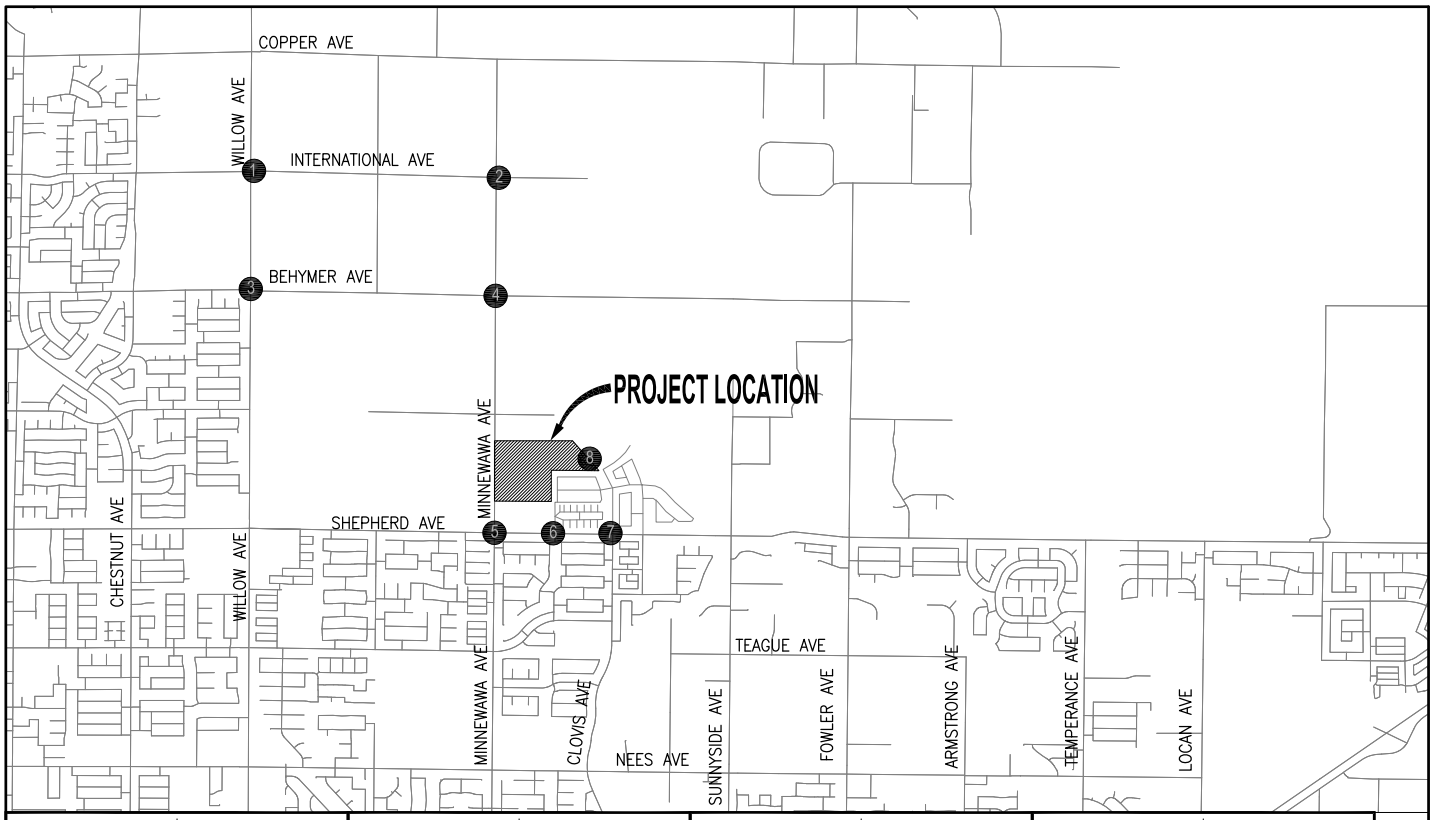
LEGEND

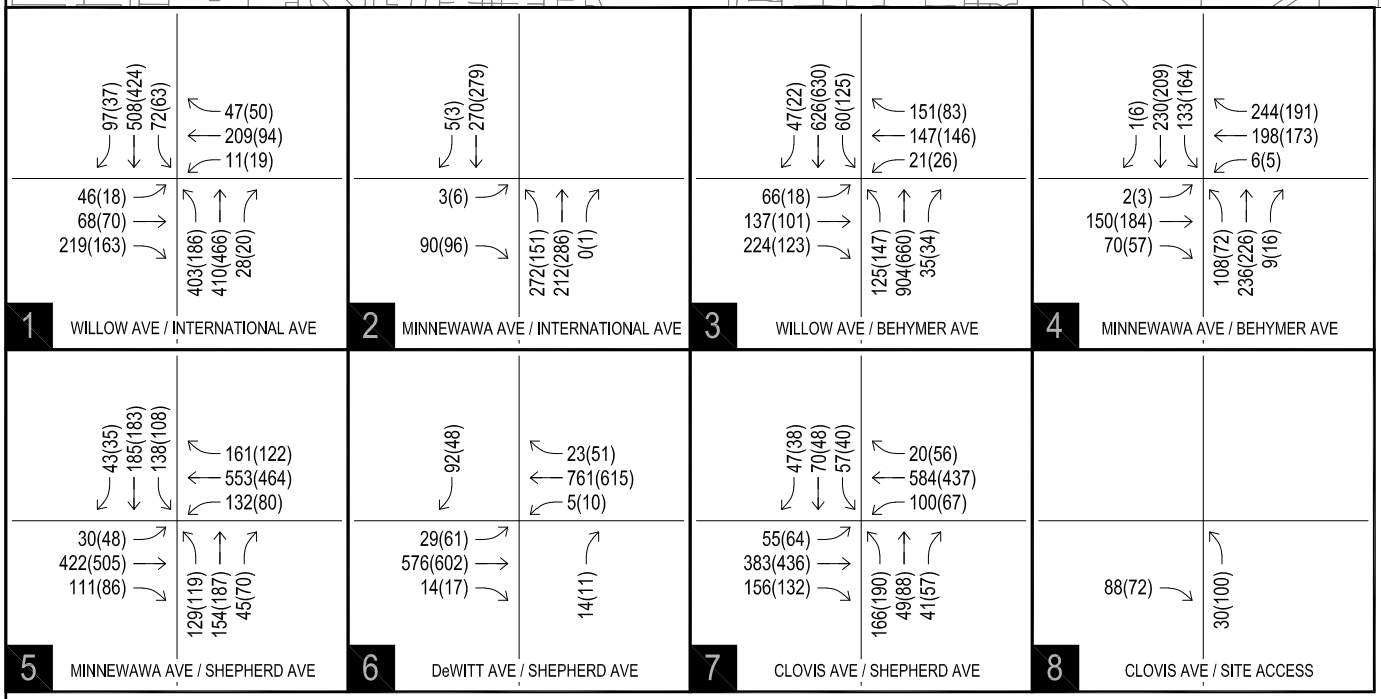
X	STUDY AREA INTERSECTIONS
XX (YY)	AM (PM) PEAK HOUR VOLUMES
	PROJECT SITE

Proposed Tract 6375
Clovis, California

PEAK-HOUR PROJECT TRAFFIC VOLUMES

Not to Scale





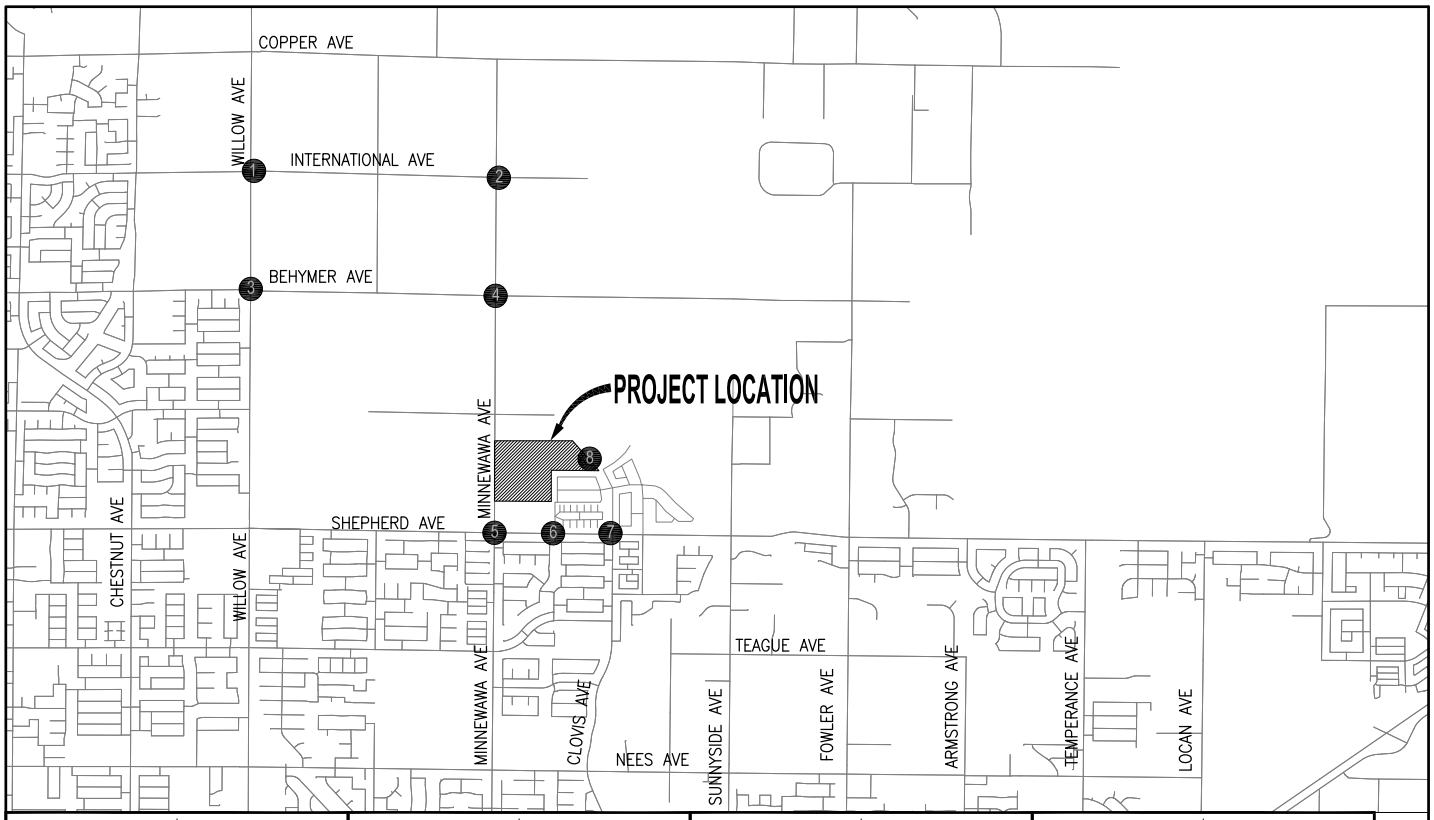
LEGEND

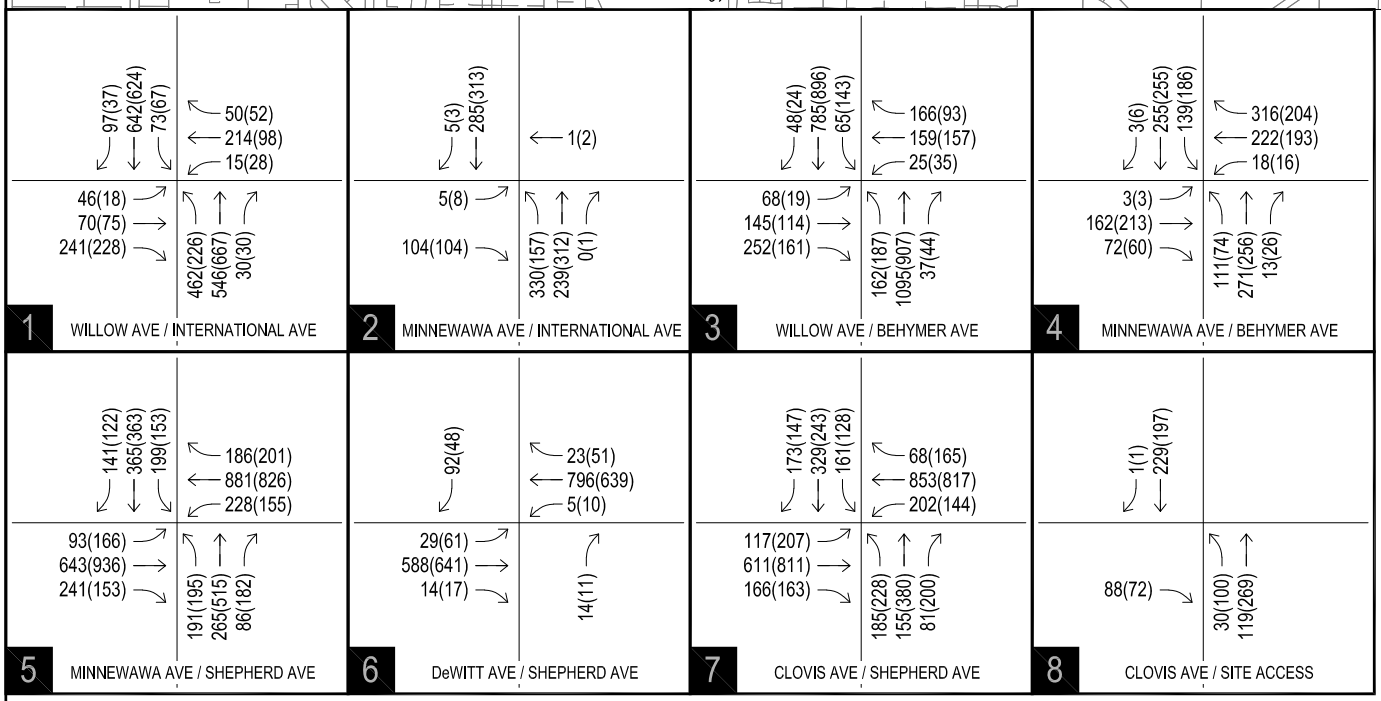
X	STUDY AREA INTERSECTIONS
XX (YY)	AM (PM) PEAK HOUR VOLUMES
	PROJECT SITE

Proposed Tract 6375
Clovis, California

EXISTING-PLUS-PROJECT PEAK-HOUR TRAFFIC VOLUMES

Not to Scale





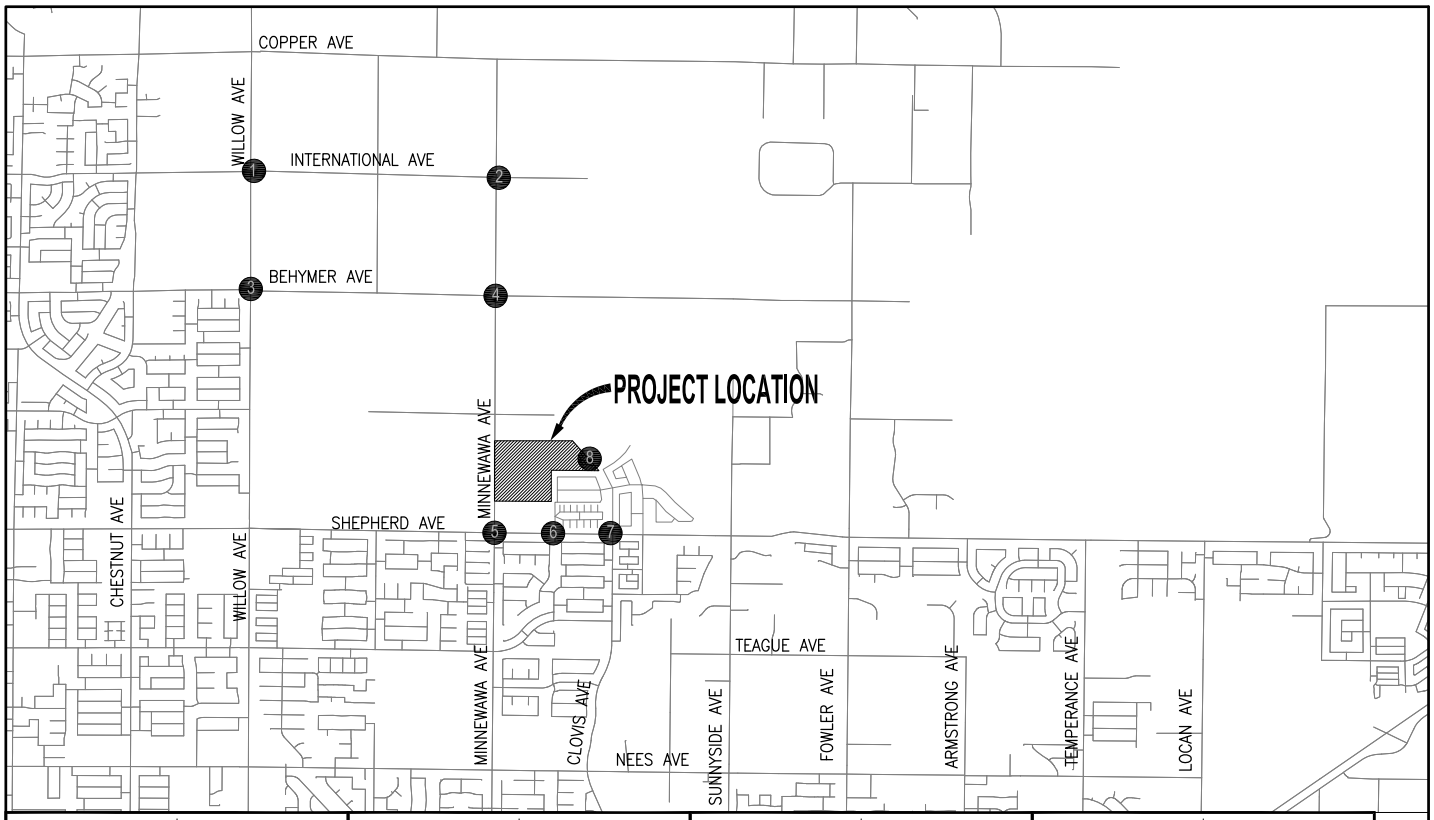
LEGEND

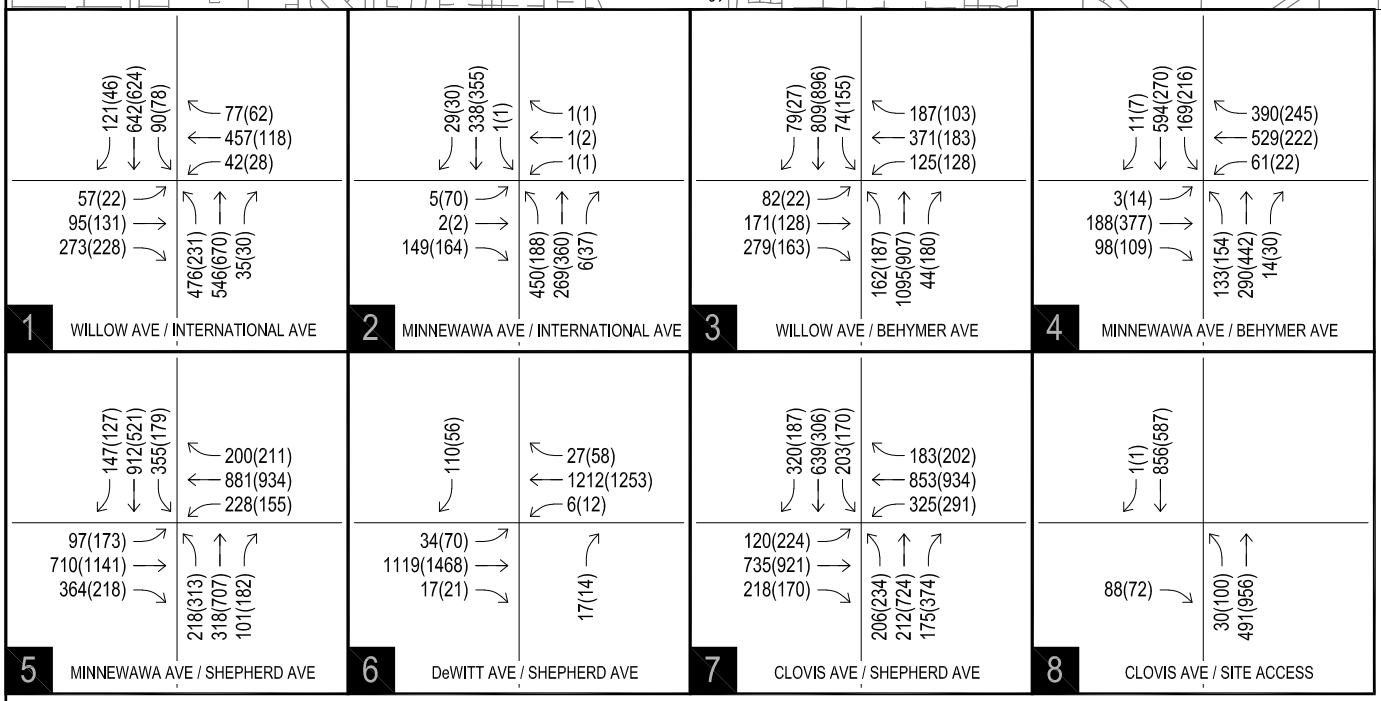
X	STUDY AREA INTERSECTIONS
XX (YY)	AM (PM) PEAK HOUR VOLUMES
	PROJECT SITE

Proposed Tract 6375
Clovis, California

NEAR-TERM WITH-PROJECT PEAK-HOUR TRAFFIC VOLUMES

Not to Scale





LEGEND

X	STUDY AREA INTERSECTIONS
XX (YY)	AM (PM) PEAK HOUR VOLUMES
	PROJECT SITE

Proposed Tract 6375
Clovis, California

CUMULATIVE (YEAR 2045) WITH-PROJECT PEAK-HOUR TRAFFIC VOLUMES

Not to Scale

APPENDIX A

TRAFFIC MODELING

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION

VMT Results

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION

Tract 6375, City of Clovis - VMT Analysis

Tract 6375 (project)	Region (Fresno County)[1]	Difference	Percentage Difference
16.6	14.1	2.5	17.7%

Source: Fresno Council of Governments' Activity-Based Model

VMT = Vehicle Miles Traveled

[1] *The Fresno County VMT per capita was obtained from the Interim Transportation Impact Guidelines, City of Clovis - July 14, 2020*

Appendix - Detailed VMT Calculations

Total project households	387
Total project population (a)	1,336
Percent Population traveling to outside (b) *	7.79%
Project Population traveling to outside (c=b*a)	104
Total Internal-Internal (II) Project VMT (d) **	18,417
Internal project population (e=a-c)	1,232
II VMT per capita (f=d/e)	14.95
IX VMT per capita (g) ***	20.2
Total IX VMT (h=g*c)	2,102
Total project VMT (i=d+h)	20,520
VMT per capita (j=i/a)	15.4
VMT adjustment factor for new base model (k)	1.08
Adjusted project VMT per capita (l = k*j)	16.6

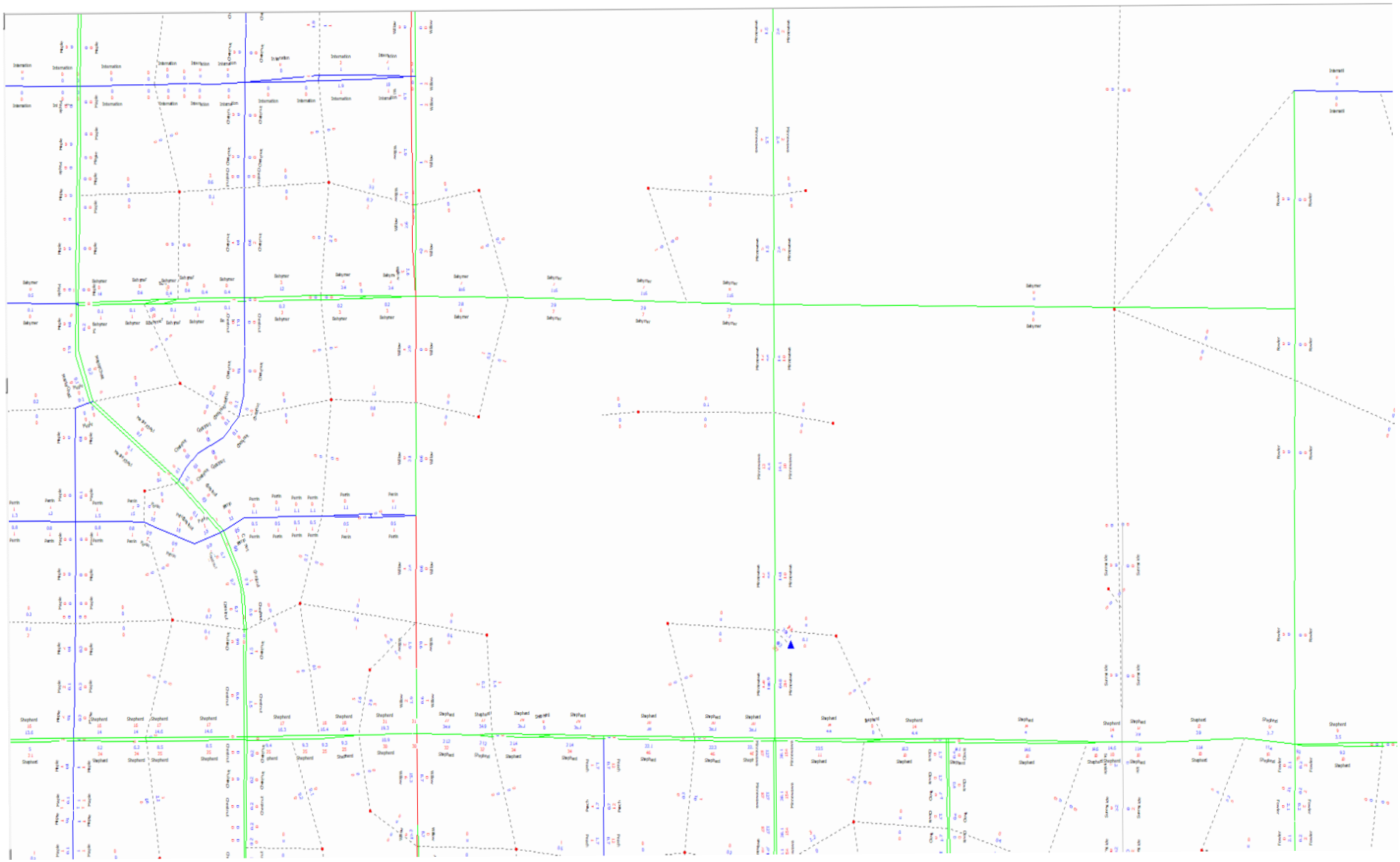
** : Obtained from "Fresno_worker_ixxifractions.dat" from model inputs. Used same percentages/values as the parent TAZ (252)*

***: Includes all tours and all sub-tours from the ABM model run for VMT estimation*

****: IX VMT per capita was estimated as average for all TAZs in the CSTDM Zone 2569*

Select Zone Analysis

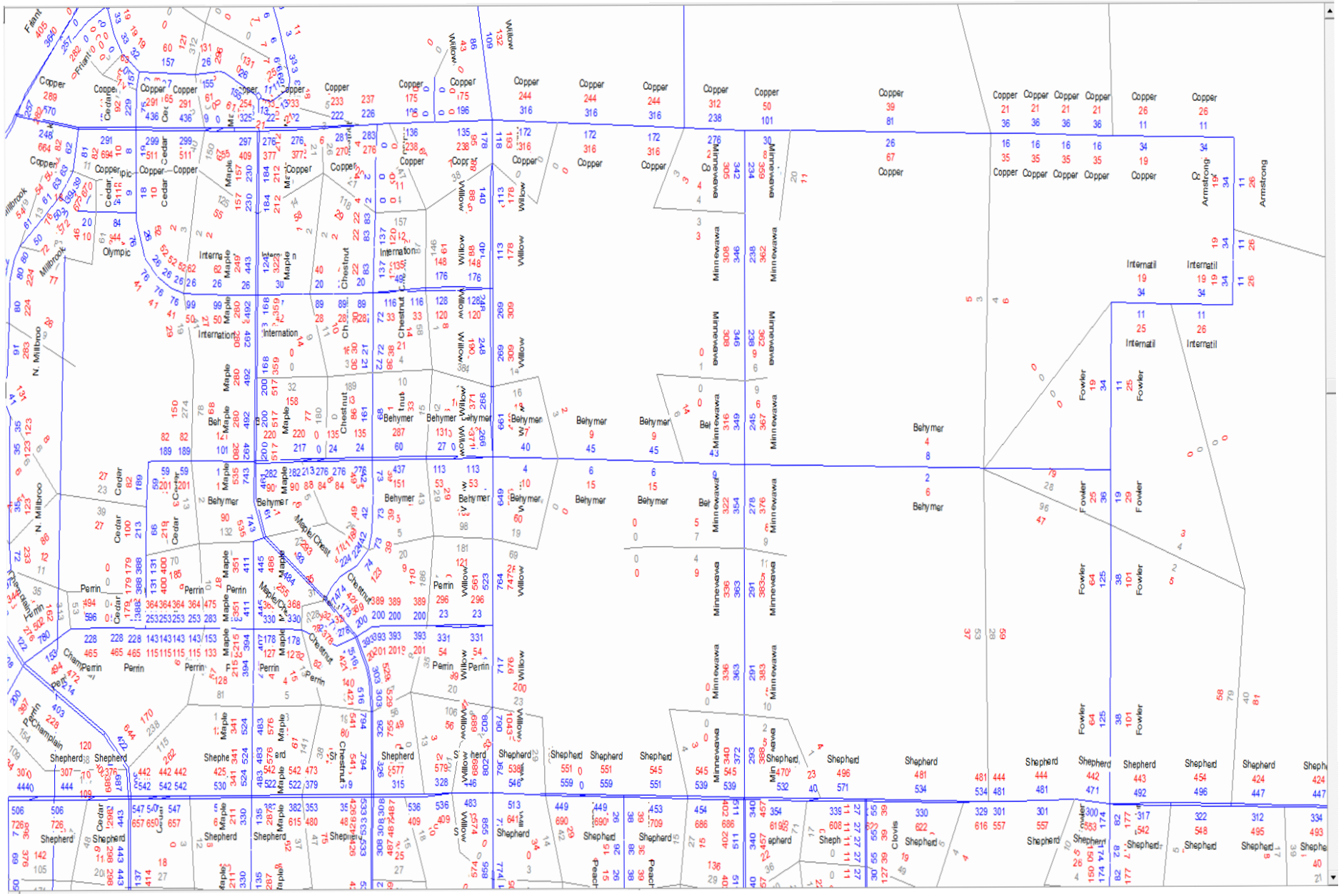
PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION



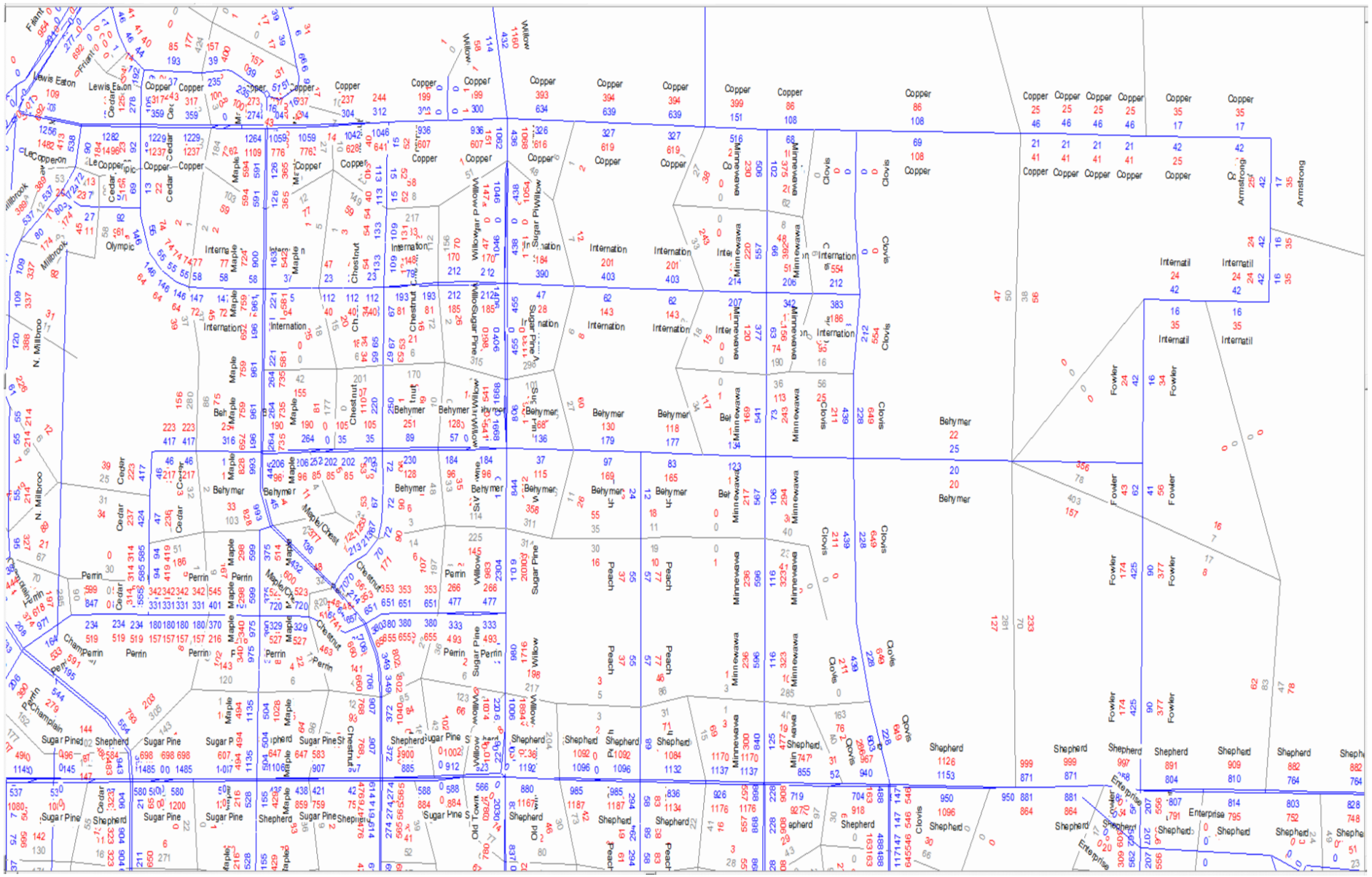
Select Zone Analysis Fresno County Travel Model
AM and PM Peak-Hour Traffic Volumes

Baseline and Future Model Output

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION



2019 Fresno County Travel Model
AM and PM Peak-Hour Traffic Volumes



2035 Fresno County Travel Model
AM and PM Peak-Hour Traffic Volumes

APPENDIX B

TRAFFIC COUNT DATA SHEETS

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION Clovis Ave @ Shepherd Ave
COUNTY Fresno
COLLECTION DATE Thursday, November 2, 2023

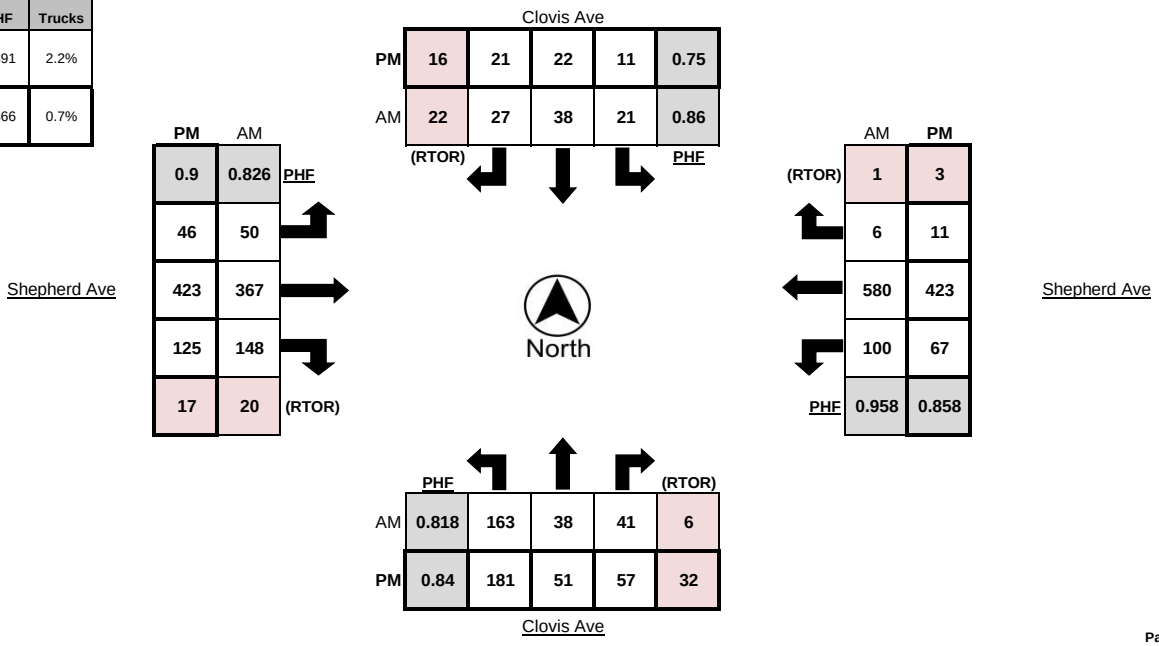
LATITUDE 36.8666
LONGITUDE -119.7021
WEATHER Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
7:00 AM - 7:15 AM	23	4	9	2	2	6	8	0	0	0	2	48	27	5	1	8	56	2	1	3
7:15 AM - 7:30 AM	14	6	4	0	0	4	14	10	6	0	1	88	28	5	3	13	81	4	0	4
7:30 AM - 7:45 AM	39	13	14	1	1	5	9	9	5	1	5	75	32	1	2	22	145	0	0	2
7:45 AM - 8:00 AM	51	11	12	3	3	6	9	10	8	0	14	108	49	9	2	27	143	3	1	2
8:00 AM - 8:15 AM	37	6	7	1	1	7	12	2	4	0	20	107	32	7	4	23	155	1	0	3
8:15 AM - 8:30 AM	36	8	8	1	1	3	8	6	5	0	11	77	35	3	8	28	137	2	0	4
8:30 AM - 8:45 AM	27	8	20	1	1	3	3	4	3	0	10	102	39	5	8	9	87	2	1	2
8:45 AM - 9:00 AM	30	5	4	0	0	5	8	4	3	1	13	67	26	7	0	16	78	1	0	1
TOTAL	**257**	**61**	**78**	**9**	**9**	**39**	**71**	**45**	**34**	**2**	**76**	**672**	**268**	**42**	**28**	**146**	**882**	**15**	**3**	**21**

	Northbound					Southbound					Eastbound					Westbound				
Time	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
4:00 PM - 4:15 PM	51	4	13	6	1	4	11	6	4	0	11	94	26	14	4	9	79	0	0	3
4:15 PM - 4:30 PM	35	11	9	6	1	1	4	1	1	0	12	119	20	4	4	22	104	1	1	1
4:30 PM - 4:45 PM	41	18	15	6	1	1	7	6	1	0	11	101	30	6	2	13	92	2	0	1
4:45 PM - 5:00 PM	47	9	15	6	0	3	6	4	3	1	14	108	27	5	0	14	99	0	0	0
5:00 PM - 5:15 PM	30	12	15	10	0	2	3	4	2	0	11	91	35	3	3	13	102	1	1	1
5:15 PM - 5:30 PM	58	13	15	11	0	1	8	9	7	0	11	123	31	2	1	22	116	8	2	2
5:30 PM - 5:45 PM	46	17	12	5	1	5	5	4	4	0	10	101	32	7	0	18	106	2	0	1
5:45 PM - 6:00 PM	48	14	6	5	0	5	9	5	5	0	8	101	38	2	0	17	87	2	0	0
TOTAL	**356**	**98**	**100**	**55**	**4**	**22**	**53**	**39**	**27**	**1**	**88**	**838**	**239**	**43**	**14**	**128**	**785**	**16**	**4**	**9**

	Northbound					Southbound					Eastbound					Westbound				
PEAK HOUR	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
7:30 AM - 8:30 AM	163	38	41	6	6	21	38	27	22	1	50	367	148	20	16	100	580	6	1	11
4:45 PM - 5:45 PM	181	51	57	32	1	11	22	21	16	1	46	423	125	17	4	67	423	11	3	4

	PHF	Trucks
AM	0.891	2.2%
PM	0.866	0.7%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

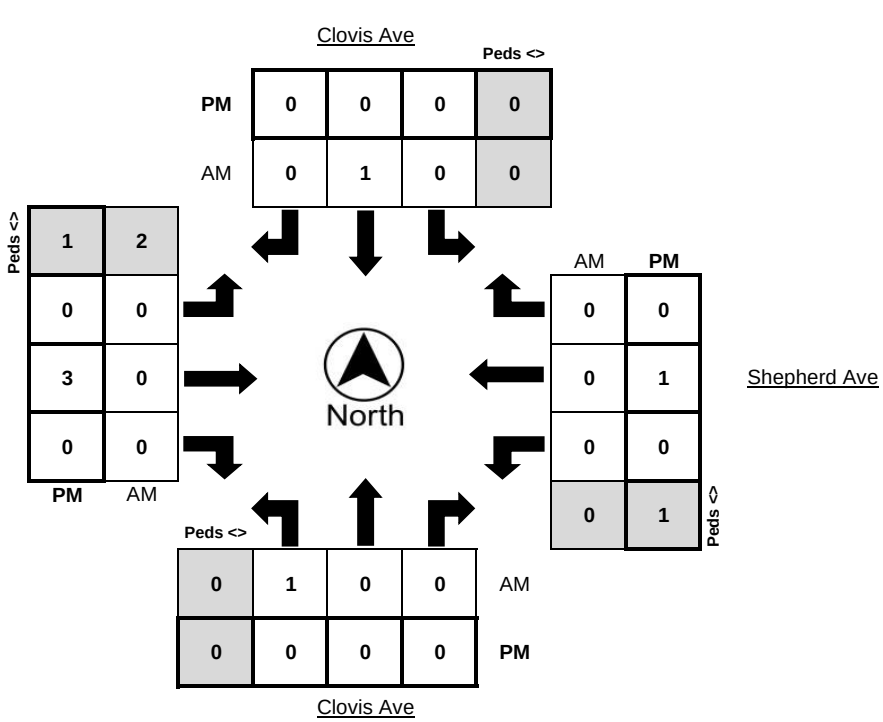
LOCATION Clovis Ave @ Shepherd Ave
LATITUDE 36.8666
COUNTY Fresno
LONGITUDE -119.7021
COLLECTION DATE Thursday, November 2, 2023
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
TOTAL	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**4**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**5**	**1**	**1**	**0**	**2**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:30 AM - 8:30 AM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
4:45 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	3	0	1	0	1	0	1

	Bikes	Peds
AM Peak Total	2	2
PM Peak Total	**4**	**2**



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

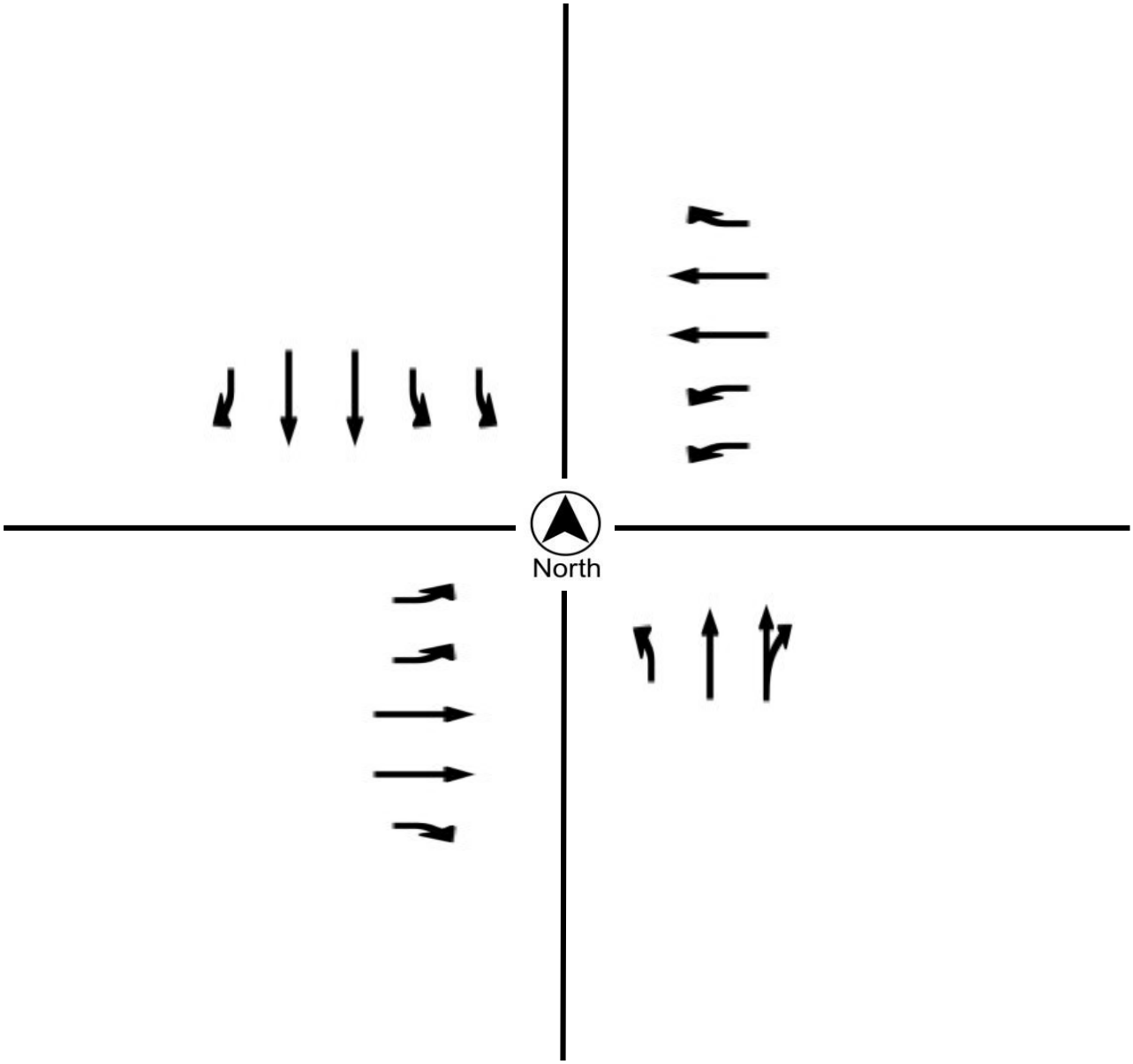
Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION	Clovis Ave @ Shepherd Ave	**N/S STREET**	Clovis Ave
COUNTY	Fresno	**E/W STREET**	Shepherd Ave
COLLECTION DATE	Thursday, November 2, 2023	**WEATHER**	Clear
CYCLE TIME	116 Seconds	**CONTROL TYPE**	Signal

COMMENTS All approaches have protected left turns



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

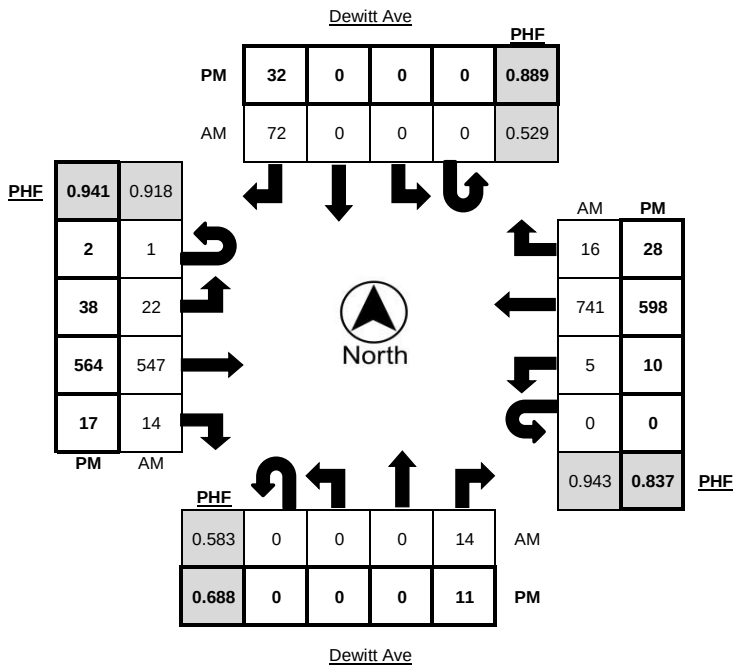
LOCATION Dewitt Ave @ Shepherd Ave
LATITUDE 36.8666
COUNTY Fresno
LONGITUDE -119.7065
COLLECTION DATE Thursday, November 2, 2023
WEATHER Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	0	0	1	0	0	0	0	5	0	0	3	77	1	1	0	1	74	5	2
7:15 AM - 7:30 AM	0	0	0	3	0	0	0	0	10	0	1	0	111	1	2	0	0	103	2	3
7:30 AM - 7:45 AM	0	0	0	5	0	0	0	0	34	0	0	3	122	4	2	0	1	172	6	3
7:45 AM - 8:00 AM	0	0	0	6	0	0	0	0	9	0	0	10	146	3	2	0	1	195	6	2
8:00 AM - 8:15 AM	0	0	0	2	0	0	0	0	13	0	1	7	144	3	3	0	1	198	2	3
8:15 AM - 8:30 AM	0	0	0	1	0	0	0	0	16	0	0	2	135	4	9	0	2	176	2	4
8:30 AM - 8:45 AM	0	0	0	4	1	0	0	0	9	0	0	4	138	0	6	0	2	112	2	1
8:45 AM - 9:00 AM	0	0	0	1	0	0	0	0	7	0	0	7	95	2	0	2	0	111	2	2
TOTAL	**0**	**0**	**0**	**23**	**1**	**0**	**0**	**0**	**103**	**0**	**2**	**36**	**968**	**18**	**25**	**2**	**8**	**1141**	**27**	**20**

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	0	0	4	0	0	0	0	9	0	0	12	129	1	6	0	0	137	7	1
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	7	0	0	10	131	5	4	0	1	133	5	2
4:30 PM - 4:45 PM	0	0	0	1	0	0	0	0	8	1	0	10	140	8	2	0	2	136	2	1
4:45 PM - 5:00 PM	0	0	0	1	0	0	0	0	7	0	0	11	150	4	0	0	2	141	8	0
5:00 PM - 5:15 PM	0	0	0	3	0	0	0	0	9	0	2	8	134	6	1	0	1	132	4	0
5:15 PM - 5:30 PM	0	0	0	3	0	0	0	0	9	0	0	6	148	5	1	0	3	179	8	0
5:30 PM - 5:45 PM	0	0	0	4	0	0	0	0	7	0	0	13	132	2	0	0	4	146	8	1
5:45 PM - 6:00 PM	0	0	0	1	0	0	0	0	9	0	0	8	152	5	0	0	0	142	3	0
TOTAL	**0**	**0**	**0**	**17**	**0**	**0**	**0**	**0**	**65**	**1**	**2**	**78**	**1116**	**36**	**14**	**0**	**13**	**1146**	**45**	**5**

	Northbound					Southbound					Eastbound					Westbound				
PEAK HOUR	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
7:30 AM - 8:30 AM	0	0	0	14	0	0	0	0	72	0	1	22	547	14	16	0	5	741	16	12
4:45 PM - 5:45 PM	0	0	0	11	0	0	0	0	32	0	2	38	564	17	2	0	10	598	28	1

	PHF	Trucks
AM	0.952	2.0%
PM	0.900	0.2%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION Dewitt Ave @ Shepherd Ave **LATITUDE** 36.8666

COUNTY Fresno **LONGITUDE** -119.7065

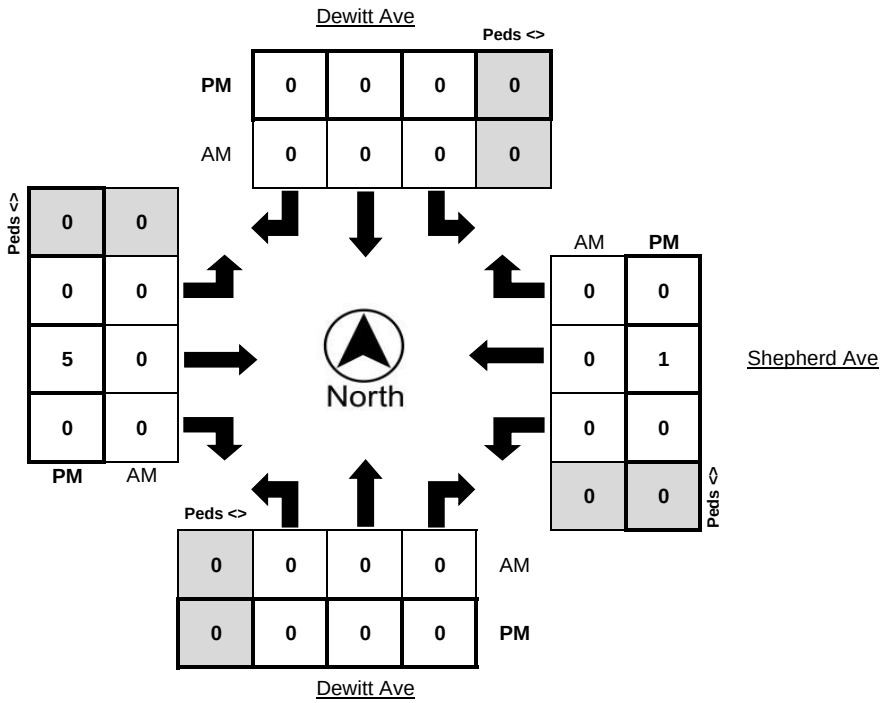
COLLECTION DATE Thursday, November 2, 2023 **WEATHER** Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**1**	**1**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:30 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	0

	Bikes	Peds
AM Peak Total	0	0
PM Peak Total	**6**	**0**



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

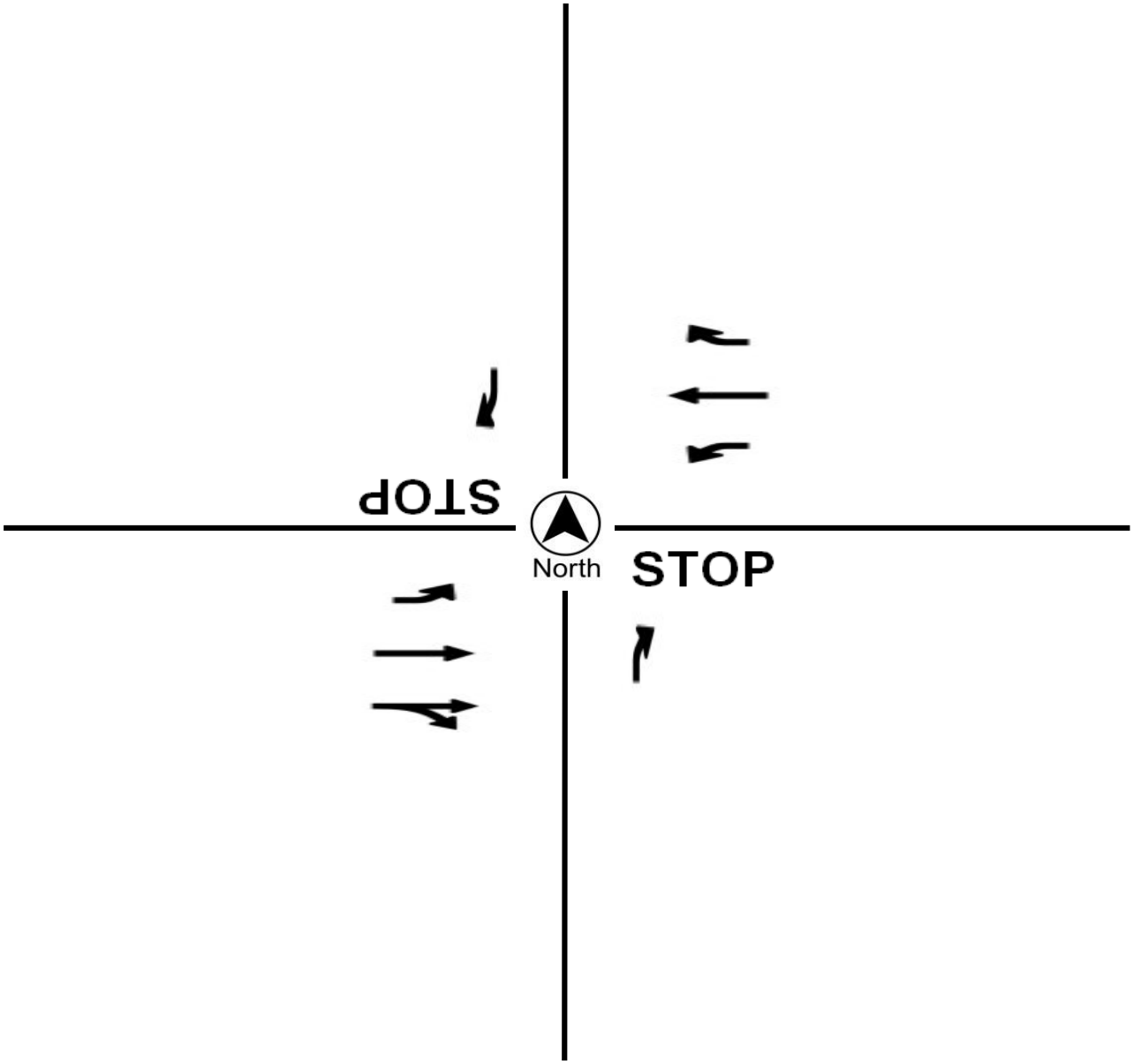
Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION	Dewitt Ave @ Shepherd Ave	**N/S STREET**	Dewitt Ave / Dewitt Ave
COUNTY	Fresno	**E/W STREET**	Shepherd Ave / Shepherd Ave
COLLECTION DATE	Thursday, November 2, 2023	**WEATHER**	Clear
CYCLE TIME	N/A	**CONTROL TYPE**	Two-Way Stop

COMMENTS



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

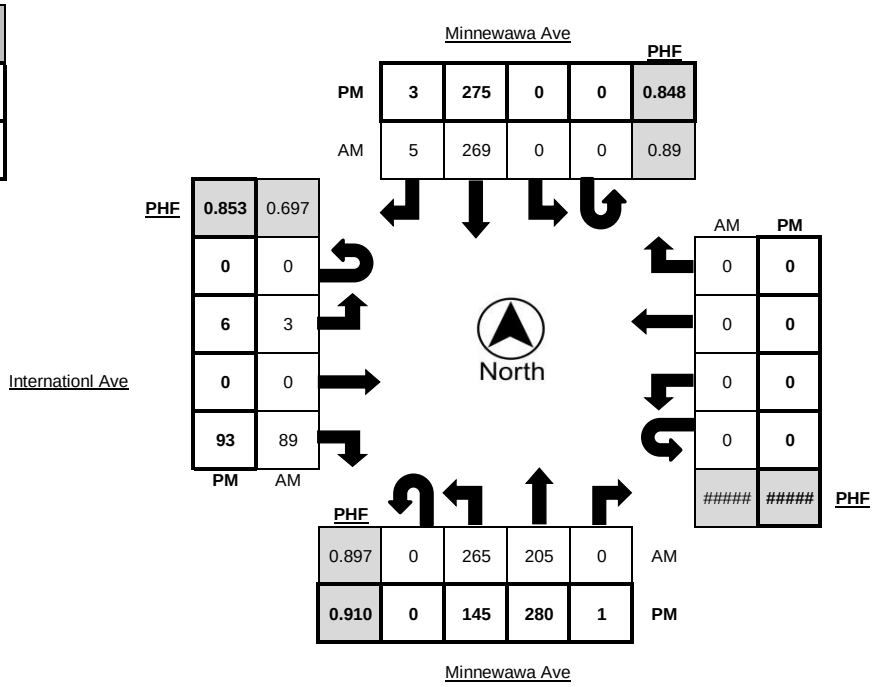
LOCATION Minnewawa Ave @ International Ave
LATITUDE 36.8884
COUNTY Fresno
LONGITUDE -119.7112
COLLECTION DATE Thursday, September 14, 2023
WEATHER Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	38	40	0	3	0	0	55	1	2	0	1	0	10	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	41	40	0	1	0	0	59	0	1	0	0	0	15	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	47	42	0	2	0	0	66	0	2	0	0	0	21	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	65	58	0	5	0	0	61	1	0	0	0	0	13	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	82	49	0	1	0	0	73	4	3	0	3	0	30	1	0	0	0	0	0
8:15 AM - 8:30 AM	0	71	56	0	3	0	0	69	0	2	0	0	0	25	1	0	0	0	0	0
8:30 AM - 8:45 AM	0	31	51	0	6	0	0	55	0	3	0	0	0	35	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	25	59	0	4	0	0	51	0	3	0	0	0	6	0	0	0	0	0	0
TOTAL	**0**	**400**	**395**	**0**	**25**	**0**	**0**	**489**	**6**	**16**	**0**	**4**	**0**	**155**	**2**	**0**	**0**	**0**	**0**	**0**

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	26	57	0	1	0	0	55	0	0	0	0	0	23	0	0	1	0	0	0
4:15 PM - 4:30 PM	0	25	59	0	2	0	0	58	0	1	0	0	0	23	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	37	60	0	1	0	0	50	0	2	0	0	0	24	0	0	1	0	0	0
4:45 PM - 5:00 PM	0	25	68	0	0	0	0	79	0	1	0	1	0	17	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	33	73	0	0	0	0	63	0	1	0	1	0	26	1	0	0	0	0	0
5:15 PM - 5:30 PM	0	48	69	0	0	0	0	81	1	1	0	3	0	22	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	39	70	1	3	0	0	52	2	0	0	1	0	28	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	29	55	0	0	0	0	57	0	1	0	0	0	34	0	0	0	0	0	0
TOTAL	**0**	**262**	**511**	**1**	**7**	**0**	**0**	**495**	**3**	**7**	**0**	**6**	**0**	**197**	**1**	**0**	**2**	**0**	**0**	**0**

	Northbound					Southbound					Eastbound					Westbound				
PEAK HOUR	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
7:30 AM - 8:30 AM	0	265	205	0	11	0	0	269	5	7	0	3	0	89	2	0	0	0	0	0
4:45 PM - 5:45 PM	0	145	280	1	3	0	0	275	3	3	0	6	0	93	1	0	0	0	0	0

	PHF	Trucks
AM	0.867	2.4%
PM	0.896	0.9%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

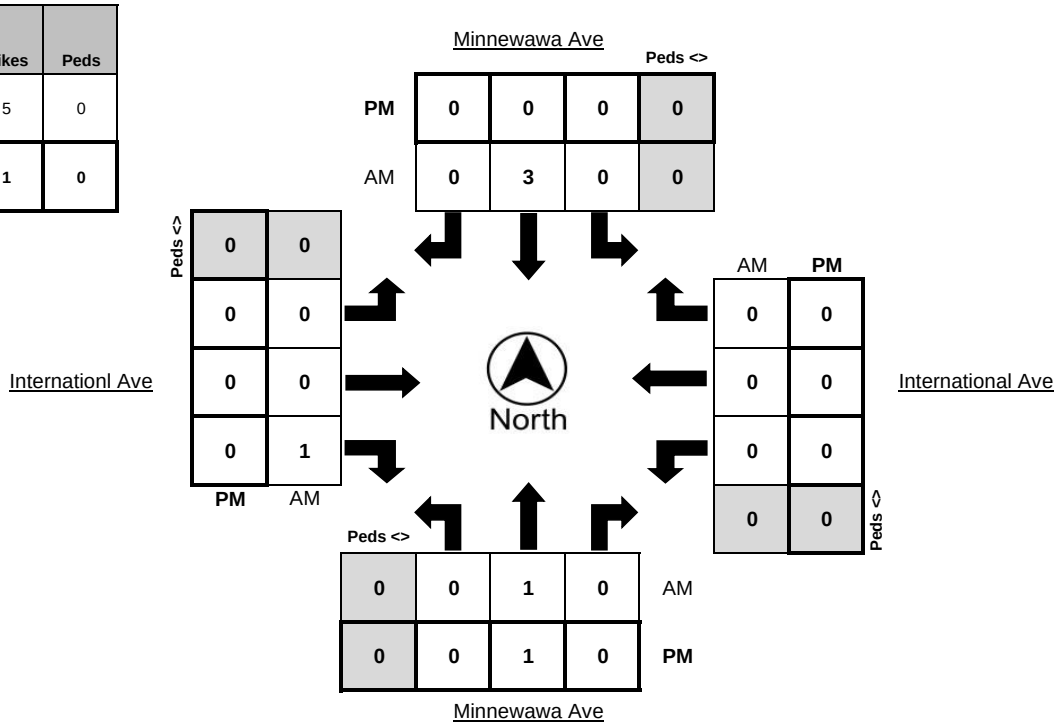
LOCATION Minnewawa Ave @ International Ave
LATITUDE 36.8884
COUNTY Fresno
LONGITUDE -119.7112
COLLECTION DATE Thursday, September 14, 2023
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:00 AM - 7:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
8:15 AM - 8:30 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**2**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:30 AM - 8:30 AM	0	1	0	0	0	3	0	0	0	0	1	0	0	0	0	0
4:45 PM - 5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Bikes	Peds
AM Peak Total	5	0
PM Peak Total	**1**	**0**



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

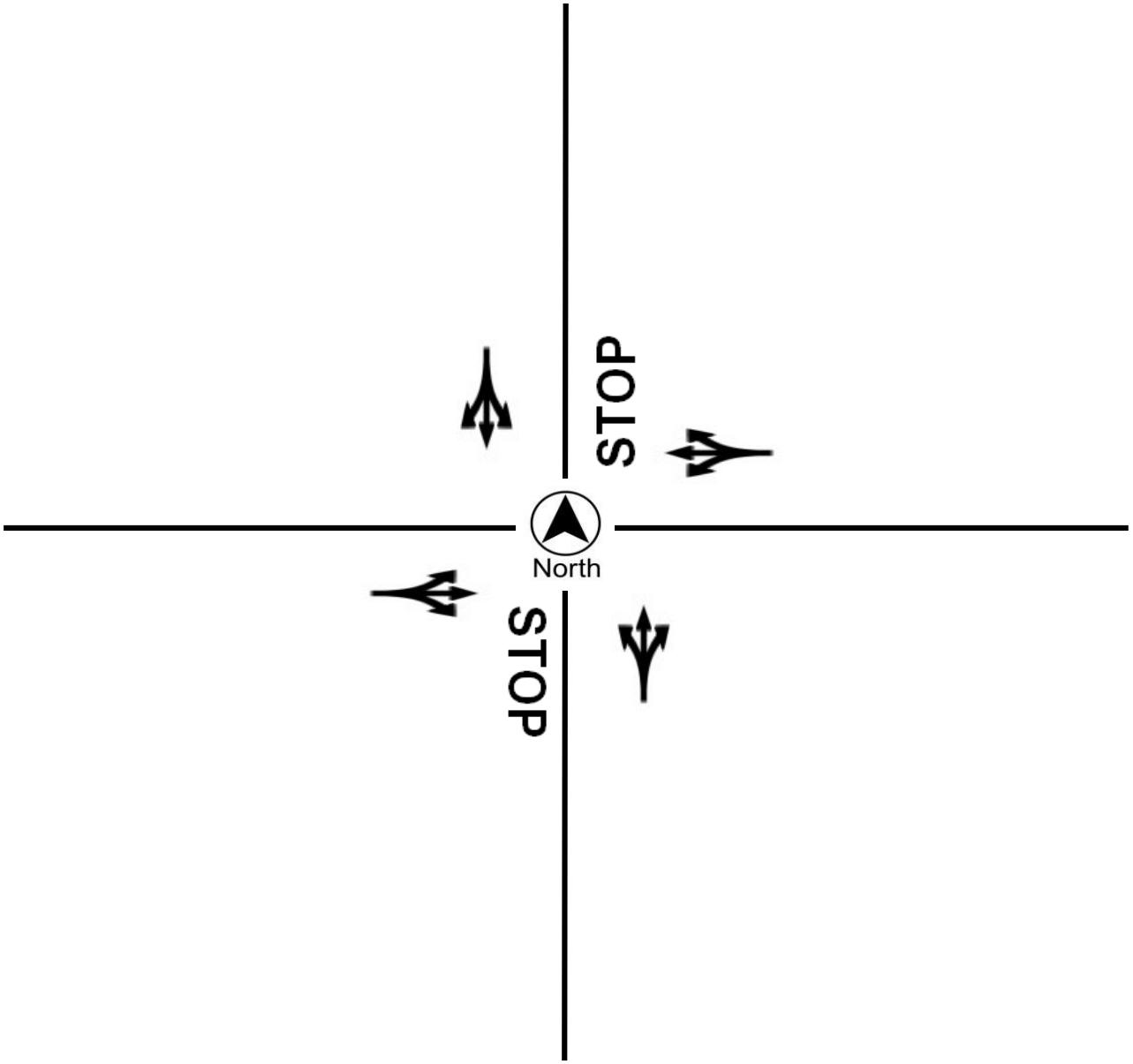
Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION	Minnewawa Ave @ International Ave	**N/S STREET**	Minnewawa Ave / Minnewawa Ave
COUNTY	Fresno	**E/W STREET**	International Ave / Internationl Ave
COLLECTION DATE	Thursday, September 14, 2023	**WEATHER**	Clear
CYCLE TIME	N/A	**CONTROL TYPE**	Two-Way Stop

COMMENTS



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION Minnewawa Ave @ Shepherd Ave
COUNTY Fresno
COLLECTION DATE Thursday, November 2, 2023

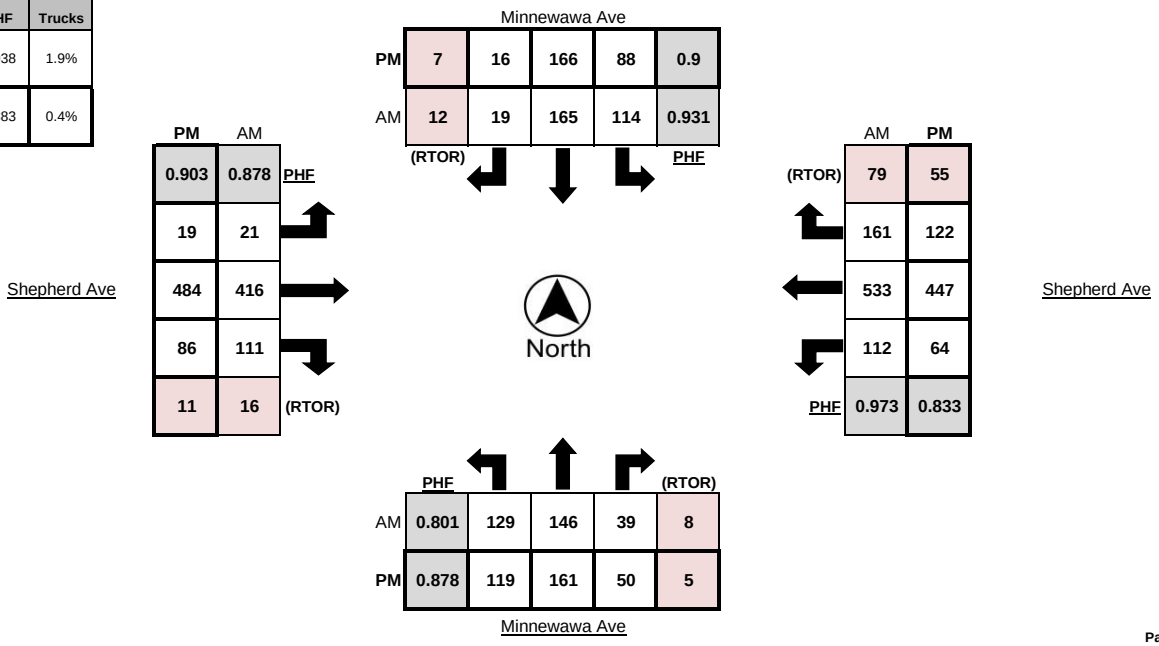
LATITUDE 36.8666
LONGITUDE -119.7111
WEATHER Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
7:00 AM - 7:15 AM	12	17	0	0	1	12	18	3	2	1	4	65	16	9	1	4	56	19	7	3
7:15 AM - 7:30 AM	15	31	4	1	0	23	43	3	0	1	2	92	14	4	3	15	78	16	7	2
7:30 AM - 7:45 AM	19	40	8	3	1	24	40	7	5	2	5	90	20	5	1	18	133	42	23	1
7:45 AM - 8:00 AM	29	28	7	2	0	30	34	4	2	1	5	120	31	4	2	19	149	38	21	3
8:00 AM - 8:15 AM	36	33	16	1	1	31	46	3	2	1	7	109	36	4	4	43	129	35	14	3
8:15 AM - 8:30 AM	45	45	8	2	4	29	45	5	3	4	4	97	24	3	5	32	122	46	21	5
8:30 AM - 8:45 AM	23	29	12	3	0	29	33	1	0	4	2	103	13	0	3	10	100	17	10	0
8:45 AM - 9:00 AM	19	17	4	1	2	20	36	2	0	1	3	80	14	0	0	3	96	23	6	2
TOTAL	**198**	**240**	**59**	**13**	**9**	**198**	**295**	**28**	**14**	**15**	**32**	**756**	**168**	**29**	**19**	**144**	**863**	**236**	**109**	**19**

	Northbound					Southbound					Eastbound					Westbound				
Time	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
4:00 PM - 4:15 PM	22	37	10	2	0	25	35	0	0	5	7	112	15	2	4	4	108	29	11	1
4:15 PM - 4:30 PM	15	28	9	1	2	21	41	1	0	1	11	115	15	2	2	19	98	28	7	1
4:30 PM - 4:45 PM	19	31	8	1	0	28	33	2	2	1	4	123	13	2	2	8	103	24	7	2
4:45 PM - 5:00 PM	24	36	14	2	1	20	48	2	0	0	5	130	19	4	0	6	112	29	11	0
5:00 PM - 5:15 PM	22	32	12	2	1	19	31	2	1	1	3	124	13	2	1	12	108	26	11	0
5:15 PM - 5:30 PM	40	42	8	0	1	19	51	3	2	1	7	140	16	3	1	19	131	40	20	0
5:30 PM - 5:45 PM	34	40	20	3	0	25	43	2	0	0	7	94	29	4	1	19	93	28	8	1
5:45 PM - 6:00 PM	23	47	10	0	0	25	41	9	4	0	2	126	28	2	0	14	115	28	16	0
TOTAL	**199**	**293**	**91**	**11**	**5**	**182**	**323**	**21**	**9**	**9**	**46**	**964**	**148**	**21**	**11**	**101**	**868**	**232**	**91**	**5**

	Northbound					Southbound					Eastbound					Westbound				
PEAK HOUR	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
7:30 AM - 8:30 AM	129	146	39	8	6	114	165	19	12	8	21	416	111	16	12	112	533	161	79	12
5:00 PM - 6:00 PM	119	161	50	5	2	88	166	16	7	2	19	484	86	11	3	64	447	122	55	1

	PHF	Trucks
AM	0.938	1.9%
PM	0.883	0.4%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

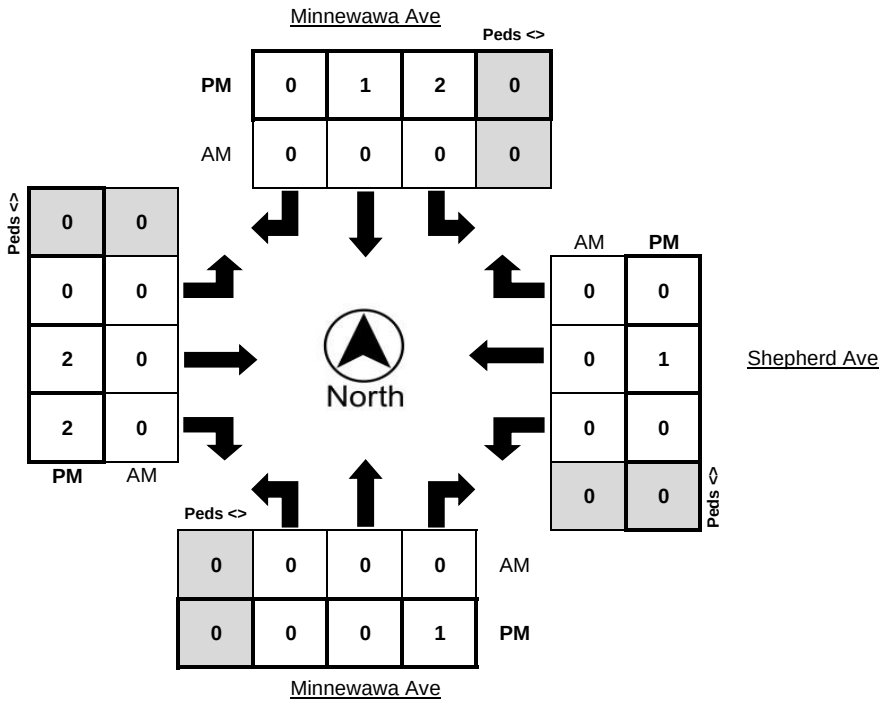
LOCATION Minnewawa Ave @ Shepherd Ave
LATITUDE 36.8666
COUNTY Fresno
LONGITUDE -119.7111
COLLECTION DATE Thursday, November 2, 2023
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
TOTAL	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**1**	**0**	**2**	**2**	**1**	**0**	**0**	**3**	**2**	**0**	**0**	**1**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:30 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 6:00 PM	0	0	1	0	2	1	0	0	0	2	2	0	0	1	0	0

	Bikes	**Peds**
AM Peak Total	0	0
PM Peak Total	**9**	**0**



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

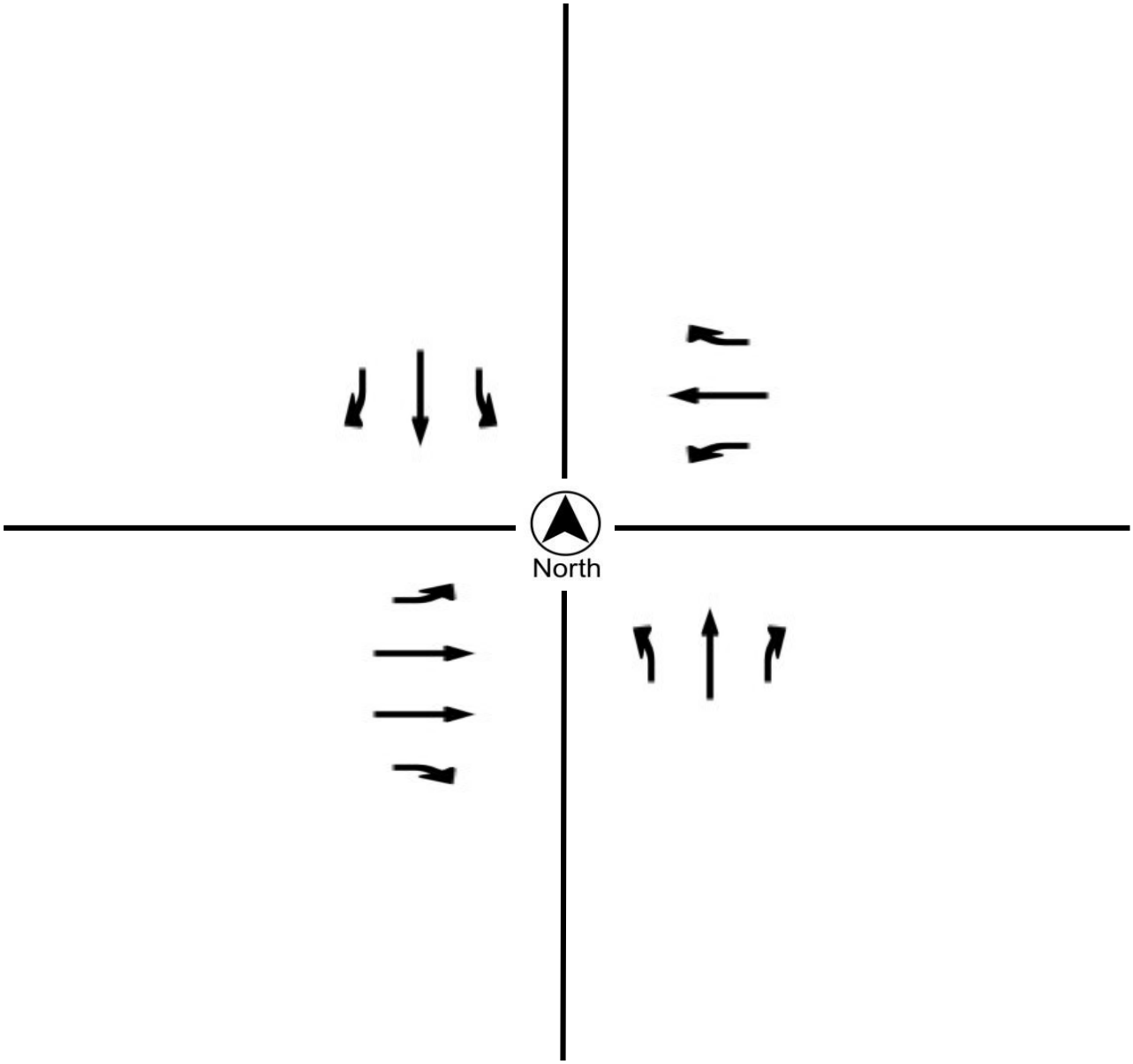
Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION	Minnewawa Ave @ Shepherd Ave	**N/S STREET**	Minnewawa Ave
COUNTY	Fresno	**E/W STREET**	Shepherd Ave
COLLECTION DATE	Thursday, November 2, 2023	**WEATHER**	Clear
CYCLE TIME	108 Seconds	**CONTROL TYPE**	Signal

COMMENTS All approaches have protected left turns



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

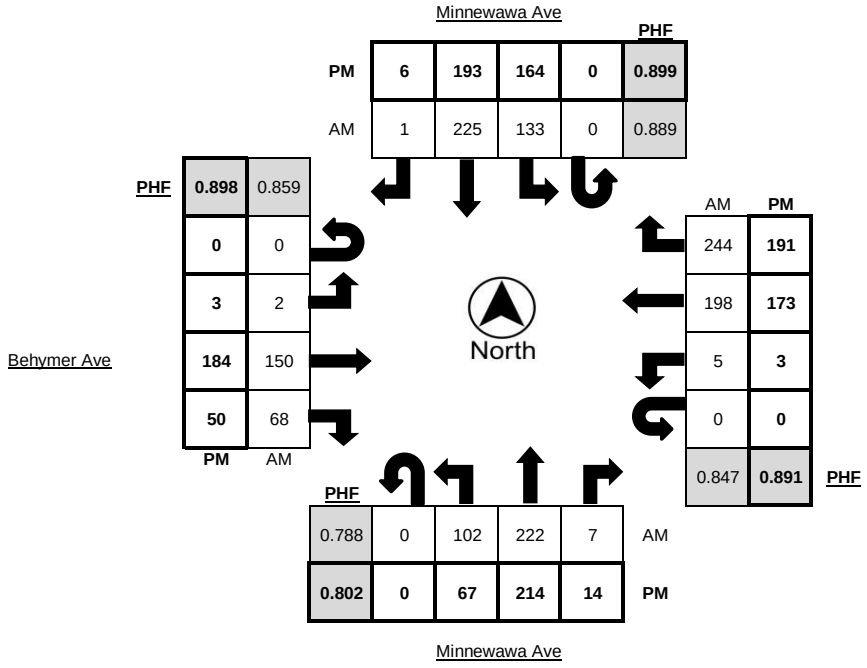
LOCATION Minnewawa Ave @ Behymer Ave
LATITUDE 36.8812
COUNTY Fresno
LONGITUDE -119.7112
COLLECTION DATE Thursday, September 14, 2023
WEATHER Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	2	33	1	2	0	26	36	0	2	0	0	26	9	0	0	3	32	45	1
7:15 AM - 7:30 AM	0	9	40	2	1	0	36	39	0	1	0	0	27	9	1	0	3	46	44	3
7:30 AM - 7:45 AM	0	33	42	1	2	0	35	48	0	2	0	0	37	10	1	0	3	72	48	1
7:45 AM - 8:00 AM	0	28	47	1	2	0	25	51	0	0	0	2	36	26	1	0	2	54	76	5
8:00 AM - 8:15 AM	0	14	59	1	2	0	33	68	0	3	0	0	36	16	2	0	0	34	68	3
8:15 AM - 8:30 AM	0	27	74	4	3	0	40	58	1	3	0	0	41	16	1	0	0	38	52	1
8:30 AM - 8:45 AM	0	8	44	3	3	0	36	52	1	3	0	2	24	16	4	0	1	32	41	4
8:45 AM - 9:00 AM	0	9	42	2	2	0	22	36	0	3	0	1	15	11	0	0	4	43	36	3
TOTAL	**0**	**130**	**381**	**15**	**17**	**0**	**253**	**388**	**2**	**17**	**0**	**5**	**242**	**113**	**10**	**0**	**16**	**351**	**410**	**21**

	Northbound					Southbound					Eastbound					Westbound				
Time	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	16	55	2	0	0	26	45	0	0	0	0	46	14	0	0	0	35	30	2
4:15 PM - 4:30 PM	0	11	49	2	1	0	34	52	1	2	0	4	25	6	1	0	3	37	32	1
4:30 PM - 4:45 PM	0	14	57	1	1	0	37	36	0	2	0	0	40	10	0	0	0	22	39	0
4:45 PM - 5:00 PM	0	10	56	3	0	0	39	59	0	1	0	2	26	1	0	0	1	38	39	1
5:00 PM - 5:15 PM	0	11	51	1	0	0	38	40	3	2	0	0	39	11	0	0	1	41	56	0
5:15 PM - 5:30 PM	0	27	59	6	0	0	40	61	0	2	0	0	56	10	0	0	1	47	55	0
5:30 PM - 5:45 PM	0	20	61	4	1	0	45	43	1	0	0	2	55	7	1	0	1	42	46	0
5:45 PM - 6:00 PM	0	9	43	3	0	0	41	49	2	1	0	1	34	22	1	0	0	43	34	0
TOTAL	**0**	**118**	**431**	**22**	**3**	**0**	**300**	**385**	**7**	**10**	**0**	**9**	**321**	**81**	**3**	**0**	**7**	**305**	**331**	**4**

	Northbound					Southbound					Eastbound					Westbound				
PEAK HOUR	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**	**U-Turn**	**Left**	**Thru**	**Right**	**Trucks**
7:30 AM - 8:30 AM	0	102	222	7	9	0	133	225	1	8	0	2	150	68	5	0	5	198	244	10
5:00 PM - 6:00 PM	0	67	214	14	1	0	164	193	6	5	0	3	184	50	2	0	3	173	191	0

	PHF	Trucks
AM	0.967	2.4%
PM	0.872	0.6%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

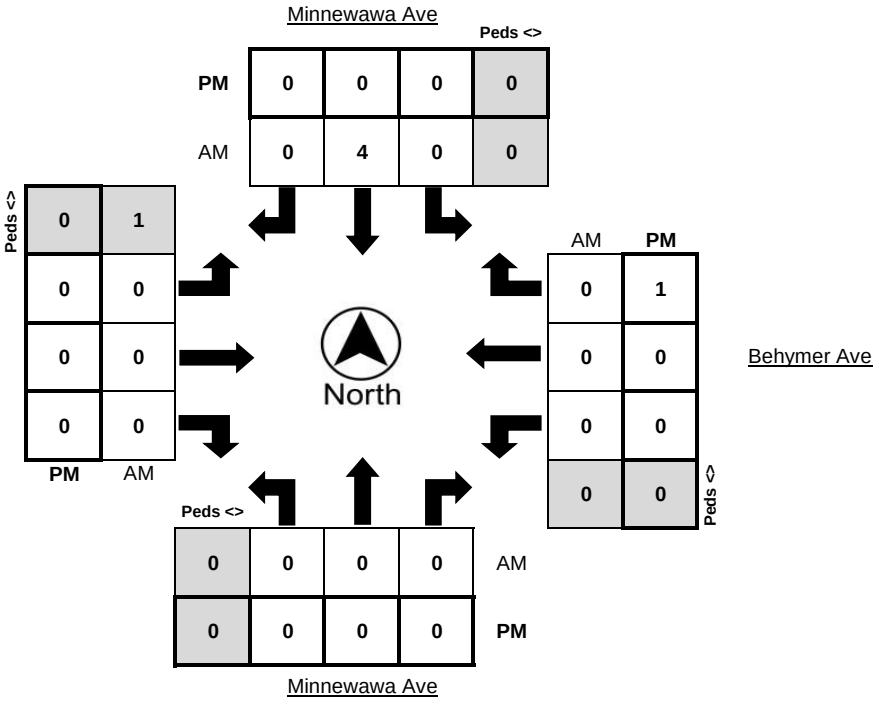
LOCATION Minnewawa Ave @ Behymer Ave
LATITUDE 36.8812
COUNTY Fresno
LONGITUDE -119.7112
COLLECTION DATE Thursday, September 14, 2023
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:00 AM - 7:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
8:00 AM - 8:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**1**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
4:00 PM - 4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:30 AM - 8:30 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1
5:00 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

	Bikes	Peds
AM Peak Total	4	1
PM Peak Total	**1**	**0**



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

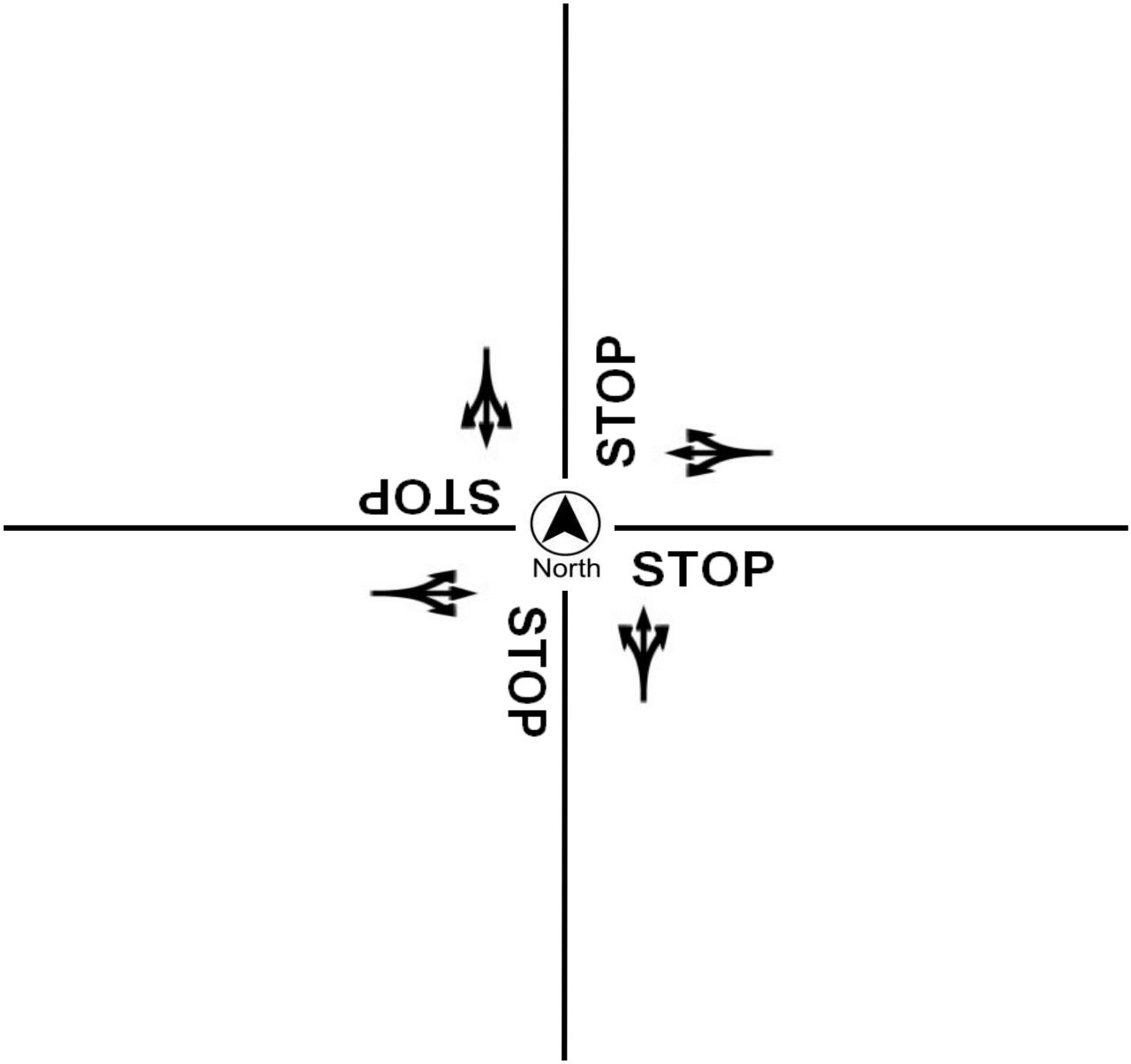
Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION	Minnewawa Ave @ Behymer Ave	**N/S STREET**	Minnewawa Ave / Minnewawa Ave
COUNTY	Fresno	**E/W STREET**	Behymer Ave / Behymer Ave
COLLECTION DATE	Thursday, September 14, 2023	**WEATHER**	Clear
CYCLE TIME	N/A	**CONTROL TYPE**	All-Way Stop

COMMENTS



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

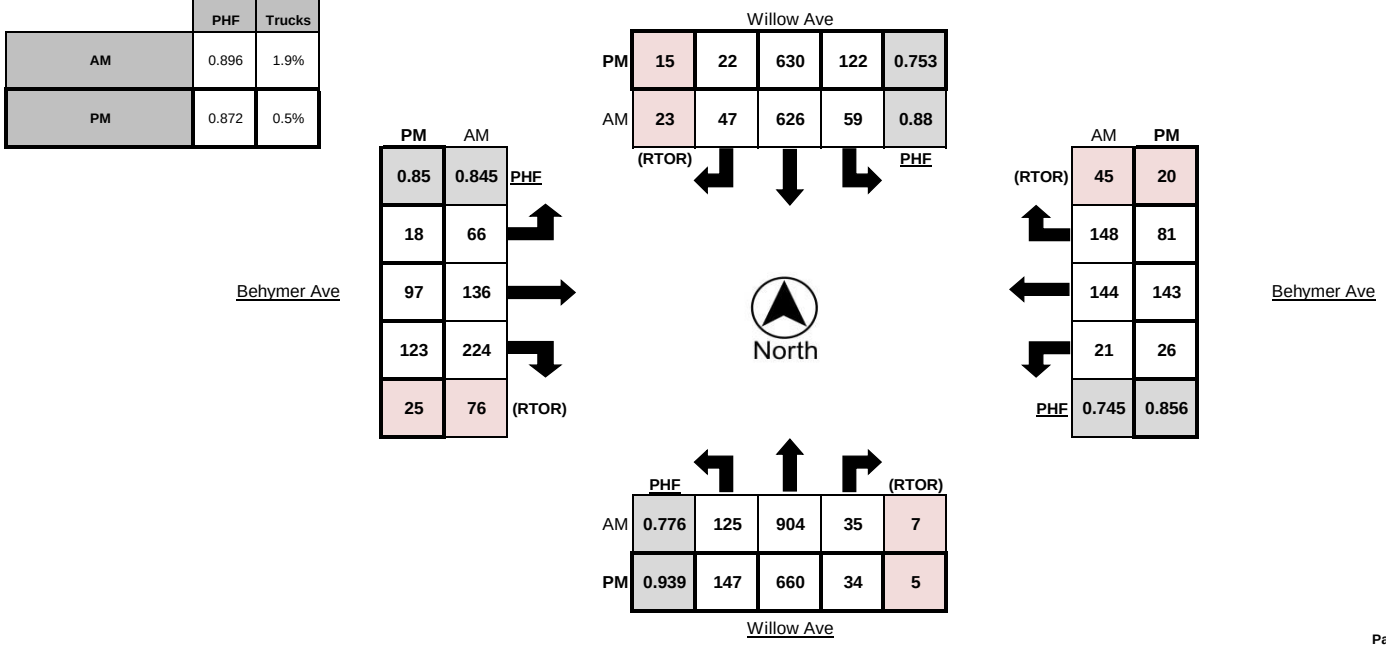
LOCATION Willow Ave @ Behymer Ave
LATITUDE 36.8814
COUNTY Fresno
LONGITUDE -119.7299
COLLECTION DATE Thursday, September 14, 2023
WEATHER Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
7:00 AM - 7:15 AM	15	68	5	2	4	9	74	4	2	1	15	19	21	5	2	2	19	13	6	0
7:15 AM - 7:30 AM	13	95	11	4	2	7	107	10	3	2	4	23	31	7	0	7	21	16	4	1
7:30 AM - 7:45 AM	29	147	9	3	4	10	127	10	7	4	9	30	62	23	1	7	60	38	18	1
7:45 AM - 8:00 AM	30	223	10	3	3	16	159	12	9	0	19	38	69	24	4	5	36	47	16	1
8:00 AM - 8:15 AM	27	239	7	1	6	18	163	9	1	2	18	35	53	14	3	3	22	32	7	4
8:15 AM - 8:30 AM	39	295	9	0	3	15	177	16	6	7	20	33	40	15	4	6	26	31	4	2
8:30 AM - 8:45 AM	23	144	8	0	3	12	174	16	6	4	12	22	45	14	1	2	15	20	6	0
8:45 AM - 9:00 AM	30	128	4	0	1	8	86	0	0	1	5	16	21	5	1	11	21	23	8	0
TOTAL	**206**	**1339**	**63**	**13**	**26**	**95**	**1067**	**77**	**34**	**21**	**102**	**216**	**342**	**107**	**16**	**43**	**220**	**220**	**69**	**9**

	Northbound					Southbound					Eastbound					Westbound				
Time	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
4:00 PM - 4:15 PM	31	122	11	1	2	19	120	6	5	2	10	37	48	13	0	6	29	16	5	1
4:15 PM - 4:30 PM	28	139	6	0	2	16	127	4	1	0	4	16	19	5	1	9	26	16	8	0
4:30 PM - 4:45 PM	26	156	9	1	3	17	115	4	2	1	1	27	28	8	0	3	25	9	4	1
4:45 PM - 5:00 PM	20	144	6	2	1	14	102	3	1	0	3	14	21	4	0	8	26	16	4	1
5:00 PM - 5:15 PM	28	149	9	2	1	19	136	6	4	3	3	19	32	6	0	8	29	19	6	0
5:15 PM - 5:30 PM	37	176	7	1	0	47	204	6	5	0	2	27	24	4	0	7	43	23	2	0
5:30 PM - 5:45 PM	48	164	12	1	1	37	144	4	3	2	6	16	39	3	0	3	40	23	6	0
5:45 PM - 6:00 PM	34	171	6	1	0	19	146	6	3	2	7	35	28	12	1	8	31	16	6	0
TOTAL	**252**	**1221**	**66**	**9**	**10**	**188**	**1094**	**39**	**24**	**10**	**36**	**191**	**239**	**55**	**2**	**52**	**249**	**138**	**41**	**3**

	Northbound					Southbound					Eastbound					Westbound				
PEAK HOUR	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
7:30 AM - 8:30 AM	125	904	35	7	16	59	626	47	23	13	66	136	224	76	12	21	144	148	45	8
5:00 PM - 6:00 PM	147	660	34	5	2	122	630	22	15	7	18	97	123	25	1	26	143	81	20	0

	PHF	Trucks
AM	0.896	1.9%
PM	0.872	0.5%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

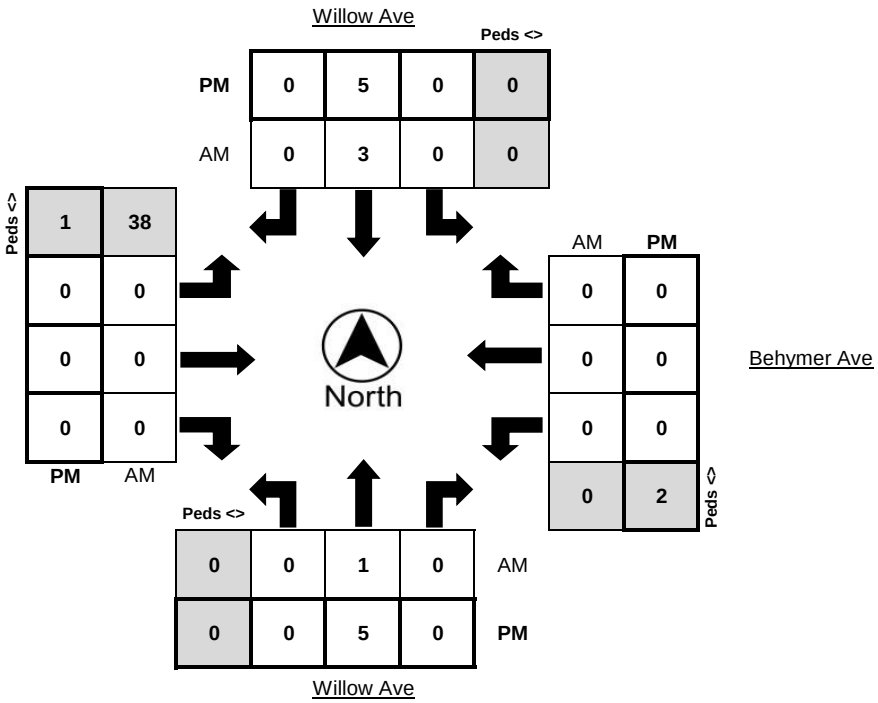
LOCATION Willow Ave @ Behymer Ave
LATITUDE 36.8814
COUNTY Fresno
LONGITUDE -119.7299
COLLECTION DATE Thursday, September 14, 2023
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:00 AM - 7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	13
7:30 AM - 7:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	13
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
8:00 AM - 8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
8:15 AM - 8:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	14
8:30 AM - 8:45 AM	0	4	0	0	0	3	0	0	0	0	0	0	0	0	0	3
8:45 AM - 9:00 AM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
TOTAL	**0**	**6**	**0**	**0**	**0**	**9**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**56**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
4:00 PM - 4:15 PM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1
5:15 PM - 5:30 PM	0	1	0	0	0	4	0	0	0	0	0	1	0	0	0	0
5:30 PM - 5:45 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**5**	**0**	**0**	**0**	**13**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**1**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:30 AM - 8:30 AM	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	38
5:00 PM - 6:00 PM	0	5	0	0	0	5	0	0	0	0	0	2	0	0	0	1

	Bikes	Peds
AM Peak Total	4	38
PM Peak Total	**10**	**3**



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

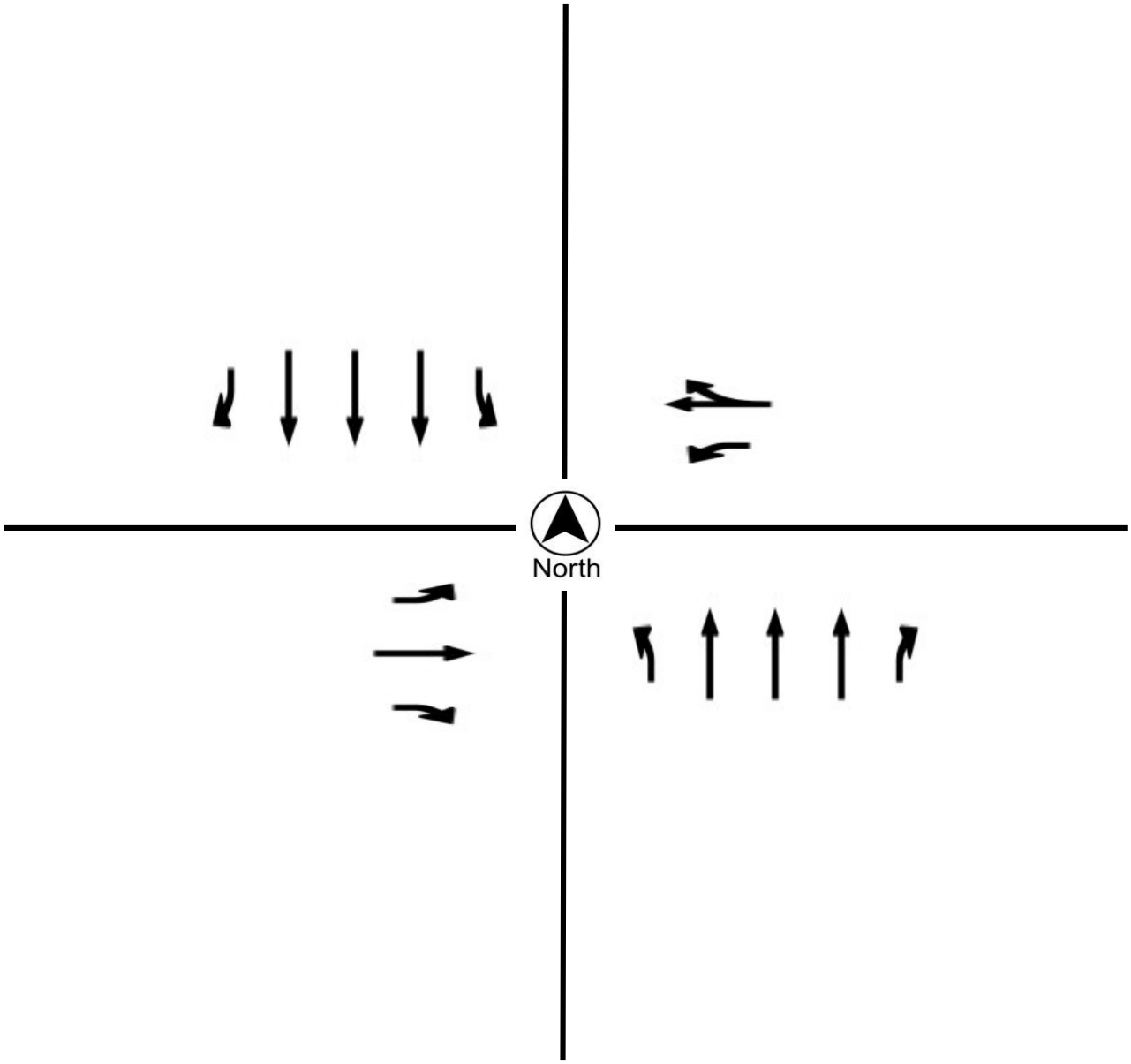
Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION	Willow Ave @ Behymer Ave	**N/S STREET**	Willow Ave
COUNTY	Fresno	**E/W STREET**	Behymer Ave
COLLECTION DATE	Thursday, September 14, 2023	**WEATHER**	Clear
CYCLE TIME	58 Seconds	**CONTROL TYPE**	Signal

COMMENTS All approaches have protected left turns.



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION Willow Ave @ International Ave
COUNTY Fresno
COLLECTION DATE Thursday, September 14, 2023

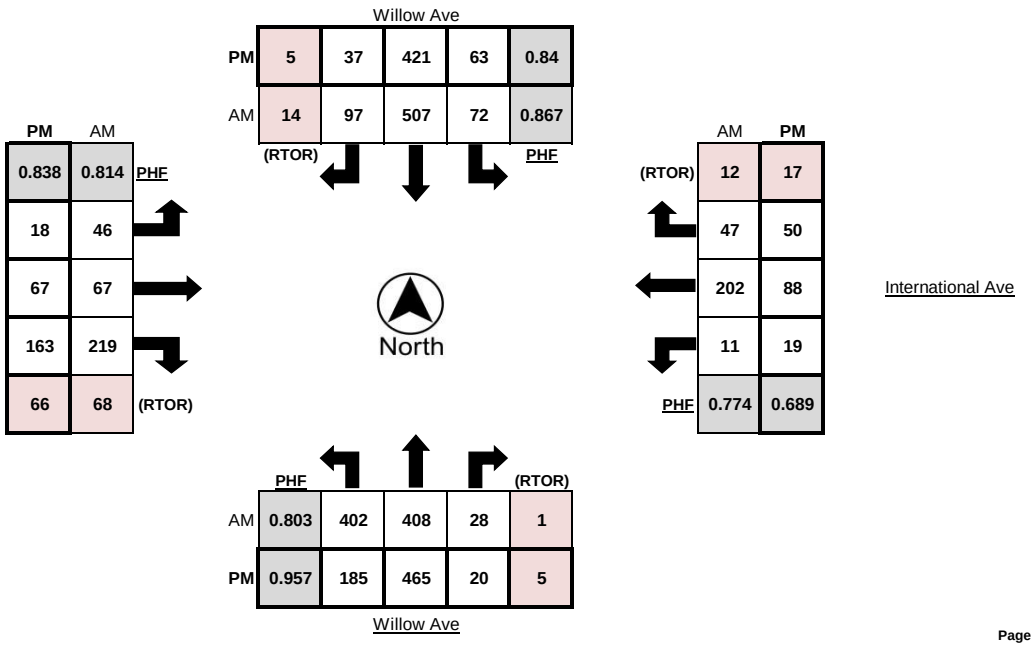
LATITUDE 36.8887
LONGITUDE -119.7299
WEATHER Clear

	Northbound					Southbound					Eastbound					Westbound				
Time	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
7:00 AM - 7:15 AM	35	54	3	0	4	2	69	5	0	1	1	7	14	8	1	0	30	8	1	1
7:15 AM - 7:30 AM	49	53	0	0	4	12	105	2	0	1	1	10	21	11	1	1	29	10	5	0
7:30 AM - 7:45 AM	63	49	1	0	3	6	116	9	0	3	2	15	30	12	1	3	31	14	5	0
7:45 AM - 8:00 AM	86	90	8	0	3	10	115	8	3	0	7	11	44	13	0	6	43	13	6	0
8:00 AM - 8:15 AM	125	106	10	0	3	12	132	25	2	2	5	18	43	14	1	3	66	15	1	0
8:15 AM - 8:30 AM	135	122	4	1	3	26	129	40	6	10	17	18	67	19	0	2	68	10	1	0
8:30 AM - 8:45 AM	56	90	6	0	1	24	131	24	3	2	17	20	65	22	1	0	25	9	4	1
8:45 AM - 9:00 AM	19	75	11	0	0	4	66	4	1	1	1	11	19	11	0	3	6	4	3	1
TOTAL	**568**	**639**	**43**	**1**	**21**	**96**	**863**	**117**	**15**	**20**	**51**	**110**	**303**	**110**	**5**	**18**	**298**	**83**	**26**	**3**

	Northbound					Southbound					Eastbound					Westbound				
Time	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
4:00 PM - 4:15 PM	40	81	3	1	1	5	75	9	2	1	2	16	36	13	1	3	19	8	4	0
4:15 PM - 4:30 PM	28	113	3	1	1	6	82	7	1	0	4	14	42	11	0	0	20	6	3	1
4:30 PM - 4:45 PM	44	112	4	1	3	12	84	6	3	0	3	19	23	9	1	4	21	13	1	0
4:45 PM - 5:00 PM	42	120	7	2	1	7	69	8	1	1	1	6	33	17	0	2	17	12	5	0
5:00 PM - 5:15 PM	51	111	4	1	0	17	96	8	1	3	5	13	44	19	2	2	14	12	5	0
5:15 PM - 5:30 PM	52	119	4	1	0	18	129	8	1	1	3	14	49	20	1	8	35	14	3	0
5:30 PM - 5:45 PM	51	111	8	2	0	18	103	15	1	2	4	14	28	11	1	4	28	13	5	1
5:45 PM - 6:00 PM	31	124	4	1	1	10	93	6	2	2	6	26	42	16	1	5	11	11	4	0
TOTAL	**339**	**891**	**37**	**10**	**7**	**93**	**731**	**67**	**12**	**10**	**28**	**122**	**297**	**116**	**7**	**28**	**165**	**89**	**30**	**2**

	Northbound					Southbound					Eastbound					Westbound				
PEAK HOUR	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**	**Left**	**Thru**	**Right**	**(RTOR)**	**Trucks**
7:45 AM - 8:45 AM	402	408	28	1	10	72	507	97	14	14	46	67	219	68	2	11	202	47	12	1
5:00 PM - 6:00 PM	185	465	20	5	1	63	421	37	5	8	18	67	163	66	5	19	88	50	17	1

	PHF	Trucks
AM	0.825	1.3%
PM	0.881	0.9%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

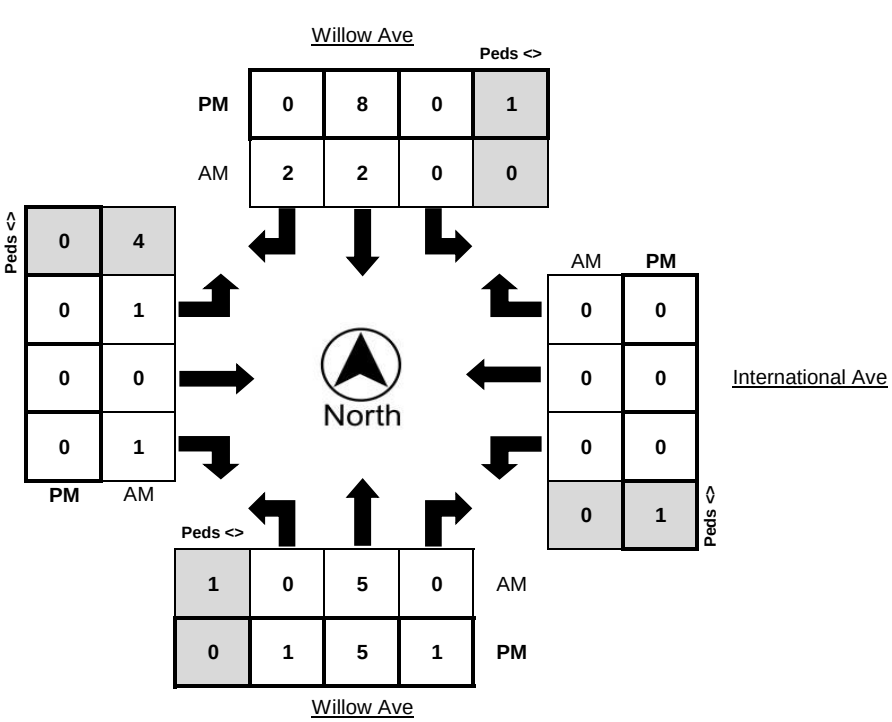
LOCATION Willow Ave @ International Ave
LATITUDE 36.8887
COUNTY Fresno
LONGITUDE -119.7299
COLLECTION DATE Thursday, September 14, 2023
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:00 AM - 7:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	2
7:30 AM - 7:45 AM	0	0	0	0	0	4	0	1	0	0	0	0	0	1	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:00 AM - 8:15 AM	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	1
8:15 AM - 8:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM - 8:45 AM	0	4	0	0	0	2	0	0	1	0	1	0	0	0	0	0
8:45 AM - 9:00 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**8**	**0**	**0**	**0**	**9**	**2**	**2**	**2**	**0**	**1**	**0**	**0**	**1**	**0**	**6**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	1	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	4	0	1	0	1	0	0	0	0	0	1	0	0	0	0
TOTAL	**1**	**8**	**1**	**2**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**	**Left**	**Thru**	**Right**	**Peds**
7:45 AM - 8:45 AM	0	5	0	0	0	2	2	1	1	0	1	0	0	0	0	4
5:00 PM - 6:00 PM	1	5	1	1	0	8	0	0	0	0	0	1	0	0	0	0

	Bikes	**Peds**
AM Peak Total	11	5
PM Peak Total	**15**	**2**



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

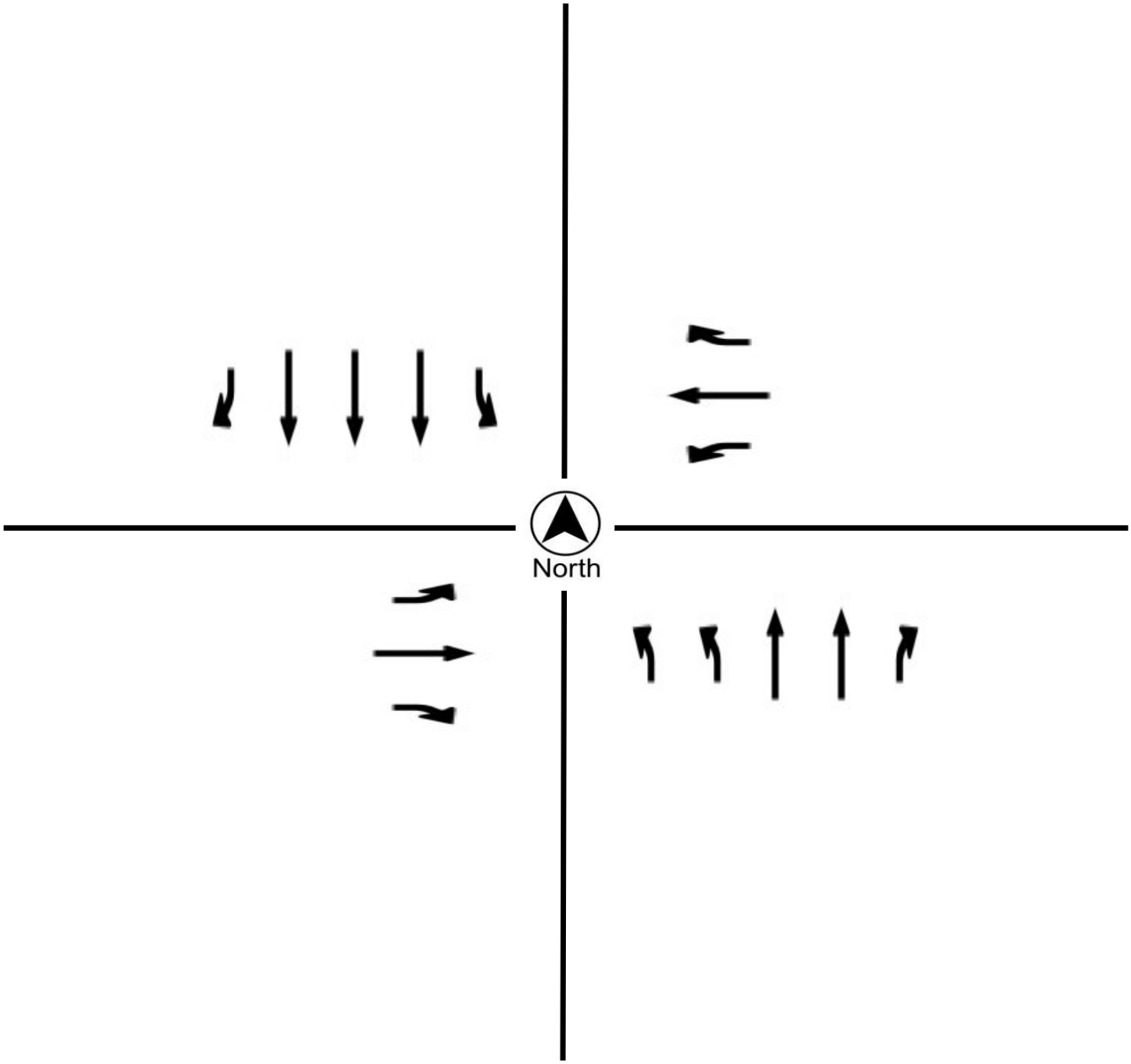
Turning Movement Report

Prepared For:

Peters Engineering Group
862 Pollasky Ave
Clovis, CA 93612

LOCATION	Willow Ave @ International Ave	**N/S STREET**	Willow Ave
COUNTY	Fresno	**E/W STREET**	International Ave
COLLECTION DATE	Thursday, September 14, 2023	**WEATHER**	Clear
CYCLE TIME		**CONTROL TYPE**	Signal

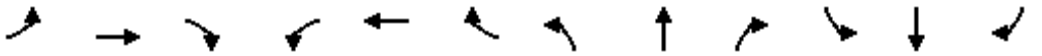
COMMENTS All approaches have protected left turns.



APPENDIX C

INTERSECTION ANALYSES

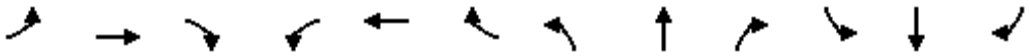
PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	67	219	11	202	47	402	408	28	72	507	97
Future Volume (veh/h)	46	67	219	11	202	47	402	408	28	72	507	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	81	182	13	243	43	484	492	33	87	611	100
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	94	430	354	29	363	297	674	1226	525	122	1115	336
Arrive On Green	0.05	0.23	0.23	0.02	0.19	0.19	0.20	0.34	0.34	0.07	0.22	0.22
Sat Flow, veh/h	1781	1870	1539	1781	1870	1534	3456	3554	1524	1781	5106	1538
Grp Volume(v), veh/h	55	81	182	13	243	43	484	492	33	87	611	100
Grp Sat Flow(s),veh/h/ln	1781	1870	1539	1781	1870	1534	1728	1777	1524	1781	1702	1538
Q Serve(g_s), s	1.6	1.8	5.4	0.4	6.3	1.2	6.9	5.5	0.8	2.5	5.6	2.8
Cycle Q Clear(g_c), s	1.6	1.8	5.4	0.4	6.3	1.2	6.9	5.5	0.8	2.5	5.6	2.8
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	94	430	354	29	363	297	674	1226	525	122	1115	336
V/C Ratio(X)	0.59	0.19	0.51	0.44	0.67	0.14	0.72	0.40	0.06	0.71	0.55	0.30
Avail Cap(c_a), veh/h	272	861	709	204	790	648	1386	2111	905	374	2058	620
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	24.2	16.2	17.6	25.5	19.5	17.5	19.7	13.0	11.5	23.9	18.2	17.1
Incr Delay (d2), s/veh	5.7	0.2	1.2	10.2	2.1	0.2	1.4	0.2	0.0	7.5	0.4	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	0.7	1.8	0.2	2.7	0.4	2.4	1.7	0.2	1.1	1.8	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.0	16.4	18.8	35.7	21.7	17.7	21.2	13.2	11.5	31.3	18.6	17.6
LnGrp LOS	C	B	B	D	C	B	C	B	B	C	B	B
Approach Vol, veh/h		318			299			1009			798	
Approach Delay, s/veh		20.1			21.7			17.0			19.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	23.0	4.9	16.9	14.2	16.3	6.8	15.0
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	11.0	31.1	6.0	24.1	21.0	21.1	8.0	22.1
Max Q Clear Time (g_c+I1), s	4.5	7.5	2.4	7.4	8.9	7.6	3.6	8.3
Green Ext Time (p_c), s	0.1	3.0	0.0	0.9	1.4	3.4	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	18.9
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	55	81	264	13	243	57	484	492	34	87	611	117
v/c Ratio	0.27	0.15	0.42	0.08	0.59	0.12	0.61	0.38	0.05	0.36	0.53	0.24
Control Delay	37.5	20.4	5.6	37.5	32.4	0.5	28.8	19.5	0.1	36.4	26.2	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	20.4	5.6	37.5	32.4	0.5	28.8	19.5	0.1	36.4	26.2	3.1
Queue Length 50th (ft)	22	22	0	5	96	0	98	90	0	35	87	0
Queue Length 95th (ft)	62	65	42	23	176	0	161	140	0	85	134	10
Internal Link Dist (ft)		2470			1342			2623			1390	
Turn Bay Length (ft)	250					25	250			250		205
Base Capacity (vph)	237	791	805	177	689	674	1207	1843	846	326	1797	651
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.10	0.33	0.07	0.35	0.08	0.40	0.27	0.04	0.27	0.34	0.18

Intersection Summary

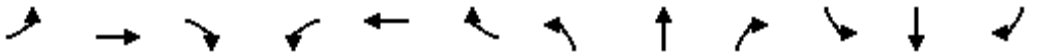
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	3	0	89	0	0	0	265	205	0	0	269	5
Future Vol, veh/h	3	0	89	0	0	0	265	205	0	0	269	5
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	102	0	0	0	305	236	0	0	309	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1168	1168	322	1219	1171	246	320	0	0	241	0	0
Stage 1	317	317	-	851	851	-	-	-	-	-	-	-
Stage 2	851	851	-	368	320	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	170	193	719	157	193	793	1240	-	-	1326	-	-
Stage 1	694	654	-	355	376	-	-	-	-	-	-	-
Stage 2	355	376	-	652	652	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	131	137	712	104	137	785	1234	-	-	1320	-	-
Mov Cap-2 Maneuver	131	137	-	104	137	-	-	-	-	-	-	-
Stage 1	495	651	-	253	268	-	-	-	-	-	-	-
Stage 2	253	268	-	556	649	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	0	5	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1234	-	-	622	-	1320	-	-
HCM Lane V/C Ratio	0.247	-	-	0.17	-	-	-	-
HCM Control Delay (s)	8.9	0	-	12	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	1	-	-	0.6	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	136	224	21	144	148	125	904	35	59	626	47
Future Volume (veh/h)	66	136	224	21	144	148	125	904	35	59	626	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.91	1.00		0.90
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	151	165	23	160	114	139	1004	31	66	696	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	109	540	433	48	251	179	179	1556	442	103	1338	375
Arrive On Green	0.06	0.29	0.29	0.03	0.25	0.25	0.10	0.30	0.30	0.06	0.26	0.26
Sat Flow, veh/h	1781	1870	1500	1781	988	704	1781	5106	1449	1781	5106	1432
Grp Volume(v), veh/h	73	151	165	23	0	274	139	1004	31	66	696	26
Grp Sat Flow(s),veh/h/ln	1781	1870	1500	1781	0	1691	1781	1702	1449	1781	1702	1432
Q Serve(g_s), s	2.2	3.5	4.9	0.7	0.0	8.0	4.2	9.4	0.8	2.0	6.4	0.8
Cycle Q Clear(g_c), s	2.2	3.5	4.9	0.7	0.0	8.0	4.2	9.4	0.8	2.0	6.4	0.8
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	109	540	433	48	0	430	179	1556	442	103	1338	375
V/C Ratio(X)	0.67	0.28	0.38	0.48	0.00	0.64	0.78	0.65	0.07	0.64	0.52	0.07
Avail Cap(c_a), veh/h	193	616	494	190	0	554	290	1960	556	222	1765	495
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.4	15.2	15.7	26.5	0.0	18.3	24.3	16.6	13.6	25.5	17.4	15.3
Incr Delay (d2), s/veh	7.0	0.3	0.6	7.3	0.0	1.6	7.1	0.5	0.1	6.6	0.3	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.3	1.4	0.4	0.0	2.8	1.9	2.9	0.2	0.9	2.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.4	15.5	16.3	33.8	0.0	19.9	31.4	17.1	13.7	32.0	17.7	15.4
LnGrp LOS	C	B	B	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		389			297			1174			788	
Approach Delay, s/veh		19.0			21.0			18.7			18.9	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	21.7	5.5	20.8	9.5	19.4	7.4	19.0
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	6.9	21.2	5.9	18.2	9.0	19.1	6.0	18.1
Max Q Clear Time (g_c+I1), s	4.0	11.4	2.7	6.9	6.2	8.4	4.2	10.0
Green Ext Time (p_c), s	0.0	4.4	0.0	1.0	0.1	3.2	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	19.0
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	73	151	249	23	324	139	1004	39	66	696	52
v/c Ratio	0.35	0.29	0.41	0.11	0.68	0.49	0.54	0.06	0.29	0.47	0.10
Control Delay	34.4	20.4	5.8	31.0	25.3	34.5	18.1	0.2	32.1	19.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	20.4	5.8	31.0	25.3	34.5	18.1	0.2	32.1	19.7	0.4
Queue Length 50th (ft)	29	40	0	9	95	54	128	0	26	87	0
Queue Length 95th (ft)	#72	99	50	30	180	#125	178	0	63	126	0
Internal Link Dist (ft)		2660			5395		1188			2623	
Turn Bay Length (ft)	235			88		250		105	250		205
Base Capacity (vph)	216	733	738	213	661	325	2291	729	249	1982	651
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.21	0.34	0.11	0.49	0.43	0.44	0.05	0.27	0.35	0.08

Intersection Summary

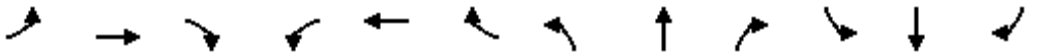
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	38
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	150	68	5	198	244	102	222	7	133	225	1
Future Vol, veh/h	2	150	68	5	198	244	102	222	7	133	225	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	155	70	5	204	252	105	229	7	137	232	1
Number of Lanes	0	1	0	0	1	0	0	1	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	20	52	31.9	37.1
HCM LOS	C	F	D	E

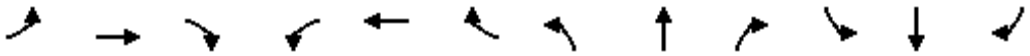
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	31%	1%	1%	37%
Vol Thru, %	67%	68%	44%	63%
Vol Right, %	2%	31%	55%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	331	220	447	359
LT Vol	102	2	5	133
Through Vol	222	150	198	225
RT Vol	7	68	244	1
Lane Flow Rate	341	227	461	370
Geometry Grp	1	1	1	1
Degree of Util (X)	0.755	0.519	0.929	0.811
Departure Headway (Hd)	7.967	8.245	7.261	7.887
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	454	435	498	459
Service Time	6.053	6.344	5.337	5.97
HCM Lane V/C Ratio	0.751	0.522	0.926	0.806
HCM Control Delay	31.9	20	52	37.1
HCM Lane LOS	D	C	F	E
HCM 95th-tile Q	6.3	2.9	11.1	7.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	416	111	112	533	161	129	146	39	114	165	19
Future Volume (veh/h)	21	416	111	112	533	161	129	146	39	114	165	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.95
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	443	101	119	567	87	137	155	32	121	176	7
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	1130	487	156	710	583	180	308	254	159	286	231
Arrive On Green	0.03	0.32	0.32	0.09	0.38	0.38	0.10	0.16	0.16	0.09	0.15	0.15
Sat Flow, veh/h	1781	3554	1532	1781	1870	1535	1781	1870	1541	1781	1870	1509
Grp Volume(v), veh/h	22	443	101	119	567	87	137	155	32	121	176	7
Grp Sat Flow(s),veh/h/ln	1781	1777	1532	1781	1870	1535	1781	1870	1541	1781	1870	1509
Q Serve(g_s), s	0.6	5.1	2.5	3.4	14.1	2.0	3.9	4.0	0.9	3.5	4.6	0.2
Cycle Q Clear(g_c), s	0.6	5.1	2.5	3.4	14.1	2.0	3.9	4.0	0.9	3.5	4.6	0.2
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	47	1130	487	156	710	583	180	308	254	159	286	231
V/C Ratio(X)	0.47	0.39	0.21	0.76	0.80	0.15	0.76	0.50	0.13	0.76	0.62	0.03
Avail Cap(c_a), veh/h	204	2654	1144	510	1718	1411	544	754	621	510	718	579
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	25.1	13.9	13.0	23.3	14.5	10.7	22.9	19.9	18.6	23.3	20.7	18.9
Incr Delay (d2), s/veh	7.3	0.2	0.2	7.4	2.1	0.1	6.5	1.3	0.2	7.3	2.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.6	0.7	1.5	4.7	0.5	1.7	1.5	0.3	1.5	1.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.4	14.1	13.2	30.7	16.6	10.8	29.4	21.2	18.9	30.6	22.9	18.9
LnGrp LOS	C	B	B	C	B	B	C	C	B	C	C	B
Approach Vol, veh/h		566			773			324			304	
Approach Delay, s/veh		14.7			18.1			24.4			25.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	13.5	8.6	21.6	9.3	12.9	5.4	24.8
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	15.0	21.1	15.0	39.1	16.0	20.1	6.0	48.1
Max Q Clear Time (g_c+I1), s	5.5	6.0	5.4	7.1	5.9	6.6	2.6	16.1
Green Ext Time (p_c), s	0.2	0.7	0.2	3.0	0.2	0.6	0.0	3.8

Intersection Summary	
HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	22	443	118	119	567	171	137	155	41	121	176	20
v/c Ratio	0.13	0.40	0.21	0.42	0.70	0.23	0.46	0.42	0.10	0.43	0.50	0.05
Control Delay	44.0	23.1	3.8	40.0	24.3	4.3	39.8	35.3	0.5	40.0	37.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	23.1	3.8	40.0	24.3	4.3	39.8	35.3	0.5	40.0	37.4	0.2
Queue Length 50th (ft)	8	83	0	43	174	2	50	55	0	44	64	0
Queue Length 95th (ft)	41	158	27	137	434	41	152	159	0	139	181	0
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	178	2170	986	447	1319	1125	477	662	638	447	631	605
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.20	0.12	0.27	0.43	0.15	0.29	0.23	0.06	0.27	0.28	0.03

Intersection Summary

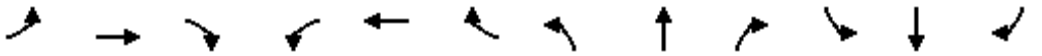
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	547	14	5	741	16	0	0	14	0	0	72
Future Vol, veh/h	22	547	14	5	741	16	0	0	14	0	0	72
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	265	-	-	265	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	576	15	5	780	17	0	0	15	0	0	76

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	802	0	0	596	0	0	-	-	306	-	-	790
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.13	-	-	4.13	-	-	-	-	6.93	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	-	3.319	-	-	3.319
Pot Cap-1 Maneuver	819	-	-	978	-	-	0	0	691	0	0	389
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	815	-	-	973	-	-	-	-	684	-	-	385
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	10.4	16.6
HCM LOS			B	C

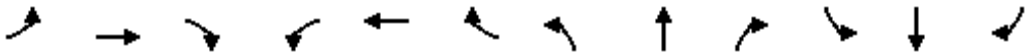
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	684	815	-	-	973	-	-	385
HCM Lane V/C Ratio	0.022	0.028	-	-	0.005	-	-	0.197
HCM Control Delay (s)	10.4	9.5	-	-	8.7	-	-	16.6
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	367	148	100	580	6	163	38	41	21	38	27
Future Volume (veh/h)	50	367	148	100	580	6	163	38	41	21	38	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	56	412	144	112	652	6	183	43	39	24	43	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	963	420	285	1059	462	244	832	363	99	446	193
Arrive On Green	0.06	0.27	0.27	0.08	0.30	0.30	0.14	0.23	0.23	0.03	0.13	0.13
Sat Flow, veh/h	3456	3554	1551	3456	3554	1552	1781	3554	1549	3456	3554	1534
Grp Volume(v), veh/h	56	412	144	112	652	6	183	43	39	24	43	5
Grp Sat Flow(s),veh/h/ln	1728	1777	1551	1728	1777	1552	1781	1777	1549	1728	1777	1534
Q Serve(g_s), s	0.7	4.4	3.5	1.4	7.3	0.1	4.6	0.4	0.9	0.3	0.5	0.1
Cycle Q Clear(g_c), s	0.7	4.4	3.5	1.4	7.3	0.1	4.6	0.4	0.9	0.3	0.5	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	191	963	420	285	1059	462	244	832	363	99	446	193
V/C Ratio(X)	0.29	0.43	0.34	0.39	0.62	0.01	0.75	0.05	0.11	0.24	0.10	0.03
Avail Cap(c_a), veh/h	596	2843	1241	820	3073	1342	1075	3226	1406	596	1693	731
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	21.0	13.9	13.6	20.2	14.0	11.5	19.2	13.8	13.9	22.0	17.9	17.8
Incr Delay (d2), s/veh	0.8	0.3	0.5	0.9	0.6	0.0	4.6	0.0	0.1	1.2	0.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.3	0.9	0.5	2.2	0.0	1.9	0.1	0.3	0.1	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.9	14.2	14.1	21.1	14.6	11.5	23.8	13.8	14.1	23.3	18.0	17.8
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		612			770			265			72	
Approach Delay, s/veh		14.9			15.5			20.7			19.8	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	15.8	7.8	17.5	10.4	10.7	6.6	18.7
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	8.0	42.1	11.0	37.1	28.0	22.1	8.0	40.1
Max Q Clear Time (g_c+I1), s	2.3	2.9	3.4	6.4	6.6	2.5	2.7	9.3
Green Ext Time (p_c), s	0.0	0.3	0.2	3.0	0.4	0.1	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	56	412	166	112	652	7	183	43	46	24	43	30
v/c Ratio	0.14	0.43	0.32	0.24	0.57	0.01	0.49	0.04	0.08	0.07	0.11	0.10
Control Delay	28.9	20.5	8.3	28.1	19.9	0.0	27.8	19.2	1.4	29.8	29.1	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	20.5	8.3	28.1	19.9	0.0	27.8	19.2	1.4	29.8	29.1	0.7
Queue Length 50th (ft)	9	64	10	19	107	0	60	5	0	4	7	0
Queue Length 95th (ft)	29	118	53	47	182	0	132	20	6	16	24	0
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	497	2380	1081	684	2520	1137	898	2610	1164	497	1418	695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.17	0.15	0.16	0.26	0.01	0.20	0.02	0.04	0.05	0.03	0.04

Intersection Summary

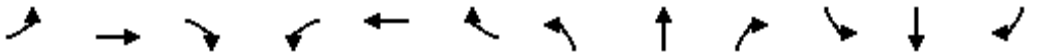
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1	1	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	1083	1620	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	1083	1620	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

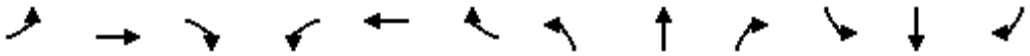
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1620	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	67	163	19	88	50	185	465	20	63	421	37
Future Volume (veh/h)	18	67	163	19	88	50	185	465	20	63	421	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.95	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	76	110	22	100	38	210	528	17	72	478	36
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	284	230	49	288	233	409	979	415	125	1161	348
Arrive On Green	0.03	0.15	0.15	0.03	0.15	0.15	0.12	0.28	0.28	0.07	0.23	0.23
Sat Flow, veh/h	1781	1870	1516	1781	1870	1517	3456	3554	1508	1781	5106	1533
Grp Volume(v), veh/h	20	76	110	22	100	38	210	528	17	72	478	36
Grp Sat Flow(s),veh/h/ln	1781	1870	1516	1781	1870	1517	1728	1777	1508	1781	1702	1533
Q Serve(g_s), s	0.4	1.3	2.5	0.5	1.8	0.8	2.1	4.7	0.3	1.5	3.0	0.7
Cycle Q Clear(g_c), s	0.4	1.3	2.5	0.5	1.8	0.8	2.1	4.7	0.3	1.5	3.0	0.7
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	45	284	230	49	288	233	409	979	415	125	1161	348
V/C Ratio(X)	0.45	0.27	0.48	0.45	0.35	0.16	0.51	0.54	0.04	0.57	0.41	0.10
Avail Cap(c_a), veh/h	381	1104	895	381	1104	895	1292	2856	1212	571	3831	1150
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	18.0	14.0	14.5	17.9	14.2	13.8	15.5	11.5	9.9	16.9	12.3	11.4
Incr Delay (d2), s/veh	6.9	0.5	1.5	6.4	0.7	0.3	1.0	0.5	0.0	4.1	0.2	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.5	0.8	0.2	0.7	0.3	0.7	1.2	0.1	0.6	0.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	14.6	16.1	24.4	14.9	14.1	16.5	12.0	10.0	21.0	12.6	11.6
LnGrp LOS	C	B	B	C	B	B	B	B	A	C	B	B
Approach Vol, veh/h		206			160			755			586	
Approach Delay, s/veh		16.4			16.0			13.2			13.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	15.2	5.0	10.6	8.4	13.4	4.9	10.7
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	12.0	30.1	8.0	22.1	14.0	28.1	8.0	22.1
Max Q Clear Time (g_c+I1), s	3.5	6.7	2.5	4.5	4.1	5.0	2.4	3.8
Green Ext Time (p_c), s	0.1	3.2	0.0	0.7	0.4	2.9	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	14.0
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	20	76	185	22	100	57	210	528	23	72	478	42
v/c Ratio	0.08	0.22	0.43	0.09	0.29	0.15	0.32	0.37	0.03	0.24	0.36	0.09
Control Delay	23.6	20.9	7.9	23.5	21.6	1.4	19.9	13.8	0.1	22.2	15.3	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	20.9	7.9	23.5	21.6	1.4	19.9	13.8	0.1	22.2	15.3	0.4
Queue Length 50th (ft)	4	15	0	4	20	0	21	52	0	14	31	0
Queue Length 95th (ft)	26	62	46	27	76	3	68	137	0	60	82	0
Internal Link Dist (ft)		2470			1342			2623			1390	
Turn Bay Length (ft)	250					25	250			250		205
Base Capacity (vph)	331	964	882	331	964	850	1126	2496	1097	497	3348	1052
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.08	0.21	0.07	0.10	0.07	0.19	0.21	0.02	0.14	0.14	0.04

Intersection Summary

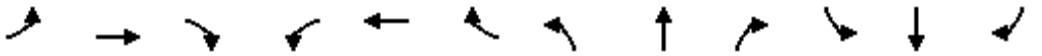
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	6	0	93	0	0	0	145	280	1	0	275	3
Future Vol, veh/h	6	0	93	0	0	0	145	280	1	0	275	3
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	103	0	0	0	161	311	1	0	306	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	952	952	318	1003	953	322	314	0	0	317	0	0
Stage 1	313	313	-	639	639	-	-	-	-	-	-	-
Stage 2	639	639	-	364	314	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	239	259	723	221	259	719	1246	-	-	1243	-	-
Stage 1	698	657	-	464	470	-	-	-	-	-	-	-
Stage 2	464	470	-	655	656	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	208	216	716	165	216	712	1240	-	-	1237	-	-
Mov Cap-2 Maneuver	208	216	-	165	216	-	-	-	-	-	-	-
Stage 1	586	654	-	389	394	-	-	-	-	-	-	-
Stage 2	389	394	-	558	653	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	0	2.8	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1240	-	-	624	-	1237	-	-
HCM Lane V/C Ratio	0.13	-	-	0.176	-	-	-	-
HCM Control Delay (s)	8.3	0	-	12	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.6	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	97	123	26	143	81	147	660	34	122	630	22
Future Volume (veh/h)	18	97	123	26	143	81	147	660	34	122	630	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	111	112	30	164	70	169	759	33	140	724	8
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	356	292	62	246	105	219	1394	414	181	1287	382
Arrive On Green	0.03	0.19	0.19	0.03	0.20	0.20	0.12	0.27	0.27	0.10	0.25	0.25
Sat Flow, veh/h	1781	1870	1536	1781	1231	525	1781	5106	1518	1781	5106	1515
Grp Volume(v), veh/h	21	111	112	30	0	234	169	759	33	140	724	8
Grp Sat Flow(s),veh/h/ln	1781	1870	1536	1781	0	1756	1781	1702	1518	1781	1702	1515
Q Serve(g_s), s	0.5	2.3	2.8	0.7	0.0	5.5	4.1	5.6	0.7	3.4	5.5	0.2
Cycle Q Clear(g_c), s	0.5	2.3	2.8	0.7	0.0	5.5	4.1	5.6	0.7	3.4	5.5	0.2
Prop In Lane	1.00		1.00	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	46	356	292	62	0	350	219	1394	414	181	1287	382
V/C Ratio(X)	0.46	0.31	0.38	0.48	0.00	0.67	0.77	0.54	0.08	0.77	0.56	0.02
Avail Cap(c_a), veh/h	236	756	621	236	0	710	400	2214	658	360	2099	623
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	15.5	15.7	21.1	0.0	16.5	18.9	13.8	12.0	19.5	14.5	12.5
Incr Delay (d2), s/veh	7.0	0.5	0.8	5.7	0.0	2.2	5.7	0.3	0.1	6.8	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.8	0.8	0.4	0.0	1.9	1.7	1.6	0.2	1.5	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.4	16.0	16.6	26.8	0.0	18.6	24.7	14.1	12.1	26.3	14.9	12.5
LnGrp LOS	C	B	B	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		244			264			961			872	
Approach Delay, s/veh		17.3			19.6			15.9			16.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	17.1	5.5	13.4	9.5	16.1	5.1	13.8
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	9.0	19.3	5.9	18.0	10.0	18.3	5.9	18.0
Max Q Clear Time (g_c+I1), s	5.4	7.6	2.7	4.8	6.1	7.5	2.5	7.5
Green Ext Time (p_c), s	0.1	3.7	0.0	0.7	0.1	3.3	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	21	111	141	30	257	169	759	39	140	724	25
v/c Ratio	0.09	0.26	0.30	0.13	0.53	0.49	0.49	0.07	0.45	0.49	0.05
Control Delay	27.6	21.2	5.7	27.8	19.8	29.6	17.5	0.2	29.7	18.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	21.2	5.7	27.8	19.8	29.6	17.5	0.2	29.7	18.2	0.1
Queue Length 50th (ft)	5	25	0	8	54	42	64	0	36	63	0
Queue Length 95th (ft)	27	73	31	35	141	#141	131	0	#120	128	0
Internal Link Dist (ft)		2660			5395		1188			2623	
Turn Bay Length (ft)	235			88		250		105	250		205
Base Capacity (vph)	232	748	711	232	735	394	2188	740	355	2075	709
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.15	0.20	0.13	0.35	0.43	0.35	0.05	0.39	0.35	0.04

Intersection Summary

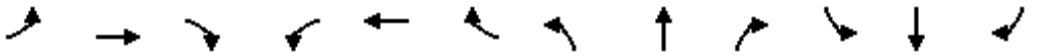
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	54.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	184	50	3	173	191	67	214	14	164	193	6
Future Vol, veh/h	3	184	50	3	173	191	67	214	14	164	193	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	211	57	3	199	220	77	246	16	189	222	7
Number of Lanes	0	1	0	0	1	0	0	1	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	29.7	63.6	42.5	71.8
HCM LOS	D	F	E	F

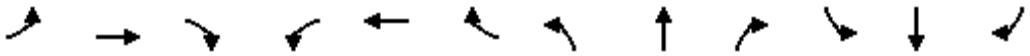
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	1%	1%	45%
Vol Thru, %	73%	78%	47%	53%
Vol Right, %	5%	21%	52%	2%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	295	237	367	363
LT Vol	67	3	3	164
Through Vol	214	184	173	193
RT Vol	14	50	191	6
Lane Flow Rate	339	272	422	417
Geometry Grp	1	1	1	1
Degree of Util (X)	0.828	0.683	0.964	0.992
Departure Headway (Hd)	8.891	9.132	8.223	8.558
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	410	398	443	426
Service Time	6.891	7.132	6.26	6.599
HCM Lane V/C Ratio	0.827	0.683	0.953	0.979
HCM Control Delay	42.5	29.7	63.6	71.8
HCM Lane LOS	E	D	F	F
HCM 95th-tile Q	7.7	4.9	11.6	12.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	484	86	64	447	122	119	161	50	88	166	16
Future Volume (veh/h)	19	484	86	64	447	122	119	161	50	88	166	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.95
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	550	86	73	508	77	135	183	51	100	189	10
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	1108	475	114	654	534	178	353	290	134	307	246
Arrive On Green	0.03	0.31	0.31	0.06	0.35	0.35	0.10	0.19	0.19	0.08	0.16	0.16
Sat Flow, veh/h	1781	3554	1524	1781	1870	1527	1781	1870	1537	1781	1870	1498
Grp Volume(v), veh/h	22	550	86	73	508	77	135	183	51	100	189	10
Grp Sat Flow(s),veh/h/ln	1781	1777	1524	1781	1870	1527	1781	1870	1537	1781	1870	1498
Q Serve(g_s), s	0.6	6.2	2.0	2.0	12.0	1.7	3.6	4.4	1.4	2.7	4.6	0.3
Cycle Q Clear(g_c), s	0.6	6.2	2.0	2.0	12.0	1.7	3.6	4.4	1.4	2.7	4.6	0.3
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	47	1108	475	114	654	534	178	353	290	134	307	246
V/C Ratio(X)	0.47	0.50	0.18	0.64	0.78	0.14	0.76	0.52	0.18	0.74	0.62	0.04
Avail Cap(c_a), veh/h	216	2953	1267	360	1706	1393	612	987	811	468	836	669
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	23.7	13.9	12.4	22.6	14.4	11.0	21.7	18.0	16.8	22.4	19.2	17.4
Incr Delay (d2), s/veh	7.1	0.3	0.2	5.9	2.0	0.1	6.4	1.2	0.3	7.8	2.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.9	0.5	0.9	4.0	0.4	1.6	1.6	0.4	1.2	1.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	14.2	12.6	28.4	16.4	11.1	28.1	19.2	17.1	30.2	21.2	17.5
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	C	B
Approach Vol, veh/h		658			658			369			299	
Approach Delay, s/veh		14.5			17.1			22.2			24.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	14.2	7.2	20.3	9.0	13.0	5.3	22.2
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	13.0	26.1	10.0	41.1	17.0	22.1	6.0	45.1
Max Q Clear Time (g_c+I1), s	4.7	6.4	4.0	8.2	5.6	6.6	2.6	14.0
Green Ext Time (p_c), s	0.1	0.9	0.1	3.8	0.2	0.7	0.0	3.2

Intersection Summary	
HCM 6th Ctrl Delay	18.3
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	22	550	98	73	508	139	135	183	57	100	189	18
v/c Ratio	0.13	0.47	0.17	0.32	0.65	0.19	0.45	0.45	0.14	0.38	0.51	0.05
Control Delay	42.8	22.6	5.4	40.9	23.7	4.4	38.4	32.5	2.1	39.7	36.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	22.6	5.4	40.9	23.7	4.4	38.4	32.5	2.1	39.7	36.0	0.2
Queue Length 50th (ft)	8	103	0	28	151	0	51	66	0	38	71	0
Queue Length 95th (ft)	40	186	31	93	379	35	143	169	7	116	183	0
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	182	2252	1000	303	1264	1073	516	835	744	395	707	632
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.24	0.10	0.24	0.40	0.13	0.26	0.22	0.08	0.25	0.27	0.03

Intersection Summary

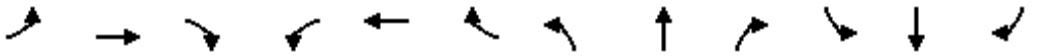
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	564	17	10	598	28	0	0	11	0	0	32
Future Vol, veh/h	38	564	17	10	598	28	0	0	11	0	0	32
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	265	-	-	265	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	627	19	11	664	31	0	0	12	0	0	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	700	0	0	651	0	0	-	-	333	-	-	674
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.13	-	-	4.13	-	-	-	-	6.93	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	-	3.319	-	-	3.319
Pot Cap-1 Maneuver	895	-	-	933	-	-	0	0	664	0	0	454
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	891	-	-	929	-	-	-	-	658	-	-	450
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.1	10.6	13.7
HCM LOS			B	B

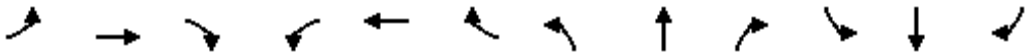
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	658	891	-	-	929	-	-	450
HCM Lane V/C Ratio	0.019	0.047	-	-	0.012	-	-	0.079
HCM Control Delay (s)	10.6	9.2	-	-	8.9	-	-	13.7
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	423	125	67	423	11	181	51	57	11	22	21
Future Volume (veh/h)	46	423	125	67	423	11	181	51	57	11	22	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	486	124	77	486	10	208	59	29	13	25	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	882	385	238	935	408	278	955	417	58	460	199
Arrive On Green	0.05	0.25	0.25	0.07	0.26	0.26	0.16	0.27	0.27	0.02	0.13	0.13
Sat Flow, veh/h	3456	3554	1550	3456	3554	1551	1781	3554	1551	3456	3554	1535
Grp Volume(v), veh/h	53	486	124	77	486	10	208	59	29	13	25	6
Grp Sat Flow(s),veh/h/ln	1728	1777	1550	1728	1777	1551	1781	1777	1551	1728	1777	1535
Q Serve(g_s), s	0.7	5.3	2.9	1.0	5.2	0.2	5.0	0.6	0.6	0.2	0.3	0.2
Cycle Q Clear(g_c), s	0.7	5.3	2.9	1.0	5.2	0.2	5.0	0.6	0.6	0.2	0.3	0.2
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	186	882	385	238	935	408	278	955	417	58	460	199
V/C Ratio(X)	0.28	0.55	0.32	0.32	0.52	0.02	0.75	0.06	0.07	0.23	0.05	0.03
Avail Cap(c_a), veh/h	695	2707	1180	695	2707	1181	1313	3818	1666	540	1754	758
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	20.3	14.7	13.8	19.9	14.1	12.2	18.1	12.2	12.2	21.7	17.1	17.0
Incr Delay (d2), s/veh	0.8	0.5	0.5	0.8	0.4	0.0	4.0	0.0	0.1	2.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.6	0.8	0.3	1.6	0.1	1.9	0.2	0.2	0.1	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.2	15.2	14.2	20.6	14.5	12.3	22.1	12.2	12.3	23.7	17.1	17.1
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		663			573			296			44	
Approach Delay, s/veh		15.5			15.3			19.2			19.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.7	16.9	7.1	16.0	11.0	10.7	6.4	16.7
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	7.0	48.1	9.0	34.1	33.0	22.1	9.0	34.1
Max Q Clear Time (g_c+I1), s	2.2	2.6	3.0	7.3	7.0	2.3	2.7	7.2
Green Ext Time (p_c), s	0.0	0.4	0.1	3.3	0.5	0.1	0.0	2.9

Intersection Summary	
HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	53	486	144	77	486	13	208	59	66	13	25	24
v/c Ratio	0.13	0.54	0.29	0.18	0.46	0.02	0.52	0.04	0.10	0.04	0.06	0.08
Control Delay	27.3	21.8	7.1	26.9	19.2	0.1	26.3	15.2	3.3	28.4	28.0	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	21.8	7.1	26.9	19.2	0.1	26.3	15.2	3.3	28.4	28.0	0.6
Queue Length 50th (ft)	8	76	3	12	76	0	64	6	0	2	4	0
Queue Length 95th (ft)	26	133	40	34	130	0	134	23	16	10	16	0
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	580	2266	1035	580	2266	1035	1096	2953	1305	451	1468	715
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.21	0.14	0.13	0.21	0.01	0.19	0.02	0.05	0.03	0.02	0.03

Intersection Summary

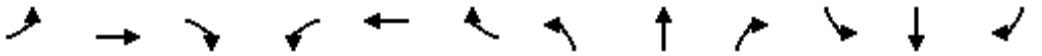
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1	1	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	1083	1620	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	1083	1620	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

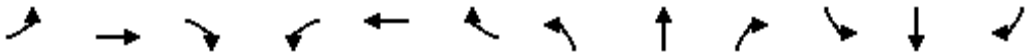
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1620	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	68	219	11	209	47	403	410	28	72	508	97
Future Volume (veh/h)	46	68	219	11	209	47	403	410	28	72	508	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	82	182	13	252	43	486	494	33	87	612	100
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	438	360	29	370	304	675	1224	525	122	1111	334
Arrive On Green	0.05	0.23	0.23	0.02	0.20	0.20	0.20	0.34	0.34	0.07	0.22	0.22
Sat Flow, veh/h	1781	1870	1540	1781	1870	1535	3456	3554	1523	1781	5106	1538
Grp Volume(v), veh/h	55	82	182	13	252	43	486	494	33	87	612	100
Grp Sat Flow(s),veh/h/ln	1781	1870	1540	1781	1870	1535	1728	1777	1523	1781	1702	1538
Q Serve(g_s), s	1.6	1.9	5.4	0.4	6.6	1.2	7.0	5.6	0.8	2.5	5.6	2.9
Cycle Q Clear(g_c), s	1.6	1.9	5.4	0.4	6.6	1.2	7.0	5.6	0.8	2.5	5.6	2.9
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	93	438	360	29	370	304	675	1224	525	122	1111	334
V/C Ratio(X)	0.59	0.19	0.51	0.44	0.68	0.14	0.72	0.40	0.06	0.72	0.55	0.30
Avail Cap(c_a), veh/h	270	853	702	202	782	642	1373	2091	897	371	2039	614
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	24.5	16.2	17.6	25.8	19.6	17.5	19.9	13.2	11.6	24.1	18.4	17.3
Incr Delay (d2), s/veh	5.8	0.2	1.1	10.2	2.2	0.2	1.5	0.2	0.0	7.6	0.4	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	0.7	1.8	0.2	2.8	0.4	2.4	1.7	0.2	1.2	1.8	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.3	16.4	18.7	35.9	21.8	17.7	21.4	13.4	11.7	31.7	18.8	17.8
LnGrp LOS	C	B	B	D	C	B	C	B	B	C	B	B
Approach Vol, veh/h		319			308			1013			799	
Approach Delay, s/veh		20.1			21.9			17.2			20.1	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	23.1	4.9	17.3	14.3	16.4	6.8	15.4
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	11.0	31.1	6.0	24.1	21.0	21.1	8.0	22.1
Max Q Clear Time (g_c+I1), s	4.5	7.6	2.4	7.4	9.0	7.6	3.6	8.6
Green Ext Time (p_c), s	0.1	3.0	0.0	0.9	1.4	3.4	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	55	82	264	13	252	57	486	494	34	87	612	117
v/c Ratio	0.28	0.15	0.42	0.08	0.60	0.12	0.62	0.38	0.05	0.37	0.53	0.25
Control Delay	37.7	20.3	5.6	37.7	32.7	0.5	29.1	19.7	0.1	36.5	26.4	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	20.3	5.6	37.7	32.7	0.5	29.1	19.7	0.1	36.5	26.4	3.1
Queue Length 50th (ft)	23	23	0	5	101	0	100	91	0	36	88	0
Queue Length 95th (ft)	62	66	42	23	183	0	161	140	0	85	134	10
Internal Link Dist (ft)		2470			1342			2623			1390	
Turn Bay Length (ft)	250					25	250			250		205
Base Capacity (vph)	235	791	805	176	685	672	1200	1833	842	324	1787	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.10	0.33	0.07	0.37	0.08	0.41	0.27	0.04	0.27	0.34	0.18

Intersection Summary

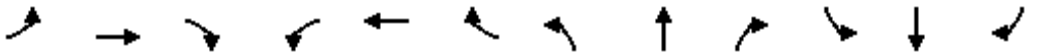
Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	3	0	90	0	0	0	272	212	0	0	270	5
Future Vol, veh/h	3	0	90	0	0	0	272	212	0	0	270	5
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	103	0	0	0	313	244	0	0	310	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1193	1193	323	1245	1196	254	321	0	0	249	0	0
Stage 1	318	318	-	875	875	-	-	-	-	-	-	-
Stage 2	875	875	-	370	321	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	164	187	718	151	186	785	1239	-	-	1317	-	-
Stage 1	693	654	-	344	367	-	-	-	-	-	-	-
Stage 2	344	367	-	650	652	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	125	131	711	99	130	778	1233	-	-	1311	-	-
Mov Cap-2 Maneuver	125	131	-	99	130	-	-	-	-	-	-	-
Stage 1	487	651	-	242	258	-	-	-	-	-	-	-
Stage 2	242	258	-	553	649	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	0	5	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1233	-	-	618	-	1311	-	-
HCM Lane V/C Ratio	0.254	-	-	0.173	-	-	-	-
HCM Control Delay (s)	8.9	0	-	12	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	1	-	-	0.6	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	137	224	21	147	151	125	904	35	60	626	47
Future Volume (veh/h)	66	137	224	21	147	151	125	904	35	60	626	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.91	1.00		0.90
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	152	165	23	163	118	139	1004	31	67	696	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	108	543	436	48	251	182	179	1551	440	103	1335	374
Arrive On Green	0.06	0.29	0.29	0.03	0.26	0.26	0.10	0.30	0.30	0.06	0.26	0.26
Sat Flow, veh/h	1781	1870	1501	1781	980	710	1781	5106	1449	1781	5106	1432
Grp Volume(v), veh/h	73	152	165	23	0	281	139	1004	31	67	696	26
Grp Sat Flow(s),veh/h/ln	1781	1870	1501	1781	0	1690	1781	1702	1449	1781	1702	1432
Q Serve(g_s), s	2.2	3.5	4.9	0.7	0.0	8.2	4.2	9.4	0.8	2.0	6.5	0.8
Cycle Q Clear(g_c), s	2.2	3.5	4.9	0.7	0.0	8.2	4.2	9.4	0.8	2.0	6.5	0.8
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	108	543	436	48	0	433	179	1551	440	103	1335	374
V/C Ratio(X)	0.67	0.28	0.38	0.48	0.00	0.65	0.78	0.65	0.07	0.65	0.52	0.07
Avail Cap(c_a), veh/h	193	614	493	190	0	552	289	1952	554	222	1759	493
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	15.2	15.7	26.6	0.0	18.4	24.3	16.7	13.7	25.6	17.5	15.4
Incr Delay (d2), s/veh	7.0	0.3	0.5	7.3	0.0	1.7	7.1	0.5	0.1	6.6	0.3	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.3	1.4	0.4	0.0	2.9	1.9	3.0	0.2	0.9	2.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.5	15.5	16.2	33.9	0.0	20.1	31.5	17.2	13.8	32.2	17.8	15.5
LnGrp LOS	C	B	B	C	A	C	C	B	B	C	B	B
Approach Vol, veh/h		390			304			1174			789	
Approach Delay, s/veh		19.0			21.2			18.8			19.0	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	21.7	5.5	21.0	9.6	19.4	7.4	19.1
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	6.9	21.2	5.9	18.2	9.0	19.1	6.0	18.1
Max Q Clear Time (g_c+I1), s	4.0	11.4	2.7	6.9	6.2	8.5	4.2	10.2
Green Ext Time (p_c), s	0.0	4.4	0.0	1.0	0.1	3.2	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	19.2
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	73	152	249	23	331	139	1004	39	67	696	52
v/c Ratio	0.35	0.28	0.41	0.11	0.69	0.49	0.54	0.06	0.30	0.47	0.10
Control Delay	34.6	20.4	5.7	31.0	25.7	34.7	18.2	0.2	32.3	19.8	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	20.4	5.7	31.0	25.7	34.7	18.2	0.2	32.3	19.8	0.4
Queue Length 50th (ft)	29	41	0	9	98	55	130	0	26	88	0
Queue Length 95th (ft)	#72	99	50	30	#190	#125	178	0	64	126	0
Internal Link Dist (ft)		2660			5395		1188			2623	
Turn Bay Length (ft)	235			88		250		105	250		205
Base Capacity (vph)	215	731	736	211	657	323	2280	725	247	1969	647
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.21	0.34	0.11	0.50	0.43	0.44	0.05	0.27	0.35	0.08

Intersection Summary

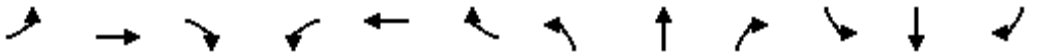
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	46.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	150	70	6	198	244	108	236	9	133	230	1
Future Vol, veh/h	2	150	70	6	198	244	108	236	9	133	230	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	155	72	6	204	252	111	243	9	137	237	1
Number of Lanes	0	1	0	0	1	0	0	1	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	22.1	65.5	41.4	44.6
HCM LOS	C	F	E	E

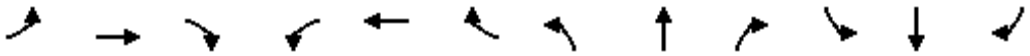
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	31%	1%	1%	37%
Vol Thru, %	67%	68%	44%	63%
Vol Right, %	3%	32%	54%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	353	222	448	364
LT Vol	108	2	6	133
Through Vol	236	150	198	230
RT Vol	9	70	244	1
Lane Flow Rate	364	229	462	375
Geometry Grp	1	1	1	1
Degree of Util (X)	0.835	0.552	0.984	0.859
Departure Headway (Hd)	8.264	8.787	7.671	8.243
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	437	414	476	439
Service Time	6.356	6.787	5.671	6.334
HCM Lane V/C Ratio	0.833	0.553	0.971	0.854
HCM Control Delay	41.4	22.1	65.5	44.6
HCM Lane LOS	E	C	F	E
HCM 95th-tile Q	8	3.2	12.7	8.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	422	111	132	553	161	129	154	45	138	185	43
Future Volume (veh/h)	30	422	111	132	553	161	129	154	45	138	185	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.95
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	449	101	140	588	87	137	164	39	147	197	33
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	1133	488	183	723	593	179	289	238	192	302	244
Arrive On Green	0.03	0.32	0.32	0.10	0.39	0.39	0.10	0.15	0.15	0.11	0.16	0.16
Sat Flow, veh/h	1781	3554	1532	1781	1870	1536	1781	1870	1540	1781	1870	1511
Grp Volume(v), veh/h	32	449	101	140	588	87	137	164	39	147	197	33
Grp Sat Flow(s),veh/h/ln	1781	1777	1532	1781	1870	1536	1781	1870	1540	1781	1870	1511
Q Serve(g_s), s	1.0	5.5	2.7	4.3	15.8	2.1	4.2	4.6	1.2	4.5	5.6	1.1
Cycle Q Clear(g_c), s	1.0	5.5	2.7	4.3	15.8	2.1	4.2	4.6	1.2	4.5	5.6	1.1
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	62	1133	488	183	723	593	179	289	238	192	302	244
V/C Ratio(X)	0.51	0.40	0.21	0.77	0.81	0.15	0.76	0.57	0.16	0.77	0.65	0.14
Avail Cap(c_a), veh/h	190	2471	1065	475	1600	1314	507	702	578	475	669	540
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	26.7	14.9	14.0	24.6	15.4	11.2	24.6	22.0	20.6	24.4	22.1	20.2
Incr Delay (d2), s/veh	6.4	0.2	0.2	6.5	2.3	0.1	6.6	1.7	0.3	6.3	2.4	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	0.5	1.8	0.8	1.9	5.4	0.6	1.8	1.8	0.4	2.0	2.2	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.1	15.2	14.2	31.1	17.7	11.3	31.2	23.8	20.9	30.7	24.5	20.5
LnGrp LOS	C	B	B	C	B	B	C	C	C	C	C	C
Approach Vol, veh/h		582			815			340			377	
Approach Delay, s/veh		16.0			19.3			26.4			26.6	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	13.6	9.8	22.8	9.7	14.0	6.0	26.6
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	15.0	21.1	15.0	39.1	16.0	20.1	6.0	48.1
Max Q Clear Time (g_c+I1), s	6.5	6.6	6.3	7.5	6.2	7.6	3.0	17.8
Green Ext Time (p_c), s	0.2	0.7	0.2	3.1	0.2	0.8	0.0	3.9

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	32	449	118	140	588	171	137	164	48	147	197	46
v/c Ratio	0.22	0.45	0.22	0.54	0.75	0.23	0.52	0.51	0.13	0.56	0.48	0.10
Control Delay	47.8	24.9	4.0	44.9	28.0	4.7	44.2	39.6	0.7	45.4	38.1	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	24.9	4.0	44.9	28.0	4.7	44.2	39.6	0.7	45.4	38.1	0.5
Queue Length 50th (ft)	16	94	0	68	264	4	66	78	0	71	95	0
Queue Length 95th (ft)	54	161	27	157	456	44	152	168	0	165	201	0
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	146	1911	885	366	1237	1063	391	542	548	366	517	521
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.23	0.13	0.38	0.48	0.16	0.35	0.30	0.09	0.40	0.38	0.09

Intersection Summary

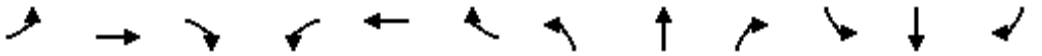
Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	576	14	5	761	23	0	0	14	0	0	92
Future Vol, veh/h	29	576	14	5	761	23	0	0	14	0	0	92
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	265	-	-	265	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	606	15	5	801	24	0	0	15	0	0	97

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	830	0	0	626	0	0	-	-	321	-	-	811
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.13	-	-	4.13	-	-	-	-	6.93	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	-	3.319	-	-	3.319
Pot Cap-1 Maneuver	800	-	-	954	-	-	0	0	675	0	0	378
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	796	-	-	949	-	-	-	-	669	-	-	374
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	10.5	18
HCM LOS			B	C

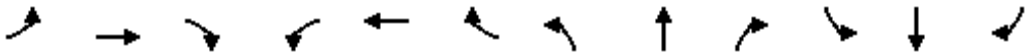
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	669	796	-	-	949	-	-	374
HCM Lane V/C Ratio	0.022	0.038	-	-	0.006	-	-	0.259
HCM Control Delay (s)	10.5	9.7	-	-	8.8	-	-	18
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	383	156	100	584	20	166	49	41	57	70	47
Future Volume (veh/h)	55	383	156	100	584	20	166	49	41	57	70	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	62	430	153	112	656	21	187	55	39	64	79	28
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	204	980	428	282	1061	463	249	724	315	208	441	190
Arrive On Green	0.06	0.28	0.28	0.08	0.30	0.30	0.14	0.20	0.20	0.06	0.12	0.12
Sat Flow, veh/h	3456	3554	1551	3456	3554	1552	1781	3554	1546	3456	3554	1533
Grp Volume(v), veh/h	62	430	153	112	656	21	187	55	39	64	79	28
Grp Sat Flow(s),veh/h/ln	1728	1777	1551	1728	1777	1552	1781	1777	1546	1728	1777	1533
Q Serve(g_s), s	0.8	4.7	3.7	1.4	7.5	0.5	4.7	0.6	1.0	0.8	0.9	0.8
Cycle Q Clear(g_c), s	0.8	4.7	3.7	1.4	7.5	0.5	4.7	0.6	1.0	0.8	0.9	0.8
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	204	980	428	282	1061	463	249	724	315	208	441	190
V/C Ratio(X)	0.30	0.44	0.36	0.40	0.62	0.05	0.75	0.08	0.12	0.31	0.18	0.15
Avail Cap(c_a), veh/h	588	2803	1224	808	3030	1324	1061	3181	1384	588	1670	721
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	21.2	14.0	13.7	20.5	14.2	11.7	19.4	15.1	15.3	21.2	18.4	18.4
Incr Delay (d2), s/veh	0.8	0.3	0.5	0.9	0.6	0.0	4.5	0.0	0.2	0.8	0.2	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	0.3	1.4	1.0	0.5	2.2	0.1	1.9	0.2	0.3	0.3	0.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	14.3	14.2	21.4	14.8	11.8	23.9	15.2	15.5	22.0	18.6	18.7
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		645			789			281			171	
Approach Delay, s/veh		15.0			15.6			21.1			19.9	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	14.5	7.8	17.9	10.6	10.7	6.8	18.9
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	8.0	42.1	11.0	37.1	28.0	22.1	8.0	40.1
Max Q Clear Time (g_c+I1), s	2.8	3.0	3.4	6.7	6.7	2.9	2.8	9.5
Green Ext Time (p_c), s	0.0	0.4	0.2	3.1	0.5	0.4	0.0	4.3

Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	62	430	175	112	656	22	187	55	46	64	79	53
v/c Ratio	0.16	0.45	0.34	0.24	0.57	0.04	0.50	0.05	0.09	0.16	0.18	0.18
Control Delay	30.0	21.2	9.1	29.0	20.6	0.1	28.7	21.0	1.4	29.9	29.5	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	21.2	9.1	29.0	20.6	0.1	28.7	21.0	1.4	29.9	29.5	1.3
Queue Length 50th (ft)	11	70	12	20	112	0	63	8	0	11	14	0
Queue Length 95th (ft)	32	127	59	49	190	0	138	24	6	32	39	0
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	487	2329	1060	670	2472	1118	879	2561	1143	487	1387	683
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.18	0.17	0.17	0.27	0.02	0.21	0.02	0.04	0.13	0.06	0.08

Intersection Summary

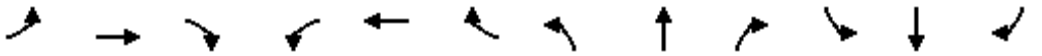
Intersection	
Int Delay, s/veh	8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	88	30	1	1	1
Future Vol, veh/h	0	88	30	1	1	1
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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	96	33	1	1	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1	2	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	1083	1619	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	1083	1619	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	7	0
HCM LOS	A		

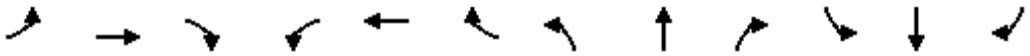
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1619	-	1083	-	-
HCM Lane V/C Ratio	0.02	-	0.088	-	-
HCM Control Delay (s)	7.3	-	8.6	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	70	163	19	94	50	186	466	20	63	424	37
Future Volume (veh/h)	18	70	163	19	94	50	186	466	20	63	424	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.95	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	80	110	22	107	38	211	530	17	72	482	36
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	285	231	49	289	234	409	980	416	125	1163	349
Arrive On Green	0.03	0.15	0.15	0.03	0.15	0.15	0.12	0.28	0.28	0.07	0.23	0.23
Sat Flow, veh/h	1781	1870	1517	1781	1870	1517	3456	3554	1508	1781	5106	1533
Grp Volume(v), veh/h	20	80	110	22	107	38	211	530	17	72	482	36
Grp Sat Flow(s),veh/h/ln	1781	1870	1517	1781	1870	1517	1728	1777	1508	1781	1702	1533
Q Serve(g_s), s	0.4	1.4	2.5	0.5	1.9	0.8	2.2	4.8	0.3	1.5	3.0	0.7
Cycle Q Clear(g_c), s	0.4	1.4	2.5	0.5	1.9	0.8	2.2	4.8	0.3	1.5	3.0	0.7
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	45	285	231	49	289	234	409	980	416	125	1163	349
V/C Ratio(X)	0.45	0.28	0.48	0.45	0.37	0.16	0.52	0.54	0.04	0.57	0.41	0.10
Avail Cap(c_a), veh/h	380	1101	893	380	1101	893	1289	2850	1209	569	3822	1147
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	18.0	14.1	14.5	18.0	14.2	13.8	15.5	11.6	10.0	16.9	12.4	11.5
Incr Delay (d2), s/veh	6.9	0.5	1.5	6.4	0.8	0.3	1.0	0.5	0.0	4.1	0.2	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.5	0.8	0.2	0.7	0.2	0.7	1.2	0.1	0.6	0.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	14.6	16.1	24.4	15.0	14.1	16.5	12.0	10.0	21.0	12.6	11.6
LnGrp LOS	C	B	B	C	B	B	B	B	A	C	B	B
Approach Vol, veh/h		210			167			758			590	
Approach Delay, s/veh		16.4			16.0			13.2			13.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	15.3	5.0	10.6	8.4	13.4	4.9	10.7
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	12.0	30.1	8.0	22.1	14.0	28.1	8.0	22.1
Max Q Clear Time (g_c+I1), s	3.5	6.8	2.5	4.5	4.2	5.0	2.4	3.9
Green Ext Time (p_c), s	0.1	3.2	0.0	0.7	0.4	3.0	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	14.0
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	20	80	185	22	107	57	211	530	23	72	482	42
v/c Ratio	0.08	0.23	0.42	0.09	0.30	0.15	0.32	0.38	0.03	0.24	0.36	0.09
Control Delay	23.9	21.0	7.8	23.8	21.8	1.3	20.1	13.9	0.1	22.4	15.5	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	21.0	7.8	23.8	21.8	1.3	20.1	13.9	0.1	22.4	15.5	0.4
Queue Length 50th (ft)	4	15	0	4	21	0	21	52	0	14	32	0
Queue Length 95th (ft)	26	64	47	28	81	3	69	139	0	61	84	0
Internal Link Dist (ft)		2470			1342			2623			1390	
Turn Bay Length (ft)	250					25	250			250		205
Base Capacity (vph)	329	958	877	329	958	846	1118	2480	1091	494	3326	1046
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.08	0.21	0.07	0.11	0.07	0.19	0.21	0.02	0.15	0.14	0.04

Intersection Summary

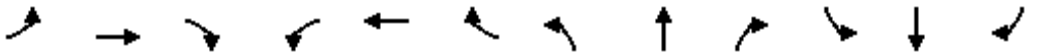
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	6	0	96	0	0	0	151	286	1	0	279	3
Future Vol, veh/h	6	0	96	0	0	0	151	286	1	0	279	3
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	107	0	0	0	168	318	1	0	310	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	977	977	322	1030	978	329	318	0	0	324	0	0
Stage 1	317	317	-	660	660	-	-	-	-	-	-	-
Stage 2	660	660	-	370	318	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	230	251	719	212	250	712	1242	-	-	1236	-	-
Stage 1	694	654	-	452	460	-	-	-	-	-	-	-
Stage 2	452	460	-	650	654	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	208	712	156	207	705	1236	-	-	1230	-	-
Mov Cap-2 Maneuver	199	208	-	156	207	-	-	-	-	-	-	-
Stage 1	577	651	-	376	382	-	-	-	-	-	-	-
Stage 2	376	382	-	550	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	0	2.9	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1236	-	-	618	-	1230	-	-
HCM Lane V/C Ratio	0.136	-	-	0.183	-	-	-	-
HCM Control Delay (s)	8.4	0	-	12.1	0	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	0.7	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	101	123	26	146	83	147	660	34	125	630	22
Future Volume (veh/h)	18	101	123	26	146	83	147	660	34	125	630	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	21	116	112	30	168	72	169	759	33	144	724	8
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	362	297	62	249	107	219	1376	409	187	1284	381
Arrive On Green	0.03	0.19	0.19	0.03	0.20	0.20	0.12	0.27	0.27	0.10	0.25	0.25
Sat Flow, veh/h	1781	1870	1536	1781	1229	527	1781	5106	1517	1781	5106	1515
Grp Volume(v), veh/h	21	116	112	30	0	240	169	759	33	144	724	8
Grp Sat Flow(s),veh/h/ln	1781	1870	1536	1781	0	1756	1781	1702	1517	1781	1702	1515
Q Serve(g_s), s	0.5	2.4	2.8	0.7	0.0	5.7	4.1	5.7	0.7	3.5	5.5	0.2
Cycle Q Clear(g_c), s	0.5	2.4	2.8	0.7	0.0	5.7	4.1	5.7	0.7	3.5	5.5	0.2
Prop In Lane	1.00		1.00	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	46	362	297	62	0	356	219	1376	409	187	1284	381
V/C Ratio(X)	0.46	0.32	0.38	0.48	0.00	0.67	0.77	0.55	0.08	0.77	0.56	0.02
Avail Cap(c_a), veh/h	235	752	618	235	0	706	398	2202	654	358	2087	619
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.5	15.5	15.7	21.2	0.0	16.5	19.0	14.0	12.2	19.5	14.6	12.6
Incr Delay (d2), s/veh	7.0	0.5	0.8	5.8	0.0	2.2	5.7	0.3	0.1	6.6	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.9	0.8	0.4	0.0	2.0	1.7	1.6	0.2	1.5	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.5	16.0	16.5	27.0	0.0	18.7	24.8	14.4	12.3	26.2	15.0	12.6
LnGrp LOS	C	B	B	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		249			270			961			876	
Approach Delay, s/veh		17.3			19.6			16.1			16.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	17.0	5.6	13.6	9.5	16.2	5.1	14.0
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	9.0	19.3	5.9	18.0	10.0	18.3	5.9	18.0
Max Q Clear Time (g_c+I1), s	5.5	7.7	2.7	4.8	6.1	7.5	2.5	7.7
Green Ext Time (p_c), s	0.1	3.7	0.0	0.7	0.1	3.3	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	16.9
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	21	116	141	30	263	169	759	39	144	724	25
v/c Ratio	0.09	0.27	0.30	0.13	0.54	0.49	0.50	0.07	0.46	0.50	0.05
Control Delay	27.7	21.3	5.7	27.8	20.0	29.7	17.6	0.2	30.1	18.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	21.3	5.7	27.8	20.0	29.7	17.6	0.2	30.1	18.3	0.2
Queue Length 50th (ft)	6	27	0	8	56	43	64	0	37	63	0
Queue Length 95th (ft)	27	76	31	35	145	#141	131	0	#124	128	0
Internal Link Dist (ft)		2660			5395		1188			2623	
Turn Bay Length (ft)	235			88		250		105	250		205
Base Capacity (vph)	232	747	711	232	736	394	2188	740	355	2075	708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.16	0.20	0.13	0.36	0.43	0.35	0.05	0.41	0.35	0.04

Intersection Summary

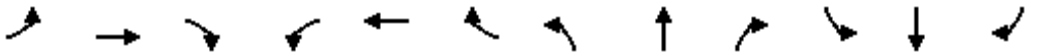
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	62.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	184	57	5	173	191	72	226	16	164	209	6
Future Vol, veh/h	3	184	57	5	173	191	72	226	16	164	209	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	211	66	6	199	220	83	260	18	189	240	7
Number of Lanes	0	1	0	0	1	0	0	1	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	31.6	65.1	49.6	90.3
HCM LOS	D	F	E	F

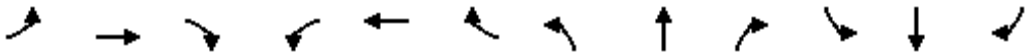
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	1%	1%	43%
Vol Thru, %	72%	75%	47%	55%
Vol Right, %	5%	23%	52%	2%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	314	244	369	379
LT Vol	72	3	5	164
Through Vol	226	184	173	209
RT Vol	16	57	191	6
Lane Flow Rate	361	280	424	436
Geometry Grp	1	1	1	1
Degree of Util (X)	0.872	0.7	0.965	1.057
Departure Headway (Hd)	9.08	9.403	8.549	8.736
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	401	387	428	418
Service Time	7.08	7.403	6.549	6.736
HCM Lane V/C Ratio	0.9	0.724	0.991	1.043
HCM Control Delay	49.6	31.6	65.1	90.3
HCM Lane LOS	E	D	F	F
HCM 95th-tile Q	8.6	5.2	11.5	14.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	505	86	80	464	122	119	187	70	108	183	35
Future Volume (veh/h)	48	505	86	80	464	122	119	187	70	108	183	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.97	1.00		0.95
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	574	86	91	527	77	135	212	74	123	208	32
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	92	1193	512	122	659	538	178	335	275	161	317	255
Arrive On Green	0.05	0.34	0.34	0.07	0.35	0.35	0.10	0.18	0.18	0.09	0.17	0.17
Sat Flow, veh/h	1781	3554	1526	1781	1870	1527	1781	1870	1536	1781	1870	1500
Grp Volume(v), veh/h	55	574	86	91	527	77	135	212	74	123	208	32
Grp Sat Flow(s),veh/h/ln	1781	1777	1526	1781	1870	1527	1781	1870	1536	1781	1870	1500
Q Serve(g_s), s	1.6	7.0	2.2	2.7	13.9	1.9	4.0	5.7	2.3	3.7	5.7	1.0
Cycle Q Clear(g_c), s	1.6	7.0	2.2	2.7	13.9	1.9	4.0	5.7	2.3	3.7	5.7	1.0
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	92	1193	512	122	659	538	178	335	275	161	317	255
V/C Ratio(X)	0.60	0.48	0.17	0.74	0.80	0.14	0.76	0.63	0.27	0.77	0.66	0.13
Avail Cap(c_a), veh/h	196	2678	1150	327	1547	1263	555	895	735	425	758	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	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.3	14.4	12.8	24.9	15.9	12.0	23.9	20.7	19.3	24.2	21.1	19.2
Incr Delay (d2), s/veh	6.0	0.3	0.2	8.6	2.3	0.1	6.5	2.0	0.5	7.4	2.3	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	0.8	2.2	0.6	1.3	4.8	0.5	1.8	2.2	0.7	1.6	2.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	14.7	12.9	33.6	18.2	12.2	30.5	22.7	19.8	31.6	23.4	19.4
LnGrp LOS	C	B	B	C	B	B	C	C	B	C	C	B
Approach Vol, veh/h		715			695			421			363	
Approach Delay, s/veh		15.7			19.6			24.7			25.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	14.7	7.7	23.2	9.4	14.2	6.8	24.1
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	13.0	26.1	10.0	41.1	17.0	22.1	6.0	45.1
Max Q Clear Time (g_c+I1), s	5.7	7.7	4.7	9.0	6.0	7.7	3.6	15.9
Green Ext Time (p_c), s	0.1	1.1	0.1	3.9	0.2	0.9	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	55	574	98	91	527	139	135	213	80	123	208	40
v/c Ratio	0.34	0.46	0.16	0.41	0.73	0.21	0.47	0.53	0.20	0.47	0.55	0.10
Control Delay	48.8	22.6	5.3	45.2	29.3	4.7	41.6	36.4	5.6	43.9	38.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	22.6	5.3	45.2	29.3	4.7	41.6	36.4	5.6	43.9	38.9	0.5
Queue Length 50th (ft)	26	119	0	42	225	1	62	96	0	57	95	0
Queue Length 95th (ft)	#88	196	31	112	400	36	145	196	24	140	202	0
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	168	2096	938	281	1174	1006	477	771	695	365	653	592
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.27	0.10	0.32	0.45	0.14	0.28	0.28	0.12	0.34	0.32	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

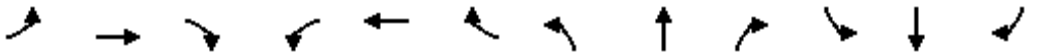
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	61	602	17	10	615	51	0	0	11	0	0	48
Future Vol, veh/h	61	602	17	10	615	51	0	0	11	0	0	48
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	265	-	-	265	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	669	19	11	683	57	0	0	12	0	0	53

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	745	0	0	693	0	0	-	-	354	-	-	693
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.13	-	-	4.13	-	-	-	-	6.93	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	-	3.319	-	-	3.319
Pot Cap-1 Maneuver	861	-	-	900	-	-	0	0	643	0	0	442
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	857	-	-	896	-	-	-	-	637	-	-	438
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.1	10.8	14.4
HCM LOS			B	B

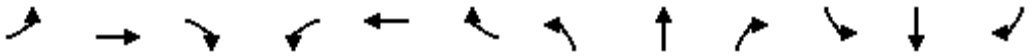
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	637	857	-	-	896	-	-	438
HCM Lane V/C Ratio	0.019	0.079	-	-	0.012	-	-	0.122
HCM Control Delay (s)	10.8	9.6	-	-	9.1	-	-	14.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.3	-	-	0	-	-	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	436	132	67	437	56	190	88	57	40	48	38
Future Volume (veh/h)	64	436	132	67	437	56	190	88	57	40	48	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	501	132	77	502	61	218	101	29	46	55	26
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	895	390	236	901	393	289	858	374	167	453	195
Arrive On Green	0.07	0.25	0.25	0.07	0.25	0.25	0.16	0.24	0.24	0.05	0.13	0.13
Sat Flow, veh/h	3456	3554	1550	3456	3554	1550	1781	3554	1549	3456	3554	1534
Grp Volume(v), veh/h	74	501	132	77	502	61	218	101	29	46	55	26
Grp Sat Flow(s),veh/h/ln	1728	1777	1550	1728	1777	1550	1781	1777	1549	1728	1777	1534
Q Serve(g_s), s	0.9	5.6	3.2	1.0	5.6	1.4	5.3	1.0	0.7	0.6	0.6	0.7
Cycle Q Clear(g_c), s	0.9	5.6	3.2	1.0	5.6	1.4	5.3	1.0	0.7	0.6	0.6	0.7
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	230	895	390	236	901	393	289	858	374	167	453	195
V/C Ratio(X)	0.32	0.56	0.34	0.33	0.56	0.16	0.75	0.12	0.08	0.27	0.12	0.13
Avail Cap(c_a), veh/h	682	2655	1158	682	2655	1158	1288	3668	1599	606	1721	743
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	20.3	14.9	14.0	20.3	14.8	13.2	18.2	13.5	13.4	20.9	17.6	17.7
Incr Delay (d2), s/veh	0.8	0.6	0.5	0.8	0.5	0.2	4.0	0.1	0.1	0.9	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.7	0.9	0.3	1.7	0.4	2.1	0.3	0.2	0.2	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	15.4	14.5	21.1	15.3	13.4	22.2	13.6	13.5	21.8	17.8	18.0
LnGrp LOS	C	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		707			640			348			127	
Approach Delay, s/veh		15.8			15.9			19.0			19.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	15.9	7.1	16.4	11.4	10.7	7.0	16.5
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	8.0	47.1	9.0	34.1	33.0	22.1	9.0	34.1
Max Q Clear Time (g_c+I1), s	2.6	3.0	3.0	7.6	7.3	2.7	2.9	7.6
Green Ext Time (p_c), s	0.0	0.7	0.1	3.5	0.6	0.3	0.1	3.2

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	74	501	152	77	502	64	218	101	66	46	55	44
v/c Ratio	0.17	0.55	0.31	0.18	0.55	0.13	0.54	0.09	0.12	0.12	0.13	0.15
Control Delay	28.3	22.6	7.8	28.2	22.5	0.7	27.2	19.2	3.5	28.7	28.5	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	22.6	7.8	28.2	22.5	0.7	27.2	19.2	3.5	28.7	28.5	1.1
Queue Length 50th (ft)	12	82	6	13	82	0	70	15	0	7	9	0
Queue Length 95th (ft)	34	143	45	35	142	1	145	36	16	24	28	0
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	565	2207	1011	565	2207	1011	1068	2835	1256	502	1430	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.23	0.15	0.14	0.23	0.06	0.20	0.04	0.05	0.09	0.04	0.06

Intersection Summary

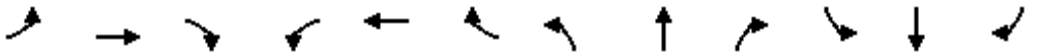
Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	72	100	1	1	1
Future Vol, veh/h	0	72	100	1	1	1
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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	78	109	1	1	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1	2	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	1083	1619	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	1083	1619	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	7.3	0
HCM LOS	A		

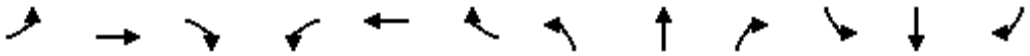
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1619	-	1083	-	-
HCM Lane V/C Ratio	0.067	-	0.072	-	-
HCM Control Delay (s)	7.4	-	8.6	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	70	241	15	214	50	462	546	30	73	642	97
Future Volume (veh/h)	46	70	241	15	214	50	462	546	30	73	642	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	84	208	18	258	46	557	658	35	88	773	100
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	90	416	342	39	362	297	731	1383	594	115	1237	373
Arrive On Green	0.05	0.22	0.22	0.02	0.19	0.19	0.21	0.39	0.39	0.06	0.24	0.24
Sat Flow, veh/h	1781	1870	1538	1781	1870	1534	3456	3554	1527	1781	5106	1541
Grp Volume(v), veh/h	55	84	208	18	258	46	557	658	35	88	773	100
Grp Sat Flow(s),veh/h/ln	1781	1870	1538	1781	1870	1534	1728	1777	1527	1781	1702	1541
Q Serve(g_s), s	1.8	2.2	7.2	0.6	7.6	1.5	8.9	8.2	0.8	2.9	8.0	3.1
Cycle Q Clear(g_c), s	1.8	2.2	7.2	0.6	7.6	1.5	8.9	8.2	0.8	2.9	8.0	3.1
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	90	416	342	39	362	297	731	1383	594	115	1237	373
V/C Ratio(X)	0.61	0.20	0.61	0.47	0.71	0.15	0.76	0.48	0.06	0.76	0.62	0.27
Avail Cap(c_a), veh/h	215	705	580	181	670	549	1290	2045	879	305	1907	575
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	27.4	18.7	20.6	28.5	22.2	19.8	21.8	13.5	11.2	27.1	19.9	18.1
Incr Delay (d2), s/veh	6.6	0.2	1.8	8.5	2.6	0.2	1.7	0.3	0.0	9.9	0.5	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	0.9	0.9	2.5	0.3	3.4	0.5	3.2	2.5	0.3	1.4	2.7	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	18.9	22.4	37.0	24.8	20.0	23.5	13.7	11.3	37.0	20.4	18.5
LnGrp LOS	C	B	C	D	C	B	C	B	B	D	C	B
Approach Vol, veh/h		347			322			1250			961	
Approach Delay, s/veh		23.4			24.8			18.0			21.8	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	27.8	5.3	18.0	16.5	19.2	7.0	16.3
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	10.1	33.9	6.0	22.2	22.0	22.0	7.1	21.1
Max Q Clear Time (g_c+I1), s	4.9	10.2	2.6	9.2	10.9	10.0	3.8	9.6
Green Ext Time (p_c), s	0.1	4.1	0.0	0.9	1.5	4.0	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	20.7
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	55	84	290	18	258	60	557	658	36	88	773	117
v/c Ratio	0.32	0.18	0.48	0.12	0.64	0.13	0.67	0.45	0.05	0.41	0.60	0.23
Control Delay	41.9	25.1	6.7	40.2	35.9	0.6	31.0	19.1	0.1	40.5	27.6	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	25.1	6.7	40.2	35.9	0.6	31.0	19.1	0.1	40.5	27.6	2.8
Queue Length 50th (ft)	26	27	0	8	116	0	128	131	0	40	122	0
Queue Length 95th (ft)	63	69	45	28	190	0	183	180	0	87	168	10
Internal Link Dist (ft)		2470			1342			2623			1390	
Turn Bay Length (ft)	250					25	250			250		205
Base Capacity (vph)	189	646	723	160	591	602	1136	1806	831	268	1683	621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.13	0.40	0.11	0.44	0.10	0.49	0.36	0.04	0.33	0.46	0.19

Intersection Summary

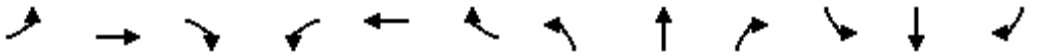
Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	0	104	0	1	0	330	239	0	0	285	5
Future Vol, veh/h	5	0	104	0	1	0	330	239	0	0	285	5
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	120	0	1	0	379	275	0	0	328	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1375	1374	341	1434	1377	285	339	0	0	280	0	0
Stage 1	336	336	-	1038	1038	-	-	-	-	-	-	-
Stage 2	1039	1038	-	396	339	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	123	145	701	112	145	754	1220	-	-	1283	-	-
Stage 1	678	642	-	279	308	-	-	-	-	-	-	-
Stage 2	279	308	-	629	640	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	86	91	694	66	91	747	1214	-	-	1277	-	-
Mov Cap-2 Maneuver	86	91	-	66	91	-	-	-	-	-	-	-
Stage 1	426	639	-	175	194	-	-	-	-	-	-	-
Stage 2	174	194	-	518	637	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14	45.1	5.4	0
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1214	-	-	524	91	1277	-	-
HCM Lane V/C Ratio	0.312	-	-	0.239	0.013	-	-	-
HCM Control Delay (s)	9.3	0	-	14	45.1	0	-	-
HCM Lane LOS	A	A	-	B	E	A	-	-
HCM 95th %tile Q(veh)	1.3	-	-	0.9	0	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	145	252	25	159	166	162	1095	37	65	785	48
Future Volume (veh/h)	68	145	252	25	159	166	162	1095	37	65	785	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.92	1.00		0.90
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	161	196	28	177	134	180	1217	33	72	872	27
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	106	530	425	55	244	185	225	1702	486	103	1354	380
Arrive On Green	0.06	0.28	0.28	0.03	0.25	0.25	0.13	0.33	0.33	0.06	0.27	0.27
Sat Flow, veh/h	1781	1870	1499	1781	959	726	1781	5106	1458	1781	5106	1434
Grp Volume(v), veh/h	76	161	196	28	0	311	180	1217	33	72	872	27
Grp Sat Flow(s),veh/h/ln	1781	1870	1499	1781	0	1686	1781	1702	1458	1781	1702	1434
Q Serve(g_s), s	2.5	4.1	6.5	0.9	0.0	10.2	5.9	12.6	0.9	2.4	9.2	0.9
Cycle Q Clear(g_c), s	2.5	4.1	6.5	0.9	0.0	10.2	5.9	12.6	0.9	2.4	9.2	0.9
Prop In Lane	1.00		1.00	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	106	530	425	55	0	429	225	1702	486	103	1354	380
V/C Ratio(X)	0.72	0.30	0.46	0.51	0.00	0.72	0.80	0.71	0.07	0.70	0.64	0.07
Avail Cap(c_a), veh/h	174	557	446	174	0	502	295	1891	540	174	1545	434
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.9	17.0	17.9	28.8	0.0	20.6	25.7	17.6	13.8	28.0	19.7	16.6
Incr Delay (d2), s/veh	8.6	0.3	0.8	7.0	0.0	4.3	11.1	1.2	0.1	8.2	0.8	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.6	2.0	0.5	0.0	3.9	2.9	4.1	0.3	1.1	3.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.6	17.3	18.7	35.9	0.0	24.9	36.8	18.8	13.8	36.1	20.5	16.7
LnGrp LOS	D	B	B	D	A	C	D	B	B	D	C	B
Approach Vol, veh/h		433			339			1430			971	
Approach Delay, s/veh		21.3			25.8			21.0			21.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	25.1	5.9	22.0	11.6	20.9	7.6	20.3
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	5.9	22.4	5.9	18.0	10.0	18.3	5.9	18.0
Max Q Clear Time (g_c+I1), s	4.4	14.6	2.9	8.5	7.9	11.2	4.5	12.2
Green Ext Time (p_c), s	0.0	4.4	0.0	1.0	0.1	3.1	0.0	0.8

Intersection Summary		
HCM 6th Ctrl Delay		21.7
HCM 6th LOS		C

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	76	161	280	28	361	180	1217	41	72	872	53
v/c Ratio	0.45	0.29	0.43	0.17	0.78	0.67	0.61	0.06	0.43	0.66	0.10
Control Delay	40.0	20.4	5.6	32.4	32.8	42.8	19.4	0.2	38.8	24.5	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	20.4	5.6	32.4	32.8	42.8	19.4	0.2	38.8	24.5	0.4
Queue Length 50th (ft)	32	44	0	12	114	75	169	0	30	122	0
Queue Length 95th (ft)	#79	105	53	34	#237	#163	217	0	#74	163	0
Internal Link Dist (ft)		2660			5395		1188			2623	
Turn Bay Length (ft)	235			88		250		105	250		205
Base Capacity (vph)	172	644	698	172	546	292	2006	657	172	1536	583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.25	0.40	0.16	0.66	0.62	0.61	0.06	0.42	0.57	0.09

Intersection Summary

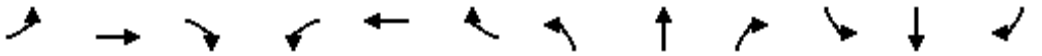
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	106.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	162	72	18	222	316	111	271	13	139	255	3
Future Vol, veh/h	3	162	72	18	222	316	111	271	13	139	255	3
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	167	74	19	229	326	114	279	13	143	263	3
Number of Lanes	0	1	0	0	1	0	0	1	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	29.3	189.4	71.5	73
HCM LOS	D	F	F	F

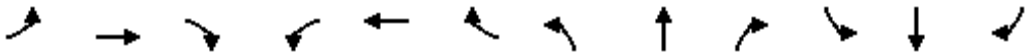
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	28%	1%	3%	35%
Vol Thru, %	69%	68%	40%	64%
Vol Right, %	3%	30%	57%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	395	237	556	397
LT Vol	111	3	18	139
Through Vol	271	162	222	255
RT Vol	13	72	316	3
Lane Flow Rate	407	244	573	409
Geometry Grp	1	1	1	1
Degree of Util (X)	0.971	0.627	1.333	0.977
Departure Headway (Hd)	9.669	10.362	8.374	9.684
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	379	352	441	377
Service Time	7.669	8.362	6.374	7.684
HCM Lane V/C Ratio	1.074	0.693	1.299	1.085
HCM Control Delay	71.5	29.3	189.4	73
HCM Lane LOS	F	D	F	F
HCM 95th-tile Q	11	4	26.1	11.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	643	241	228	881	186	191	265	86	199	365	141
Future Volume (veh/h)	93	643	241	228	881	186	191	265	86	199	365	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	684	239	243	937	114	203	282	82	212	388	137
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	1309	566	276	869	715	201	347	286	230	377	307
Arrive On Green	0.06	0.37	0.37	0.16	0.46	0.46	0.11	0.19	0.19	0.13	0.20	0.20
Sat Flow, veh/h	1781	3554	1535	1781	1870	1539	1781	1870	1544	1781	1870	1520
Grp Volume(v), veh/h	99	684	239	243	937	114	203	282	82	212	388	137
Grp Sat Flow(s),veh/h/ln	1781	1777	1535	1781	1870	1539	1781	1870	1544	1781	1870	1520
Q Serve(g_s), s	6.1	16.6	12.8	14.7	51.1	4.7	12.4	15.9	5.0	12.9	22.2	8.7
Cycle Q Clear(g_c), s	6.1	16.6	12.8	14.7	51.1	4.7	12.4	15.9	5.0	12.9	22.2	8.7
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	105	1309	566	276	869	715	201	347	286	230	377	307
V/C Ratio(X)	0.94	0.52	0.42	0.88	1.08	0.16	1.01	0.81	0.29	0.92	1.03	0.45
Avail Cap(c_a), veh/h	105	1309	566	398	869	715	201	347	286	230	377	307
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	51.6	27.2	26.0	45.5	29.5	17.0	48.8	43.0	38.5	47.4	43.9	38.5
Incr Delay (d2), s/veh	68.7	0.4	0.5	14.5	53.9	0.1	66.4	13.7	0.5	38.6	53.7	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	4.6	6.6	4.5	7.3	33.4	1.6	9.0	8.3	1.9	8.0	15.4	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	120.3	27.5	26.5	60.0	83.4	17.1	115.2	56.7	39.1	86.0	97.6	39.5
LnGrp LOS	F	C	C	E	F	B	F	E	D	F	F	D
Approach Vol, veh/h		1022			1294			567			737	
Approach Delay, s/veh		36.3			73.1			75.1			83.4	
Approach LOS		D			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.2	25.3	21.1	45.4	16.4	27.1	10.5	56.0
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	14.2	20.4	24.6	33.0	12.4	22.2	6.5	51.1
Max Q Clear Time (g_c+I1), s	14.9	17.9	16.7	18.6	14.4	24.2	8.1	53.1
Green Ext Time (p_c), s	0.0	0.4	0.4	4.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	65.1
HCM 6th LOS	E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	99	684	256	243	937	198	203	282	91	212	388	150
v/c Ratio	0.95	0.56	0.42	0.77	1.08	0.26	1.02	0.82	0.23	0.93	1.03	0.36
Control Delay	128.9	32.3	15.6	58.6	85.4	8.4	118.2	62.9	3.2	92.3	99.4	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	128.9	32.3	15.6	58.6	85.4	8.4	118.2	62.9	3.2	92.3	99.4	10.5
Queue Length 50th (ft)	71	206	59	164	~743	32	~149	193	0	150	~295	7
Queue Length 95th (ft)	#179	284	141	241	#987	77	#299	#329	15	#294	#483	62
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	104	1218	613	395	865	769	199	345	398	228	375	415
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.56	0.42	0.62	1.08	0.26	1.02	0.82	0.23	0.93	1.03	0.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

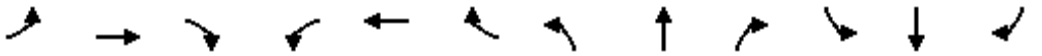
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	588	14	5	796	23	0	0	14	0	0	92
Future Vol, veh/h	29	588	14	5	796	23	0	0	14	0	0	92
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	265	-	-	265	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	619	15	5	838	24	0	0	15	0	0	97

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	867	0	0	639	0	0	-	-	327	-	-	848
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.13	-	-	4.13	-	-	-	-	6.93	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	-	3.319	-	-	3.319
Pot Cap-1 Maneuver	775	-	-	943	-	-	0	0	669	0	0	360
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	771	-	-	939	-	-	-	-	663	-	-	357
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	10.6	18.8
HCM LOS			B	C

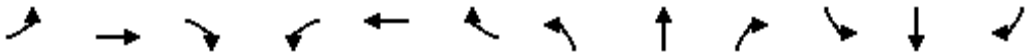
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	663	771	-	-	939	-	-	357
HCM Lane V/C Ratio	0.022	0.04	-	-	0.006	-	-	0.271
HCM Control Delay (s)	10.6	9.9	-	-	8.9	-	-	18.8
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	1.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	611	166	202	853	68	185	155	81	161	329	173
Future Volume (veh/h)	117	611	166	202	853	68	185	155	81	161	329	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	131	687	165	227	958	75	208	174	84	181	370	169
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	228	1175	514	333	1283	561	259	842	367	278	611	265
Arrive On Green	0.07	0.33	0.33	0.10	0.36	0.36	0.15	0.24	0.24	0.08	0.17	0.17
Sat Flow, veh/h	3456	3554	1554	3456	3554	1555	1781	3554	1549	3456	3554	1542
Grp Volume(v), veh/h	131	687	165	227	958	75	208	174	84	181	370	169
Grp Sat Flow(s),veh/h/ln	1728	1777	1554	1728	1777	1555	1781	1777	1549	1728	1777	1542
Q Serve(g_s), s	2.6	11.2	5.5	4.4	16.4	2.3	7.9	2.7	3.0	3.5	6.7	7.1
Cycle Q Clear(g_c), s	2.6	11.2	5.5	4.4	16.4	2.3	7.9	2.7	3.0	3.5	6.7	7.1
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	228	1175	514	333	1283	561	259	842	367	278	611	265
V/C Ratio(X)	0.57	0.58	0.32	0.68	0.75	0.13	0.80	0.21	0.23	0.65	0.61	0.64
Avail Cap(c_a), veh/h	446	1994	872	645	2198	962	614	1785	778	551	1127	489
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	19.3	17.5	30.4	19.5	14.9	28.8	21.3	21.5	31.1	26.7	26.8
Incr Delay (d2), s/veh	2.3	0.5	0.4	2.5	0.9	0.1	5.7	0.1	0.3	2.6	1.0	2.5
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	4.0	1.7	1.8	5.8	0.7	3.5	1.0	1.0	1.5	2.7	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.8	19.8	17.8	32.9	20.4	15.1	34.5	21.5	21.8	33.6	27.6	29.4
LnGrp LOS	C	B	B	C	C	B	C	C	C	C	C	C
Approach Vol, veh/h		983			1260			466			720	
Approach Delay, s/veh		21.3			22.3			27.3			29.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	21.4	10.7	27.9	14.1	16.9	8.6	30.1
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	11.1	35.0	13.0	39.1	24.0	22.1	9.0	43.1
Max Q Clear Time (g_c+I1), s	5.5	5.0	6.4	13.2	9.9	9.1	4.6	18.4
Green Ext Time (p_c), s	0.2	1.3	0.4	4.9	0.5	2.3	0.1	6.7

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	131	687	187	227	958	76	208	174	91	181	370	194
v/c Ratio	0.41	0.61	0.32	0.54	0.78	0.12	0.65	0.20	0.20	0.49	0.60	0.46
Control Delay	48.1	29.7	10.7	46.2	32.1	0.8	47.5	28.9	7.4	47.0	41.2	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.1	29.7	10.7	46.2	32.1	0.8	47.5	28.9	7.4	47.0	41.2	9.9
Queue Length 50th (ft)	37	175	23	64	257	0	114	42	0	51	105	2
Queue Length 95th (ft)	80	278	82	124	392	4	219	77	35	104	181	63
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	355	1589	765	512	1751	830	487	1422	676	437	898	533
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.43	0.24	0.44	0.55	0.09	0.43	0.12	0.13	0.41	0.41	0.36

Intersection Summary

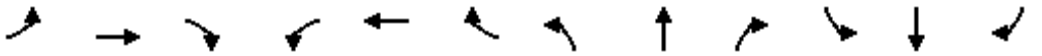
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	88	30	119	229	1
Future Vol, veh/h	0	88	30	119	229	1
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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	96	33	129	249	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	125	250	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	902	1313	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	902	1313	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	1.6	0
HCM LOS	A		

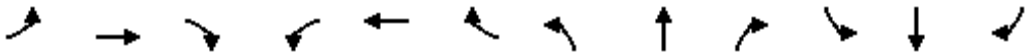
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1313	-	902	-	-
HCM Lane V/C Ratio	0.025	-	0.106	-	-
HCM Control Delay (s)	7.8	-	9.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	75	228	28	98	52	226	667	30	67	624	37
Future Volume (veh/h)	18	75	228	28	98	52	226	667	30	67	624	37
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.96	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	85	184	32	111	40	257	758	28	76	709	36
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	348	283	65	370	302	416	1177	502	119	1420	428
Arrive On Green	0.02	0.19	0.19	0.04	0.20	0.20	0.12	0.33	0.33	0.07	0.28	0.28
Sat Flow, veh/h	1781	1870	1525	1781	1870	1528	3456	3554	1515	1781	5106	1539
Grp Volume(v), veh/h	20	85	184	32	111	40	257	758	28	76	709	36
Grp Sat Flow(s),veh/h/ln	1781	1870	1525	1781	1870	1528	1728	1777	1515	1781	1702	1539
Q Serve(g_s), s	0.5	1.8	5.2	0.8	2.4	1.0	3.3	8.5	0.6	1.9	5.5	0.8
Cycle Q Clear(g_c), s	0.5	1.8	5.2	0.8	2.4	1.0	3.3	8.5	0.6	1.9	5.5	0.8
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	44	348	283	65	370	302	416	1177	502	119	1420	428
V/C Ratio(X)	0.46	0.24	0.65	0.49	0.30	0.13	0.62	0.64	0.06	0.64	0.50	0.08
Avail Cap(c_a), veh/h	266	802	654	266	802	655	1032	2584	1102	418	3386	1021
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	16.3	17.7	22.2	16.0	15.5	19.6	13.3	10.7	21.3	14.2	12.5
Incr Delay (d2), s/veh	7.4	0.4	2.5	5.7	0.5	0.2	1.5	0.6	0.0	5.5	0.3	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.7	1.8	0.4	0.9	0.3	1.2	2.5	0.2	0.8	1.6	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.9	16.6	20.2	27.9	16.5	15.7	21.1	13.9	10.7	26.8	14.5	12.6
LnGrp LOS	C	B	C	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		289			183			1043			821	
Approach Delay, s/veh		19.8			18.3			15.6			15.5	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	20.4	5.7	13.6	9.6	17.9	5.1	14.2
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	11.0	34.1	7.0	20.1	14.0	31.1	7.0	20.1
Max Q Clear Time (g_c+I1), s	3.9	10.5	2.8	7.2	5.3	7.5	2.5	4.4
Green Ext Time (p_c), s	0.1	4.9	0.0	0.9	0.5	4.5	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	20	85	259	32	111	59	257	758	34	76	709	42
v/c Ratio	0.09	0.27	0.55	0.15	0.30	0.15	0.40	0.48	0.05	0.28	0.46	0.08
Control Delay	30.2	26.6	9.2	30.4	24.0	1.3	24.6	15.2	0.1	28.5	17.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	26.6	9.2	30.4	24.0	1.3	24.6	15.2	0.1	28.5	17.2	0.3
Queue Length 50th (ft)	5	22	0	9	29	0	34	85	0	20	55	0
Queue Length 95th (ft)	29	74	56	40	92	3	91	205	0	71	128	0
Internal Link Dist (ft)		2470			1342			2623			1390	
Turn Bay Length (ft)	250					25	250			250		205
Base Capacity (vph)	248	752	771	248	755	691	965	2424	1071	391	3176	1005
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.11	0.34	0.13	0.15	0.09	0.27	0.31	0.03	0.19	0.22	0.04

Intersection Summary

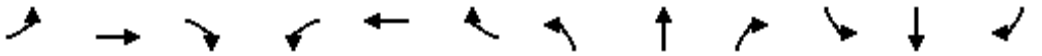
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	0	104	0	2	0	157	312	1	0	313	3
Future Vol, veh/h	8	0	104	0	2	0	157	312	1	0	313	3
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	116	0	2	0	174	347	1	0	348	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1057	1056	360	1114	1057	358	356	0	0	353	0	0
Stage 1	355	355	-	701	701	-	-	-	-	-	-	-
Stage 2	702	701	-	413	356	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	203	225	684	185	225	686	1203	-	-	1206	-	-
Stage 1	662	630	-	429	441	-	-	-	-	-	-	-
Stage 2	429	441	-	616	629	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	172	183	678	131	183	679	1197	-	-	1200	-	-
Mov Cap-2 Maneuver	172	183	-	131	183	-	-	-	-	-	-	-
Stage 1	540	627	-	350	360	-	-	-	-	-	-	-
Stage 2	348	360	-	509	626	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	24.9	2.8	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1197	-	-	560	183	1200	-	-
HCM Lane V/C Ratio	0.146	-	-	0.222	0.012	-	-	-
HCM Control Delay (s)	8.5	0	-	13.3	24.9	0	-	-
HCM Lane LOS	A	A	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	0.8	0	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	114	161	35	157	93	187	907	44	143	896	24
Future Volume (veh/h)	19	114	161	35	157	93	187	907	44	143	896	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	131	156	40	180	84	215	1043	45	164	1030	11
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	354	291	75	245	114	267	1622	484	209	1457	434
Arrive On Green	0.03	0.19	0.19	0.04	0.21	0.21	0.15	0.32	0.32	0.12	0.29	0.29
Sat Flow, veh/h	1781	1870	1535	1781	1193	557	1781	5106	1523	1781	5106	1519
Grp Volume(v), veh/h	22	131	156	40	0	264	215	1043	45	164	1030	11
Grp Sat Flow(s),veh/h/ln	1781	1870	1535	1781	0	1750	1781	1702	1523	1781	1702	1519
Q Serve(g_s), s	0.6	3.3	4.9	1.2	0.0	7.5	6.2	9.3	1.1	4.8	9.6	0.3
Cycle Q Clear(g_c), s	0.6	3.3	4.9	1.2	0.0	7.5	6.2	9.3	1.1	4.8	9.6	0.3
Prop In Lane	1.00		1.00	1.00		0.32	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	46	354	291	75	0	359	267	1622	484	209	1457	434
V/C Ratio(X)	0.47	0.37	0.54	0.54	0.00	0.74	0.81	0.64	0.09	0.78	0.71	0.03
Avail Cap(c_a), veh/h	197	631	518	197	0	591	334	1800	537	317	1752	521
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	18.8	19.5	25.0	0.0	19.8	21.9	15.6	12.8	22.9	17.1	13.7
Incr Delay (d2), s/veh	7.3	0.6	1.5	5.8	0.0	2.9	11.0	0.7	0.1	7.0	1.0	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	0.3	1.3	1.6	0.6	0.0	2.8	3.0	2.9	0.3	2.1	3.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	19.5	21.1	30.9	0.0	22.8	32.9	16.3	12.9	29.9	18.1	13.7
LnGrp LOS	C	B	C	C	A	C	C	B	B	C	B	B
Approach Vol, veh/h		309			304			1303			1205	
Approach Delay, s/veh		21.2			23.9			18.9			19.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	21.8	6.2	15.0	12.0	20.1	5.4	15.8
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	9.5	18.8	5.9	18.0	10.0	18.3	5.9	18.0
Max Q Clear Time (g_c+I1), s	6.8	11.3	3.2	6.9	8.2	11.6	2.6	9.5
Green Ext Time (p_c), s	0.1	3.8	0.0	0.9	0.1	3.4	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	22	131	185	40	287	215	1043	51	164	1030	28
v/c Ratio	0.12	0.31	0.37	0.22	0.67	0.70	0.66	0.09	0.59	0.69	0.05
Control Delay	30.1	22.0	6.3	31.3	26.8	41.1	21.3	0.3	36.5	22.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	22.0	6.3	31.3	26.8	41.1	21.3	0.3	36.5	22.3	0.2
Queue Length 50th (ft)	7	35	0	12	72	67	101	0	50	101	0
Queue Length 95th (ft)	28	84	40	43	160	#194	188	0	#141	187	0
Internal Link Dist (ft)		2660			5395		1188			2623	
Turn Bay Length (ft)	235			88		250		105	250		205
Base Capacity (vph)	187	602	623	187	591	318	1718	613	302	1672	601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.22	0.30	0.21	0.49	0.68	0.61	0.08	0.54	0.62	0.05

Intersection Summary

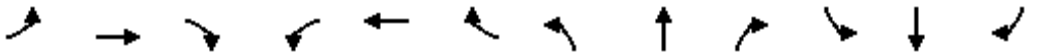
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	127.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	213	60	16	193	204	74	256	26	186	255	6
Future Vol, veh/h	3	213	60	16	193	204	74	256	26	186	255	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	245	69	18	222	234	85	294	30	214	293	7
Number of Lanes	0	1	0	0	1	0	0	1	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	52	135	95.8	192.3
HCM LOS	F	F	F	F

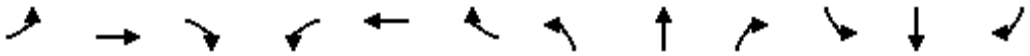
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	21%	1%	4%	42%
Vol Thru, %	72%	77%	47%	57%
Vol Right, %	7%	22%	49%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	356	276	413	447
LT Vol	74	3	16	186
Through Vol	256	213	193	255
RT Vol	26	60	204	6
Lane Flow Rate	409	317	475	514
Geometry Grp	1	1	1	1
Degree of Util (X)	1.046	0.835	1.175	1.324
Departure Headway (Hd)	10.702	11.239	9.986	10.047
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	344	324	366	365
Service Time	8.702	9.239	7.986	8.047
HCM Lane V/C Ratio	1.189	0.978	1.298	1.408
HCM Control Delay	95.8	52	135	192.3
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	12.5	7.2	17.1	22.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	936	153	155	826	201	195	515	182	153	363	122
Future Volume (veh/h)	166	936	153	155	826	201	195	515	182	153	363	122
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	189	1064	162	176	939	166	222	585	201	174	412	131
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	165	1406	605	200	776	636	225	522	432	153	446	361
Arrive On Green	0.09	0.40	0.40	0.11	0.41	0.41	0.13	0.28	0.28	0.09	0.24	0.24
Sat Flow, veh/h	1781	3554	1530	1781	1870	1531	1781	1870	1546	1781	1870	1515
Grp Volume(v), veh/h	189	1064	162	176	939	166	222	585	201	174	412	131
Grp Sat Flow(s),veh/h/ln	1781	1777	1530	1781	1870	1531	1781	1870	1546	1781	1870	1515
Q Serve(g_s), s	13.0	36.2	10.0	13.6	58.1	10.0	17.4	39.1	15.1	12.0	30.1	10.1
Cycle Q Clear(g_c), s	13.0	36.2	10.0	13.6	58.1	10.0	17.4	39.1	15.1	12.0	30.1	10.1
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	165	1406	605	200	776	636	225	522	432	153	446	361
V/C Ratio(X)	1.14	0.76	0.27	0.88	1.21	0.26	0.99	1.12	0.47	1.14	0.92	0.36
Avail Cap(c_a), veh/h	165	1406	605	230	776	636	225	522	432	153	446	361
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	63.5	36.5	28.6	61.2	41.0	26.9	61.0	50.5	41.8	64.0	52.0	44.4
Incr Delay (d2), s/veh	113.5	2.4	0.2	27.6	106.3	0.2	55.8	76.6	0.8	115.3	24.8	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	11.0	15.5	3.6	7.5	48.1	3.6	11.1	28.7	5.7	10.2	16.7	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	177.0	38.9	28.8	88.8	147.2	27.1	116.8	127.1	42.6	179.3	76.9	45.0
LnGrp LOS	F	D	C	F	F	C	F	F	D	F	E	D
Approach Vol, veh/h		1415			1281			1008			717	
Approach Delay, s/veh		56.2			123.6			108.0			95.9	
Approach LOS		E			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	44.0	19.7	60.3	21.7	38.3	17.0	63.0
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	12.0	39.1	18.1	53.0	17.7	33.4	13.0	58.1
Max Q Clear Time (g_c+I1), s	14.0	41.1	15.6	38.2	19.4	32.1	15.0	60.1
Green Ext Time (p_c), s	0.0	0.0	0.1	6.4	0.0	0.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	94.0
HCM 6th LOS	F



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	189	1064	174	176	939	228	222	585	207	174	413	139
v/c Ratio	1.15	0.78	0.26	0.83	1.21	0.33	1.00	1.12	0.39	1.15	0.93	0.30
Control Delay	171.3	42.7	8.5	89.1	144.8	15.5	119.4	124.2	16.2	174.5	80.5	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	171.3	42.7	8.5	89.1	144.8	15.5	119.4	124.2	16.2	174.5	80.5	8.3
Queue Length 50th (ft)	~202	451	20	157	~1044	69	205	~614	47	~185	371	0
Queue Length 95th (ft)	#351	521	68	#262	#1257	130	#363	#818	114	#329	#549	51
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	164	1370	669	228	773	689	223	520	528	151	444	463
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.78	0.26	0.77	1.21	0.33	1.00	1.13	0.39	1.15	0.93	0.30

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

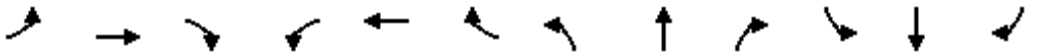
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	61	641	17	10	639	51	0	0	11	0	0	48
Future Vol, veh/h	61	641	17	10	639	51	0	0	11	0	0	48
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	265	-	-	265	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	712	19	11	710	57	0	0	12	0	0	53

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	772	0	0	736	0	0	-	-	376	-	-	720
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.13	-	-	4.13	-	-	-	-	6.93	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	-	3.319	-	-	3.319
Pot Cap-1 Maneuver	841	-	-	867	-	-	0	0	622	0	0	427
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	837	-	-	863	-	-	-	-	616	-	-	423
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.1	11	14.7
HCM LOS			B	B

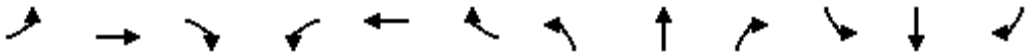
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	616	837	-	-	863	-	-	423
HCM Lane V/C Ratio	0.02	0.081	-	-	0.013	-	-	0.126
HCM Control Delay (s)	11	9.7	-	-	9.2	-	-	14.7
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0.3	-	-	0	-	-	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	811	163	144	817	165	228	380	200	128	243	147
Future Volume (veh/h)	207	811	163	144	817	165	228	380	200	128	243	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	238	932	167	166	939	187	262	437	193	147	279	151
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	336	1316	576	253	1231	538	312	914	399	230	527	228
Arrive On Green	0.10	0.37	0.37	0.07	0.35	0.35	0.18	0.26	0.26	0.07	0.15	0.15
Sat Flow, veh/h	3456	3554	1555	3456	3554	1554	1781	3554	1550	3456	3554	1539
Grp Volume(v), veh/h	238	932	167	166	939	187	262	437	193	147	279	151
Grp Sat Flow(s),veh/h/ln	1728	1777	1555	1728	1777	1554	1781	1777	1550	1728	1777	1539
Q Serve(g_s), s	5.1	17.1	5.8	3.6	18.0	6.8	10.9	8.0	8.1	3.2	5.6	7.1
Cycle Q Clear(g_c), s	5.1	17.1	5.8	3.6	18.0	6.8	10.9	8.0	8.1	3.2	5.6	7.1
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	336	1316	576	253	1231	538	312	914	399	230	527	228
V/C Ratio(X)	0.71	0.71	0.29	0.66	0.76	0.35	0.84	0.48	0.48	0.64	0.53	0.66
Avail Cap(c_a), veh/h	587	1988	870	465	1863	815	605	1645	717	438	887	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)	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	33.5	20.5	17.0	34.5	22.2	18.6	30.5	24.1	24.1	34.8	30.1	30.8
Incr Delay (d2), s/veh	2.8	0.7	0.3	2.9	1.0	0.4	6.0	0.4	0.9	2.9	0.8	3.3
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	2.1	6.2	1.8	1.5	6.6	2.2	4.8	3.1	2.7	1.3	2.3	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.2	21.3	17.3	37.4	23.2	19.0	36.5	24.5	25.0	37.7	30.9	34.0
LnGrp LOS	D	C	B	D	C	B	D	C	C	D	C	C
Approach Vol, veh/h		1337			1292			892			577	
Approach Delay, s/veh		23.4			24.4			28.1			33.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	24.6	9.6	33.2	17.4	16.2	11.4	31.4
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	9.7	35.4	10.3	42.8	26.0	19.1	13.0	40.1
Max Q Clear Time (g_c+I1), s	5.2	10.1	5.6	19.1	12.9	9.1	7.1	20.0
Green Ext Time (p_c), s	0.2	3.3	0.2	6.8	0.6	1.5	0.4	6.5

Intersection Summary	
HCM 6th Ctrl Delay	26.2
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	238	932	187	166	939	190	262	437	230	147	279	169
v/c Ratio	0.58	0.73	0.29	0.49	0.78	0.29	0.73	0.50	0.46	0.46	0.56	0.47
Control Delay	48.7	30.8	9.4	49.7	34.1	5.0	50.3	33.2	13.6	49.9	45.0	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	30.8	9.4	49.7	34.1	5.0	50.3	33.2	13.6	49.9	45.0	11.3
Queue Length 50th (ft)	73	257	23	51	270	0	154	124	34	45	87	0
Queue Length 95th (ft)	126	368	73	94	386	44	261	176	96	86	140	55
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	487	1653	791	386	1549	782	502	1367	695	363	738	454
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.56	0.24	0.43	0.61	0.24	0.52	0.32	0.33	0.40	0.38	0.37

Intersection Summary

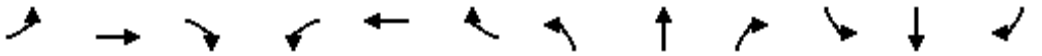
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	72	100	269	197	1
Future Vol, veh/h	0	72	100	269	197	1
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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	78	109	292	214	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	108	215	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	925	1352	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	925	1352	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	2.1	0
HCM LOS	A		

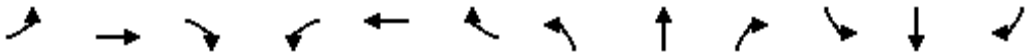
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1352	-	925	-	-
HCM Lane V/C Ratio	0.08	-	0.085	-	-
HCM Control Delay (s)	7.9	-	9.3	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	57	95	273	42	457	77	476	546	35	90	642	121
Future Volume (veh/h)	57	95	273	42	457	77	476	546	35	90	642	121
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.96	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	108	233	48	519	74	541	620	39	102	730	122
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	89	613	507	75	599	496	653	1121	480	132	1024	308
Arrive On Green	0.05	0.33	0.33	0.04	0.32	0.32	0.19	0.32	0.32	0.07	0.20	0.20
Sat Flow, veh/h	1781	1870	1547	1781	1870	1547	3456	3554	1521	1781	5106	1535
Grp Volume(v), veh/h	65	108	233	48	519	74	541	620	39	102	730	122
Grp Sat Flow(s),veh/h/ln	1781	1870	1547	1781	1870	1547	1728	1777	1521	1781	1702	1535
Q Serve(g_s), s	2.7	3.1	8.8	2.0	19.3	2.5	11.2	10.7	1.3	4.2	9.9	5.1
Cycle Q Clear(g_c), s	2.7	3.1	8.8	2.0	19.3	2.5	11.2	10.7	1.3	4.2	9.9	5.1
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	89	613	507	75	599	496	653	1121	480	132	1024	308
V/C Ratio(X)	0.73	0.18	0.46	0.64	0.87	0.15	0.83	0.55	0.08	0.77	0.71	0.40
Avail Cap(c_a), veh/h	144	744	616	161	762	630	816	1165	499	281	1275	383
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	34.7	17.8	19.7	34.9	23.7	18.0	28.9	21.0	17.8	33.7	27.6	25.7
Incr Delay (d2), s/veh	11.0	0.1	0.6	8.6	8.5	0.1	5.8	0.5	0.1	9.2	1.4	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	1.4	1.3	3.1	1.0	9.4	0.9	4.7	3.9	0.5	2.0	3.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.8	17.9	20.4	43.5	32.2	18.1	34.7	21.6	17.9	42.9	29.1	26.6
LnGrp LOS	D	B	C	D	C	B	C	C	B	D	C	C
Approach Vol, veh/h		406			641			1200			954	
Approach Delay, s/veh		23.8			31.4			27.4			30.2	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	28.3	7.1	29.2	18.0	19.8	7.7	28.7
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	11.7	24.3	6.7	29.5	17.5	18.5	6.0	30.2
Max Q Clear Time (g_c+I1), s	6.2	12.7	4.0	10.8	13.2	11.9	4.7	21.3
Green Ext Time (p_c), s	0.1	2.9	0.0	1.3	0.9	2.6	0.0	2.4

Intersection Summary	
HCM 6th Ctrl Delay	28.6
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	65	108	310	48	519	88	541	620	40	102	730	138
v/c Ratio	0.49	0.17	0.42	0.34	0.85	0.14	0.79	0.54	0.07	0.49	0.70	0.31
Control Delay	53.8	21.6	4.8	46.2	42.0	0.5	42.1	28.0	0.2	45.0	35.4	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	21.6	4.8	46.2	42.0	0.5	42.1	28.0	0.2	45.0	35.4	5.1
Queue Length 50th (ft)	37	43	0	27	269	0	153	161	0	55	142	0
Queue Length 95th (ft)	#86	80	51	61	#421	0	#219	216	0	102	179	29
Internal Link Dist (ft)		2470			1342			2623			1390	
Turn Bay Length (ft)	250					25	250			250		205
Base Capacity (vph)	136	736	797	152	722	700	770	1151	571	266	1207	492
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.15	0.39	0.32	0.72	0.13	0.70	0.54	0.07	0.38	0.60	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

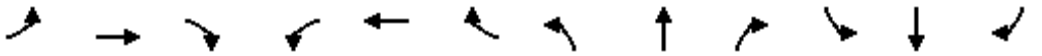
Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	2	149	1	1	1	450	269	6	1	338	29
Future Vol, veh/h	5	2	149	1	1	1	450	269	6	1	338	29
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	2	162	1	1	1	489	292	7	1	367	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1670	1672	393	1751	1685	306	404	0	0	304	0	0
Stage 1	390	390	-	1279	1279	-	-	-	-	-	-	-
Stage 2	1280	1282	-	472	406	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	76	96	656	67	94	734	1155	-	-	1257	-	-
Stage 1	634	608	-	204	237	-	-	-	-	-	-	-
Stage 2	204	236	-	573	598	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	44	47	650	29	46	727	1150	-	-	1251	-	-
Mov Cap-2 Maneuver	44	47	-	29	46	-	-	-	-	-	-	-
Stage 1	309	604	-	100	116	-	-	-	-	-	-	-
Stage 2	98	115	-	426	594	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.1	78.8	6.5	0
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1150	-	-	405	52	1251	-	-
HCM Lane V/C Ratio	0.425	-	-	0.419	0.063	0.001	-	-
HCM Control Delay (s)	10.4	0	-	20.1	78.8	7.9	0	-
HCM Lane LOS	B	A	-	C	F	A	A	-
HCM 95th %tile Q(veh)	2.2	-	-	2	0.2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	171	279	125	371	187	162	1095	44	74	809	79
Future Volume (veh/h)	82	171	279	125	371	187	162	1095	44	74	809	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.95	1.00		0.91	1.00		0.89
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	89	186	220	136	403	154	176	1190	40	80	879	61
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	114	599	482	172	448	171	214	1519	430	103	1199	333
Arrive On Green	0.06	0.32	0.32	0.10	0.35	0.35	0.12	0.30	0.30	0.06	0.23	0.23
Sat Flow, veh/h	1781	1870	1507	1781	1270	485	1781	5106	1447	1781	5106	1418
Grp Volume(v), veh/h	89	186	220	136	0	557	176	1190	40	80	879	61
Grp Sat Flow(s),veh/h/ln	1781	1870	1507	1781	0	1755	1781	1702	1447	1781	1702	1418
Q Serve(g_s), s	3.8	5.9	9.1	5.8	0.0	23.5	7.5	16.7	1.6	3.5	12.4	2.7
Cycle Q Clear(g_c), s	3.8	5.9	9.1	5.8	0.0	23.5	7.5	16.7	1.6	3.5	12.4	2.7
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	114	599	482	172	0	619	214	1519	430	103	1199	333
V/C Ratio(X)	0.78	0.31	0.46	0.79	0.00	0.90	0.82	0.78	0.09	0.78	0.73	0.18
Avail Cap(c_a), veh/h	142	619	498	308	0	745	251	1761	499	137	1433	398
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.0	20.0	21.1	34.5	0.0	23.9	33.5	25.1	19.8	36.3	27.6	23.9
Incr Delay (d2), s/veh	19.5	0.3	0.7	7.8	0.0	12.4	17.0	2.1	0.1	18.1	1.6	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	2.2	2.4	3.0	2.7	0.0	10.7	4.0	6.2	0.5	1.9	4.7	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.5	20.3	21.8	42.3	0.0	36.3	50.5	27.2	19.9	54.4	29.2	24.1
LnGrp LOS	E	C	C	D	A	D	D	C	B	D	C	C
Approach Vol, veh/h		495			693			1406			1020	
Approach Delay, s/veh		27.3			37.5			29.9			30.9	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	28.1	11.5	29.9	13.4	23.2	9.0	32.4
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	6.0	26.9	13.5	25.8	11.0	21.9	6.2	33.1
Max Q Clear Time (g_c+I1), s	5.5	18.7	7.8	11.1	9.5	14.4	5.8	25.5
Green Ext Time (p_c), s	0.0	4.5	0.1	1.5	0.1	3.3	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	31.3
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	89	186	303	136	606	176	1190	48	80	879	86
v/c Ratio	0.66	0.32	0.46	0.58	0.92	0.78	0.71	0.08	0.62	0.71	0.17
Control Delay	66.5	26.2	6.7	46.4	46.9	62.1	29.3	0.3	62.9	33.6	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.5	26.2	6.7	46.4	46.9	62.1	29.3	0.3	62.9	33.6	0.7
Queue Length 50th (ft)	51	82	7	73	311	99	225	0	45	168	0
Queue Length 95th (ft)	#128	142	70	130	#526	#209	279	0	#116	213	0
Internal Link Dist (ft)		2660			5395		1188			2623	
Turn Bay Length (ft)	235			88		250		105	250		205
Base Capacity (vph)	134	608	672	293	720	238	1682	574	130	1366	533
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.31	0.45	0.46	0.84	0.74	0.71	0.08	0.62	0.64	0.16

Intersection Summary

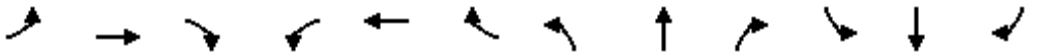
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	462
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	188	98	61	529	390	133	290	14	169	594	11
Future Vol, veh/h	3	188	98	61	529	390	133	290	14	169	594	11
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	194	101	63	545	402	137	299	14	174	612	11
Number of Lanes	0	1	0	0	1	0	0	1	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	68.2	692.6	148.1	494.2
HCM LOS	F	F	F	F

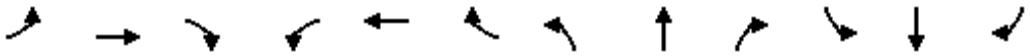
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	1%	6%	22%
Vol Thru, %	66%	65%	54%	77%
Vol Right, %	3%	34%	40%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	437	289	980	774
LT Vol	133	3	61	169
Through Vol	290	188	529	594
RT Vol	14	98	390	11
Lane Flow Rate	451	298	1010	798
Geometry Grp	1	1	1	1
Degree of Util (X)	1.132	0.78	2.464	2.004
Departure Headway (Hd)	17.2	19.063	11.685	13.63
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	216	194	323	279
Service Time	15.2	17.063	9.685	11.63
HCM Lane V/C Ratio	2.088	1.536	3.127	2.86
HCM Control Delay	148.1	68.2	692.6	494.2
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	11.3	5.3	61	38.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	710	364	228	881	200	218	318	101	355	912	147
Future Volume (veh/h)	97	710	364	228	881	200	218	318	101	355	912	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.98	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	755	370	243	937	129	232	338	98	378	970	143
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	83	912	392	257	662	543	166	488	404	392	724	595
Arrive On Green	0.05	0.26	0.26	0.14	0.35	0.35	0.09	0.26	0.26	0.22	0.39	0.39
Sat Flow, veh/h	1781	3554	1527	1781	1870	1534	1781	1870	1550	1781	1870	1536
Grp Volume(v), veh/h	103	755	370	243	937	129	232	338	98	378	970	143
Grp Sat Flow(s),veh/h/ln	1781	1777	1527	1781	1870	1534	1781	1870	1550	1781	1870	1536
Q Serve(g_s), s	7.0	30.1	35.7	20.3	53.1	8.9	14.0	24.5	7.5	31.5	58.1	9.4
Cycle Q Clear(g_c), s	7.0	30.1	35.7	20.3	53.1	8.9	14.0	24.5	7.5	31.5	58.1	9.4
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	83	912	392	257	662	543	166	488	404	392	724	595
V/C Ratio(X)	1.24	0.83	0.94	0.95	1.42	0.24	1.40	0.69	0.24	0.96	1.34	0.24
Avail Cap(c_a), veh/h	83	912	392	257	662	543	166	488	404	392	724	595
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	71.5	52.6	54.7	63.6	48.5	34.2	68.0	50.0	43.8	57.9	46.0	31.0
Incr Delay (d2), s/veh	176.1	6.4	31.5	41.9	195.7	0.2	210.3	4.2	0.3	36.1	161.8	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	7.2	13.8	16.7	12.0	59.7	3.3	15.9	11.7	2.9	17.7	58.3	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	247.6	59.0	86.1	105.5	244.1	34.4	278.3	54.2	44.1	94.1	207.7	31.2
LnGrp LOS	F	E	F	F	F	C	F	D	D	F	F	C
Approach Vol, veh/h		1228			1309			668			1491	
Approach Delay, s/veh		83.0			197.7			130.6			162.0	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	37.0	44.0	25.6	43.4	18.0	63.0	11.0	58.0
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	33.0	39.1	21.6	38.5	14.0	58.1	7.0	53.1
Max Q Clear Time (g_c+I1), s	33.5	26.5	22.3	37.7	16.0	60.1	9.0	55.1
Green Ext Time (p_c), s	0.0	1.7	0.0	0.5	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	146.8
HCM 6th LOS	F



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	103	755	387	243	937	213	232	338	107	378	970	156
v/c Ratio	1.26	0.83	0.80	0.96	1.42	0.35	1.41	0.70	0.22	0.97	1.35	0.24
Control Delay	237.1	61.8	47.7	109.1	235.1	20.0	261.3	58.9	4.6	96.4	201.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	237.1	61.8	47.7	109.1	235.1	20.0	261.3	58.9	4.6	96.4	201.4	12.4
Queue Length 50th (ft)	~125	370	246	240	~1232	77	~303	301	0	371	~1236	34
Queue Length 95th (ft)	#255	450	#405	#415	#1494	150	#482	416	31	#583	#1497	87
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	82	908	483	254	659	600	165	485	497	389	721	647
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.26	0.83	0.80	0.96	1.42	0.35	1.41	0.70	0.22	0.97	1.35	0.24

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

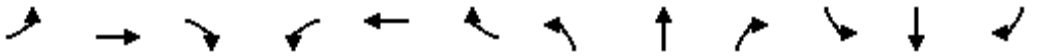
Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	1119	17	6	1212	27	0	0	17	0	0	110
Future Vol, veh/h	34	1119	17	6	1212	27	0	0	17	0	0	110
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	265	-	-	265	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	1178	18	6	1276	28	0	0	18	0	0	116

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1309	0	0	1201	0	0	-	-	608	-	-	1286
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.13	-	-	4.13	-	-	-	-	6.93	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	-	3.319	-	-	3.319
Pot Cap-1 Maneuver	527	-	-	579	-	-	0	0	440	0	0	200
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	524	-	-	576	-	-	-	-	436	-	-	198
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	13.6	46
HCM LOS			B	E

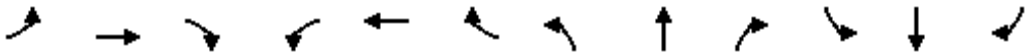
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	436	524	-	-	576	-	-	198
HCM Lane V/C Ratio	0.041	0.068	-	-	0.011	-	-	0.585
HCM Control Delay (s)	13.6	12.4	-	-	11.3	-	-	46
HCM Lane LOS	B	B	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	3.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	735	218	325	853	183	206	212	175	203	639	320
Future Volume (veh/h)	120	735	218	325	853	183	206	212	175	203	639	320
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	799	215	353	927	198	224	230	183	221	695	324
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	980	428	437	1228	537	262	1135	496	300	921	402
Arrive On Green	0.06	0.28	0.28	0.13	0.35	0.35	0.15	0.32	0.32	0.09	0.26	0.26
Sat Flow, veh/h	3456	3554	1551	3456	3554	1554	1781	3554	1553	3456	3554	1550
Grp Volume(v), veh/h	130	799	215	353	927	198	224	230	183	221	695	324
Grp Sat Flow(s),veh/h/ln	1728	1777	1551	1728	1777	1554	1781	1777	1553	1728	1777	1550
Q Serve(g_s), s	3.4	19.5	10.8	9.2	21.5	8.9	11.4	4.4	8.5	5.8	16.8	18.2
Cycle Q Clear(g_c), s	3.4	19.5	10.8	9.2	21.5	8.9	11.4	4.4	8.5	5.8	16.8	18.2
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	196	980	428	437	1228	537	262	1135	496	300	921	402
V/C Ratio(X)	0.66	0.81	0.50	0.81	0.75	0.37	0.85	0.20	0.37	0.74	0.75	0.81
Avail Cap(c_a), veh/h	260	1226	535	594	1569	686	383	1424	622	475	1149	501
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	43.0	31.5	28.3	39.5	27.0	22.8	38.7	23.0	24.4	41.5	31.8	32.3
Incr Delay (d2), s/veh	3.8	3.5	0.9	5.9	1.6	0.4	11.9	0.1	0.5	3.5	2.2	7.6
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	8.2	3.8	4.0	8.5	3.0	5.6	1.7	2.9	2.5	7.0	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.8	35.0	29.2	45.4	28.6	23.3	50.6	23.1	24.9	45.0	34.0	39.9
LnGrp LOS	D	D	C	D	C	C	D	C	C	D	C	D
Approach Vol, veh/h		1144			1478			637			1240	
Approach Delay, s/veh		35.3			31.9			33.3			37.5	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	34.6	15.8	30.6	17.7	29.0	9.3	37.1
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	12.8	37.3	16.0	32.1	20.0	30.1	7.0	41.1
Max Q Clear Time (g_c+I1), s	7.8	10.5	11.2	21.5	13.4	20.2	5.4	23.5
Green Ext Time (p_c), s	0.3	1.9	0.5	4.1	0.3	3.9	0.0	6.2

Intersection Summary	
HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	130	799	237	353	927	199	224	230	190	221	695	348
v/c Ratio	0.57	0.83	0.44	0.74	0.76	0.30	0.77	0.21	0.31	0.59	0.78	0.65
Control Delay	61.3	45.5	13.6	55.7	36.0	4.9	62.2	28.3	5.6	54.1	44.7	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	45.5	13.6	55.7	36.0	4.9	62.2	28.3	5.6	54.1	44.7	21.9
Queue Length 50th (ft)	50	293	39	132	316	0	160	65	0	82	252	96
Queue Length 95th (ft)	#84	370	110	184	394	49	#268	97	51	123	323	201
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	233	1101	595	532	1409	734	343	1280	679	425	1032	591
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.73	0.40	0.66	0.66	0.27	0.65	0.18	0.28	0.52	0.67	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

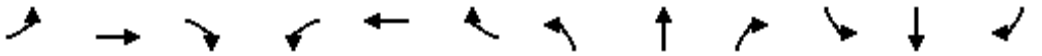
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	88	30	491	856	1
Future Vol, veh/h	0	88	30	491	856	1
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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	96	33	534	930	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	466	931	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	543	731	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	543	731	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	731	-	543	-	-
HCM Lane V/C Ratio	0.045	-	0.176	-	-
HCM Control Delay (s)	10.2	-	13	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	131	228	28	118	62	231	670	30	78	624	46
Future Volume (veh/h)	22	131	228	28	118	62	231	670	30	78	624	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.96	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	25	149	184	32	134	51	262	761	28	89	709	46
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	53	356	291	64	368	301	419	1171	499	129	1433	432
Arrive On Green	0.03	0.19	0.19	0.04	0.20	0.20	0.12	0.33	0.33	0.07	0.28	0.28
Sat Flow, veh/h	1781	1870	1526	1781	1870	1528	3456	3554	1515	1781	5106	1539
Grp Volume(v), veh/h	25	149	184	32	134	51	262	761	28	89	709	46
Grp Sat Flow(s),veh/h/ln	1781	1870	1526	1781	1870	1528	1728	1777	1515	1781	1702	1539
Q Serve(g_s), s	0.7	3.4	5.3	0.8	3.0	1.3	3.5	8.8	0.6	2.3	5.6	1.1
Cycle Q Clear(g_c), s	0.7	3.4	5.3	0.8	3.0	1.3	3.5	8.8	0.6	2.3	5.6	1.1
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	53	356	291	64	368	301	419	1171	499	129	1433	432
V/C Ratio(X)	0.48	0.42	0.63	0.50	0.36	0.17	0.63	0.65	0.06	0.69	0.49	0.11
Avail Cap(c_a), veh/h	260	785	641	260	785	641	1010	2530	1079	409	3315	999
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	22.9	17.1	17.9	22.7	16.6	16.0	20.0	13.7	11.0	21.7	14.4	12.8
Incr Delay (d2), s/veh	6.5	0.8	2.3	5.8	0.6	0.3	1.5	0.6	0.0	6.4	0.3	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.4	1.8	0.4	1.2	0.4	1.2	2.6	0.2	1.0	1.6	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.4	17.8	20.1	28.5	17.2	16.2	21.5	14.3	11.0	28.1	14.7	12.9
LnGrp LOS	C	B	C	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		358			217			1051			844	
Approach Delay, s/veh		19.8			18.7			16.0			16.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	20.7	5.7	14.0	9.8	18.3	5.4	14.3
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	11.0	34.1	7.0	20.1	14.0	31.1	7.0	20.1
Max Q Clear Time (g_c+I1), s	4.3	10.8	2.8	7.3	5.5	7.6	2.7	5.0
Green Ext Time (p_c), s	0.1	4.9	0.0	1.2	0.5	4.6	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	25	149	259	32	134	70	263	761	34	89	709	52
v/c Ratio	0.12	0.41	0.51	0.15	0.37	0.18	0.42	0.55	0.05	0.33	0.45	0.09
Control Delay	33.1	28.2	8.1	33.1	27.5	2.5	27.1	18.3	0.1	31.5	18.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	28.2	8.1	33.1	27.5	2.5	27.1	18.3	0.1	31.5	18.3	0.3
Queue Length 50th (ft)	7	42	0	9	37	0	38	96	0	26	60	0
Queue Length 95th (ft)	36	119	55	43	108	9	100	221	0	86	136	0
Internal Link Dist (ft)		2470			1342			2623			1390	
Turn Bay Length (ft)	250					25	250			250		205
Base Capacity (vph)	234	709	742	234	709	656	910	2285	1016	368	2994	955
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.21	0.35	0.14	0.19	0.11	0.29	0.33	0.03	0.24	0.24	0.05

Intersection Summary

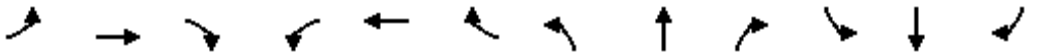
Intersection	
Int Delay, s/veh	16.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	70	2	164	1	2	1	188	360	37	1	355	30
Future Vol, veh/h	70	2	164	1	2	1	188	360	37	1	355	30
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	2	178	1	2	1	204	391	40	1	386	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1236	1254	413	1324	1250	421	424	0	0	436	0	0
Stage 1	410	410	-	824	824	-	-	-	-	-	-	-
Stage 2	826	844	-	500	426	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	153	172	639	133	173	632	1135	-	-	1124	-	-
Stage 1	619	595	-	367	387	-	-	-	-	-	-	-
Stage 2	366	379	-	553	586	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	122	130	633	76	130	626	1130	-	-	1119	-	-
Mov Cap-2 Maneuver	122	130	-	76	130	-	-	-	-	-	-	-
Stage 1	469	591	-	278	293	-	-	-	-	-	-	-
Stage 2	275	287	-	394	582	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	75.9	33	2.9	0
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1130	-	-	278	133	1119	-	-
HCM Lane V/C Ratio	0.181	-	-	0.923	0.033	0.001	-	-
HCM Control Delay (s)	8.9	0	-	75.9	33	8.2	0	-
HCM Lane LOS	A	A	-	F	D	A	A	-
HCM 95th %tile Q(veh)	0.7	-	-	8.6	0.1	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	128	163	128	183	103	187	907	180	155	896	27
Future Volume (veh/h)	22	128	163	128	183	103	187	907	180	155	896	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.96	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	139	150	139	199	90	203	986	191	168	974	13
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	50	296	242	177	277	125	252	1520	453	212	1405	418
Arrive On Green	0.03	0.16	0.16	0.10	0.23	0.23	0.14	0.30	0.30	0.12	0.28	0.28
Sat Flow, veh/h	1781	1870	1529	1781	1207	546	1781	5106	1521	1781	5106	1518
Grp Volume(v), veh/h	24	139	150	139	0	289	203	986	191	168	974	13
Grp Sat Flow(s),veh/h/ln	1781	1870	1529	1781	0	1754	1781	1702	1521	1781	1702	1518
Q Serve(g_s), s	0.7	3.7	5.0	4.2	0.0	8.3	6.0	9.2	5.5	5.0	9.3	0.3
Cycle Q Clear(g_c), s	0.7	3.7	5.0	4.2	0.0	8.3	6.0	9.2	5.5	5.0	9.3	0.3
Prop In Lane	1.00		1.00	1.00		0.31	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	50	296	242	177	0	402	252	1520	453	212	1405	418
V/C Ratio(X)	0.48	0.47	0.62	0.79	0.00	0.72	0.81	0.65	0.42	0.79	0.69	0.03
Avail Cap(c_a), veh/h	193	617	504	212	0	598	294	1880	560	248	1749	520
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	20.9	21.4	24.0	0.0	19.4	22.7	16.7	15.4	23.4	17.7	14.5
Incr Delay (d2), s/veh	7.1	1.2	2.6	14.8	0.0	2.4	13.4	0.6	0.6	14.1	0.9	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	0.4	1.5	1.7	2.2	0.0	3.1	3.0	2.9	1.6	2.6	3.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.2	22.1	24.0	38.9	0.0	21.8	36.1	17.2	16.0	37.5	18.6	14.5
LnGrp LOS	C	C	C	D	A	C	D	B	B	D	B	B
Approach Vol, veh/h		313			428			1380			1155	
Approach Delay, s/veh		23.9			27.3			19.8			21.3	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	21.1	9.4	13.5	11.7	19.9	5.5	17.4
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	7.6	20.1	6.5	18.0	9.0	18.7	5.9	18.6
Max Q Clear Time (g_c+I1), s	7.0	11.2	6.2	7.0	8.0	11.3	2.7	10.3
Green Ext Time (p_c), s	0.0	4.4	0.0	0.9	0.1	3.5	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	21.7
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	139	177	139	311	203	986	196	168	974	29
v/c Ratio	0.15	0.40	0.41	0.75	0.56	0.79	0.66	0.33	0.77	0.70	0.06
Control Delay	31.2	25.6	7.0	57.4	22.2	53.1	22.2	5.2	55.8	24.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	25.6	7.0	57.4	22.2	53.1	22.2	5.2	55.8	24.1	0.2
Queue Length 50th (ft)	8	48	0	52	80	74	111	0	62	113	0
Queue Length 95th (ft)	31	92	43	#154	182	#202	179	43	#177	182	0
Internal Link Dist (ft)		2660			5395		1188			2623	
Turn Bay Length (ft)	235			88		250		105	250		205
Base Capacity (vph)	169	543	575	186	564	257	1655	625	217	1539	566
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.26	0.31	0.75	0.55	0.79	0.60	0.31	0.77	0.63	0.05

Intersection Summary

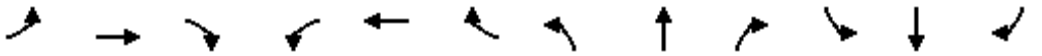
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	295.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	377	109	22	222	245	154	442	30	216	270	7
Future Vol, veh/h	14	377	109	22	222	245	154	442	30	216	270	7
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	410	118	24	241	266	167	480	33	235	293	8
Number of Lanes	0	1	0	0	1	0	0	1	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	254.2	226.9	409.4	259.6
HCM LOS	F	F	F	F

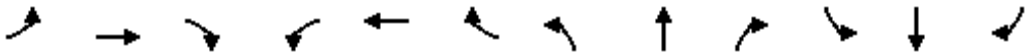
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	25%	3%	4%	44%
Vol Thru, %	71%	75%	45%	55%
Vol Right, %	5%	22%	50%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	626	500	489	493
LT Vol	154	14	22	216
Through Vol	442	377	222	270
RT Vol	30	109	245	7
Lane Flow Rate	680	543	532	536
Geometry Grp	1	1	1	1
Degree of Util (X)	1.809	1.435	1.366	1.445
Departure Headway (Hd)	13.77	14.864	15.015	15.262
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	272	250	250	246
Service Time	11.77	12.864	13.015	13.262
HCM Lane V/C Ratio	2.5	2.172	2.128	2.179
HCM Control Delay	409.4	254.2	226.9	259.6
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	32	19.8	17.8	19.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	1141	218	155	934	211	313	707	182	179	521	127
Future Volume (veh/h)	173	1141	218	155	934	211	313	707	182	179	521	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.98	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	188	1240	225	168	1015	169	340	768	193	195	566	130
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	143	1324	570	181	737	603	249	600	497	154	500	406
Arrive On Green	0.08	0.37	0.37	0.10	0.39	0.39	0.14	0.32	0.32	0.09	0.27	0.27
Sat Flow, veh/h	1781	3554	1529	1781	1870	1530	1781	1870	1549	1781	1870	1519
Grp Volume(v), veh/h	188	1240	225	168	1015	169	340	768	193	195	566	130
Grp Sat Flow(s),veh/h/ln	1781	1777	1529	1781	1870	1530	1781	1870	1549	1781	1870	1519
Q Serve(g_s), s	12.0	50.4	16.2	14.0	59.1	11.3	21.0	48.1	14.5	13.0	40.1	10.3
Cycle Q Clear(g_c), s	12.0	50.4	16.2	14.0	59.1	11.3	21.0	48.1	14.5	13.0	40.1	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	143	1324	570	181	737	603	249	600	497	154	500	406
V/C Ratio(X)	1.32	0.94	0.39	0.93	1.38	0.28	1.36	1.28	0.39	1.26	1.13	0.32
Avail Cap(c_a), veh/h	143	1324	570	181	737	603	249	600	497	154	500	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.0	45.3	34.6	66.9	45.4	31.0	64.5	50.9	39.5	68.5	55.0	44.0
Incr Delay (d2), s/veh	184.3	12.5	0.4	47.4	178.3	0.3	187.2	138.7	0.5	159.9	81.8	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	12.6	23.6	6.0	8.6	62.6	4.1	22.3	44.7	5.5	12.6	29.6	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	253.3	57.9	35.1	114.3	223.7	31.2	251.7	189.6	40.0	228.4	136.8	44.5
LnGrp LOS	F	E	D	F	F	C	F	F	D	F	F	D
Approach Vol, veh/h		1653			1352			1301			891	
Approach Delay, s/veh		77.0			186.1			183.7			143.3	
Approach LOS		E			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	53.0	19.2	60.8	25.0	45.0	16.0	64.0
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	13.0	48.1	15.2	55.9	21.0	40.1	12.0	59.1
Max Q Clear Time (g_c+I1), s	15.0	50.1	16.0	52.4	23.0	42.1	14.0	61.1
Green Ext Time (p_c), s	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	143.4
HCM 6th LOS	F



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	188	1240	237	168	1015	229	340	768	198	195	566	138
v/c Ratio	1.33	0.94	0.38	0.94	1.38	0.35	1.38	1.29	0.35	1.27	1.14	0.29
Control Delay	239.9	59.7	21.0	118.6	216.5	18.9	238.6	182.4	20.7	216.3	132.1	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	239.9	59.7	21.0	118.6	216.5	18.9	238.6	182.4	20.7	216.3	132.1	15.3
Queue Length 50th (ft)	~238	614	94	166	~1314	84	~438	~952	70	~240	~643	27
Queue Length 95th (ft)	#400	#760	170	#315	#1578	155	#641	#1204	142	#406	#878	87
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	141	1318	624	179	734	654	247	597	560	153	498	474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.33	0.94	0.38	0.94	1.38	0.35	1.38	1.29	0.35	1.27	1.14	0.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

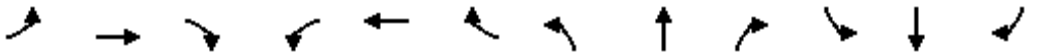
Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	1468	21	12	1253	58	0	0	14	0	0	56
Future Vol, veh/h	70	1468	21	12	1253	58	0	0	14	0	0	56
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	265	-	-	265	-	0	-	-	-	-	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	1596	23	13	1362	63	0	0	15	0	0	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1430	0	0	1624	0	0	-	-	820	-	-	1372
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.13	-	-	4.13	-	-	-	-	6.93	-	-	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	-	-	3.319	-	-	3.319
Pot Cap-1 Maneuver	473	-	-	398	-	-	0	0	319	0	0	178
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	471	-	-	396	-	-	-	-	316	-	-	176
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.1	17	35.9
HCM LOS			C	E

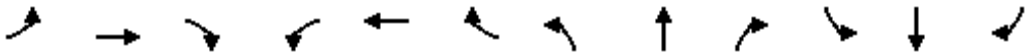
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	316	471	-	-	396	-	-	176
HCM Lane V/C Ratio	0.048	0.162	-	-	0.033	-	-	0.346
HCM Control Delay (s)	17	14.1	-	-	14.4	-	-	35.9
HCM Lane LOS	C	B	-	-	B	-	-	E
HCM 95th %tile Q(veh)	0.2	0.6	-	-	0.1	-	-	1.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	921	170	291	934	202	234	724	374	170	306	187
Future Volume (veh/h)	224	921	170	291	934	202	234	724	374	170	306	187
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	243	1001	167	316	1015	217	254	787	372	185	333	186
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	317	1193	522	394	1273	557	292	1043	455	254	722	314
Arrive On Green	0.09	0.34	0.34	0.11	0.36	0.36	0.16	0.29	0.29	0.07	0.20	0.20
Sat Flow, veh/h	3456	3554	1554	3456	3554	1555	1781	3554	1552	3456	3554	1546
Grp Volume(v), veh/h	243	1001	167	316	1015	217	254	787	372	185	333	186
Grp Sat Flow(s),veh/h/ln	1728	1777	1554	1728	1777	1555	1781	1777	1552	1728	1777	1546
Q Serve(g_s), s	6.7	25.3	7.8	8.7	24.9	10.1	13.5	19.5	21.6	5.1	8.0	10.6
Cycle Q Clear(g_c), s	6.7	25.3	7.8	8.7	24.9	10.1	13.5	19.5	21.6	5.1	8.0	10.6
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	317	1193	522	394	1273	557	292	1043	455	254	722	314
V/C Ratio(X)	0.77	0.84	0.32	0.80	0.80	0.39	0.87	0.75	0.82	0.73	0.46	0.59
Avail Cap(c_a), veh/h	427	1431	626	534	1541	674	422	1284	561	320	772	336
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	43.1	29.8	24.0	41.9	28.0	23.3	39.6	31.1	31.9	44.0	34.0	35.1
Incr Delay (d2), s/veh	5.8	4.0	0.4	6.2	2.5	0.4	12.8	2.1	7.6	6.1	0.5	2.5
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	3.0	10.5	2.7	3.8	10.1	3.5	6.7	8.1	8.4	2.3	3.3	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	33.8	24.4	48.1	30.5	23.7	52.4	33.2	39.5	50.1	34.5	37.5
LnGrp LOS	D	C	C	D	C	C	D	C	D	D	C	D
Approach Vol, veh/h		1411			1548			1413			704	
Approach Delay, s/veh		35.3			33.2			38.3			39.4	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	33.4	15.1	37.5	19.9	24.6	12.9	39.7
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	9.0	35.1	15.0	39.1	23.0	21.1	12.0	42.1
Max Q Clear Time (g_c+I1), s	7.1	23.6	10.7	27.3	15.5	12.6	8.7	26.9
Green Ext Time (p_c), s	0.1	4.9	0.4	5.3	0.4	1.7	0.2	6.3

Intersection Summary	
HCM 6th Ctrl Delay	36.0
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	243	1001	185	316	1015	220	254	787	407	185	333	203
v/c Ratio	0.67	0.85	0.31	0.72	0.81	0.32	0.79	0.77	0.73	0.65	0.50	0.45
Control Delay	57.7	42.2	10.8	56.0	37.6	4.9	60.7	41.2	29.8	61.1	43.4	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.7	42.2	10.8	56.0	37.6	4.9	60.7	41.2	29.8	61.1	43.4	9.2
Queue Length 50th (ft)	91	357	27	117	348	1	180	277	168	70	117	0
Queue Length 95th (ft)	135	448	82	167	437	52	#287	350	289	#117	167	65
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	393	1320	658	491	1422	751	388	1185	621	295	714	473
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.76	0.28	0.64	0.71	0.29	0.65	0.66	0.66	0.63	0.47	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	72	100	956	587	1
Future Vol, veh/h	0	72	100	956	587	1
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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	78	109	1039	638	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	320	639	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	676	941	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	676	941	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	941	-	676	-	-
HCM Lane V/C Ratio	0.116	-	0.116	-	-
HCM Control Delay (s)	9.3	-	11	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.4	-	-

APPENDIX D

FLORIDA TABLE

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION

TABLE 8

Generalized **Peak Hour Directional** Volumes for Florida's Transitioning Areas **and** Areas Over 5,000 Not In Urbanized Areas[1]

January 2020

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	710	800	**
2	Divided	*	1,740	1,820	**
3	Divided	*	2,670	2,740	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	330	680	720
2	Divided	*	500	1,460	1,600
3	Divided	*	810	2,280	2,420

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding directional volumes in this table by 1.2

BICYCLE MODE[2]

(Multiply vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	140	320	1,000
50-84%	100	280	940	>1,000
85-100%	380	1,000	>1,000	**

PEDESTRIAN MODE[2]

(Multiply vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,430	3,180	3,790	3,910
3	3,520	4,670	5,610	5,870
4	4,630	6,170	7,440	7,830
5	5,480	7,310	8,730	9,800

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	560	860	1,160	1,560
2	Divided	1,710	2,470	3,120	3,550
3	Divided	2,560	3,700	4,680	5,320

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1]Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the HCM and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Implementation Office
https://www.fdot.gov/planning/systems/

TABLE 8
(continued)

Generalized **Peak Hour Directional** Volumes for Florida's Transitioning Areas **and** Areas Over 5,000 Not In Urbanized Areas

January 2020

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities					
				State Arterials				Class I	
	Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS									
Area type (urban, rural)	urban								
Number of through lanes (both dir.)	4-10	2	4-6	2	4-6	2	4-6	4	4
Posted speed (mph)	70	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	55	55	50	55	35	35	50	50
Auxiliary lanes (n,y)	n								
Median (d, n, nr, r)			d	n	y	n	y	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l
% no passing zone		60							
Exclusive left turn lane impact (n, y)		[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)				n	n	n	n	n	n
Facility length (mi)	6	5	5	1.8	2	2	2	2	2
TRAFFIC CHARACTERISTICS									
Planning analysis hour factor (K)	0.098	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.55	0.55	0.55	0.550	0.570	0.570	0.565	0.570	0.570
Peak hour factor (PHF)	0.92	0.92	0.92	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)	2,400	1,700	2,200	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	9.0	4.0	4.0	2.0	3.0	2.0	3.0	3.0	3.0
Speed Adjustment Factor (SAF)	0.975		0.975						
Capacity Adjustment Factor (CAF)	0.968		0.968						
% left turns				12	12	12	12	12	12
% right turns				12	12	12	12	12	12
CONTROL CHARACTERISTICS									
Number of signals				5	4	10	10	4	6
Arrival type (1-6)				4	3	4	4	4	4
Signal type (a, c, p)				c	c	c	c	c	c
Cycle length (C)				120	150	120	150	120	120
Effective green ratio (g/C)				0.44	0.45	0.44	0.45	0.44	0.44
MULTIMODAL CHARACTERISTICS									
Paved shoulder/bicycle lane (n, y)								n, 50%, y	n
Outside lane width (n, t, w)								t	t
Pavement condition (d, t, u)								t	
On-street parking (n, y)								n	n
Sidewalk (n, y)									n, 50%, y
Sidewalk/roadway separation (a, t, w)									t
Sidewalk protective barrier (n, y)									n

LEVEL OF SERVICE THRESHOLDS

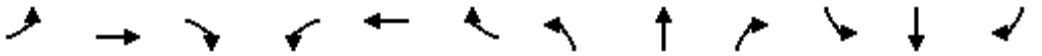
Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane %ffs	Multilane Density	Class I ats	Class II ats	Score	Score	Buses/hr.
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

APPENDIX E

IMPROVED INTERSECTION ANALYSES

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	150	70	6	198	244	108	236	9	133	230	1
Future Volume (veh/h)	2	150	70	6	198	244	108	236	9	133	230	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	155	72	6	204	252	111	243	9	137	237	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	92	413	190	93	260	314	158	377	14	177	412	2
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.09	0.21	0.21	0.10	0.22	0.22
Sat Flow, veh/h	3	1194	549	6	751	909	1781	1789	66	1781	1861	8
Grp Volume(v), veh/h	229	0	0	462	0	0	111	0	252	137	0	238
Grp Sat Flow(s),veh/h/ln	1746	0	0	1667	0	0	1781	0	1855	1781	0	1869
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	0.0	2.4	0.0	5.0	3.0	0.0	4.6
Cycle Q Clear(g_c), s	4.0	0.0	0.0	10.0	0.0	0.0	2.4	0.0	5.0	3.0	0.0	4.6
Prop In Lane	0.01		0.31	0.01		0.55	1.00		0.04	1.00		0.00
Lane Grp Cap(c), veh/h	694	0	0	667	0	0	158	0	391	177	0	414
V/C Ratio(X)	0.33	0.00	0.00	0.69	0.00	0.00	0.70	0.00	0.64	0.77	0.00	0.57
Avail Cap(c_a), veh/h	921	0	0	884	0	0	311	0	884	355	0	937
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.9	0.0	0.0	11.9	0.0	0.0	17.8	0.0	14.5	17.6	0.0	13.9
Incr Delay (d2), s/veh	0.3	0.0	0.0	1.5	0.0	0.0	5.6	0.0	1.8	7.0	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	2.7	0.0	0.0	1.0	0.0	1.6	1.3	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.2	0.0	0.0	13.4	0.0	0.0	23.4	0.0	16.2	24.7	0.0	15.2
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		229			462			363			375	
Approach Delay, s/veh		10.2			13.4			18.4			18.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	13.4		18.8	7.5	13.8		18.8				
Change Period (Y+Rc), s	4.0	4.9		4.9	4.0	4.9		4.9				
Max Green Setting (Gmax), s	8.0	19.1		19.1	7.0	20.1		19.1				
Max Q Clear Time (g_c+I1), s	5.0	7.0		6.0	4.4	6.6		12.0				
Green Ext Time (p_c), s	0.1	0.9		0.9	0.1	0.9		1.6				

Intersection Summary												
HCM 6th Ctrl Delay			15.5									
HCM 6th LOS			B									

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	229	462	111	252	137	238
v/c Ratio	0.38	0.74	0.41	0.53	0.45	0.47
Control Delay	13.6	21.2	27.7	20.9	27.7	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	21.2	27.7	20.9	27.7	19.2
Queue Length 50th (ft)	41	89	31	65	38	60
Queue Length 95th (ft)	100	#242	#88	127	#105	117
Internal Link Dist (ft)	5395	1520		2614		2532
Turn Bay Length (ft)						
Base Capacity (vph)	814	817	292	836	334	882
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.57	0.38	0.30	0.41	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	184	57	5	173	191	72	226	16	164	209	6
Future Volume (veh/h)	3	184	57	5	173	191	72	226	16	164	209	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.96	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	211	66	6	199	220	83	260	18	189	240	7
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	87	428	132	88	253	274	131	381	26	243	513	15
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.07	0.22	0.22	0.14	0.28	0.28
Sat Flow, veh/h	5	1351	418	7	800	867	1781	1724	119	1781	1806	53
Grp Volume(v), veh/h	280	0	0	425	0	0	83	0	278	189	0	247
Grp Sat Flow(s),veh/h/ln	1774	0	0	1674	0	0	1781	0	1843	1781	0	1859
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	0.0	1.9	0.0	5.9	4.3	0.0	4.6
Cycle Q Clear(g_c), s	5.4	0.0	0.0	9.8	0.0	0.0	1.9	0.0	5.9	4.3	0.0	4.6
Prop In Lane	0.01		0.24	0.01		0.52	1.00		0.06	1.00		0.03
Lane Grp Cap(c), veh/h	648	0	0	616	0	0	131	0	408	243	0	528
V/C Ratio(X)	0.43	0.00	0.00	0.69	0.00	0.00	0.63	0.00	0.68	0.78	0.00	0.47
Avail Cap(c_a), veh/h	842	0	0	800	0	0	298	0	809	399	0	921
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.7	0.0	0.0	13.2	0.0	0.0	19.1	0.0	15.1	17.7	0.0	12.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	1.7	0.0	0.0	5.0	0.0	2.0	5.3	0.0	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	1.6	0.0	0.0	2.8	0.0	0.0	0.8	0.0	2.0	1.7	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.2	0.0	0.0	14.9	0.0	0.0	24.1	0.0	17.1	23.0	0.0	13.2
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		280			425			361			436	
Approach Delay, s/veh		12.2			14.9			18.7			17.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	14.3		18.3	7.1	16.9		18.3				
Change Period (Y+Rc), s	4.0	4.9		4.9	4.0	4.9		4.9				
Max Green Setting (Gmax), s	9.5	18.6		18.1	7.1	21.0		18.1				
Max Q Clear Time (g_c+I1), s	6.3	7.9		7.4	3.9	6.6		11.8				
Green Ext Time (p_c), s	0.1	1.0		1.1	0.0	1.0		1.3				

Intersection Summary												
HCM 6th Ctrl Delay			16.1									
HCM 6th LOS			B									



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	280	425	83	278	189	247
v/c Ratio	0.49	0.73	0.32	0.56	0.55	0.38
Control Delay	17.6	22.2	26.5	21.4	29.8	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	22.2	26.5	21.4	29.8	15.5
Queue Length 50th (ft)	62	89	24	75	55	61
Queue Length 95th (ft)	131	#217	63	134	#138	112
Internal Link Dist (ft)	5395	1520		2614		2532
Turn Bay Length (ft)			250		250	
Base Capacity (vph)	744	747	284	778	380	904
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.57	0.29	0.36	0.50	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Warrant 3: Peak Hour

4: Minnewawa Ave & Behymer Ave Existing Plus Proj

Intersection Information:

	Major Street	Minor Street
Street Name	Minnewawa Ave	Behymer Ave
Direction	NB/SB	EB/WB
Number of Lanes	1	1
Approach Speed	50	45

Warrant 3 Met? Yes

Details

Low Population? No

Condition A Met? No

Notes 0 Hours met (1 required)

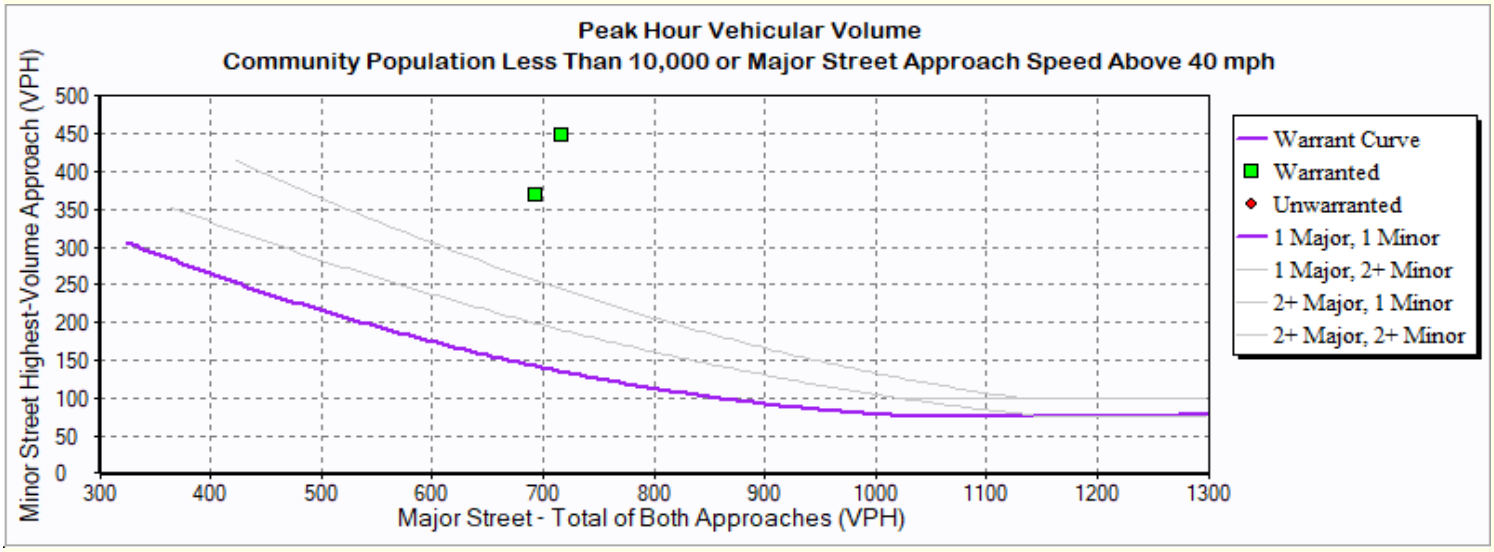
Condition B Met? Yes

Notes 2 Hours met (1 required)

Minor Approach Time Delay Condition Met? Not Met

Minor Approach Volume Condition Met? Met

Total Entering Intersection Volume Condition Met? Not Met



Warrant 3: Peak Hour

4: Minnewawa Ave & Behymer Ave Existing Plus Proj

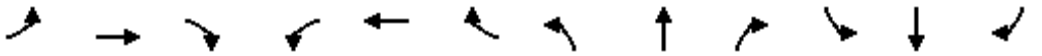
Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
7:15	717	448
17:00	693	369

Intersection	
Intersection Delay, s/veh	23.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	104	0	1	0	330	239	0	0	285	5
Future Vol, veh/h	5	0	104	0	1	0	330	239	0	0	285	5
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	120	0	1	0	379	275	0	0	328	6
Number of Lanes	0	1	0	0	1	0	0	1	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	10.1	9.7	31.1	12.6
HCM LOS	B	A	D	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	58%	5%	0%	0%
Vol Thru, %	42%	0%	100%	98%
Vol Right, %	0%	95%	0%	2%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	569	109	1	290
LT Vol	330	5	0	0
Through Vol	239	0	1	285
RT Vol	0	104	0	5
Lane Flow Rate	654	125	1	333
Geometry Grp	1	1	1	1
Degree of Util (X)	0.869	0.198	0.002	0.474
Departure Headway (Hd)	4.786	5.697	6.619	5.115
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	746	633	542	710
Service Time	2.879	3.71	4.642	3.115
HCM Lane V/C Ratio	0.877	0.197	0.002	0.469
HCM Control Delay	31.1	10.1	9.7	12.6
HCM Lane LOS	D	B	A	B
HCM 95th-tile Q	10.6	0.7	0	2.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	162	72	18	222	316	111	271	13	139	255	3
Future Volume (veh/h)	3	162	72	18	222	316	111	271	13	139	255	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.96	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	167	74	19	229	326	114	279	13	143	263	3
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	474	207	87	268	363	146	391	18	182	445	5
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.08	0.22	0.22	0.10	0.24	0.24
Sat Flow, veh/h	5	1225	535	22	691	938	1781	1769	82	1781	1845	21
Grp Volume(v), veh/h	244	0	0	574	0	0	114	0	292	143	0	266
Grp Sat Flow(s),veh/h/ln	1764	0	0	1652	0	0	1781	0	1852	1781	0	1866
Q Serve(g_s), s	0.0	0.0	0.0	4.7	0.0	0.0	3.0	0.0	7.0	3.7	0.0	6.0
Cycle Q Clear(g_c), s	4.7	0.0	0.0	15.5	0.0	0.0	3.0	0.0	7.0	3.7	0.0	6.0
Prop In Lane	0.01		0.30	0.03		0.57	1.00		0.04	1.00		0.01
Lane Grp Cap(c), veh/h	759	0	0	717	0	0	146	0	409	182	0	450
V/C Ratio(X)	0.32	0.00	0.00	0.80	0.00	0.00	0.78	0.00	0.71	0.78	0.00	0.59
Avail Cap(c_a), veh/h	820	0	0	774	0	0	224	0	781	224	0	787
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.4	0.0	0.0	13.7	0.0	0.0	21.5	0.0	17.2	20.9	0.0	16.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	5.6	0.0	0.0	9.2	0.0	2.3	13.6	0.0	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	1.3	0.0	0.0	5.1	0.0	0.0	1.4	0.0	2.5	1.9	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.6	0.0	0.0	19.3	0.0	0.0	30.7	0.0	19.5	34.5	0.0	17.2
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		244			574			406			409	
Approach Delay, s/veh		10.6			19.3			22.6			23.3	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	15.4		23.3	7.9	16.4		23.3				
Change Period (Y+Rc), s	4.0	4.9		4.9	4.0	4.9		4.9				
Max Green Setting (Gmax), s	6.0	20.1		20.1	6.0	20.1		20.1				
Max Q Clear Time (g_c+I1), s	5.7	9.0		6.7	5.0	8.0		17.5				
Green Ext Time (p_c), s	0.0	1.1		1.0	0.0	1.0		0.9				

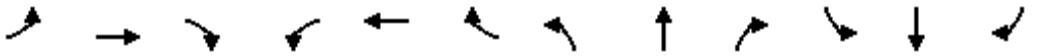
Intersection Summary												
HCM 6th Ctrl Delay			19.8									
HCM 6th LOS			B									



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	244	574	114	292	143	266
v/c Ratio	0.37	0.85	0.55	0.62	0.69	0.47
Control Delay	13.0	28.4	37.1	23.1	46.2	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.0	28.4	37.1	23.1	46.2	19.6
Queue Length 50th (ft)	44	124	35	80	45	73
Queue Length 95th (ft)	106	#336	#105	143	#136	131
Internal Link Dist (ft)	5395	1520		2614		2532
Turn Bay Length (ft)						
Base Capacity (vph)	714	722	206	725	206	728
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.80	0.55	0.40	0.69	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	643	241	228	881	186	191	265	86	199	365	141
Future Volume (veh/h)	93	643	241	228	881	186	191	265	86	199	365	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	684	239	243	937	114	203	282	82	212	388	137
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	127	953	416	292	1148	140	248	588	255	257	606	263
Arrive On Green	0.07	0.27	0.27	0.16	0.36	0.36	0.14	0.17	0.17	0.14	0.17	0.17
Sat Flow, veh/h	1781	3554	1551	1781	3182	387	1781	3554	1541	1781	3554	1542
Grp Volume(v), veh/h	99	684	239	243	523	528	203	282	82	212	388	137
Grp Sat Flow(s),veh/h/ln	1781	1777	1551	1781	1777	1792	1781	1777	1541	1781	1777	1542
Q Serve(g_s), s	3.8	12.0	9.2	9.1	18.4	18.4	7.6	5.0	3.2	8.0	7.0	5.6
Cycle Q Clear(g_c), s	3.8	12.0	9.2	9.1	18.4	18.4	7.6	5.0	3.2	8.0	7.0	5.6
Prop In Lane	1.00		1.00	1.00		0.22	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	127	953	416	292	641	646	248	588	255	257	606	263
V/C Ratio(X)	0.78	0.72	0.57	0.83	0.82	0.82	0.82	0.48	0.32	0.82	0.64	0.52
Avail Cap(c_a), veh/h	181	1129	493	419	802	808	336	1088	472	336	1088	472
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	31.5	22.9	21.8	27.9	20.0	20.0	28.8	26.1	25.4	28.6	26.6	26.0
Incr Delay (d2), s/veh	12.8	1.8	1.3	9.4	5.3	5.3	11.0	0.6	0.7	12.0	1.1	1.6
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	1.9	4.6	3.0	4.2	7.2	7.3	3.7	1.9	1.1	3.9	2.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.3	24.7	23.1	37.3	25.3	25.3	39.8	26.7	26.1	40.7	27.8	27.6
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1022			1294			567			737	
Approach Delay, s/veh		26.2			27.5			31.3			31.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	16.3	15.3	23.4	13.6	16.7	8.9	29.8
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	13.0	21.1	16.2	21.9	13.0	21.1	7.0	31.1
Max Q Clear Time (g_c+I1), s	10.0	7.0	11.1	14.0	9.6	9.0	5.8	20.4
Green Ext Time (p_c), s	0.2	1.5	0.3	3.1	0.2	2.1	0.0	4.5

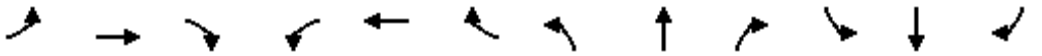
Intersection Summary	
HCM 6th Ctrl Delay	28.5
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	99	684	256	243	1135	203	282	91	212	388	150
v/c Ratio	0.64	0.75	0.49	0.75	0.84	0.75	0.44	0.22	0.77	0.60	0.36
Control Delay	59.2	34.6	13.8	48.7	30.9	52.9	32.2	1.3	54.6	35.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.2	34.6	13.8	48.7	30.9	52.9	32.2	1.3	54.6	35.1	6.5
Queue Length 50th (ft)	51	171	36	119	276	102	70	0	107	100	0
Queue Length 95th (ft)	#135	255	112	#243	#452	#224	106	2	#237	144	38
Internal Link Dist (ft)		2560			1263		2631			2555	
Turn Bay Length (ft)	250		45	250		250			255		25
Base Capacity (vph)	155	989	553	360	1360	289	939	533	289	939	533
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.69	0.46	0.68	0.83	0.70	0.30	0.17	0.73	0.41	0.28

Intersection Summary

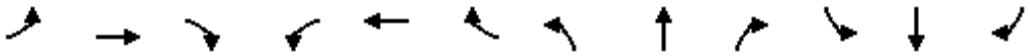
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	611	166	202	853	68	185	155	81	161	329	173
Future Volume (veh/h)	117	611	166	202	853	68	185	155	81	161	329	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	131	687	165	227	958	75	208	174	84	181	370	169
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	1219	533	344	1317	576	321	671	292	287	636	276
Arrive On Green	0.07	0.34	0.34	0.10	0.37	0.37	0.09	0.19	0.19	0.08	0.18	0.18
Sat Flow, veh/h	3456	3554	1554	3456	3554	1555	3456	3554	1544	3456	3554	1543
Grp Volume(v), veh/h	131	687	165	227	958	75	208	174	84	181	370	169
Grp Sat Flow(s),veh/h/ln	1728	1777	1554	1728	1777	1555	1728	1777	1544	1728	1777	1543
Q Serve(g_s), s	2.3	9.8	4.9	3.9	14.5	2.0	3.6	2.6	2.9	3.2	5.9	6.3
Cycle Q Clear(g_c), s	2.3	9.8	4.9	3.9	14.5	2.0	3.6	2.6	2.9	3.2	5.9	6.3
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	248	1219	533	344	1317	576	321	671	292	287	636	276
V/C Ratio(X)	0.53	0.56	0.31	0.66	0.73	0.13	0.65	0.26	0.29	0.63	0.58	0.61
Avail Cap(c_a), veh/h	499	2058	900	721	2286	1000	665	1260	547	610	1203	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	27.9	16.7	15.1	27.0	16.9	13.0	27.3	21.6	21.7	27.7	23.5	23.6
Incr Delay (d2), s/veh	1.7	0.4	0.3	2.2	0.8	0.1	2.2	0.2	0.5	2.3	0.8	2.2
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	0.9	3.3	1.4	1.5	4.8	0.6	1.4	1.0	1.0	1.3	2.3	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	17.1	15.4	29.2	17.7	13.1	29.5	21.8	22.2	29.9	24.3	25.8
LnGrp LOS	C	B	B	C	B	B	C	C	C	C	C	C
Approach Vol, veh/h		983			1260			466			720	
Approach Delay, s/veh		18.5			19.5			25.3			26.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.2	16.7	10.2	26.3	9.8	16.1	8.5	28.0
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	11.0	22.1	13.0	36.1	12.0	21.1	9.0	40.1
Max Q Clear Time (g_c+I1), s	5.2	4.9	5.9	11.8	5.6	8.3	4.3	16.5
Green Ext Time (p_c), s	0.3	1.1	0.4	4.9	0.3	2.2	0.1	6.6

Intersection Summary	
HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	131	687	187	227	958	76	208	174	91	181	370	194
v/c Ratio	0.38	0.59	0.32	0.50	0.75	0.12	0.48	0.26	0.24	0.45	0.57	0.44
Control Delay	40.8	25.3	11.4	38.9	27.1	2.1	39.4	30.4	6.6	39.8	35.1	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	25.3	11.4	38.9	27.1	2.1	39.4	30.4	6.6	39.8	35.1	8.6
Queue Length 50th (ft)	32	150	28	56	219	0	51	40	0	44	91	0
Queue Length 95th (ft)	70	233	83	107	324	14	100	77	30	90	154	55
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	399	1652	780	577	1836	854	532	1012	518	488	966	562
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.42	0.24	0.39	0.52	0.09	0.39	0.17	0.18	0.37	0.38	0.35

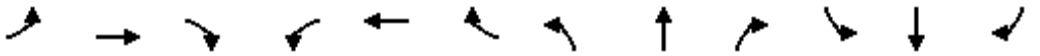
Intersection Summary

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	104	0	2	0	157	312	1	0	313	3
Future Vol, veh/h	8	0	104	0	2	0	157	312	1	0	313	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	116	0	2	0	174	347	1	0	348	3
Number of Lanes	0	1	0	0	1	0	0	1	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	9.7	9.3	17.7	12.3
HCM LOS	A	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	7%	0%	0%
Vol Thru, %	66%	0%	100%	99%
Vol Right, %	0%	93%	0%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	470	112	2	316
LT Vol	157	8	0	0
Through Vol	312	0	2	313
RT Vol	1	104	0	3
Lane Flow Rate	522	124	2	351
Geometry Grp	1	1	1	1
Degree of Util (X)	0.687	0.188	0.004	0.473
Departure Headway (Hd)	4.735	5.437	6.288	4.851
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	757	665	572	734
Service Time	2.81	3.437	4.294	2.934
HCM Lane V/C Ratio	0.69	0.186	0.003	0.478
HCM Control Delay	17.7	9.7	9.3	12.3
HCM Lane LOS	C	A	A	B
HCM 95th-tile Q	5.5	0.7	0	2.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	213	60	16	193	204	74	256	26	186	255	6
Future Volume (veh/h)	3	213	60	16	193	204	74	256	26	186	255	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.96	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	245	69	18	222	234	85	294	30	214	293	7
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	76	458	128	86	269	270	125	394	40	267	576	14
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.07	0.24	0.24	0.15	0.32	0.32
Sat Flow, veh/h	4	1397	390	26	819	824	1781	1662	170	1781	1817	43
Grp Volume(v), veh/h	317	0	0	474	0	0	85	0	324	214	0	300
Grp Sat Flow(s),veh/h/ln	1791	0	0	1669	0	0	1781	0	1832	1781	0	1861
Q Serve(g_s), s	0.0	0.0	0.0	3.7	0.0	0.0	2.3	0.0	7.9	5.6	0.0	6.4
Cycle Q Clear(g_c), s	7.0	0.0	0.0	12.9	0.0	0.0	2.3	0.0	7.9	5.6	0.0	6.4
Prop In Lane	0.01		0.22	0.04		0.49	1.00		0.09	1.00		0.02
Lane Grp Cap(c), veh/h	663	0	0	625	0	0	125	0	435	267	0	590
V/C Ratio(X)	0.48	0.00	0.00	0.76	0.00	0.00	0.68	0.00	0.75	0.80	0.00	0.51
Avail Cap(c_a), veh/h	743	0	0	699	0	0	261	0	722	331	0	806
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.3	0.0	0.0	15.2	0.0	0.0	22.0	0.0	17.1	19.9	0.0	13.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	4.3	0.0	0.0	6.3	0.0	2.6	10.8	0.0	0.7
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	2.2	0.0	0.0	4.4	0.0	0.0	1.0	0.0	2.9	2.7	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.8	0.0	0.0	19.6	0.0	0.0	28.3	0.0	19.7	30.7	0.0	14.2
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		317			474			409			514	
Approach Delay, s/veh		13.8			19.6			21.5			21.0	
Approach LOS		B			B			C			C	

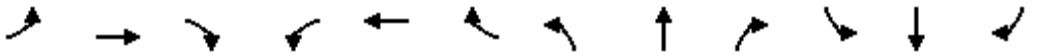
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	16.4		20.8	7.4	20.3		20.8				
Change Period (Y+Rc), s	4.0	4.9		4.9	4.0	4.9		4.9				
Max Green Setting (Gmax), s	9.0	19.1		18.1	7.1	21.0		18.1				
Max Q Clear Time (g_c+I1), s	7.6	9.9		9.0	4.3	8.4		14.9				
Green Ext Time (p_c), s	0.1	1.1		1.1	0.0	1.2		0.9				

Intersection Summary												
HCM 6th Ctrl Delay			19.4									
HCM 6th LOS			B									

Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	317	474	85	324	214	300
v/c Ratio	0.56	0.83	0.38	0.66	0.72	0.41
Control Delay	19.5	30.3	28.8	24.5	40.4	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	30.3	28.8	24.5	40.4	16.1
Queue Length 50th (ft)	76	113	26	92	68	81
Queue Length 95th (ft)	151	#267	64	155	#168	137
Internal Link Dist (ft)	5395	1520		2614		2532
Turn Bay Length (ft)						
Base Capacity (vph)	634	632	239	672	303	773
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.75	0.36	0.48	0.71	0.39

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	936	153	155	826	201	195	515	182	153	363	122
Future Volume (veh/h)	166	936	153	155	826	201	195	515	182	153	363	122
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	189	1064	162	176	939	166	222	585	201	174	412	131
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	222	1249	545	209	1035	183	255	728	315	209	635	274
Arrive On Green	0.12	0.35	0.35	0.12	0.34	0.34	0.14	0.20	0.20	0.12	0.18	0.18
Sat Flow, veh/h	1781	3554	1550	1781	3006	531	1781	3554	1539	1781	3554	1536
Grp Volume(v), veh/h	189	1064	162	176	555	550	222	585	201	174	412	131
Grp Sat Flow(s),veh/h/ln	1781	1777	1550	1781	1777	1761	1781	1777	1539	1781	1777	1536
Q Serve(g_s), s	8.8	23.6	6.4	8.2	25.3	25.4	10.4	13.3	10.2	8.1	9.2	6.5
Cycle Q Clear(g_c), s	8.8	23.6	6.4	8.2	25.3	25.4	10.4	13.3	10.2	8.1	9.2	6.5
Prop In Lane	1.00		1.00	1.00		0.30	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	222	1249	545	209	612	606	255	728	315	209	635	274
V/C Ratio(X)	0.85	0.85	0.30	0.84	0.91	0.91	0.87	0.80	0.64	0.83	0.65	0.48
Avail Cap(c_a), veh/h	222	1307	570	209	641	635	255	872	378	209	781	337
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	36.5	25.6	20.0	36.8	26.6	26.6	35.7	32.2	30.9	36.8	32.5	31.4
Incr Delay (d2), s/veh	25.9	5.4	0.3	25.3	16.3	16.5	26.0	4.6	2.6	24.1	1.3	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	9.7	2.1	4.8	12.2	12.2	6.0	5.7	3.7	4.7	3.8	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.4	31.0	20.3	62.1	42.9	43.1	61.6	36.8	33.6	60.9	33.8	32.7
LnGrp LOS	E	C	C	E	D	D	E	D	C	E	C	C
Approach Vol, veh/h		1415			1281			1008			717	
Approach Delay, s/veh		34.0			45.6			41.7			40.2	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	22.3	14.0	34.8	16.2	20.1	14.6	34.2
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	10.0	20.9	10.0	31.3	12.2	18.7	10.6	30.7
Max Q Clear Time (g_c+I1), s	10.1	15.3	10.2	25.6	12.4	11.2	10.8	27.4
Green Ext Time (p_c), s	0.0	2.0	0.0	3.3	0.0	1.7	0.0	1.9

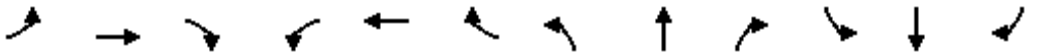
Intersection Summary	
HCM 6th Ctrl Delay	40.1
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	189	1064	174	176	1167	222	585	207	174	413	139
v/c Ratio	0.89	0.85	0.28	0.88	0.96	0.91	0.77	0.42	0.87	0.61	0.36
Control Delay	79.7	34.4	8.9	79.7	46.7	78.5	39.9	7.2	78.0	36.9	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	79.7	34.4	8.9	79.7	46.7	78.5	39.9	7.2	78.0	36.9	10.9
Queue Length 50th (ft)	108	293	21	100	333	127	161	0	99	111	9
Queue Length 95th (ft)	#224	#367	63	#212	#462	#253	214	50	#210	155	54
Internal Link Dist (ft)		2560			1263		2631			2555	
Turn Bay Length (ft)	250		45	250		250			255		25
Base Capacity (vph)	212	1257	626	200	1215	244	839	523	200	751	420
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.85	0.28	0.88	0.96	0.91	0.70	0.40	0.87	0.55	0.33

Intersection Summary

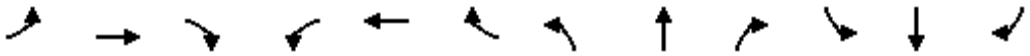
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	811	163	144	817	165	228	380	200	128	243	147
Future Volume (veh/h)	207	811	163	144	817	165	228	380	200	128	243	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	238	932	167	166	939	187	262	437	193	147	279	151
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	352	1390	609	263	1298	568	381	707	308	240	562	244
Arrive On Green	0.10	0.39	0.39	0.08	0.37	0.37	0.11	0.20	0.20	0.07	0.16	0.16
Sat Flow, veh/h	3456	3554	1556	3456	3554	1555	3456	3554	1546	3456	3554	1540
Grp Volume(v), veh/h	238	932	167	166	939	187	262	437	193	147	279	151
Grp Sat Flow(s),veh/h/ln	1728	1777	1556	1728	1777	1555	1728	1777	1546	1728	1777	1540
Q Serve(g_s), s	4.5	14.6	4.9	3.1	15.4	5.8	4.9	7.6	7.7	2.8	4.8	6.2
Cycle Q Clear(g_c), s	4.5	14.6	4.9	3.1	15.4	5.8	4.9	7.6	7.7	2.8	4.8	6.2
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	352	1390	609	263	1298	568	381	707	308	240	562	244
V/C Ratio(X)	0.68	0.67	0.27	0.63	0.72	0.33	0.69	0.62	0.63	0.61	0.50	0.62
Avail Cap(c_a), veh/h	769	2590	1134	564	2379	1041	821	1430	622	564	1166	505
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	29.2	16.9	14.0	30.2	18.4	15.4	28.9	24.6	24.7	30.5	25.9	26.5
Incr Delay (d2), s/veh	2.3	0.6	0.2	2.5	0.8	0.3	2.2	0.9	2.1	2.5	0.7	2.6
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	1.8	4.9	1.5	1.3	5.3	1.8	2.0	2.9	2.6	1.1	1.9	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.4	17.5	14.2	32.7	19.2	15.8	31.1	25.5	26.8	33.0	26.6	29.0
LnGrp LOS	C	B	B	C	B	B	C	C	C	C	C	C
Approach Vol, veh/h		1337			1292			892			577	
Approach Delay, s/veh		19.6			20.4			27.4			28.8	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	18.3	9.1	31.3	11.4	15.6	10.9	29.5
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	11.0	27.1	11.0	49.1	16.0	22.1	15.0	45.1
Max Q Clear Time (g_c+I1), s	4.8	9.7	5.1	16.6	6.9	8.2	6.5	17.4
Green Ext Time (p_c), s	0.2	3.0	0.2	7.4	0.6	1.8	0.5	7.3

Intersection Summary	
HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	238	932	187	166	939	190	262	437	230	147	279	169
v/c Ratio	0.53	0.69	0.28	0.45	0.74	0.28	0.56	0.61	0.54	0.42	0.47	0.43
Control Delay	44.1	26.6	8.1	45.9	29.8	4.5	43.8	38.2	18.9	45.6	38.8	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	26.6	8.1	45.9	29.8	4.5	43.8	38.2	18.9	45.6	38.8	9.8
Queue Length 50th (ft)	64	225	20	45	236	0	71	118	40	40	75	0
Queue Length 95th (ft)	124	331	65	93	356	41	133	195	120	84	135	53
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	597	2017	937	438	1852	899	637	1113	585	438	908	520
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.46	0.20	0.38	0.51	0.21	0.41	0.39	0.39	0.34	0.31	0.33

Intersection Summary

Warrant 3: Peak Hour

4: Minnewawa Ave & Behymer Ave - Near-Term W Proj

Intersection Information:

	Major Street	Minor Street
Street Name	Minnewawa Ave	Behymer Ave
Direction	NB/SB	EB/WB
Number of Lanes	1	1
Approach Speed	50	45

Warrant 3 Met? Yes

Details

Low Population? No

Condition A Met? No

Notes 0 Hours met (1 required)

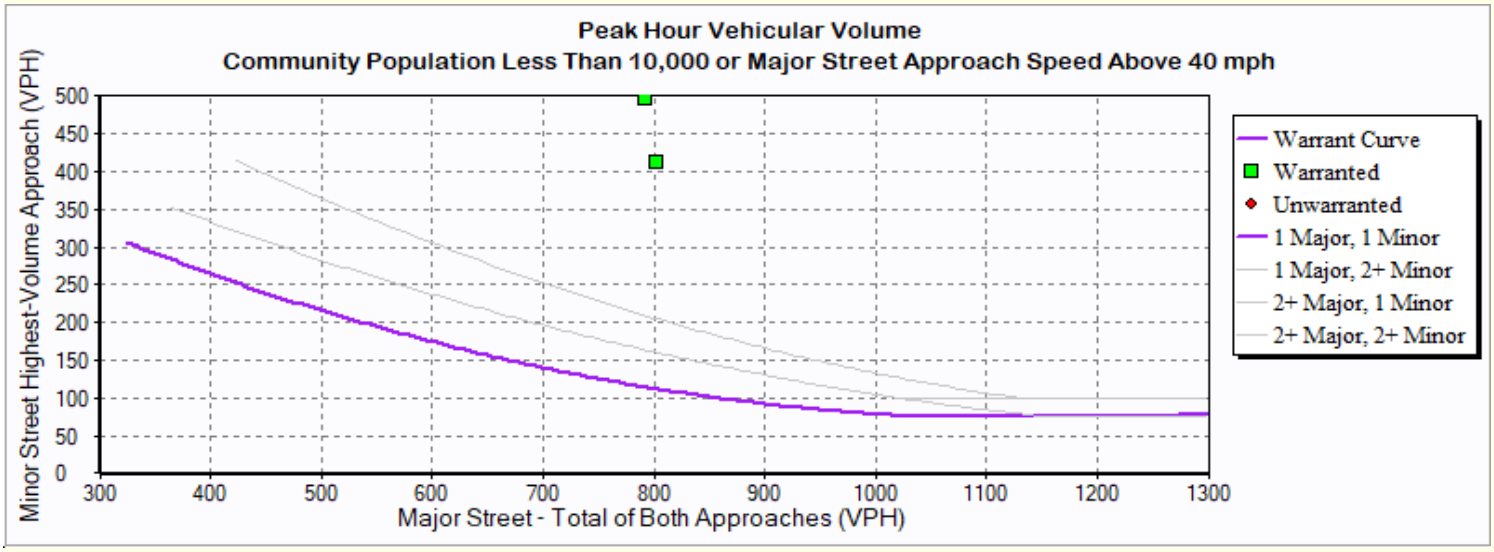
Condition B Met? Yes

Notes 2 Hours met (1 required)

Minor Approach Time Delay Condition Met? Not Met

Minor Approach Volume Condition Met? Met

Total Entering Intersection Volume Condition Met? Not Met



Warrant 3: Peak Hour

4: Minnewawa Ave & Behymer Ave - Near-Term W Proj

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
7:15	792	556
17:00	803	413

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	2	149	1	1	1	450	269	6	1	338	29
Future Volume (veh/h)	5	2	149	1	1	1	450	269	6	1	338	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.94	1.00		0.97	1.00		0.96
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	2	113	1	1	1	489	292	7	1	367	22
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	7	171	132	98	65	574	1081	26	4	477	29
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.32	0.59	0.59	0.00	0.27	0.27
Sat Flow, veh/h	32	58	1449	277	830	554	1781	1818	44	1781	1743	104
Grp Volume(v), veh/h	120	0	0	3	0	0	489	0	299	1	0	389
Grp Sat Flow(s),veh/h/ln	1539	0	0	1661	0	0	1781	0	1861	1781	0	1847
Q Serve(g_s), s	0.7	0.0	0.0	0.0	0.0	0.0	12.4	0.0	3.7	0.0	0.0	9.4
Cycle Q Clear(g_c), s	3.6	0.0	0.0	0.1	0.0	0.0	12.4	0.0	3.7	0.0	0.0	9.4
Prop In Lane	0.04		0.94	0.33		0.33	1.00		0.02	1.00		0.06
Lane Grp Cap(c), veh/h	260	0	0	296	0	0	574	0	1107	4	0	505
V/C Ratio(X)	0.46	0.00	0.00	0.01	0.00	0.00	0.85	0.00	0.27	0.27	0.00	0.77
Avail Cap(c_a), veh/h	649	0	0	679	0	0	959	0	1630	218	0	849
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	0.0	18.8	0.0	0.0	15.3	0.0	4.7	24.1	0.0	16.1
Incr Delay (d2), s/veh	1.3	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.1	35.4	0.0	2.5
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	1.1	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.6	0.0	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	0.0	0.0	18.8	0.0	0.0	19.2	0.0	4.9	59.5	0.0	18.7
LnGrp LOS	C	A	A	B	A	A	B	A	A	E	A	B
Approach Vol, veh/h		120			3			788			390	
Approach Delay, s/veh		21.6			18.8			13.8			18.8	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.1	33.6		10.6	19.6	18.1		10.6				
Change Period (Y+Rc), s	4.0	4.9		4.9	4.0	4.9		4.9				
Max Green Setting (Gmax), s	5.9	42.3		18.0	26.0	22.2		18.0				
Max Q Clear Time (g_c+I1), s	2.0	5.7		5.6	14.4	11.4		2.1				
Green Ext Time (p_c), s	0.0	1.6		0.4	1.2	1.5		0.0				

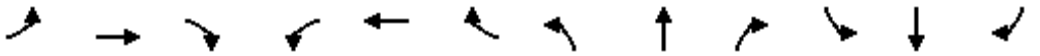
Intersection Summary												
HCM 6th Ctrl Delay			16.0									
HCM 6th LOS			B									



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	169	3	489	299	1	399
v/c Ratio	0.52	0.02	0.77	0.23	0.01	0.73
Control Delay	12.4	24.3	28.7	4.9	31.0	29.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	24.3	28.7	4.9	31.0	29.4
Queue Length 50th (ft)	3	1	155	24	0	132
Queue Length 95th (ft)	53	8	#344	102	5	#260
Internal Link Dist (ft)	1204	1166		2532		1799
Turn Bay Length (ft)						
Base Capacity (vph)	586	454	769	1398	174	684
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.01	0.64	0.21	0.01	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	188	98	61	529	390	133	290	14	169	594	11
Future Volume (veh/h)	3	188	98	61	529	390	133	290	14	169	594	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	194	71	63	545	281	137	299	14	174	612	11
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	358	131	84	596	495	170	597	28	212	661	12
Arrive On Green	0.00	0.28	0.28	0.05	0.32	0.32	0.10	0.34	0.34	0.12	0.36	0.36
Sat Flow, veh/h	1781	1298	475	1781	1870	1553	1781	1769	83	1781	1830	33
Grp Volume(v), veh/h	3	0	265	63	545	281	137	0	313	174	0	623
Grp Sat Flow(s),veh/h/ln	1781	0	1773	1781	1870	1553	1781	0	1852	1781	0	1863
Q Serve(g_s), s	0.1	0.0	10.3	2.8	22.6	12.1	6.1	0.0	10.9	7.7	0.0	25.9
Cycle Q Clear(g_c), s	0.1	0.0	10.3	2.8	22.6	12.1	6.1	0.0	10.9	7.7	0.0	25.9
Prop In Lane	1.00		0.27	1.00		1.00	1.00		0.04	1.00		0.02
Lane Grp Cap(c), veh/h	7	0	489	84	596	495	170	0	625	212	0	673
V/C Ratio(X)	0.42	0.00	0.54	0.75	0.91	0.57	0.81	0.00	0.50	0.82	0.00	0.93
Avail Cap(c_a), veh/h	130	0	556	170	629	522	172	0	625	274	0	726
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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.0	0.0	24.9	37.9	26.4	22.8	35.7	0.0	21.3	34.7	0.0	24.7
Incr Delay (d2), s/veh	34.4	0.0	0.9	12.8	17.6	1.3	23.4	0.0	0.6	14.1	0.0	17.2
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	0.1	0.0	4.1	1.5	11.9	4.2	3.5	0.0	4.3	3.9	0.0	13.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.4	0.0	25.8	50.7	44.0	24.2	59.1	0.0	21.9	48.8	0.0	41.9
LnGrp LOS	E	A	C	D	D	C	E	A	C	D	A	D
Approach Vol, veh/h		268			889			450			797	
Approach Delay, s/veh		26.3			38.2			33.2			43.4	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.6	32.1	7.8	27.1	11.7	34.0	4.3	30.6
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	12.4	26.8	7.7	25.3	7.8	31.4	5.9	27.1
Max Q Clear Time (g_c+I1), s	9.7	12.9	4.8	12.3	8.1	27.9	2.1	24.6
Green Ext Time (p_c), s	0.1	1.3	0.0	1.1	0.0	1.2	0.0	1.1

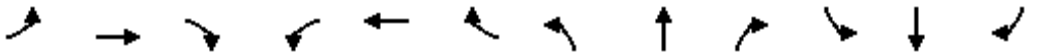
Intersection Summary	
HCM 6th Ctrl Delay	37.7
HCM 6th LOS	D



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	3	295	63	545	402	137	313	174	623
v/c Ratio	0.02	0.62	0.41	0.84	0.50	0.82	0.52	0.71	0.91
Control Delay	39.0	32.0	45.9	40.1	5.0	75.4	27.2	52.2	45.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	32.0	45.9	40.1	5.0	75.4	27.2	52.2	45.1
Queue Length 50th (ft)	2	129	31	252	0	71	129	86	293
Queue Length 95th (ft)	10	213	75	#512	65	#187	233	#189	#566
Internal Link Dist (ft)		5395		1520			2614		2532
Turn Bay Length (ft)									
Base Capacity (vph)	126	565	165	646	799	167	606	266	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.52	0.38	0.84	0.50	0.82	0.52	0.65	0.88

Intersection Summary

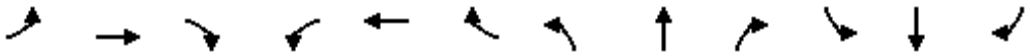
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	710	364	228	881	200	218	318	101	355	912	147
Future Volume (veh/h)	97	710	364	228	881	200	218	318	101	355	912	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	755	309	243	937	129	232	338	86	378	970	125
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	123	798	347	265	1082	473	253	727	316	400	1019	445
Arrive On Green	0.07	0.22	0.22	0.15	0.30	0.30	0.14	0.20	0.20	0.22	0.29	0.29
Sat Flow, veh/h	1781	3554	1548	1781	3554	1553	1781	3554	1546	1781	3554	1552
Grp Volume(v), veh/h	103	755	309	243	937	129	232	338	86	378	970	125
Grp Sat Flow(s),veh/h/ln	1781	1777	1548	1781	1777	1553	1781	1777	1546	1781	1777	1552
Q Serve(g_s), s	5.1	18.8	17.4	12.1	22.4	5.7	11.6	7.5	4.2	18.8	24.1	5.6
Cycle Q Clear(g_c), s	5.1	18.8	17.4	12.1	22.4	5.7	11.6	7.5	4.2	18.8	24.1	5.6
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	123	798	347	265	1082	473	253	727	316	400	1019	445
V/C Ratio(X)	0.84	0.95	0.89	0.92	0.87	0.27	0.92	0.47	0.27	0.95	0.95	0.28
Avail Cap(c_a), veh/h	123	798	347	265	1082	473	253	727	316	400	1019	445
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	34.4	33.8	37.7	29.6	23.7	38.1	31.5	30.2	34.4	31.5	24.9
Incr Delay (d2), s/veh	37.7	20.0	23.4	33.9	7.6	0.3	34.9	0.5	0.5	31.3	17.8	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	3.4	9.7	8.3	7.4	9.8	2.0	7.2	3.1	1.5	11.0	11.9	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.1	54.4	57.2	71.7	37.1	24.1	73.0	31.9	30.6	65.7	49.3	25.2
LnGrp LOS	E	D	E	E	D	C	E	C	C	E	D	C
Approach Vol, veh/h		1167			1309			656			1473	
Approach Delay, s/veh		57.3			42.2			46.3			51.5	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.2	23.3	17.4	25.1	16.8	30.7	10.2	32.3
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	20.2	18.4	13.4	20.2	12.8	25.8	6.2	27.4
Max Q Clear Time (g_c+I1), s	20.8	9.5	14.1	20.8	13.6	26.1	7.1	24.4
Green Ext Time (p_c), s	0.0	1.4	0.0	0.0	0.0	0.0	0.0	1.7

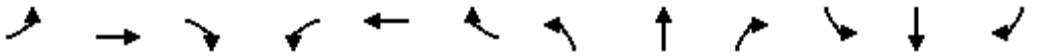
Intersection Summary	
HCM 6th Ctrl Delay	49.6
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	103	755	387	243	937	213	232	338	107	378	970	156
v/c Ratio	0.85	0.95	0.75	0.92	0.87	0.34	0.92	0.47	0.22	0.95	0.96	0.28
Control Delay	93.4	57.6	24.5	78.9	40.0	5.2	80.6	34.0	1.0	71.0	52.2	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	93.4	57.6	24.5	78.9	40.0	5.2	80.6	34.0	1.0	71.0	52.2	4.9
Queue Length 50th (ft)	59	223	88	138	263	0	132	89	0	213	284	0
Queue Length 95th (ft)	#152	#339	#225	#279	#372	49	#269	132	0	#386	#413	38
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	121	794	515	263	1077	619	251	723	488	397	1014	563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.95	0.75	0.92	0.87	0.34	0.92	0.47	0.22	0.95	0.96	0.28

Intersection Summary

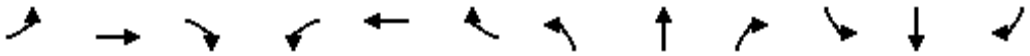
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	735	218	325	853	183	206	212	175	203	639	320
Future Volume (veh/h)	120	735	218	325	853	183	206	212	175	203	639	320
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	130	799	189	353	927	159	224	230	152	221	695	278
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	205	1040	454	458	1301	569	314	941	410	312	939	410
Arrive On Green	0.06	0.29	0.29	0.13	0.37	0.37	0.09	0.26	0.26	0.09	0.26	0.26
Sat Flow, veh/h	3456	3554	1552	3456	3554	1555	3456	3554	1551	3456	3554	1551
Grp Volume(v), veh/h	130	799	189	353	927	159	224	230	152	221	695	278
Grp Sat Flow(s),veh/h/ln	1728	1777	1552	1728	1777	1555	1728	1777	1551	1728	1777	1551
Q Serve(g_s), s	3.0	16.6	7.9	8.0	18.1	5.9	5.1	4.1	6.5	5.0	14.5	13.0
Cycle Q Clear(g_c), s	3.0	16.6	7.9	8.0	18.1	5.9	5.1	4.1	6.5	5.0	14.5	13.0
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	205	1040	454	458	1301	569	314	941	410	312	939	410
V/C Ratio(X)	0.63	0.77	0.42	0.77	0.71	0.28	0.71	0.24	0.37	0.71	0.74	0.68
Avail Cap(c_a), veh/h	371	1539	672	767	1947	852	512	1416	618	546	1451	633
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	37.3	26.1	23.1	34.0	22.0	18.1	35.8	23.4	24.3	35.8	27.3	26.7
Incr Delay (d2), s/veh	3.2	1.4	0.6	2.8	0.7	0.3	3.0	0.1	0.6	3.0	1.2	2.0
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	1.3	6.5	2.7	3.3	6.7	1.9	2.2	1.6	2.2	2.1	5.8	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.5	27.5	23.7	36.7	22.8	18.4	38.8	23.6	24.8	38.8	28.4	28.7
LnGrp LOS	D	C	C	D	C	B	D	C	C	D	C	C
Approach Vol, veh/h		1118			1439			606			1194	
Approach Delay, s/veh		28.4			25.7			29.5			30.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	26.4	14.7	28.6	11.4	26.3	8.8	34.6
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	12.8	32.3	18.0	35.1	12.0	33.1	8.7	44.4
Max Q Clear Time (g_c+I1), s	7.0	8.5	10.0	18.6	7.1	16.5	5.0	20.1
Green Ext Time (p_c), s	0.3	1.8	0.8	5.1	0.3	4.9	0.1	6.8

Intersection Summary	
HCM 6th Ctrl Delay	28.2
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	130	799	237	353	927	199	224	230	190	221	695	348
v/c Ratio	0.46	0.78	0.44	0.68	0.73	0.29	0.60	0.25	0.35	0.58	0.74	0.63
Control Delay	53.6	39.7	16.8	49.5	32.3	4.6	52.7	31.1	6.6	51.5	39.7	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	39.7	16.8	49.5	32.3	4.6	52.7	31.1	6.6	51.5	39.7	20.4
Queue Length 50th (ft)	44	258	54	118	280	0	75	64	0	74	225	88
Queue Length 95th (ft)	81	356	132	180	375	47	125	104	54	123	311	198
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	306	1276	640	634	1614	813	423	1174	638	451	1203	652
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.63	0.37	0.56	0.57	0.24	0.53	0.20	0.30	0.49	0.58	0.53

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	2	164	1	2	1	188	360	37	1	355	30
Future Volume (veh/h)	70	2	164	1	2	1	188	360	37	1	355	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.96	1.00		0.97	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	76	2	178	1	2	1	204	391	40	1	386	33
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	189	29	240	158	241	97	262	735	75	4	502	43
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.15	0.44	0.44	0.00	0.30	0.30
Sat Flow, veh/h	339	128	1066	220	1070	430	1781	1663	170	1781	1693	145
Grp Volume(v), veh/h	256	0	0	4	0	0	204	0	431	1	0	419
Grp Sat Flow(s),veh/h/ln	1534	0	0	1720	0	0	1781	0	1834	1781	0	1838
Q Serve(g_s), s	4.2	0.0	0.0	0.0	0.0	0.0	4.6	0.0	7.1	0.0	0.0	8.6
Cycle Q Clear(g_c), s	6.4	0.0	0.0	0.1	0.0	0.0	4.6	0.0	7.1	0.0	0.0	8.6
Prop In Lane	0.30		0.70	0.25		0.25	1.00		0.09	1.00		0.08
Lane Grp Cap(c), veh/h	457	0	0	495	0	0	262	0	810	4	0	545
V/C Ratio(X)	0.56	0.00	0.00	0.01	0.00	0.00	0.78	0.00	0.53	0.23	0.00	0.77
Avail Cap(c_a), veh/h	769	0	0	820	0	0	428	0	983	253	0	804
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	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	0.0	12.5	0.0	0.0	17.1	0.0	8.5	20.7	0.0	13.3
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.5	25.8	0.0	2.7
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	1.7	0.0	0.0	0.0	0.0	0.0	1.8	0.0	1.6	0.0	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.0	0.0	0.0	12.5	0.0	0.0	22.1	0.0	9.0	46.5	0.0	16.0
LnGrp LOS	B	A	A	B	A	A	C	A	A	D	A	B
Approach Vol, veh/h		256			4			635			420	
Approach Delay, s/veh		16.0			12.5			13.2			16.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.1	23.3		14.3	10.1	17.2		14.3				
Change Period (Y+Rc), s	4.0	4.9		4.9	4.0	4.9		4.9				
Max Green Setting (Gmax), s	5.9	22.3		18.0	10.0	18.2		18.0				
Max Q Clear Time (g_c+I1), s	2.0	9.1		8.4	6.6	10.6		2.1				
Green Ext Time (p_c), s	0.0	1.9		0.9	0.2	1.3		0.0				

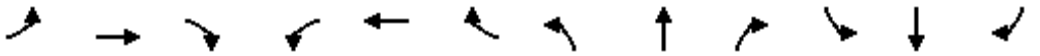
Intersection Summary												
HCM 6th Ctrl Delay			14.7									
HCM 6th LOS			B									



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	256	4	204	431	1	419
v/c Ratio	0.61	0.01	0.58	0.41	0.00	0.72
Control Delay	13.4	15.0	28.1	9.1	22.0	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	15.0	28.1	9.1	22.0	23.3
Queue Length 50th (ft)	19	1	51	46	0	96
Queue Length 95th (ft)	74	7	#145	189	4	#237
Internal Link Dist (ft)	1204	1166		2532		1799
Turn Bay Length (ft)						
Base Capacity (vph)	690	650	384	1055	226	729
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.01	0.53	0.41	0.00	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	377	109	22	222	245	154	442	30	216	270	7
Future Volume (veh/h)	14	377	109	22	222	245	154	442	30	216	270	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	15	410	94	24	241	213	167	480	26	235	293	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	31	446	102	46	584	485	204	523	28	273	614	13
Arrive On Green	0.02	0.30	0.30	0.03	0.31	0.31	0.11	0.30	0.30	0.15	0.34	0.34
Sat Flow, veh/h	1781	1466	336	1781	1870	1553	1781	1754	95	1781	1825	37
Grp Volume(v), veh/h	15	0	504	24	241	213	167	0	506	235	0	299
Grp Sat Flow(s),veh/h/ln	1781	0	1802	1781	1870	1553	1781	0	1849	1781	0	1862
Q Serve(g_s), s	0.7	0.0	22.0	1.1	8.3	8.9	7.5	0.0	21.5	10.5	0.0	10.3
Cycle Q Clear(g_c), s	0.7	0.0	22.0	1.1	8.3	8.9	7.5	0.0	21.5	10.5	0.0	10.3
Prop In Lane	1.00		0.19	1.00		1.00	1.00		0.05	1.00		0.02
Lane Grp Cap(c), veh/h	31	0	548	46	584	485	204	0	551	273	0	627
V/C Ratio(X)	0.48	0.00	0.92	0.52	0.41	0.44	0.82	0.00	0.92	0.86	0.00	0.48
Avail Cap(c_a), veh/h	131	0	591	131	613	509	267	0	593	293	0	627
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	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.6	0.0	27.3	39.2	22.1	22.3	35.2	0.0	27.6	33.6	0.0	21.3
Incr Delay (d2), s/veh	10.8	0.0	18.9	9.0	0.5	0.6	13.9	0.0	18.7	21.0	0.0	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	0.4	0.0	11.4	0.6	3.4	3.0	3.8	0.0	11.3	5.8	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.4	0.0	46.2	48.1	22.6	22.9	49.1	0.0	46.4	54.6	0.0	21.9
LnGrp LOS	D	A	D	D	C	C	D	A	D	D	A	C
Approach Vol, veh/h		519			478			673			534	
Approach Delay, s/veh		46.3			24.0			47.0			36.3	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.5	29.2	6.1	29.7	13.3	32.3	5.4	30.3
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	13.4	26.1	6.0	26.7	12.2	27.3	6.0	26.7
Max Q Clear Time (g_c+I1), s	12.5	23.5	3.1	24.0	9.5	12.3	2.7	10.9
Green Ext Time (p_c), s	0.1	0.7	0.0	0.8	0.1	1.3	0.0	1.7

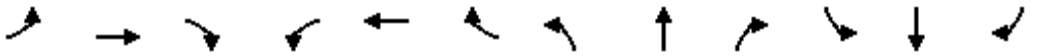
Intersection Summary	
HCM 6th Ctrl Delay	39.3
HCM 6th LOS	D



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	528	24	241	266	167	513	235	301
v/c Ratio	0.12	0.90	0.19	0.38	0.38	0.70	0.90	0.83	0.49
Control Delay	41.1	48.8	42.5	23.5	4.7	52.2	50.0	61.2	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	48.8	42.5	23.5	4.7	52.2	50.0	61.2	26.5
Queue Length 50th (ft)	7	238	12	91	0	79	235	114	116
Queue Length 95th (ft)	28	#498	38	180	55	#181	#487	#267	222
Internal Link Dist (ft)		5395		1520			2614		2532
Turn Bay Length (ft)									
Base Capacity (vph)	128	589	128	642	708	260	583	286	617
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.90	0.19	0.38	0.38	0.64	0.88	0.82	0.49

Intersection Summary

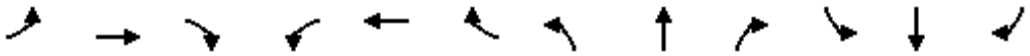
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	1141	218	155	934	211	313	707	182	179	521	127
Future Volume (veh/h)	173	1141	218	155	934	211	313	707	182	179	521	127
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	188	1240	190	168	1015	183	340	768	159	195	566	111
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	1228	536	180	1171	511	345	900	391	215	642	278
Arrive On Green	0.12	0.35	0.35	0.10	0.33	0.33	0.19	0.25	0.25	0.12	0.18	0.18
Sat Flow, veh/h	1781	3554	1550	1781	3554	1549	1781	3554	1544	1781	3554	1536
Grp Volume(v), veh/h	188	1240	190	168	1015	183	340	768	159	195	566	111
Grp Sat Flow(s),veh/h/ln	1781	1777	1550	1781	1777	1549	1781	1777	1544	1781	1777	1536
Q Serve(g_s), s	10.3	34.3	9.1	9.3	26.6	8.9	18.9	20.4	8.5	10.7	15.4	6.3
Cycle Q Clear(g_c), s	10.3	34.3	9.1	9.3	26.6	8.9	18.9	20.4	8.5	10.7	15.4	6.3
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	208	1228	536	180	1171	511	345	900	391	215	642	278
V/C Ratio(X)	0.90	1.01	0.35	0.94	0.87	0.36	0.99	0.85	0.41	0.91	0.88	0.40
Avail Cap(c_a), veh/h	208	1228	536	180	1171	511	345	928	403	215	670	289
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	43.3	32.5	24.2	44.3	31.2	25.3	39.9	35.3	30.8	43.1	39.6	35.9
Incr Delay (d2), s/veh	36.9	28.0	0.4	48.9	7.1	0.4	44.7	7.6	0.7	36.6	12.7	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	6.5	18.2	3.1	6.3	11.6	3.1	12.0	9.2	3.0	6.7	7.5	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	80.2	60.5	24.6	93.2	38.3	25.7	84.6	42.9	31.5	79.6	52.3	36.8
LnGrp LOS	F	F	C	F	D	C	F	D	C	E	D	D
Approach Vol, veh/h		1618			1366			1267			872	
Approach Delay, s/veh		58.6			43.4			52.7			56.5	
Approach LOS		E			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	30.0	14.0	39.2	23.2	22.8	15.6	37.6
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	12.0	25.9	10.0	34.3	19.2	18.7	11.6	32.7
Max Q Clear Time (g_c+I1), s	12.7	22.4	11.3	36.3	20.9	17.4	12.3	28.6
Green Ext Time (p_c), s	0.0	1.7	0.0	0.0	0.0	0.5	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	52.7
HCM 6th LOS	D

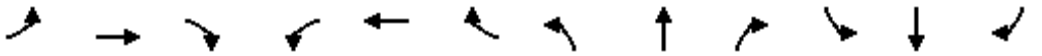


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	188	1240	237	168	1015	229	340	768	198	195	566	138
v/c Ratio	0.91	1.02	0.38	0.94	0.87	0.36	1.00	0.85	0.37	0.92	0.87	0.34
Control Delay	88.7	63.5	11.1	101.0	41.3	6.6	90.0	45.6	6.4	88.1	55.4	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.7	63.5	11.1	101.0	41.3	6.6	90.0	45.6	6.4	88.1	55.4	7.3
Queue Length 50th (ft)	120	~444	37	108	318	10	~219	244	0	125	185	0
Queue Length 95th (ft)	#251	#577	98	#237	#433	62	#400	#336	53	#259	#273	42
Internal Link Dist (ft)		2560			1263			2631			2555	
Turn Bay Length (ft)	250		45	250		200	250			255		25
Base Capacity (vph)	206	1219	630	178	1163	644	341	921	547	213	664	411
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	1.02	0.38	0.94	0.87	0.36	1.00	0.83	0.36	0.92	0.85	0.34

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

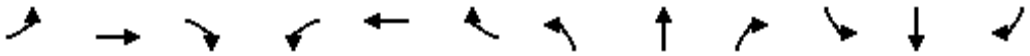
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	921	170	291	934	202	234	724	374	170	306	187
Future Volume (veh/h)	224	921	170	291	934	202	234	724	374	170	306	187
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	243	1001	148	316	1015	177	254	787	325	185	333	163
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	320	1205	527	398	1286	562	335	1001	437	257	920	401
Arrive On Green	0.09	0.34	0.34	0.12	0.36	0.36	0.10	0.28	0.28	0.07	0.26	0.26
Sat Flow, veh/h	3456	3554	1554	3456	3554	1555	3456	3554	1552	3456	3554	1550
Grp Volume(v), veh/h	243	1001	148	316	1015	177	254	787	325	185	333	163
Grp Sat Flow(s),veh/h/ln	1728	1777	1554	1728	1777	1555	1728	1777	1552	1728	1777	1550
Q Serve(g_s), s	6.4	24.3	6.5	8.4	23.9	7.7	6.7	19.2	17.9	4.9	7.2	8.2
Cycle Q Clear(g_c), s	6.4	24.3	6.5	8.4	23.9	7.7	6.7	19.2	17.9	4.9	7.2	8.2
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	320	1205	527	398	1286	562	335	1001	437	257	920	401
V/C Ratio(X)	0.76	0.83	0.28	0.79	0.79	0.31	0.76	0.79	0.74	0.72	0.36	0.41
Avail Cap(c_a), veh/h	442	1482	648	553	1595	698	527	1330	581	332	1129	493
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	41.5	28.5	22.6	40.4	26.7	21.6	41.3	31.1	30.6	42.5	28.4	28.8
Incr Delay (d2), s/veh	5.0	3.4	0.3	5.4	2.2	0.3	3.5	2.3	3.6	5.3	0.2	0.7
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	2.8	9.9	2.2	3.6	9.5	2.6	2.9	8.0	6.6	2.2	2.9	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.5	32.0	22.9	45.8	28.9	21.9	44.8	33.4	34.2	47.8	28.7	29.4
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		1392			1508			1366			681	
Approach Delay, s/veh		33.5			31.6			35.7			34.0	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	31.3	14.8	36.7	13.1	29.2	12.7	38.8
Change Period (Y+Rc), s	4.0	4.9	4.0	4.9	4.0	4.9	4.0	4.9
Max Green Setting (Gmax), s	9.0	35.1	15.0	39.1	14.3	29.8	12.0	42.1
Max Q Clear Time (g_c+I1), s	6.9	21.2	10.4	26.3	8.7	10.2	8.4	25.9
Green Ext Time (p_c), s	0.1	5.2	0.5	5.5	0.4	2.4	0.3	6.4

Intersection Summary	
HCM 6th Ctrl Delay	33.6
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	243	1001	185	316	1015	220	254	787	407	185	333	203
v/c Ratio	0.67	0.85	0.31	0.72	0.81	0.32	0.63	0.77	0.73	0.65	0.37	0.38
Control Delay	57.7	42.2	10.8	56.0	37.6	4.9	53.8	41.2	29.8	61.1	35.2	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.7	42.2	10.8	56.0	37.6	4.9	53.8	41.2	29.8	61.1	35.2	6.9
Queue Length 50th (ft)	91	357	27	117	348	1	93	277	168	70	107	0
Queue Length 95th (ft)	135	448	82	167	437	52	137	350	289	#117	151	58
Internal Link Dist (ft)		1234			1233			1070			873	
Turn Bay Length (ft)	250		50	250		255	235		65	255		100
Base Capacity (vph)	393	1320	658	491	1422	751	468	1185	621	295	1006	584
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.76	0.28	0.64	0.71	0.29	0.54	0.66	0.66	0.63	0.33	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Warrant 3: Peak Hour

2: Minnewawa Ave & International Ave - 2045 W Proj

Intersection Information:

	Major Street	Minor Street
Street Name	Minnewawa Ave	International Ave
Direction	NB/SB	EB/WB
Number of Lanes	1	1
Approach Speed	50	50

Warrant 3 Met? **Yes**

Details

Low Population? No

Condition A Met? No

Notes 0 Hours met (1 required)

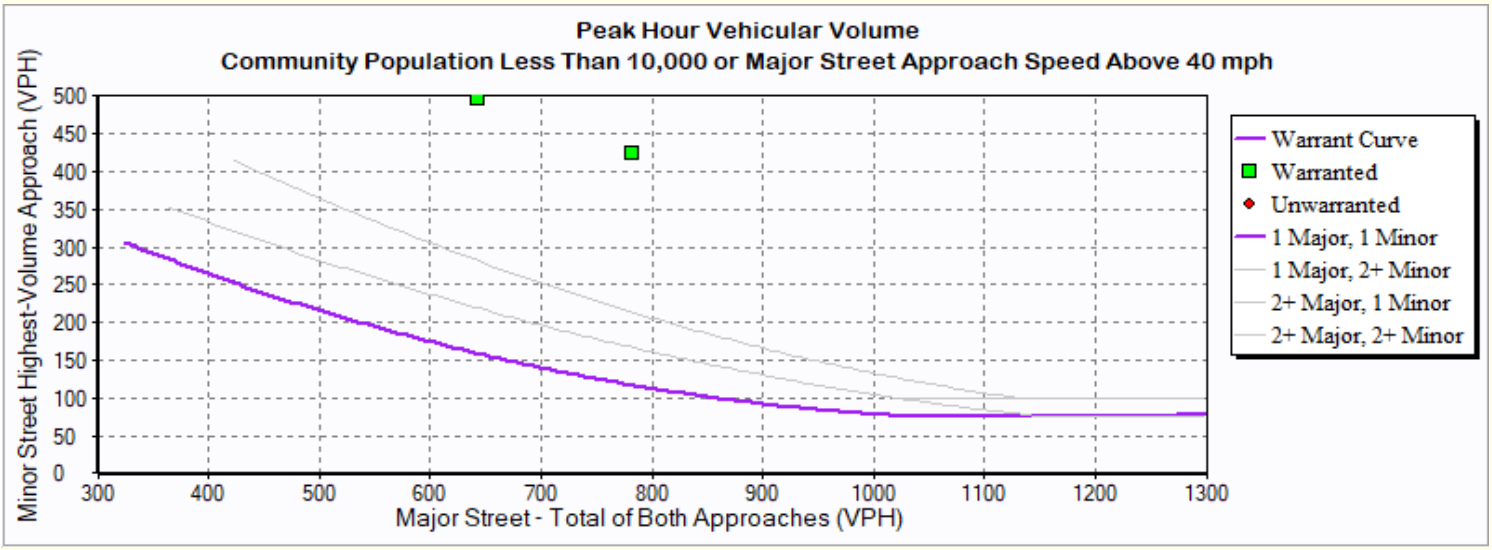
Condition B Met? Yes

Notes 2 Hours met (1 required)

Minor Approach Time Delay Condition Met? Not Met

Minor Approach Volume Condition Met? Met

Total Entering Intersection Volume Condition Met? Not Met



Warrant 3: Peak Hour

2: Minnewawa Ave & International Ave - 2045 W Proj

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
7:30	643	606
17:00	783	424

Warrant 3: Peak Hour

4: Minnewawa Ave & Behymer Ave - 2045 W Proj

Intersection Information:

	Major Street	Minor Street
Street Name	Minnewawa Ave	Behymer Ave
Direction	NB/SB	EB/WB
Number of Lanes	1	1
Approach Speed	50	45

Warrant 3 Met? Yes

Details

Low Population? No

Condition A Met? No

Notes 0 Hours met (1 required)

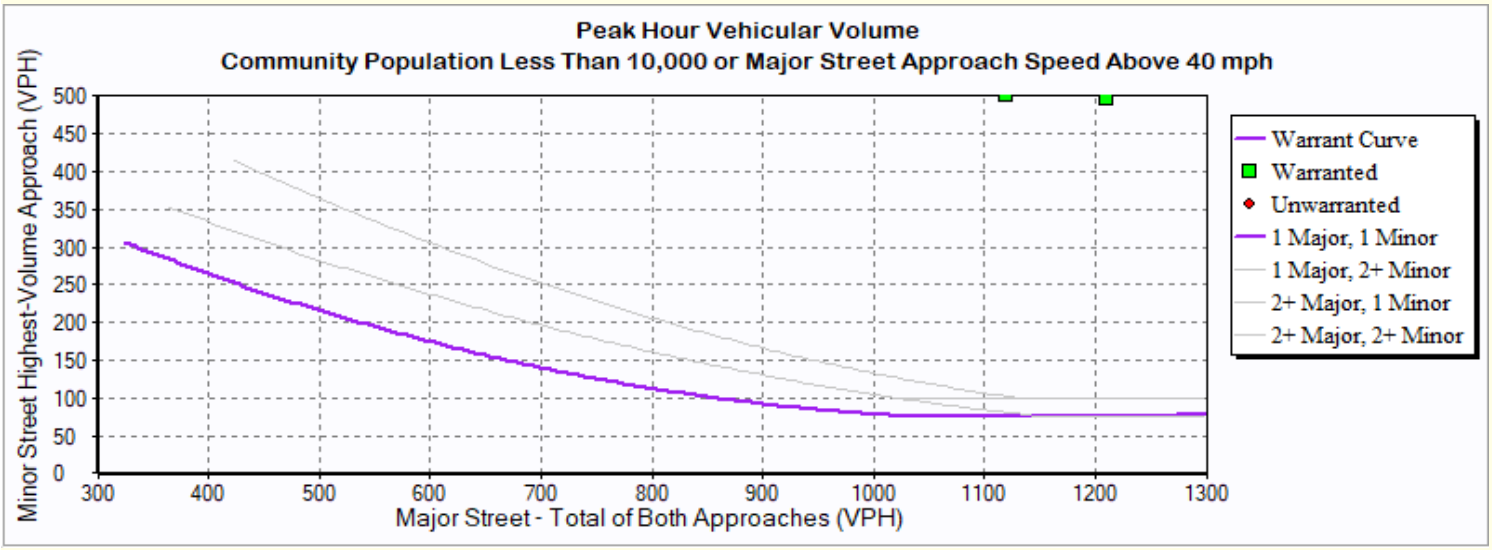
Condition B Met? Yes

Notes 2 Hours met (1 required)

Minor Approach Time Delay Condition Met? Not Met

Minor Approach Volume Condition Met? Met

Total Entering Intersection Volume Condition Met? Not Met



Warrant 3: Peak Hour

4: Minnewawa Ave & Behymer Ave - 2045 W Proj

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
7:15	1,211	980
17:00	1,119	500