Ritchie Ranch Residential Development

Traffic Impact Study
July 25, 2025

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

Ritchie Ranch Residential Development
Traffic Impact Study

Study Team

- ✓ Georgiena Vivian, President, VRPA Technologies, Inc., gvivian@vrpatechnologies.com, (559) 259-9257
- ✓ Erik Ruehr, Dir. of Traffic Engineering, VRPA Technologies, Inc., eruehr@vrpatechnologies.com, (858) 566-1766
- ✓ Jeff Stine, Senior Transportation Planner, VRPA Technologies, Inc. jstine@vrpatechnologies.com, (858) 566-1766

Table of Contents

Section	Description	Page
	Executive Summary	E-1
1.0	Introduction	1
1.1	Description of the Region/Project	1
1.1.1	Project Access	1
1.1.2	Study Area	1
1.1.3	Study Scenarios	1
1.2	Methodology	2
1.2.1	Intersection Analysis	2
1.3	Policies to Maintain Level of Service	8
1.3.1	City of Visalia	8
1.3.2	California Department of Transportation (Caltrans)	8
1.4	VMT Analysis	8
2.0	Project Traffic	9
2.1	Trip Generation	9
2.2	Trip Distribution	9
2.3	Project Traffic	9
3.0	Traffic Impacts	15
3.1	Existing Traffic	15
3.2	Opening Year Traffic Conditions	16
3.3	Future Year Traffic Conditions	16
3.4	City of Visalia Transportation Impact Fee Program	17
3.5	Queuing Analysis	36
3.6	VMT Analysis	36
3.7	Impacts to Public Transit, Bicycle, and Pedestrian Facilities	36
3.8	Study Area Collision Data	39
3.9	Deceleration Lane Analysis	39
4.0	Mitigation	41
4.1	Recommended Improvements	41

Appendices

Appendix A – Traffic Count Data Worksheets
Appendix B – Synchro Worksheets
Appendix C – Collision Data Worksheets
Appendix D – Signal Warrant Worksheets
Appendix E – Intersection Sight Visibility

List of Tables

1-1	Signalized Intersection Level of Service Definitions	6
1-2	Unsignalized Intersection Level of Service Definitions	7
2-1	Project Trip Generation	9
3-1	Intersection Operations	21
3-2	Future Year 2030 Intersection Operations	35
3-3	Existing and Opening Year Queuing Operations	37
3-4	Future Year Queuing Operations	38
4-1	Timing of Signalization Improvements	43
4-2	Left Turn and Right Turn Storage Requirements	44

List of Figures

1-1	Regional Location	3
1-2	Project Location	4
1-3	Site Plan	5
2-1	Trip Distribution	10
2-2a	Project AM Peak Hour Trips	11
2-2b	Project AM Peak Hour Trips	12
2-3a	Project PM Peak Hour Trips	13
2-3b	Project PM Peak Hour Trips	14
3-1	Existing (2024) Lane Geometry	18
3-2	Existing (2024) AM Peak Hour Traffic	19
3-3	Existing (2024) PM Peak Hour Traffic	20
3-4	Opening Year (2026) AM Peak Hour Traffic	22
3-5	Opening Year (2026) PM Peak Hour Traffic	23
3-6a	Opening Year (2026) Plus Project AM Peak Hour Traffic	24
3-6b	Opening Year (2026) Plus Project AM Peak Hour Traffic	25
3-7a	Opening Year (2026) Plus Project PM Peak Hour Traffic	26
3-7b	Opening Year (2026) Plus Project PM Peak Hour Traffic	27
3-8	Future Year (2030) Lane Geometry	28
3-9	Future Year (2030) AM Peak Hour Traffic	29
3-10	Future Year (2030) PM Peak Hour Traffic	30
3-11a	Future Year (2030) Plus Project AM Peak Hour Traffic	31
3-11b	Future Year (2030) Plus Project AM Peak Hour Traffic	32

3-12a Future Year (2030) Plus Project PM Peak Hour Traffic 33
3-12b Future Year (2030) Plus Project PM Peak Hour Traffic 34
3-13 Existing Study Area Collision Map (01/01/2019 – 12/31/2023) 40

Executive Summary

This Traffic Impact Study (TIS) has been prepared for the purpose of analyzing traffic conditions related to the Ritchie Ranch Residential Development (Project). The Project is located at the southwest corner of River Way Drive and Demaree Street in the City of Visalia. The Project proposes to develop 321 single-family residential units and public park space on 44.9 acres of land.

Primary vehicular access to the site would be provided at the Demaree Avenue/Shannon Parkway intersection with secondary access provided along Demaree Avenue and River Way Drive.

STUDY AREA

The following intersections and roadway segments included in this TIS were determined in consultation with City of Visalia staff and include:

Intersections

- ✓ Demaree St/Ave 320
- ✓ Demaree St/Pratt Rd
- ✓ Demaree St/River Way Dr
- ✓ Demaree St/Shannon Pkwy
- ✓ Demaree St/Riggin Ave
- ✓ Linwood St/Riggin Ave
- ✓ Linwood St/Shannon Pkwy (Future Intersection)

STUDY SCENARIOS

The TIS completed for the Project includes level of service (LOS) analysis for the following traffic scenarios.

- ✓ Existing Conditions
- ✓ Opening Year Without Project
- ✓ Opening Year Plus Project
- ✓ 5 Year Horizon Without Project
- ✓ 5 Year Horizon Plus Project

IMPACTS

Intersections

As discussed in Chapter 3.0, Traffic Impacts, all study area intersections are expected to operate at level of service D or better under the Existing and Opening Year scenarios except for the

Demaree Street and Shannon Parkway intersection. It should be noted that this intersection does not meet peak hour signal warrants because the minor approach does not carry enough traffic to justify signalization.

All of the study area intersections are expected to operate at level of service D or better with or without the Project for Future Year 2030 conditions. By 2030, traffic signals are expected to be needed at intersections in the study area. At the Demaree Street/Shannon Parkway intersection, it is recommended that the Project applicant work with the City of Visalia to determine the responsibility for installation of the traffic signal. Traffic signals at the other locations are expected to be the responsibility of other projects, although the Project may be asked to provide a fair share contribution per City of Visalia standards.

Table E-1 provides a summary of the timing of signalization for study intersections. It should be noted that the City of Visalia uses California Manual on Uniform Traffic Control Devices (CA MUTCD) Warrant 1 (Eight-Hour Vehicular Volume) when considering an intersection for signalization. The City of Visalia will ultimately monitor the need for intersection signalization. As noted in the analysis, the intersection of Linwood Street and Riggin Avenue is currently a 'T' intersection. The City recommends signalization of this intersection when warranted and when the north leg of Linwood Street is developed by the City or others. Section 3.3 of the TIS indicates that the signalization of the Demaree Street at Avenue 320 and Demaree Street at Pratt Road intersections are future roadway improvements planned for the Future Year 2030 scenario.

Furthermore, as described in Section 3.6, VMT Analysis, the Project was screened out of requiring a detailed VMT impacts and determined to have a less than significant VMT impact.

RECOMMENDED IMPROVEMENTS

As shown in Table 3-5, traffic volumes at the southbound left and eastbound left turning movement of the Demaree Street and Riggin Avenue intersection will exceed the existing queue lane storage length for the Future Year 2030 study scenario. Recommended storage pocket lengths are presented in Table E-2 considering the Future Year 2030 study scenario. The timing of recommended storage pocket length improvements is shown below:

Opening Year Plus Project

- ✓ Demaree Street at Shannon Parkway
  - Provide a 300-foot northbound left turn storage pocket.
  - Provide a 100-foot eastbound left turn storage pocket.

- ✓ Street L at Shannon Parkway
  - Provide a 100-foot eastbound left turn storage pocket.
  - Provide a 100-foot westbound left turn storage pocket.

Future Year 2030 Plus Project

✓ Demaree Street at Riggin Avenue

- Providing a 300-foot southbound left turn storage pocket would alleviate excessive queuing at the intersection. However, there is insufficient space to extend the southbound left due to the constraint of the northbound left turn pocket at the Demaree Street and Jerome Avenue intersection.

  Providing dual left turn lanes at the southbound approach would also alleviate excessive queuing at the intersection. However, the existing pavement width of approximately 64 feet will not accommodate an additional southbound left turn lane. Increasing the green time for the southbound left turning movement could also alleviate excessive queuing but this would potentially cause the intersection delay to fall below the City of Visalia's acceptable level of service criteria. The City of Visalia will monitor signal timing at the intersection and make adjustments as necessary to maximize vehicular flow at the intersection.

- Provide a 300-foot eastbound left turn storage pocket.

✓ Linwood Street at Riggin Avenue

The City of Visalia will monitor the need for intersection improvements and signalization since this intersection is currently a 'T' intersection. Once the north leg of Linwood Street is developed by others, the following improvements are recommended.

- Provide a 100-foot northbound left turn storage pocket.
- Provide a 100-foot southbound left turn storage pocket.
- Provide a 100-foot eastbound right turn storage pocket.
- Provide a 100-foot westbound right turn storage pocket

Table E-1
Timing of Signalization Improvements

INTERSECTION	EXISTING INTERSECTION CONTROL	FUTURE YEAR 2030 PLUS PROJECT INTERSECTION CONTROL	PROJECTED YEAR SIGNAL IMPROVEMENT IS NEEDED	SIGNAL WARRANT MET
1. Demaree St/Ave 320	One-Way Stop	Signalized	2030	N/A
2. Demaree St/Pratt Rd	One-Way Stop	Signalized	2030	N/A
3. Demaree St/River Way Dr	One-Way Stop	One-Way Stop	N/A	N/A
4. Demaree St/Shannon Pkwy	One-Way Stop	Signalized	Future Year 2030 Without Project scenario	CA MUTCD Warrant 3 (Peak Hour)
5. Demaree St/Riggin Ave	Signalized	Signalized	N/A	N/A
6. Linwood St/Riggin Ave	One-Way Stop	Signalized	Future Year 2030 Plus Project scenario	CA MUTCD Warrant 3 (Peak Hour)

Table E-2
Left Turn and Right Turn Storage Requirements

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		FUTURE YEAR 2030 RECOMMENDED STORAGE LENGTH (ft)
2. Demaree St/Pratt Rd	NB Right[1]	--	--
	WB Right	200	200
3. Demaree St/River Way Dr	NB Left	175	175
4. Demaree St/Shannon Pkwy	NB Left	--	**300**
	SB Left	100	100
	EB Left	--	**100**
	WB Left	200	200
5. Demaree St/Riggin Ave	NB Left	250	250
	SB Left	200	**300**
	EB Left	275	**300**
	EB Right	150	150
	WB Left	2 @ 150	2 @ 150
	WB Right	150	150
6. Riggin Ave/ Linwood St	NB Left	--	**100**
	SB Left	--	**100**
	EB Left	250	250
	EB Right	--	**100**
	WB Left	250	250
	WB Right	--	**100**
10. Street L/Shannon Pkwy	EB Left	--	**100**
	WB Left	--	**100**

BOLD denotes change in storage pocket length

1 - The northbound number travel lane terminates into right turn at Pratt Road

1.0 Introduction

1.1 Description of the Region/Project

This Traffic Impact Study (TIS) has been prepared for the purpose of analyzing traffic conditions related to the Ritchie Ranch Residential Development (Project). The Project is located at the southwest corner of River Way Drive and Demaree Street in the City of Visalia. The Project proposes to develop 321 single-family residential units and public park space on 44.9 acres of land.

Figure 1-1 shows the regional context of the Project site while Figure 1-2 shows the Project location within the City of Visalia. Figure 1-3 shows the conceptual layout of the Project.

1.1.1 *Project Access*

Primary vehicular access to the site would be provided at the Demaree Avenue/Shannon Parkway intersection with secondary access provided along Demaree Avenue and River Way Drive.

1.1.2 *Study Area*

The study intersections included in this TIS are listed below and shown in Figure 1-2. The study intersections were developed in consultation with City of Visalia staff and are located within 1-mile of the Project site based on analysis requirements found in the City of Visalia "Procedures For Traffic Impact Analysis (TIA)", dated March 2021. This TIS also includes and analysis of Project driveway intersections.

Intersections

- ✓ Demaree St/Ave 320
- ✓ Demaree St/Pratt Rd
- ✓ Demaree St/River Way Dr
- ✓ Demaree St/Shannon Pkwy
- ✓ Demaree St/Riggin Ave
- ✓ Linwood St/Riggin Ave
- ✓ Linwood St/Shannon Pkwy (Future Intersection)

1.1.3 *Study Scenarios*

The TIS completed for the Project includes level of service (LOS) analysis for the following traffic scenarios.

- ✓ Existing Conditions
- ✓ Opening Year Without Project
- ✓ Opening Year Plus Project

- ✓ 5 Year Horizon Without Project
- ✓ 5 Year Horizon Plus Project

1.2 Methodology

When preparing a TIS, guidelines set by affected agencies are followed. In analyzing street and intersection capacities the Level of Service (LOS) methodologies are applied. LOS standards are applied by transportation agencies to quantitatively assess a street and highway system's performance. In addition, safety concerns are analyzed to determine the need for appropriate mitigation resulting from increased traffic near sensitive uses, the need for dedicated ingress and egress access lanes to the project, and other evaluations such as the need for signalized intersections or other improvements. Guidelines incorporated in the Highway Capacity Manual (HCM), 7th Edition, were also used in the development of this TIS.

1.2.1 *Intersection Analysis*

Intersection LOS analysis was conducted using the Synchro software program. Synchro supports HCM methodologies and is deemed an acceptable program by City of Visalia staff for assessment of traffic impacts. Levels of Service can be determined for both signalized and unsignalized intersections.

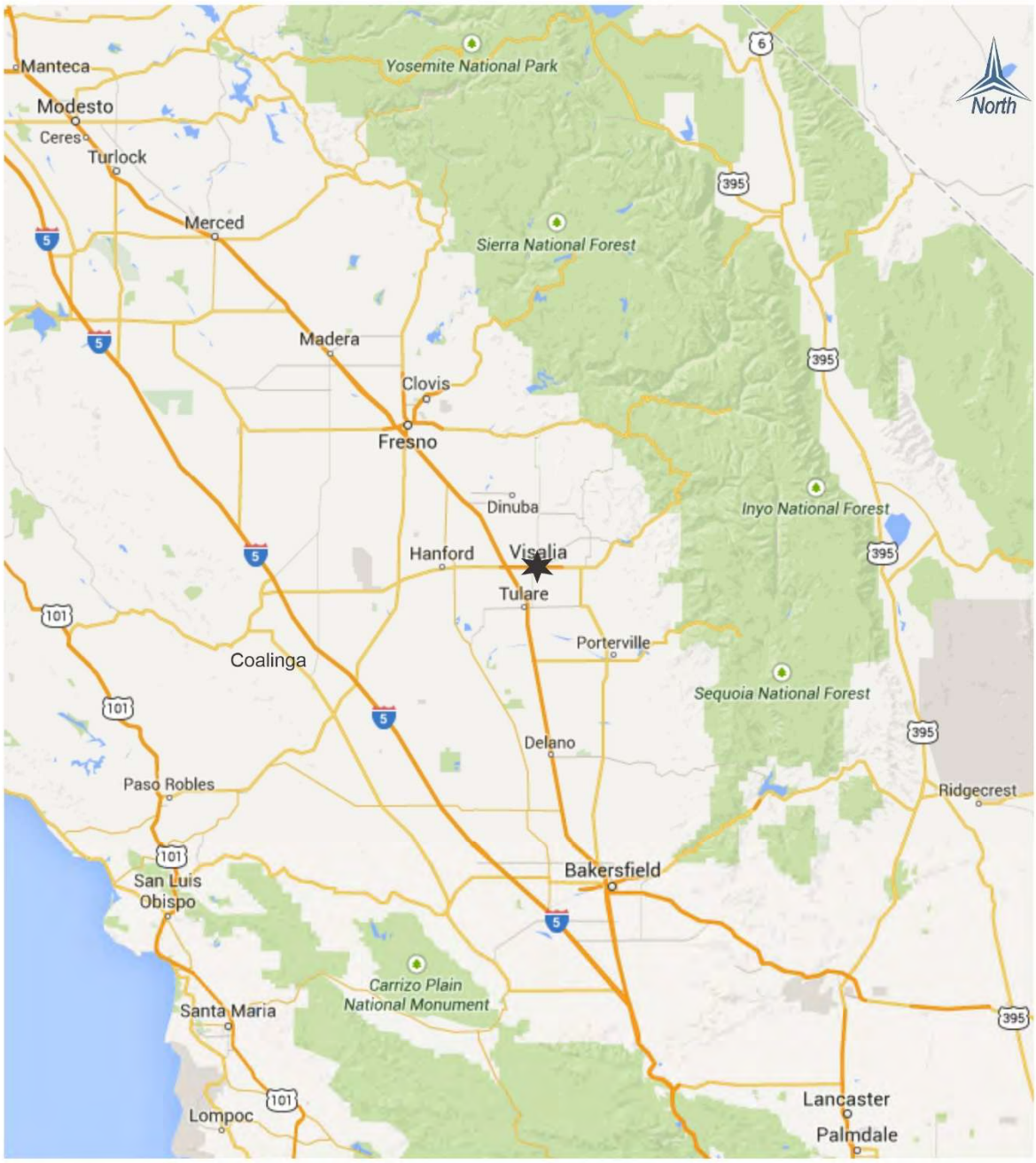
Tables 1-1 and 1-2 indicate the ranges in the amounts of average delay for a vehicle at signalized and unsignalized intersections for the various levels of service ranging from LOS "A" to "F".

The signalized LOS standards applied to calculate intersection LOS are in accordance with the current edition of the HCM. Intersection turning movement counts and roadway geometrics used to develop LOS calculations were obtained from field review findings and count data provided from the traffic count sources identified in Chapter 3.

When an unsignalized intersection does not meet acceptable LOS standards, the investigation of the need for a traffic signal shall be evaluated. The latest edition of the California Manual on Uniform Traffic Control Devices (CA MUTCD) introduces standards for determining the need for traffic signals. The CA MUTCD indicates that the satisfaction of one or more traffic signal warrants does not in itself require the installation of a traffic signal. In addition to the warrant analysis, an engineering study of the current or expected traffic conditions should be conducted to determine whether the installation of a traffic signal is justified. The City of Visalia uses the CA MUTCD Eight (8) Peak Hour Signal Warrant (Warrant 1) when evaluating the need for signalization at an intersection. The CA MUTCD Peak Hour Warrant (Warrant 3) was solely used to illustrate peak hour conditions at unsignalized intersections that do not meet the City of Visalia's acceptable level of service criteria.

Ritchie Ranch Residential Development
Regional Location

Figure 1-1



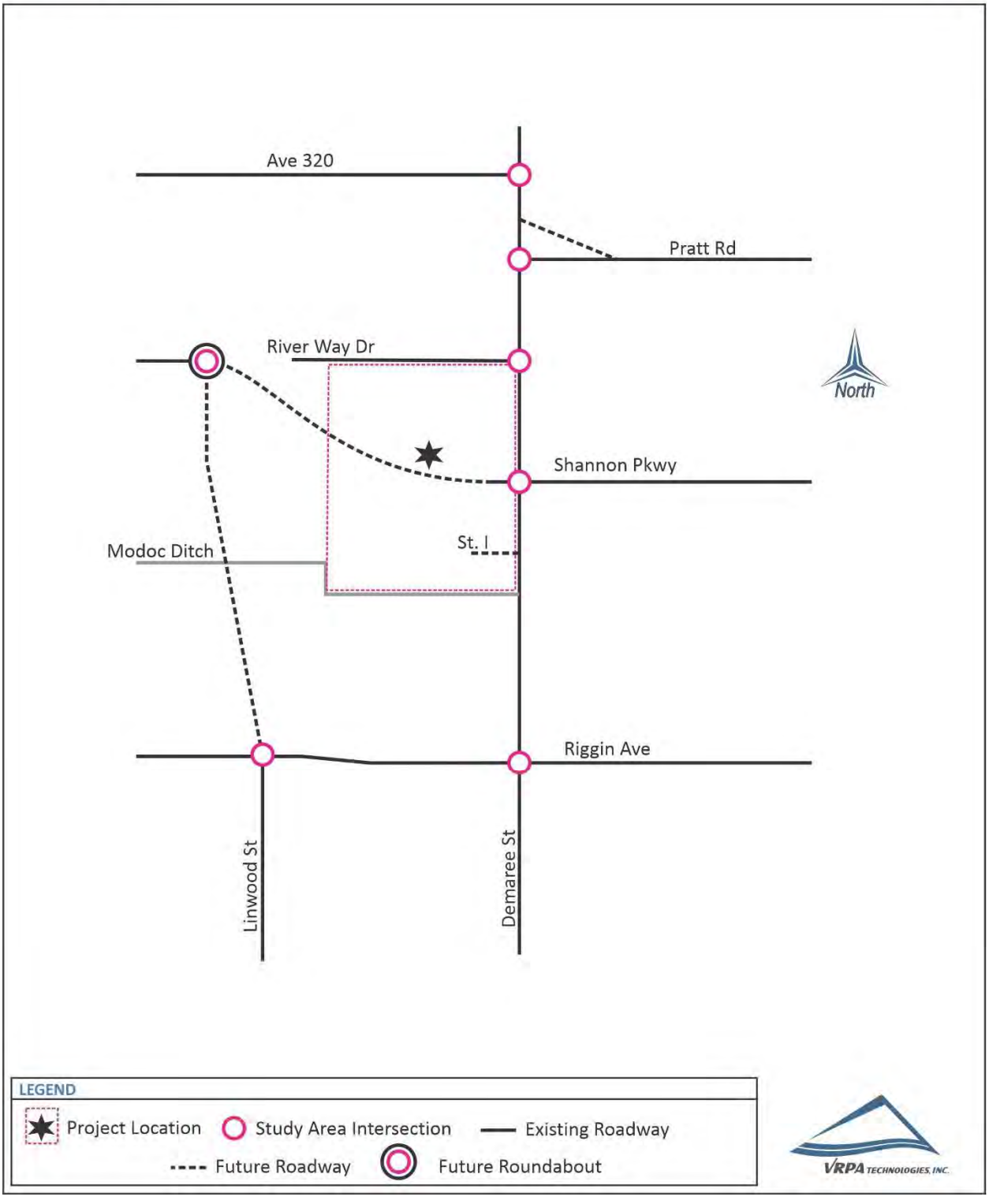
LEGEND

★ Project Location

VRPA TECHNOLOGIES, INC.

Ritchie Ranch Residential Development
Project Location

Figure 1-2



Ritchie Ranch Residential Development **Figure 1-3**
Site Plan

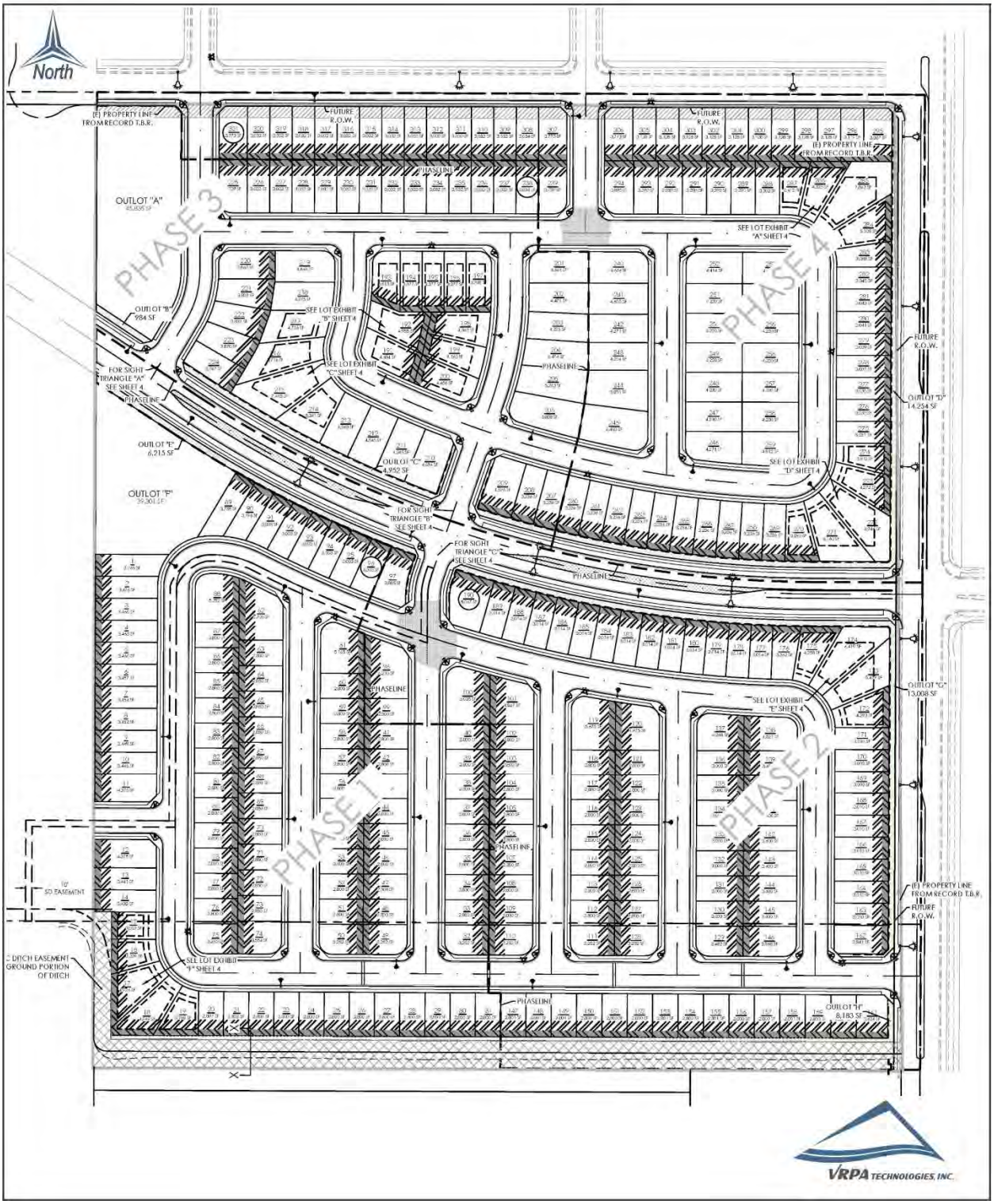


Table 1-1
Signalized Intersections
Level of Service Definitions
(Highway Capacity Manual)

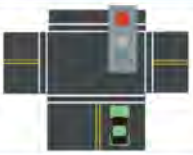
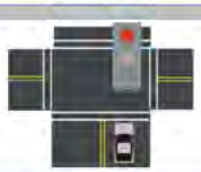
LEVEL OF SERVICE	DEFINITION		AVERAGE TOTAL DELAY (sec/veh)
A	Describes operations with very low delay. This level of service occurs when there is no conflicting traffic for a minor street.		≤ 10.0
B	Describes operations with moderately low delay. This level generally occurs with a small amount of conflicting traffic causing higher levels of average delay.		> 10.0 - 20.0
C	Describes operations with average delays. These higher delays may result from a moderate amount of minor street traffic. Queues begin to get longer.		> 20.0 - 35.0
D	Describes a crowded operation, with below average delays. At level D, the influence of congestion becomes more noticeable. Longer delays may result from shorter gaps on the mainline and an increase of minor street traffic. The queues of vehicles are increasing.		> 35.0 - 55.0
E	Describes operations at or near capacity. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor gaps for the minor street to cross and large queues.		> 55.0 - 80.0
F	Describes operations that are at the failure point. This level, considered to be unacceptable to most drivers, often occurs with over- saturation, that is, when arrival flow rates exceed the capacity of the intersection. Insufficient gaps of suitable size exist to allow minor traffic to cross the intersection safely.		> 80.0

Table 1-2
Unsignalized Intersections
Level of Service Definitions
(Highway Capacity Manual)

LEVEL OF SERVICE	DEFINITION	AVERAGE TOTAL DELAY (sec/veh)
A	No delay for stop-controlled approaches. 	0 - 10.0
B	Describes operations with minor delay. 	> 10.0 - 15.0
C	Describes operations with moderate delays. 	> 15.0 - 25.0
D	Describes operations with some delays. 	> 25.0 - 35.0
E	Describes operations with high delays and long queues. 	> 35.0 - 50.0
F	Describes operations with extreme congestion, with very high delays and long queues unacceptable to most drivers. 	> 50.0

1.3 Policies to Maintain Level of Service

1.3.1 *City of Visalia*

The City of Visalia General Plan states that the City will plan for LOS "D" for street segments and intersections.

1.3.2 *California Department of Transportation (Caltrans)*

With the changes brought about by SB 743, Caltrans no longer uses level of service to determine the need for transportation improvements. Instead, the focus is on providing adequate facilities for pedestrians, bicycles, and transit as well as safety considerations for all transportation modes. Guidance is provided in the Transportation Impact Study Guide dated May 20, 2020, and the Interim Land Development and Intergovernmental Review Safety Review Practitioners Guidance dated July 2020. This guidance was used in determining the need for roadway improvements on Caltrans facilities.

1.4 VMT Analysis

Senate Bill 743 (SB 743) went into effect throughout California on July 1, 2020. This legislation changed the performance measure for CEQA transportation studies from level of service to vehicle miles traveled (VMT). An assessment of potential VMT impacts associated with the Project is provided in Chapter 3 to address changes in CEQA requirements.

2.0 Project Traffic

2.1 Trip Generation

To assess the impacts that the Project may have on the surrounding roadway network, the first step is to determine Project trip generation. Project trip generation was determined using trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition). The considerations described above led to the recommended trip generation for weekday AM (7:00-9:00am) and PM (4:00-6:00pm) peak hours shown in Table 2-1.

Table 2-1
Project Trip Generation

LAND USE (ITE LAND USE CODE)	QUANTITY	DAILY TRIP ENDS	(ADT)	WEEKDAY AM PEAK HOUR					WEEKDAY PM PEAK HOUR				
		RATE	VOLUME	RATE	IN:OUT SPLIT	VOLUME			RATE	IN:OUT SPLIT	VOLUME		
						IN	OUT	TOTAL			IN	OUT	TOTAL
Residential Single-Family (210)	321 Units	9.43	3,027	0.70	25:75	56	169	225	0.94	63:37	190	112	302
Public Park (411)	2.007 Acres	44.84	90	0.02	59:41	0	0	0	11.46	55:45	12	11	23
TOTAL TRIP GENERATION			**3,117**			**56**	**169**	**225**			**202**	**123**	**325**

2.2 Trip Distribution

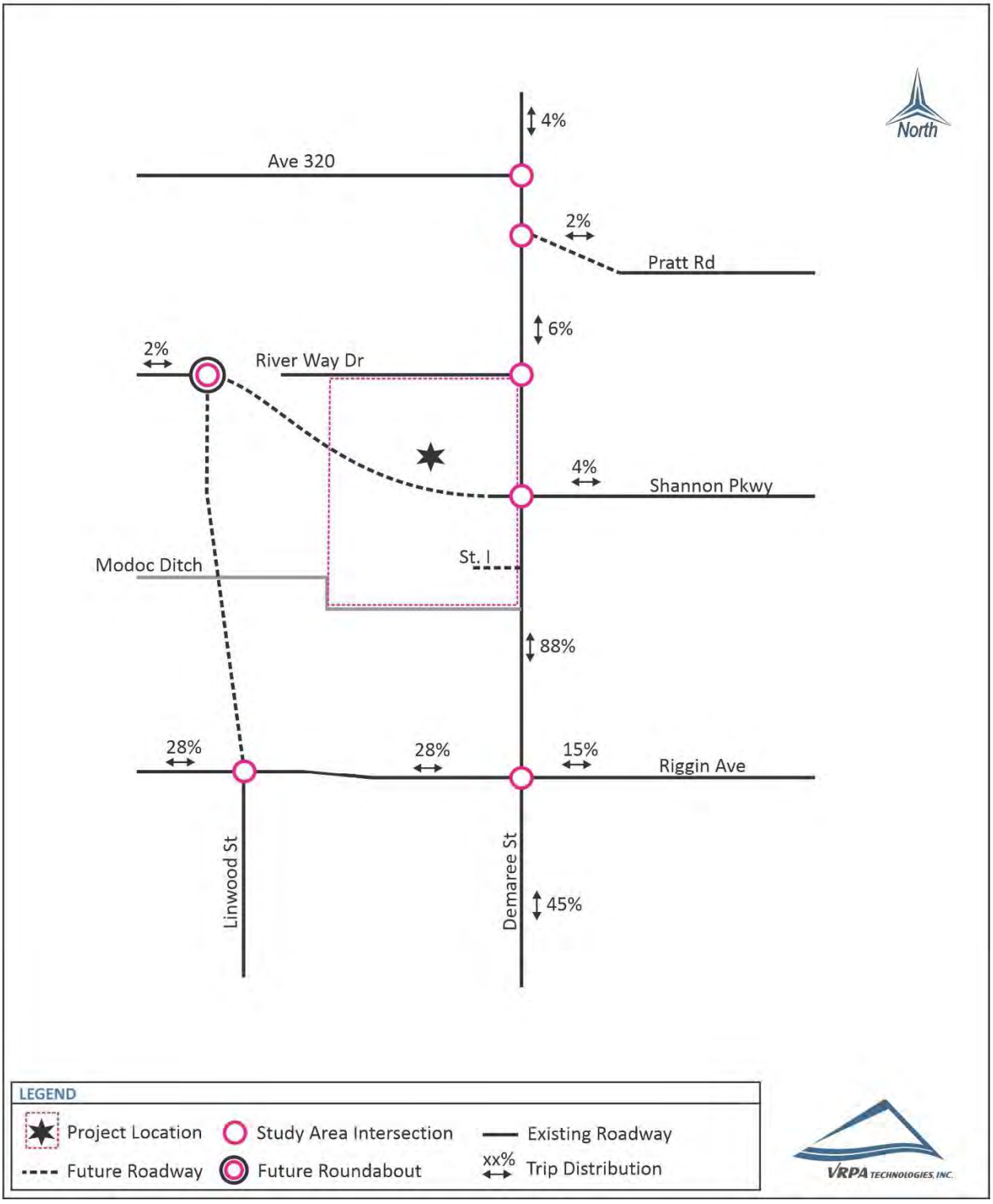
Project trip distribution percentages are shown in Figure 2-1. These percentages are based upon knowledge of the study area, engineering judgement, prevailing traffic patterns in the study area, major routes, population centers, and other existing development.

2.3 Project Traffic

Project traffic as shown in Table 2-1 was distributed to the roadway system using the trip distribution percentages shown in Figure 2-1. A graphical representation of the resulting AM and PM peak hour Project trips is shown in Figures 2-2a, 2-2b, 2-3a, and 2-3b.

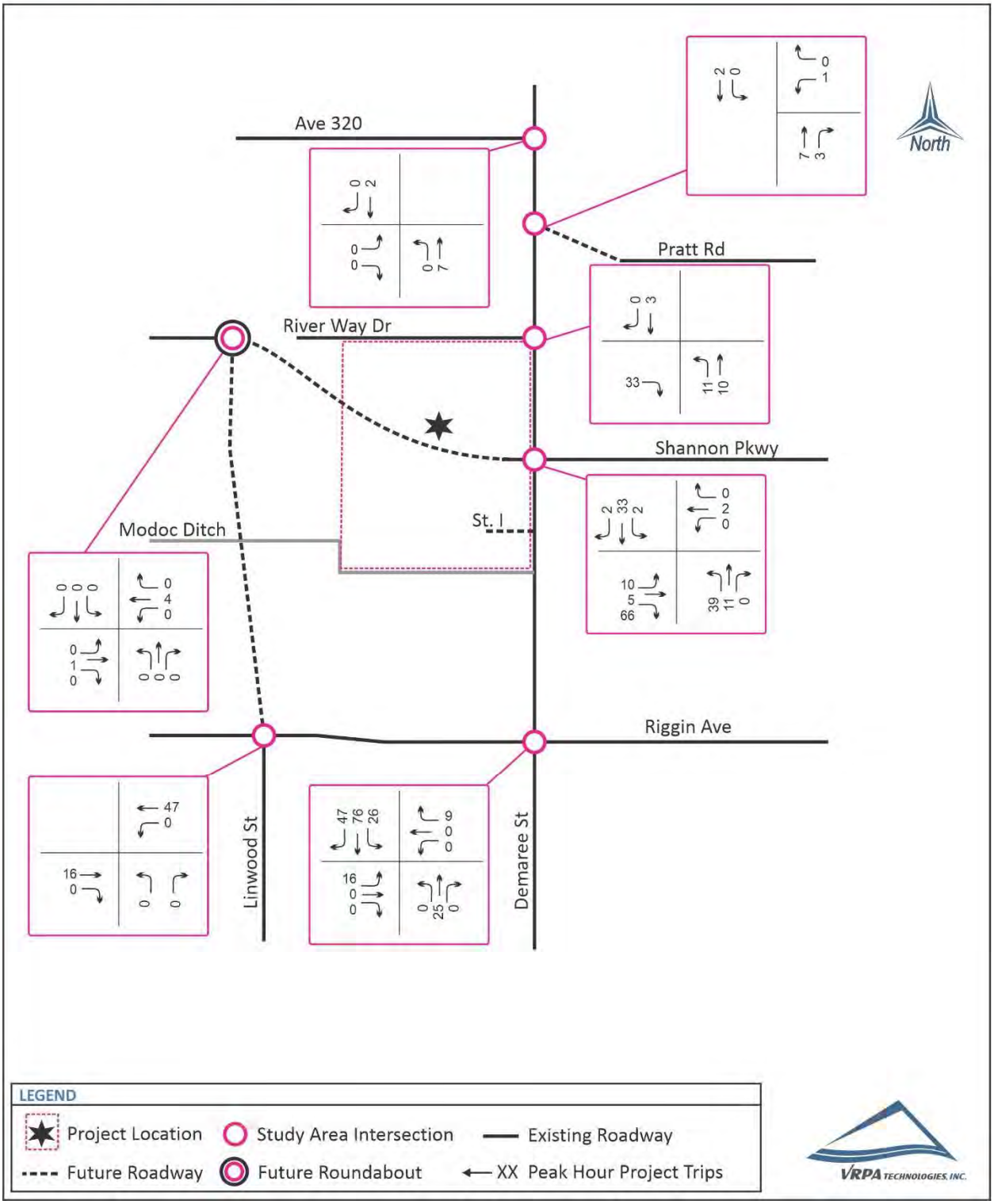
Ritchie Ranch Residential Development
Trip Distribution

Figure 2-1



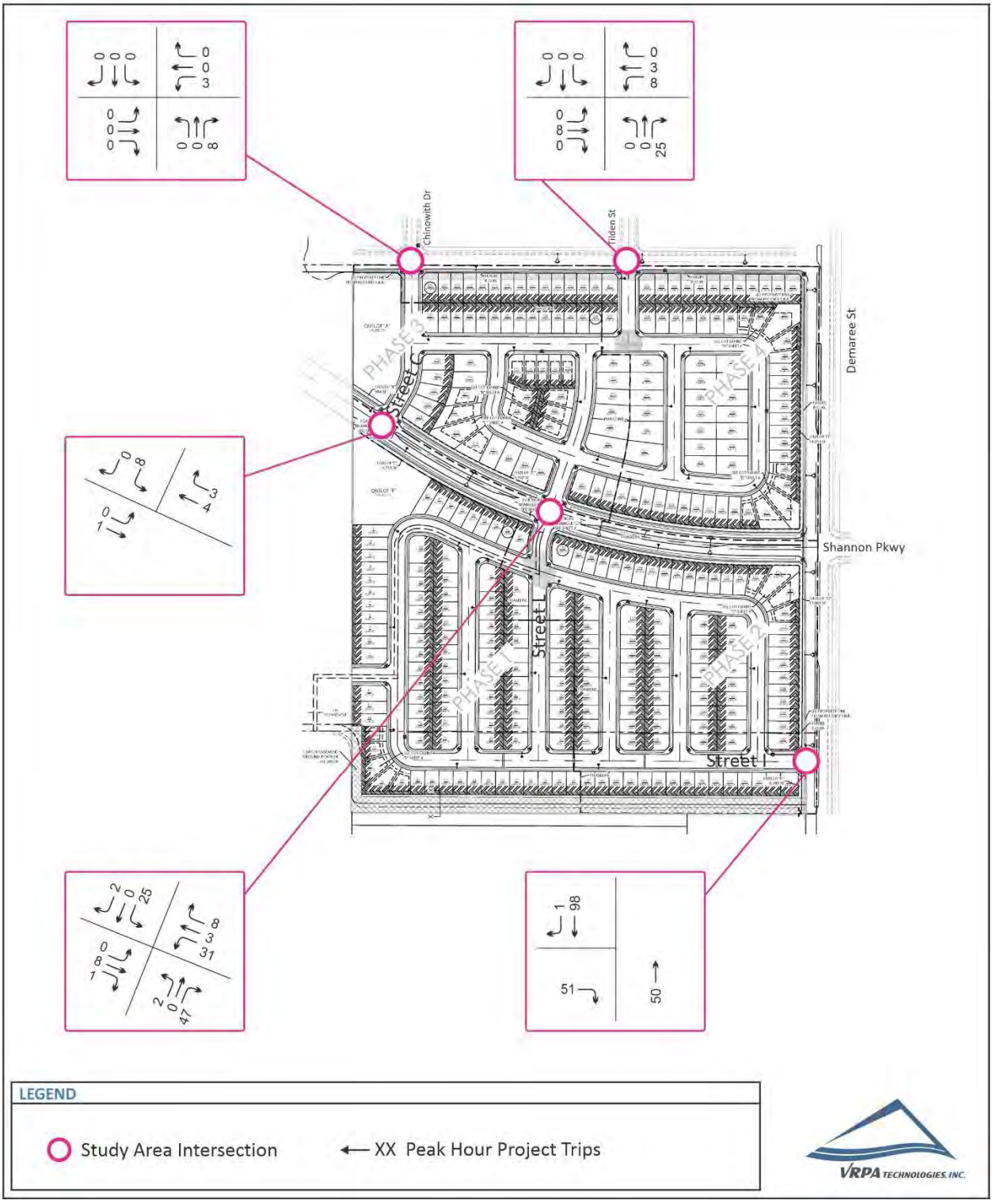
Ritchie Ranch Residential Development
Project AM Peak Hour Trips

Figure 2-2a



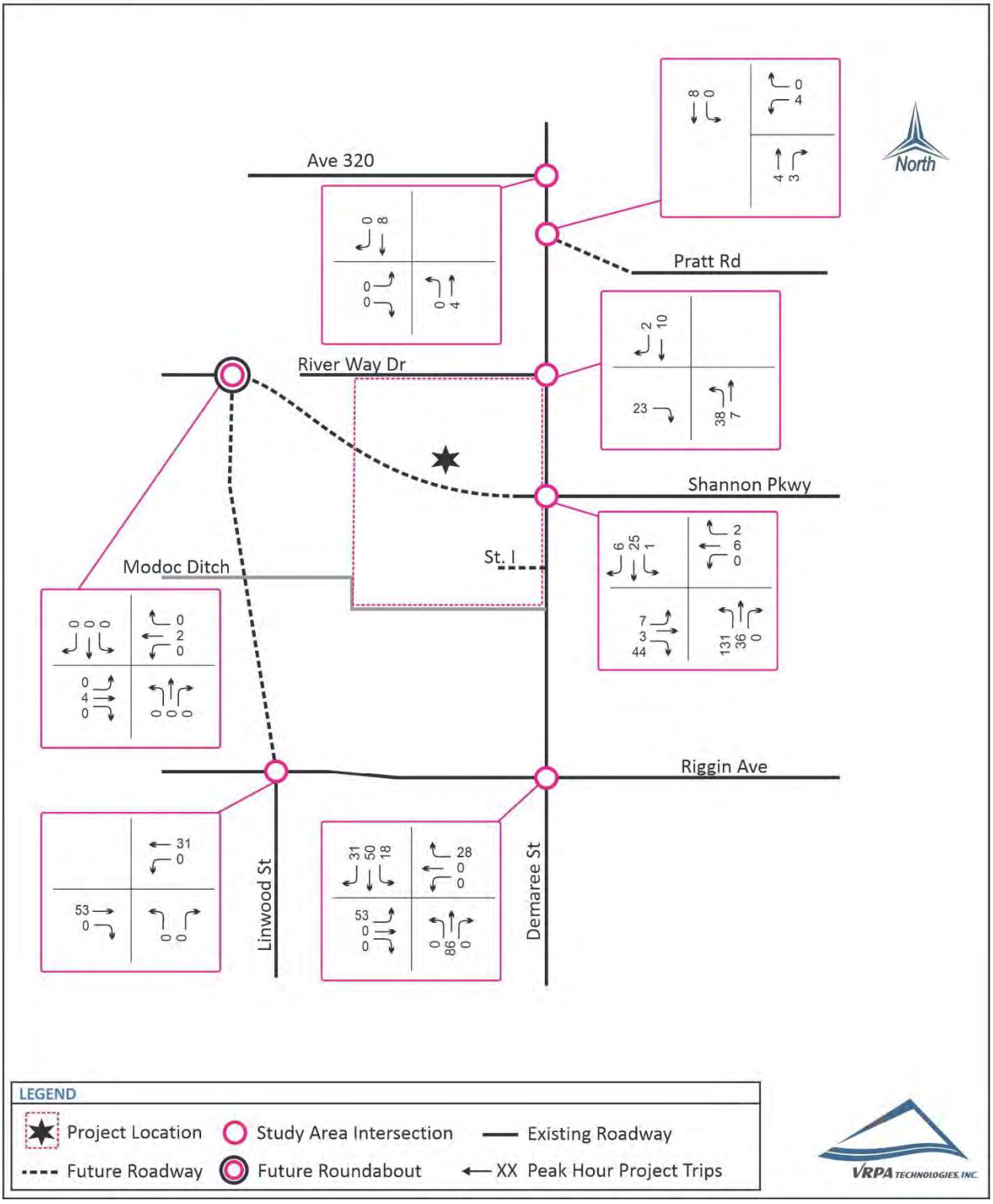
Ritchie Ranch Residential Development
Project AM Peak Hour Trips

Figure 2-2b



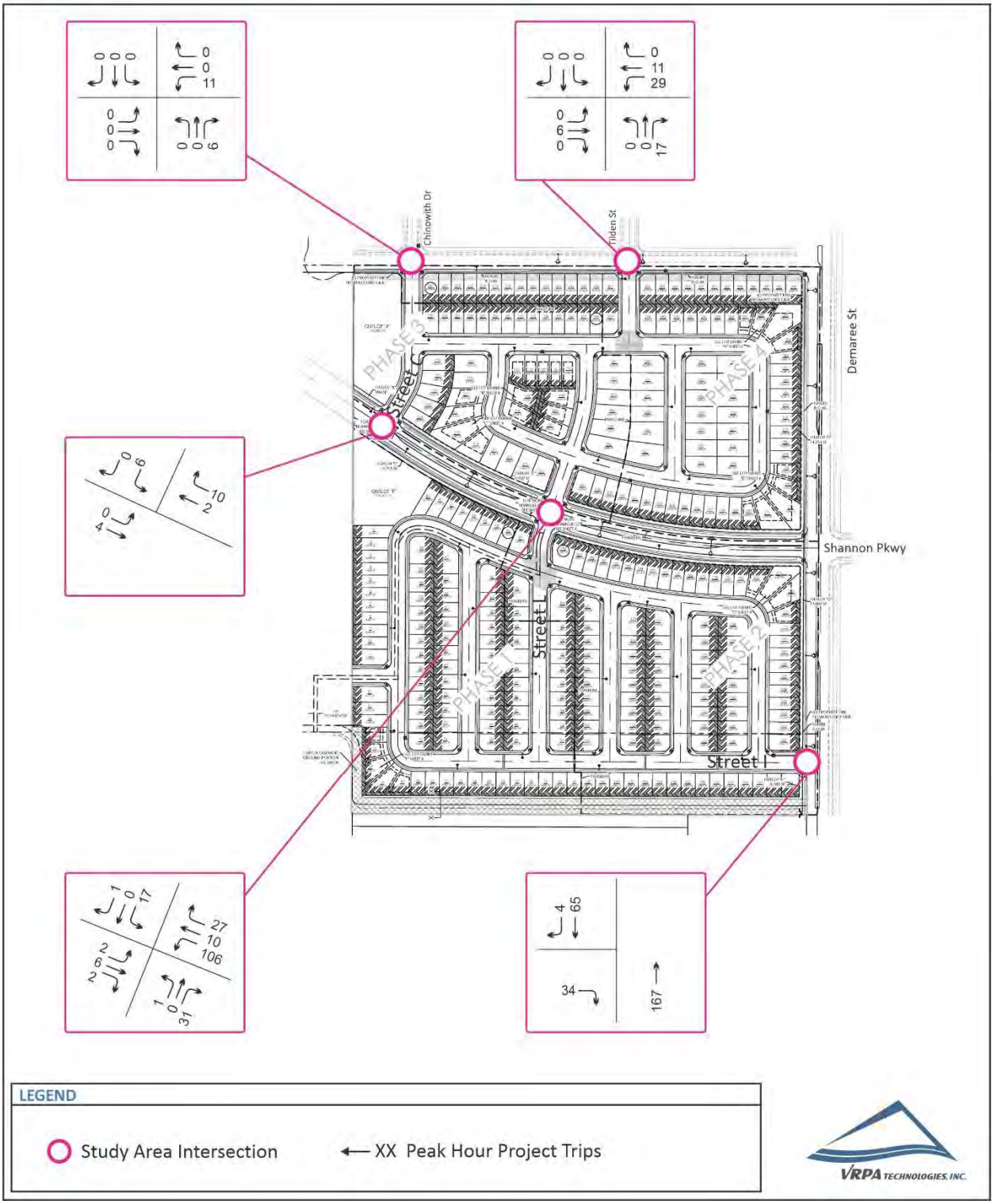
Ritchie Ranch Residential Development
Project PM Peak Hour Trips

Figure 2-3a



Ritchie Ranch Residential Development — **Figure 2-3b**

Project PM Peak Hour Trips



3.0 Traffic Impacts

3.1 Existing Roadway Geometrics and Traffic Counts

Existing AM and PM peak hour turning movements were collected at each study intersection by National Data and Surveying Services in September 2024. Intersection turning movement counts were conducted for the peak hour periods of 7:00-9:00 AM and 4:00-6:00 PM. Existing roadway lane geometry is shown in Figure 3-1. Existing traffic is shown in Figures 3-2 and 3-3. Traffic count data worksheets are provided in Appendix A.

Intersection operations for Existing conditions are shown in Table 3-1. All study area intersections currently operate at level of service D or better.

Existing roadway conditions are as follows:

- ✓ Demaree Street: Adjacent to and south of the Project site, Demaree Street has four through lanes, a two-way left turn, and a sidewalk provided on the east side of the roadway. North of Pratt Road, Demaree Street narrows to a two-lane roadway without curb, gutter, or sidewalks.

- ✓ Avenue 320: West of Demaree Street, Avenue 320 is a two-lane roadway without curb, gutter, or sidewalks.

- ✓ Pratt Road: East of Demaree Street, Pratt Road is a two-lane roadway with curb, gutter, and a sidewalk on the south side of the roadway.

- ✓ Riverway Drive: West of Demaree Street, Riverway Drive is a two-lane roadway with curb, gutter, and a sidewalk on the north side of the roadway.

- ✓ Shannon Parkway: East of Demaree Street, Shannon Parkway is a two-lane divided roadway with a sidewalk provided on the north side of the roadway. In addition, Shannon Parkway also contains curb and gutter on the north and south side of the roadway and a Class I trail on the south side.

- ✓ Riggin Avenue: East and west of Demaree Street, Riggin Avenue is a four- lane divided roadway with curb, gutter, and sidewalks on both sides of the roadway.

- ✓ Linwood Street: South of Riggin Avenue, Linwood Street is a two- lane roadway with curb, gutter, and sidewalks on both sides of the roadway.

3.2 Opening Year Traffic Conditions

Traffic conditions with and without the Project for the assumed opening year of 2026 were estimated by applying a growth rate of 2% per year to the existing traffic volumes. The resulting traffic for the Opening Year scenario is shown in Figures 3-4 and 3-5.

Project traffic, as calculated in Chapter 2, was added to Opening Year traffic to determine Opening Year Plus Project traffic as shown in Figures 3-6a, 3-6b, 3-7a and 3-7b. Intersection operations for Opening Year conditions with and without Project traffic are shown in Table 3-1. All study area intersections are expected to operate at level of service D or better except for the Demaree Street and Shannon Parkway intersection. It should be noted that this intersection does not meet peak hour signal warrants because the minor approach does not carry enough traffic to justify signalization.

It is also noted that stop signs are recommended to control project exiting traffic at the access points to the street system. Section 2B.04 (Right-of-Way at Intersections), Bullet 03-A of the CA MUTCD indicates that a Stop Sign should be used at an intersection if a*n intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law*. In our estimation, Riverway Drive would be treated/viewed as a main road to motorists which would limit the application of the normal right-of-way rule.

3.3 Future Year Traffic Conditions

Future Year traffic conditions with and without the Project in the Year 2030 (5 years from Opening Year conditions) were estimated by applying a growth rate of 2% per year to the existing traffic volumes. The Future Year lane geometry is shown in Figure 3-8. The resulting traffic for the Future Year scenario is shown in Figures 3-9 and 3-10.

Project traffic, as calculated in Chapter 2, was added to Future Year traffic to determine Future Year Plus Project traffic as shown in Figures 3-11a, 3-11b, 3-12a, and 3-12b.

The following future roadway improvements are planned for this scenario:

- ✓ Pratt Road will be realigned to meet Demaree Street at a location north of its current location.
- ✓ Linwood Street will be extended from Riggin Avenue to Avenue 320 with a roundabout installed at the intersection of Shannon Parkway. The analysis described in this report indicates that a one-lane roundabout will be sufficient to accommodate future traffic conditions.
- ✓ Shannon Parkway will be extended from Demaree Street to west of Linwood Street.

- ✓ Traffic signals will be installed at the intersections of Demaree Street with Avenue 320, Pratt Road, and Shannon Parkway and at the intersection of Riggin Avenue and Linwood Street.

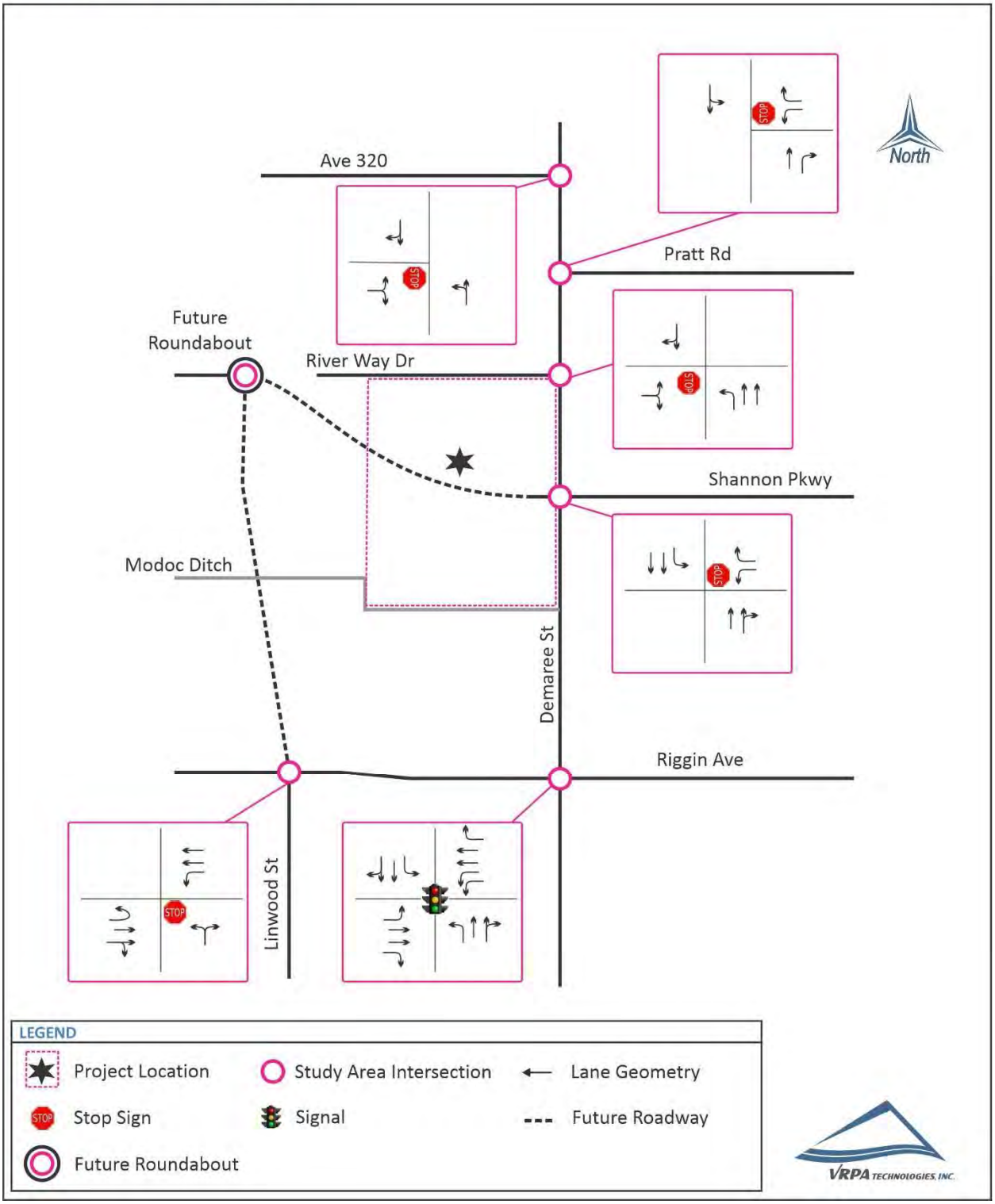
Intersection operations for Future Year conditions with and without Project traffic are shown in Table 3-2. All study area intersections are expected to operate at level of service D or better with or without the Project.

3.4 City of Visalia Transportation Impact Fee Program

As noted in Section 3.3, traffic signals will be installed at the intersections of Demaree Street at Avenue 320, Demaree Street at Pratt Road, Demaree Street at Shannon Parkway, and Riggin Avenue at Linwood Street. The signalization of these intersections is included in the City of Visalia's Transportation Impact Fee (TIF) Program. The City of Visalia Fee Schedule will be used to determine the TIF Fee for the Project.

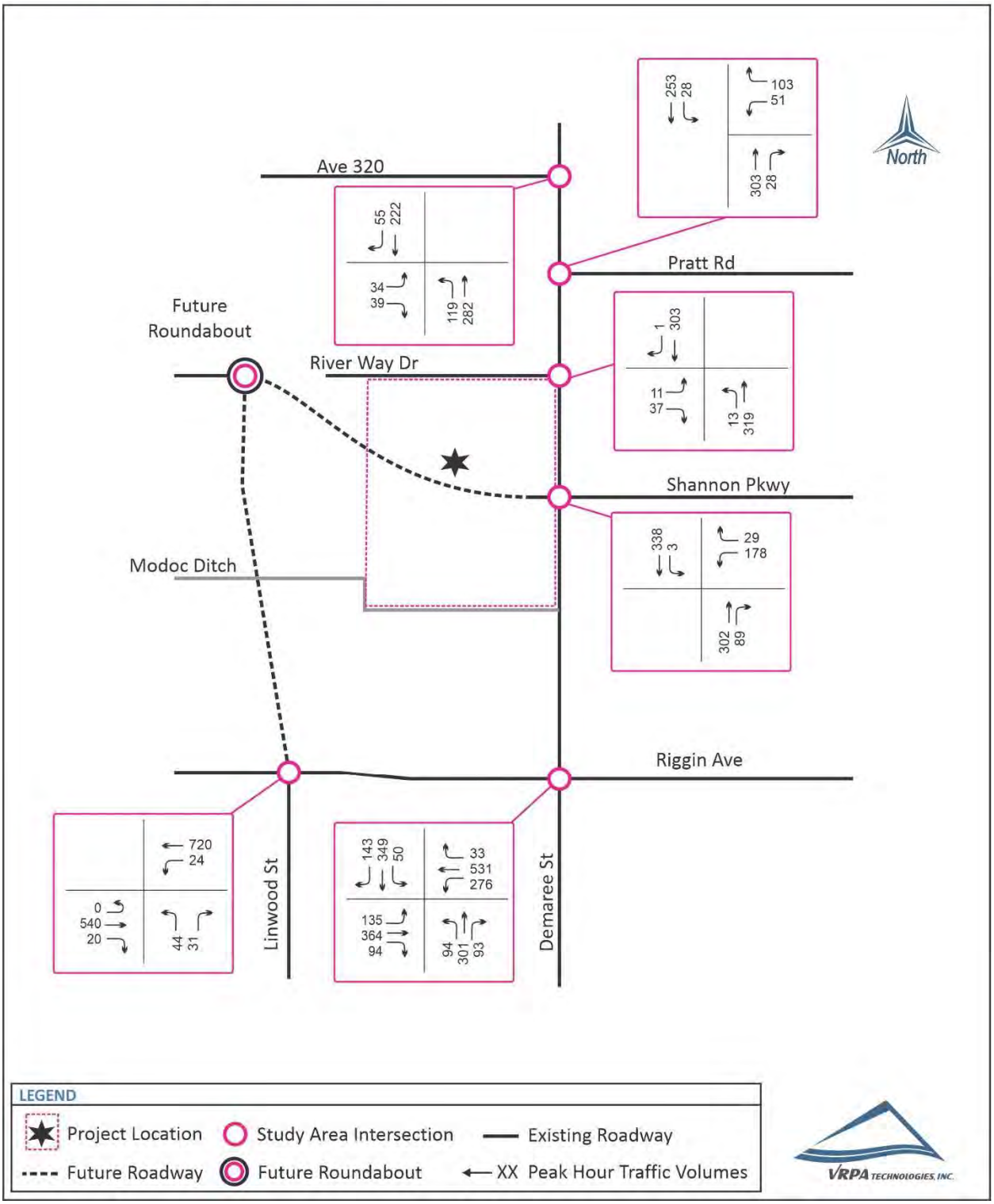
Ritchie Ranch Residential Development
Existing (2024) Lane Geometry

Figure 3-1



Ritchie Ranch Residential Development
Existing (2024) AM Peak Hour Traffic

Figure 3-2



Ritchie Ranch Residential Development
Existing (2024) PM Peak Hour Traffic

Figure 3-3

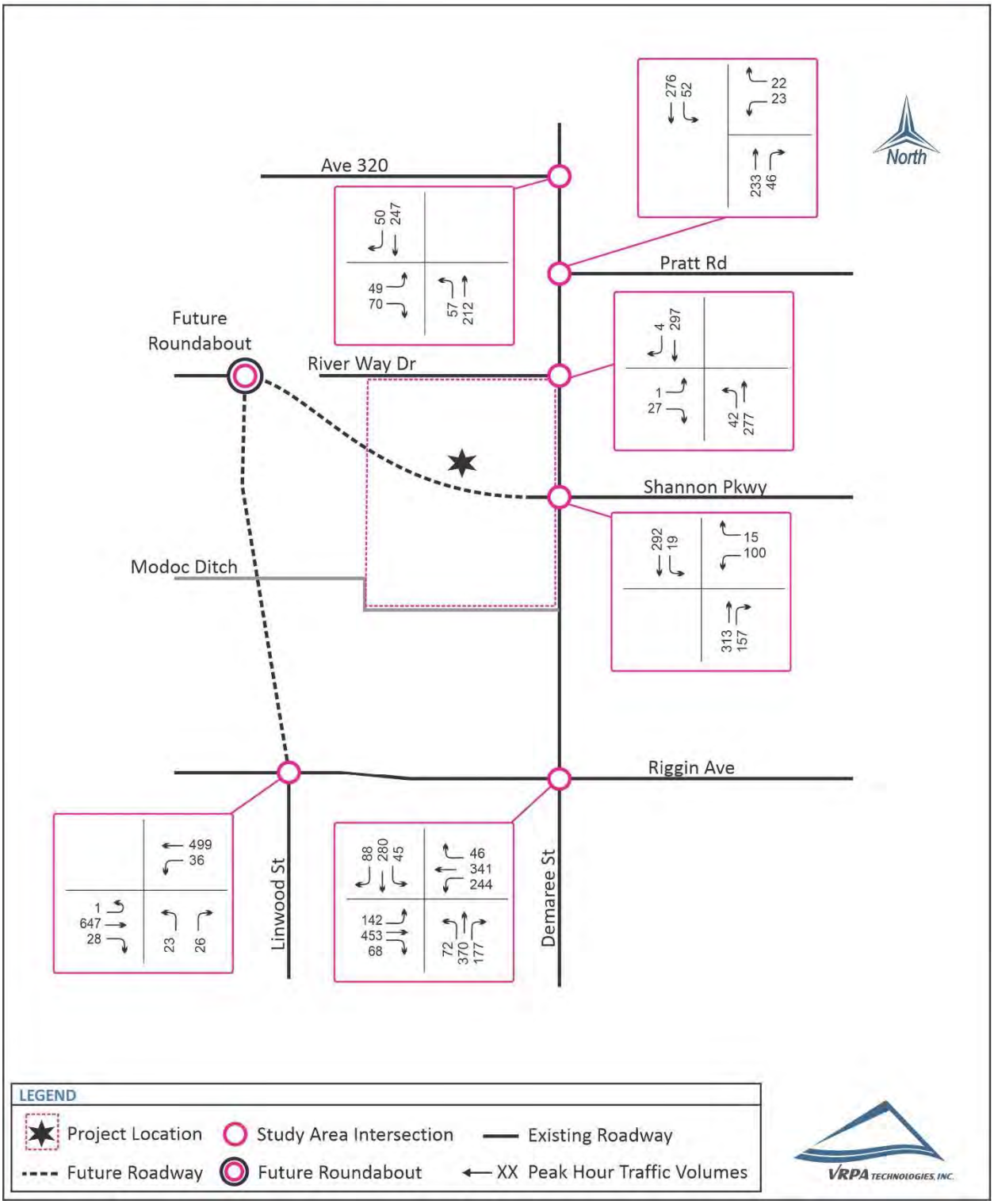


Table 3-1

Intersection Operations

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	EXISTING		OPENING YEAR		OPENING YEAR PLUS PROJECT	
				DELAY	LOS	DELAY	LOS	DELAY	LOS
1. Demaree St/Ave 320	One-Way Stop	D	AM	16.0	C	16.6	C	16.8	C
			PM	14.0	B	14.5	B	14.7	B
2. Demaree St/Pratt Rd	One-Way Stop	D	AM	16.2	C	18.6	C	19.0	C
			PM	14.5	B	16.3	C	16.7	C
3. Demaree St/River Way Dr	One-Way Stop	D	AM	11.3	B	12.3	B	13.0	B
			PM	10.5	B	11.3	B	11.7	B
4. Demaree St/Shannon Pkwy	One-Way Stop	D	AM	23.0	C	**38.2**	**E +**	**175.3**	**F +**
			PM	17.5	C	**26.2**	**D +**	**181.7**	**F +**
5. Demaree St/Riggin Ave	Signalized	D	AM	37.6	D	39.5	D	42.8	D
			PM	31.8	C	33.7	C	35.1	D
6. Linwood St/Riggin Ave	One-Way Stop	D	AM	25.9	D	31.1	D	33.9	D
			PM	18.9	C	21.2	C	23.4	C
7. Chinowith Dr-Street C/River Way Dr	Two-Way Stop	D	AM					9.6	A
			PM					10.0	B
8. Tilden St/River Way Dr	Two-Way Stop	D	AM					10.2	B
			PM					11.1	B
9. Street C/Shannon Pkwy	One-Way Stop	D	AM					8.6	A
			PM					8.6	A
10. Street L/Shannon Pkwy	Two-Way Stop	D	AM					9.6	A
			PM					11.0	B
11. Demaree St/Street I	One-Way Stop	D	AM					11.8	B
			PM					10.5	B

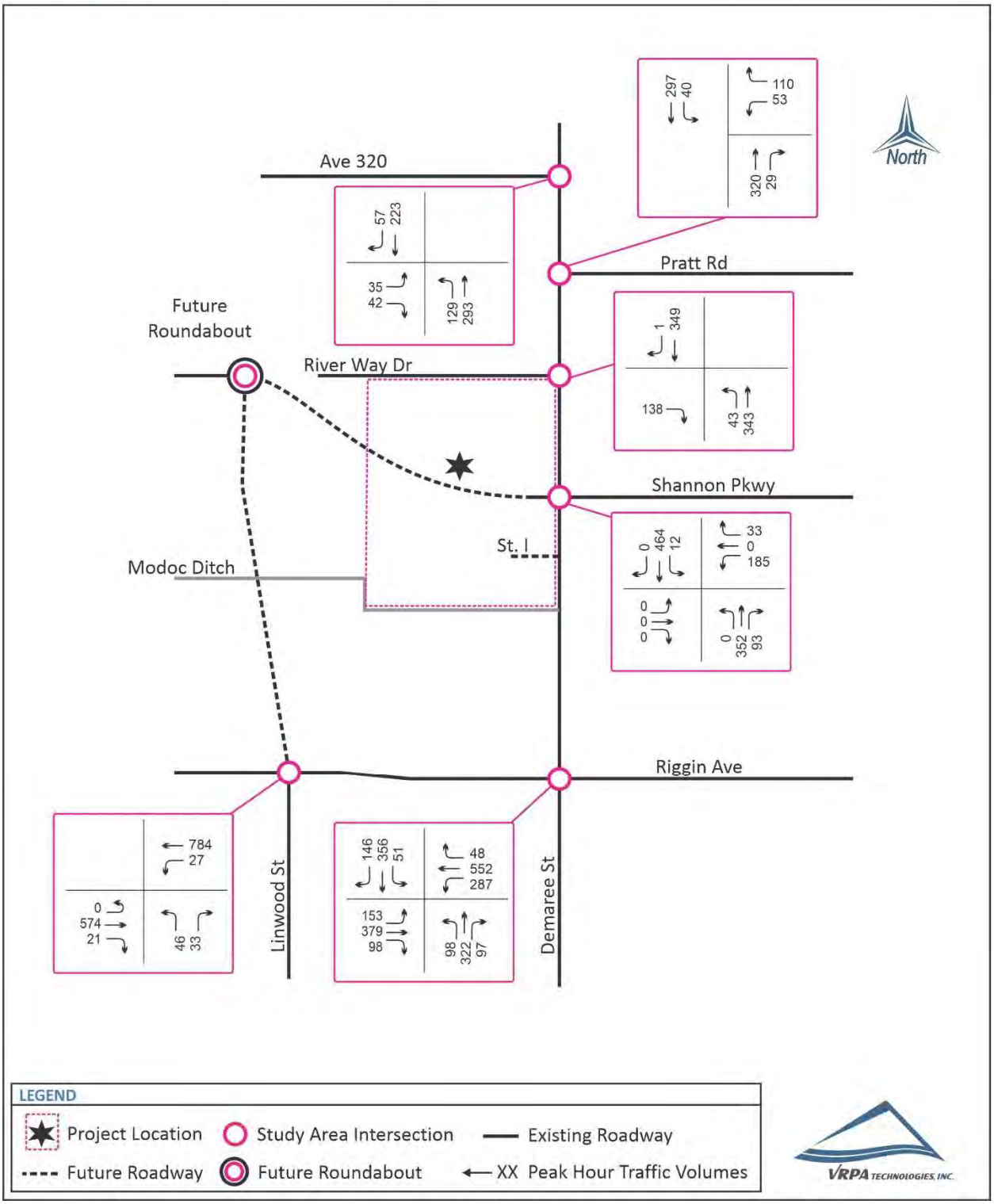
DELAY is measured in seconds
LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized intersections, delay results show the average for the entire intersection. For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

+ Does not meet peak hour signal warrant

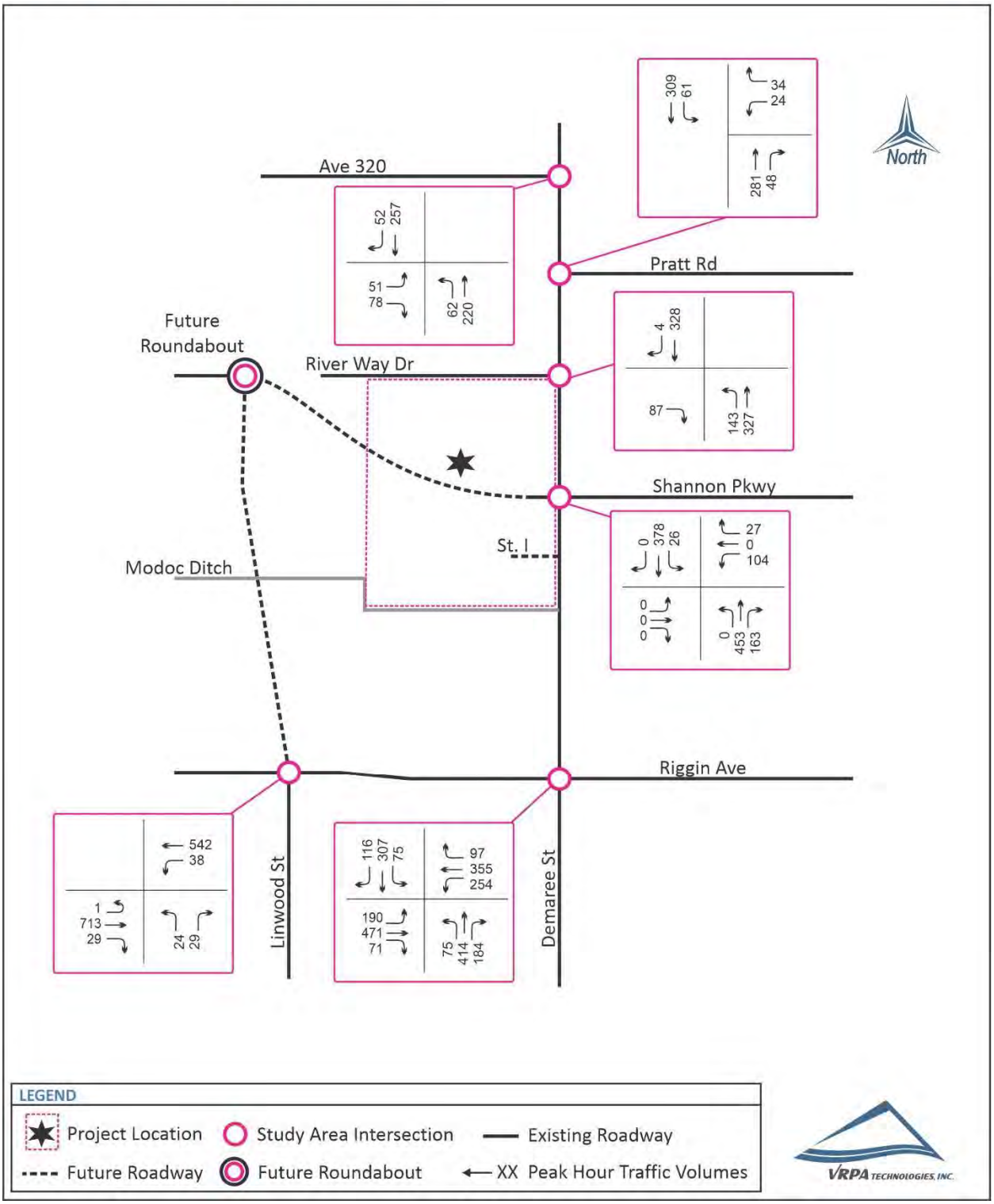
Ritchie Ranch Residential Development
Opening Year (2026) AM Peak Hour Traffic

Figure 3-4



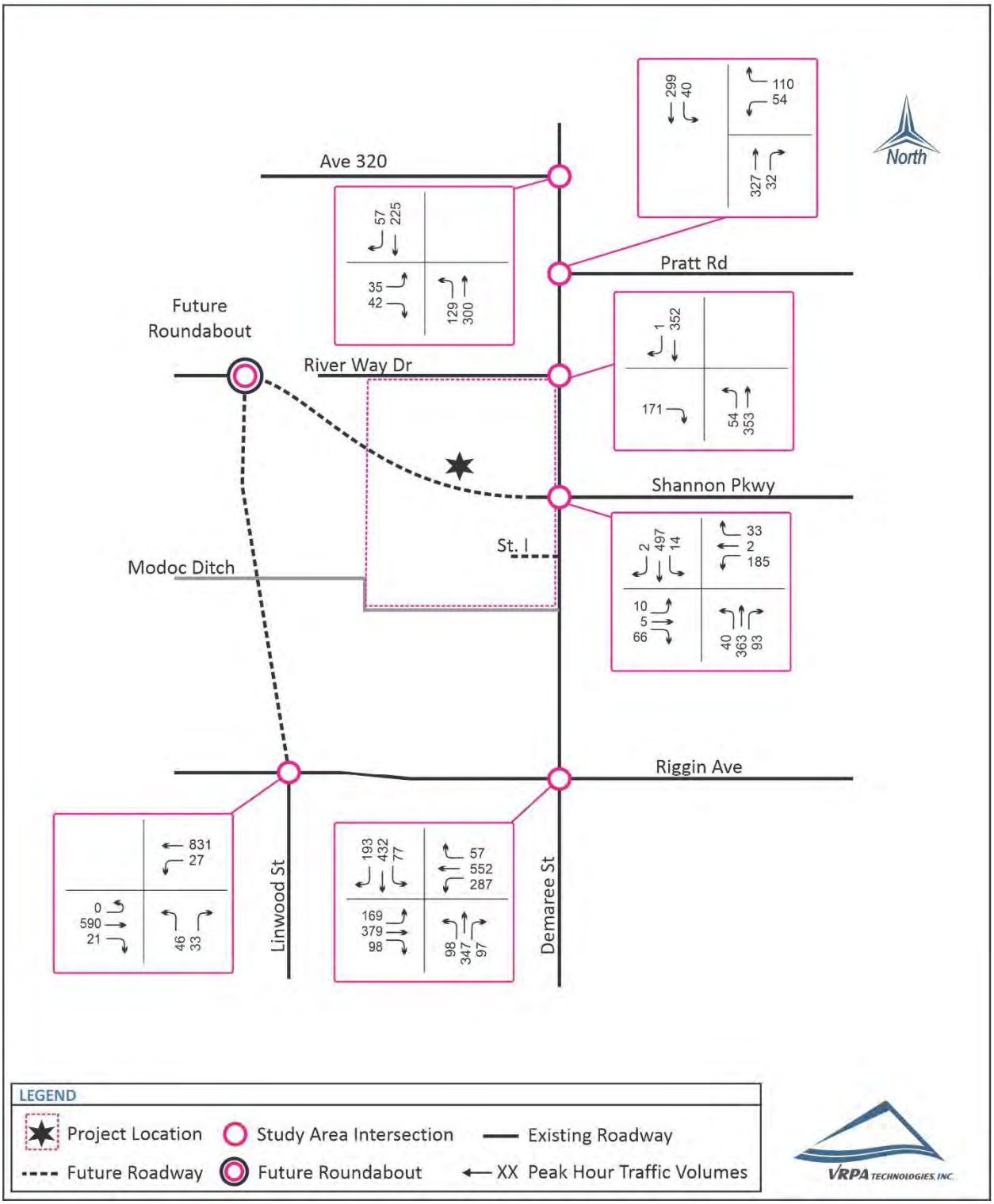
Ritchie Ranch Residential Development
Opening Year (2026) PM Peak Hour Traffic

Figure 3-5



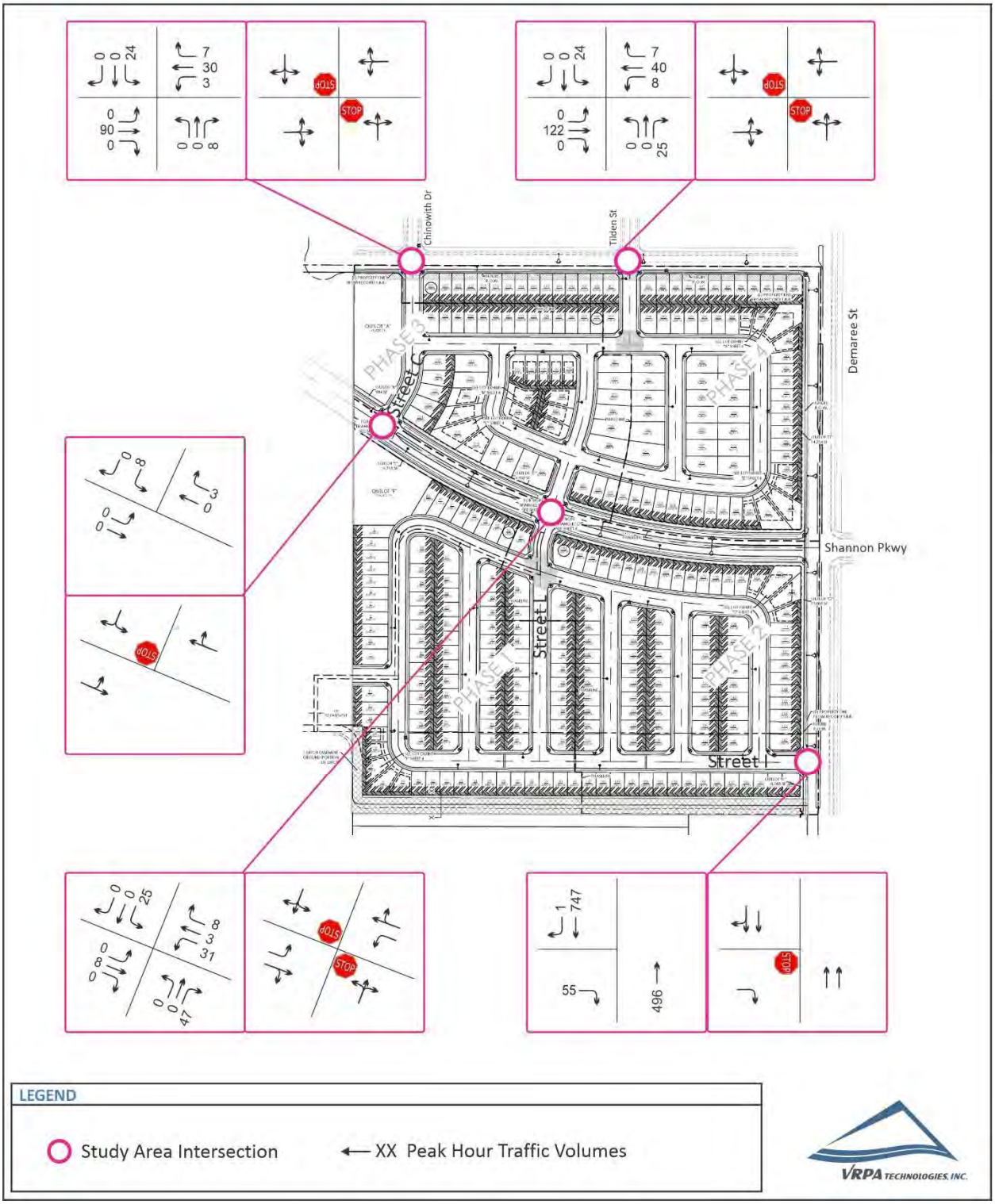
Ritchie Ranch Residential Development
Opening Year (2026) Plus Project AM Peak Hour Traffic

Figure 3-6a



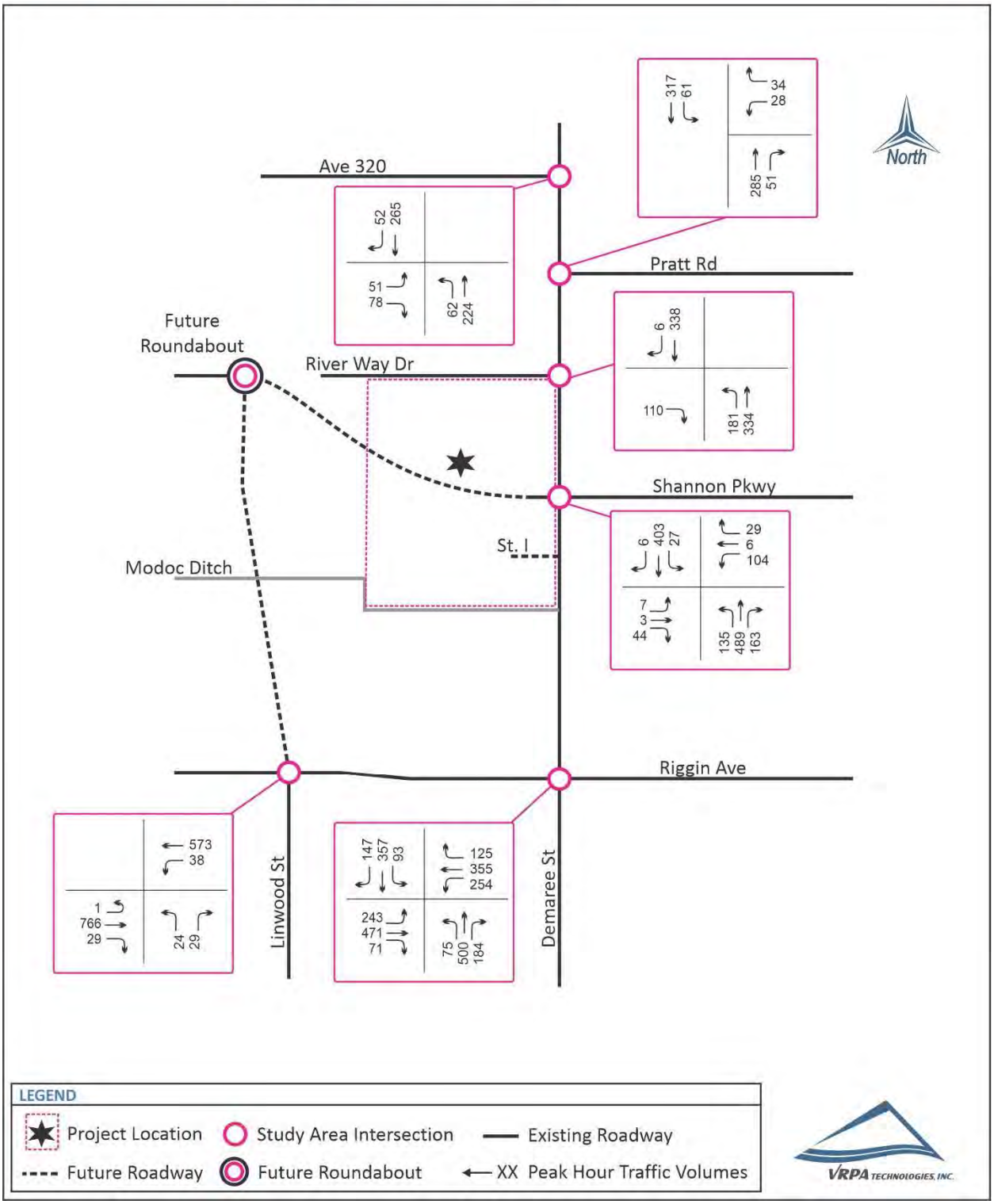
Ritchie Ranch Residential Development
Opening Year (2026) Plus Project AM Peak Hour Traffic

Figure 3-6b



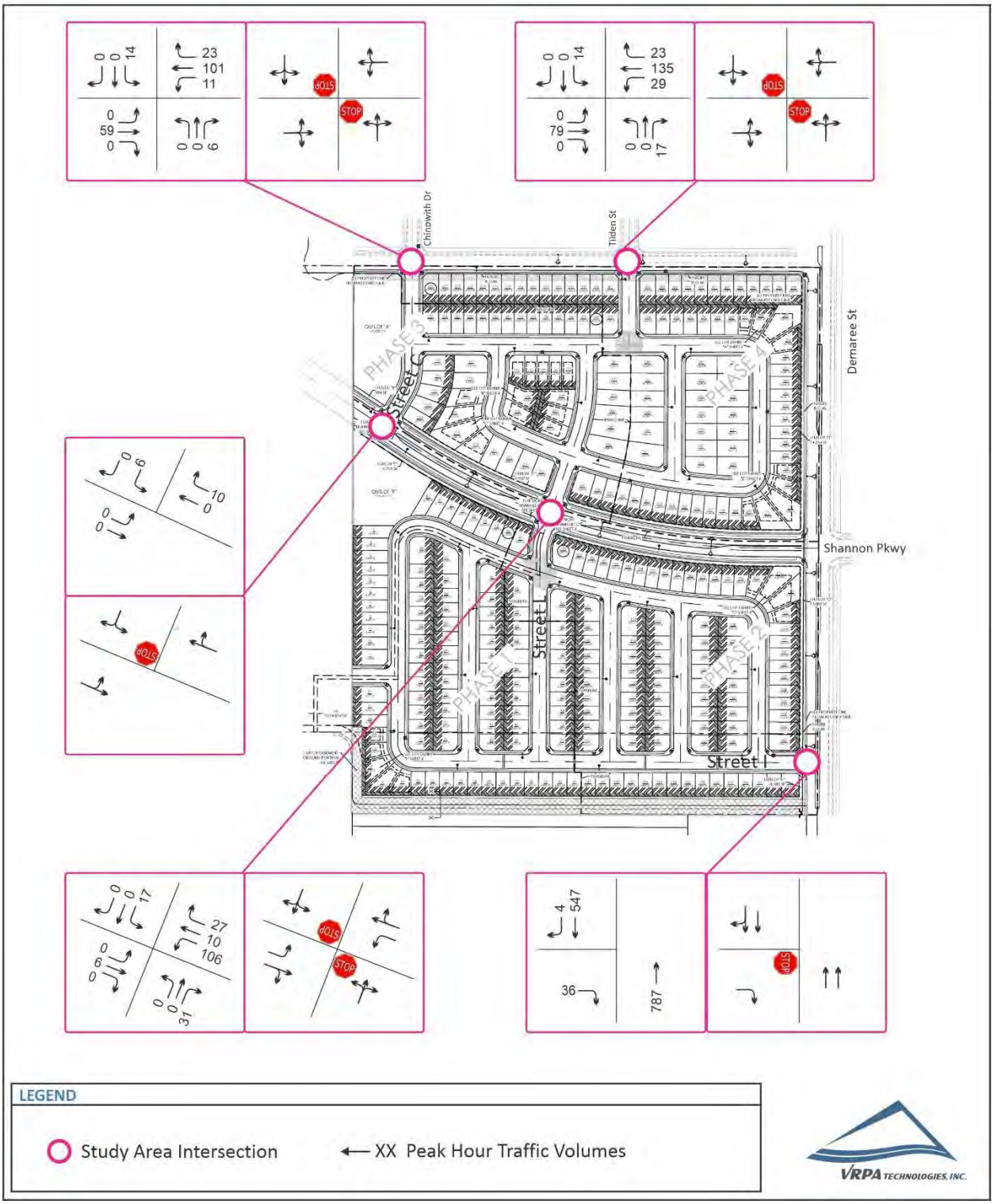
Ritchie Ranch Residential Development
Opening Year (2026) Plus Project PM Peak Hour Traffic

Figure 3-7a

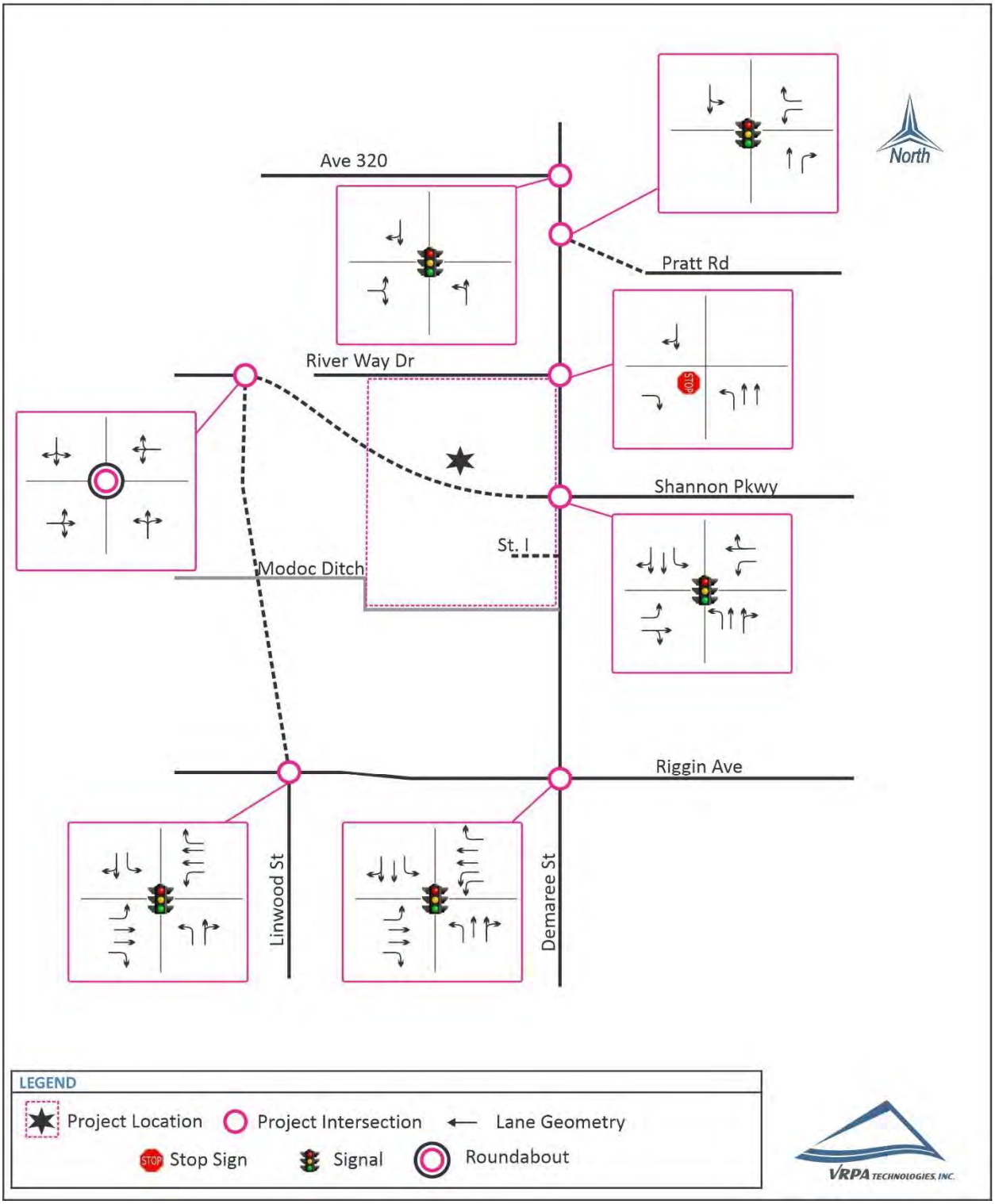


Ritchie Ranch Residential Development
Opening Year (2026) Plus Project PM Peak Hour Traffic

Figure 3-7b

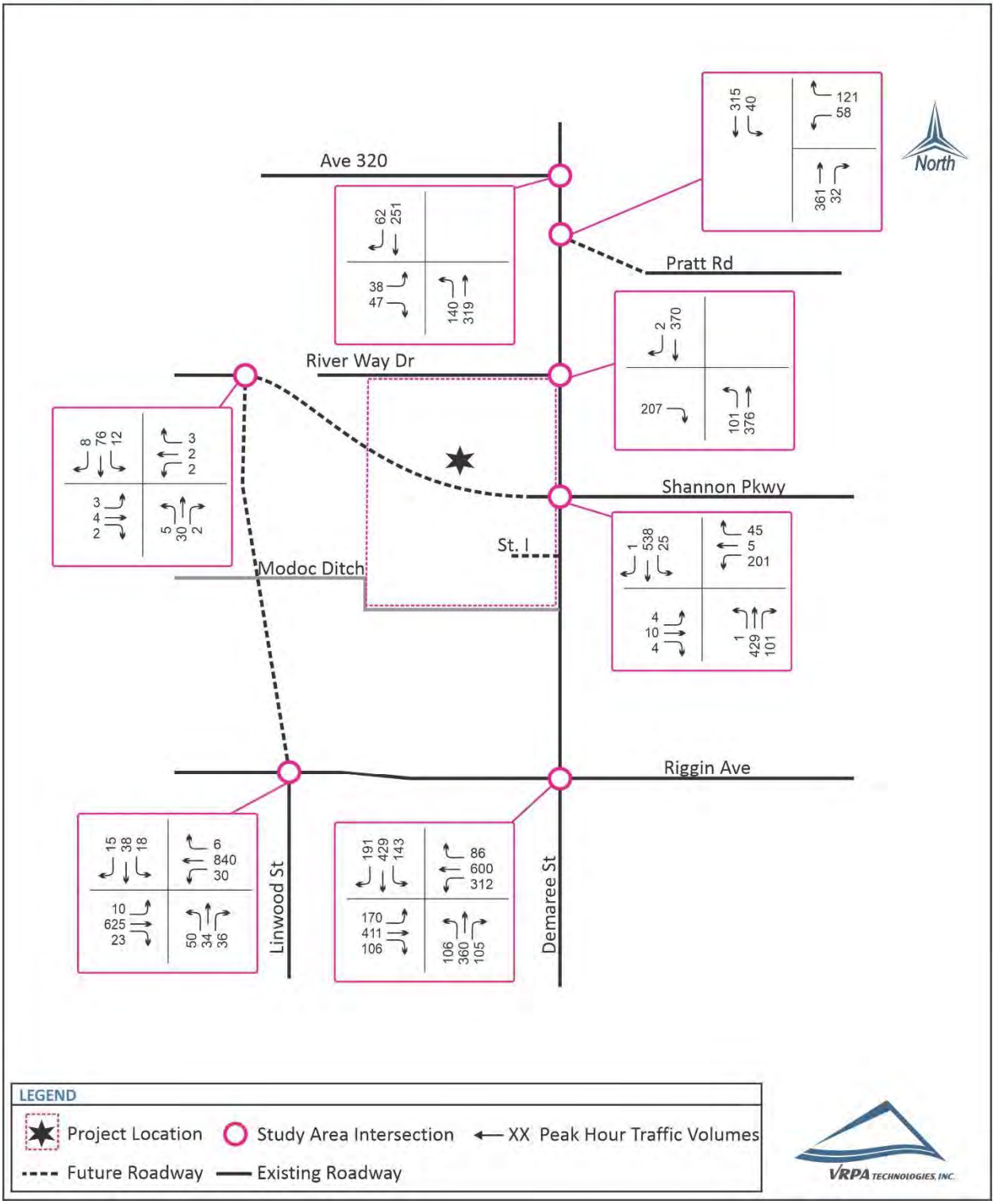


Ritchie Ranch Residential Development **Figure 3-8**
Future Year (2030) Lane Geometry



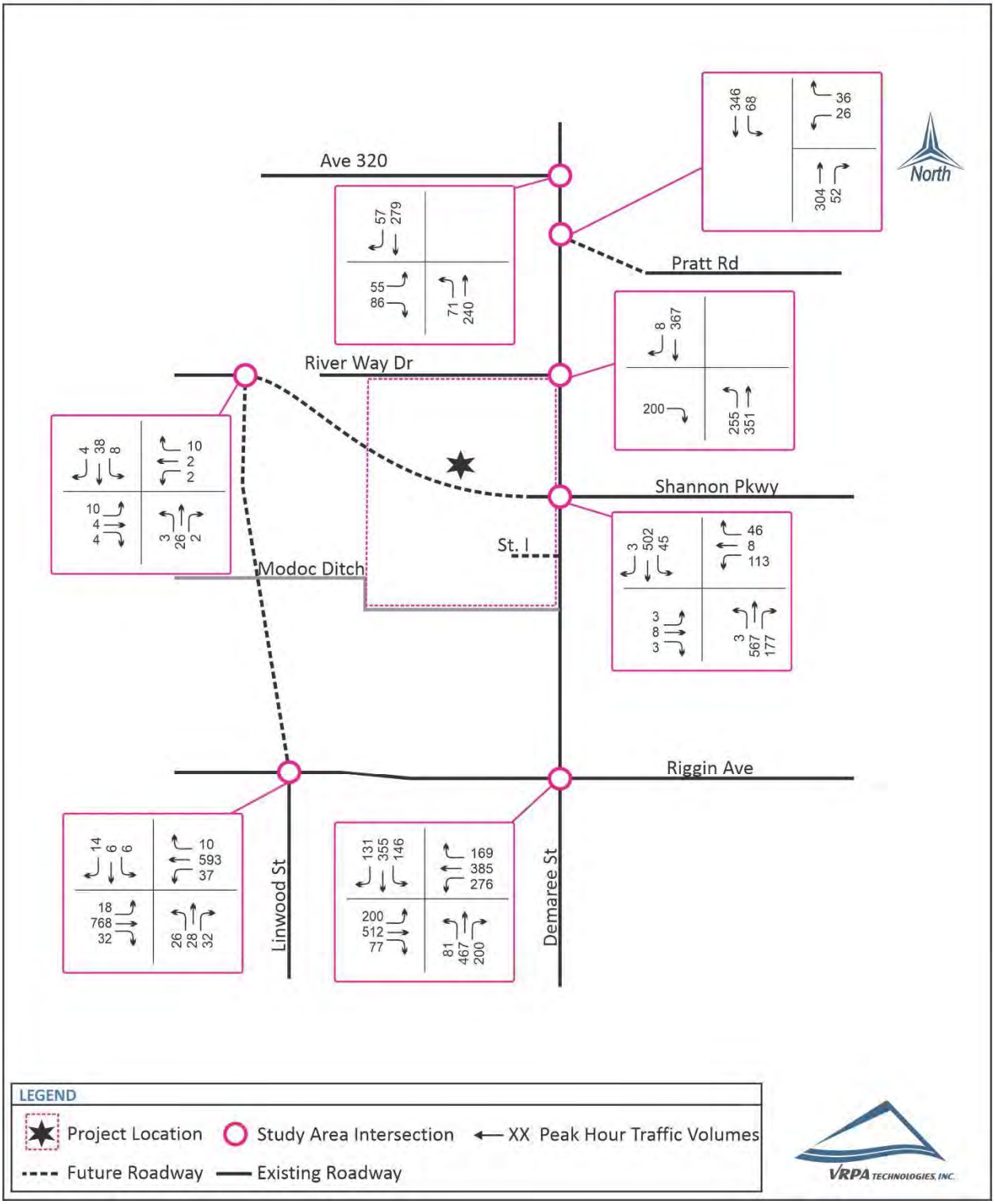
Ritchie Ranch Residential Development
Future Year (2030) AM Peak Hour Traffic

Figure 3-9



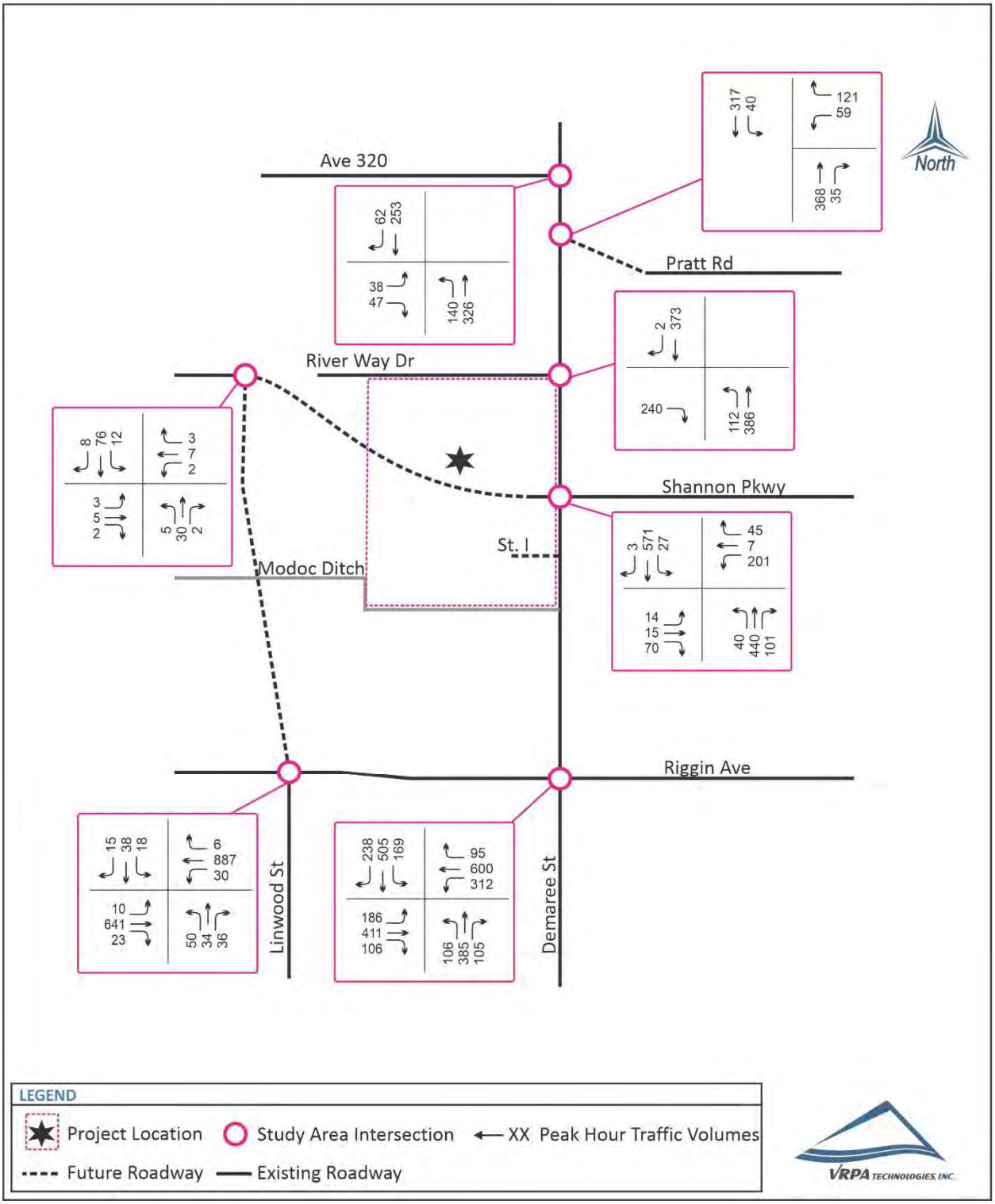
Ritchie Ranch Residential Development
Future Year (2030) PM Peak Hour Traffic

Figure 3-10



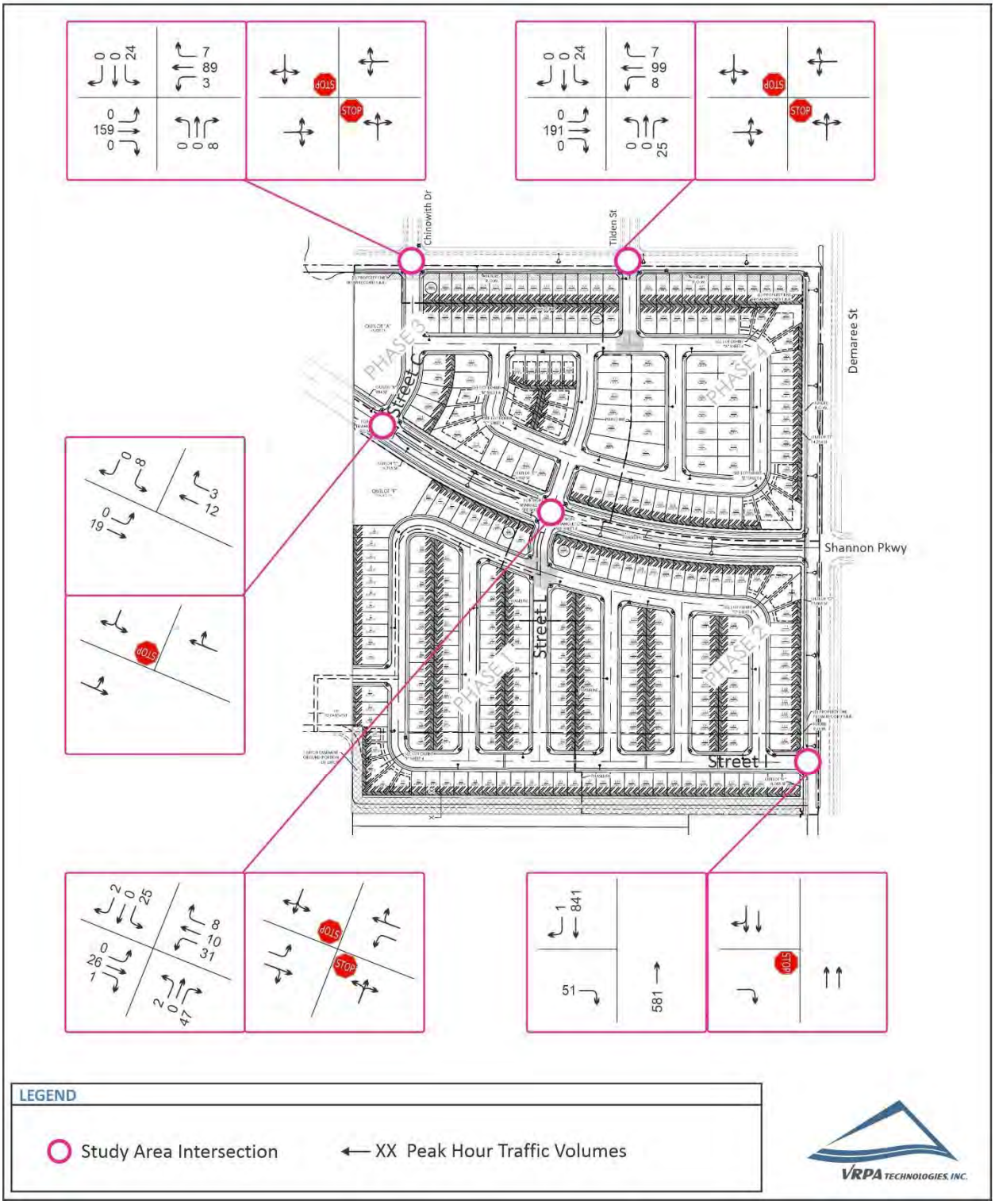
Ritchie Ranch Residential Development
Future Year (2030) Plus Project AM Peak Hour Traffic

Figure 3-11a



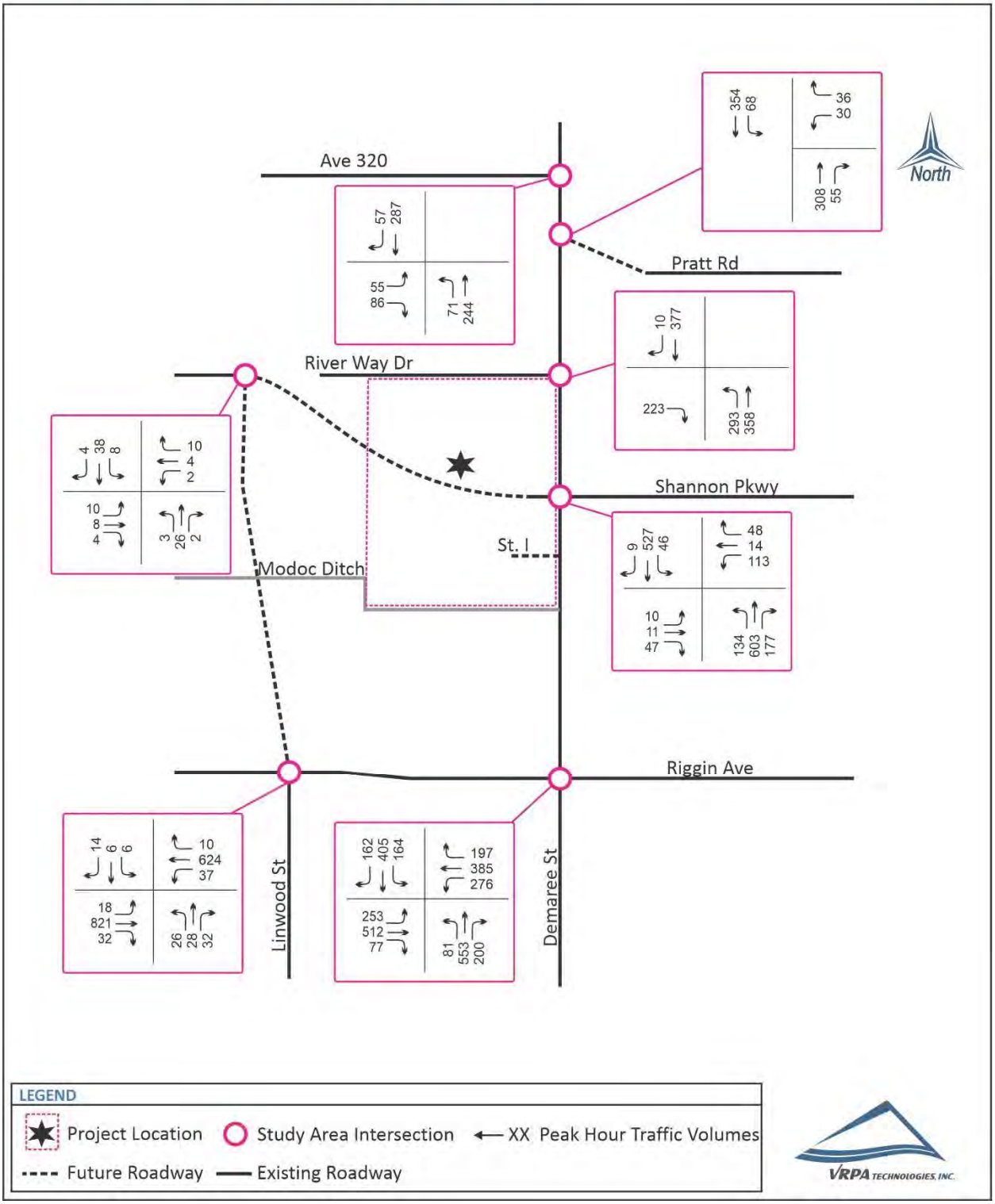
Ritchie Ranch Residential Development
Future Year (2030) Plus Project AM Peak Hour Traffic

Figure 3-11b



Ritchie Ranch Residential Development
Future Year (2030) Plus Project PM Peak Hour Traffic

Figure 3-12a



Ritchie Ranch Residential Development
Future Year (2030) Plus Project PM Peak Hour Traffic

Figure 3-12b

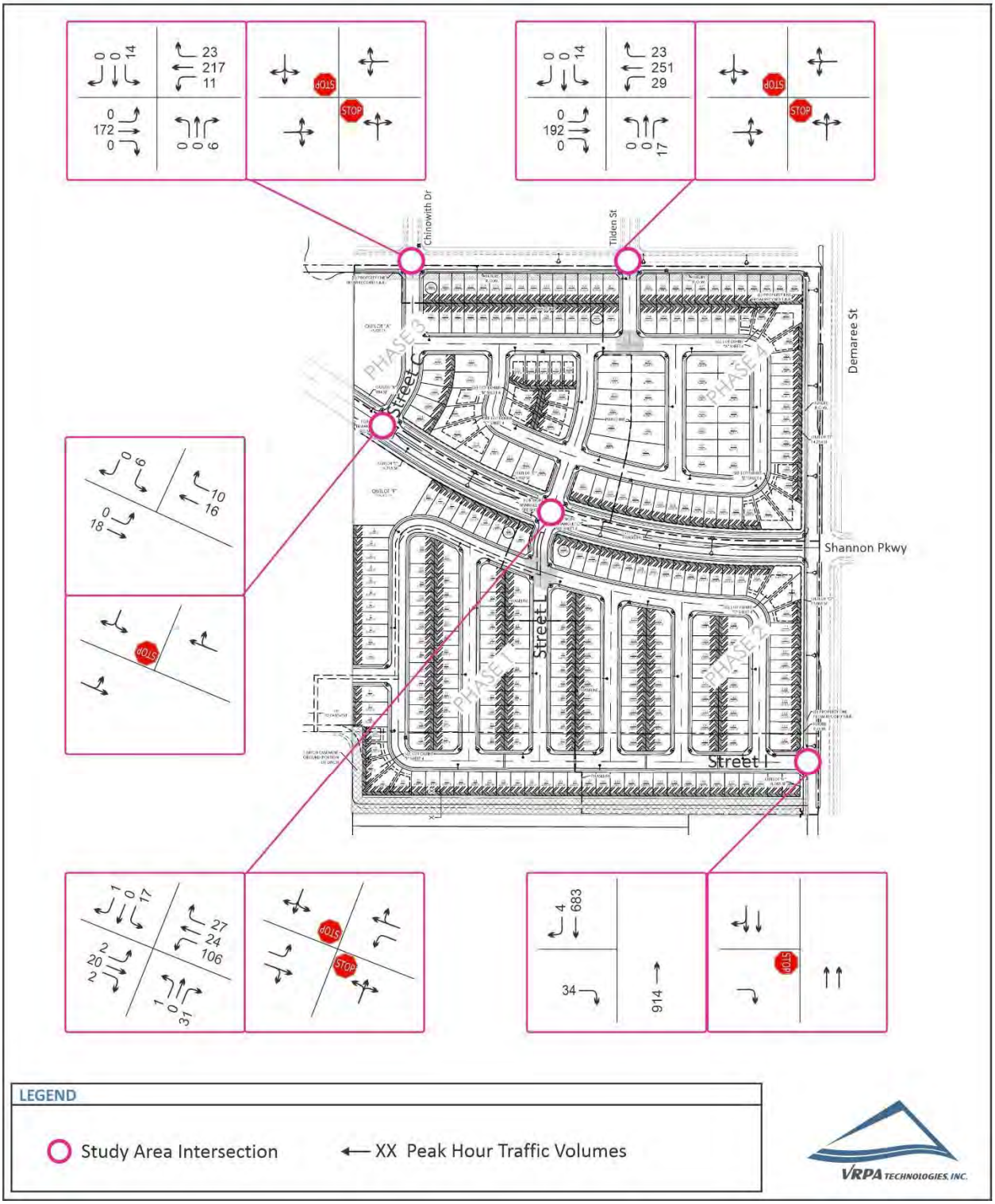


Table 3-2

Future Year 2030 Intersection Operations

INTERSECTION	CONTROL	TARGET LOS	PEAK HOUR	FUTURE YEAR 2030		FUTURE YEAR 2030 PLUS PROJECT	
				DELAY	LOS	DELAY	LOS
1. Demaree St/Ave 320	Signalized	D	AM	5.1	A	5.1	A
			PM	6.1	A	6.1	A
2. Demaree St/Pratt Rd	Signalized	D	AM	6.1	A	6.1	A
			PM	4.4	A	4.4	A
3. Demaree St/River Way Dr	One-Way Stop	D	AM	14.1	B	15.1	C
			PM	13.8	B	14.6	B
4. Demaree St/Shannon Pkwy	Signalized	D	AM	15.0	B	17.4	B
			PM	13.2	B	17.4	B
5. Demaree St/Riggin Ave	Signalized	D	AM	49.0	D	54.9	D
			PM	37.5	D	41.4	D
6. Riggin Ave/ Linwood St	Signalized	D	AM	13.7	B	13.6	B
			PM	13.4	B	13.4	B
7. Chinowith Dr-Street C/River Way Dr	Two-Way Stop	D	AM			10.7	B
			PM			12.4	B
8. Tilden St/River Way Dr	Two-Way Stop	D	AM			11.5	B
			PM			14.1	B
9. Street C/Shannon Pkwy	One-Way Stop	D	AM			8.7	A
			PM			8.8	A
10. Street L/Shannon Pkwy	Two-Way Stop	D	AM			9.7	A
			PM			11.3	B
11. Demaree St/Street I	One-Way Stop	D	AM			12.3	B
			PM			11.2	B
12. Linwood St/Shannon Pkwy	Roundabout	D	AM	2.9	A	3.2	A
			PM	3.2	A	3.0	A

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized and roundabout controlled intersections, delay results show the average for the entire intersection. For one-way and two-way stop controlled intersections, delay results show the delay for the worst movement.

3.5 Queuing Analysis

Tables 3-3 and 3-4 provide a queue length summary for left and right turn lanes at the study intersections for all study scenarios as noted above. Queuing analysis was performed at study intersections utilizing the Synchro 12 software program. Synchro provides the 95th percentile queue for unsignalized intersections in terms of number of vehicles. A vehicle length of 25 feet was applied to estimate the queue length, in feet, for unsignalized intersections when the queue was shown to be less than one vehicle. Synchro also provides the 95th percentile queue for signalized intersections and shows the length of the queue in feet. As shown in Table 3-4, traffic volumes at the westbound left turning movement of the Demaree Street and Shannon Parkway intersection will exceed the existing queue lane storage length for the Opening Year Plus Project study scenario. As shown in Table 3-4, traffic volumes at the southbound left and eastbound left turning movement of the Demaree Street and Riggin Avenue intersection will exceed the existing queue lane storage length for the Future Year 2030 study scenario.

3.6 VMT Analysis

The VMT analysis was conducted according to the City of Visalia's VMT Thresholds and Implementation Guidelines (City of Visalia 2021).

The first step in the VMT analysis was to determine whether the Project was screened out of requiring a detailed VMT analysis based on the screening criteria included in the City of Visalia's VMT guidelines. Based on Figure 6 of the VMT guidelines, the project is located in a low VMT area north of Riggin Avenue and west of Demaree Avenue. Therefore, the project is screened out of requiring a detailed VMT analysis. VMT impacts are presumed to be less than significant and no mitigation measures are required.

3.7 Impacts to Public Transit, Bicycle, and Pedestrian Facilities

The Project does not conflict with any applicable adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. Visalia Transit (VT) operates 13 bus routes that serve Visalia, Farmersville, Exeter, Goshen, and Tulare. Implementation of the Project will not hinder the operation of Route 16 in the City of Visalia which runs along Demaree Avenue.

The City of Visalia's Active Transportation Plan (ATP) identifies goals and objectives to improve conditions for people walking, bicycling, or using other mobility devices throughout the City of Visalia. The proposed Project will not prohibit walking or bicycling throughout the study area or within the Project boundaries. The Project will also include the development of sidewalks throughout the Project site in addition to bike lanes along Shannon Parkway.

As a result, the Project will not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Table 3-3

Existing and Opening Year Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		EXISTING		OPENING YEAR		OPENING YEAR PLUS PROJECT	
			AM Queue	PM Queue	AM Queue	PM Queue	AM Queue	PM Queue
2. Demaree St/Pratt Rd	NB Right[1]	--	0	0	0	0	0	0
	WB Right	200	25	25	25	25	25	25
3. Demaree St/River Way Dr	NB Left	175	0	25	25	25	25	25
4. Demaree St/Shannon Pkwy	NB Left	--					25	25
	SB Left	100	0	25	0	25	25	25
	EB Left	--					25	25
	WB Left	200	73	28	123	48	**290**	178
5. Demaree St/Riggin Ave	NB Left	250	132	99	136	105	139	108
	SB Left	200	83	71	84	107	113	128
	EB Left	275	174	166	196	215	213	264
	EB Right	150	21	0	24	0	24	0
	WB Left	2 @ 150	159	131	165	138	163	144
	WB Right	150	0	0	0	20	0	8
6. Riggin Ave/ Linwood St	EB Left	250	0	0	0	0	0	0
	WB Left	250	25	25	25	25	25	25
10. Street L/Shannon Pkwy	EB Left	--					0	0
	WB Left	--					25	25

Queue is measured in feet / **BOLD** denotes exceedance

1 - The northbound number travel lane terminates into right turn at Pratt Road

Table 3-4
Future Year Queuing Operations

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		FUTURE YEAR 2030		FUTURE YEAR 2030 PLUS PROJECT	
			AM Queue	PM Queue	AM Queue	PM Queue
2. Demaree St/Pratt Rd	NB Right[1]	--	7	8	7	8
	WB Right	200	22	16	22	16
3. Demaree St/River Way Dr	NB Left	175	25	25	25	30
4. Demaree St/Shannon Pkwy	NB Left	--	5	10	54	204
	SB Left	100	36	55	41	57
	EB Left	--	11	10	26	20
	WB Left	200	149	100	161	103
5. Demaree St/Riggin Ave	NB Left	250	153	115	153	115
	SB Left	200	**234**	178	**289**	198
	EB Left	275	214	227	246	**307**
	EB Right	150	32	3	32	3
	WB Left	2 @ 150	177	154	177	154
	WB Right	150	14	45	21	66
6. Riggin Ave/ Linwood St	NB Left	--	53	33	53	33
	SB Left	--	29	14	29	14
	EB Left	250	19	27	19	27
	EB Right	--	0	0	0	0
	WB Left	250	39	44	39	44
	WB Right	--	0	0	0	0
10. Street L/Shannon Pkwy	EB Left	--			0	0
	WB Left	--			25	25

Queue is measured in feet / **BOLD** denotes exceedance

1 - The northbound number travel lane terminates into right turn at Pratt Road

3.8 Study Area Collision Data

The Project does not conflict with any The Transportation Injury Mapping System (TIMS) provided by University of California, Berkeley was used to evaluate traffic collisions in the study area. TIMS utilizes geocoded data provided by the Statewide Integrated Traffic Records System (SWITRS). SWITRS is a tool used by California Highway Patrol (CHP) and other Allied Agencies throughout California and includes various types of statistical reports and data. The database serves as a means to collect and process data gathered from a collision scene. Information from the TIMS database shows that approximately 48 injury accidents have occurred throughout the study area during the 5-year period between January 1st, 2019, and December 31st, 2023. A graphical representation of traffic collisions throughout the study area for the 5-year period reflected above is provided in Figure 3-13. More detailed collision data is provided in Appendix C. The Tulare County region had approximately 9,100 injury accidents and 371 fatal accidents over the same timeframe referenced above. Injury accidents in the study area represent 0.5% of incidents that occurred in the Tulare County Region. Broadside collisions represent 38% of the accidents in the study area while rear end collisions represent 25%. Unsafe Speed ranked as the highest primary crash factor at 29% of accidents in the study area. Automobile right-of-way was the second highest primary crash factor at 23%.

3.9 Deceleration Lane Analysis

The characteristics of roadways near the Project site were compared to the criteria for deceleration lanes listed in the City of Visalia's Procedures for Traffic Impact Analysis (March 2021). The results are as follows:

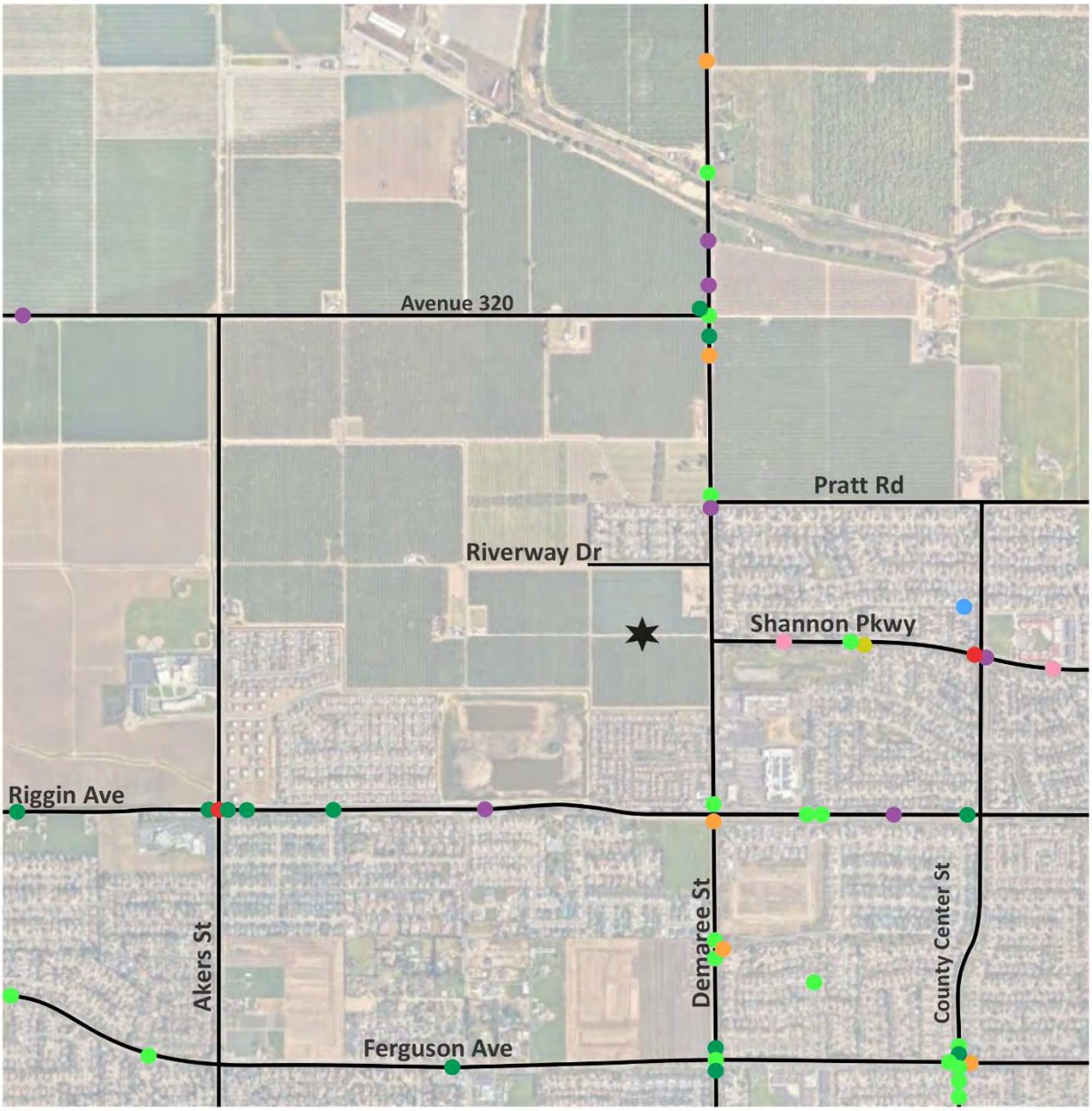
- ✓ Traffic Levels on Adjacent Street: Of the roadways adjacent to the project site, only Demaree Street meets the criterion of 5,000 vehicles per day in the near future.

- ✓ Speed: Of the roadways adjacent to the project site, Demaree Street and Shannon Parkway meet the criterion of speeds of 35 or greater.

- ✓ Driveway Traffic Levels: None of the Project driveways meet the criteria of 1,000 vehicles per day or 40 right turns in a one-hour period.

Since the driveway criteria are not met, deceleration lanes are not required for the Project driveways.

Ritchie Ranch Residential Development **Figure 3-13**
Existing Study Area Collision Map (01/01/2019 - 12/31/2023)



4.0 Mitigation

As discussed in Chapter 3.0, Traffic Impacts, all study area intersections are expected to operate at level of service D or better under the Existing and Opening Year scenarios except for the Demaree Street and Shannon Parkway intersection. It should be noted that this intersection does not meet peak hour signal warrants because the minor approach does not carry enough traffic to justify signalization.

All of the study area intersections are expected to operate at level of service D or better with or without the Project for Future Year 2030 conditions. By 2030, traffic signals are expected to be needed at intersections in the study area. At the Demaree Street/Shannon Parkway intersection, it is recommended that the Project applicant work with the City of Visalia to determine the responsibility for installation of the traffic signal. Traffic signals at the other locations are expected to be the responsibility of other projects, although the Project may be asked to provide a fair share contribution per City of Visalia standards.

Table 4-1 provides a summary of the timing of signalization for study intersections. It should be noted that the City of Visalia uses California Manual on Uniform Traffic Control Devices (CA MUTCD) Warrant 1 (Eight-Hour Vehicular Volume) when considering an intersection for signalization. The City of Visalia will ultimately monitor the need for intersection signalization. As noted in the analysis, the intersection of Linwood Street and Riggin Avenue is currently a 'T' intersection. The City recommends signalization of this intersection when warranted and when the north leg of Linwood Street is developed by the City or others. Section 3.3 of the TIS indicates that the signalization of the Demaree Street at Avenue 320 and Demaree Street at Pratt Road intersections are future roadway improvements planned for the Future Year 2030 scenario.

Furthermore, as described in Section 3.6, VMT Analysis, the Project was screened out of requiring a detailed VMT impacts and determined to have a less than significant VMT impact.

4.1 Recommended Improvements

As shown in Table 3-5, traffic volumes at the southbound left and eastbound left turning movement of the Demaree Street and Riggin Avenue intersection will exceed the existing queue lane storage length for the Future Year 2030 study scenario. Recommended storage pocket lengths are presented in Table 4-2 considering the Future Year 2030 study scenario. The timing of recommended storage pocket length improvements is shown below:

Opening Year Plus Project

- ✓ Demaree Street at Shannon Parkway
  - Provide a 300-foot northbound left turn storage pocket.
  - Provide a 100-foot eastbound left turn storage pocket.

✓ Street L at Shannon Parkway
- Provide a 100-foot eastbound left turn storage pocket.
- Provide a 100-foot westbound left turn storage pocket.

Future Year 2030 Plus Project

✓ Demaree Street at Riggin Avenue
- Providing a 300-foot southbound left turn storage pocket would alleviate excessive queuing at the intersection. However, there is insufficient space to extend the southbound left due to the constraint of the northbound left turn pocket at the Demaree Street and Jerome Avenue intersection.

  Providing dual left turn lanes at the southbound approach would also alleviate excessive queuing at the intersection. However, the existing pavement width of approximately 64 feet will not accommodate an additional southbound left turn lane. Increasing the green time for the southbound left turning movement could also alleviate excessive queuing but this would potentially cause the intersection delay to fall below the City of Visalia's acceptable level of service criteria. The City of Visalia will monitor signal timing at the intersection and make adjustments as necessary to maximize vehicular flow at the intersection.

- Provide a 300-foot eastbound left turn storage pocket.

✓ Linwood Street at Riggin Avenue

The City of Visalia will monitor the need for intersection improvements and signalization since this intersection is currently a 'T' intersection. Once the north leg of Linwood Street is developed by others, the following improvements are recommended.

- Provide a 100-foot northbound left turn storage pocket.
- Provide a 100-foot southbound left turn storage pocket.
- Provide a 100-foot eastbound right turn storage pocket.
- Provide a 100-foot westbound right turn storage pocket

Table 4-1
Timing of Signalization Improvements

INTERSECTION	EXISTING INTERSECTION CONTROL	FUTURE YEAR 2030 PLUS PROJECT INTERSECTION CONTROL	PROJECTED YEAR SIGNAL IMPROVEMENT IS NEEDED	SIGNAL WARRANT MET
1. Demaree St/Ave 320	One-Way Stop	Signalized	2030	N/A
2. Demaree St/Pratt Rd	One-Way Stop	Signalized	2030	N/A
3. Demaree St/River Way Dr	One-Way Stop	One-Way Stop	N/A	N/A
4. Demaree St/Shannon Pkwy	One-Way Stop	Signalized	Future Year 2030 Without Project scenario	CA MUTCD Warrant 3 (Peak Hour)
5. Demaree St/Riggin Ave	Signalized	Signalized	N/A	N/A
6. Linwood St/Riggin Ave	One-Way Stop	Signalized	Future Year 2030 Plus Project scenario	CA MUTCD Warrant 3 (Peak Hour)

Table 4-2
Left Turn and Right Turn Storage Requirements

INTERSECTION	EXISTING QUEUE STORAGE LENGTH (ft)		FUTURE YEAR 2030 RECOMMENDED STORAGE LENGTH (ft)
2. Demaree St/Pratt Rd	NB Right[1]	--	--
	WB Right	200	200
3. Demaree St/River Way Dr	NB Left	175	175
4. Demaree St/Shannon Pkwy	NB Left	--	**300**
	SB Left	100	100
	EB Left	--	**100**
	WB Left	200	200
5. Demaree St/Riggin Ave	NB Left	250	250
	SB Left	200	**300**
	EB Left	275	**300**
	EB Right	150	150
	WB Left	2 @ 150	2 @ 150
	WB Right	150	150
6. Riggin Ave/ Linwood St	NB Left	--	**100**
	SB Left	--	**100**
	EB Left	250	250
	EB Right	--	**100**
	WB Left	250	250
	WB Right	--	**100**
10. Street L/Shannon Pkwy	EB Left	--	**100**
	WB Left	--	**100**

BOLD denotes change in storage pocket length

1 - The northbound number travel lane terminates into right turn at Pratt Road

APPENDIX A

Traffic Count Data Worksheets

Prepared by National Data & Surveying Services

N Demaree St/Rd 108 & Ave 320

Peak Hour Turning Movement Count

ID: 24-060020-002
City: Visalia

Day: Thursday
Date: 9/5/2024

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	7:00 AM - 09:00 AM
NONE	NONE
04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND — N Demaree St/Rd 108

AM	55	222	0	0	316	AM
NOON	0	0	0	0	0	NOON
PM	50	247	0	0	261	PM

EASTBOUND — Ave 320

AM	NOON	PM	
174	0	107	
0	0	0	0
34	0	49	0
0	0	0	1
39	0	70	0
AM	NOON	PM	

WESTBOUND — Ave 320

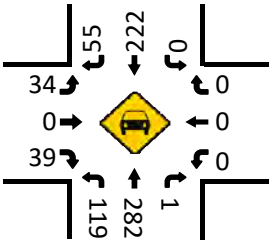
PM	NOON	AM	
0	0	0	0
0	0	0	1
0	0	0	0
0	0	0	0
0	0	1	
PM	NOON	AM	

NORTHBOUND — N Demaree St/Rd 108

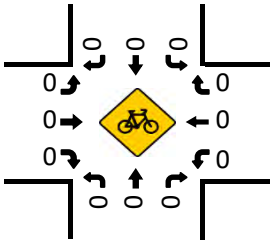
PM	317	0	57	212	0	PM
NOON	0	0	0	0	0	NOON
AM	261	0	119	282	1	AM

CONTROL			
1-Way Stop(EB)			
TEV	752 AM	0 NOON	685 PM
PHF	0.87		0.88

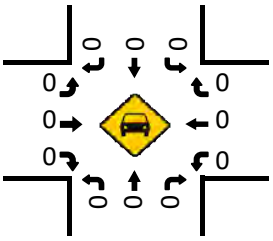
Totals (AM)



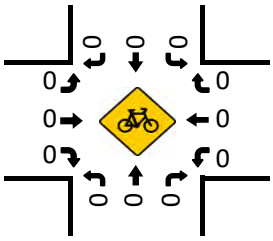
Total Bikes (AM)



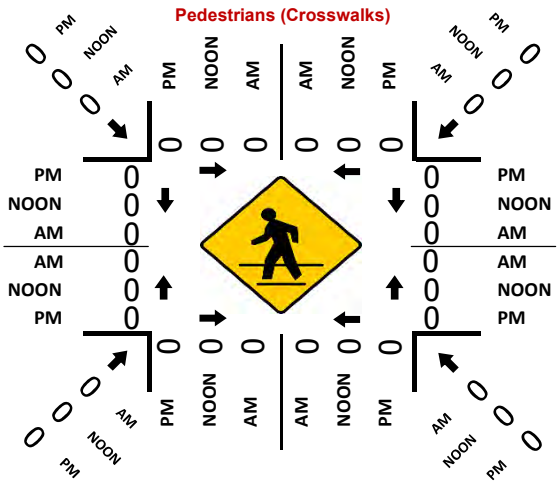
Totals (NOON)



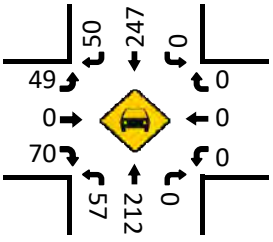
Total Bikes (NOON)



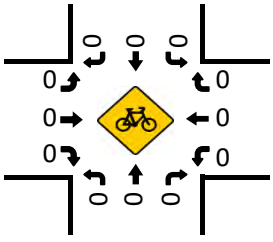
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



Prepared by National Data & Surveying Services

N Demaree St & Pratt Rd

Peak Hour Turning Movement Count

ID: 24-060014-004
City: Visalia

Day: Tuesday
Date: 8/20/2024

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	7:00 AM - 09:00 AM
NONE	NONE
04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND (N Demaree St)

AM	0	253	28	0	406	AM
NOON	0	0	0	0	0	NOON
PM	0	276	52	0	255	PM

EASTBOUND (Pratt Rd)

AM	NOON	PM	
0	0	0	⇦
0	0	0	↶ 0
0	0	0	↱ 0
0	0	0	→ 0
0	0	0	↴ 0
AM	NOON	PM	

WESTBOUND (Pratt Rd)

PM	NOON	AM	
22	0	103	1 ↰
0	0	0	0 ←
23	0	51	1 ↲
0	0	0	0 ↩
98	0	56	⇨
PM	NOON	AM	

NORTHBOUND (N Demaree St)

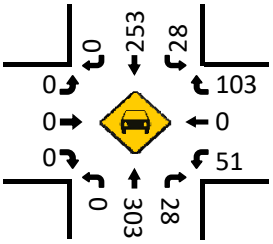
PM	300	1	0	233	46	PM
NOON	0	0	0	0	0	NOON
AM	304	0	0	303	28	AM

CONTROL

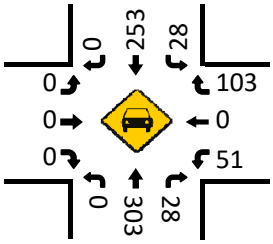
1-Way Stop(WB)

TEV	766 AM	0 NOON	653 PM
PHF	0.85		0.93

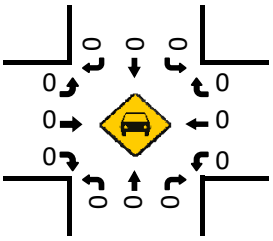
Totals (AM)



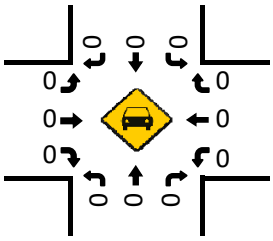
Totals (AM)



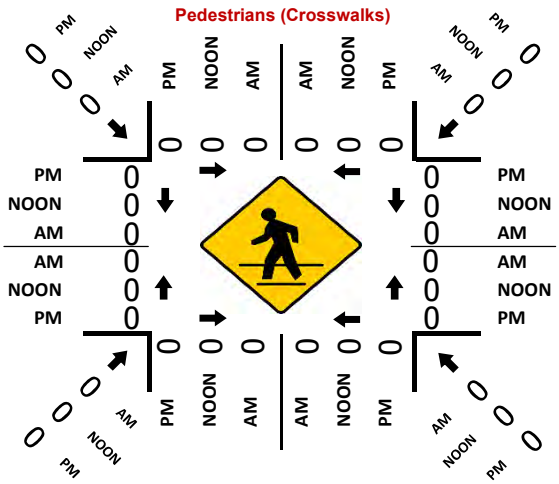
Totals (NOON)



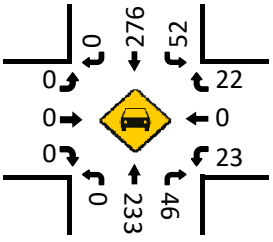
Totals (NOON)



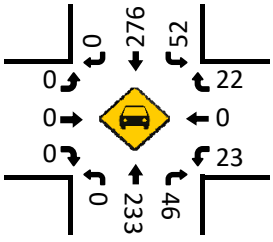
Pedestrians (Crosswalks)



Totals (PM)



Totals (PM)



Prepared by National Data & Surveying Services

N Demaree St & River Way Dr

Peak Hour Turning Movement Count

ID: 24-060014-003
City: Visalia

Day: Tuesday
Date: 8/20/2024

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	7:00 AM - 09:00 AM
NONE	NONE
04:45 PM - 05:45 PM	4:00 PM - 06:00 PM

SOUTHBOUND (N Demaree St)

	L	T	R	U	Total	
AM	1	303	0	0	330	AM
NOON	0	0	0	0	0	NOON
PM	4	297	0	0	278	PM

EASTBOUND (River Way Dr)

	L	T	R	U	Total	
AM	0	1	0	0	1	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	0	PM

WESTBOUND (River Way Dr)

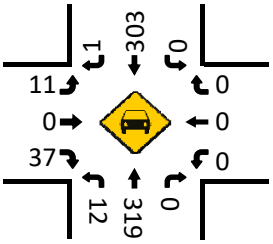
	L	T	R	U	Total	
AM	13	0	44	0	57	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	0	PM

NORTHBOUND (N Demaree St)

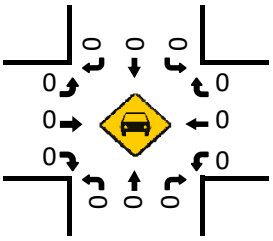
	L	T	R	U	Total	
AM	37	0	27	0	64	AM
NOON	11	0	1	0	12	NOON
PM	0	0	0	0	0	PM

CONTROL	AM	NOON	PM
1-Way Stop(EB)			
TEV	684	0	648
PHF	0.88		0.89

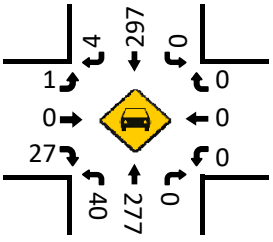
Totals (AM)



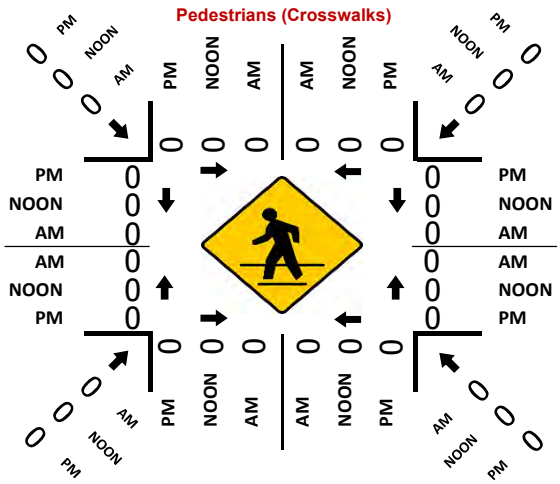
Totals (NOON)



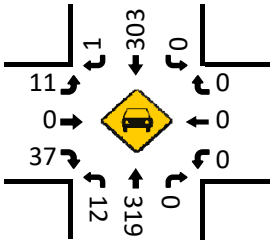
Totals (PM)



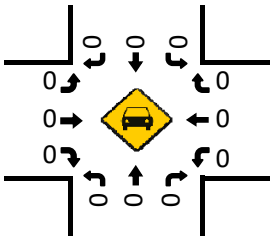
Pedestrians (Crosswalks)



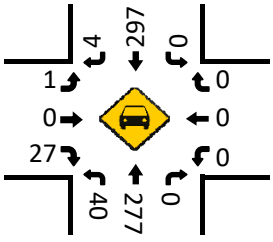
Totals (AM)



Totals (NOON)



Totals (PM)



Prepared by National Data & Surveying Services

N Demaree St & Shannon Pkwy

Peak Hour Turning Movement Count

ID: 24-060014-002
City: Visalia

Day: Tuesday
Date: 8/20/2024

PEAK HOURS

AM: 07:15 AM - 08:15 AM
NOON: NONE
PM: 05:00 PM - 06:00 PM

COUNT PERIODS

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

SOUTHBOUND (N Demaree St)

AM	0	338	3	0	331	AM
NOON	0	0	0	0	0	NOON
PM	0	292	19	0	328	PM

EASTBOUND (Shannon Pkwy)

AM	NOON	PM	
0	0	0	⇦
0	0	0	↩ 0
0	0	0	↱ 0
0	0	0	→ 0
0	0	0	↴ 0
AM	NOON	PM	

WESTBOUND (Shannon Pkwy)

PM	NOON	AM	
15	0	29	↰ 0
0	0	0	← 1
100	0	178	↰ 0
0	0	0	↩ 0
176	0	92	⇨
PM	NOON	AM	

NORTHBOUND (N Demaree St)

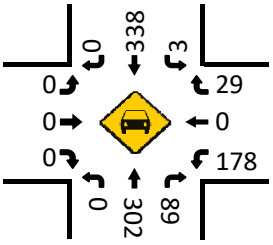
PM	392	0	0	313	157	PM
NOON	0	0	0	0	0	NOON
AM	516	0	0	302	89	AM

Turning movements: 0 2 1 0 (SB) | 0 0 2 0 (NB) | 0 1 0 0 (WB)

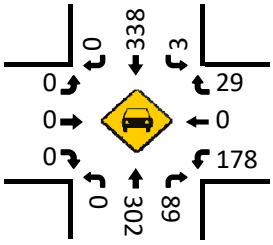
CONTROL: 1-Way Stop(WB)

TEV	939	0	896
	AM	NOON	PM
PHF	0.83		0.90

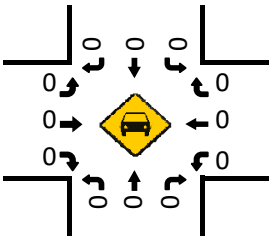
Totals (AM)



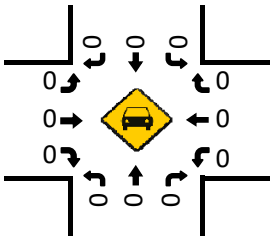
Totals (AM)



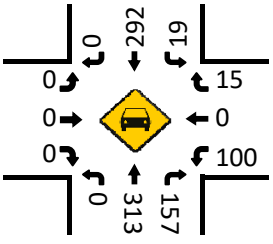
Totals (NOON)



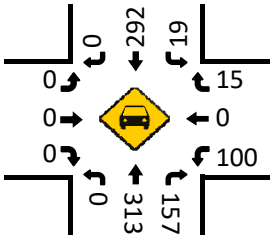
Totals (NOON)



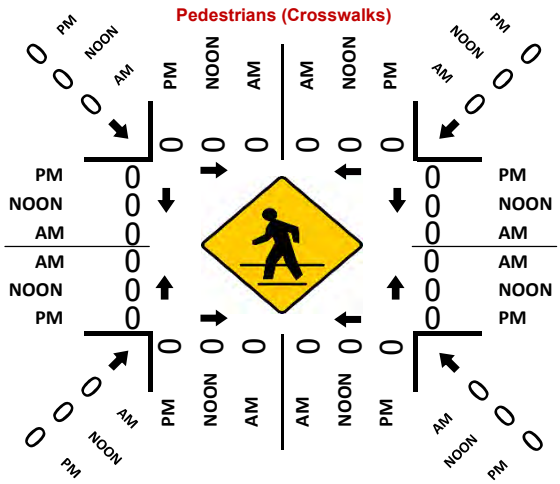
Totals (PM)



Totals (PM)



Pedestrians (Crosswalks)



Prepared by National Data & Surveying Services

N Demaree St & W Riggin Ave

Peak Hour Turning Movement Count

ID: 24-060014-001
City: Visalia

Day: Tuesday
Date: 8/20/2024

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	7:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	4:00 PM - 06:00 PM

SOUTHBOUND (N Demaree St)

	L	T	R	U	Total	
AM	143	349	50	0	467	AM
NOON	0	0	0	0	0	NOON
PM	88	280	45	0	555	PM

EASTBOUND (W Riggin Ave)

	AM	NOON	PM
Through	770	0	504
Left	2	0	3
Right	133	0	139
Through	364	0	453
Right	94	0	68

WESTBOUND (W Riggin Ave)

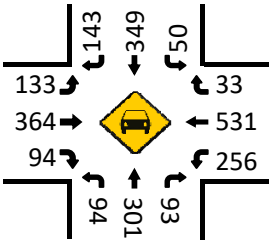
	PM	NOON	AM
Left	46	0	33
Through	341	0	531
Left	202	0	256
U-turn	42	0	20
Through	717	0	527

NORTHBOUND (N Demaree St)

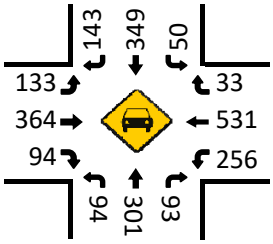
	L	T	R	U	Total	
PM	550	0	72	370	177	PM
NOON	0	0	0	0	0	NOON
AM	699	0	94	301	93	AM

CONTROL			
Signalized			
TEV	2463 AM	0 NOON	2326 PM
PHF	0.81		0.98

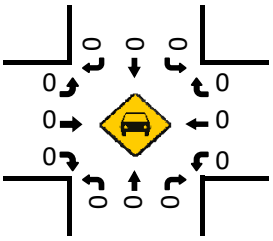
Totals (AM)



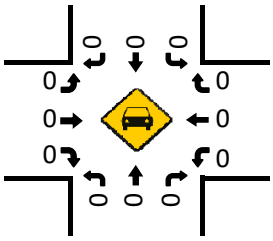
Totals (AM)



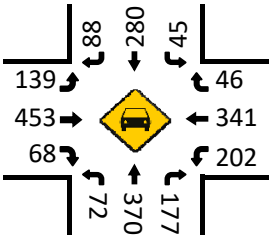
Totals (NOON)



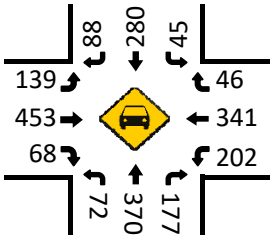
Totals (NOON)



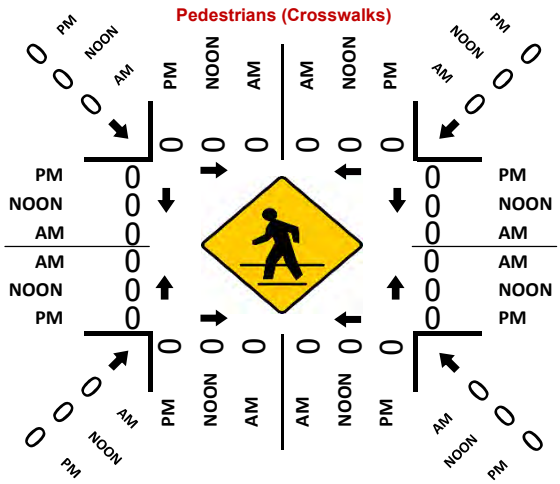
Totals (PM)



Totals (PM)



Pedestrians (Crosswalks)



Prepared by National Data & Surveying Services

N Linwood St/Rd 104 & W Riggin Ave

Peak Hour Turning Movement Count

ID: 24-060020-001
City: Visalia

Day: Thursday
Date: 9/5/2024

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	7:00 AM - 09:00 AM
NONE	NONE
04:30 PM - 05:30 PM	4:00 PM - 06:00 PM

SOUTHBOUND (N Linwood St/Rd 104)

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	0	PM

EASTBOUND (W Riggin Ave)

AM	NOON	PM		
764	0	523	⇦	
0	0	1	↶	0
0	0	0	↱	1
540	0	647	→	2
20	0	28	↴	0
AM	NOON	PM		

WESTBOUND (W Riggin Ave)

PM	NOON	AM		
0	0	0	↰	0
499	0	720	←	2
28	0	17	↰	1
8	0	7	↶	0
681	0	578	⇨	
PM	NOON	AM		

NORTHBOUND (N Linwood St/Rd 104)

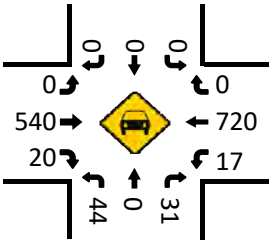
PM	56	0	23	0	26	PM
NOON	0	0	0	0	0	NOON
AM	37	0	44	0	31	AM

CONTROL

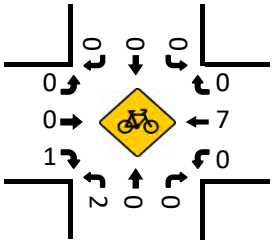
1-Way Stop(NB)

TEV	1379 AM	0 NOON	1260 PM
PHF	0.83		0.91

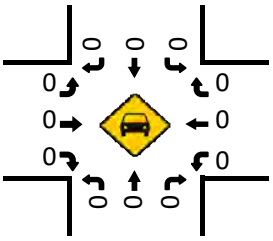
Totals (AM)



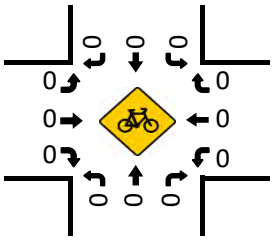
Total Bikes (AM)



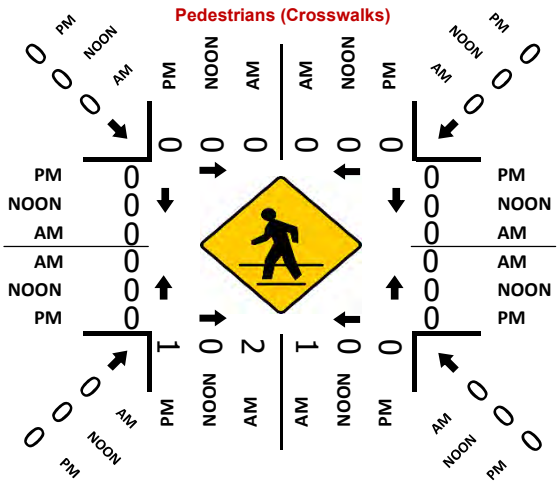
Totals (NOON)



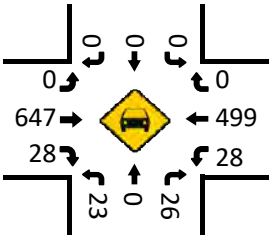
Total Bikes (NOON)



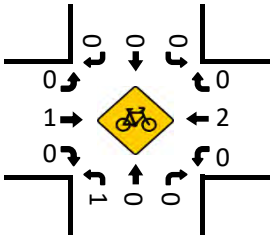
Pedestrians (Crosswalks)



Totals (PM)



Total Bikes (PM)



APPENDIX B

Synchro Worksheets

EXISTING CONDITIONS

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	39	119	282	222	55
Future Vol, veh/h	34	39	119	282	222	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	39	45	137	324	255	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	885	287	318	0	-	0
Stage 1	287	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	314	750	1236	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	272	750	1236	-	-	-
Mov Cap-2 Maneuver	272	-	-	-	-	-
Stage 1	657	-	-	-	-	-
Stage 2	547	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	16	2.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1236	-	412	-	-
HCM Lane V/C Ratio	0.111	-	0.204	-	-
HCM Control Delay (s/veh)	8.3	0	16	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q (veh)	0.4	-	0.8	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	51	103	303	28	28	253
Future Vol, veh/h	51	103	303	28	28	253
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	60	121	356	33	33	298

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	720	356	0	0	389	0
Stage 1	356	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	393	686	-	-	1164	-
Stage 1	707	-	-	-	-	-
Stage 2	701	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	380	686	-	-	1164	-
Mov Cap-2 Maneuver	380	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	677	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	380	686	1164	-
HCM Lane V/C Ratio	-	-	0.158	0.177	0.028	-
HCM Control Delay (s/veh)	-	-	16.2	11.4	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q (veh)	-	-	0.6	0.6	0.1	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	37	13	319	303	1
Future Vol, veh/h	11	37	13	319	303	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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	80
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	13	42	15	363	344	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	557	345	345	0	-	0
Stage 1	345	-	-	-	-	-
Stage 2	212	-	-	-	-	-
Critical Hdwy	6.645	6.245	4.145	-	-	-
Critical Hdwy Stg 1	5.445	-	-	-	-	-
Critical Hdwy Stg 2	5.845	-	-	-	-	-
Follow-up Hdwy	3.5285	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	474	694	1206	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	801	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	468	694	1206	-	-	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	801	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1206	-	625	-	-
HCM Lane V/C Ratio	0.012	-	0.087	-	-
HCM Control Delay (s/veh)	8	-	11.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	178	29	302	89	3	338
Future Vol, veh/h	178	29	302	89	3	338
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	214	35	364	107	4	407

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	630	236	0	0	471	0
Stage 1	418	-	-	-	-	-
Stage 2	212	-	-	-	-	-
Critical Hdwy	6.86	6.96	-	-	4.16	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	-	-	2.23	-
Pot Cap-1 Maneuver	412	763	-	-	1080	-
Stage 1	630	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	410	763	-	-	1080	-
Mov Cap-2 Maneuver	410	-	-	-	-	-
Stage 1	630	-	-	-	-	-
Stage 2	797	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	21.2	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	410	763	1080	-
HCM Lane V/C Ratio	-	-	0.523	0.046	0.003	-
HCM Control Delay (s/veh)	-	-	23	9.9	8.3	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q (veh)	-	-	2.9	0.1	0	-

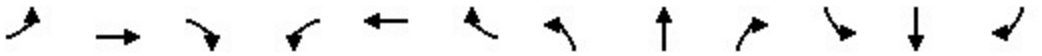
Intersection	
Int Delay, s/veh	1.6

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	0	540	20	24	720	44	31
Future Vol, veh/h	0	540	20	24	720	44	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	250	-	-	250	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83	83
Heavy Vehicles, %	3	3	3	3	3	3	3
Mvmt Flow	0	651	24	29	867	53	37

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	867	0	0	675	0	1155	338
Stage 1	-	-	-	-	-	663	-
Stage 2	-	-	-	-	-	492	-
Critical Hdwy	6.46	-	-	4.16	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.53	-	-	2.23	-	3.53	3.33
Pot Cap-1 Maneuver	401	-	-	905	-	189	655
Stage 1	-	-	-	-	-	471	-
Stage 2	-	-	-	-	-	577	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	401	-	-	905	-	183	655
Mov Cap-2 Maneuver	-	-	-	-	-	183	-
Stage 1	-	-	-	-	-	471	-
Stage 2	-	-	-	-	-	559	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.3	25.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBU	EBT	EBR	WBL	WBT
Capacity (veh/h)	261	401	-	-	905	-
HCM Lane V/C Ratio	0.346	-	-	-	0.032	-
HCM Control Delay (s/veh)	25.9	0	-	-	9.1	-
HCM Lane LOS	D	A	-	-	A	-
HCM 95th %tile Q (veh)	1.5	0	-	-	0.1	-



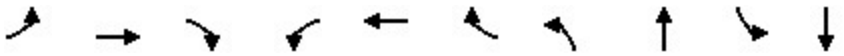
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	364	94	276	531	33	94	301	93	50	349	143
Future Volume (veh/h)	135	364	94	276	531	33	94	301	93	50	349	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	167	449	116	341	656	41	116	372	115	62	431	177
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	201	779	347	423	799	357	145	971	296	87	811	330
Arrive On Green	0.11	0.22	0.22	0.12	0.23	0.23	0.08	0.36	0.36	0.05	0.33	0.33
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2660	812	1767	2445	994
Grp Volume(v), veh/h	167	449	116	341	656	41	116	245	242	62	310	298
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1709	1767	1763	1677
Q Serve(g_s), s	9.3	11.5	6.3	9.8	17.8	2.1	6.5	10.3	10.6	3.5	14.4	14.6
Cycle Q Clear(g_c), s	9.3	11.5	6.3	9.8	17.8	2.1	6.5	10.3	10.6	3.5	14.4	14.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.59
Lane Grp Cap(c), veh/h	201	779	347	423	799	357	145	643	624	87	585	556
V/C Ratio(X)	0.83	0.58	0.33	0.81	0.82	0.12	0.80	0.38	0.39	0.72	0.53	0.54
Avail Cap(c_a), veh/h	329	1063	474	632	1056	471	259	643	624	172	585	556
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	43.8	35.1	33.0	43.0	37.1	31.0	45.5	23.6	23.7	47.3	27.3	27.4
Incr Delay (d2), s/veh	9.0	0.7	0.6	4.7	4.0	0.1	9.6	1.7	1.8	10.5	3.4	3.7
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	4.4	4.7	2.3	4.2	7.7	0.8	3.1	4.3	4.3	1.7	6.2	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	52.8	35.7	33.6	47.7	41.0	31.1	55.1	25.3	25.5	57.7	30.7	31.1
LnGrp LOS	D	D	C	D	D	C	E	C	C	E	C	C
Approach Vol, veh/h		732			1038			603			670	
Approach Delay, s/veh		39.3			42.9			31.1			33.4	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	43.0	18.2	28.5	14.5	39.7	17.7	29.1
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	9.8	36.8	18.6	30.4	14.8	31.8	18.8	* 30
Max Q Clear Time (g_c+I1), s	5.5	12.6	11.8	13.5	8.5	16.6	11.3	19.8
Green Ext Time (p_c), s	0.0	2.6	0.7	2.7	0.1	2.9	0.2	3.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	37.6
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	167	449	116	341	656	41	116	487	62	608
v/c Ratio	0.69	0.56	0.25	0.70	0.80	0.08	0.61	0.39	0.45	0.58
Control Delay (s/veh)	62.6	41.1	5.1	54.4	49.1	0.3	62.8	28.2	62.8	34.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	62.6	41.1	5.1	54.4	49.1	0.3	62.8	28.2	62.8	34.2
Queue Length 50th (ft)	118	152	0	123	237	0	82	136	44	183
Queue Length 95th (ft)	174	185	21	159	276	0	132	175	83	232
Internal Link Dist (ft)		2580			1664			917		1824
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	302	979	537	581	973	534	238	1231	157	1039
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.46	0.22	0.59	0.67	0.08	0.49	0.40	0.39	0.59

Intersection Summary

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	49	70	57	212	247	50
Future Vol, veh/h	49	70	57	212	247	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	56	80	65	241	281	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	681	310	338	0	-	0
Stage 1	310	-	-	-	-	-
Stage 2	371	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	414	728	1216	-	-	-
Stage 1	741	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	388	728	1216	-	-	-
Mov Cap-2 Maneuver	388	-	-	-	-	-
Stage 1	695	-	-	-	-	-
Stage 2	696	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14	1.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1216	-	535	-	-
HCM Lane V/C Ratio	0.053	-	0.253	-	-
HCM Control Delay (s/veh)	8.1	0	14	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q (veh)	0.2	-	1	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	22	233	46	52	276
Future Vol, veh/h	23	22	233	46	52	276
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	25	24	251	49	56	297

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	660	251	0	0	300	0
Stage 1	251	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	426	785	-	-	1255	-
Stage 1	788	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	403	785	-	-	1255	-
Mov Cap-2 Maneuver	403	-	-	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	633	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.2	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	403	785	1255	-
HCM Lane V/C Ratio	-	-	0.061	0.03	0.045	-
HCM Control Delay (s/veh)	-	-	14.5	9.7	8	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q (veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	27	42	277	297	4
Future Vol, veh/h	1	27	42	277	297	4
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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	1	30	47	311	334	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	586	336	338	0	-	0
Stage 1	336	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.645	6.245	4.145	-	-	-
Critical Hdwy Stg 1	5.445	-	-	-	-	-
Critical Hdwy Stg 2	5.845	-	-	-	-	-
Follow-up Hdwy	3.5285	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	455	702	1213	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	437	702	1213	-	-	-
Mov Cap-2 Maneuver	437	-	-	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	10.5	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1213	-	687	-	-
HCM Lane V/C Ratio	0.039	-	0.046	-	-
HCM Control Delay (s/veh)	8.1	-	10.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	100	15	313	157	19	292
Future Vol, veh/h	100	15	313	157	19	292
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	111	17	348	174	21	324

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	639	261	0	0	522	0
Stage 1	435	-	-	-	-	-
Stage 2	204	-	-	-	-	-
Critical Hdwy	6.86	6.96	-	-	4.16	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	-	-	2.23	-
Pot Cap-1 Maneuver	406	735	-	-	1034	-
Stage 1	617	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	398	735	-	-	1034	-
Mov Cap-2 Maneuver	398	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	791	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.5	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	398	735	1034	-
HCM Lane V/C Ratio	-	-	0.279	0.023	0.02	-
HCM Control Delay (s/veh)	-	-	17.5	10	8.6	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q (veh)	-	-	1.1	0.1	0.1	-

Intersection	
Int Delay, s/veh	1

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	647	28	36	499	23	26
Future Vol, veh/h	1	647	28	36	499	23	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	250	-	-	250	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3
Mvmt Flow	1	711	31	40	548	25	29

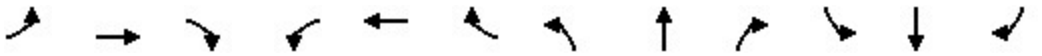
Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	548	0	0	742	0	1083	371
Stage 1	-	-	-	-	-	729	-
Stage 2	-	-	-	-	-	354	-
Critical Hdwy	6.46	-	-	4.16	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.53	-	-	2.23	-	3.53	3.33
Pot Cap-1 Maneuver	641	-	-	854	-	210	623
Stage 1	-	-	-	-	-	436	-
Stage 2	-	-	-	-	-	678	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	641	-	-	854	-	200	623
Mov Cap-2 Maneuver	-	-	-	-	-	200	-
Stage 1	-	-	-	-	-	435	-
Stage 2	-	-	-	-	-	646	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.6	18.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBU	EBT	EBR	WBL	WBT
Capacity (veh/h)	313	641	-	-	854	-
HCM Lane V/C Ratio	0.172	0.002	-	-	0.046	-
HCM Control Delay (s/veh)	18.9	10.6	-	-	9.4	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q (veh)	0.6	0	-	-	0.1	-

HCM 6th Signalized Intersection Summary
5: Demaree Street & Riggin Avenue

05/17/2025



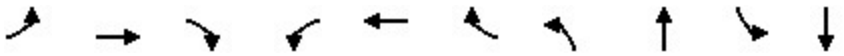
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	453	68	244	341	46	72	370	177	45	280	88
Future Volume (veh/h)	142	453	68	244	341	46	72	370	177	45	280	88
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	145	462	69	249	348	47	73	378	181	46	286	90
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	181	617	275	339	588	262	99	951	449	81	1058	326
Arrive On Green	0.10	0.17	0.17	0.10	0.17	0.17	0.06	0.41	0.41	0.05	0.40	0.40
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2324	1097	1767	2653	818
Grp Volume(v), veh/h	145	462	69	249	348	47	73	285	274	46	188	188
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1658	1767	1763	1708
Q Serve(g_s), s	7.2	11.2	3.4	6.3	8.2	2.3	3.7	10.3	10.5	2.3	6.5	6.7
Cycle Q Clear(g_c), s	7.2	11.2	3.4	6.3	8.2	2.3	3.7	10.3	10.5	2.3	6.5	6.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.66	1.00		0.48
Lane Grp Cap(c), veh/h	181	617	275	339	588	262	99	721	679	81	703	681
V/C Ratio(X)	0.80	0.75	0.25	0.74	0.59	0.18	0.74	0.40	0.40	0.57	0.27	0.28
Avail Cap(c_a), veh/h	448	1129	504	694	949	423	271	721	679	232	703	681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.4	35.2	32.0	39.4	34.6	32.2	41.8	18.7	18.8	42.0	18.2	18.3
Incr Delay (d2), s/veh	7.9	1.8	0.5	3.1	1.0	0.3	10.2	1.6	1.8	6.2	0.9	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	4.6	1.3	2.7	3.4	0.9	1.8	4.1	3.9	1.1	2.5	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	47.3	37.1	32.5	42.5	35.6	32.5	52.0	20.3	20.6	48.3	19.1	19.3
LnGrp LOS	D	D	C	D	D	C	D	C	C	D	B	B
Approach Vol, veh/h		676			644			632			422	
Approach Delay, s/veh		38.8			38.0			24.1			22.4	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	43.0	14.7	21.9	11.2	42.1	15.4	21.2
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	11.8	36.8	18.2	28.8	13.8	34.8	22.8	* 24
Max Q Clear Time (g_c+I1), s	4.3	12.5	8.3	13.2	5.7	8.7	9.2	10.2
Green Ext Time (p_c), s	0.0	3.0	0.6	2.5	0.1	1.9	0.3	1.8

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	31.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	145	462	69	249	348	47	73	559	46	376
v/c Ratio	0.60	0.69	0.16	0.57	0.55	0.11	0.43	0.40	0.31	0.29
Control Delay (s/veh)	52.8	44.4	0.8	47.6	41.9	0.6	53.4	21.9	52.2	23.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	52.8	44.4	0.8	47.6	41.9	0.6	53.4	21.9	52.2	23.7
Queue Length 50th (ft)	89	147	0	78	108	0	45	122	28	82
Queue Length 95th (ft)	166	220	0	131	171	0	99	212	71	150
Internal Link Dist (ft)		2580			1664			917		1824
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	413	1043	563	639	876	495	250	1395	213	1258
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.44	0.12	0.39	0.40	0.09	0.29	0.40	0.22	0.30

Intersection Summary

OPENING YEAR 2026

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	42	129	293	223	57
Future Vol, veh/h	35	42	129	293	223	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	40	48	148	337	256	66

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	922	289	322	0	-	0
Stage 1	289	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	299	748	1232	-	-	-
Stage 1	758	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	255	748	1232	-	-	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	646	-	-	-	-	-
Stage 2	527	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	16.6	2.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1232	-	398	-	-
HCM Lane V/C Ratio	0.12	-	0.222	-	-
HCM Control Delay (s/veh)	8.3	0	16.6	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q (veh)	0.4	-	0.8	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	53	110	320	29	40	297
Future Vol, veh/h	53	110	320	29	40	297
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	62	129	376	34	47	349

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	819	376	0	0	410	0
Stage 1	376	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	344	668	-	-	1143	-
Stage 1	692	-	-	-	-	-
Stage 2	645	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	326	668	-	-	1143	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	612	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.9	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	326	668	1143	-
HCM Lane V/C Ratio	-	-	0.191	0.194	0.041	-
HCM Control Delay (s/veh)	-	-	18.6	11.7	8.3	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q (veh)	-	-	0.7	0.7	0.1	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	138	43	343	349	1
Future Vol, veh/h	0	138	43	343	349	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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	80
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	157	49	390	397	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	398	398	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.245	4.145	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	0	648	1153	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	648	1153	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.3	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1153	-	648	-	-
HCM Lane V/C Ratio	0.042	-	0.242	-	-
HCM Control Delay (s/veh)	8.3	-	12.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	0.1	-	0.9	-	-

Intersection	
Int Delay, s/veh	6.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	185	33	352	93	12	464
Future Vol, veh/h	185	33	352	93	12	464
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	223	40	424	112	14	559

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	788	268	0	0	536	0
Stage 1	480	-	-	-	-	-
Stage 2	308	-	-	-	-	-
Critical Hdwy	6.86	6.96	-	-	4.16	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	-	-	2.23	-
Pot Cap-1 Maneuver	326	727	-	-	1021	-
Stage 1	585	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	321	727	-	-	1021	-
Mov Cap-2 Maneuver	321	-	-	-	-	-
Stage 1	585	-	-	-	-	-
Stage 2	706	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	34	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	321	727	1021	-
HCM Lane V/C Ratio	-	-	0.694	0.055	0.014	-
HCM Control Delay (s/veh)	-	-	38.2	10.2	8.6	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q (veh)	-	-	4.9	0.2	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	0	574	21	27	784	46	33
Future Vol, veh/h	0	574	21	27	784	46	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	250	-	-	250	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83	83
Heavy Vehicles, %	3	3	3	3	3	3	3
Mvmt Flow	0	692	25	33	945	55	40

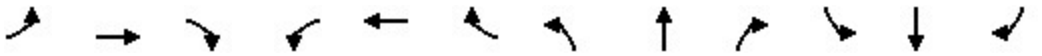
Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	945	0	0	717	0	1244	359
Stage 1	-	-	-	-	-	705	-
Stage 2	-	-	-	-	-	539	-
Critical Hdwy	6.46	-	-	4.16	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.53	-	-	2.23	-	3.53	3.33
Pot Cap-1 Maneuver	357	-	-	873	-	165	635
Stage 1	-	-	-	-	-	448	-
Stage 2	-	-	-	-	-	546	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	357	-	-	873	-	159	635
Mov Cap-2 Maneuver	-	-	-	-	-	159	-
Stage 1	-	-	-	-	-	448	-
Stage 2	-	-	-	-	-	525	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.3	31.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBU	EBT	EBR	WBL	WBT
Capacity (veh/h)	231	357	-	-	873	-
HCM Lane V/C Ratio	0.412	-	-	-	0.037	-
HCM Control Delay (s/veh)	31.1	0	-	-	9.3	-
HCM Lane LOS	D	A	-	-	A	-
HCM 95th %tile Q (veh)	1.9	0	-	-	0.1	-

HCM 6th Signalized Intersection Summary
5: Demaree Street & Riggin Avenue

05/18/2025



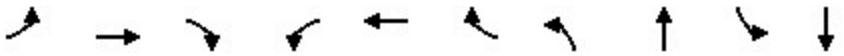
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	379	98	287	552	48	98	322	97	51	356	146
Future Volume (veh/h)	153	379	98	287	552	48	98	322	97	51	356	146
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	189	468	121	354	681	59	121	398	120	63	440	180
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	222	829	370	433	817	365	150	950	283	86	779	316
Arrive On Green	0.13	0.24	0.24	0.13	0.23	0.23	0.09	0.35	0.35	0.05	0.32	0.32
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2677	798	1767	2448	992
Grp Volume(v), veh/h	189	468	121	354	681	59	121	261	257	63	316	304
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1712	1767	1763	1677
Q Serve(g_s), s	10.9	12.1	6.6	10.4	19.1	3.1	7.0	11.6	11.8	3.6	15.4	15.7
Cycle Q Clear(g_c), s	10.9	12.1	6.6	10.4	19.1	3.1	7.0	11.6	11.8	3.6	15.4	15.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.59
Lane Grp Cap(c), veh/h	222	829	370	433	817	365	150	626	608	86	561	534
V/C Ratio(X)	0.85	0.56	0.33	0.82	0.83	0.16	0.81	0.42	0.42	0.74	0.56	0.57
Avail Cap(c_a), veh/h	320	1034	461	615	1027	458	252	626	608	167	561	534
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	44.4	35.0	32.9	44.1	37.9	31.8	46.6	25.3	25.4	48.7	29.4	29.4
Incr Delay (d2), s/veh	13.7	0.6	0.5	5.9	4.9	0.2	9.7	2.0	2.2	11.5	4.0	4.4
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	5.4	5.0	2.5	4.6	8.4	1.2	3.3	4.9	4.8	1.8	6.7	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.1	35.6	33.4	50.0	42.8	32.0	56.3	27.4	27.6	60.2	33.4	33.8
LnGrp LOS	E	D	C	D	D	C	E	C	C	E	C	C
Approach Vol, veh/h		778			1094			639			683	
Approach Delay, s/veh		40.7			44.5			32.9			36.1	
Approach LOS		D			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	43.0	18.9	30.6	15.0	39.2	19.2	30.2
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	9.8	36.8	18.6	30.4	14.8	31.8	18.8	* 30
Max Q Clear Time (g_c+I1), s	5.6	13.8	12.4	14.1	9.0	17.7	12.9	21.1
Green Ext Time (p_c), s	0.0	2.7	0.7	2.8	0.1	2.9	0.2	3.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	39.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	468	121	354	681	59	121	518	63	620
v/c Ratio	0.75	0.57	0.25	0.72	0.82	0.12	0.63	0.42	0.47	0.60
Control Delay (s/veh)	66.5	41.1	5.7	55.7	50.6	0.5	64.4	29.4	63.9	35.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	66.5	41.1	5.7	55.7	50.6	0.5	64.4	29.4	63.9	35.6
Queue Length 50th (ft)	137	162	0	132	255	0	88	154	46	198
Queue Length 95th (ft)	196	193	24	165	288	0	136	187	84	237
Internal Link Dist (ft)		2580			1664			917		1824
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	297	962	530	571	956	528	234	1211	155	1017
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.49	0.23	0.62	0.71	0.11	0.52	0.43	0.41	0.61

Intersection Summary

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	78	62	220	257	52
Future Vol, veh/h	51	78	62	220	257	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	58	89	70	250	292	59

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	712	322	351	0	-	0
Stage 1	322	-	-	-	-	-
Stage 2	390	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	397	717	1202	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	370	717	1202	-	-	-
Mov Cap-2 Maneuver	370	-	-	-	-	-
Stage 1	682	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.5	1.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1202	-	523	-	-
HCM Lane V/C Ratio	0.059	-	0.28	-	-
HCM Control Delay (s/veh)	8.2	0	14.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q (veh)	0.2	-	1.1	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	34	281	48	61	309
Future Vol, veh/h	24	34	281	48	61	309
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	26	37	302	52	66	332

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	766	302	0	0	354	0
Stage 1	302	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	369	735	-	-	1199	-
Stage 1	748	-	-	-	-	-
Stage 2	631	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	344	735	-	-	1199	-
Mov Cap-2 Maneuver	344	-	-	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	588	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.7	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	344	735	1199	-
HCM Lane V/C Ratio	-	-	0.075	0.05	0.055	-
HCM Control Delay (s/veh)	-	-	16.3	10.2	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q (veh)	-	-	0.2	0.2	0.2	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	87	143	327	328	4
Future Vol, veh/h	0	87	143	327	328	4
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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	98	161	367	369	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	371	373	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.245	4.145	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	0	671	1177	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	671	1177	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.3	2.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1177	-	671	-	-
HCM Lane V/C Ratio	0.137	-	0.146	-	-
HCM Control Delay (s/veh)	8.5	-	11.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	0.5	-	0.5	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	104	27	453	163	26	378
Future Vol, veh/h	104	27	453	163	26	378
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	116	30	503	181	29	420

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	862	342	0	0	684	0
Stage 1	594	-	-	-	-	-
Stage 2	268	-	-	-	-	-
Critical Hdwy	6.86	6.96	-	-	4.16	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	-	-	2.23	-
Pot Cap-1 Maneuver	292	651	-	-	898	-
Stage 1	512	-	-	-	-	-
Stage 2	750	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	283	651	-	-	898	-
Mov Cap-2 Maneuver	283	-	-	-	-	-
Stage 1	512	-	-	-	-	-
Stage 2	726	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	23	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	283	651	898	-
HCM Lane V/C Ratio	-	-	0.408	0.046	0.032	-
HCM Control Delay (s/veh)	-	-	26.2	10.8	9.1	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q (veh)	-	-	1.9	0.1	0.1	-

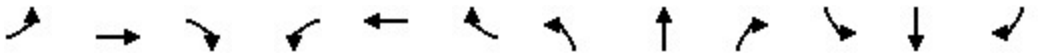
Intersection	
Int Delay, s/veh	1.1

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	713	29	38	542	24	29
Future Vol, veh/h	1	713	29	38	542	24	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	250	-	-	250	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3
Mvmt Flow	1	784	32	42	596	26	32

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	596	0	0	816	0	1184	408
Stage 1	-	-	-	-	-	802	-
Stage 2	-	-	-	-	-	382	-
Critical Hdwy	6.46	-	-	4.16	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.53	-	-	2.23	-	3.53	3.33
Pot Cap-1 Maneuver	598	-	-	801	-	181	590
Stage 1	-	-	-	-	-	399	-
Stage 2	-	-	-	-	-	657	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	598	-	-	801	-	171	590
Mov Cap-2 Maneuver	-	-	-	-	-	171	-
Stage 1	-	-	-	-	-	398	-
Stage 2	-	-	-	-	-	623	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.6	21.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBU	EBT	EBR	WBL	WBT
Capacity (veh/h)	280	598	-	-	801	-
HCM Lane V/C Ratio	0.208	0.002	-	-	0.052	-
HCM Control Delay (s/veh)	21.2	11	-	-	9.7	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q (veh)	0.8	0	-	-	0.2	-



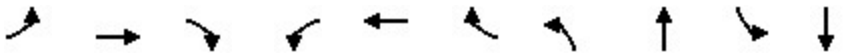
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	471	71	254	355	97	75	414	184	75	307	116
Future Volume (veh/h)	190	471	71	254	355	97	75	414	184	75	307	116
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	194	481	72	259	362	99	77	422	188	77	313	118
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	233	633	282	347	510	228	100	949	418	99	1004	371
Arrive On Green	0.13	0.18	0.18	0.10	0.14	0.14	0.06	0.40	0.40	0.06	0.40	0.40
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2380	1049	1767	2519	931
Grp Volume(v), veh/h	194	481	72	259	362	99	77	311	299	77	217	214
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1667	1767	1763	1688
Q Serve(g_s), s	9.9	12.0	3.6	6.8	9.0	5.3	4.0	11.9	12.1	4.0	7.8	8.1
Cycle Q Clear(g_c), s	9.9	12.0	3.6	6.8	9.0	5.3	4.0	11.9	12.1	4.0	7.8	8.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.63	1.00		0.55
Lane Grp Cap(c), veh/h	233	633	282	347	510	228	100	703	664	99	702	673
V/C Ratio(X)	0.83	0.76	0.25	0.75	0.71	0.44	0.77	0.44	0.45	0.77	0.31	0.32
Avail Cap(c_a), veh/h	436	1100	491	676	924	412	264	703	664	226	702	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.1	36.0	32.6	40.3	37.6	36.0	43.0	20.3	20.3	43.0	19.0	19.1
Incr Delay (d2), s/veh	7.6	1.9	0.5	3.2	1.8	1.3	11.9	2.0	2.2	12.0	1.1	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	4.5	5.0	1.4	2.9	3.8	2.0	2.0	4.8	4.6	2.0	3.1	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.7	37.9	33.0	43.6	39.5	37.3	54.9	22.3	22.5	55.0	20.2	20.4
LnGrp LOS	D	D	C	D	D	D	D	C	C	E	C	C
Approach Vol, veh/h		747			720			687			508	
Approach Delay, s/veh		39.7			40.6			26.0			25.5	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	43.0	15.1	22.8	11.4	43.0	18.4	19.6
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	11.8	36.8	18.2	28.8	13.8	34.8	22.8	* 24
Max Q Clear Time (g_c+I1), s	6.0	14.1	8.8	14.0	6.0	10.1	11.9	11.0
Green Ext Time (p_c), s	0.1	3.3	0.6	2.6	0.1	2.2	0.4	2.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	33.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	194	481	72	259	362	99	77	610	77	431
v/c Ratio	0.69	0.71	0.17	0.58	0.63	0.26	0.45	0.47	0.47	0.34
Control Delay (s/veh)	55.3	45.5	0.9	49.1	46.6	4.3	55.7	25.8	57.3	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	55.3	45.5	0.9	49.1	46.6	4.3	55.7	25.8	57.3	24.3
Queue Length 50th (ft)	123	160	0	85	121	0	49	148	49	97
Queue Length 95th (ft)	215	230	0	138	183	20	105	244	107	172
Internal Link Dist (ft)		2580			1664			917		1824
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	402	1016	552	623	854	486	243	1278	208	1263
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.47	0.13	0.42	0.42	0.20	0.32	0.48	0.37	0.34

Intersection Summary

OPENING YEAR 2026 PLUS PROJECT

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	35	42	129	300	225	57
Future Vol, veh/h	35	42	129	300	225	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	40	48	148	345	259	66

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	933	292	325	0	-	0
Stage 1	292	-	-	-	-	-
Stage 2	641	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	294	745	1229	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	250	745	1229	-	-	-
Mov Cap-2 Maneuver	250	-	-	-	-	-
Stage 1	643	-	-	-	-	-
Stage 2	523	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	16.8	2.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1229	-	392	-	-
HCM Lane V/C Ratio	0.121	-	0.226	-	-
HCM Control Delay (s/veh)	8.3	0	16.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q (veh)	0.4	-	0.9	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	54	110	327	32	40	299
Future Vol, veh/h	54	110	327	32	40	299
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	64	129	385	38	47	352

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	831	385	0	0	423	0
Stage 1	385	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	338	660	-	-	1131	-
Stage 1	686	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	320	660	-	-	1131	-
Mov Cap-2 Maneuver	320	-	-	-	-	-
Stage 1	686	-	-	-	-	-
Stage 2	610	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	14.2	0	1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	320	660	1131	-
HCM Lane V/C Ratio	-	-	0.199	0.196	0.042	-
HCM Control Delay (s/veh)	-	-	19	11.8	8.3	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q (veh)	-	-	0.7	0.7	0.1	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	171	54	353	352	1
Future Vol, veh/h	0	171	54	353	352	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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	80
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	194	61	401	400	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	401	401	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.245	4.145	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	0	646	1150	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	646	1150	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	13	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1150	-	646	-	-
HCM Lane V/C Ratio	0.053	-	0.301	-	-
HCM Control Delay (s/veh)	8.3	-	13	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	0.2	-	1.3	-	-

Intersection	
Int Delay, s/veh	26.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	5	66	185	2	33	40	363	93	14	497	2
Future Vol, veh/h	10	5	66	185	2	33	40	363	93	14	497	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	0	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	83	92	83	92	83	83	83	83	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	11	5	72	223	2	40	43	437	112	17	599	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	940	1269	301	915	1214	275	601	0	0	549	0	0
Stage 1	634	634	-	579	579	-	-	-	-	-	-	-
Stage 2	306	635	-	336	635	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	6.96	7.56	6.56	6.96	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.56	5.56	-	6.56	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	3.33	3.53	4.03	3.33	2.23	-	-	2.23	-	-
Pot Cap-1 Maneuver	217	166	692	226	179	719	965	-	-	1010	-	-
Stage 1	431	469	-	465	496	-	-	-	-	-	-	-
Stage 2	676	468	-	649	468	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	194	156	692	~ 188	168	719	965	-	-	1010	-	-
Mov Cap-2 Maneuver	194	156	-	~ 188	168	-	-	-	-	-	-	-
Stage 1	412	461	-	444	474	-	-	-	-	-	-	-
Stage 2	607	447	-	565	460	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	14	149.3	0.7	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	965	-	-	194	557	188	615	1010	-	-
HCM Lane V/C Ratio	0.045	-	-	0.056	0.139	1.186	0.068	0.017	-	-
HCM Control Delay (s/veh)	8.9	-	-	24.7	12.5	175.3	11.3	8.6	-	-
HCM Lane LOS	A	-	-	C	B	F	B	A	-	-
HCM 95th %tile Q (veh)	0.1	-	-	0.2	0.5	11.6	0.2	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.9

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	0	590	21	27	831	46	33
Future Vol, veh/h	0	590	21	27	831	46	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	250	-	-	250	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83	83
Heavy Vehicles, %	3	3	3	3	3	3	3
Mvmt Flow	0	711	25	33	1001	55	40

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	1001	0	0	736	0	1291	368
Stage 1	-	-	-	-	-	724	-
Stage 2	-	-	-	-	-	567	-
Critical Hdwy	6.46	-	-	4.16	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.53	-	-	2.23	-	3.53	3.33
Pot Cap-1 Maneuver	329	-	-	859	-	154	626
Stage 1	-	-	-	-	-	438	-
Stage 2	-	-	-	-	-	528	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	329	-	-	859	-	148	626
Mov Cap-2 Maneuver	-	-	-	-	-	148	-
Stage 1	-	-	-	-	-	438	-
Stage 2	-	-	-	-	-	508	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.3	33.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBU	EBT	EBR	WBL	WBT
Capacity (veh/h)	217	329	-	-	859	-
HCM Lane V/C Ratio	0.439	-	-	-	0.038	-
HCM Control Delay (s/veh)	33.9	0	-	-	9.4	-
HCM Lane LOS	D	A	-	-	A	-
HCM 95th %tile Q (veh)	2.1	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	90	0	3	30	7	0	0	8	24	0	0
Future Vol, veh/h	0	90	0	3	30	7	0	0	8	24	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	98	0	3	33	8	0	0	9	26	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	41	0	0	98	0	0	141	145	98	146	141	37
Stage 1	-	-	-	-	-	-	98	98	-	43	43	-
Stage 2	-	-	-	-	-	-	43	47	-	103	98	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1562	-	-	1489	-	-	827	744	955	820	748	1032
Stage 1	-	-	-	-	-	-	906	812	-	969	857	-
Stage 2	-	-	-	-	-	-	969	854	-	900	812	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1562	-	-	1489	-	-	825	743	955	811	747	1032
Mov Cap-2 Maneuver	-	-	-	-	-	-	825	743	-	811	747	-
Stage 1	-	-	-	-	-	-	906	812	-	969	855	-
Stage 2	-	-	-	-	-	-	967	852	-	892	812	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	0.6	8.8	9.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	955	1562	-	-	1489	-	-	811
HCM Lane V/C Ratio	0.009	-	-	-	0.002	-	-	0.032
HCM Control Delay (s/veh)	8.8	0	-	-	7.4	0	-	9.6
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q (veh)	0	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	122	0	8	40	7	0	0	25	24	0	0
Future Vol, veh/h	0	122	0	8	40	7	0	0	25	24	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	133	0	9	43	8	0	0	27	26	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	51	0	0	133	0	0	198	202	133	212	198	47
Stage 1	-	-	-	-	-	-	133	133	-	65	65	-
Stage 2	-	-	-	-	-	-	65	69	-	147	133	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1549	-	-	1446	-	-	759	692	913	743	696	1019
Stage 1	-	-	-	-	-	-	868	784	-	943	839	-
Stage 2	-	-	-	-	-	-	943	835	-	853	784	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1549	-	-	1446	-	-	755	688	913	718	692	1019
Mov Cap-2 Maneuver	-	-	-	-	-	-	755	688	-	718	692	-
Stage 1	-	-	-	-	-	-	868	784	-	943	834	-
Stage 2	-	-	-	-	-	-	937	830	-	828	784	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	1.1	9.1	10.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	913	1549	-	-	1446	-	-	718
HCM Lane V/C Ratio	0.03	-	-	-	0.006	-	-	0.036
HCM Control Delay (s/veh)	9.1	0	-	-	7.5	0	-	10.2
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q (veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	3	8	0
Future Vol, veh/h	0	0	0	3	8	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	0	0	3	9	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	3	0	-	0	2	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1612	-	-	-	1018	1079
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1612	-	-	-	1018	1079
Mov Cap-2 Maneuver	-	-	-	-	1018	-
Stage 1	-	-	-	-	1019	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1612	-	-	-	1018
HCM Lane V/C Ratio	-	-	-	-	0.009
HCM Control Delay (s/veh)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q (veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	0	31	3	8	0	0	47	25	0	0
Future Vol, veh/h	0	8	0	31	3	8	0	0	47	25	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	125	-	-	125	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	9	0	34	3	9	0	0	51	27	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	12	0	0	9	0	0	85	89	9	111	85	8
Stage 1	-	-	-	-	-	-	9	9	-	76	76	-
Stage 2	-	-	-	-	-	-	76	80	-	35	9	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1600	-	-	1604	-	-	899	799	1070	865	803	1071
Stage 1	-	-	-	-	-	-	1010	886	-	931	830	-
Stage 2	-	-	-	-	-	-	931	826	-	978	886	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1600	-	-	1604	-	-	885	782	1070	811	786	1071
Mov Cap-2 Maneuver	-	-	-	-	-	-	885	782	-	811	786	-
Stage 1	-	-	-	-	-	-	1010	886	-	931	813	-
Stage 2	-	-	-	-	-	-	911	809	-	931	886	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	5.4	8.5	9.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1070	1600	-	-	1604	-	-	811
HCM Lane V/C Ratio	0.048	-	-	-	0.021	-	-	0.034
HCM Control Delay (s/veh)	8.5	0	-	-	7.3	-	-	9.6
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q (veh)	0.2	0	-	-	0.1	-	-	0.1

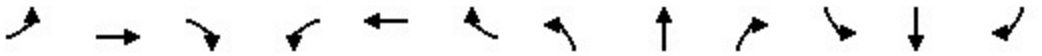
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	55	0	496	747	1
Future Vol, veh/h	0	55	0	496	747	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	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	60	0	539	812	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	407	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.96	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.33	-	-	-	-
Pot Cap-1 Maneuver	0	591	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	591	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	591	-	-
HCM Lane V/C Ratio	-	0.101	-	-
HCM Control Delay (s/veh)	-	11.8	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q (veh)	-	0.3	-	-



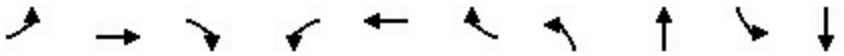
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	379	98	287	552	57	98	347	97	77	432	193
Future Volume (veh/h)	169	379	98	287	552	57	98	347	97	77	432	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	209	468	121	354	681	70	121	428	120	95	533	238
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	241	846	378	431	795	355	149	925	257	120	767	341
Arrive On Green	0.14	0.24	0.24	0.13	0.23	0.23	0.08	0.34	0.34	0.07	0.32	0.32
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2725	757	1767	2372	1056
Grp Volume(v), veh/h	209	468	121	354	681	70	121	275	273	95	396	375
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1719	1767	1763	1665
Q Serve(g_s), s	12.5	12.5	6.8	10.8	20.0	3.9	7.2	13.2	13.4	5.7	21.1	21.2
Cycle Q Clear(g_c), s	12.5	12.5	6.8	10.8	20.0	3.9	7.2	13.2	13.4	5.7	21.1	21.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.44	1.00		0.63
Lane Grp Cap(c), veh/h	241	846	378	431	795	355	149	599	584	120	570	538
V/C Ratio(X)	0.87	0.55	0.32	0.82	0.86	0.20	0.81	0.46	0.47	0.79	0.69	0.70
Avail Cap(c_a), veh/h	325	937	418	618	924	412	210	599	584	215	570	538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.5	35.8	33.7	45.9	40.0	33.8	48.4	27.8	27.9	49.4	31.8	31.8
Incr Delay (d2), s/veh	16.7	0.6	0.5	5.9	7.2	0.3	14.9	2.5	2.7	10.9	6.8	7.3
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	6.3	5.2	2.6	4.8	9.1	1.5	3.7	5.6	5.6	2.8	9.5	9.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.2	36.4	34.2	51.8	47.2	34.1	63.3	30.4	30.6	60.3	38.6	39.1
LnGrp LOS	E	D	C	D	D	C	E	C	C	E	D	D
Approach Vol, veh/h		798			1105			669			866	
Approach Delay, s/veh		42.8			47.8			36.4			41.2	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	42.8	19.3	32.0	15.3	41.0	20.9	30.5
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	13.1	34.5	19.4	28.6	12.8	34.8	19.8	* 28
Max Q Clear Time (g_c+I1), s	7.7	15.4	12.8	14.5	9.2	23.2	14.5	22.0
Green Ext Time (p_c), s	0.1	2.8	0.7	2.6	0.1	3.4	0.2	2.3

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	42.8
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	209	468	121	354	681	70	121	548	95	771
v/c Ratio	0.78	0.57	0.25	0.71	0.85	0.15	0.69	0.50	0.57	0.72
Control Delay (s/veh)	68.1	42.2	5.8	55.9	54.7	0.7	71.5	33.5	64.6	38.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	68.1	42.2	5.8	55.9	54.7	0.7	71.5	33.5	64.6	38.1
Queue Length 50th (ft)	155	165	0	136	265	0	91	175	71	265
Queue Length 95th (ft)	213	197	24	163	295	0	139	206	113	293
Internal Link Dist (ft)		2580			1664			917		1204
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	305	892	502	580	869	493	197	1078	202	1065
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.52	0.24	0.61	0.78	0.14	0.61	0.51	0.47	0.72

Intersection Summary

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	78	62	224	265	52
Future Vol, veh/h	51	78	62	224	265	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	58	89	70	255	301	59

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	726	331	360	0	-	0
Stage 1	331	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	390	708	1193	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	678	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	363	708	1193	-	-	-
Mov Cap-2 Maneuver	363	-	-	-	-	-
Stage 1	676	-	-	-	-	-
Stage 2	678	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.7	1.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1193	-	515	-	-
HCM Lane V/C Ratio	0.059	-	0.285	-	-
HCM Control Delay (s/veh)	8.2	0	14.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q (veh)	0.2	-	1.2	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	28	34	285	51	61	317
Future Vol, veh/h	28	34	285	51	61	317
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	30	37	306	55	66	341

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	779	306	0	0	361	0
Stage 1	306	-	-	-	-	-
Stage 2	473	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	363	732	-	-	1192	-
Stage 1	745	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	338	732	-	-	1192	-
Mov Cap-2 Maneuver	338	-	-	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	583	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.1	0	1.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	338	732	1192	-
HCM Lane V/C Ratio	-	-	0.089	0.05	0.055	-
HCM Control Delay (s/veh)	-	-	16.7	10.2	8.2	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q (veh)	-	-	0.3	0.2	0.2	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	110	181	334	338	6
Future Vol, veh/h	0	110	181	334	338	6
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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	124	203	375	380	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	384	387	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.245	4.145	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	0	660	1163	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	660	1163	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.7	3.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1163	-	660	-	-
HCM Lane V/C Ratio	0.175	-	0.187	-	-
HCM Control Delay (s/veh)	8.8	-	11.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	0.6	-	0.7	-	-

Intersection	
Int Delay, s/veh	15.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	3	44	104	6	29	135	489	163	27	403	6
Future Vol, veh/h	7	3	44	104	6	29	135	489	163	27	403	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	150	-	0	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	90	92	90	90	90	90	90	90	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	8	3	48	116	7	32	150	543	181	30	448	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1087	1536	228	1220	1449	362	455	0	0	724	0	0
Stage 1	512	512	-	934	934	-	-	-	-	-	-	-
Stage 2	575	1024	-	286	515	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	6.96	7.56	6.56	6.96	4.16	-	-	4.16	-	-
Critical Hdwy Stg 1	6.56	5.56	-	6.56	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	3.33	3.53	4.03	3.33	2.23	-	-	2.23	-	-
Pot Cap-1 Maneuver	169	114	772	135	129	632	1095	-	-	868	-	-
Stage 1	510	532	-	284	340	-	-	-	-	-	-	-
Stage 2	468	309	-	694	531	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	134	95	772	~ 108	107	632	1095	-	-	868	-	-
Mov Cap-2 Maneuver	134	95	-	~ 108	107	-	-	-	-	-	-	-
Stage 1	440	513	-	245	293	-	-	-	-	-	-	-
Stage 2	375	267	-	625	512	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	15.2	140.3	1.5	0.6
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1095	-	-	134	531	108	346	868	-	-
HCM Lane V/C Ratio	0.137	-	-	0.057	0.096	1.07	0.112	0.035	-	-
HCM Control Delay (s/veh)	8.8	-	-	33.5	12.5	181.7	16.7	9.3	-	-
HCM Lane LOS	A	-	-	D	B	F	C	A	-	-
HCM 95th %tile Q (veh)	0.5	-	-	0.2	0.3	7.1	0.4	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.1

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Vol, veh/h	1	766	29	38	573	24	29
Future Vol, veh/h	1	766	29	38	573	24	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	250	-	-	250	-	0	-
Veh in Median Storage, #	-	0	-	-	0	0	-
Grade, %	-	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3
Mvmt Flow	1	842	32	42	630	26	32

Major/Minor	Major1			Major2		Minor1	
Conflicting Flow All	630	0	0	874	0	1259	437
Stage 1	-	-	-	-	-	860	-
Stage 2	-	-	-	-	-	399	-
Critical Hdwy	6.46	-	-	4.16	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	-	5.86	-
Follow-up Hdwy	2.53	-	-	2.23	-	3.53	3.33
Pot Cap-1 Maneuver	569	-	-	761	-	161	565
Stage 1	-	-	-	-	-	372	-
Stage 2	-	-	-	-	-	644	-
Platoon blocked, %		-	-		-		
Mov Cap-1 Maneuver	569	-	-	761	-	152	565
Mov Cap-2 Maneuver	-	-	-	-	-	152	-
Stage 1	-	-	-	-	-	371	-
Stage 2	-	-	-	-	-	609	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.6	23.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBU	EBT	EBR	WBL	WBT
Capacity (veh/h)	253	569	-	-	761	-
HCM Lane V/C Ratio	0.23	0.002	-	-	0.055	-
HCM Control Delay (s/veh)	23.4	11.3	-	-	10	-
HCM Lane LOS	C	B	-	-	B	-
HCM 95th %tile Q (veh)	0.9	0	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	59	0	11	101	23	0	0	6	14	0	0
Future Vol, veh/h	0	59	0	11	101	23	0	0	6	14	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	64	0	12	110	25	0	0	7	15	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	135	0	0	64	0	0	211	223	64	215	211	123
Stage 1	-	-	-	-	-	-	64	64	-	147	147	-
Stage 2	-	-	-	-	-	-	147	159	-	68	64	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1443	-	-	1532	-	-	744	674	998	739	684	925
Stage 1	-	-	-	-	-	-	944	840	-	853	774	-
Stage 2	-	-	-	-	-	-	853	764	-	940	840	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1443	-	-	1532	-	-	740	669	998	729	679	925
Mov Cap-2 Maneuver	-	-	-	-	-	-	740	669	-	729	679	-
Stage 1	-	-	-	-	-	-	944	840	-	853	768	-
Stage 2	-	-	-	-	-	-	846	758	-	934	840	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	0.6	8.6	10
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	998	1443	-	-	1532	-	-	729
HCM Lane V/C Ratio	0.007	-	-	-	0.008	-	-	0.021
HCM Control Delay (s/veh)	8.6	0	-	-	7.4	0	-	10
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q (veh)	0	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	79	0	29	135	23	0	0	17	14	0	0
Future Vol, veh/h	0	79	0	29	135	23	0	0	17	14	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	86	0	32	147	25	0	0	18	15	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	172	0	0	86	0	0	310	322	86	319	310	160
Stage 1	-	-	-	-	-	-	86	86	-	224	224	-
Stage 2	-	-	-	-	-	-	224	236	-	95	86	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1399	-	-	1504	-	-	641	594	970	632	603	882
Stage 1	-	-	-	-	-	-	919	822	-	776	716	-
Stage 2	-	-	-	-	-	-	776	708	-	909	822	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1399	-	-	1504	-	-	629	580	970	609	589	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	629	580	-	609	589	-
Stage 1	-	-	-	-	-	-	919	822	-	776	699	-
Stage 2	-	-	-	-	-	-	757	691	-	892	822	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	1.2	8.8	11.1
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	970	1399	-	-	1504	-	-	609
HCM Lane V/C Ratio	0.019	-	-	-	0.021	-	-	0.025
HCM Control Delay (s/veh)	8.8	0	-	-	7.4	0	-	11.1
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q (veh)	0.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	10	6	0
Future Vol, veh/h	0	0	0	10	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	0	0	11	7	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	11	0	-	0	6	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1602	-	-	-	1013	1074
Stage 1	-	-	-	-	1014	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1602	-	-	-	1013	1074
Mov Cap-2 Maneuver	-	-	-	-	1013	-
Stage 1	-	-	-	-	1014	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1602	-	-	-	1013
HCM Lane V/C Ratio	-	-	-	-	0.006
HCM Control Delay (s/veh)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q (veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	6	0	106	10	27	0	0	31	17	0	0
Future Vol, veh/h	0	6	0	106	10	27	0	0	31	17	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	125	-	-	125	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	7	0	115	11	29	0	0	34	18	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	40	0	0	7	0	0	263	277	7	280	263	26
Stage 1	-	-	-	-	-	-	7	7	-	256	256	-
Stage 2	-	-	-	-	-	-	256	270	-	24	7	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1563	-	-	1607	-	-	688	629	1072	670	640	1047
Stage 1	-	-	-	-	-	-	1012	888	-	746	694	-
Stage 2	-	-	-	-	-	-	746	684	-	991	888	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1563	-	-	1607	-	-	650	584	1072	614	594	1047
Mov Cap-2 Maneuver	-	-	-	-	-	-	650	584	-	614	594	-
Stage 1	-	-	-	-	-	-	1012	888	-	746	644	-
Stage 2	-	-	-	-	-	-	693	635	-	960	888	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	5.5	8.5	11
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1072	1563	-	-	1607	-	-	614
HCM Lane V/C Ratio	0.031	-	-	-	0.072	-	-	0.03
HCM Control Delay (s/veh)	8.5	0	-	-	7.4	-	-	11
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q (veh)	0.1	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	36	0	787	547	4
Future Vol, veh/h	0	36	0	787	547	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	39	0	855	595	4

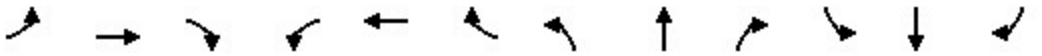
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	300	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.96	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.33	-	-	-	-
Pot Cap-1 Maneuver	0	693	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	693	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	10.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	693	-	-
HCM Lane V/C Ratio	-	0.056	-	-
HCM Control Delay (s/veh)	-	10.5	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q (veh)	-	0.2	-	-

HCM 6th Signalized Intersection Summary
5: Demaree Street & Riggin Avenue

05/18/2025



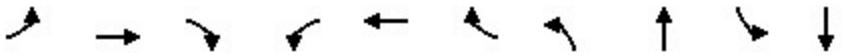
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	243	471	71	254	355	125	75	500	184	93	357	147
Future Volume (veh/h)	243	471	71	254	355	125	75	500	184	93	357	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	248	481	72	259	362	128	77	510	188	95	364	150
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	288	725	324	340	485	216	99	930	341	122	932	378
Arrive On Green	0.16	0.21	0.21	0.10	0.14	0.14	0.06	0.37	0.37	0.07	0.38	0.38
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2525	926	1767	2447	993
Grp Volume(v), veh/h	248	481	72	259	362	128	77	355	343	95	261	253
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1689	1767	1763	1677
Q Serve(g_s), s	12.9	11.9	3.6	7.0	9.3	7.2	4.1	15.1	15.2	5.0	10.2	10.4
Cycle Q Clear(g_c), s	12.9	11.9	3.6	7.0	9.3	7.2	4.1	15.1	15.2	5.0	10.2	10.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.55	1.00		0.59
Lane Grp Cap(c), veh/h	288	725	324	340	485	216	99	649	622	122	671	638
V/C Ratio(X)	0.86	0.66	0.22	0.76	0.75	0.59	0.78	0.55	0.55	0.78	0.39	0.40
Avail Cap(c_a), veh/h	512	1208	539	551	753	336	224	649	622	247	671	638
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	34.5	31.3	41.5	39.2	38.3	44.0	23.6	23.7	43.3	21.3	21.4
Incr Delay (d2), s/veh	7.4	1.0	0.3	3.5	2.3	2.6	12.1	3.3	3.5	10.4	1.7	1.8
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	5.8	4.9	1.3	3.0	4.0	2.8	2.0	6.3	6.1	2.4	4.1	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.0	35.6	31.6	45.0	41.5	40.8	56.1	26.9	27.2	53.7	23.0	23.2
LnGrp LOS	D	D	C	D	D	D	E	C	C	D	C	C
Approach Vol, veh/h		801			749			775			609	
Approach Delay, s/veh		38.4			42.6			29.9			27.9	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	41.0	15.2	25.7	11.5	42.2	21.6	19.2
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	13.2	34.8	15.2	32.4	12.0	36.0	27.4	* 20
Max Q Clear Time (g_c+I1), s	7.0	17.2	9.0	13.9	6.1	12.4	14.9	11.3
Green Ext Time (p_c), s	0.1	3.6	0.4	2.8	0.1	2.7	0.5	1.7

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	35.1
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	248	481	72	259	362	128	77	698	95	514
v/c Ratio	0.74	0.61	0.15	0.61	0.66	0.31	0.47	0.58	0.53	0.42
Control Delay (s/veh)	55.1	40.6	0.7	52.3	49.5	2.8	59.0	31.3	59.4	26.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	55.1	40.6	0.7	52.3	49.5	2.8	59.0	31.3	59.4	26.7
Queue Length 50th (ft)	162	158	0	88	125	0	51	198	63	128
Queue Length 95th (ft)	264	220	0	144	191	8	108	306	128	208
Internal Link Dist (ft)		2580			1664			917		1204
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	471	1115	593	507	695	467	206	1192	227	1218
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.43	0.12	0.51	0.52	0.27	0.37	0.59	0.42	0.42

Intersection Summary

FUTURE YEAR 2030



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	47	140	319	251	62
Future Volume (veh/h)	38	47	140	319	251	62
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	44	54	161	367	289	71
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	76	93	376	605	714	176
Arrive On Green	0.10	0.10	0.50	0.50	0.50	0.50
Sat Flow, veh/h	736	903	336	1217	1439	353
Grp Volume(v), veh/h	99	0	528	0	0	360
Grp Sat Flow(s),veh/h/ln	1656	0	1554	0	0	1792
Q Serve(g_s), s	1.3	0.0	2.6	0.0	0.0	2.8
Cycle Q Clear(g_c), s	1.3	0.0	5.4	0.0	0.0	2.8
Prop In Lane	0.44	0.55	0.30			0.20
Lane Grp Cap(c), veh/h	170	0	981	0	0	890
V/C Ratio(X)	0.58	0.00	0.54	0.00	0.00	0.40
Avail Cap(c_a), veh/h	1438	0	4300	0	0	4908
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	9.6	0.0	4.1	0.0	0.0	3.6
Incr Delay (d2), s/veh	3.1	0.0	0.5	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.1	0.0	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.8	0.0	4.6	0.0	0.0	3.9
LnGrp LOS	B		A			A
Approach Vol, veh/h	99			528	360	
Approach Delay, s/veh	12.8			4.6	3.9	
Approach LOS	B			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		15.7		6.8		15.7
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		61.5		19.5		61.5
Max Q Clear Time (g_c+I1), s		7.4		3.3		4.8
Green Ext Time (p_c), s		3.7		0.2		2.1

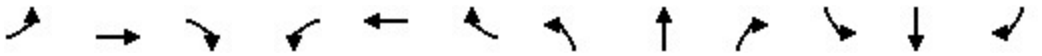
Intersection Summary	
HCM 6th Ctrl Delay, s/veh	5.1
HCM 6th LOS	A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	58	121	361	32	40	315
Future Volume (veh/h)	58	121	361	32	40	315
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	68	142	425	38	47	371
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	298	265	741	628	234	655
Arrive On Green	0.17	0.17	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1767	1572	1856	1572	104	1641
Grp Volume(v), veh/h	68	142	425	38	418	0
Grp Sat Flow(s),veh/h/ln	1767	1572	1856	1572	1744	0
Q Serve(g_s), s	0.7	1.7	3.7	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.7	1.7	3.7	0.3	3.7	0.0
Prop In Lane	1.00	1.00		1.00	0.11	
Lane Grp Cap(c), veh/h	298	265	741	628	888	0
V/C Ratio(X)	0.23	0.53	0.57	0.06	0.47	0.00
Avail Cap(c_a), veh/h	2163	1925	4944	4190	4662	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	7.5	7.9	4.9	3.9	4.9	0.0
Incr Delay (d2), s/veh	0.4	1.7	0.7	0.0	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	0.1	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	7.9	9.6	5.6	3.9	5.2	0.0
LnGrp LOS	A	A	A	A	A	
Approach Vol, veh/h	210		463			418
Approach Delay, s/veh	9.0		5.4			5.2
Approach LOS	A		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		12.8			12.8	8.0
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		55.5			55.5	25.5
Max Q Clear Time (g_c+I1), s		5.7			5.7	3.7
Green Ext Time (p_c), s		2.6			2.6	0.6

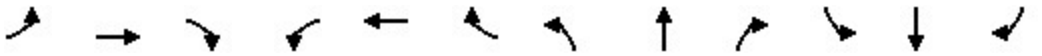
Intersection Summary	
HCM 6th Ctrl Delay, s/veh	6.1
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	10	4	201	5	45	1	429	101	25	538	1
Future Volume (veh/h)	4	10	4	201	5	45	1	429	101	25	538	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	4	11	4	242	5	54	1	517	122	30	648	1
Peak Hour Factor	0.92	0.92	0.92	0.83	0.92	0.83	0.92	0.83	0.83	0.83	0.83	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	10	92	33	326	34	365	4	805	189	62	1148	2
Arrive On Green	0.01	0.07	0.07	0.18	0.25	0.25	0.00	0.28	0.28	0.04	0.32	0.32
Sat Flow, veh/h	1767	1298	472	1767	135	1458	1767	2833	665	1767	3612	6
Grp Volume(v), veh/h	4	0	15	242	0	59	1	321	318	30	316	333
Grp Sat Flow(s),veh/h/ln	1767	0	1771	1767	0	1593	1767	1763	1736	1767	1763	1855
Q Serve(g_s), s	0.1	0.0	0.3	5.5	0.0	1.2	0.0	6.7	6.8	0.7	6.3	6.3
Cycle Q Clear(g_c), s	0.1	0.0	0.3	5.5	0.0	1.2	0.0	6.7	6.8	0.7	6.3	6.3
Prop In Lane	1.00		0.27	1.00		0.92	1.00		0.38	1.00		0.00
Lane Grp Cap(c), veh/h	10	0	126	326	0	399	4	501	493	62	560	589
V/C Ratio(X)	0.42	0.00	0.12	0.74	0.00	0.15	0.24	0.64	0.65	0.48	0.56	0.56
Avail Cap(c_a), veh/h	209	0	753	897	0	1298	209	1112	1095	242	1145	1205
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	0.0	18.4	16.3	0.0	12.4	21.1	13.3	13.3	20.0	12.0	12.0
Incr Delay (d2), s/veh	26.4	0.0	0.4	3.3	0.0	0.2	27.2	1.4	1.4	5.7	0.9	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	2.1	0.0	0.4	0.0	2.0	2.0	0.3	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	47.4	0.0	18.8	19.6	0.0	12.5	48.3	14.6	14.7	25.8	12.9	12.9
LnGrp LOS	D		B	B		B	D	B	B	C	B	B
Approach Vol, veh/h		19			301			640			679	
Approach Delay, s/veh		24.8			18.2			14.7			13.4	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.0	16.5	12.3	7.5	4.6	18.0	4.7	15.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	26.7	21.5	18.0	5.0	27.5	5.0	34.5
Max Q Clear Time (g_c+I1), s	2.7	8.8	7.5	2.3	2.0	8.3	2.1	3.2
Green Ext Time (p_c), s	0.0	3.2	0.6	0.0	0.0	3.3	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	15.0
HCM 6th LOS	B



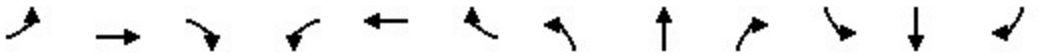
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	411	106	312	600	86	106	360	105	143	429	191
Future Volume (veh/h)	170	411	106	312	600	86	106	360	105	143	429	191
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	210	507	131	385	741	106	131	444	130	177	530	236
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	240	846	377	454	822	367	158	810	235	202	773	343
Arrive On Green	0.14	0.24	0.24	0.13	0.23	0.23	0.09	0.30	0.30	0.11	0.33	0.33
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2695	782	1767	2375	1054
Grp Volume(v), veh/h	210	507	131	385	741	106	131	289	285	177	393	373
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1715	1767	1763	1666
Q Serve(g_s), s	13.4	14.6	7.9	12.6	23.4	6.4	8.4	15.7	16.0	11.3	22.2	22.3
Cycle Q Clear(g_c), s	13.4	14.6	7.9	12.6	23.4	6.4	8.4	15.7	16.0	11.3	22.2	22.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.63
Lane Grp Cap(c), veh/h	240	846	377	454	822	367	158	530	516	202	574	542
V/C Ratio(X)	0.88	0.60	0.35	0.85	0.90	0.29	0.83	0.55	0.55	0.88	0.68	0.69
Avail Cap(c_a), veh/h	305	879	392	580	867	387	197	530	516	202	574	542
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	48.6	38.7	36.2	48.6	42.7	36.2	51.4	33.5	33.6	50.0	33.6	33.6
Incr Delay (d2), s/veh	19.9	1.1	0.5	9.2	12.1	0.4	20.6	4.0	4.2	32.4	6.5	7.0
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	7.0	6.2	3.0	5.8	11.2	2.4	4.5	7.0	6.9	6.6	10.0	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	68.6	39.8	36.7	57.8	54.8	36.6	71.9	37.5	37.9	82.4	40.1	40.6
LnGrp LOS	E	D	D	E	D	D	E	D	D	F	D	D
Approach Vol, veh/h		848			1232			705			943	
Approach Delay, s/veh		46.4			54.2			44.1			48.2	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.3	40.7	21.0	33.7	16.5	43.5	21.8	32.9
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	13.1	34.5	19.4	28.6	12.8	34.8	19.8	* 28
Max Q Clear Time (g_c+I1), s	13.3	18.0	14.6	16.6	10.4	24.3	15.4	25.4
Green Ext Time (p_c), s	0.0	2.8	0.6	2.7	0.1	3.2	0.2	1.3

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	49.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	625	23	30	840	6	50	34	36	18	38	15
Future Volume (veh/h)	10	625	23	30	840	6	50	34	36	18	38	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	12	753	28	36	1012	7	60	37	43	20	41	16
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.92	0.83	0.92	0.83	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	27	1342	599	70	1428	637	183	143	166	43	132	51
Arrive On Green	0.02	0.38	0.38	0.04	0.40	0.40	0.10	0.18	0.18	0.02	0.10	0.10
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1767	782	909	1767	1270	496
Grp Volume(v), veh/h	12	753	28	36	1012	7	60	0	80	20	0	57
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1767	0	1692	1767	0	1766
Q Serve(g_s), s	0.3	8.1	0.5	1.0	11.6	0.1	1.5	0.0	2.0	0.5	0.0	1.4
Cycle Q Clear(g_c), s	0.3	8.1	0.5	1.0	11.6	0.1	1.5	0.0	2.0	0.5	0.0	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.28
Lane Grp Cap(c), veh/h	27	1342	599	70	1428	637	183	0	309	43	0	183
V/C Ratio(X)	0.44	0.56	0.05	0.51	0.71	0.01	0.33	0.00	0.26	0.46	0.00	0.31
Avail Cap(c_a), veh/h	183	2146	957	223	2226	993	659	0	1093	194	0	677
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.6	11.8	9.4	22.7	12.0	8.6	20.1	0.0	16.9	23.3	0.0	20.1
Incr Delay (d2), s/veh	10.8	0.4	0.0	5.7	0.7	0.0	1.0	0.0	0.4	7.6	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.3	0.1	0.4	3.1	0.0	0.6	0.0	0.7	0.3	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.4	12.1	9.5	28.5	12.7	8.6	21.1	0.0	17.4	30.8	0.0	21.0
LnGrp LOS	C	B	A	C	B	A	C		B	C		C
Approach Vol, veh/h		793			1055			140			77	
Approach Delay, s/veh		12.4			13.2			19.0			23.6	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	13.3	6.4	22.9	9.5	9.5	5.2	24.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.3	31.2	6.1	29.4	18.0	18.5	5.0	30.5
Max Q Clear Time (g_c+I1), s	2.5	4.0	3.0	10.1	3.5	3.4	2.3	13.6
Green Ext Time (p_c), s	0.0	0.4	0.0	4.7	0.1	0.2	0.0	6.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	13.7
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	207	101	376	370	2
Future Vol, veh/h	0	207	101	376	370	2
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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	80
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	235	115	427	420	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	422	423	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.245	4.145	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	0	628	1128	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	628	1128	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.1	1.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1128	-	628	-	-
HCM Lane V/C Ratio	0.102	-	0.375	-	-
HCM Control Delay (s/veh)	8.6	-	14.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	0.3	-	1.7	-	-

Intersection	
Intersection Delay, s/veh	3.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	9	7	40	105
Demand Flow Rate, veh/h	9	7	41	107
Vehicles Circulating, veh/h	100	42	20	9
Vehicles Exiting, veh/h	16	19	89	40
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.0	2.8	3.0	3.3
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	9	7	41	107
Cap Entry Lane, veh/h	1246	1322	1352	1367
Entry HV Adj Factor	0.987	0.992	0.976	0.977
Flow Entry, veh/h	9	7	40	105
Cap Entry, veh/h	1230	1311	1319	1336
V/C Ratio	0.007	0.005	0.030	0.078
Control Delay, s/veh	3.0	2.8	3.0	3.3
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0



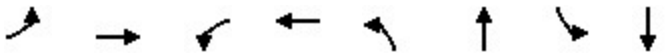
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	98	528	360
v/c Ratio	0.30	0.50	0.27
Control Delay (s/veh)	12.8	6.5	3.9
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	12.8	6.5	3.9
Queue Length 50th (ft)	11	57	28
Queue Length 95th (ft)	41	131	63
Internal Link Dist (ft)	1572	2000	572
Turn Bay Length (ft)			
Base Capacity (vph)	817	1463	1795
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.12	0.36	0.20

Intersection Summary



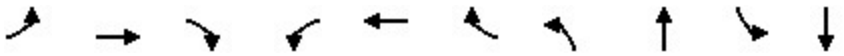
Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	68	142	425	38	418
v/c Ratio	0.17	0.31	0.38	0.04	0.41
Control Delay (s/veh)	11.3	4.8	6.4	2.1	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	11.3	4.8	6.4	2.1	6.8
Queue Length 50th (ft)	8	0	37	0	37
Queue Length 95th (ft)	27	22	78	7	80
Internal Link Dist (ft)	1684		620		2000
Turn Bay Length (ft)	200				
Base Capacity (vph)	1438	1312	1845	1568	1710
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.11	0.23	0.02	0.24

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	4	15	242	59	1	639	30	649
v/c Ratio	0.01	0.05	0.48	0.11	0.00	0.46	0.12	0.42
Control Delay (s/veh)	27.7	23.0	19.6	7.0	29.0	13.7	26.7	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.7	23.0	19.6	7.0	29.0	13.7	26.7	12.0
Queue Length 50th (ft)	1	2	35	1	0	41	5	44
Queue Length 95th (ft)	11	22	149	27	5	160	36	166
Internal Link Dist (ft)		1131		1664		540		750
Turn Bay Length (ft)	150		150		100		100	
Base Capacity (vph)	212	775	914	1284	212	2216	246	2339
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.02	0.26	0.05	0.00	0.29	0.12	0.28

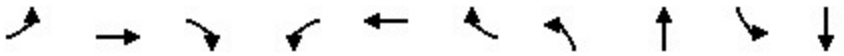
Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	210	507	131	385	741	106	131	574	177	766
v/c Ratio	0.79	0.61	0.27	0.76	0.90	0.22	0.74	0.56	0.90	0.72
Control Delay (s/veh)	70.2	43.8	6.9	58.7	59.6	3.8	76.2	35.8	95.7	38.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	70.2	43.8	6.9	58.7	59.6	3.8	76.2	35.8	95.7	38.5
Queue Length 50th (ft)	156	183	0	147	294	0	100	188	138	263
Queue Length 95th (ft)	214	214	32	177	324	14	#153	216	#234	291
Internal Link Dist (ft)		2580			1664			917		1204
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	296	861	489	563	845	483	191	1021	196	1063
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.59	0.27	0.68	0.88	0.22	0.69	0.56	0.90	0.72

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	12	753	28	36	1012	7	60	80	20	57
v/c Ratio	0.07	0.54	0.03	0.17	0.66	0.00	0.23	0.13	0.10	0.22
Control Delay (s/veh)	29.7	15.3	0.0	29.4	15.2	0.0	26.8	11.5	29.8	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.7	15.3	0.0	29.4	15.2	0.0	26.8	11.5	29.8	22.2
Queue Length 50th (ft)	3	76	0	10	114	0	16	7	5	11
Queue Length 95th (ft)	19	165	0	39	230	0	53	48	29	49
Internal Link Dist (ft)		684			2580			454		411
Turn Bay Length (ft)	250		100	250		100	100		100	
Base Capacity (vph)	171	2020	980	209	2113	1017	618	1053	182	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.37	0.03	0.17	0.48	0.01	0.10	0.08	0.11	0.09

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	86	71	240	279	57
Future Volume (veh/h)	55	86	71	240	279	57
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	62	98	81	273	317	65
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	94	149	307	526	590	121
Arrive On Green	0.15	0.15	0.40	0.40	0.40	0.40
Sat Flow, veh/h	633	1001	208	1333	1494	306
Grp Volume(v), veh/h	161	0	354	0	0	382
Grp Sat Flow(s),veh/h/ln	1644	0	1541	0	0	1800
Q Serve(g_s), s	1.8	0.0	0.4	0.0	0.0	3.2
Cycle Q Clear(g_c), s	1.8	0.0	3.6	0.0	0.0	3.2
Prop In Lane	0.39	0.61	0.23			0.17
Lane Grp Cap(c), veh/h	244	0	833	0	0	711
V/C Ratio(X)	0.66	0.00	0.42	0.00	0.00	0.54
Avail Cap(c_a), veh/h	2209	0	4500	0	0	4976
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.9	0.0	4.5	0.0	0.0	4.6
Incr Delay (d2), s/veh	3.0	0.0	0.3	0.0	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.0	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	10.9	0.0	4.8	0.0	0.0	5.2
LnGrp LOS	B		A			A
Approach Vol, veh/h	161			354	382	
Approach Delay, s/veh	10.9			4.8	5.2	
Approach LOS	B			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		12.3		7.4		12.3
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		54.5		26.5		54.5
Max Q Clear Time (g_c+I1), s		5.6		3.8		5.2
Green Ext Time (p_c), s		2.2		0.4		2.2

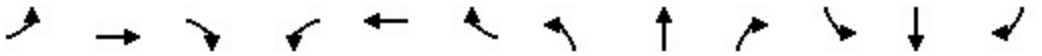
Intersection Summary	
HCM 6th Ctrl Delay, s/veh	6.1
HCM 6th LOS	A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	36	304	52	68	346
Future Volume (veh/h)	26	36	304	52	68	346
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	28	39	327	56	73	372
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	139	124	813	689	297	679
Arrive On Green	0.08	0.08	0.44	0.44	0.44	0.44
Sat Flow, veh/h	1767	1572	1856	1572	164	1548
Grp Volume(v), veh/h	28	39	327	56	445	0
Grp Sat Flow(s),veh/h/ln	1767	1572	1856	1572	1712	0
Q Serve(g_s), s	0.3	0.4	2.2	0.4	0.2	0.0
Cycle Q Clear(g_c), s	0.3	0.4	2.2	0.4	3.3	0.0
Prop In Lane	1.00	1.00		1.00	0.16	
Lane Grp Cap(c), veh/h	139	124	813	689	976	0
V/C Ratio(X)	0.20	0.32	0.40	0.08	0.46	0.00
Avail Cap(c_a), veh/h	1944	1730	6024	5105	5536	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	8.0	8.1	3.6	3.0	3.9	0.0
Incr Delay (d2), s/veh	0.7	1.4	0.3	0.0	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.1	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	8.7	9.6	3.9	3.1	4.2	0.0
LnGrp LOS	A	A	A	A	A	
Approach Vol, veh/h	67		383			445
Approach Delay, s/veh	9.2		3.8			4.2
Approach LOS	A		A			A

Timer - Assigned Phs		2				6	8
Phs Duration (G+Y+Rc), s		12.7				12.7	6.0
Change Period (Y+Rc), s		4.5				4.5	4.5
Max Green Setting (Gmax), s		60.5				60.5	20.5
Max Q Clear Time (g_c+I1), s		4.2				5.3	2.4
Green Ext Time (p_c), s		2.0				2.8	0.1

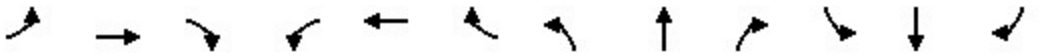
Intersection Summary	
HCM 6th Ctrl Delay, s/veh	4.4
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	8	3	113	8	46	3	567	177	45	502	3
Future Volume (veh/h)	3	8	3	113	8	46	3	567	177	45	502	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	3	9	3	126	9	51	3	630	197	50	558	3
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	7	92	31	191	42	236	7	933	291	92	1442	8
Arrive On Green	0.00	0.07	0.07	0.11	0.17	0.17	0.00	0.35	0.35	0.05	0.40	0.40
Sat Flow, veh/h	1767	1332	444	1767	241	1368	1767	2644	826	1767	3595	19
Grp Volume(v), veh/h	3	0	12	126	0	60	3	420	407	50	274	287
Grp Sat Flow(s),veh/h/ln	1767	0	1776	1767	0	1609	1767	1763	1707	1767	1763	1852
Q Serve(g_s), s	0.1	0.0	0.3	2.9	0.0	1.4	0.1	8.7	8.7	1.2	4.7	4.7
Cycle Q Clear(g_c), s	0.1	0.0	0.3	2.9	0.0	1.4	0.1	8.7	8.7	1.2	4.7	4.7
Prop In Lane	1.00		0.25	1.00		0.85	1.00		0.48	1.00		0.01
Lane Grp Cap(c), veh/h	7	0	122	191	0	278	7	622	602	92	707	743
V/C Ratio(X)	0.41	0.00	0.10	0.66	0.00	0.22	0.41	0.67	0.68	0.54	0.39	0.39
Avail Cap(c_a), veh/h	209	0	747	743	0	1163	209	1200	1162	267	1257	1321
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	18.8	18.4	0.0	15.3	21.4	11.8	11.8	19.9	9.1	9.1
Incr Delay (d2), s/veh	33.8	0.0	0.3	3.9	0.0	0.4	33.8	1.3	1.3	4.9	0.3	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	1.2	0.0	0.5	0.1	2.4	2.3	0.5	1.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	55.2	0.0	19.1	22.3	0.0	15.7	55.2	13.1	13.2	24.7	9.5	9.5
LnGrp LOS	E		B	C		B	E	B	B	C	A	A
Approach Vol, veh/h		15			186			830			611	
Approach Delay, s/veh		26.3			20.2			13.3			10.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	19.7	9.1	7.5	4.7	21.8	4.7	11.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	29.3	18.1	18.1	5.1	30.7	5.1	31.1
Max Q Clear Time (g_c+I1), s	3.2	10.7	4.9	2.3	2.1	6.7	2.1	3.4
Green Ext Time (p_c), s	0.0	4.5	0.2	0.0	0.0	2.9	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	13.2
HCM 6th LOS	B



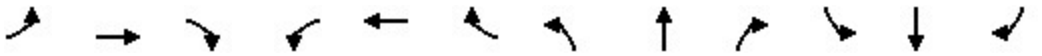
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	512	77	276	385	169	81	467	200	146	355	131
Future Volume (veh/h)	200	512	77	276	385	169	81	467	200	146	355	131
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	204	522	79	282	393	172	83	477	204	149	362	134
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	241	663	296	361	539	241	107	857	364	182	1008	367
Arrive On Green	0.14	0.19	0.19	0.11	0.15	0.15	0.06	0.36	0.36	0.10	0.40	0.40
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2410	1024	1767	2530	922
Grp Volume(v), veh/h	204	522	79	282	393	172	83	348	333	149	251	245
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1671	1767	1763	1690
Q Serve(g_s), s	11.1	13.9	4.2	7.9	10.5	10.2	4.6	15.6	15.8	8.1	9.8	10.1
Cycle Q Clear(g_c), s	11.1	13.9	4.2	7.9	10.5	10.2	4.6	15.6	15.8	8.1	9.8	10.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.61	1.00		0.55
Lane Grp Cap(c), veh/h	241	663	296	361	539	241	107	626	594	182	702	673
V/C Ratio(X)	0.85	0.79	0.27	0.78	0.73	0.71	0.78	0.56	0.56	0.82	0.36	0.36
Avail Cap(c_a), veh/h	424	1003	447	557	731	326	223	626	594	334	702	673
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	38.1	34.2	42.9	39.7	39.6	45.6	25.5	25.5	43.2	20.8	20.8
Incr Delay (d2), s/veh	8.0	2.4	0.5	3.8	2.4	4.7	11.5	3.5	3.8	8.6	1.4	1.5
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	5.1	5.9	1.6	3.4	4.5	4.1	2.2	6.6	6.4	3.8	4.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	49.5	40.5	34.6	46.8	42.1	44.3	57.1	29.0	29.3	51.8	22.2	22.4
LnGrp LOS	D	D	C	D	D	D	E	C	C	D	C	C
Approach Vol, veh/h		805			847			764			645	
Approach Delay, s/veh		42.2			44.1			32.2			29.1	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.4	41.2	16.2	24.7	12.1	45.4	19.6	21.3
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	18.6	33.0	16.0	28.0	12.4	39.2	23.6	* 20
Max Q Clear Time (g_c+I1), s	10.1	17.8	9.9	15.9	6.6	12.1	13.1	12.5
Green Ext Time (p_c), s	0.2	3.3	0.5	2.6	0.1	2.7	0.4	1.8

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	37.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	768	32	37	593	10	26	28	32	6	6	14
Future Volume (veh/h)	18	768	32	37	593	10	26	28	32	6	6	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	20	844	35	41	652	11	29	30	35	7	7	15
Peak Hour Factor	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.92	0.91	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	43	1259	561	78	1328	592	189	160	186	16	56	120
Arrive On Green	0.02	0.36	0.36	0.04	0.38	0.38	0.11	0.20	0.20	0.01	0.11	0.11
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1767	781	911	1767	526	1127
Grp Volume(v), veh/h	20	844	35	41	652	11	29	0	65	7	0	22
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1767	0	1692	1767	0	1653
Q Serve(g_s), s	0.5	9.5	0.7	1.1	6.6	0.2	0.7	0.0	1.5	0.2	0.0	0.6
Cycle Q Clear(g_c), s	0.5	9.5	0.7	1.1	6.6	0.2	0.7	0.0	1.5	0.2	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.68
Lane Grp Cap(c), veh/h	43	1259	561	78	1328	592	189	0	346	16	0	177
V/C Ratio(X)	0.46	0.67	0.06	0.53	0.49	0.02	0.15	0.00	0.19	0.43	0.00	0.12
Avail Cap(c_a), veh/h	200	2224	992	208	2239	999	680	0	1158	189	0	672
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	12.7	9.9	21.9	11.1	9.1	19.0	0.0	15.4	23.0	0.0	18.9
Incr Delay (d2), s/veh	7.5	0.6	0.0	5.4	0.3	0.0	0.4	0.0	0.3	16.5	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.8	0.2	0.5	1.8	0.0	0.3	0.0	0.5	0.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.0	13.3	9.9	27.3	11.4	9.2	19.3	0.0	15.6	39.6	0.0	19.2
LnGrp LOS	C	B	A	C	B	A	B		B	D		B
Approach Vol, veh/h		899			704			94			29	
Approach Delay, s/veh		13.6			12.3			16.8			24.1	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.9	14.1	6.6	21.2	9.5	9.5	5.6	22.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	32.0	5.5	29.5	18.0	19.0	5.3	29.7
Max Q Clear Time (g_c+I1), s	2.2	3.5	3.1	11.5	2.7	2.6	2.5	8.6
Green Ext Time (p_c), s	0.0	0.3	0.0	5.2	0.0	0.0	0.0	3.9

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	13.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	200	255	351	367	8
Future Vol, veh/h	0	200	255	351	367	8
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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	225	287	394	412	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	417	421	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.245	4.145	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	0	632	1130	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	632	1130	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	13.8	3.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1130	-	632	-	-
HCM Lane V/C Ratio	0.254	-	0.356	-	-
HCM Control Delay (s/veh)	9.3	-	13.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	1	-	1.6	-	-

Intersection	
Intersection Delay, s/veh	2.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	19	15	33	54
Demand Flow Rate, veh/h	19	15	34	55
Vehicles Circulating, veh/h	53	43	24	7
Vehicles Exiting, veh/h	9	15	48	51
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	2.9	2.8	2.9	3.0
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	19	15	34	55
Cap Entry Lane, veh/h	1307	1321	1346	1370
Entry HV Adj Factor	0.994	0.996	0.975	0.978
Flow Entry, veh/h	19	15	33	54
Cap Entry, veh/h	1299	1316	1313	1340
V/C Ratio	0.015	0.011	0.025	0.040
Control Delay, s/veh	2.9	2.8	2.9	3.0
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0



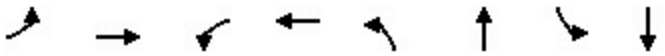
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	161	354	382
v/c Ratio	0.37	0.36	0.34
Control Delay (s/veh)	8.4	6.7	6.0
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	8.4	6.7	6.0
Queue Length 50th (ft)	11	32	32
Queue Length 95th (ft)	38	80	78
Internal Link Dist (ft)	1572	2000	572
Turn Bay Length (ft)			
Base Capacity (vph)	1354	1577	1802
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.12	0.22	0.21

Intersection Summary



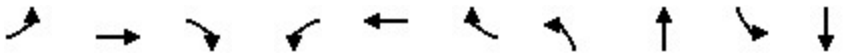
Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	28	39	327	56	445
v/c Ratio	0.08	0.12	0.22	0.04	0.34
Control Delay (s/veh)	15.5	7.5	3.5	1.4	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	15.5	7.5	3.5	1.4	4.2
Queue Length 50th (ft)	6	0	26	0	39
Queue Length 95th (ft)	20	16	55	8	85
Internal Link Dist (ft)	1684		620		2000
Turn Bay Length (ft)	200				
Base Capacity (vph)	1048	954	1845	1568	1675
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.18	0.04	0.27

Intersection Summary



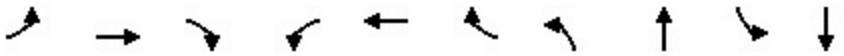
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	3	12	126	60	3	827	50	561
v/c Ratio	0.01	0.04	0.34	0.16	0.01	0.44	0.20	0.25
Control Delay (s/veh)	27.6	23.6	23.2	9.9	27.6	11.9	26.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.6	23.6	23.2	9.9	27.6	11.9	26.9	7.8
Queue Length 50th (ft)	1	2	30	2	1	86	12	30
Queue Length 95th (ft)	10	19	100	32	10	207	55	133
Internal Link Dist (ft)		1131		1664		540		750
Turn Bay Length (ft)	150		150		100		100	
Base Capacity (vph)	207	747	736	1199	207	2314	264	2475
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.02	0.17	0.05	0.01	0.36	0.19	0.23

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	204	522	79	282	393	172	83	681	149	496
v/c Ratio	0.72	0.74	0.18	0.66	0.68	0.40	0.51	0.61	0.65	0.37
Control Delay (s/veh)	59.3	48.4	1.2	54.5	50.4	7.2	61.0	33.3	60.4	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	59.3	48.4	1.2	54.5	50.4	7.2	61.0	33.3	60.4	25.1
Queue Length 50th (ft)	140	185	0	100	139	0	57	200	102	125
Queue Length 95th (ft)	227	253	3	154	206	45	115	300	178	193
Internal Link Dist (ft)		2580			1664			917		1204
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	384	912	510	505	664	455	202	1102	302	1318
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.57	0.15	0.56	0.59	0.38	0.41	0.62	0.49	0.38

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	20	844	35	41	652	11	29	65	7	22
v/c Ratio	0.10	0.61	0.04	0.20	0.43	0.01	0.12	0.11	0.03	0.09
Control Delay (s/veh)	27.3	15.0	0.1	28.0	11.3	0.0	25.1	12.3	27.0	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.3	15.0	0.1	28.0	11.3	0.0	25.1	12.3	27.0	17.6
Queue Length 50th (ft)	5	80	0	10	57	0	7	5	2	2
Queue Length 95th (ft)	27	187	0	44	137	0	33	42	14	21
Internal Link Dist (ft)		684			2580			454		342
Turn Bay Length (ft)	250		100	250		100	100		100	
Base Capacity (vph)	197	2195	1050	204	2250	1071	669	1162	186	677
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.38	0.03	0.20	0.29	0.01	0.04	0.06	0.04	0.03

Intersection Summary

FUTURE YEAR 2030 PLUS PROJECT

HCM 6th Signalized Intersection Summary
1: Demaree Street & Avenue 320

05/18/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	47	140	326	253	62
Future Volume (veh/h)	38	47	140	326	253	62
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	44	54	161	375	291	71
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	75	92	373	613	720	176
Arrive On Green	0.10	0.10	0.50	0.50	0.50	0.50
Sat Flow, veh/h	736	903	333	1227	1441	352
Grp Volume(v), veh/h	99	0	536	0	0	362
Grp Sat Flow(s),veh/h/ln	1656	0	1560	0	0	1792
Q Serve(g_s), s	1.3	0.0	2.6	0.0	0.0	2.9
Cycle Q Clear(g_c), s	1.3	0.0	5.5	0.0	0.0	2.9
Prop In Lane	0.44	0.55	0.30			0.20
Lane Grp Cap(c), veh/h	170	0	987	0	0	896
V/C Ratio(X)	0.58	0.00	0.54	0.00	0.00	0.40
Avail Cap(c_a), veh/h	1428	0	4279	0	0	4872
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	9.7	0.0	4.1	0.0	0.0	3.5
Incr Delay (d2), s/veh	3.2	0.0	0.5	0.0	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.1	0.0	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.9	0.0	4.6	0.0	0.0	3.8
LnGrp LOS	B		A			A
Approach Vol, veh/h	99			536	362	
Approach Delay, s/veh	12.9			4.6	3.8	
Approach LOS	B			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		15.8		6.8		15.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		61.5		19.5		61.5
Max Q Clear Time (g_c+I1), s		7.5		3.3		4.9
Green Ext Time (p_c), s		3.8		0.2		2.1

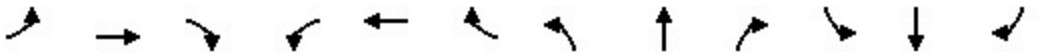
Intersection Summary	
HCM 6th Ctrl Delay, s/veh	5.1
HCM 6th LOS	A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	121	368	35	40	317
Future Volume (veh/h)	59	121	368	35	40	317
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	69	142	433	41	47	373
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	298	265	747	633	232	660
Arrive On Green	0.17	0.17	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1767	1572	1856	1572	102	1639
Grp Volume(v), veh/h	69	142	433	41	420	0
Grp Sat Flow(s),veh/h/ln	1767	1572	1856	1572	1741	0
Q Serve(g_s), s	0.7	1.7	3.8	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.7	1.7	3.8	0.3	3.8	0.0
Prop In Lane	1.00	1.00		1.00	0.11	
Lane Grp Cap(c), veh/h	298	265	747	633	892	0
V/C Ratio(X)	0.23	0.54	0.58	0.06	0.47	0.00
Avail Cap(c_a), veh/h	2146	1910	4905	4156	4618	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	7.6	8.0	4.9	3.8	4.8	0.0
Incr Delay (d2), s/veh	0.4	1.7	0.7	0.0	0.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	0.1	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	7.9	9.7	5.6	3.9	5.2	0.0
LnGrp LOS	A	A	A	A	A	
Approach Vol, veh/h	211		474			420
Approach Delay, s/veh	9.1		5.4			5.2
Approach LOS	A		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		13.0			13.0	8.0
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		55.5			55.5	25.5
Max Q Clear Time (g_c+I1), s		5.8			5.8	3.7
Green Ext Time (p_c), s		2.6			2.6	0.6

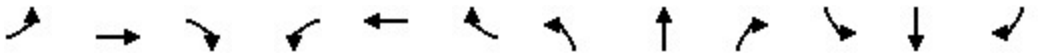
Intersection Summary	
HCM 6th Ctrl Delay, s/veh	6.1
HCM 6th LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	15	70	201	7	45	40	440	101	27	571	3
Future Volume (veh/h)	14	15	70	201	7	45	40	440	101	27	571	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	15	16	76	242	8	54	43	530	122	33	688	3
Peak Hour Factor	0.92	0.92	0.92	0.83	0.92	0.83	0.92	0.83	0.83	0.83	0.83	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	33	27	128	322	54	362	81	840	192	66	1030	4
Arrive On Green	0.02	0.10	0.10	0.18	0.26	0.26	0.05	0.29	0.29	0.04	0.29	0.29
Sat Flow, veh/h	1767	281	1334	1767	207	1397	1767	2848	653	1767	3600	16
Grp Volume(v), veh/h	15	0	92	242	0	62	43	327	325	33	337	354
Grp Sat Flow(s),veh/h/ln	1767	0	1615	1767	0	1604	1767	1763	1738	1767	1763	1853
Q Serve(g_s), s	0.4	0.0	2.5	6.0	0.0	1.4	1.1	7.4	7.5	0.8	7.8	7.8
Cycle Q Clear(g_c), s	0.4	0.0	2.5	6.0	0.0	1.4	1.1	7.4	7.5	0.8	7.8	7.8
Prop In Lane	1.00		0.83	1.00		0.87	1.00		0.38	1.00		0.01
Lane Grp Cap(c), veh/h	33	0	155	322	0	416	81	520	512	66	505	530
V/C Ratio(X)	0.45	0.00	0.59	0.75	0.00	0.15	0.53	0.63	0.63	0.50	0.67	0.67
Avail Cap(c_a), veh/h	191	0	630	823	0	1199	191	1019	1005	222	1050	1103
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	0.0	20.0	17.9	0.0	13.2	21.5	14.1	14.1	21.8	14.5	14.5
Incr Delay (d2), s/veh	9.1	0.0	3.6	3.6	0.0	0.2	5.3	1.3	1.3	5.7	1.5	1.5
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	0.2	0.0	1.0	2.4	0.0	0.4	0.5	2.3	2.3	0.4	2.4	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	31.5	0.0	23.6	21.4	0.0	13.3	26.8	15.4	15.4	27.5	16.1	16.0
LnGrp LOS	C		C	C		B	C	B	B	C	B	B
Approach Vol, veh/h		107			304			695			724	
Approach Delay, s/veh		24.7			19.8			16.1			16.6	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	18.1	12.9	8.9	6.6	17.7	5.4	16.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	26.7	21.5	18.0	5.0	27.5	5.0	34.5
Max Q Clear Time (g_c+I1), s	2.8	9.5	8.0	4.5	3.1	9.8	2.4	3.4
Green Ext Time (p_c), s	0.0	3.3	0.6	0.3	0.0	3.4	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	17.4
HCM 6th LOS	B



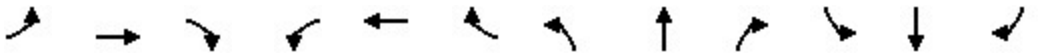
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	186	411	106	312	600	95	106	385	105	169	505	238
Future Volume (veh/h)	186	411	106	312	600	95	106	385	105	169	505	238
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	230	507	131	385	741	117	131	475	130	209	623	294
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	259	880	392	453	817	364	158	812	221	199	743	350
Arrive On Green	0.15	0.25	0.25	0.13	0.23	0.23	0.09	0.30	0.30	0.11	0.32	0.32
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2739	745	1767	2324	1097
Grp Volume(v), veh/h	230	507	131	385	741	117	131	305	300	209	472	445
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1721	1767	1763	1658
Q Serve(g_s), s	14.9	14.7	7.9	12.8	23.8	7.2	8.5	17.1	17.3	13.1	29.0	29.0
Cycle Q Clear(g_c), s	14.9	14.7	7.9	12.8	23.8	7.2	8.5	17.1	17.3	13.1	29.0	29.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.43	1.00		0.66
Lane Grp Cap(c), veh/h	259	880	392	453	817	364	158	522	510	199	563	530
V/C Ratio(X)	0.89	0.58	0.33	0.85	0.91	0.32	0.83	0.58	0.59	1.05	0.84	0.84
Avail Cap(c_a), veh/h	301	880	392	571	854	381	194	522	510	199	563	530
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	48.8	38.3	35.8	49.4	43.5	37.1	52.1	34.8	34.9	51.7	36.8	36.8
Incr Delay (d2), s/veh	23.9	0.9	0.5	9.7	13.0	0.5	21.3	4.7	4.9	77.9	13.9	14.7
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	8.0	6.2	3.0	5.9	11.5	2.7	4.6	7.7	7.6	9.9	13.9	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	72.7	39.2	36.3	59.1	56.5	37.6	73.5	39.5	39.8	129.6	50.8	51.5
LnGrp LOS	E	D	D	E	E	D	E	D	D	F	D	D
Approach Vol, veh/h		868			1243			736			1126	
Approach Delay, s/veh		47.6			55.5			45.7			65.7	
Approach LOS		D			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.3	40.7	21.2	35.2	16.6	43.4	23.2	33.2
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	13.1	34.5	19.4	28.6	12.8	34.8	19.8	* 28
Max Q Clear Time (g_c+I1), s	15.1	19.3	14.8	16.7	10.5	31.0	16.9	25.8
Green Ext Time (p_c), s	0.0	2.9	0.6	2.7	0.1	1.8	0.2	1.2

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	54.9
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	641	23	30	887	6	50	34	36	18	38	15
Future Volume (veh/h)	10	641	23	30	887	6	50	34	36	18	38	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	12	772	28	36	1069	7	60	37	43	20	41	16
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.92	0.83	0.92	0.83	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	27	1391	621	70	1476	658	179	139	162	43	128	50
Arrive On Green	0.02	0.39	0.39	0.04	0.42	0.42	0.10	0.18	0.18	0.02	0.10	0.10
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1767	782	909	1767	1270	496
Grp Volume(v), veh/h	12	772	28	36	1069	7	60	0	80	20	0	57
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1767	0	1692	1767	0	1766
Q Serve(g_s), s	0.3	8.4	0.5	1.0	12.5	0.1	1.6	0.0	2.0	0.6	0.0	1.5
Cycle Q Clear(g_c), s	0.3	8.4	0.5	1.0	12.5	0.1	1.6	0.0	2.0	0.6	0.0	1.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.28
Lane Grp Cap(c), veh/h	27	1391	621	70	1476	658	179	0	301	43	0	179
V/C Ratio(X)	0.44	0.55	0.05	0.52	0.72	0.01	0.34	0.00	0.27	0.47	0.00	0.32
Avail Cap(c_a), veh/h	179	2095	934	218	2173	969	643	0	1067	189	0	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	11.6	9.2	23.3	12.0	8.4	20.7	0.0	17.6	23.8	0.0	20.7
Incr Delay (d2), s/veh	10.9	0.3	0.0	5.8	0.7	0.0	1.1	0.0	0.5	7.7	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.4	0.1	0.5	3.4	0.0	0.6	0.0	0.7	0.3	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	35.0	12.0	9.3	29.1	12.7	8.4	21.8	0.0	18.0	31.5	0.0	21.7
LnGrp LOS	D	B	A	C	B	A	C		B	C		C
Approach Vol, veh/h		812			1112			140			77	
Approach Delay, s/veh		12.2			13.2			19.6			24.2	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	13.3	6.5	24.0	9.5	9.5	5.3	25.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.3	31.2	6.1	29.4	18.0	18.5	5.0	30.5
Max Q Clear Time (g_c+I1), s	2.6	4.0	3.0	10.4	3.6	3.5	2.3	14.5
Green Ext Time (p_c), s	0.0	0.4	0.0	4.8	0.1	0.2	0.0	6.2

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	13.6
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	240	112	386	373	2
Future Vol, veh/h	0	240	112	386	373	2
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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	80
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	273	127	439	424	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	426	427	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.245	4.145	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	0	625	1124	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	625	1124	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	15.1	1.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1124	-	625	-	-
HCM Lane V/C Ratio	0.113	-	0.436	-	-
HCM Control Delay (s/veh)	8.6	-	15.1	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q (veh)	0.4	-	2.2	-	-

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	0	159	0	3	89	7	0	0	8	24	0	0
Future Vol, veh/h	0	159	0	3	89	7	0	0	8	24	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	173	0	3	97	8	0	0	9	26	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	105	0	0	173	0	0	280	284	173	285	280	101
Stage 1	-	-	-	-	-	-	173	173	-	107	107	-
Stage 2	-	-	-	-	-	-	107	111	-	178	173	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1480	-	-	1398	-	-	670	623	868	665	627	952
Stage 1	-	-	-	-	-	-	827	754	-	896	805	-
Stage 2	-	-	-	-	-	-	896	802	-	821	754	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1480	-	-	1398	-	-	669	622	868	657	626	952
Mov Cap-2 Maneuver	-	-	-	-	-	-	669	622	-	657	626	-
Stage 1	-	-	-	-	-	-	827	754	-	896	803	-
Stage 2	-	-	-	-	-	-	894	800	-	813	754	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	0.2	9.2	10.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	868	1480	-	-	1398	-	-	657
HCM Lane V/C Ratio	0.01	-	-	-	0.002	-	-	0.04
HCM Control Delay (s/veh)	9.2	0	-	-	7.6	0	-	10.7
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q (veh)	0	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	191	0	8	99	7	0	0	25	24	0	0
Future Vol, veh/h	0	191	0	8	99	7	0	0	25	24	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	208	0	9	108	8	0	0	27	26	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	116	0	0	208	0	0	338	342	208	352	338	112
Stage 1	-	-	-	-	-	-	208	208	-	130	130	-
Stage 2	-	-	-	-	-	-	130	134	-	222	208	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1466	-	-	1357	-	-	614	579	830	601	582	938
Stage 1	-	-	-	-	-	-	792	728	-	871	787	-
Stage 2	-	-	-	-	-	-	871	784	-	778	728	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1466	-	-	1357	-	-	611	575	830	578	578	938
Mov Cap-2 Maneuver	-	-	-	-	-	-	611	575	-	578	578	-
Stage 1	-	-	-	-	-	-	792	728	-	871	781	-
Stage 2	-	-	-	-	-	-	865	779	-	753	728	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	0.5	9.5	11.5
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	830	1466	-	-	1357	-	-	578
HCM Lane V/C Ratio	0.033	-	-	-	0.006	-	-	0.045
HCM Control Delay (s/veh)	9.5	0	-	-	7.7	0	-	11.5
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q (veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	19	12	3	8	0
Future Vol, veh/h	0	19	12	3	8	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	21	13	3	9	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	16	0	-	0	36	15
Stage 1	-	-	-	-	15	-
Stage 2	-	-	-	-	21	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1595	-	-	-	974	1062
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1595	-	-	-	974	1062
Mov Cap-2 Maneuver	-	-	-	-	974	-
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1595	-	-	-	974
HCM Lane V/C Ratio	-	-	-	-	0.009
HCM Control Delay (s/veh)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q (veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	26	1	31	10	8	2	0	47	25	0	2
Future Vol, veh/h	0	26	1	31	10	8	2	0	47	25	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	125	-	-	125	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	28	1	34	11	9	2	0	51	27	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	20	0	0	29	0	0	114	117	29	138	113	16
Stage 1	-	-	-	-	-	-	29	29	-	84	84	-
Stage 2	-	-	-	-	-	-	85	88	-	54	29	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1590	-	-	1578	-	-	861	771	1043	830	775	1060
Stage 1	-	-	-	-	-	-	985	869	-	922	823	-
Stage 2	-	-	-	-	-	-	920	820	-	956	869	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1590	-	-	1578	-	-	846	754	1043	776	758	1060
Mov Cap-2 Maneuver	-	-	-	-	-	-	846	754	-	776	758	-
Stage 1	-	-	-	-	-	-	985	869	-	922	805	-
Stage 2	-	-	-	-	-	-	898	802	-	909	869	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	4.6	8.7	9.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1033	1590	-	-	1578	-	-	792
HCM Lane V/C Ratio	0.052	-	-	-	0.021	-	-	0.037
HCM Control Delay (s/veh)	8.7	0	-	-	7.3	-	-	9.7
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q (veh)	0.2	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	51	0	581	841	1
Future Vol, veh/h	0	51	0	581	841	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	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	55	0	632	914	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	458	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.96	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.33	-	-	-	-
Pot Cap-1 Maneuver	0	547	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	547	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	547	-	-
HCM Lane V/C Ratio	-	0.101	-	-
HCM Control Delay (s/veh)	-	12.3	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q (veh)	-	0.3	-	-

Intersection	
Intersection Delay, s/veh	3.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	9	7	40	105
Demand Flow Rate, veh/h	9	7	41	107
Vehicles Circulating, veh/h	100	42	20	9
Vehicles Exiting, veh/h	16	19	89	40
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.0	2.8	3.0	3.3
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	9	7	41	107
Cap Entry Lane, veh/h	1246	1322	1352	1367
Entry HV Adj Factor	0.987	0.992	0.976	0.977
Flow Entry, veh/h	9	7	40	105
Cap Entry, veh/h	1230	1311	1319	1336
V/C Ratio	0.007	0.005	0.030	0.078
Control Delay, s/veh	3.0	2.8	3.0	3.3
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0



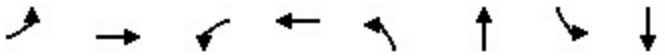
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	98	536	362
v/c Ratio	0.30	0.50	0.27
Control Delay (s/veh)	12.8	6.5	3.9
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	12.8	6.5	3.9
Queue Length 50th (ft)	11	58	28
Queue Length 95th (ft)	42	134	64
Internal Link Dist (ft)	1572	2000	572
Turn Bay Length (ft)			
Base Capacity (vph)	813	1467	1797
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.12	0.37	0.20

Intersection Summary



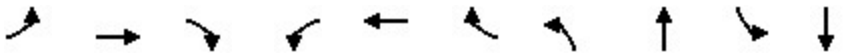
Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	69	142	433	41	420
v/c Ratio	0.18	0.31	0.39	0.04	0.41
Control Delay (s/veh)	11.4	4.8	6.5	2.1	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	11.4	4.8	6.5	2.1	6.8
Queue Length 50th (ft)	8	0	38	0	38
Queue Length 95th (ft)	28	22	80	7	81
Internal Link Dist (ft)	1684		620		2000
Turn Bay Length (ft)	200				
Base Capacity (vph)	1437	1312	1845	1568	1708
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.11	0.23	0.03	0.25

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	92	242	62	43	652	33	691
v/c Ratio	0.09	0.34	0.57	0.09	0.26	0.49	0.17	0.55
Control Delay (s/veh)	34.5	15.3	28.3	6.9	36.8	17.4	34.3	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	34.5	15.3	28.3	6.9	36.8	17.4	34.3	19.9
Queue Length 50th (ft)	5	6	81	2	16	76	12	116
Queue Length 95th (ft)	26	49	161	29	54	173	41	188
Internal Link Dist (ft)		1131		1664		540		750
Turn Bay Length (ft)	150		150		100		100	
Base Capacity (vph)	164	595	706	1056	164	1734	190	1805
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.15	0.34	0.06	0.26	0.38	0.17	0.38

Intersection Summary

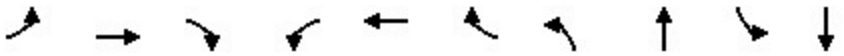


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	230	507	131	385	741	117	131	605	209	917
v/c Ratio	0.84	0.60	0.27	0.76	0.90	0.24	0.74	0.59	1.07	0.86
Control Delay (s/veh)	75.3	43.5	6.9	59.0	60.3	5.3	76.8	37.1	135.1	46.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	75.3	43.5	6.9	59.0	60.3	5.3	76.8	37.1	135.1	46.5
Queue Length 50th (ft)	173	183	0	147	294	0	100	203	~183	337
Queue Length 95th (ft)	#246	214	32	177	324	21	#153	231	#289	363
Internal Link Dist (ft)		2580			1664			917		1204
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	295	864	490	560	839	480	190	1015	195	1058
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.59	0.27	0.69	0.88	0.24	0.69	0.60	1.07	0.87

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.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	12	772	28	36	1069	7	60	80	20	57
v/c Ratio	0.07	0.53	0.03	0.18	0.67	0.00	0.24	0.13	0.11	0.23
Control Delay (s/veh)	30.0	15.0	0.0	29.9	15.3	0.0	27.4	11.6	30.1	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	30.0	15.0	0.0	29.9	15.3	0.0	27.4	11.6	30.1	22.5
Queue Length 50th (ft)	3	78	0	10	123	0	17	7	6	11
Queue Length 95th (ft)	19	170	0	39	246	0	53	48	29	49
Internal Link Dist (ft)		684			2580			454		411
Turn Bay Length (ft)	250		100	250		100	100		100	
Base Capacity (vph)	165	1943	950	201	2037	988	594	1014	175	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.40	0.03	0.18	0.52	0.01	0.10	0.08	0.11	0.09

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	86	71	244	287	57
Future Volume (veh/h)	55	86	71	244	287	57
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	62	98	81	277	326	65
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	94	148	303	531	599	119
Arrive On Green	0.15	0.15	0.40	0.40	0.40	0.40
Sat Flow, veh/h	633	1001	203	1332	1502	300
Grp Volume(v), veh/h	161	0	358	0	0	391
Grp Sat Flow(s),veh/h/ln	1644	0	1535	0	0	1802
Q Serve(g_s), s	1.8	0.0	0.4	0.0	0.0	3.3
Cycle Q Clear(g_c), s	1.8	0.0	3.7	0.0	0.0	3.3
Prop In Lane	0.39	0.61	0.23			0.17
Lane Grp Cap(c), veh/h	244	0	834	0	0	718
V/C Ratio(X)	0.66	0.00	0.43	0.00	0.00	0.54
Avail Cap(c_a), veh/h	2194	0	4463	0	0	4946
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	0.0	4.5	0.0	0.0	4.6
Incr Delay (d2), s/veh	3.0	0.0	0.4	0.0	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.0	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.0	0.0	4.8	0.0	0.0	5.2
LnGrp LOS	B		A			A
Approach Vol, veh/h	161			358	391	
Approach Delay, s/veh	11.0			4.8	5.2	
Approach LOS	B			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		12.4		7.4		12.4
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		54.5		26.5		54.5
Max Q Clear Time (g_c+I1), s		5.7		3.8		5.3
Green Ext Time (p_c), s		2.2		0.4		2.3

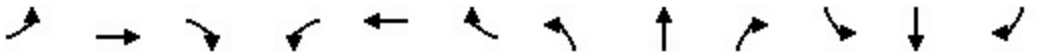
Intersection Summary	
HCM 6th Ctrl Delay, s/veh	6.1
HCM 6th LOS	A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	36	308	55	68	354
Future Volume (veh/h)	30	36	308	55	68	354
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	32	39	331	59	73	381
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	145	129	820	695	292	687
Arrive On Green	0.08	0.08	0.44	0.44	0.44	0.44
Sat Flow, veh/h	1767	1572	1856	1572	161	1553
Grp Volume(v), veh/h	32	39	331	59	454	0
Grp Sat Flow(s),veh/h/ln	1767	1572	1856	1572	1714	0
Q Serve(g_s), s	0.3	0.4	2.3	0.4	0.2	0.0
Cycle Q Clear(g_c), s	0.3	0.4	2.3	0.4	3.5	0.0
Prop In Lane	1.00	1.00		1.00	0.16	
Lane Grp Cap(c), veh/h	145	129	820	695	978	0
V/C Ratio(X)	0.22	0.30	0.40	0.08	0.46	0.00
Avail Cap(c_a), veh/h	1915	1704	5933	5028	5456	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	8.1	8.2	3.6	3.1	3.9	0.0
Incr Delay (d2), s/veh	0.8	1.3	0.3	0.1	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.1	0.0	0.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	8.9	9.5	3.9	3.1	4.2	0.0
LnGrp LOS	A	A	A	A	A	
Approach Vol, veh/h	71		390			454
Approach Delay, s/veh	9.2		3.8			4.2
Approach LOS	A		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		12.9			12.9	6.1
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		60.5			60.5	20.5
Max Q Clear Time (g_c+I1), s		4.3			5.5	2.4
Green Ext Time (p_c), s		2.0			2.9	0.1

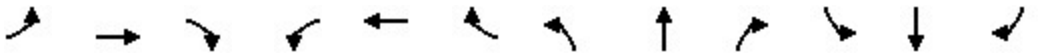
Intersection Summary						
HCM 6th Ctrl Delay, s/veh			4.4			
HCM 6th LOS			A			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	11	47	113	14	48	134	603	177	46	527	9
Future Volume (veh/h)	10	11	47	113	14	48	134	603	177	46	527	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	11	12	51	126	15	53	149	670	197	51	586	10
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	25	28	119	192	66	235	189	960	282	92	1073	18
Arrive On Green	0.01	0.09	0.09	0.11	0.19	0.19	0.11	0.36	0.36	0.05	0.30	0.30
Sat Flow, veh/h	1767	308	1311	1767	359	1268	1767	2687	789	1767	3547	61
Grp Volume(v), veh/h	11	0	63	126	0	68	149	439	428	51	291	305
Grp Sat Flow(s),veh/h/ln	1767	0	1620	1767	0	1627	1767	1763	1713	1767	1763	1845
Q Serve(g_s), s	0.3	0.0	1.7	3.2	0.0	1.6	3.8	9.8	9.8	1.3	6.3	6.4
Cycle Q Clear(g_c), s	0.3	0.0	1.7	3.2	0.0	1.6	3.8	9.8	9.8	1.3	6.3	6.4
Prop In Lane	1.00		0.81	1.00		0.78	1.00		0.46	1.00		0.03
Lane Grp Cap(c), veh/h	25	0	147	192	0	301	189	630	612	92	533	558
V/C Ratio(X)	0.44	0.00	0.43	0.66	0.00	0.23	0.79	0.70	0.70	0.55	0.55	0.55
Avail Cap(c_a), veh/h	196	0	637	695	0	1100	196	1122	1091	250	1176	1230
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.5	0.0	19.8	19.7	0.0	15.9	20.0	12.7	12.7	21.3	13.4	13.4
Incr Delay (d2), s/veh	11.5	0.0	2.0	3.8	0.0	0.4	18.5	1.4	1.5	5.1	0.9	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	0.2	0.0	0.6	1.3	0.0	0.6	2.2	2.8	2.8	0.6	1.9	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.0	0.0	21.7	23.5	0.0	16.3	38.6	14.1	14.1	26.4	14.3	14.2
LnGrp LOS	C		C	C		B	D	B	B	C	B	B
Approach Vol, veh/h		74			194			1016			647	
Approach Delay, s/veh		23.6			21.0			17.7			15.2	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.9	21.0	9.5	8.7	9.4	18.4	5.2	13.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	29.3	18.1	18.1	5.1	30.7	5.1	31.1
Max Q Clear Time (g_c+I1), s	3.3	11.8	5.2	3.7	5.8	8.4	2.3	3.6
Green Ext Time (p_c), s	0.0	4.6	0.2	0.2	0.0	3.1	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	17.4
HCM 6th LOS	B



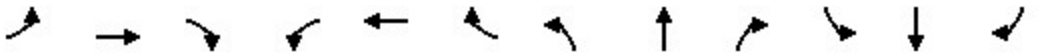
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	512	77	276	385	197	81	563	200	164	405	162
Future Volume (veh/h)	253	512	77	276	385	197	81	563	200	164	405	162
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	258	522	79	282	393	201	83	574	204	167	413	165
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	293	785	350	356	554	247	106	829	294	200	933	368
Arrive On Green	0.17	0.22	0.22	0.10	0.16	0.16	0.06	0.33	0.33	0.11	0.38	0.38
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	2551	904	1767	2468	975
Grp Volume(v), veh/h	258	522	79	282	393	201	83	396	382	167	294	284
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1763	1693	1767	1763	1680
Q Serve(g_s), s	14.8	14.0	4.3	8.3	11.0	12.8	4.8	20.3	20.4	9.6	12.9	13.1
Cycle Q Clear(g_c), s	14.8	14.0	4.3	8.3	11.0	12.8	4.8	20.3	20.4	9.6	12.9	13.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.58
Lane Grp Cap(c), veh/h	293	785	350	356	554	247	106	573	550	200	666	635
V/C Ratio(X)	0.88	0.66	0.23	0.79	0.71	0.81	0.78	0.69	0.69	0.84	0.44	0.45
Avail Cap(c_a), veh/h	402	952	424	529	693	309	211	573	550	317	666	635
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	42.3	36.8	33.0	45.4	41.5	42.2	48.1	30.5	30.5	45.1	24.1	24.2
Incr Delay (d2), s/veh	15.5	1.3	0.3	4.9	2.5	12.5	11.6	6.7	7.1	10.4	2.1	2.3
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	7.4	5.8	1.6	3.7	4.8	5.6	2.4	9.1	8.8	4.6	5.4	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.8	38.1	33.3	50.2	44.0	54.7	59.7	37.2	37.6	55.5	26.2	26.4
LnGrp LOS	E	D	C	D	D	D	E	D	D	E	C	C
Approach Vol, veh/h		859			876			861			745	
Approach Delay, s/veh		43.6			48.4			39.5			32.8	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.9	39.9	16.6	29.3	12.4	45.4	23.4	22.5
Change Period (Y+Rc), s	6.2	6.2	5.8	6.2	6.2	6.2	6.2	* 6.2
Max Green Setting (Gmax), s	18.6	33.0	16.0	28.0	12.4	39.2	23.6	* 20
Max Q Clear Time (g_c+I1), s	11.6	22.4	10.3	16.0	6.8	15.1	16.8	14.8
Green Ext Time (p_c), s	0.2	3.2	0.5	2.6	0.1	3.1	0.4	1.5

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	41.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	821	32	37	624	10	26	28	32	6	6	14
Future Volume (veh/h)	18	821	32	37	624	10	26	28	32	6	6	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	20	902	35	41	686	11	29	30	35	7	7	15
Peak Hour Factor	0.92	0.91	0.91	0.91	0.91	0.92	0.91	0.92	0.91	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	43	1313	586	78	1382	616	184	155	181	16	55	117
Arrive On Green	0.02	0.37	0.37	0.04	0.39	0.39	0.10	0.20	0.20	0.01	0.10	0.10
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1767	781	911	1767	526	1127
Grp Volume(v), veh/h	20	902	35	41	686	11	29	0	65	7	0	22
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1767	0	1692	1767	0	1653
Q Serve(g_s), s	0.5	10.4	0.7	1.1	7.0	0.2	0.7	0.0	1.5	0.2	0.0	0.6
Cycle Q Clear(g_c), s	0.5	10.4	0.7	1.1	7.0	0.2	0.7	0.0	1.5	0.2	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.68
Lane Grp Cap(c), veh/h	43	1313	586	78	1382	616	184	0	337	16	0	172
V/C Ratio(X)	0.46	0.69	0.06	0.53	0.50	0.02	0.16	0.00	0.19	0.43	0.00	0.13
Avail Cap(c_a), veh/h	195	2168	967	203	2182	973	663	0	1128	184	0	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	12.7	9.7	22.5	11.0	8.9	19.6	0.0	16.0	23.6	0.0	19.5
Incr Delay (d2), s/veh	7.6	0.6	0.0	5.5	0.3	0.0	0.4	0.0	0.3	16.6	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	3.0	0.2	0.5	1.9	0.0	0.3	0.0	0.5	0.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.7	13.3	9.7	27.9	11.3	8.9	20.0	0.0	16.3	40.2	0.0	19.8
LnGrp LOS	C	B	A	C	B	A	B		B	D		B
Approach Vol, veh/h		957			738			94			29	
Approach Delay, s/veh		13.6			12.2			17.4			24.8	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.9	14.1	6.6	22.4	9.5	9.5	5.7	23.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	32.0	5.5	29.5	18.0	19.0	5.3	29.7
Max Q Clear Time (g_c+I1), s	2.2	3.5	3.1	12.4	2.7	2.6	2.5	9.0
Green Ext Time (p_c), s	0.0	0.3	0.0	5.5	0.0	0.0	0.0	4.1

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	13.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	223	293	358	377	10
Future Vol, veh/h	0	223	293	358	377	10
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	-	175	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	251	329	402	424	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	430	435	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.245	4.145	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3285	2.2285	-	-	-
Pot Cap-1 Maneuver	0	622	1117	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	622	1117	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.6	4.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1117	-	622	-	-
HCM Lane V/C Ratio	0.295	-	0.403	-	-
HCM Control Delay (s/veh)	9.6	-	14.6	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q (veh)	1.2	-	1.9	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	172	0	11	217	23	0	0	6	14	0	0
Future Vol, veh/h	0	172	0	11	217	23	0	0	6	14	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	187	0	12	236	25	0	0	7	15	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	261	0	0	187	0	0	460	472	187	464	460	249
Stage 1	-	-	-	-	-	-	187	187	-	273	273	-
Stage 2	-	-	-	-	-	-	273	285	-	191	187	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1298	-	-	1381	-	-	510	489	852	507	496	787
Stage 1	-	-	-	-	-	-	812	743	-	731	682	-
Stage 2	-	-	-	-	-	-	731	674	-	808	743	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1298	-	-	1381	-	-	506	484	852	499	491	787
Mov Cap-2 Maneuver	-	-	-	-	-	-	506	484	-	499	491	-
Stage 1	-	-	-	-	-	-	812	743	-	731	675	-
Stage 2	-	-	-	-	-	-	724	667	-	802	743	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	0.3	9.3	12.4
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	852	1298	-	-	1381	-	-	499
HCM Lane V/C Ratio	0.008	-	-	-	0.009	-	-	0.03
HCM Control Delay (s/veh)	9.3	0	-	-	7.6	0	-	12.4
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q (veh)	0	0	-	-	0	-	-	0.1

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	0	192	0	29	251	23	0	0	17	14	0	0
Future Vol, veh/h	0	192	0	29	251	23	0	0	17	14	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	209	0	32	273	25	0	0	18	15	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	298	0	0	209	0	0	559	571	209	568	559	286
Stage 1	-	-	-	-	-	-	209	209	-	350	350	-
Stage 2	-	-	-	-	-	-	350	362	-	218	209	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1258	-	-	1356	-	-	438	429	829	432	436	751
Stage 1	-	-	-	-	-	-	791	727	-	664	631	-
Stage 2	-	-	-	-	-	-	664	623	-	782	727	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1258	-	-	1356	-	-	429	417	829	413	424	751
Mov Cap-2 Maneuver	-	-	-	-	-	-	429	417	-	413	424	-
Stage 1	-	-	-	-	-	-	791	727	-	664	613	-
Stage 2	-	-	-	-	-	-	645	606	-	765	727	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	0.7	9.4	14.1
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	829	1258	-	-	1356	-	-	413
HCM Lane V/C Ratio	0.022	-	-	-	0.023	-	-	0.037
HCM Control Delay (s/veh)	9.4	0	-	-	7.7	0	-	14.1
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q (veh)	0.1	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	18	16	10	6	0
Future Vol, veh/h	0	18	16	10	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	20	17	11	7	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	28	0	-	0	43	23
Stage 1	-	-	-	-	23	-
Stage 2	-	-	-	-	20	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1579	-	-	-	965	1051
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1579	-	-	-	965	1051
Mov Cap-2 Maneuver	-	-	-	-	965	-
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	1000	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1579	-	-	-	965
HCM Lane V/C Ratio	-	-	-	-	0.007
HCM Control Delay (s/veh)	0	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q (veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	20	2	106	24	27	1	0	31	17	0	1
Future Vol, veh/h	2	20	2	106	24	27	1	0	31	17	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	125	-	-	125	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	2	22	2	115	26	29	1	0	34	18	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	55	0	0	24	0	0	298	312	23	315	299	41
Stage 1	-	-	-	-	-	-	27	27	-	271	271	-
Stage 2	-	-	-	-	-	-	271	285	-	44	28	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1544	-	-	1584	-	-	652	601	1051	636	611	1027
Stage 1	-	-	-	-	-	-	988	871	-	733	683	-
Stage 2	-	-	-	-	-	-	733	674	-	968	870	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1544	-	-	1584	-	-	615	557	1051	581	566	1027
Mov Cap-2 Maneuver	-	-	-	-	-	-	615	557	-	581	566	-
Stage 1	-	-	-	-	-	-	987	870	-	732	633	-
Stage 2	-	-	-	-	-	-	679	625	-	936	869	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0.6	5	8.6	11.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1028	1544	-	-	1584	-	-	595
HCM Lane V/C Ratio	0.034	0.001	-	-	0.073	-	-	0.033
HCM Control Delay (s/veh)	8.6	7.3	-	-	7.5	-	-	11.3
HCM Lane LOS	A	A	-	-	A	-	-	B
HCM 95th %tile Q (veh)	0.1	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	34	0	914	683	4
Future Vol, veh/h	0	34	0	914	683	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	37	0	993	742	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	373	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.96	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.33	-	-	-	-
Pot Cap-1 Maneuver	0	622	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	622	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	622	-	-
HCM Lane V/C Ratio	-	0.059	-	-
HCM Control Delay (s/veh)	-	11.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q (veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	3.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	24	17	33	54
Demand Flow Rate, veh/h	24	17	34	55
Vehicles Circulating, veh/h	53	43	29	9
Vehicles Exiting, veh/h	11	20	48	51
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	2.9	2.8	3.0	3.0
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	24	17	34	55
Cap Entry Lane, veh/h	1307	1321	1340	1367
Entry HV Adj Factor	0.989	0.993	0.975	0.978
Flow Entry, veh/h	24	17	33	54
Cap Entry, veh/h	1293	1312	1306	1337
V/C Ratio	0.018	0.013	0.025	0.040
Control Delay, s/veh	2.9	2.8	3.0	3.0
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0



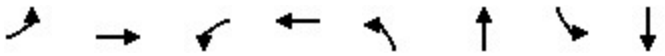
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	161	358	391
v/c Ratio	0.37	0.37	0.35
Control Delay (s/veh)	8.5	6.7	6.0
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	8.5	6.7	6.0
Queue Length 50th (ft)	11	33	33
Queue Length 95th (ft)	38	81	80
Internal Link Dist (ft)	1572	2000	572
Turn Bay Length (ft)			
Base Capacity (vph)	1352	1575	1804
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.12	0.23	0.22

Intersection Summary



Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	32	39	331	59	454
v/c Ratio	0.10	0.12	0.23	0.04	0.35
Control Delay (s/veh)	15.3	7.4	3.6	1.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	15.3	7.4	3.6	1.4	4.4
Queue Length 50th (ft)	7	0	26	0	40
Queue Length 95th (ft)	21	16	57	8	89
Internal Link Dist (ft)	1684		620		2000
Turn Bay Length (ft)	200				
Base Capacity (vph)	1047	953	1845	1568	1677
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.18	0.04	0.27

Intersection Summary

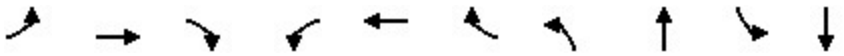


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	63	126	68	149	867	51	596
v/c Ratio	0.06	0.26	0.40	0.15	0.88	0.47	0.25	0.40
Control Delay (s/veh)	32.9	15.8	29.1	9.6	81.9	14.9	33.3	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	32.9	15.8	29.1	9.6	81.9	14.9	33.3	14.8
Queue Length 50th (ft)	4	4	44	4	~61	138	18	87
Queue Length 95th (ft)	20	39	103	35	#204	232	57	150
Internal Link Dist (ft)		1131		1664		540		750
Turn Bay Length (ft)	150		150		100		100	
Base Capacity (vph)	169	590	602	984	169	2059	216	2038
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.11	0.21	0.07	0.88	0.42	0.24	0.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

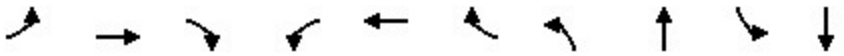
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	258	522	79	282	393	201	83	778	167	578
v/c Ratio	0.81	0.69	0.17	0.66	0.71	0.48	0.52	0.73	0.70	0.44
Control Delay (s/veh)	64.7	46.1	1.1	55.8	53.3	10.2	62.4	39.3	63.6	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	64.7	46.1	1.1	55.8	53.3	10.2	62.4	39.3	63.6	27.1
Queue Length 50th (ft)	184	186	0	104	147	0	60	266	120	163
Queue Length 95th (ft)	#307	253	3	154	206	66	115	360	198	228
Internal Link Dist (ft)		2580			1664			917		1204
Turn Bay Length (ft)	275		150	150		150	250		200	
Base Capacity (vph)	376	892	502	494	650	454	197	1054	296	1297
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.59	0.16	0.57	0.60	0.44	0.42	0.74	0.56	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	20	902	35	41	686	11	29	65	7	22
v/c Ratio	0.10	0.63	0.04	0.20	0.44	0.01	0.12	0.11	0.03	0.10
Control Delay (s/veh)	28.1	15.1	0.1	28.8	11.2	0.0	25.9	12.7	27.8	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.1	15.1	0.1	28.8	11.2	0.0	25.9	12.7	27.8	18.1
Queue Length 50th (ft)	5	87	0	11	61	0	7	5	2	2
Queue Length 95th (ft)	27	202	0	44	144	0	33	43	14	22
Internal Link Dist (ft)		684			2580			454		342
Turn Bay Length (ft)	250		100	250		100	100		100	
Base Capacity (vph)	192	2141	1028	199	2210	1055	652	1134	181	661
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.42	0.03	0.21	0.31	0.01	0.04	0.06	0.04	0.03

Intersection Summary

APPENDIX C

Collision Data Worksheets

TIMS SWITRS Crash Summary & Map

October 11, 2024

Overview

This report was created with the help of The Transportation Injury Mapping System (TIMS). TIMS has been developed by UC Berkeley SafeTREC to provide quick, easy and free access to California crash data, the Statewide Integrated Traffic Records System (SWITRS), that has been geo-coded by SafeTREC to make it easy to map crashes.

Date & Location

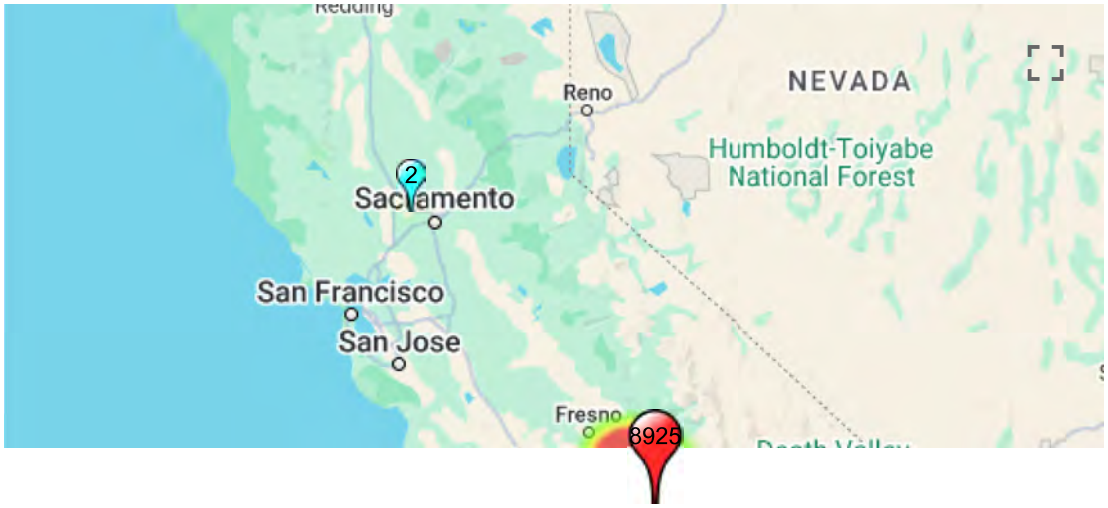
Date: 01/01/2019 - 12/31/2023

County: Tulare

City:

Result

Total Crashes	9,471
Total Victims	412 Killed & 13,701 Injured
State Highway	3,004 (31.7%)
Ped Involved	487 (5.1%)
Bike Involved	306 (3.2%)
Motorcycle Involved	504 (5.3%)



TIMS

SWITRS Crash

October 11, 2024



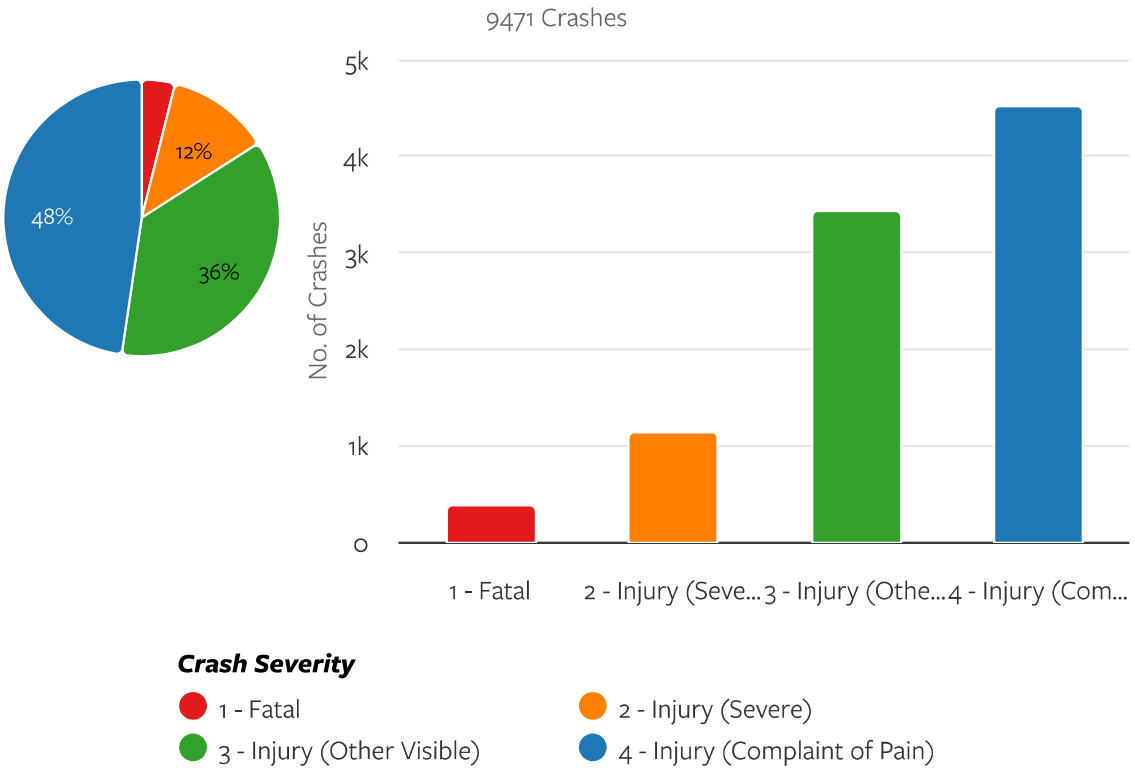
8,929 of 9,471 (94.3%) Crashes are geocoded and mapped.

TIMS SWITRS Crash Summary & Map

October 11, 2024

Crash Summary

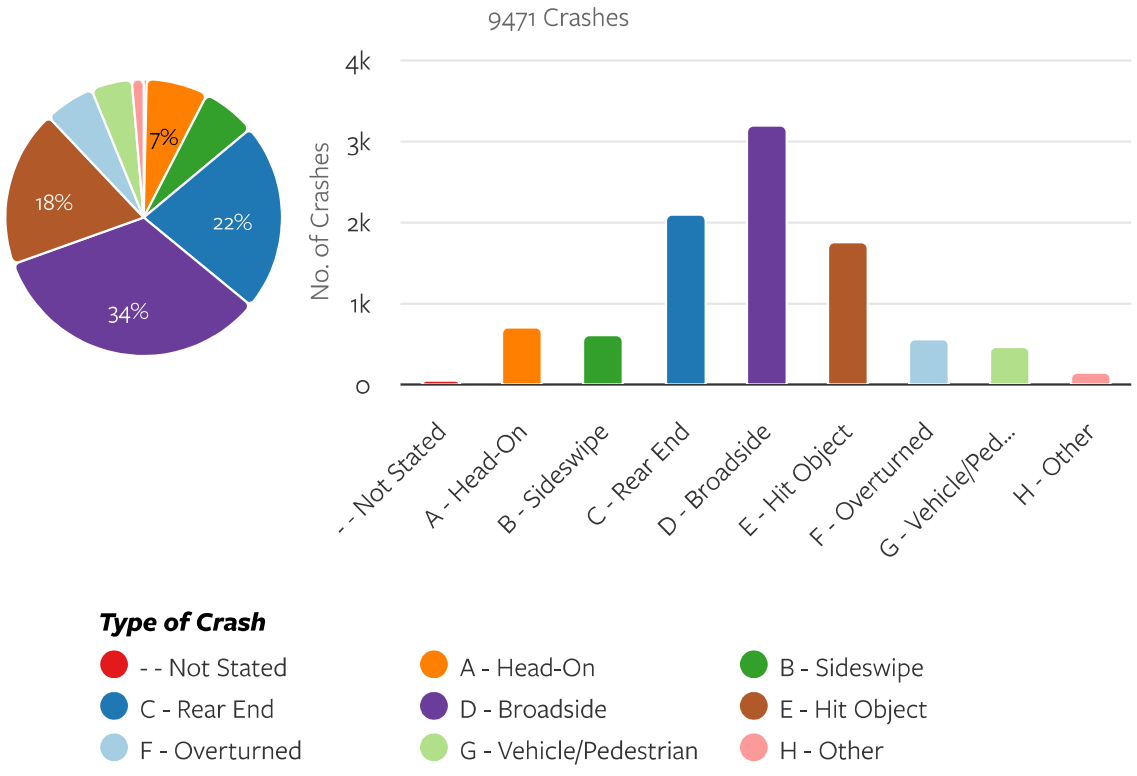
By Crash Severity



Crash Severity	Count	%
1 - Fatal	371	3.92%
2 - Injury (Severe)	1141	12.05%
3 - Injury (Other Visible)	3442	36.34%
4 - Injury (Complaint of Pain)	4517	47.69%

TIMS SWITRS Crash Summary & Map

Number of Crashes by Type of Crash



Type of Crash	Count	%
- - Not Stated	31	0.33%
A - Head-On	688	7.26%
B - Sideswipe	599	6.32%
C - Rear End	2087	22.04%
D - Broadside	3182	33.60%
E - Hit Object	1743	18.40%
F - Overturned	558	5.89%
G - Vehicle/Pedestrian	452	4.77%
H - Other	131	1.38%

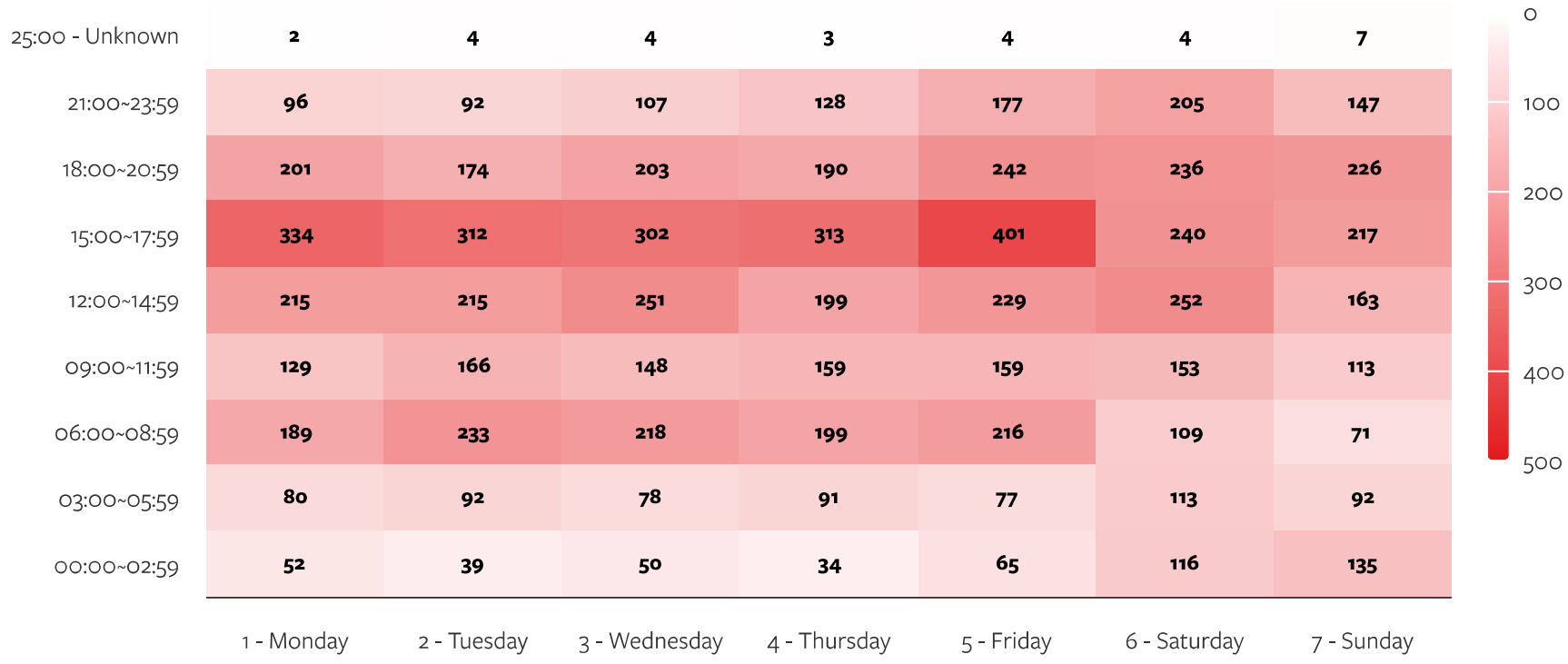
TIMS SWITRS Crash Summary & Map

October 11, 2024

By Day of Week and Time

Number of Crashes per Day of Week per Time

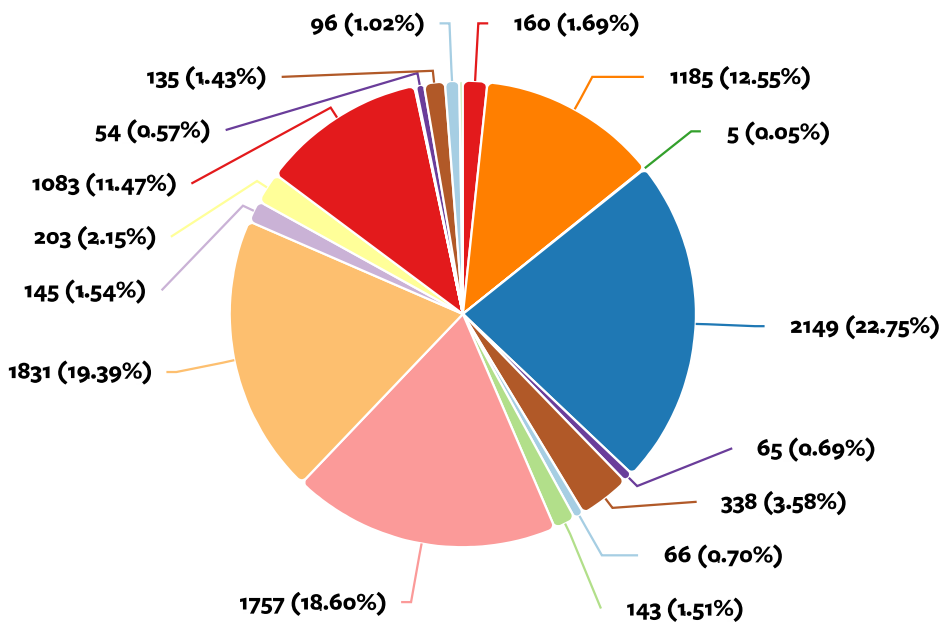
9471 Crashes



By Primary Crash Factor (PCF) Violation

Number of Crashes by PCF Violation

9445 Crashes



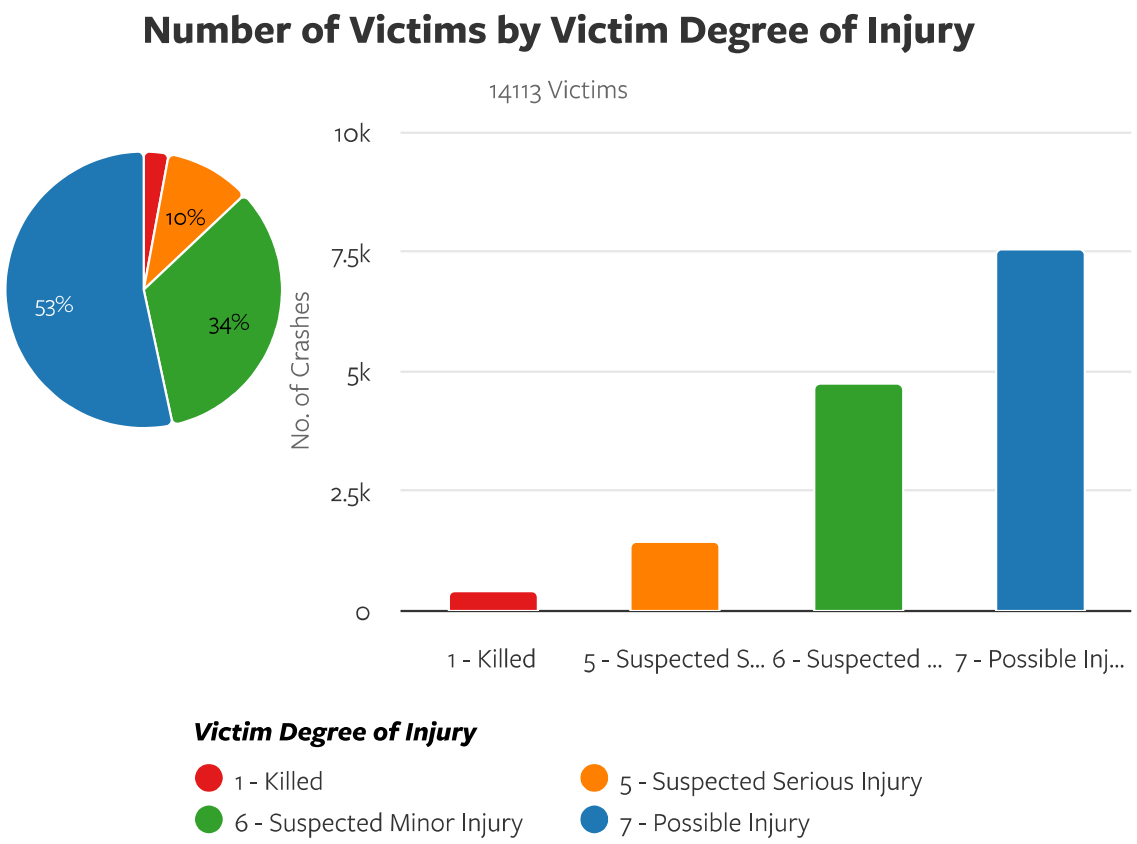
PCF Violation

- 00 - Unknown
- 01 - Driving or Bicycling Under the Influence of Alcohol or Drug
- 02 - Impeding Traffic
- 03 - Unsafe Speed
- 04 - Following Too Closely
- 05 - Wrong Side of Road
- 06 - Improper Passing
- 07 - Unsafe Lane Change
- 08 - Improper Turning
- 09 - Automobile Right of Way
- 10 - Pedestrian Right of Way
- 11 - Pedestrian Violation
- 12 - Traffic Signals and Signs
- 13 - Hazardous Parking
- 14 - Lights
- 16 - Other Equipment
- 17 - Other Hazardous Violation
- 18 - Other Than Driver (or Pedestrian)

1/2

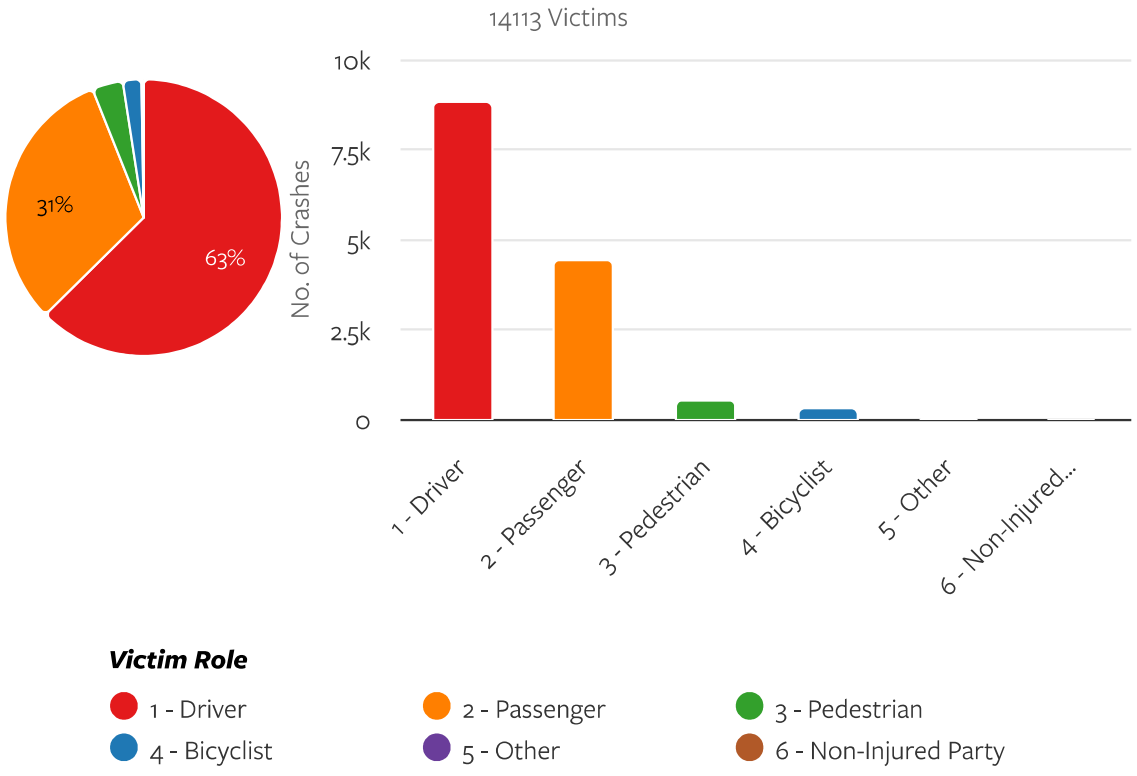
Victim Summary

By Victim Degree of Injury



Victim Degree of Injury	Count	%
1 - Killed	412	2.92%
5 - Suspected Serious Injury	1416	10.03%
6 - Suspected Minor Injury	4751	33.66%
7 - Possible Injury	7534	53.38%

Number of Victims by Victim Role



Victim Role	Count	%
1 - Driver	8837	62.62%
2 - Passenger	4425	31.35%
3 - Pedestrian	508	3.60%
4 - Bicyclist	307	2.18%
5 - Other	36	0.26%
6 - Non-Injured Party	0	0.00%

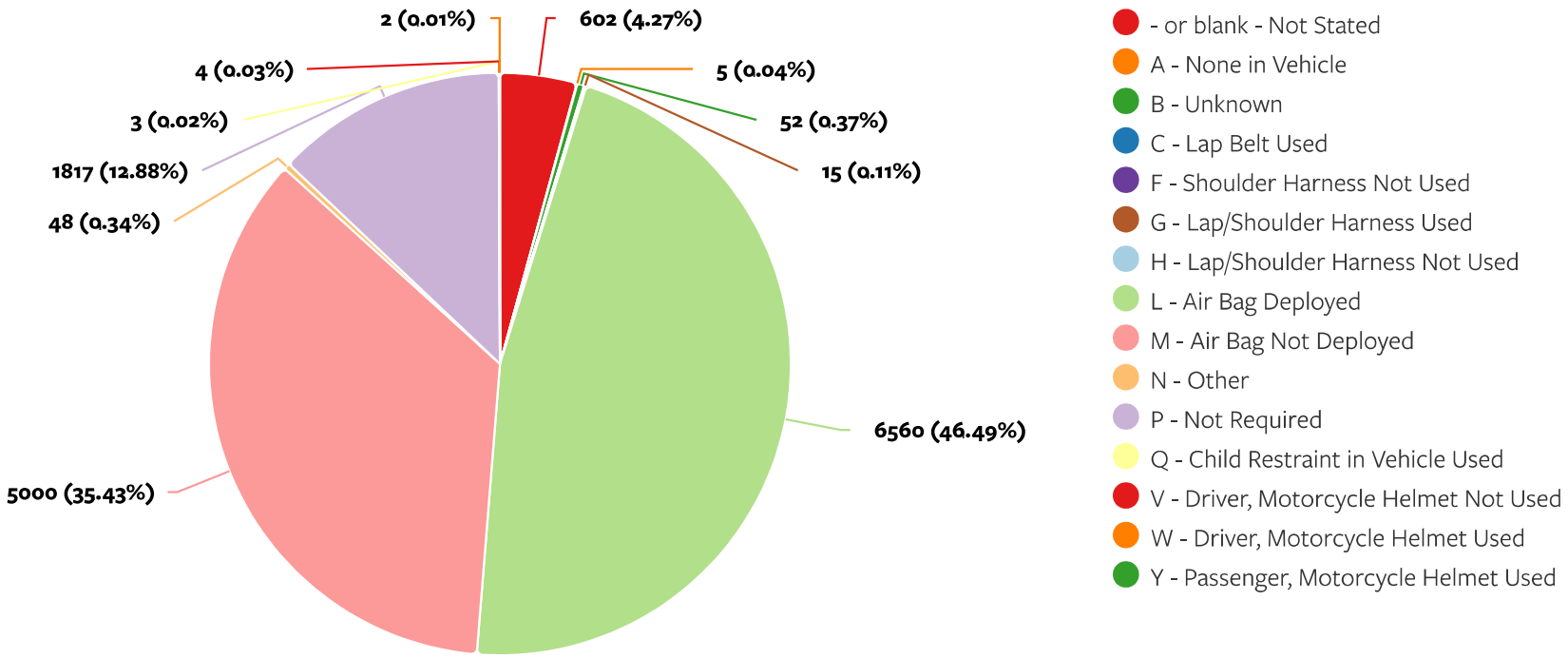
TIMS SWITRS Crash Summary & Map

October 11, 2024

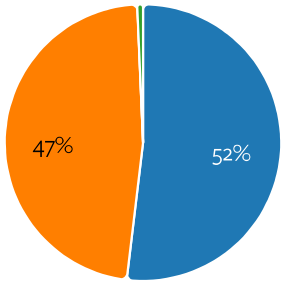
By Victim Safety Equipment 1

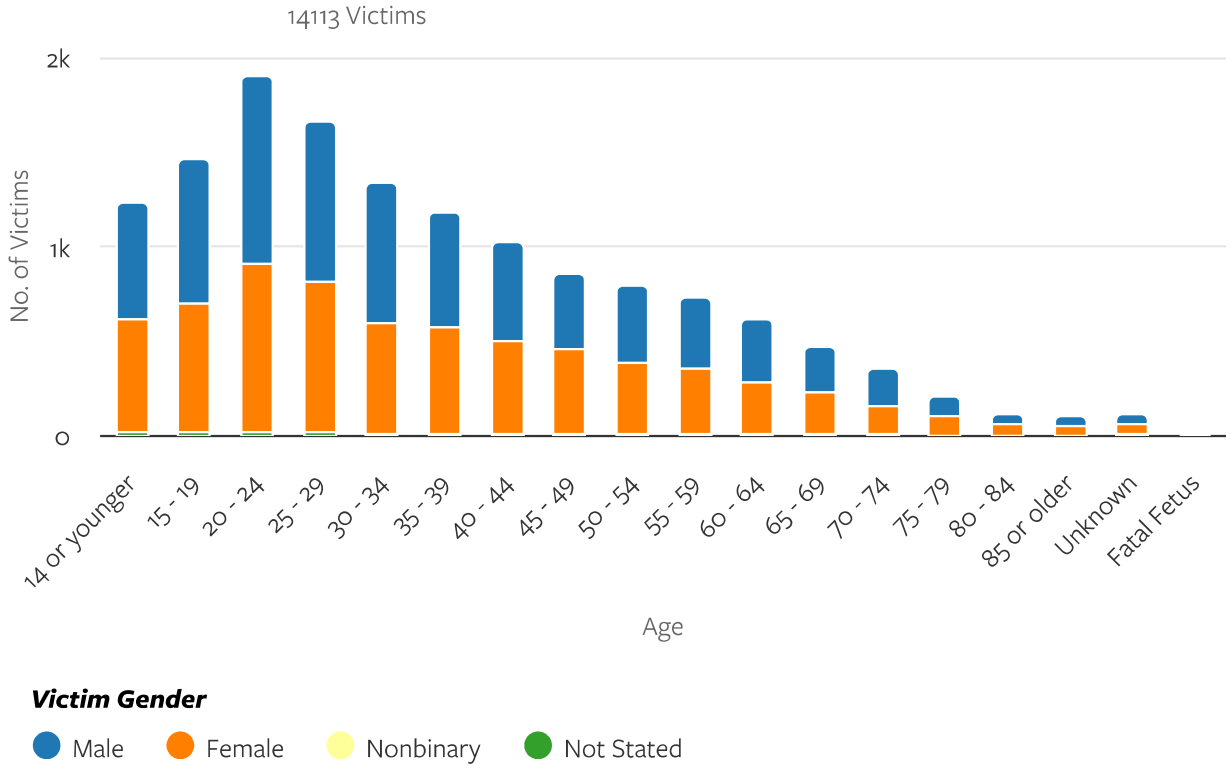
Number of Victims by Victim Safety Equipment 1

14112 Victims



Number of Victims by Victim Gender and Age





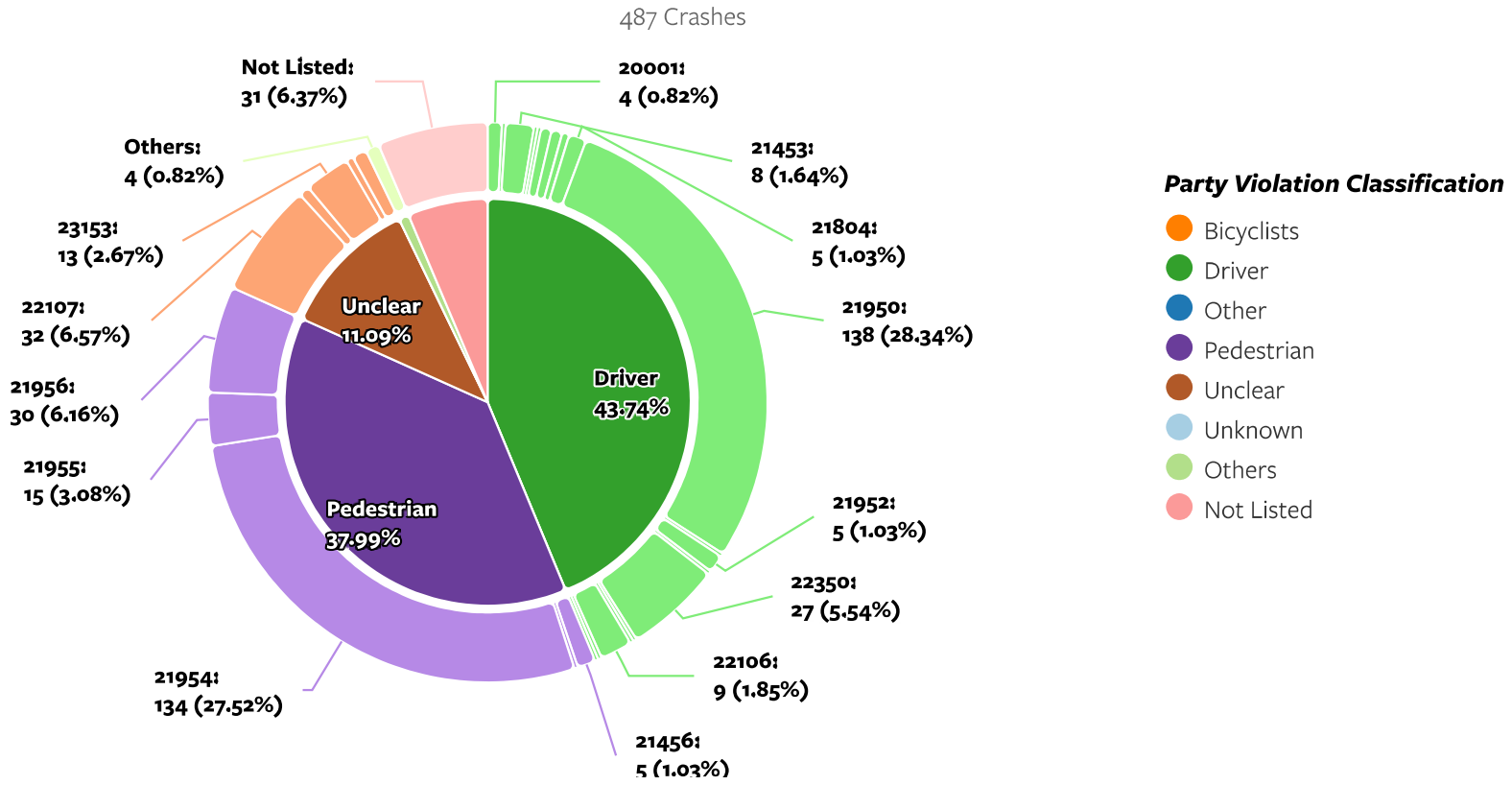
TIMS

SWITRS Crash Summary & Map

October 11, 2024

Ped Crash Summary

Number of Crashes by Type of Violation



Party Violation Classification	Type of Violation	Description	Count	%
Driver	21950	Driver failure to yield right-of-way to pedestrians at a marked or unmarked crosswalk	138	28.34%
Pedestrian	21954	Pedestrian failure to yield right-of-way to vehicles when crossing outside of a marked or unmarked crosswalk	134	27.52%
Unclear	22107	Unsafe turning or moving right or left on a roadway Turning without signaling	32	6.57%
Not Listed	Not Listed	Violation code was not included in the crash	31	6.37%
Pedestrian	21956	Pedestrian failure to walk close to the edge of the roadway when there is no sidewalk present / Pedestrian failure to walk on the left-hand edge of the roadway when outside of a business or resident district, unless crossing is not possible	30	6.16%
Driver	22350	Speeding on the highway / Driving at a dangerously high speed given highway conditions like weather, visibility, traffic, and highway measurements, or driving at a speed that endangers people or property	27	5.54%
Pedestrian	21955	Pedestrian failure to cross at crosswalks between adjacent traffic signal controlled intersections	15	3.08%
Unclear	23153	Driving under the influence of alcohol or drugs, resulting in injury to another person	13	2.67%
Driver	22106	Unsafe starting or backing of a vehicle on a highway	9	1.85%
Driver	21453	Failure to stop at a limit line or crosswalk at a red light Failure to yield right-of-way to pedestrian when turning on a red light	8	1.64%
Driver	21804	Driver failure to yield right-of-way when entering/crossing a highway	5	1.03%
Driver	21952	Driver failure to yield right-of-way to pedestrians on sidewalks	5	1.03%
Pedestrian	21456	Pedestrian failure to yield right-of-way at traffic signal / Failure of pedestrian to yield right-of-way to vehicles already in intersection Failure to obey crosswalk symbols or finish crossing before "countdown" ends	5	1.03%

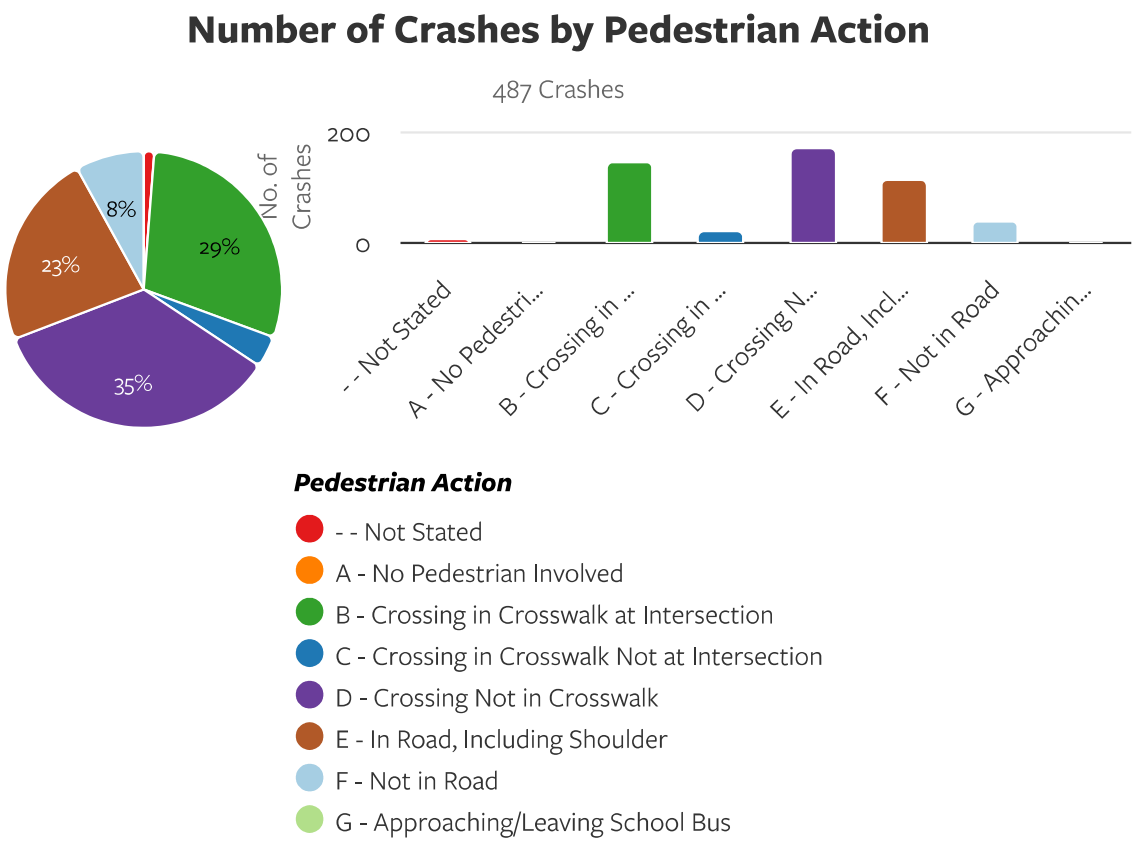
Party Violation Classification	Type of Violation	Description	Count	%
Driver	20001	Failure to stop in a collision resulting in injury or death (commonly known as hit-and-run)	4	0.82%
Unclear	21802	Failure to stop or yield right-of-way at a stop sign	4	0.82%
Others	Others	21960 (2) 22500 (1) 29105 (1)	4	0.82%
Driver	21755	Failure to pass safely on the right	3	0.62%
Driver	21801	Driver failure to yield right-of-way when making a left turn or U-turn	3	0.62%
Unclear	23152	Driving under the influence of alcohol (BAC 0.08+) or drugs	3	0.62%
Driver	21658	Failure to drive vehicle in single lane	2	0.41%
Unclear	21650	Failure to drive/ride on right half of the roadway (with some exceptions)	2	0.41%
Driver	20002	Failure to stop in a collision resulting in property damage	1	0.21%
Driver	21461	Driver failure to obey regulatory sign or signal	1	0.21%
Driver	21712	Driver failure to ensure that passengers are only riding in areas of vehicle designated for people (or in a towed trailer, with exceptions)	1	0.21%
Driver	21951	Failure to stop for a vehicle that has already stopped to permit pedestrian crossing when approaching from behind	1	0.21%
Driver	21963	Failure to yield right-of-way to a blind pedestrian carrying a predominantly white cane	1	0.21%
Driver	22400	Driver slowing or stopping on a highway as to impede or block traffic, unless necessary	1	0.21%
Driver	22515	Driver failure to set brakes before leaving vehicle unattended on highway Driver failure to turn off motor when possible before leaving a motor vehicle unattended on a highway	1	0.21%
Driver	23103	Reckless driving; driving with disregard for safety of people or property in a highway or parking facility	1	0.21%

Party Violation Classification	Type of Violation	Description	Count	%
Driver	23123	Driving a motor vehicle while using a wireless telephone that is not designed to be hands-free or used as such, with exceptions	1	0.21%
Pedestrian	21953	Pedestrian failure to yield to vehicles when crossing a roadway without using a pedestrian tunnel or overhead pedestrian crossing when one exists	1	0.21%

TIMS SWITRS Crash Summary & Map

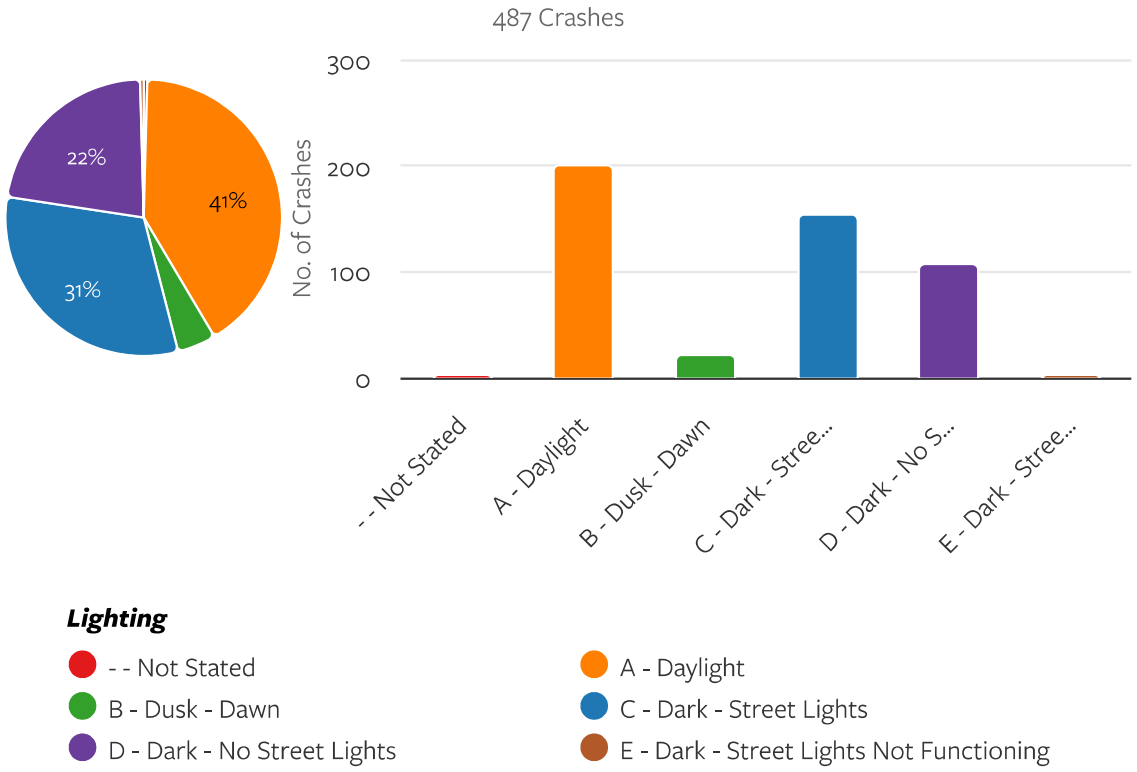
October 11, 2024

By Pedestrian Action



Pedestrian Action	Count	%
- - Not Stated	6	1.23%
A - No Pedestrian Involved	0	0.00%
B - Crossing in Crosswalk at Intersection	143	29.36%
C - Crossing in Crosswalk Not at Intersection	18	3.70%
D - Crossing Not in Crosswalk	170	34.91%
E - In Road, Including Shoulder	111	22.79%
F - Not in Road	39	8.01%
G - Approaching/Leaving School Bus	0	0.00%

Number of Crashes by Lighting

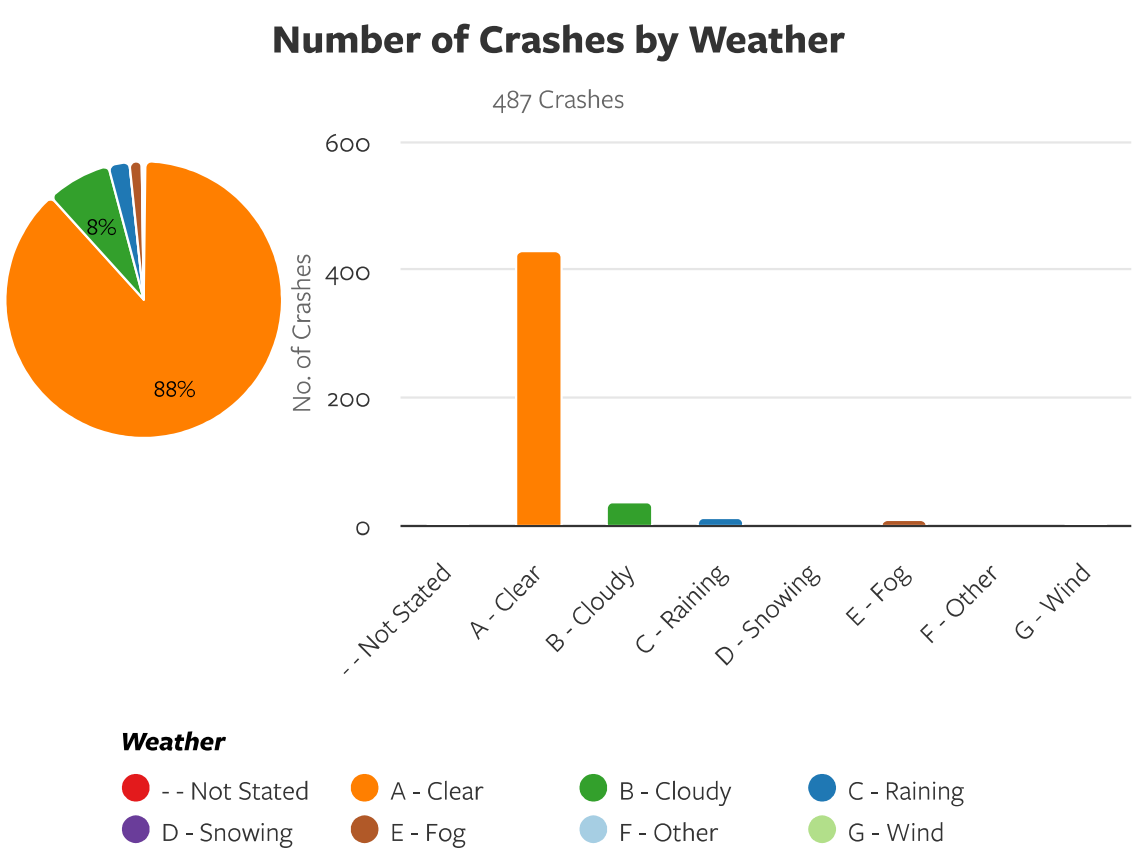


Lighting	Count	%
- - Not Stated	2	0.41%
A - Daylight	200	41.07%
B - Dusk - Dawn	22	4.52%
C - Dark - Street Lights	153	31.42%
D - Dark - No Street Lights	108	22.18%
E - Dark - Street Lights Not Functioning	2	0.41%

TIMS SWITRS Crash Summary & Map

October 11, 2024

By Weather



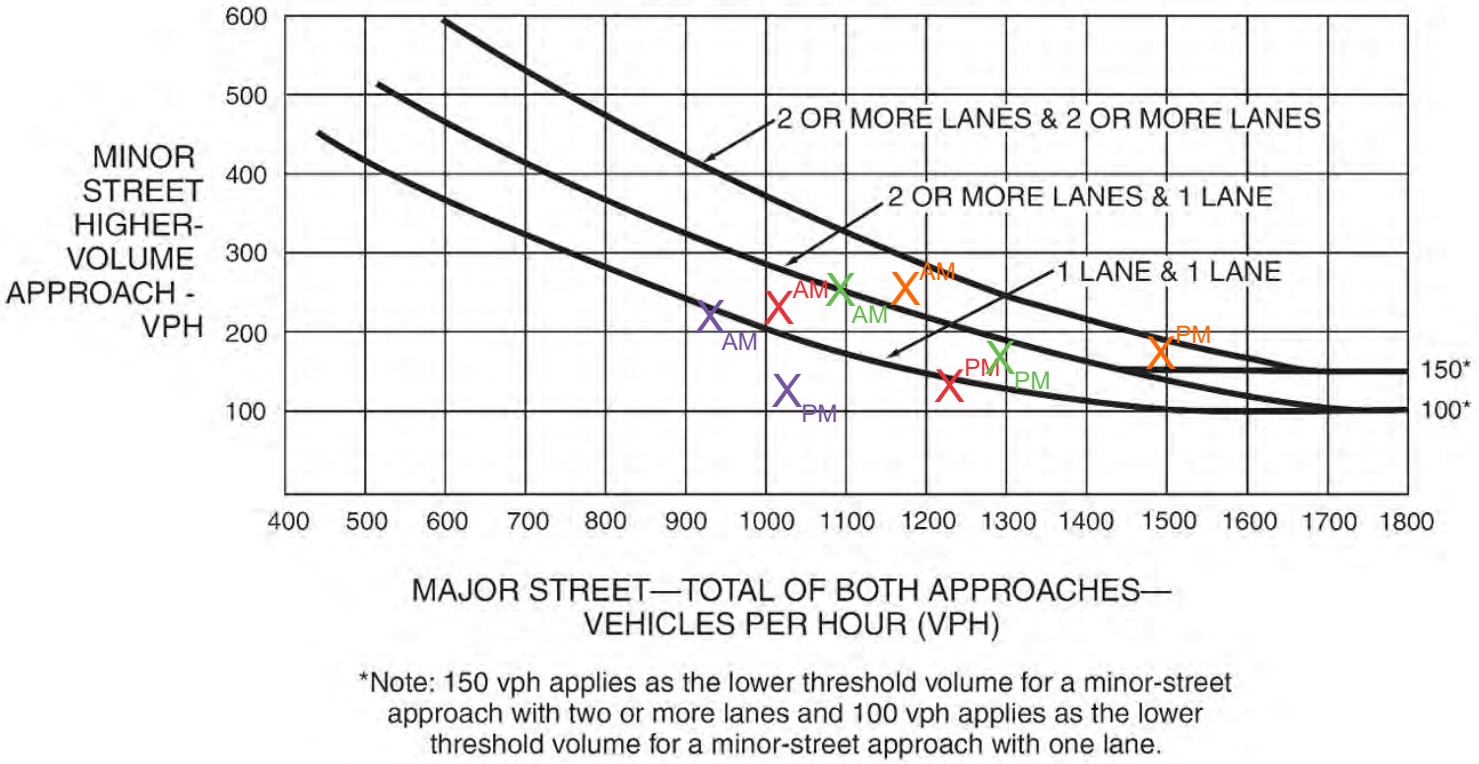
Weather	Count	%
- - Not Stated	1	0.21%
A - Clear	429	88.09%
B - Cloudy	37	7.60%
C - Raining	12	2.46%
D - Snowing	0	0.00%
E - Fog	7	1.44%
F - Other	0	0.00%
G - Wind	1	0.21%

APPENDIX D

Signal Warrant Worksheets

Demaree Street / Shannon Parkway

Figure 4C-3. Warrant 3, Peak Hour

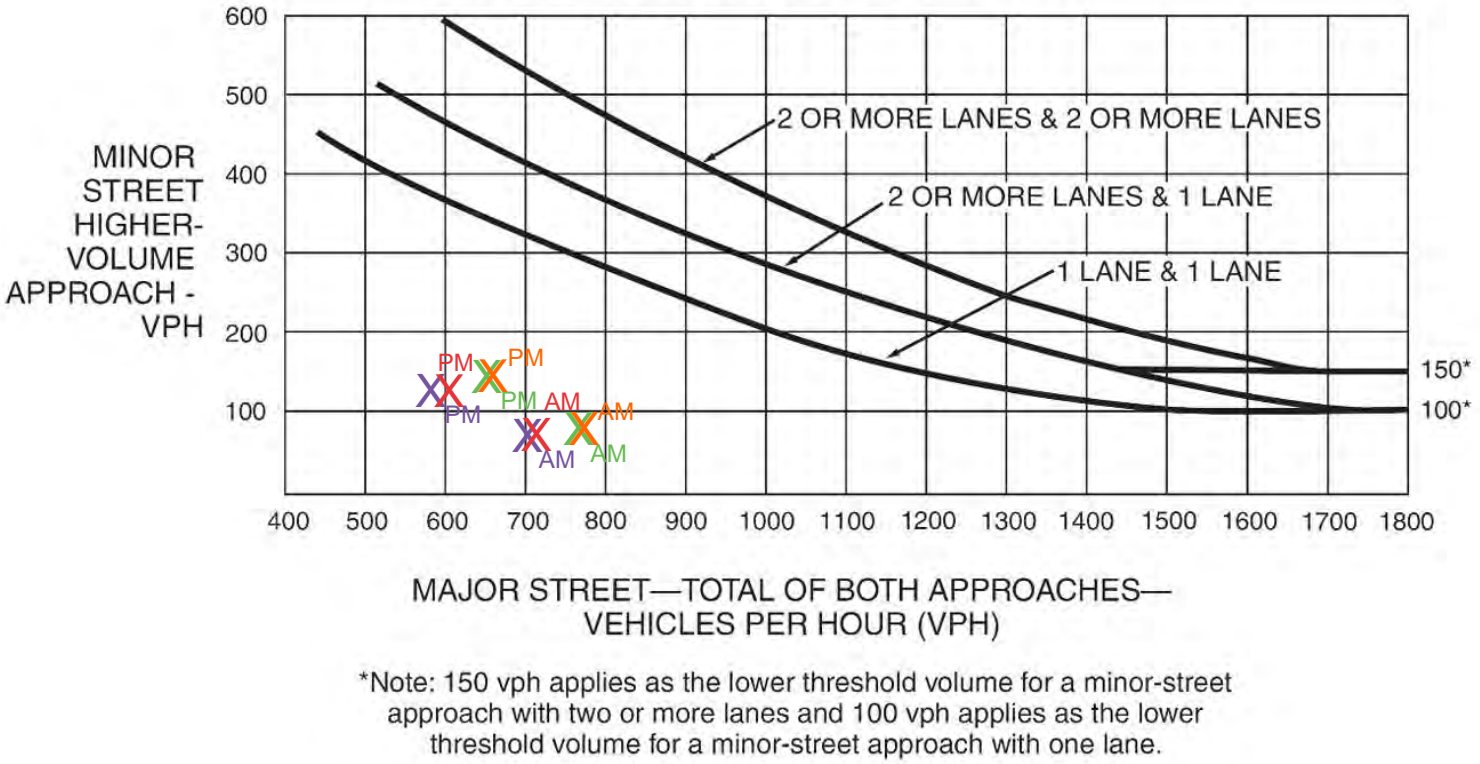


*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

LEGEND	
X_{AM} X_{PM} Opening Year 2026 Without Project	X_{AM} X_{PM} Future Year 2030 Without Project
X_{AM} X_{PM} Opening Year 2026 Plus Project	X_{AM} X_{PM} Future Year 2030 Plus Project

Demaree Street / Avenue 320

Figure 4C-3. Warrant 3, Peak Hour

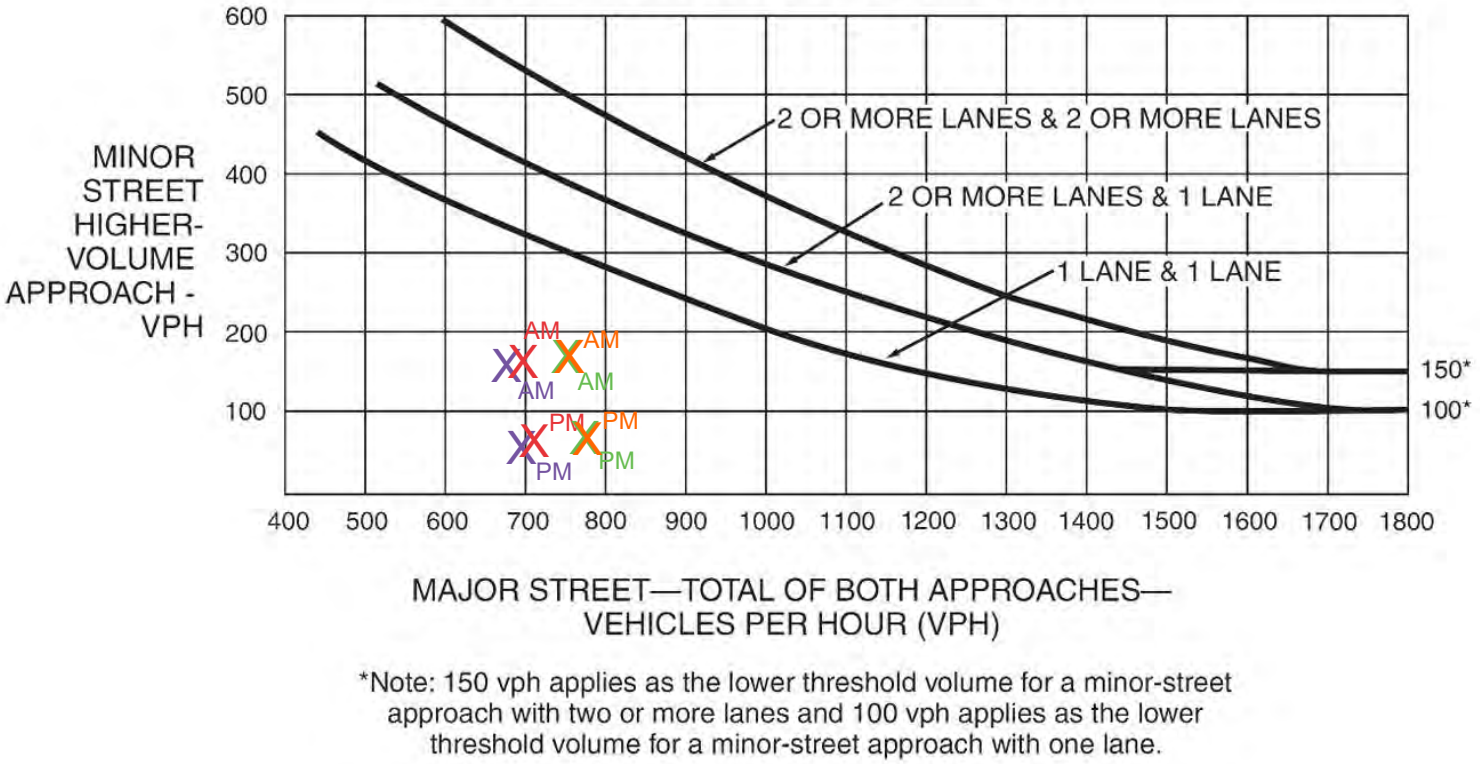


*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

LEGEND	
X_{AM} X_{PM} Opening Year 2026 Without Project	X_{AM} X_{PM} Future Year 2030 Without Project
X_{AM} X_{PM} Opening Year 2026 Plus Project	X_{AM} X_{PM} Future Year 2030 Plus Project

Demaree Street / Pratt Road

Figure 4C-3. Warrant 3, Peak Hour

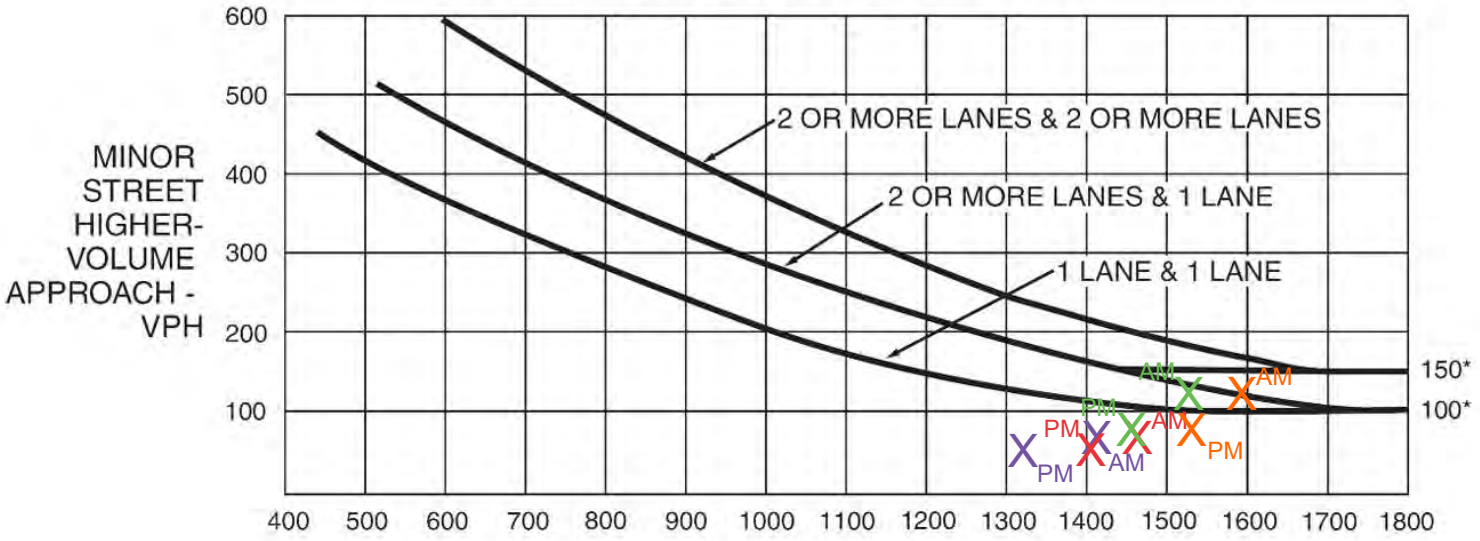


*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

LEGEND	
X_{AM} X_{PM} Opening Year 2026 Without Project	X_{AM} X_{PM} Future Year 2030 Without Project
X_{AM} X_{PM} Opening Year 2026 Plus Project	X_{AM} X_{PM} Future Year 2030 Plus Project

Linwood Street / Riggin Avenue

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

LEGEND	
X_{AM} X_{PM} Opening Year 2026 Without Project	X_{AM} X_{PM} Future Year 2030 Without Project
X_{AM} X_{PM} Opening Year 2026 Plus Project	X_{AM} X_{PM} Future Year 2030 Plus Project

APPENDIX E

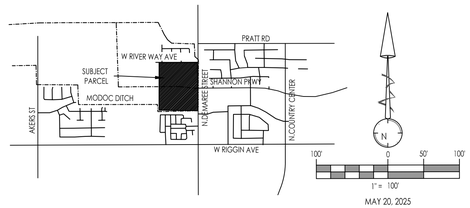
Intersection Sight Visibility

RITCHIE RANCH
TENTATIVE SUBDIVISION MAP

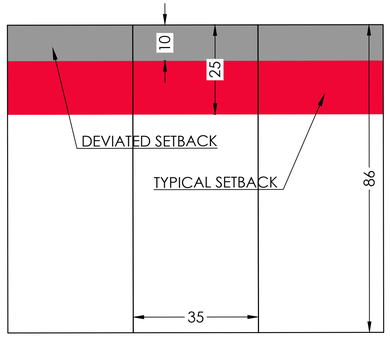
MARCH, 2024

BEING A PORTION OF SECTION 14, TOWNSHIP 18 SOUTH, RANGE 24 EAST, MOUNT DIABLO MERIDIAN IN THE CITY OF VISALIA, COUNTY OF TULARE, STATE OF CALIFORNIA.
APN NO. 077-060-022-000

LICENSED LAND SURVEYOR
BRIAN S. BORUM
L.S. 8006
STATE OF CALIFORNIA



MAY 20, 2025

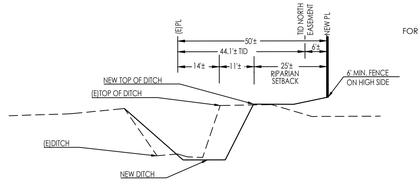


TYPICAL INTERIOR LOT PRIVATE YARD AREA REDUCTION DETAIL

TOTAL PRIVATE YARD AREA WITH NO DEVIATION	TOTAL PRIVATE YARD AREA REMOVED	TOTAL PRIVATE YARD AREA PROVIDED	TOTAL S.F. OF POCKET PARKS PROVIDED
7.97 Acres 347,114 SF	4.77 Acres 207,783 SF	3.20 Acres 139,331 SF	1.94 Acres 84,512 SF

SETBACK TYPE	TYPICAL REAR YARD LOT AREA PROVIDED
DEVIATED SETBACK	350 S.F.
TYPICAL SETBACK	1,250 S.F.





MODOC DITCH EASEMENT FOR UNDERGROUND PORTION OF DITCH

MODOC DITCH ALONG SOUTH PROPERTY LINE LOOKING WEST (X-X)

OWNERS:
LARRY RITCHIE

AUTHORIZED AGENT
AW ENGINEERING
810 W. ACEQUIA AVE
VISALIA, CA 93291
(559) 713-6139

LAND SURVEYOR
BRIAN S. BORUM LS
1445 W. GRAND AVE STE C
GROVER BEACH, CA 93433
(805)270-4154

APPLICANT
N & M LLC
1878 NORTH MOONEY BLVD, SUITE J
TULARE, CA 93274
559-799-6993

SITE DATA

APN: 077-060-022
EXISTING ZONING DESIGNATION: SINGLE FAMILY RESIDENTIAL
EXISTING USE: AGRICULTURE
PROPOSED USE: SINGLE FAMILY RESIDENTIAL
TOTAL EXISTING AREA: ±44.89 ACRES
TOTAL PROPOSED AREA: ±44.77 ACRES
ELECTRICITY: SOUTHERN CALIFORNIA EDISON
WATER: CALIFORNIA WATER
SEWER: CITY OF VISALIA
REFUSE: CITY OF VISALIA
TELEPHONE: AT&T
GAS: SO CAL GAS
CATV: SPECTRUM
STORM WATER: CITY OF VISALIA
TOTAL LOTS : 320 LOTS
RESIDENTIAL DENSITY: 7.13 UNITS/ACRE
FLOOD ZONE : X
AVERAGE LOT SIZE: 3,444 SF
MINIMUM LOT SIZE: 2,800 SF
MAXIMUM LOT SIZE: 7,649 SF
LLMD OUTLOTS: "B", "C", "D", "E", "G", "H"
POCKET PARK OUTLOTS: "A", "F"

PHASE 1 LOT TOTAL: 94
PHASE 2 LOT TOTAL: 96
PHASE 3 LOT TOTAL: 48
PHASE 4 LOT TOTAL: 82

TOTAL LOTS: 320

TYPICAL R-1-5 SETBACK

SIDE YARD:	5'
STREET SIDE YARD:	10'
REAR YARD:	25'
FRONT GARAGE:	22'
FRONT LIVING SPACE:	15'

SETBACK DEVIATION

REAR YARD:	10'
FRONT GARAGE:	20'
FRONT LIVING SPACE:	12'

STREET BULB DEVIATION

KNUCKLES TO DEVIATE FROM TYPICAL STREET BULB CONNECTION CITY STANDARD P-17, TO PROVIDE ADDITIONAL BACK YARD AND FRONT YARD SPACE, UNLESS OTHERWISE NOTED

LOTS INCLUDING DEVIATION

10' REAR YARD DEVIATION:
1-320

20' FRONT GARAGE/12' LIVING SPACE DEVIATION:
1-320

LLMD OUTLOT	TOTAL AREA	MIN. - MAX. WIDTH
B	925 SF	10'
C	5,029 SF	5' - 10'
D	14,073 SF	5' - 10'
E	6,357 SF	5' - 10'
G	12,837 SF	5' - 10'
H	8,132 SF	6' - 10'

BENCHMARK

CITY BENCHMARK NO. 701
PK NAIL IN TOP OF CURB EAST RADIUS POINT
NORTHEAST CORNER OF THE INTERSECTION
ELEV=316.580'

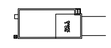
BASIS OF BEARINGS

THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 14-18-24 WHICH BEARS N00°16'58"E, PER PARCEL MAP 4649, REC. IN BK 47 OF PARCEL MAPS, PAGE 54, T.C.R.

FLOODNOTE

AS DELINEATED ON THE FEDERAL INSURANCE ADMINISTRATIONS FLOOD INSURANCE RATE MAPS, EFFECTIVE DATE JUNE 16, 2009 FOR TULARE COUNTY, CALIFORNIA (COMMUNITY NO. 065066), PANEL NO. 06107C0930E, THE PROPERTY SHOWN ON THIS MAP LIES WITHIN FLOOD HAZARD AREAS DESIGNATED AS ZONE X.

SMALLEST MIN. USABLE REAR YARD SETBACK AREA ON A SIDE LOT



450 SF REAR YARD SETBACK AREA MIN.
EX. LOT 320



477 SF REAR YARD SETBACK AREA MIN.
EX. LOT 158

NOTE:

INDIVIDUAL TRASH RECEPTACLES, 3 RECEPTACLES PER DWELLING. (2 PICKUP ON 1 DAY AND 1 ON OTHER DAY OF WEEK)

THE CURVILINEAR NON-STANDARD ROADWAY KNUCKLES WITHIN THE SUBDIVISION SHALL BE PAINTED RED TO PREVENT ON-STREET PARKING OF VEHICLES.

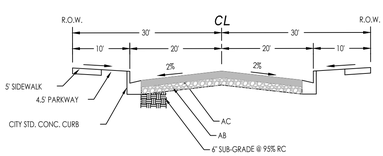
LOTS BY SQUARE FEET:

5,000 SF MIN: 28, 47, 49, 67, 144-145, 171, 200, 206, 214-216, 244-245, 271, 284
TOTAL: 16

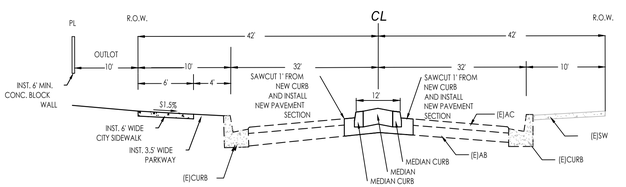
4,000 - 4,999 SF: 9-10, 27, 46, 50-51, 68, 109, 114, 172, 191-192, 198-199, 201-205, 209-213, 217-219, 240-243, 246-259, 269-270, 272-273, 283
TOTAL: 51

3,000 - 3,999 SF: 1-8, 11-19, 36-37, 52-66, 70-80, 69, 107, 110-113, 115, 132-133, 157-158, 173-190, 193-197, 193-197, 207-208, 220-239, 260-268, 274-282, 285-320
TOTAL: 155

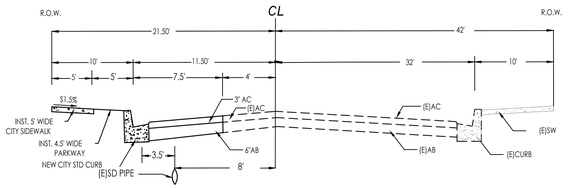
2,800 - 2,999 SF: 20-26, 29-35, 38-45, 48, 81-106, 116-131, 134-143, 146-156, 159-170
TOTAL: 98



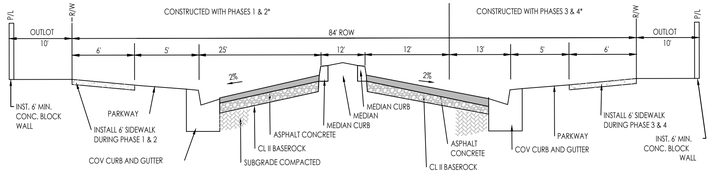
LOCAL STREETS **N.T.S.**
TI = 5.5 RVALUE = TBD MIN 2.5"AC OVER 7" AB



NORTH DEMAREE STREET **N.T.S.**
TI = 8 RVALUE = TBD MIN 5"AC OVER 8" AB



RIVERWAY AVENUE **N.T.S.**
TI = 8 RVALUE = TBD MIN 5"AC OVER 8" AB



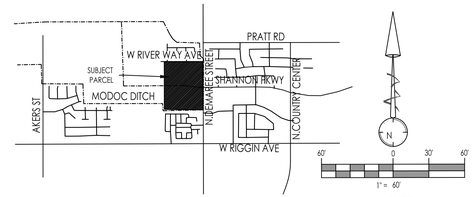
SHANNON PARKWAY **N.T.S.**
T.I. = 8, R-VALUE = TBD MIN. 5" A.C. OVER 8" A.B.

RITCHIE RANCH
TENTATIVE SUBDIVISION MAP

MARCH, 2024

BEING A PORTION OF SECTION 14, TOWNSHIP 18 SOUTH, RANGE 24 EAST, MOUNT DIABLO MERIDIAN IN THE CITY OF VISALIA, COUNTY OF TULARE, STATE OF CALIFORNIA.
APN NO. 077-060-022-000

LICENSED LAND SURVEYOR
BRIAN S. BORUM
L.S. 8006
STATE OF CALIFORNIA



MAY 20, 2025



OWNERS:
LARRY RITCHIE

APPLICANT
N & M LLC
1878 NORTH MOONEY BLVD, SUITE J
TULARE, CA 93274
559-799-6993

LAND SURVEYOR
BRIAN S. BORUM LS
1445 W. GRAND AVE STE C
GROVER BEACH, CA 93433
(805)270-4154

AUTHORIZED AGENT
AW ENGINEERING
810 W. ACEQUIA AVE
VISALIA, CA 93291
(559) 713-6139

SITE DATA
APN: 077-060-022
EXISTING ZONING DESIGNATION: SINGLE FAMILY RESIDENTIAL
EXISTING USE: AGRICULTURE
PROPOSED USE: SINGLE FAMILY RESIDENTIAL
TOTAL EXISTING AREA: ±44.89 ACRES
TOTAL PROPOSED AREA: ±44.77 ACRES
ELECTRICITY: SOUTHERN CALIFORNIA EDISON
WATER: CALIFORNIA WATER
SEWER: CITY OF VISALIA
REFUSE: CITY OF VISALIA
TELEPHONE: AT&T
GAS: SO CAL GAS
CATV: SPECTRUM
STORM WATER: CITY OF VISALIA
TOTAL LOTS : 320 LOTS
RESIDENTIAL DENSITY: 7.13 UNITS/ACRE
FLOOD ZONE : X
AVERAGE LOT SIZE: 3,444 SF
MINIMUM LOT SIZE: 2,800 SF
MAXIMUM LOT SIZE: 7,649 SF
LLMD OUTLOTS: "B", "C", "D", "E", "G", "H"
POCKET PARK OUTLOTS: "A", "F"

PHASE 1 LOT TOTAL: 94
PHASE 2 LOT TOTAL: 96
PHASE 3 LOT TOTAL: 48
PHASE 4 LOT TOTAL: 82

TOTAL LOTS: 320

TYPICAL R-1-5 SETBACK

SIDE YARD:	5'
STREET SIDE YARD:	10'
REAR YARD:	25'
FRONT GARAGE:	22'
FRONT LIVING SPACE:	15'

SETBACK DEVIATION

REAR YARD:	10'
FRONT GARAGE:	20'
FRONT LIVING SPACE:	12'

STREET BULB DEVIATION
KNUCKLES TO DEVIATE FROM TYPICAL STREET BULB CONNECTION CITY STANDARD P-17, TO PROVIDE ADDITIONAL BACK YARD AND FRONT YARD SPACE, UNLESS OTHERWISE NOTED

LOTS INCLUDING DEVIATION
10' REAR YARD DEVIATION:
1-320

20' FRONT GARAGE/12' LIVING SPACE DEVIATION:
1-320

LLMD OUTLOT	TOTAL AREA	MIN. - MAX. WIDTH
B	925 SF	10'
C	5,029 SF	5' - 10'
D	14,073 SF	5' - 10'
E	6,357 SF	5' - 10'
G	12,837 SF	5' - 10'
H	8,132 SF	6' - 10'

BENCHMARK
CITY BENCHMARK NO. 701
PK NAIL IN TOP OF CURB EAST RADIUS POINT
NORTHEAST CORNER OF THE INTERSECTION
ELEV=316.580'

BASIS OF BEARINGS
THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 14-18-24 WHICH BEARS N00°16'58"E, PER PARCEL MAP 4649, REC. IN BK 47 OF PARCEL MAPS, PAGE 54, T.C.R.

FLOODNOTE
AS DELINEATED ON THE FEDERAL INSURANCE ADMINISTRATIONS FLOOD INSURANCE RATE MAPS, EFFECTIVE DATE JUNE 16, 2009 FOR TULARE COUNTY, CALIFORNIA (COMMUNITY NO. 065066), PANEL NO. 06107C0930E, THE PROPERTY SHOWN ON THIS MAP LIES WITHIN FLOOD HAZARD AREAS DESIGNATED AS ZONE X.

SMALLEST MIN. USABLE REAR YARD SETBACK AREA ON A SIDE LOT



450 SF REAR YARD SETBACK AREA MIN.
EX. LOT 320



477 SF REAR YARD SETBACK AREA MIN.
EX. LOT 158

NOTE:
INDIVIDUAL TRASH RECEPTACLES, 3 RECEPTACLES PER DWELLING. (2 PICKUP ON 1 DAY AND 1 ON OTHER DAY OF WEEK)

THE CURVILINEAR NON-STANDARD ROADWAY KNUCKLES WITHIN THE SUBDIVISION SHALL BE PAINTED RED TO PREVENT ON-STREET PARKING OF VEHICLES.

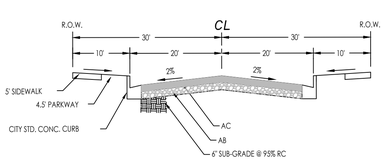
LOTS BY SQUARE FEET:

5,000 SF MIN: 28, 47, 49, 67, 144-145, 171, 200, 206, 214-216, 244-245, 271, 284
TOTAL: 16

4,000 - 4,999 SF: 9-10, 27, 46, 50-51, 68, 109, 114, 172, 191-192, 198-199, 201-205, 209-213, 217-219, 240-243, 246-259, 269-270, 272-273, 283
TOTAL: 51

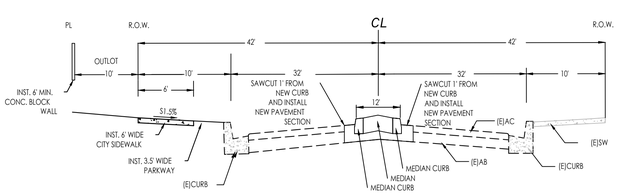
3,000 - 3,999 SF: 1-8, 11-19, 36-37, 52-66, 70-80, 69, 107, 110-113, 115, 132-133, 157-158, 173-190, 193-197, 207-208, 220-239, 260-268, 274-282, 285-320
TOTAL: 155

2,800 - 2,999 SF: 20-26, 29-35, 38-45, 48, 81-106, 116-131, 134-143, 146-156, 159-170
TOTAL: 98



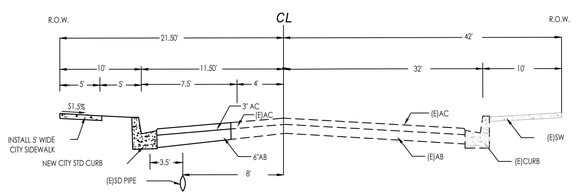
LOCAL STREETS N.T.S.

TI = 5.5 RVALUE = TBD MIN 2.5"AC OVER 7" AB



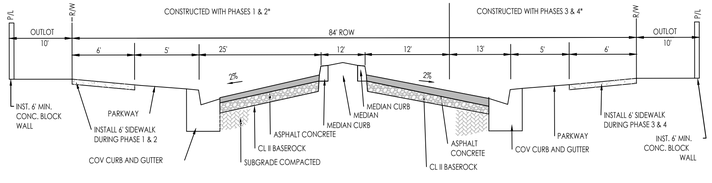
NORTH DEMAREE STREET N.T.S.

TI = 8 RVALUE = TBD MIN 5"AC OVER 8" AB



RIVERWAY AVENUE N.T.S.

TI = 8 RVALUE = TBD MIN 5"AC OVER 8" AB



SHANNON PARKWAY N.T.S.

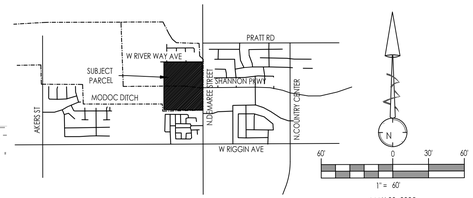
T.I. = 8, R-VALUE = TBD MIN. 5" A.C. OVER 8" A.B.

RITCHIE RANCH
TENTATIVE SUBDIVISION MAP

MARCH, 2024

BEING A PORTION OF SECTION 14, TOWNSHIP 18 SOUTH, RANGE 24 EAST, MOUNT DIABLO MERIDIAN IN THE CITY OF VISALIA, COUNTY OF TULARE, STATE OF CALIFORNIA.
APN NO. 077-060-022-000

LICENSED LAND SURVEYOR
BRIAN S. BORUM
L.S. 8006
STATE OF CALIFORNIA



MAY 20, 2025

OWNERS:
LARRY RITCHIE

APPLICANT
N & M LLC
1878 NORTH MOONEY BLVD, SUITE J
TULARE, CA 93274
559-799-6993

LAND SURVEYOR
BRIAN S. BORUM LS
1445 W. GRAND AVE STE C
GROVER BEACH, CA 93433
(805)270-4154

AUTHORIZED AGENT
AW ENGINEERING
810 W. ACEQUIA AVE
VISALIA, CA 93291
(559) 713-6139

SITE DATA
APN: 077-060-022
EXISTING ZONING DESIGNATION: SINGLE FAMILY RESIDENTIAL
EXISTING USE: AGRICULTURE
PROPOSED USE: SINGLE FAMILY RESIDENTIAL
TOTAL EXISTING AREA: ±44.89 ACRES
TOTAL PROPOSED AREA: ±44.77 ACRES
ELECTRICITY: SOUTHERN CALIFORNIA EDISON
WATER: CALIFORNIA WATER
SEWER: CITY OF VISALIA
REFUSE: CITY OF VISALIA
TELEPHONE: AT&T
GAS: SO CAL GAS
CATV: SPECTRUM
STORM WATER: CITY OF VISALIA
TOTAL LOTS : 320 LOTS
RESIDENTIAL DENSITY: 7.13 UNITS/ACRE
FLOOD ZONE : X
AVERAGE LOT SIZE: 3,444 SF
MINIMUM LOT SIZE: 2,800 SF
MAXIMUM LOT SIZE: 7,649 SF
LLMD OUTLOTS: "B", "C", "D", "E", "G", "H"
POCKET PARK OUTLOTS: "A", "F"

PHASE 1 LOT TOTAL: 94
PHASE 2 LOT TOTAL: 96
PHASE 3 LOT TOTAL: 48
PHASE 4 LOT TOTAL: 82

TOTAL LOTS: 320

TYPICAL R-1-5 SETBACK
SIDE YARD: 5'
STREET SIDE YARD: 10' 25'
REAR YARD:
FRONT GARAGE: 22'
FRONT LIVING SPACE: 15'

SETBACK DEVIATION
REAR YARD: 10'
FRONT GARAGE: 20'
FRONT LIVING SPACE: 12'

STREET BULB DEVIATION
KNUCKLES TO DEVIATE FROM TYPICAL STREET BULB CONNECTION CITY STANDARD P-17, TO PROVIDE ADDITIONAL BACK YARD AND FRONT YARD SPACE, UNLESS OTHERWISE NOTED

LOTS INCLUDING DEVIATION
10' REAR YARD DEVIATION:
1-320

20' FRONT GARAGE/12' LIVING SPACE DEVIATION:
1-320

LLMD OUTLOT	TOTAL AREA	MIN. - MAX. WIDTH
B	925 SF	10'
C	5,029 SF	5' - 10'
D	14,073 SF	5' - 10'
E	6,357 SF	5' - 10'
G	12,837 SF	5' - 10'
H	8,132 SF	6' - 10'

BENCHMARK
CITY BENCHMARK NO. 701
PK NAIL IN TOP OF CURB EAST RADIUS POINT
NORTHEAST CORNER OF THE INTERSECTION
ELEV=316.580'

BASIS OF BEARINGS
THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 14-18-24 WHICH BEARS N00°16'58"E, PER PARCEL MAP 4649, REC. IN BK 47 OF PARCEL MAPS, PAGE 54, T.C.R.

FLOODNOTE
AS DELINEATED ON THE FEDERAL INSURANCE ADMINISTRATIONS FLOOD INSURANCE RATE MAPS, EFFECTIVE DATE JUNE 16, 2009 FOR TULARE COUNTY, CALIFORNIA (COMMUNITY NO. 065066), PANEL NO. 06107C0930E. THE PROPERTY SHOWN ON THIS MAP LIES WITHIN FLOOD HAZARD AREAS DESIGNATED AS ZONE X.

SMALLEST MIN. USABLE REAR YARD SETBACK AREA ON A SIDE LOT

450 SF REAR YARD SETBACK AREA MIN.

EX. LOT 320

477 SF REAR YARD SETBACK AREA MIN.

EX. LOT 158

NOTE:
INDIVIDUAL TRASH RECEPTACLES, 3 RECEPTACLES PER DWELLING. (2 PICKUP ON 1 DAY AND 1 ON OTHER DAY OF WEEK)

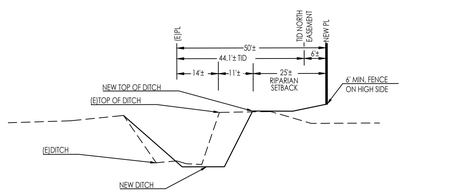
THE CURVILINEAR NON-STANDARD ROADWAY KNUCKLES WITHIN THE SUBDIVISION SHALL BE PAINTED RED TO PREVENT ON-STREET PARKING OF VEHICLES.

LOTS BY SQUARE FEET:
5,000 SF MIN: 28, 47, 49, 67, 144-145, 171, 200, 206, 214-216, 244-245, 271, 284
TOTAL: 16

4,000 - 4,999 SF: 9-10, 27, 46, 50-51, 68, 109, 114, 172, 191-192, 198-199, 201-205, 209-213, 217-219, 240-243, 246-259, 269-270, 272-273, 283
TOTAL: 51

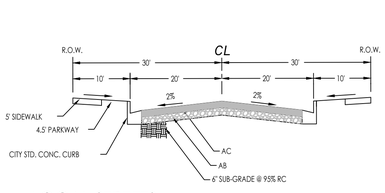
3,000 - 3,999 SF: 1-8, 11-19, 36-37, 52-66, 70-80, 69, 107, 110-113, 115, 132-133, 157-158, 173-190, 193-197, 207-208, 220-239, 260-268, 274-282, 285-320
TOTAL: 155

2,800 - 2,999 SF: 20-26, 29-35, 38-45, 48, 81-106, 116-131, 134-143, 146-156, 159-170
TOTAL: 98



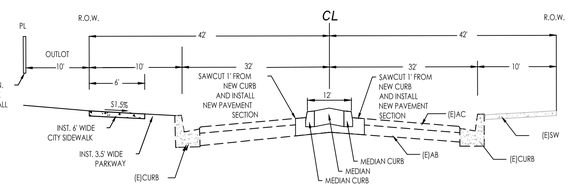
MODOC DITCH ALONG SOUTH PROPERTY LINE

LOOKING WEST (X-X)



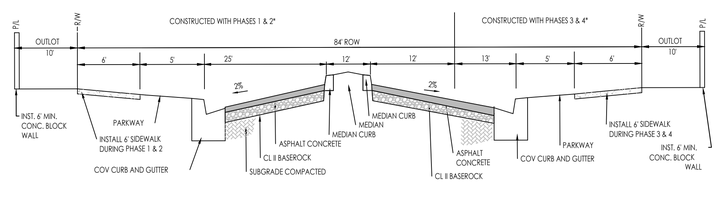
LOCAL STREETS N.T.S.

TI = 5.5 RVALUE = TBD MIN 2.5"AC OVER 7" AB



NORTH DEMAREE STREET N.T.S.

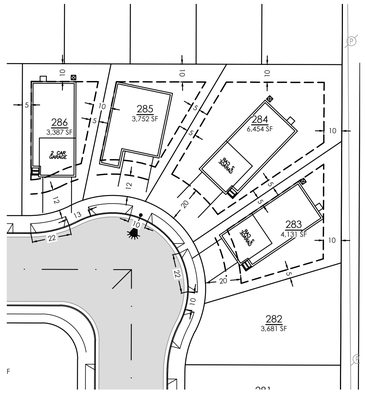
TI = 8 RVALUE = TBD MIN 5"AC OVER 8" AB



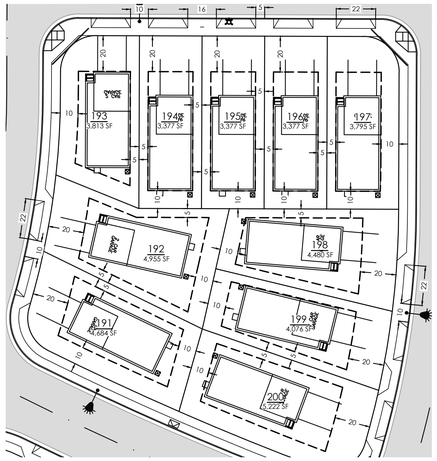
SHANNON PARKWAY N.T.S.

T.I. = 8, R-VALUE = TBD MIN. 5" A.C. OVER 8" A.B.

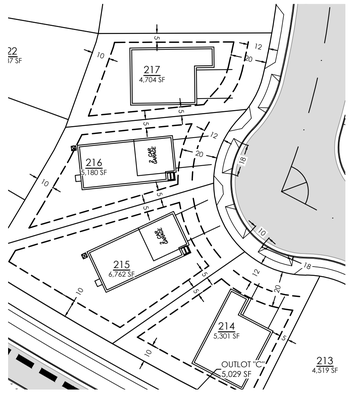
LOT EXHIBIT "A"



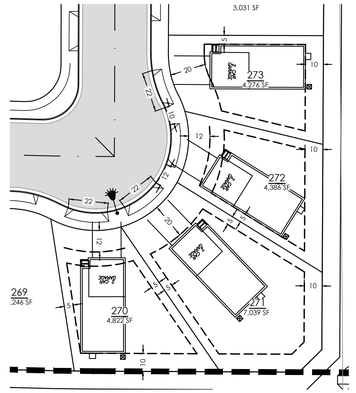
LOT EXHIBIT "B"



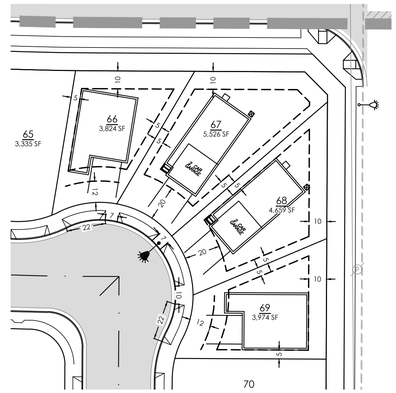
LOT EXHIBIT "C"



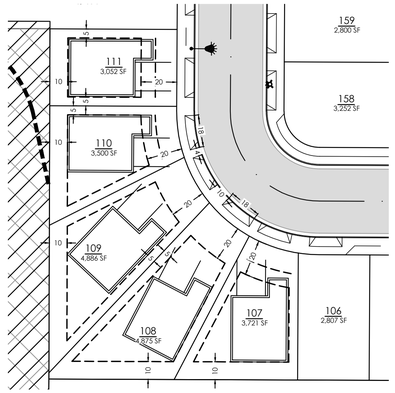
LOT EXHIBIT "D"



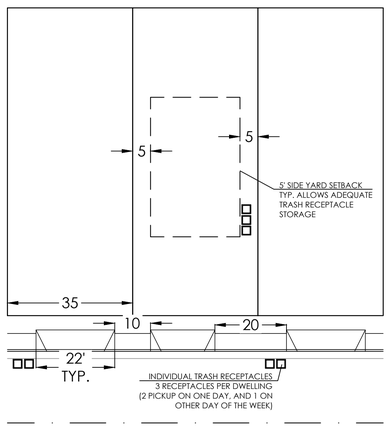
LOT EXHIBIT "E"



LOT EXHIBIT "F"

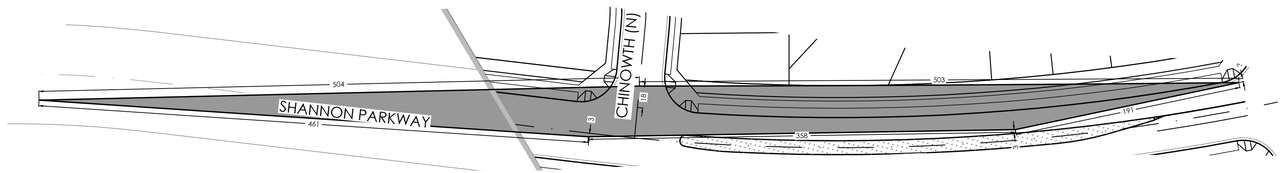


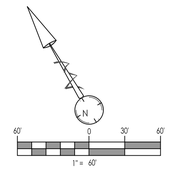
MINIMUM WIDTH LOT DRIVE APPROACH EXHIBIT N.T.S.



SIGHT TRIANGLE "A"

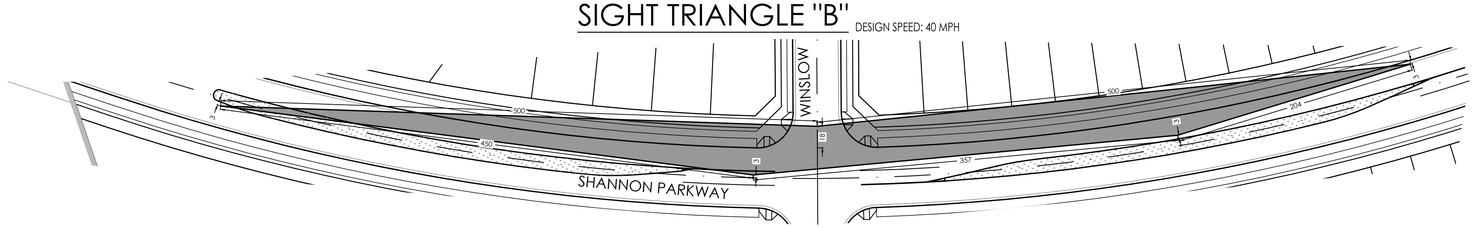
DESIGN SPEED: 40 MPH

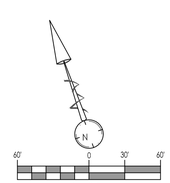




SIGHT TRIANGLE "B"

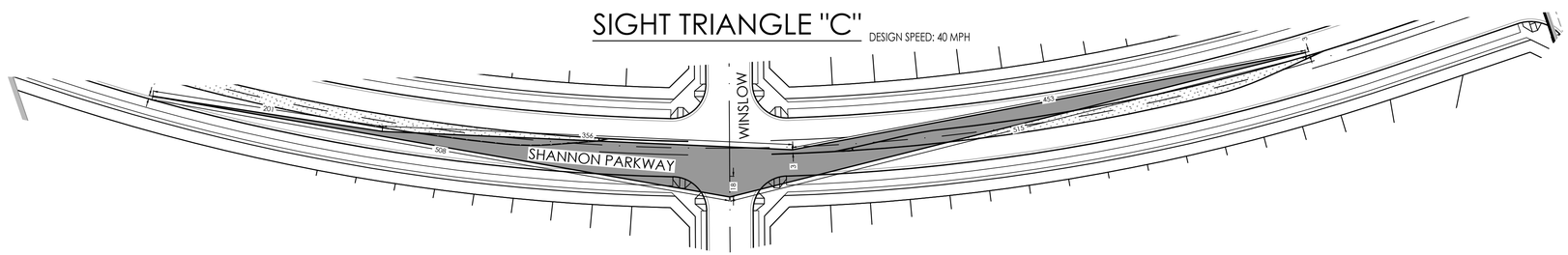
DESIGN SPEED: 40 MPH

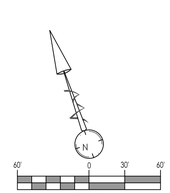


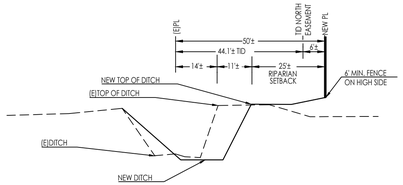


SIGHT TRIANGLE "C"

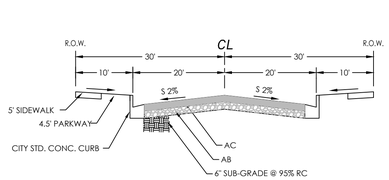
DESIGN SPEED: 40 MPH





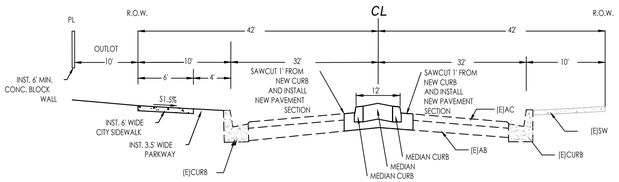


MODOC DITCH ALONG SOUTH PROPERTY LINE LOOKING WEST (X-X)



TI = 5.5 RVALUE = TBD MIN 2.5"AC OVER 7" AB

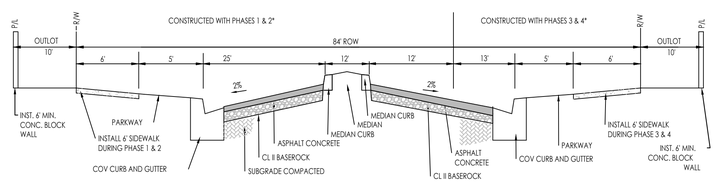
N.T.S.



NORTH DEMAREE STREET

N.T.S.

TI = 8 RVALUE = TBD MIN 5"AC OVER 8" AB



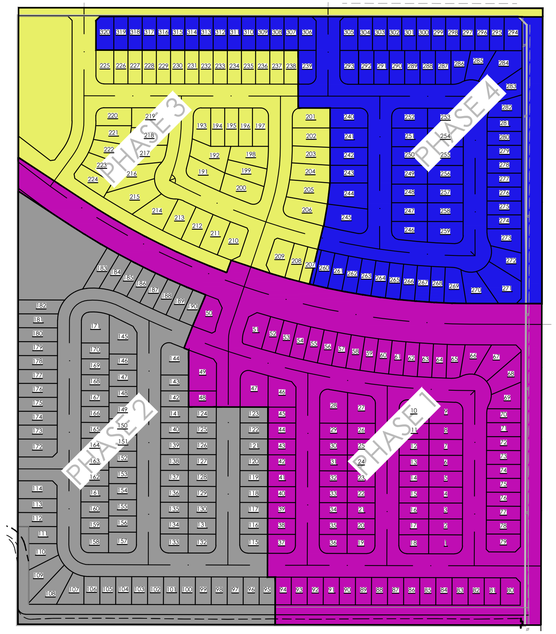
SHANNON PARKWAY

N.T.S.

T.I. = 8, R-VALUE = TBD MIN. 5" A.C. OVER 8" A.B.

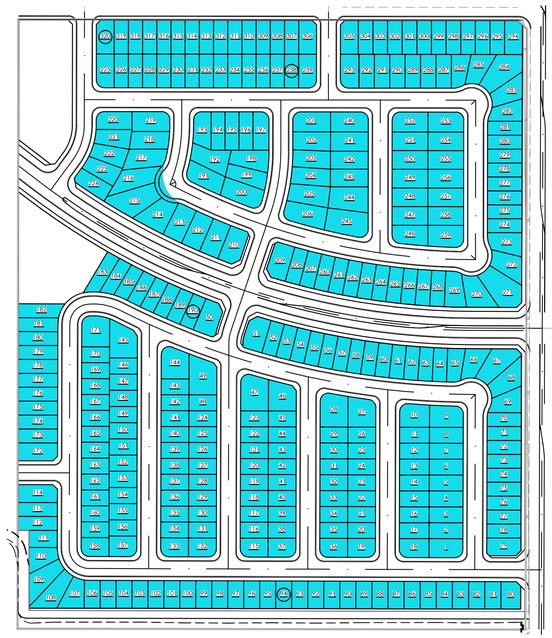
OVERALL PHASE PLAN

NOT TO SCALE



LOTS WITH FRONT YARD DEVIATION

NOT TO SCALE



LOTS WITH REAR YARD DEVIATION

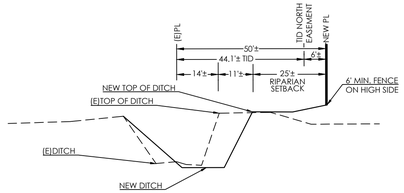
NOT TO SCALE



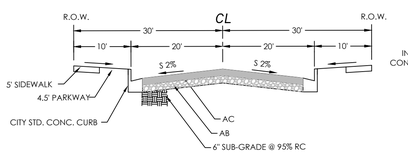
LOTS WITH FRONT & REAR YARD DEVIATION

NOT TO SCALE



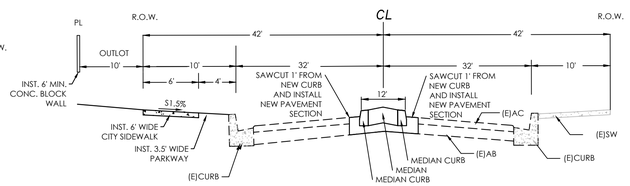


MODOC DITCH ALONG SOUTH PROPERTY LINE LOOKING WEST (X-X)



N.T.S.

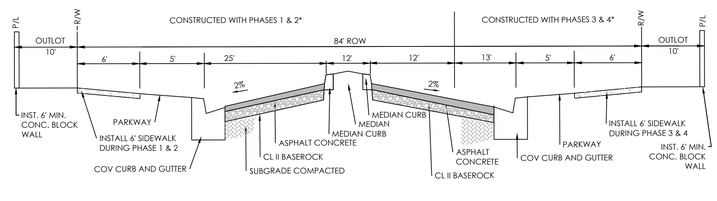
TI = 5.5 RVALUE = TBD MIN 2.5"AC OVER 7" AB



NORTH DEMAREE STREET

N.T.S.

TI = 8 RVALUE = TBD MIN 5"AC OVER 8" AB



SHANNON PARKWAY

N.T.S.

T.I. = 8, R-VALUE = TBD MIN. 5" A.C. OVER 8" A.B.

LIVE OAK
ASSOCIATES, INC.

BIOLOGICAL EVALUATION
RITCHIE RANCH DEVELOPMENT
TULARE COUNTY, CALIFORNIA

Prepared by

LIVE OAK ASSOCIATES, INC.
Austin Pearson, Vice President
Natalie E. Neff, Staff Ecologist

Prepared for:

Rabie Mekideche
Lennar Homes
8080 N. Palm, Suite 110
Fresno, CA 93711

June 21, 2024 PN 2884-01

OAKHURST
P.O. Box 2697 | 39930 Sierra Way #B
Oakhurst, CA 93644
P: (559) 642-4880 | F: (559) 642-4883

SAN JOSE
6840 Via Del Oro, Suite 220
San Jose, CA 95119
(408) 224-8300

SOUTH LAKE TAHOE
P.O. Box 7314
South Lake Tahoe, CA 96158
(408) 281-5885

WWW.LOAINC.COM

EXECUTIVE SUMMARY

Live Oak Associates, Inc. (LOA) investigated the biological resources of an approximately 45 acre parcel proposed for the development of a 320 lot residential subdivision in Tulare County, California and evaluated potential project-related impacts to such resources pursuant to the California Environmental Quality Act (CEQA). This site is located immediately within the northern city limits of Visalia.

The project site was surveyed on May 23, 2024, for its biotic habitats, the plants and animals occurring in those habitats, and significant habitat values that may be protected by state and federal law. At the time, the site consisted of a residential area, a disked field, and an almond orchard. The site supported several mature trees and herbaceous plants used for landscaping in the residential portion and grasses and forbs typical of a disturbed agricultural environment within the disked field and almond orchard. The project site did not contain wildlife movement corridors, sensitive natural communities, designated critical habitat, or federally protected waters or wetlands.

Three special status species known from the vicinity have some potential to occur on site, and project related impacts to these species are considered potentially significant under CEQA. These include Swainson's hawk, loggerhead shrike, and pallid bat. Project related impacts are also considered potentially significant for nesting birds and raptors. Impacts to Swainson's hawks, loggerhead shrike, and other nesting birds and raptors will be reduced by either constructing the project outside of the nesting season or, if construction must occur during the nesting season, by conducting preconstruction surveys and avoiding active nests. Impacts to pallid bat will be reduced by either constructing the project outside of pupping season, or, if construction must occur during pupping season, by conducting preconstruction surveys and avoiding active roosts. If construction occurs outside of pupping season but pallid bats are found to be roosting in tree cavities, they will be humanely evicted by a qualified biologist. If Oak trees can be avoided, then a Valley Oak management plan will be prepared and implemented. If avoidance of oak trees is not possible, then an oak tree removal permit will be obtained from the City of Visalia to ensure compliance with local policies and plans.

The project will either have no impact or a less than significant impact, as defined by CEQA, on the following biotic resources: all eighteen special plant species known to occur in the area; fourteen special status animal species that would not likely use the site (i.e., the project site is outside their typical range or habitats of the site are not suitable for them); one special status animal species (western mastiff bat) that may occasionally use habitats of the project site for foraging; jurisdictional waters; wildlife movement corridors; and sensitive natural communities and designated critical habitat.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ii
1.0 INTRODUCTION 1
1.1 PROJECT LOCATION 1
1.2 PROJECT DESCRIPTION 1
1.3 REPORT OBJECTIVES 4
2.0 EXISTING CONDITIONS 5
2.1 REGIONAL SETTING 5
2.2 PROJECT SITE 5
2.3 BIOTIC HABITATS 6
2.3.1 Agricultural 6
2.3.2 Residential 9
2.4 SPECIAL STATUS PLANTS AND ANIMALS 10
2.5 JURISDICTIONAL WATERS 16
2.6 DESIGNATED CRITICAL HABITAT 16
2.7 CALIFORNIA SENSITIVE NATURAL COMMUNITIES 17
2.8 WILDLIFE MOVEMENT CORRIDORS 17
3.0 RELEVANT GOALS, POLICIES, AND LAWS 18
3.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT 18
3.2 OTHER RELEVANT LAWS AND POLICIES 19
3.2.1 General Plan Policies of the City of Visalia 19
3.2.2 Threatened and Endangered Species 21
3.2.3 California Fully Protected Species 21
3.2.4 Migratory Birds 22
3.2.5 Birds of Prey 22
3.2.6 Nesting Birds 22
3.2.7 Habitat Conservation Plans and Natural Community Conservation Plans 23
3.2.8 Wetlands and Other Jurisdictional Waters 23
4.0 IMPACTS AND MITIGATIONS 26
4.1 POTENTIALLY SIGNIFICANT PROJECT IMPACTS 26
4.1.1 Potential Project Impacts to Nesting Raptors and Migratory Birds Including Loggerhead Shrike 26
4.1.2 Potential Project Impacts to the Swainson's Hawk 27
4.1.3 Potential Project Impacts to Pallid Bat 28
4.1.4 Consistency with Local Policies and Habitat Conservation Plans 29
4.2 LESS THAN SIGNIFICANT PROJECT IMPACTS 30

4.2.1 Potential Project Impacts to Special Status Plants 30
4.2.2 Potential Project Impacts to Special Status Animal Species Absent from or Unlikely to Occur Within the Project Site 30
4.2.3 Project Impacts to Special Status Animal Species that Would Use the Site for Foraging Only 31
4.2.4 Potential Project Impacts to Waters of the United States 31
4.2.5 Potential Project Impacts to Wildlife Movement Corridors 32
4.2.6 Project Impacts to Sensitive Natural Communities and Designated Critical Habitat 32

LITERATURE REFERENCED OR CITED 33

APPENDIX A: VASCULAR PLANTS OF THE PROJECT SITE 34

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES POTENTIALLY OCCURRING ON THE PROJECT SITE 37

APPENDIX C: SELECT PHOTOGRAPHS OF THE PROJECT SITE 42

APPENDIX D: STANDARD SPECIFICATIONS FOR BUILDING AROUND VALLEY OAKS 47

APPENDIX E: PERSONNEL QUALIFICATIONS 52

1.0 INTRODUCTION

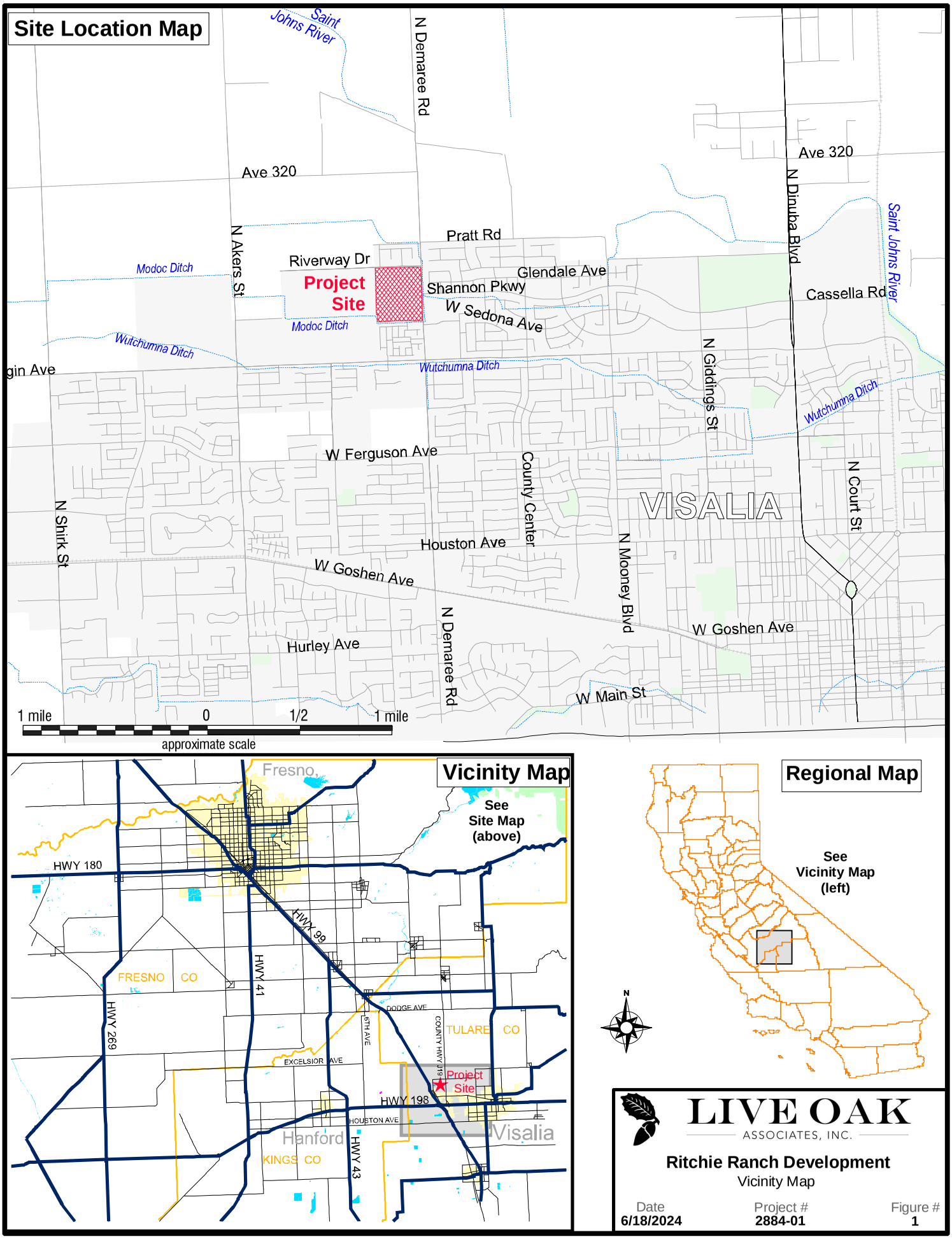
Live Oak Associates, Inc. (LOA) conducted an investigation of the biotic resources of an approximately 45 acre parcel proposed for the development of a 320 lot residential subdivision in Visalia, California ("project site" or "site"). This report describes the biotic habitats of the project site, evaluates the suitability of each habitat for special status plant and animal species, identifies potentially significant impacts to sensitive or protected biological resources from the project and proposes measures that, if implemented, would mitigate those impacts to a less than significant level as defined by the California Environmental Quality Act (CEQA).

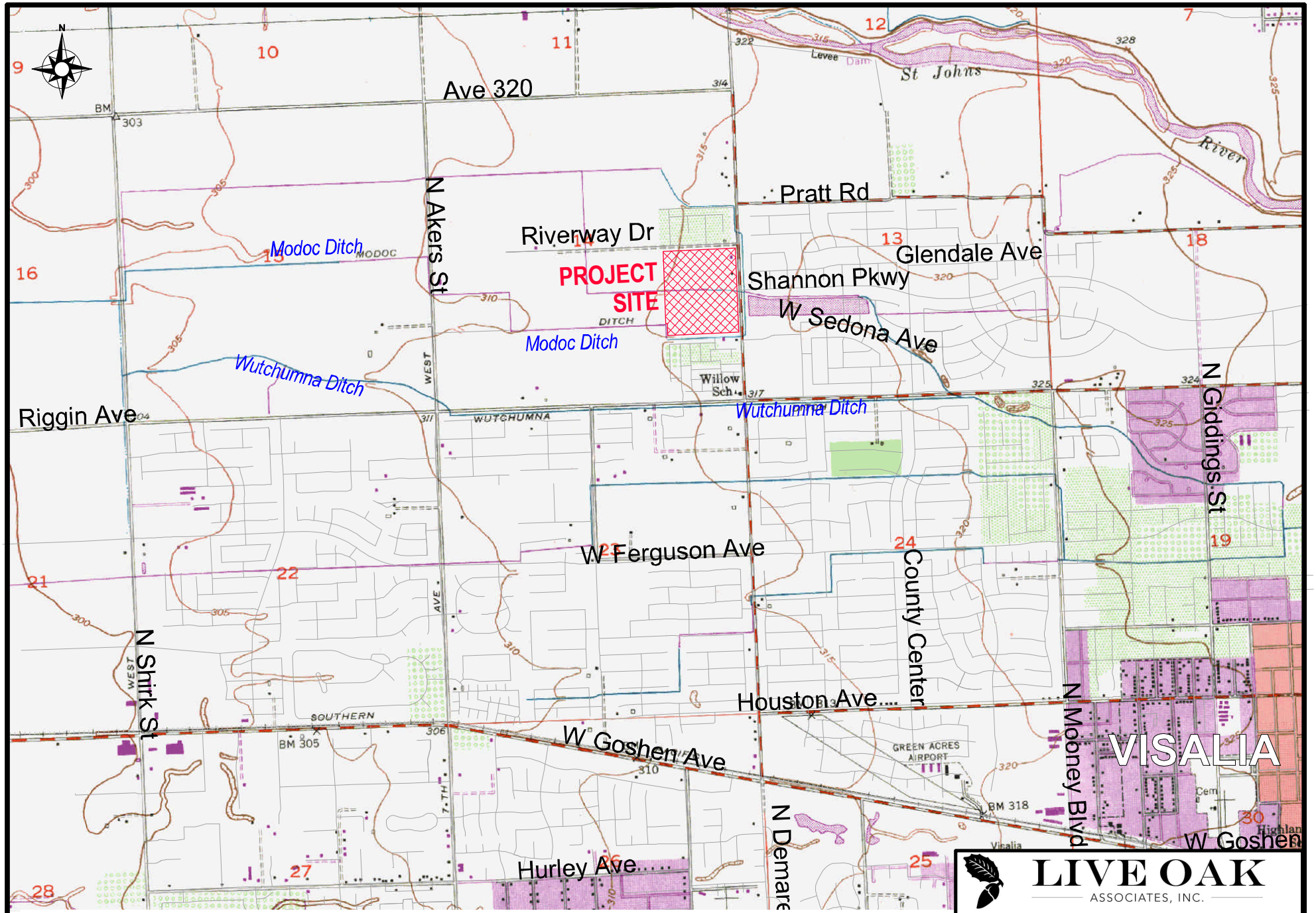
1.1 PROJECT LOCATION

The project site is located in the southwest corner of the intersection of West River Way Avenue and North Demaree Street near the northern boundary of the City of Visalia in Tulare County (Figure 1). The project site lies approximately 2.25 miles north of California State Route 198 and 2 miles west of California State Route 63. The project site is bordered by West River Way Avenue and residential housing to the north, North Demaree Street and residential housing to the east, agricultural lands, Modoc Ditch and residential housing to the south, and agricultural lands, a retention basin, and a portion of Modoc Ditch to the west. The site can be found on the Visalia U.S. Geological Survey (USGS) 7.5-minute quadrangle, Section 14, Township 18 South, Range 24 East; Mount Diablo Base and Meridian (Figure 2).

1.2 PROJECT DESCRIPTION

The proposed Ritchie Ranch Residential Subdivision consists of 320 lots on approximately 45 acres of land. The development will also include two park outlots, roads, and associated residential infrastructure and landscaping. A small earthen irrigation ditch that is part of Modoc Ditch, per City records, runs along the northern border of the project site which will be quitclaimed and removed. All project activities will maintain a minimum 25 foot no disturbance buffer from the top of bank of Modoc Ditch, which flows adjacent to the southern and southwestern borders of the project site.


Site Location Map
Saint Johns River
N Demaree Rd
Ave 320
N Akers St
Pratt Rd
Riverway Dr
Project Site
Modoc Ditch
Glendale Ave
Shannon Pkwy
W Sedona Ave
Cassella Rd
N Dinuba Blvd
Saint Johns River
Wutchumna Ditch
N Giddings St
W Ferguson Ave
County Center
VISALIA
N Court St
N Shirk St
Houston Ave
W Goshen Ave
N Mooney Blvd
Hurley Ave
W Main St
1 mile
0
1/2
1 mile
approximate scale
Vicinity Map
Fresno
See Site Map (above)
HWY 180
HWY 99
HWY 41
HWY 269
FRESNO CO
DODGE AVE
6TH AVE
COUNTY HWY 319
TULARE CO
EXCELSIOR AVE
Project Site
HWY 198
HOUSTON AVE
Visalia
Hanford
KINGS CO
HWY 43
Regional Map
See Vicinity Map (left)
N
LIVE OAK
ASSOCIATES, INC.
Ritchie Ranch Development
Vicinity Map
Date
6/18/2024
Project #
2884-01
Figure #
1



From USGS
Visalia 7.5' Quadrangle 1969

LIVE OAK ASSOCIATES, INC.

Ritchie Ranch Development
U.S.G.S. Quadrangle

Date	Project #	Figure #
6/18/2024	**2884-01**	**2**

1.3 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
- 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

1.4 STUDY METHODOLOGY

The analysis of impacts, as discussed in Section 3.0 of this report, is based on the known and potential biotic resources of the project site (discussed in Section 2.0). Sources of information used in the preparation of this analysis include: (1) the *California Natural Diversity Data Base* (CDFW 2024); (2) the *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2024); (3) manuals, reports, and references related to plants and animals of the San Joaquin Valley; and (4) other available planning documents and biological studies from the general project vicinity. A field survey of the project site was conducted on May 23, 2024 by LOA biologist Natalie Neff. The survey consisted of a meandering walk through the project site while identifying the principal land uses of the project site and the constituent plants and animals of each land use. The field survey conducted for this study was sufficient to assess the significance of possible biological impacts associated with the development plans for the project site.

2.0 EXISTING CONDITIONS

2.1 REGIONAL SETTING

The project site is located in the eastern Tulare basin which lies in the southeast portion of the San Joaquin Valley and west of the southern end of the Sierra Nevada Mountains. The San Joaquin Valley is a large, nearly flat alluvial plane 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.

The San Joaquin Valley experiences a Mediterranean climate with warm, dry summers 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 11.5 inches, almost all of which falls between the months of October and March in the form of rain (National Weather Service 2024).

The project site is at the northern edge of the City of Visalia, situated approximately 17-miles east of Hanford and 35-miles southeast of Fresno. The City of Visalia is comprised of dense urban areas with rural agricultural lands bordering its city limits. Immediately surrounding areas of the project site consist of residential and agricultural lands. The St. John's River is the principal water feature of the region and runs east to west. The main channel of the St. John's River is approximately 0.8-mile north of the project site.

2.2 PROJECT SITE

The project site consists of an agricultural area comprised of almond orchard and disked field, and a residential area. The agricultural area of the site has been used for agricultural purposes since at least 1956.

The site is relatively flat with an elevation of approximately 325 feet National Geodetic Vertical Datum (NGVD) (see Figure 2). Soils of the site comprise Grangeville sandy loam, drained, 0 to 2 percent slopes and Yetem sandy loam, 0 to 2 percent slopes. Grangeville sandy loam, drained,

0 to 2 percent slopes, which comprises all but approximately 2-acres in the southeastern corner of the site, is considered hydric. A hydric soil is defined as saturated, flooded, or ponded for long enough periods during the growing season to develop anaerobic conditions such that under sufficiently wet conditions they support hydrophytic (water-loving) vegetation. Such conditions are typically found in depressions within hydric soils forming vernal pools and wetland swales. However, the soils of the project site have been substantially altered due to decades of agricultural development at the site. As a result, soils of the site no longer maintain their native soil characteristics and would have no particular significance to biological resources of the site.

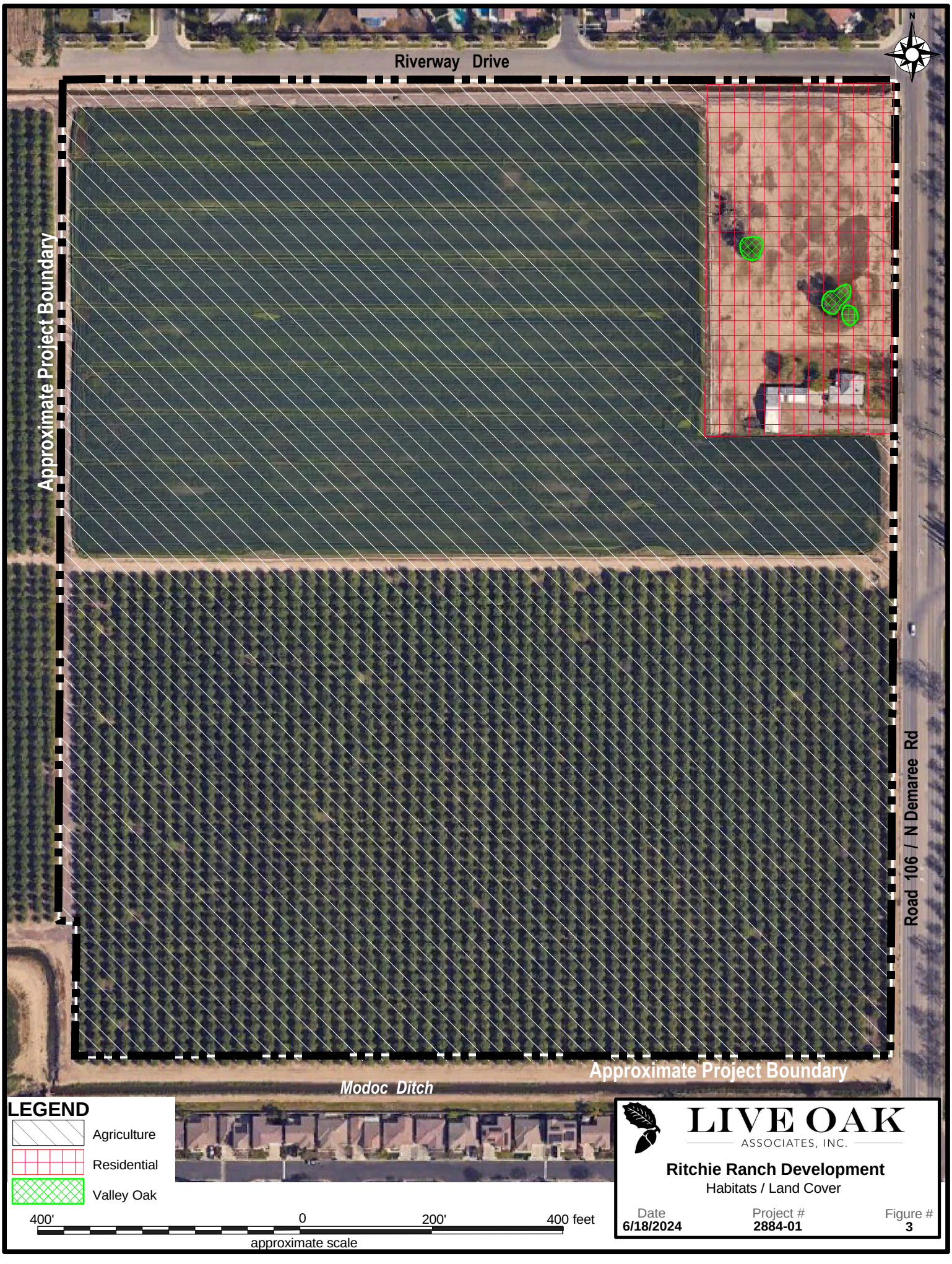
2.3 BIOTIC HABITATS

The project site contained two biotic habitats characterized as agricultural and residential. An aerial view of the site is presented in Figure 3. A list of vascular plants identified on the site is presented in Appendix A. A list of terrestrial vertebrates using or potentially using the project site is presented in Appendix B. Representative photos of the site are presented in Appendix C.

2.3.1 Agricultural

At the time of LOA's field survey, the majority of the project site consisted of agricultural land. The southern portion of the site consisted of an almond (*Prunus dulcis*) orchard and the northern portion contained a disked field which had recently been cultivated with hay. A small earthen ditch, which is part of the Modoc Ditch, runs along the northern border of the project site, which held a small amount of water at the time of the survey. The most prevalent herbaceous vegetation within the orchard included common weeds such as flaxleaf fleabane (*Erigeron bonariensis*), spotted spurge (*Euphorbia maculata*), chickweed (*Stellaria media*), jungle rice (*Echinochloa colona*) and bearded sprangletop (*Leptochloa fusca*). The disked field contained herbaceous species typrical of a disturbed environment including cheeseweed (*Malva parviflora*), prickly lettuce (*Latuca serriola*), flaxleaf fleabane, red-root amaranth (*Amaranthus retroflexus*), and cultivated wheat (*Triticum aestivum*).

The site's orchard habitat may be used by a number of native wildlife species that have adapted to make use of agricultural lands. A variety of birds could nest in the orchard including mourning doves (*Zenaida macroura*), northern mockingbirds (*Mimus polyglottos*), Brewer's blackbirds


Riverway Drive
Approximate Project Boundary
Road 106 / N Demaree Rd
Approximate Project Boundary
Modoc Ditch
N
LEGEND
Agriculture
Residential
Valley Oak
400' 0 200' 400 feet
approximate scale
LIVE OAK
ASSOCIATES, INC.
Ritchie Ranch Development
Habitats / Land Cover
Date
6/18/2024
Project #
2884-01
Figure #
3

(*Euphagus* cyanocephalus), and American robins (*Turdus migratorius*), among others. Ground nesting birds like killdeer (*Charadrius vociferus*) are highly disturbance tolerant and could nest in the dirt roads on site. The site does not provide suitable nesting habitat for large raptors, though it does provide some foraging habitat for hawks such as Cooper's hawk (*Acciputer cooperii*) which are not uncommon foragers in orchards. Other avian species likely to forage in the site's orchard include the California scrub jay (*Aphelocoma californica*) and American crow (*Corvus brachyrhynchos*).

The disked field provides relatively low wildlife value due to the high amount of disturbance it receives and general lack of vegetation; however, some common species are expected to utilize this portion of the site. The small irrigation ditch that runs along the fields northern border was highly maintained with very little vegetation. Brewer's blackbirds and American crows may forage in the disked field from time to time while the disturbance-tolerant killdeer could nest in the field.

Though this portion of the project site is near Modoc Ditch and a stormwater basin, both of which hold water seasonally when its available, amphibians such as western toad (*Anaxyrus boreas*) and Pacific tree frog (*Pseudacris regilla*) would only be found on the site in small numbers, if at all. At the time of the survey, the ditch and basin were holding water. Reptile species like side-blotched lizard (*Uta stansburiana*), gopher snake (*Pituophis melanoleucus*), and common kingsnake (*Lampropeltis getulus*) may forage in the orchard and disked field, but numbers are expected to be low as well.

Small mammal use of the site's agricultural lands may include the Botta's pocket gopher (*Thomomys bottae*), deer mouse (*Peromyscus maniculatus*), Audubon's cottontails (*Sylvilagus audubonii*), and California ground squirrel (*Otospermophilus beecheyi*). At the time of LOA's survey, burrowing rodent activity was restricted to the paths and roads between the trees in the orchard and consisted of Botta's pocket gopher burrows. No California ground squirrel burrows were observed.

Common mammalian predators such as coyotes (*Canis latrans*), raccoons (*Procyon lotor*), and striped skunks (*Mephitis mephitis*) may forage and pass through the site's agricultural lands as

well. Various bats may forage over these lands, though roosting habitat is absent in the disked field and would be unlikely in the active almond orchard.

2.3.2 Residential

In the northeast corner of the project site, approximately 3.5 acres can be categorized as residential. The residential portion consists of a hardpacked dirt lot containing a house with associated residential infrastructure including a shed, cars, and equipment as well as harvested, baled, and stacked hay. Mature trees such as valley oak (*Quercus lobata*), white mulberry (*Morus alba*), pecan (*Carya illinoinensis*), and an ornamental maple (*Acer spp.*) are scattered around this habitat. Ornamental plants associated with residential landscaping in the central valley such as oleander (*Nerium oleander*), prickly pear (*Opuntia spp.*), young fan palms (*Washingtonia spp.*) and rosemary (*Salvia rosmarinus*) were found near the home. Weedy species associated with disturbed soils such as knotweed (*Polygonum aviculare*), Palmer's amaranth (*Amaranthus palmeri*), cheeseweed, and flaxleaf fleabane were found across the hardpacked soil of this habitat.

The mature trees and shrubs on the project site provide potential habitat for nesting birds and raptors such as song sparrow (*Melospiza melodia*), lesser goldfinch (*Spinus psaltria*), northern mockingbird (*Mimus polyglottos*), yellow-rumped warbler (*Setophaga coronata*), as well as several birds that would use the agricultural habitat. Resident raptors could include red-tailed hawks (*Buteo jamaicensis*), red-shouldered hawks (*Buteo lineatus*), and Cooper's hawks (*Accipiter cooperii*). The structures in the residential area also provide nesting habitat for birds associated with built environments such as black phoebe (*Sayornis nigricans*) and the hard-packed soils provides habitat for ground nesters such as killdeer.

The same reptiles and mammals expected to be found in the agricultural habitat are expected to be found here as well, and the mature trees could provide roosting habitat for bats.

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 3.0, state and federal laws have provided California Department of Fish and Wildlife (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 (i.e., California Rare Plant Ranks, or CRPR) 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) was queried for special status plant and animal occurrences in the nine USGS 7.5-minute quadrangles containing and surrounding the project site (*Traver, Monson, Ivanhoe, Goshen, Visalia, Exeter, Paige, Tulare,* and *Cairns Corner*). A number of special status plants and animals were returned in the query and are summarized below in Table 1. Sources of information for this table included *California's Wildlife, Volumes I, II, and III* (Zeiner et. al 1988-1990), *California Natural Diversity Data Base* (CDFW 2024), *The Jepson Manual: Vascular Plants of California, second edition* (Baldwin et al 2012), the *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2024), *Calflora.org,* and *eBird.org*.

TABLE 1. LIST OF SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT VICINITY

PLANTS

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat/Range	*Occurrence within the Project Site
California Jewel-flower (*Caulanthus californicus*)	FE, CE, CRPR 1B.1	Occurs in chenopod scrub, pinyon and juniper woodland, and sandy valley and foothill grassland; blooms February–May; elevation 250-3,300 ft.	**Absent.** Suitable habitat is absent and there are no CNDDB occurrences within the vicinity of the project site.
Hoover's Spurge (*Euphorbia hooveri*)	FT, CRPR 1B.2	Occurs in vernal pools of California's Central Valley; blooms July-September; elevation 80-820 ft.	**Absent**. Suitable habitat is absent and there are no CNDDB occurrences within the vicinity of the project site.
San Joaquin Valley Orcutt Grass (*Orcuttia inaequalis*)	FT, CE, CRPR 1B.1	Occurs in vernal pools of the Central Valley; requires deep pools with prolonged periods of inundation; blooms April-September; elevation 100-2,480 ft.	**Absent.** Suitable habitat in the form of vernal pools is absent from the project site and there are no CNDDB occurrences within the vicinity of the project site.
San Joaquin Adobe Sunburst (*Pseudobahia peirsonii*)	FT, CE, CRPR 1B.1	Occurs in foothill grasslands in heavy clay soils of the Porterville and Centerville series, between 300 and 2,625 ft. in elevation. Blooms March-April.	**Absent.** Suitable habitat in the form of clay soils is absent and there are no CNDDB occurrences within the vicinity of the project site.

CNPS-listed Species

Species	Status	Habitat	*Occurrence within the Project Site
Heartscale (*Atriplex cordulata var. cordulata*)	CRPR 1B.2	Occurs on saline or alkaline soils in chenopod scrub, meadows, seeps, and grasslands; blooms April-October; elevations below 1,230 ft.	**Absent.** Suitable habitat is absent from the project site due to decades of disturbance from agricultural practices.
Earlimart Orache (*Atriplex cordulata var. erecticaulis*)	CRPR 1B.2	Occurs in valley and foothill grasslands between 130 and 330 ft. in elevation; blooms August-September.	**Absent.** Suitable habitat is absent from the project site due to decades of disturbance from agricultural practices.
Brittlescale (*Atriplex depressa*)	CRPR 1B.2	Occurs in chenopod scrub, valley and foothill grassland, meadows and seeps, playas, and vernal pools. It is rarely found in riparian or marsh habitats. Blooms April-October; elevations below 1,050 ft.	**Absent.** Suitable habitat is absent from the project site due to decades of disturbance from agricultural practices.
Lesser Saltscale (*Atriplex minuscula*)	CRPR 1B.1	Occurs in cismontane woodland and valley and foothill grasslands of the San Joaquin Valley; alkaline/sandy soils; blooms May-October; elevation 50-660 ft.	**Absent.** Suitable habitat is absent from the project site due to decades of disturbance from agricultural practices.
Vernal Pool Smallscale (*Atriplex persistens*)	CRPR 1B.2	Occurs in alkaline vernal pools; blooms July-Oct.; elevations below 400 ft.	**Absent.** Suitable habitat in the form of vernal pools is absent and there are no CNDDB occurrences within the vicinity of the project site.
Subtle Orache (*Atriplex subtilis*)	CRPR 1B.2	Occurs in alkaline vernal pools; blooms July-Oct.; elevations below 400 ft.	**Absent.** Suitable habitat in the form of vernal pools is absent from the project site.

TABLE 1. LIST OF SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT VICINITY

PLANTS (cont'd)

CNPS-listed Species

Species	Status	Habitat	*Occurrence within the Project Site
Recurved Larkspur (*Delphinium recurvatum*)	CRPR 1B.2	Occurs in alkaline soils of cismontane woodland and valley and foothill grasslands in elevations 100 – 2,000 feet. Blooms March-June.	**Absent.** Suitable habitat is absent and there are no CNDDB occurrences within the vicinity of the project site.
Spiny-sepaled Button Celery (*Eryngium spinosepalum*)	CRPR 1B.2	Found in vernal pools, swales and valley and foothill grasslands at the eastern edge of the San Joaquin Valley and in the Tulare basin; elevation between 330 and 840 ft. Blooms April to May.	**Absent.** Suitable habitat in the form of vernal pools is absent from the project site and there are no known CNDDB occurrences within the vicinity of the project site.
Winter's Sunflower (*Helianthus winteri*)	CRPR 1B.2	Occurs in steep, south-facing grassy slopes, rocky outcrops, or road cuts at elevations from 591 ft- 1509 ft.	**Absent.** There are no known CNDDB occurrences within the vicinity of the project site, suitable habitat is absent, and the project site is below the elevational range of this species.
California Satintail (*Imperata brevifolia*)	CRPR 2B.1	Occurs in costal scrub, chaparral, riparian areas, Mojavean desert scrub, and alkali meadows and seeps at elevations below 1640 feet. Blooms September- may.	**Absent.** Though there is an occurrence of this species mapped to the general vicinity of Visalia, it is from 1895 (CDFW 2024). There is no suitable habitat on the project site and decades of agricultural practices has eliminated all suitable habitat that may have once occurred on site.
Alkali-Sink Goldfields (*Lasthenia chrysantha*)	CRPR 1B.1	Occurs in valley grassland, alkali sink, wetland riparian areas less than 328 ft. in elevation in the southern Sacramento Valley and San Joaquin Valley. Blooms February – June.	**Absent.** Suitable habitat is absent from the project site due to decades of disturbance from agricultural practices.
Coulter's Goldfields (*Lasthenia glabrata* ssp. *coulteri*)	CRPR 1B.1	Found in coastal salt marshes and swamps, playas, and vernal pools at elevations below 3,281 feet. Blooms February - June.	**Absent.** Suitable habitat in the form of vernal pools is absent from the project site.
California Alkali Grass (*Puccinellia simplex*)	CRPR 1B.2	Occurs in alkali sinks and flats within grassland and chenopod scrub habitats of the Central Valley, San Francisco Bay area and western Mojave Desert; elevations below 3,000 feet. Blooms March-May.	**Absent.** Though there is an occurrence mapped within the vicinity of the project site (3.75 miles west), it is from 1925 (CDFW 2024). There is no suitable habitat on the project site and decades of agricultural practices has eliminated all suitable habitat that may have once occurred on site.
Sanford's Arrowhead (*Sagittaria sanfordii*)	CRPR 1B.2	Occurs in freshwater emergent marsh habitat in drainage ditches and canals of California's Central Valley. Blooms May to October.	**Absent.** Suitable habitat is absent from the project site and there are no CNDDB occurrences within the vicinity of the project site.

TABLE 1. LIST OF SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT VICINITY

ANIMALS

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	*Occurrence within the Project Site
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT	Primarily found in vernal pools of California's Central Valley.	**Absent**. Suitable habitat in the form of vernal pools is absent from the site and immediately surrounding lands.
Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)	FE	Primarily found in vernal pools but may use other seasonal wetlands in mesic valley and foothill grasslands.	**Absent**. Suitable habitat in the form of vernal pools is absent from the site and immediately surrounding lands.
Crotch Bumble Bee (*Bombus crotchii*)	CCE	This bee is found in Coastal California east to the Sierra-Cascade crest and south into Mexico, where it occupies open grassland and scrub habitats. Constructs nests underground in animal burrows. Overwintering sites are likely in soft soils or in debris or leaf litter. Its food plant genera include *Antirrhinum*, *Phacelia*, *Clarkia*, *Dendromecon*, *Eschscholzia*, and *Eriogonum*.	**Unlikely.** Though a 1966 occurrence was documented in the general vicinity of Visalia, this species is unlikely to occur on the site due to its disturbed nature, lake of nectar resources, and incompatible land use in the vicinity. In fact, it is generally thought to be absent from the valley floor.
Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of California's Central Valley and Sierra foothills.	**Absent.** The USFWS has revised its understanding of VELB distribution to exclude the San Joaquin Valley south of Merced County.
California Tiger Salamander (*Ambystoma californiense pop. 1*)	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).	**Absent**. Suitable habitat in the form of vernal pools is absent from the site and immediately surrounding lands and there are no CNDDB occurrences within the vicinity of the project site.
Western Spadefoot (*Spea hammondii*)	FPT, CSC	Primarily occurs in grasslands, but also occurs in valley and foothill hardwood woodlands. Requires vernal pools or other temporary pools for breeding.	**Absent.** Suitable habitat is absent from the project site. The closest known occurrence is from 2004 and located approximately 3.4-miles southwest of the project site (CDFW 2024), however, aerial mapping shows that the site has now been developed into a building and parking lot, extirpating this local population from the area.
Western Pond Turtle (*Emys marmorata*)	FPT, CSC	Associated with permanent bodies of water for breeding. Requires partially submerged rocks or logs for basking sites. Eggs are deposited in a variety of soil types near water's edge. Seasonal hibernation/estivation includes use of upland habitat from water sources including ground squirrel burrows and loose substrate for burying themselves.	**Unlikely.** Suitable habitat is marginal on site for this species. Modoc Ditched borders the project site on the south and for a short distance on the west, and a large earthen retention basin lies approximately 50 feet to the southwest. However, based on review of Google Earth photography, the retention basin and ditch are not inundated often enough to support a viable population of this species. Furthermore, there are no recent documented occurrences of this species in the vicinity. The only CNDDB occurrence of this species is a historical occurrence, mapped to the general vicinity of Visalia in 1879 (CDFW 2024).

TABLE 1. LIST OF SPECIAL STATUS SPECIES POTENTIALLY OCCURRING 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 within the Project Site
Tricolored Blackbird (*Agelaius tricolor*)	CT, CSC	Breeds colonially near fresh water in dense bulrush, cattails, or thickets of willows or shrubs. Occasionally nests in wheat fields. Forages in a wide variety of habitats.	**Absent.** Suitable nesting and foraging habitat is absent from the project site. The closest known occurrence is approximately 17.5-miles southwest of the project site from 2014 (CDFW 2014).
Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)	FT, CE	Occurs in valley foothill and desert riparian habitats in scattered locations in California Requires extensive gallery riparian forests for nesting.	**Absent.** Suitable nesting and foraging habitat is absent from the project site. A single historical occurrence from 1919 is recorded in the general vicinity of Visalia but given the complete absence of extensive riparian habitat needed for this species survival, this species is absent from the project site. Furthermore, the site is outside the current known range of this species.
Swainson's Hawk *(Buteo swainsoni*)	CT	Summer migrant in the Central Valley. Forages in grasslands and fields close to riparian areas.	**Likely.** There are 23 nesting occurrences within 10-miles of the project site (CDFW 2024) and over 20 sightings documented on ebird (ebird.com 2024). The site supports large trees that could potentially be used for nesting by Swainson's hawk. Swainson's hawks are known to nest in trees within the vicinity of agricultural fields, a vast amount of which are found to the west and north of the project site. The almond orchard does not provide suitable foraging habitat, while the hay field and open portions of the residential area could provide some foraging habitat after harvest.
Tipton Kangaroo Rat (*Dipodomys nitratoides nitratoides*)	FE, CE	Inhabits valley saltbrush scrub, valley sink scrub, and grassland habitats located from the Valley floor to 300 ft. in elevation.	**Absent.** Suitable habitat is absent from the project site and there are no occurrences within the vicinity of the project site.
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, CT	Desert alkali scrub, annual grasslands of California's San Joaquin Valley and Tulare Basin, extending west into San Luis Obispo County. This species may forage in adjacent agricultural habitats.	**Unlikely.** Fifteen occurrences of San Joaquin kit fox have been recorded within 10- miles of the project site, the closet occurring approximately 3 miles west of the project site. Although there are multiple occurrences, the most recent is from 2003 and the remaining 14 occurrences are 31 years old or older (CDFW 2024). There were no potentially suitable kit fox burrows observed on site. Furthermore, San Joaquin kit foxes exhibit aversion to agricultural sites and would, at most, pass through the site on their way to more suitable habitat if they were to occur on site at all.

TABLE 1. LIST OF SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT VICINITY

ANIMALS (cont'd)

State Species of Special Concern

Species	Status	Habitat	*Occurrence within 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.	**Unlikely.** Suitable habitat is marginal or absent from the project site due to the high amount of human disturbance and lack of suitable moisture available during dry months.
Burrowing Owl (*Athene cunicularia*)	CSC	Frequents open, dry annual or perennial grasslands, deserts, and scrublands characterized by low- growing vegetation. Dependent upon burrowing mammals, most notably the California ground squirrel, for nest burrows.	**Unlikely.** Although there are fifteen burrowing owl occurrences within 10-miles of the project site, suitable foraging and nesting habitat is extremely marginal or absent on the project site due to the high amount of agricultural and urban disturbance experienced on and around the project site.
Loggerhead Shrike (*Lanius ludovicianus*)	CSC	Frequents open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low herbaceous cover. Can often be found in cropland.	**Possible.** Onsite trees provide potential nesting habitat and areas within and immediately around the project site provide potential foraging habitat. There is one historical CNDDB occurrence and several recent occurrences documented on ebird within 10-miles of the project site.
Pallid Bat (*Antrozous pallidus*)	CSC	Roosts in rocky outcrops, cliffs, and crevices with access to open habitats for foraging. May also roost in caves, mines, hollow trees and buildings.	**Possible.** The site provides suitable foraging habitat and potential roosting habitat in mature valley oak trees on the site. There is one documented occurrence of a pallid bat maternity colony roosting under a bridge from 2007 approximately 7-miles east of the project site (CDFW 2024).
Western Mastiff Bat (*Eumops perotis 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.** Suitable roosting habitat is absent from the site, but the site provides potential foraging habitat. The one documented colony occurrence within the vicinity of the project site is from 2002 and lies approximately 4.5-miles south from the project site (CDFW 2024).
American Badger (*Taxidea taxus*)	CSC	This species inhabits open and dry sections of grasslands, shrub, and forest habitats with friable soil.	**Absent.** The project site provides marginal habitat, at best, for this species. The developed and disturbed nature of the project vicinity are incompatible with badger use and occupation.

* Explanation of 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	CE	California Endangered
FT	Federally Threatened	CT	California Threatened

FPT Federally Proposed Threatened
FC Federal Candidate
FPD Federally (Proposed) Delisted

CSC California Species of Special Concern
CRPR California Rare Plant Ranking
CFP California Fully Protected
CCE California Candidate Endangered

2.5 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 3.2.9.

Modoc Ditch, which receives water from St. Johns River upstream, runs adjacent to the southern and southwestern borders of the project site. The irrigation ditch that runs along the northern boundary of the site receives water from Modoc Ditch, and appears to reconnect with Modoc Ditch approximately 1.75 miles west of the project site. From there, Modoc Ditch continues to flow to the west, terminating in a ponding basin approximately 4.5 miles west of the project site. Both ditches are excavated wholly in and draining only dry land, and do not carry a relatively permanent flow of water. Furthermore, neither ditch is tributary to any downstream waters. As such, neither ditch appears to meet the criteria of a jurisdictional water.

2.6 DESIGNATED CRITICAL HABITAT

As will be discussed further in Section 3.0, 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 immediately surrounding lands.

2.7 CALIFORNIA SENSITIVE NATURAL COMMUNITIES

California Sensitive Natural Communities are natural communities designated by CDFW as those that are of limited distribution, distinguished by significant biological diversity, home to special status plant and animal species, of importance in maintaining water quality or sustaining flows, etc.

No habitats designated as a Sensitive Natural Community by CDFW or any other sensitive habitats are present on the site or surrounding lands.

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, rivers and creeks supporting riparian vegetation, and ridgelines.

Wildlife movement corridors are absent from 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 General Plan Policies of the City of Visalia

In compliance with CEQA, the lead agency must consider conformance with applicable goals and policies of the City of Visalia General Plan. The City of Visalia General Plan was released in October 2014 and is valid through 2030. Implementation of goals in the general plan is accomplished via a set of policies specific to each goal.

Relevant biological resource goals of the City of Visalia General Plan include:

- Preserving natural resources, specifically valley oak riparian woodland or valley oak woodland habitat, wetlands, and vernal pools;
- Preserve and/or enhance natural features along waterways in new neighborhoods;
- Establish easements or require dedication of land along waterways to protect natural habitat areas;
- Where no urban development exists, maintain a minimum riparian habitat development setback from the discernible top of the bank- 50 feet for both sides of the Mill, Packwood, and Cameron Creek corridors and 25 feet for both sides of Modoc, Persian, and Mill Creek Ditches;
- Any new development must ensure minimal disruption/loss of habitat that couple support special status animal species;

- Protect and enhance natural vegetation, especially sensitive natural communities;
- Establish Best Management Practices (BMP) for control of invasive plant species that could adversely affect wildlife;
- Establish a "no net loss" standard for sensitive habitat acreage, including wetlands and vernal pools potentially affected by development;
- Protect significant stands of valley oak woodlands from further development;
- Require assessments of biological resources prior to approval of any discretionary development projects involving riparian habitat, wetlands, or special status species habitat;
- Protect and enhance habitat for special status species designated under state and federal law;
- Develop a list of recommended native plants and landscaping guidelines for the public to use;
- Use native trees in street and public landscaping;
- Design stormwater ponds and retention basins to serve a dual role as wildlife habitat by planting species appropriate for food and cover needs;

3.2.2 City of Visalia Valley Oak Tree Ordinance

The City of Visalia has adopted an ordinance to protect Valley oaks, pursuant to Visalia Municipal Code Chapter 12.24. This ordinance establishes policies for the care, trimming and removal of Valley Oaks on public and private property. Before a Valley oak can be removed, an application must be submitted and a permit obtained from the city manager. The application must include the number, size and location of the oak tree(s) and a brief statement of the reason for removal. To offset the loss of oak tree(s) removed for development, repairs, or improvements, applicants must either replace the oak tree(s) removed with new oak trees on the same property (in-kind mitigation) or pay mitigation fees intended to be used for the establishment of new oak trees on other property (in-lieu mitigation), as approved by the city. If a project isn't removing a Valley oak tree but will result in encroachment into the crown drip-line of a Valley oak (including permanent structures, cut, fill, compaction, or paving) approval must be obtained from the City Manager. If encroachment into the crown drip line is approved, the city requires special construction techniques to be used.Before a Valley oak tree limb can be pruned, an intent to prune

application must first be completed and submitted to the city manager. The notice must include a description of the tree(s) to be pruned including the approximate size and location of the tree(s).

3.2.3 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.

3.2.4 California Fully Protected Species

The classification of certain animal species as "fully protected" was the State of California's initial effort in the 1960s, prior to the passage of the California Endangered Species Act (CESA), to identify and provide additional protection to those species that were rare or faced possible extinction. Following CESA enactment in 1970, many fully protected species were also listed as California threatened or endangered. The list of fully protected species are identified, and their protections stipulated, in California Fish and Game Code Sections 3511 (birds), 4700 (mammals),

5050 (reptiles and amphibians), and fish (5515). Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take, except in conjunction with necessary scientific research and protection of livestock.

3.2.5 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.

3.2.6 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.

3.2.7 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.

3.2.8 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.

3.2.9 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 ("waters of the State"). Nine RWQCBs oversee water quality at the local and regional level. The RWQCB for a given region regulates discharges of fill or 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 project considered in this evaluation of impacts to biological resources is the construction of 320 lots and associated infrastructure on approximately 45 acres of land in the City of Visalia in Tulare County, California. This analysis assumes that all areas of the site will experience permanent impacts from proposed development.

4.1 POTENTIALLY SIGNIFICANT PROJECT IMPACTS

4.1.1 Potential Project Impacts to Nesting Raptors and Migratory Birds Including Loggerhead Shrike

Potential Impacts. The project site has the potential to be used for nesting by a variety of migratory birds and raptors (i.e., birds of prey), including the loggerhead shrike, a California species of special concern. Nearly all birds are protected by state and federal law. If project construction takes place during the nesting season, birds nesting on the site could be injured or killed by construction activities or disturbed such that they would abandon their nests. Construction-related mortality of nesting birds and disturbance leading to nest abandonment would violate state and federal laws and constitute a significant impact of the project.

Mitigation. To avoid and minimize the potential for construction-related mortality/disturbance of nesting birds and raptors, the following measures will be implemented:

> ***Measure 4.1.1a (Construction Timing).*** If feasible, the project will be implemented outside of the avian nesting season, typically defined as February 1 to August 31.
>
> ***Measure 4.1.1b (Preconstruction Surveys*)**. If construction must occur between February 1 and August 31, a qualified biologist will conduct pre-construction surveys for active bird nests within 10 days prior to the start of construction. The survey area will encompass the site and accessible surrounding lands within 250 feet for nesting migratory birds and 500 feet for raptors.
>
> ***Measure 4.1.1c (Avoidance of Active Nests*)**. Should any active nests be discovered in or near proposed construction zones, the biologist will identify a suitable construction-free buffer around the nest. This buffer will be identified on the ground with flagging or fencing and will be maintained until the biologist has determined that the young have fledged and are capable of foraging independently.

Implementation of the above measures will reduce potential project impacts to nesting birds and raptors, including Loggerhead Shrike, to a less than significant level under CEQA and ensure compliance with state and federal laws protecting these species.

4.1.2 Potential Project Impacts to the Swainson's Hawk

Potential Impacts: Swainson's hawk, a state-listed species, is known to nest within 10 miles of the project site. Suitable nesting trees are present on and immediately adjacent to the project site. The suitable nesting trees on site are located within the residential habitat. The residential habitat experiences domestic disturbance from the tenants residing in the housing on this portion of the project site as well as disturbance in the form of vehicular and agricultural activities from the roads, agricultural fields, and orchards within its vicinity. Due to the amount of continued disturbance on and around the site, Swainson hawks are unlikely to choose to nest in the project site, however, it is theoretically possible for Swainson's hawks to nest in one of the mature trees on or near the project site. If Swainson's hawks are nesting on or near the project site at the time of construction, individual hawks could be injured, killed, or disturbed such that they would abandon their nest. Project activities that adversely affect the nesting success or result in mortality of Swainson's hawks would violate state and federal laws and would be considered a significant impact under CEQA.

The project site provides some foraging habitat in the form of approximately 20-acres of hay field, after it has been harvested, and open portions of the residential area, all slated for permanent development. The loss of approximately 20-acres of foraging habitat in an area with many square miles of similar to higher quality foraging habitat would not constitute a significant loss of Swainson's hawk foraging habitat. Therefore, the loss of foraging habitat for the Swainson's hawk is not considered a significant impact of the project under CEQA.

The following mitigation measures would reduce impacts to nesting Swainson's hawks to a less than significant level.

> ***Measure 4.1.2a (Construction Timing).*** To avoid impacts to nesting Swainson's hawks, construction activities will occur, where possible, outside the nesting season, typically defined as March 1-September 15.

***Mitigation 4.1.2b* (*Pre-construction Surveys*).** If the project must be constructed between March 1 and September 15, a qualified biologist will conduct pre-construction surveys for Swainson's hawk nests on and within ¼ mile of the project site within 10 days of the onset of these activities.

***Mitigation 4.1.2c* (*Establish Buffers*).** Should any active nests be discovered in or near proposed construction zones, the biologist will identify a suitable construction-free buffer around the nest. This buffer will be identified on the ground with flagging or fencing and will be maintained until the biologist has determined that the young have fledged.

***Mitigation 4.1.2d* (*Monitor Nest*).** Should construction activity be necessary within the designated buffer around an active Swainson's hawk nest, a qualified biologist will monitor the nest daily for one week, and thereafter once a week, for the duration of the activity or until the nest is no longer active, whichever comes first. Should construction activity within the buffer change such that a higher level of disturbance will be generated, monitoring will occur daily for one week and then resume the once-a-week regime. If, at any time, the biologist determines that construction activity may be compromising nesting success, construction activity within the designated buffer will be altered or suspended until the biologist determines that the nest is no longer at risk of failing.

Implementation of the above measures will ensure that the project does not significantly impact Swainson's hawks and is in compliance with state and federal laws.

4.1.3 Potential Project Impacts to Pallid Bat

Potential Impacts. The project site's mature trees have the potential to be used for roosting by various bat species, possibly including the pallid bat (*Antrozous pallidus*), a California Species of Special Concern. It is assumed that the trees will be removed to accommodate residential construction. Any bats roosting in the trees at the time of its demolition and removal are likely to be injured or killed. Construction-related injury or mortality of the pallid bat is considered a potentially significant impact of the project.

The project will not result in a significant loss of foraging habitat for the pallid bat. Although potential roost sites will be removed, other mature trees will remain available elsewhere in the project vicinity. The site does not offer unique foraging habitat for the pallid bat, 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 foraging habitats are abundant in the project vicinity and elsewhere in the region.

Mitigation. The following measures will be implemented for the protection of roosting pallid bats.

> ***Mitigation 4.1.3a* (*Construction Timing*).** If feasible, demolition and removal of the mature trees will occur outside of the period between April 15 and September 30. This is the time frame within which colony-nesting bats in the vicinity generally assemble, give birth, nurse their young, and ultimately disperse.
>
> ***Mitigation 4.1.3b* (*Pre-construction Surveys*).** Within 10 days prior to the removal of the site's trees, a qualified biologist will survey them for roosting bats. The biologist will look for individuals, guano, and staining, and will listen for bat vocalizations. If necessary, the biologist will wait for nighttime emergence of bats from roost sites.
>
> ***Mitigation 4.13c* (*Avoidance of Maternity Roosts*).** Should any active maternity bat roosts be discovered, the biologist will identify a suitable construction-free buffer around the maternity roost. The buffer will be identified on the ground with flagging or fencing, and will be maintained until the biologist has determined that the nursery is no longer active.
>
> ***Mitigation 4.1.3d* (*Humane Eviction of Non-breeding Bats*).** If a non-breeding bat colony is found in tree cavities, the individuals will be humanely evicted, under the direction of a qualified biologist, to ensure that bats are not physically harmed by demolition and removal of the trees.

Implementation of the above measures will reduce potential construction-related impacts to the pallid bat to a less than significant level.

4.1.4 Consistency with Local Policies and Habitat Conservation Plans

Impact: Three valley oaks were identified in the northern portion of the residential habitat (Figure 3). These trees are protected by City of Visalia's Oak Tree Protection Ordinance (2007) which was developed pursuant to Visalia Municipal Code.

With the exception of the proposed removal of valley oaks on site, the project appears to be in compliance with all other local policies and plans.

Mitigation. The applicant will implement the following measures:

> ***Mitigation Measure 4.1.4a (Avoidance).*** Should the applicant choose to avoid oak trees, a Valley Oak Management plan will be prepared and implemented, in accordance with the City of Visalia Parks and Recreation Department Urban Forestry Division's *Standard Specifications for Building Around Valley Oaks* (2007; Appendix D).

Mitigation Measure 4.1.4b (Mitigation Fees or Replacement Planting). Should avoidance of oak trees not be possible, the applicant will obtain an oak tree removal permit from the City of Visalia. Based on the City's tree protection ordinance, compensation for Valley Oak removal will consist of either payment of a mitigation fee ($120 multiplied by diameter at breast height (DBH) for each tree removed), replacement planting at a ratio of one new oak tree for every inch of DBH of the tree removed, or some combination of the two, as determined in consultation with the City.

Implementation of these measures will ensure the project is consistent with local policies and habitat conservation plans.

4.2 LESS THAN SIGNIFICANT PROJECT IMPACTS

4.2.1 Potential Project Impacts to Special Status Plants

Potential Impacts. Eighteen (18) special status plant species have been documented in the project vicinity (see Table 2). While some of these plants have been documented in very close proximity to the project site, decades of continued development and human disturbance has created unsuitable habitat for these species. Due to habitat loss or degradation associated with the high level of human disturbance at the project site, the absence of any historical suitable habitat, and/or the sites' being situated outside a particular species' range, none of these species are expected to occur within the project area. Therefore, impacts to special status plants are considered less than significant under CEQA.

Mitigation. Mitigation measures are not warranted.

4.2.2 Potential Project Impacts to Special Status Animal Species Absent from or Unlikely to Occur Within the Project Site

Potential Impacts. Of the eighteen (18) special status animal species that potentially occur in the general vicinity of the site, fourteen (14) are considered absent from or unlikely to occur within the project site due to the absence of suitable habitat and/or the project site being situated outside of the species' known distribution (see Table 2). These comprise the vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), Crotch bumblebee (*Bombus crotchii*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California tiger salamander (*Ambystoma californiense*), western spadefoot (*Spea hammondii*), Western Pond Turtle (*Emys marmorata*), tricolored blackbird (*Agelaius tricolor*), western

yellow-billed cuckoo (*Coccyzus americanus occidentalis*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), San Joaquin kit fox (*Vulpes macrotis mutica*), northern California legless lizard (*Anniella pulchra*), burrowing owl (*Athene cunicularia*), and American badger (*Taxidea taxus*). The project is expected to have an insignificant effect or no effect on these species through construction mortality/disturbance or loss of habitat because there is little or no likelihood that they are present.

Mitigation. Mitigation is not warranted.

4.2.3 Project Impacts to Special Status Animal Species that Would Use the Site for Foraging Only

Potential Impacts. One special status animal species, the western mastiff bat (*Eumops perotis* ssp. *californicus*), has the potential to forage on the site from time to time but would not roost on or near enough to the site that they could be vulnerable to construction-related disturbance or reproductive failure at their roosts (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 this species through loss of foraging habitat. The site does not offer unique habitat for these species, nor is it likely to represent an important part of any individual foraging range, given its disturbed nature and urban setting. The site does not offer unique foraging habitat for the western mastiff bat, 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 foraging habitats are abundant in the project vicinity and elsewhere in the region.

Mitigation. Mitigation is not warranted.

4.2.4 Potential Project Impacts to Waters of the United States

Potential Impacts. Modoc Ditch, which receives water from St. Johns River upstream, runs adjacent to the southern and southwestern borders of the project site. The project will stay a minimum of 25 feet away from Modoc Ditch. However, the small irrigation ditch that runs along the northern boundary of the site will be removed. The irrigation ditch connects to Modoc Ditch,

which in turn terminates in a ponding basin approximately 4.5 miles to the west. Neither ditch meets the criteria of a Water of the United States. The project site does not contain or adjoin Waters of the United States. A such, no impacts to Waters of the United States are anticipated.

Mitigation. Mitigation is not warranted.

4.2.5 Potential Project Impacts to Wildlife Movement Corridors

Potential Impacts. The project site does not contain or adjoin any geographic features that could function as a wildlife movement corridor. Therefore, the project will have no impact on wildlife movement corridors.

Mitigation. Mitigation is not warranted.

4.2.6 Project Impacts to Sensitive Natural Communities and Designated Critical Habitat

No Impact. Sensitive Natural Communities and Designated Critical Habitat are absent from the project site and surrounding lands. Project development would have no impact on Sensitive Natural Communities or Designated Critical Habitat.

Mitigation. No mitigation is warranted.

LITERATURE REFERENCED OR CITED

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, and T. J. Rosatti, Eds. 2012. The Jepson Manual: Vascular Plants of California, 2nd edition. University of California Press, Berkeley, CA.

Calflora. 2024. Calflora: An online database of plant identification and distribution [web application]. Calflora, Berkeley, California. Available: http://www.calflora.org.

California Department of Fish and Wildlife (CDFW). 2024. California Natural Diversity Database. The Resources Agency, Sacramento, CA.

California Department of Fish and Wildlife (CDFW). 2002. California Fish and Game Code. Gould Publications. Binghamton, NY.

California Native Plant Society. 2024. Inventory of Rare and Endangered Vascular Plants of California. Available: https://rareplants.cnps.org/.

California Soil Resource Lab. 2008. Streaming, seamless interface to USDA-NCSS SSURGO and STATSGO Soil Survey Products.

City of Visalia. 2007. City of Visalia Oak Tree Mitigation Policy. Available: https://www.visalia.city/civicax/filebank/blobdload.aspx?BlobID=3800

General Plan Update Review Committee. 2014. Visalia General Plan Update. Available: https://www.visalia.city/depts/community_development/planning/gp.asp

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.

iNaturalist. 2024. Available: https://www.inaturalist.org/

Jepson Flora Project (eds.) 2024. Jepson eFlora, Available: https://ucjeps.berkeley.edu/eflora/

Nafis, G. 2024. California Herps - A Guide to the Amphibians and Reptiles of California. Available: http://www.californiaherps.com/

U.S. Corps of Engineers. 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. Available: https://wildlife.ca.gov/Data/CWHR/Life-History-and-Range.

APPENDIX A: VASCULAR PLANTS OF THE PROJECT SITE

APPENDIX A
VASCULAR PLANTS OF THE PROJECT SITE

The plant species listed below were observed on the project site during LOA's May 23, 2024 surveys. The U.S. Fish and Wildlife Service wetland indicator status of each plant, if available, has been shown following its common name.

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland

ARECACEAE – Palm Family		
Washingtonia spp.	Fan Palm	FACW
AMARANTHACEAE – Amaranth Family		
Amaranthus palmeri	Palmer's Amaranth	FACU
Amaranthus retroflexus	Redroot Amaranth	FACU
APOCYNOIDEAE – Dogbane Family		
Nerium oleander	Oleander	UPL
ASTERACEAE – Sunflower Family		
Erigeron bonariensis	Flaxleaf Fleabane	FACU
Lactuca serriola	Prickly Lettuce	FACU
CACTACEAE – Cactus Family		
Opuntia spp.	Prickly Pear	UPL
CARYOPHYLLACEAE – Carnation Family		
Stellaria media	Common Chickweed	FACU
EUPHORBIACEAE – Spurge Family		
Euphorbia maculata	Spotted Spurge	UPL
FABACEAE – Legume Family		
Medicago polymorpha	Burclover	FACU
FAGACEAE – OakFamily		
Quercus lobata	Valley Oak	FACU
GERANIACEAE – Geranium Family		
Erodium cicutarium	Redstem Filaree	UPL
JUGLANDACEAE – Walnut Family		
Carya illinoinensis	Pecan	FAC
LAMIACEAE – Mint Family		
Salvia rosmarinus	Rosemary	UPL
MALVACEAE – Mallow Family		
Malva parviflora	Cheeseweed	UPL
MORACEAE – Mulberry and Fig Family		
Morus alba	White Mulberry	FACU
POACEAE – Grass Family		
Cynodon dactylon	Bermuda Grass	FAC

Echinochloa colona	Jungle Rice	FAC
Echinochloa crus-gallo	Barnyard Grass	FACW
Leptochloa fusca	Bearded Sprangletop	FACU
Hordeum murinum	Foxtail Barley	FACU
Polypogon monspeliensis	Rabbitfoot Polypogon	FACW
Triticum aestivem	Cultivated Wheat	UPL
POLYGONACEAE – Smartweed Family		
Polygonum aviculare	Prostrate Knotweed	FAC
ROSACEAE – Rose Family		
Prunus amygdalus	Almond	UPL
SALICACEAE – Willow Family		
Salix spp.	Willow	FACW
SAPINDACEAE – Soapberry Family		
Acer spp.	Maple	UPL

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES POTENTIALLY OCCURRING 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 surveys conducted by LOA on May 23, 2024.

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*)
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: CATHARTIDAE (New World Vultures)
Turkey Vulture (*Cathartes aura*)
ORDER: FALCONIFORMES (Vultures, Hawks, and Falcons)
FAMILY: ACCIPITRIDAE (Hawks, Old World Vultures, and Harriers)
Cooper's Hawk (*Accipiter cooperi*)
*Red-tailed Hawk (*Buteo jamaicensis*)
Red-shouldered Hawk (*Buteo lineatus*)
FAMILY: FALCONIDAE (Caracaras and Falcons)
American Kestrel (*Falco sparverius*)
ORDER: CHARADRIIFORMES (Shorebirds, Gulls, and relatives)
FAMILY: CHARADRIIDAE (Plovers and relatives)
Killdeer (*Charadrius vociferus*)
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*)

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: 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 bullock*)

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*)

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 catus*)

APPENDIX C:

SELECT PHOTOGRAPHS OF THE PROJECT SITE



Photo 1: Looking south. Representative photo of the residential section of the project site. Pecan trees on the left, white mulberry tree on the right, ornamental maple immediately right of red house. North Demaree Street bordering the project site on left.



Photo 2: Looking south at residential portion of project site. Valley oaks and fallen willow tree (live shoots growing from center) shown. Disked field and orchard seen in left side of photo.



Photo 3: View of three mature valley oaks on the project site.



Photo 4: Looking northeast across agricultural habitat (disked field and orchards) and the residential portion of the project site seen in the right corner of this image. Mature trees within vicinity of project site can be seen in background.



Photo 5: Representative photo of agricultural habitat type showing boundary between disked field and orchard.



Photo 6: Representative photo of agricultural habitat type depicting the orchard.



Photo 8: Irrigation ditch bordering the north end of the project site.



Photo 7: Modoc Ditch on left and stormwater basin in background at southern end of project site.

APPENDIX D: STANDARD SPECIFICATIONS FOR BUILDING AROUND VALLEY OAKS

STANDARD SPECIFICATIONS FOR BUILDING AROUND VALLEY OAKS



CITY OF VISALIA
Parks & Recreation Department
Urban Forestry Division

August 3, 2007

The citizens of Visalia are fortunate to live among the largest remaining stand of native Valley Oaks in the Central Valley. These magnificent trees need to be protected during development, so that they will survive for the next generation. By following these standard specifications we can ensure that all will enjoy the beauty of the Valley Oaks for generations to come.

1. The developer shall submit a Valley Oak management plan to the City of Visalia at the entitlement phase of a project. The management plan shall contain a protective fencing detail including the date to be installed, a watering schedule including frequency and volume of water applied at each application, and the name of the contractor who will be watering the Valley Oak tree(s) through the construction process.

2. The protection zone of all Valley Oaks shall be drawn to scale on plans; this includes accurately locating the trunk and depicting the crown drip-line. There shall be no earthwork around the crown drip-line without the consent of the City Arborist.

3. All utility locations shall be included in all development plans involving Valley Oak(s).

4. Protective tree fencing shall be added prior to any earthwork, at least 3 ft. minimum in height, installed at outer most end of the drip-line surrounding the trunk of a Valley Oak. The temporary fencing shall be: safety orange color, plastic webbing, temporary construction type fencing. (Snow fencing) Fencing shall be supported by steel T-bar stakes. This fence is to remain until construction is complete and the City Arborist approves its removal. Nothing may be stored inside the protective fence. See detail 1.

5. There shall be no back filling within 10 ft. of the trunk of a Valley Oak and a maximum of 6 inches of backfill within the crown drip-line. Any deviation from this requires City Arborist approval. Backfill will be of a high quality soil and clean of any debris.

6. There shall be no trenching within the crown drip-line of the Valley Oak, or at a distance to be determined by the City Arborist. Utilities to be installed within the crown drip-line shall be bored at a minimum depth of 36". See detail 4

7. There shall be no soil compaction, paving or structures placed within the crown of a Valley Oaks without the written consent of the City Arborist.

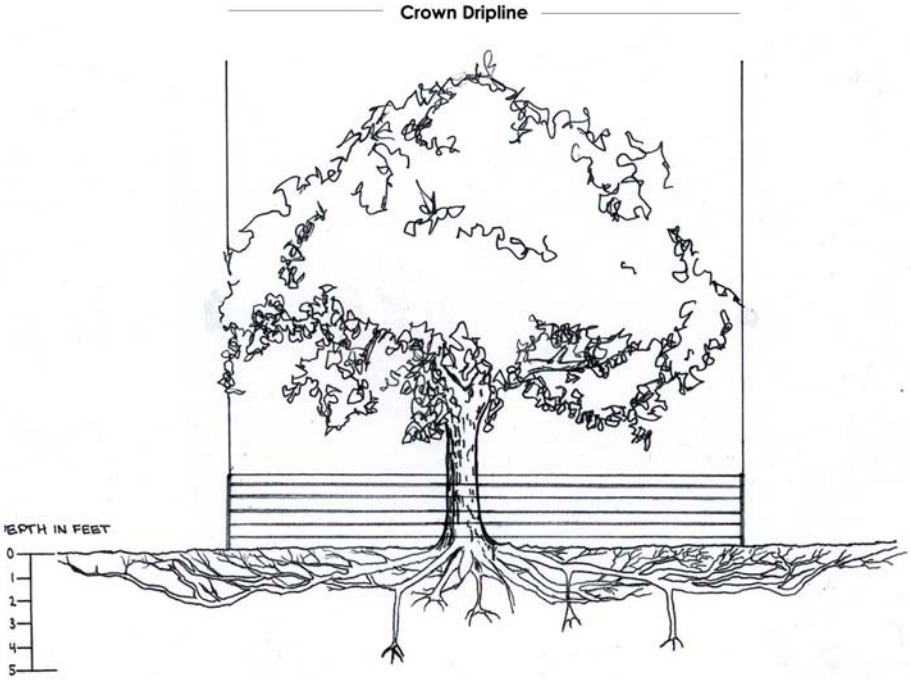
8. Valley Oak trees shall be irrigated prior to construction starting and through construction starting in May and stopping at the end of September. Irrigation shall consist of 35 gallons of water applied per one inch measured at breast height. Trees shall be watered once every three weeks. Example 36” DBH Valley Oak shall receive 2205 gallons of water at each application. The City of Visalia can require more water if needed. This will help ensure that the tree can better withstand the stress of construction. Irrigation is extremely important during spring and summer when the environment around a mature Valley Oak is changed by construction. Irrigation shall water all of the area under the crown drip-line. See detail 3.

9. Permanent irrigation systems shall be overhead spray, bubbler, drip, flood or sub-terrain only. No sprinkler systems allowed within 6 ft. of tree. If an irrigation system is to be added it must be approved by the City Arborist.

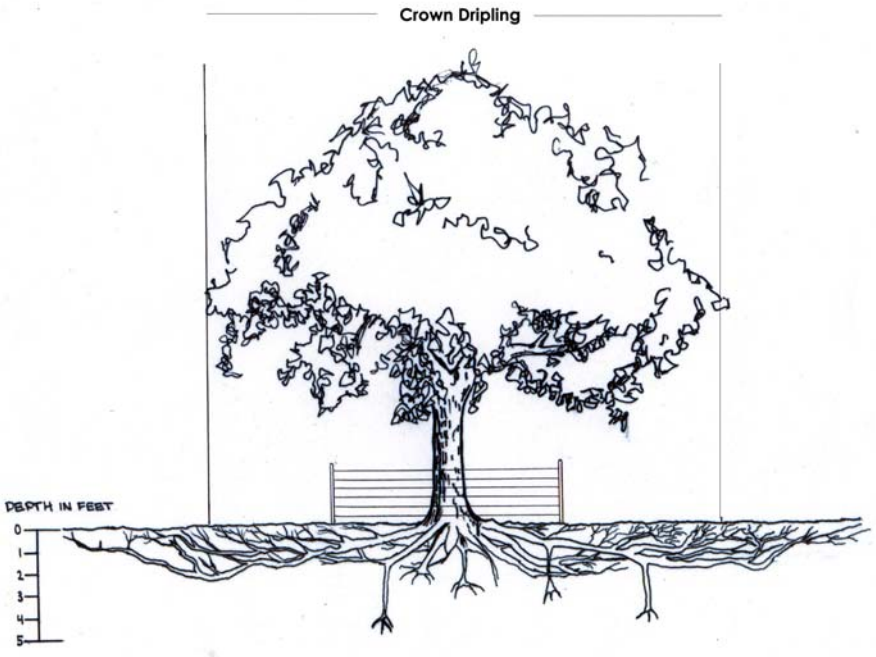
10. Landscaping under Valley Oaks shall consist of drought tolerant plants or California native plants that are drought tolerant in nature. There is to be no landscaping within 6 ft. of the trunk. Chipped bark and mulch are suitable for this area. No lawns shall be planted within 10 ft. of the trunk. We recommend that there be no lawn placed within the crown drip-line.

Please contact the City Arborist at 559-713-4295 to answer questions or provide assistance.

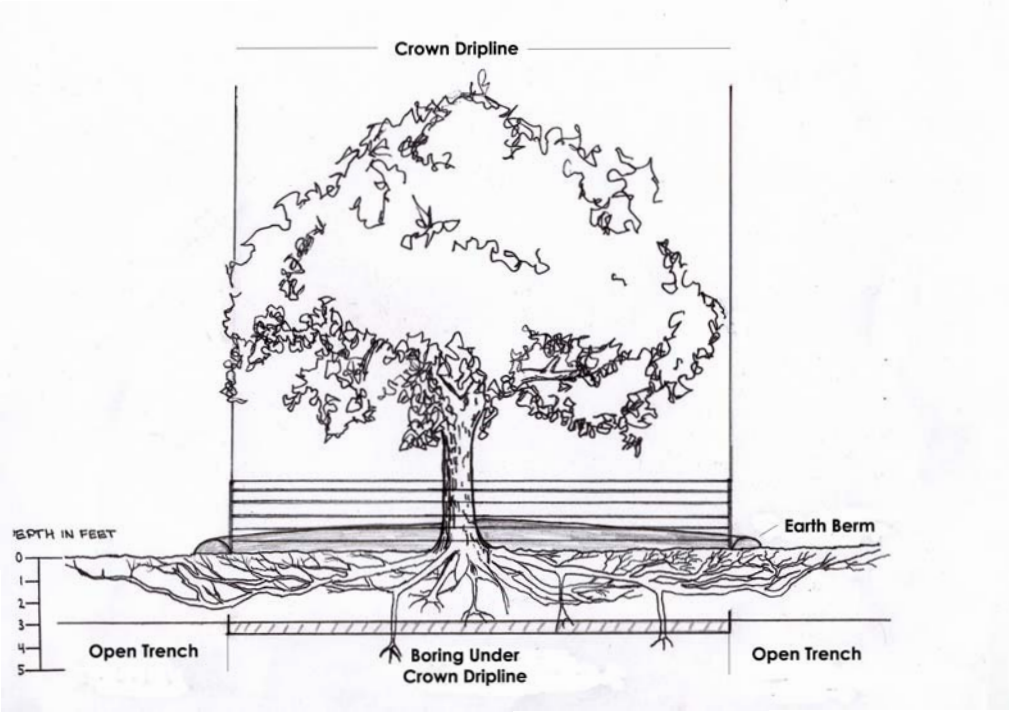
Detail 1. Proper Protective Tree Fencing: Protecting the root system under the crown drip-line is critical for the health, longevity and stability of a tree. Mature trees including Valley Oaks typically lack taproots as commonly thought. 80% of a mature trees root system is often within the top 18" of the soil surface. Protective fencing shall in place before any earth work begins on the site.



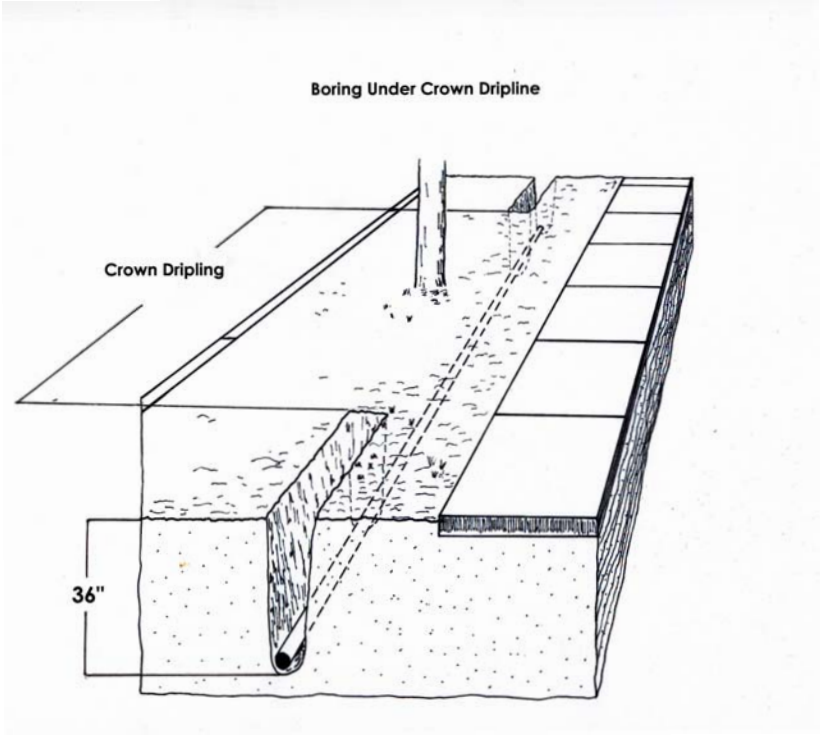
Detail 2. Improper Protective Tree Fencing: Protecting the health and stability of mature valley is impossible within out protecting the root system under the crown dripline. The detail below is not acceptable because it does not adequately protect the tree.



Detail 3. Irrigation: An eight inch tall by eight inch wide earth berm can be added direct outside the protective fence surrounding the crown dripline to direct water into the root zone. The area inside the earth berm under the crown dripline shall be flood irrigated.



Detail 4. Boring under the crown: Mechanical boring using a horizontal directional bore shall be required when tunneling under the crown dripline. The boring shall be at a minimum depth of 36".



APPENDIX E: PERSONNEL QUALIFICATIONS

AUSTIN PEARSON, B.S. Vice President / Senior Staff Ecologist

EDUCATION

- B.S. Biology with an emphasis in ecology, California State University, Fresno, CA 2002

AREAS OF EXPERTISE

Wildlife/habitat relationships, fairy shrimp and tadpole shrimp surveys, survey techniques, threatened and endangered species, and environmental regulations/permitting (CEQA, NEPA, FESA, CESA, CWA)

PROFESSIONAL EXPERIENCE

- Live Oak Associates, Inc., Oakhurst, CA. Staff Ecologist, 2003 to Present
- California Department of Fish and Game, Scientific Aide, 2001 to 2003
- Sierra Research Laboratories, Laboratory Technician III, 1997 to 1999

PROFESSIONAL TRAINING and Certifications

- Federal 10(a)(1)(A) Vernal Pool Branchiopod Recovery Permit TE108683-2
- NEPA Overview and Refresher, UC. Davis Extension, May 2013
- Blunt-Nosed Leopard Lizard Workshop and Training, May 2009
- Arid West Supplement Workshop, Wetland Training Institute, April 2007
- Advanced CEQA Course, UC. Davis Extension, November 2006
- 38-Hour Army Corps of Engineers Wetland Delineation & Management Training, October. 2005
- Bat Ecology and Field Techniques, September 2005
- Introduction to the Fairy Shrimp, Tadpole Shrimp and Clam Shrimp, Christopher Rogers, May 2005
- Morphology and Identification of Flowering Plants, Jepson Herbarium, March 2005
- Trimble GPS Training, John Daphan, California Drafting and Supply, January 2005
- California Anostraca and Notostraca Identification Class, Mary Schug Belk, August 2004
- Endangered Species Regulation and Policy, UC Davis Extension, February 2004
- CEQA: A Step-by-Step Approach, UC Davis Extension, October 2003
- Identification of Fresh Water Fish, California Department of Fish and Game Training, August 2001
- Identification and Ecology of Sensitive Amphibians and Reptiles of the Central and Southern Sierra Nevada, The Wildlife Society, June 2001

QUALIFICATIONS

Mr. Pearson is a graduate of CSUF's Biology Program who focused his studies on ecology. Prior to finishing his B.S. in biology, Mr. Pearson worked for the California Department of Fish and Game as a Scientific Aide where he performed surveys for sensitive fish, amphibian, and avian species such as California roach, hardhead, foothill and mountain yellow-legged frogs, Yosemite toad, California tiger salamander, spotted owl, great gray owl, goshawk, and willow flycatcher. He also established and maintained camera stations for fisher and wolverine.

During his time with Sierra Research Laboratories, he performed several studies testing and observing the effects of various compounds on urban invertebrate species. He gained a breadth of experience in experimental design and implementation, as well as data analysis.

Mr. Pearson has more than 17 years of experience working as a biological consultant, and more than 22 years' experience working in the biological sciences. He provides consulting services to a variety of clients including local agencies, planning firms, attorneys, private landowners, and developers. His areas of expertise include the following:

- Preparation of CEQA/NEPA Documents. Mr. Pearson has supervised teams of biologists in characterizing the biological setting of project sites and planning areas, determining project impacts, and developing mitigation plans/strategies in support of CEQA and NEPA for over 200 projects.
- Special status Species Surveys. Mr. Pearson has designed, conducted, and managed a considerable number of surveys for special status species and/or their habitats including (but not limited too) listed crustaceans (e.g., vernal pool fairy shrimp), Valley elderberry longhorn beetle, California tiger salamander, western pond turtle, blunt-nosed leopard lizard, western burrowing owl, Swainson's hawk, and San Joaquin kit fox. He also assists his clients in developing feasible mitigation strategies that reduced impacts to such species.
- Endangered Species Consultations. Mr. Pearson has prepared supporting material for section 7(a) consultations with the U.S. Fish and Wildlife Service and obtained requisite take authorizations. He has conducted and supervised data collection for listed species within project areas, analysis of project impacts, the development of mitigation plans, and has been the primary contact with the resource agencies during the process.
- Wetland Permit Assistance. Mr. Pearson has assisted clients in securing a number of U.S. Army Corps of Engineers, California Regional Water Quality Control Board, and California Department of Fish and Game permits for filling wetlands and other jurisdictional waters. He has also prepared mitigation plans for enhancing existing wetland values and/or providing replacement habitat, which are frequently required by these permits.

NATALIE E. NEFF — Wildlife Biologist

EDUCATION

- M.Ed. Secondary Education, Grand Canyon University. Arizona, Rem
- B.S. Ecology and Evolutionary Biology, University of California, Santa Cruz. Santa Cruz, CA
- B.A. Art, University of California, Santa Cruz. Santa Cruz, CA

AREA OF EXPERTISE

General California ecology knowledge, plant and wildlife surveys, habitat assessments, pre-construction surveys and construction monitoring. Bat ecology including mist netting and handling techniques (rabies vaccinated). Small mammal ecology includes live Sherman trapping and ear tagging. General bird, beetle, and tick knowledge. Natural and scientific illustration.

QUALIFICATIONS

Ms. Neff has worked in the ecology and education sphere since 2012. She is well versed in habitat surveys, camera trapping, live rodent trappings, bat mist netting, and tick identification. She has some experience mist netting northern saw-whet owls and illustrating plants and animals.

- **HABITAT SURVEYS:** Ms. Neff has conducted several habitat assessment surveys for solar farms, future construction sites, and dairy farms. These surveys determine the presence or potential presence of protected and special status species including, but not limited to, California tiger salamander, western toad, western pond turtle, Tipton's kangaroo rat, burrowing owl, tricolored blackbird, Swainson's hawk, and other native nesting birds.
- **SPECIAL STATUS SPECIES SURVEYS:** Ms. Neff has participated in several special status species surveys for Live Oak including seining for California Tiger Salamander and fairy shrimp in vernal pools and live trapping for Tipton kangaroo rats. She has handled (with supervision from qualified biologists) California tiger salamander eggs, larvae, and adults, conservancy and vernal pool fairy shrimp, and Tipton kangaroo rats.
- **AVIAN EXPERIENCE:** Ms. Neff is well versed in the birds of California and enjoys birding in her free time. She has assisted with northern saw-whet owl mist netting and has participated in nesting bird monitoring and several birding surveys and for Live Oak.
- **BAT EXPERIENCE:** Ms. Neff assisted in the mist netting, species identification, camera trapping, wing biopsy punches, guano collection, and breath collection of bats in Baja California Sur, Mexico. In Monteverde, Costa Rica, she mists netted bats, took measurements by hand, identified species, and collected guano to be assessed for dietary analysis for an undergraduate research project on niche portioning among species. She has a deep understanding of the ecology of many bat species across central and north America.
- **SMALL MAMMAL EXPERIENCE:** Ms. Neff has handled hundreds of individuals from deer mice to woodrats to kangaroo rats during live rodent trapping surveys. She completed an undergraduate research project on rodent and tick density in the redwood forest of Santa Cruz, CA and led many rodent trapping excursions in Santa Cruz and Fort Ord, California. For Live Oak, she spent several nights trapping Tipton's kangaroo rat in Maricopa, California. She is competent in setting and checking Sherman traps, ear tagging, taking measurements by hand, and identifying many rodent species across California.

- **SCIENTIFIC ILLUSTRATION:** Ms. Neff used ink and wash to illustrate over twenty plant species for an internship during her time at UCSC. From 2019- 2021, she taught several lessons on scientific illustration for 4th, 5th, 7th, and 8th grade students. She enjoys using watercolor, pencil, conte crayon, pen, ink, and wash to illustrate plants, feathers, beetles, bats, rodents, mammal skulls and more in her free time.
- **EDUCATION EXPERIENCE:** Ms. Neff was a student supervisor for undergraduate interns partaking in the Forest Ecology Research Project internship at UC Santa Cruz. She monitored plant data collection and transect setting. She later led a one quarter undergraduate internship on the natural history of mammals at UC Santa Cruz shortly after graduating. In addition, she has worked as a math tutor, substitute teacher and art teacher for grades K-12.

PROFESSIONAL EXPERIENCE

- Live Oak Associates, Inc., Oakhurst, CA. Staff Ecologist. August 2023- Present.
- Tutoring by Natalie, Fort Collins, CO. 4th-12th Grade Math Tutor. June 2021- August 2023.
- Ridgeview Classical Schools, Fort Collins, CO. Elementary and Middle School Art Teacher. August 2019- June 2021.
- Live Oak Associates, Inc., Oakhurst, CA. Staff Ecologist. August 2018- August 2019.
- Yosemite School District, Oakhurst, CA. Substitute Teacher. September 2017- June 2018.
- Liferaft Tutoring Company, Scotts Valley, CA. Math Tutor. June 2016- June 2017.
- University of California, Santa Cruz (UCSC), CA. Internship Leader of Natural History of Mammals. June 2016- January 201
- UCSC, Forest Ecology Research Project Student Supervisor. March- June 2013.

BIOLOGICAL INTERNSHIPS AND VOLUNTEER WORK

- Northern Saw-Whet Owl Mist Netting Volunteer, Fort Collins, CO. November 2021 and 2022.
- Print Studio Monitor, UCSC, Santa Cruz, CA. January 2016- August 2017.
- Small Mammal Undergraduate Research in the Forest (SMURF) Volunteer Trapping Leader, UCSC, Santa Cruz and Fort Ord, CA. September 2016- September 2017.
- Teacher's Assistant for Introduction to Printmaking, UCSC, Santa Cruz, CA. March- June 2016.
- SMURF Internship, UCSC, Santa Cruz and Fort Ord, CA. September 2015 – September 2016.
- Field Assistant for Bat Ecology PhD Candidate, Baja California Sur, Mexico. June- August 2014.
- Forest Ecology Research Project Independent Internship (FERP): Plant Illustrations, UCSC, Santa Cruz, CA. March - June 2013
- FERP: Plant Surveys. UCSC, Santa Cruz, CA. January 2013- March 2013.

BIOLOGICAL RESEARCH

- Ixodes *angustus* density in relation to habitat and abundance of Peromyscus *boylii* and Peromyscus *californicus*. SMURF, UCSC, Santa Cruz, CA. September 2015 - September 2017
- Study Abroad and Independent Study on Niche Partitioning in Fruit Bats in Monteverde, Costa Rica, Monteverde; UCSC, Costa Rica. October- December 2014.

ACOUSTICAL ANALYSIS

RITCHIE RANCH RESIDENTIAL DEVELOPMENT
VISALIA, CALIFORNIA

WJVA Project No. 24-23

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

MAY 20, 2024
(REVISED APRIL 1, 2025)

INTRODUCTION

Tentative Tract Map Ritchie Ranch is located at the Southwest corner of West Riverway Avenue and North Demaree Street up to Modoc Ditch in the City of Visalia. Ritchie Ranch is also bound to existing single family residential subdivisions, north, south: once passing of Modoc Ditch and east of the project.

Lennar Homes of California is proposing a single-family residential community with 320 lots for Ritchie Ranch, that will consist of 4 phases. Phase 1 will consist of 96 lots with minimum lot sizes at 2,800 sq. ft. to 3,500 sq. ft. maximum. Phase 2 will consist of 94 lots with minimum lot sizes at 2,800 sq. ft. to 6,419 sq. ft. maximum, being a cul-de-sac lot. Phase 3 will consist of 48 lots with minimum lots sizes at 3,700 sq. ft. to 7,418 sq. ft. maximum, being a cul-de-sac lot. Phase 4 will consist of 83 lots with minimum lot sizes at 3,031 sq. ft. to 7,862 sq. ft. maximum, being a cul-de-sac lot.

This analysis, prepared by WJV Acoustics, Inc. (WJVA), is based upon a project site plan provided by the applicant, traffic data provided by the Tulare County Association of Governments (TCAG) 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

The City of Visalia Noise Element of the General Plan (noise element) establishes noise level criteria in terms of the Day-Night Average Level (L_{dn}) metric, for transportation noise sources. The L_{dn} is the time-weighted energy average noise level for a 24-hour day, with a 10 dB penalty added to noise levels occurring during the nighttime hours (10:00 p.m.-7:00 a.m.). The L_{dn} represents cumulative exposure to noise over an extended period of time and is therefore calculated based upon *annual average* conditions.

The exterior noise level standard of the noise element is 65 dB L_{dn} for outdoor activity areas of residential uses. Outdoor activity areas generally include backyards of single-family residences and individual patios or decks and common outdoor activity 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.

The noise element also requires that interior noise levels attributable to exterior noise sources not exceed 45 dB L_{dn}. The intent of the interior noise level standard is to provide an acceptable noise environment for indoor communication and sleep.

Additionally, the noise element establishes hourly acoustical performance standards for non-transportation (stationary) noise sources. The standards are set in terms of the L_{eq} (hourly equivalent) and L_{max} (maximum) noise levels. The standards, provided in Table I, are made more restrictive during the nighttime hours of 10:00 p.m. to 7:00 a.m.

TABLE I

NON-TRANSPORTATION NOISE LEVEL STANDARDS, dBA
CITY OF VISALIA

Daytime (7 a.m.-10 p.m.)		Nighttime (10 p.m.-7 a.m.)	
L_{eq}	L_{max}	L_{eq}	L_{max}
50	70	45	65

Source: City of Visalia Noise Element of General Plan

Section 8.36 of the City's Municipal Code (noise ordinance) applies to noise sources that are not pre-empted from local control by existing state or federal regulations. Commercial activities are not pre-empted noise sources and are therefore subject to the provisions of the noise ordinance.

The noise ordinance addresses the statistical distribution of noise over time and allows for progressively shorter periods of exposure to levels of increasing loudness. Table II summarizes the exterior noise level standards of the ordinance. Note that the ordinance is to be applied during any one-hour time period of the day, and that the standards are 5 dB more restrictive between the hours of 7:00 p.m. and 6:00 a.m.

TABLE II

EXTERIOR NOISE LEVEL STANDARDS, dBA
CITY OF VISALIA NOISE ORDINANCE

Category	Cumulative # Min/Hr. (L_n)	Daytime (6am-7pm)	Nighttime (7pm-6am)
1	30 (L_{50})	50	45
2	15 (L_{25})	55	50
3	5 ($L_{8.3}$)	60	55
4	1 ($L_{1.7}$)	65	60
5	0 (L_{max})	70	65

Note: L_n is an abbreviation for the percentage of time that a certain noise level is exceeded during a specified time period (in this case, one hour). For example, an L_{50} value of 50 dBA may not be exceeded during the hours of 6 am-7pm.

Source: City of Visalia Municipal Code

The City's noise ordinance also establishes interior residential noise level standards that would apply to the project. The interior noise level standards are established in allowable exceedance limits over differing amounts of time, within residential land uses. Similar to the applicable exterior standards, the interior standards become 5 dB more restrictive during nighttime hours. The applicable interior noise level standards are provided in Table III.

TABLE III

INTERIOR NOISE LEVEL STANDARDS, dBA
CITY OF VISALIA NOISE ORDINANCE

Category	Cumulative # Min/Hr.	Daytime (6am-7pm)	Nighttime (7pm-6am)
1	5	45	35
2	1	50	40
3	0	55	45

Source: City of Visalia Municipal Code

The City's noise ordinance also states *"In the event the measured ambient noise level without the alleged offensive source in operation exceeds an applicable noise level standard in any category above, the applicable standard or standards shall be adjusted so as to equal the ambient noise level".*

PROJECT SITE NOISE EXPOSURE

The project is a 320-lot single-family residential development in. The proposed project is located on 44.93 acres, at southwest corner of the intersection of River Way Drive and Demaree Street. The project site is exposed to noise levels associated with vehicle traffic on Demaree Street. The distance from the closest proposed residential buildings to the centerline of Demaree Street is approximately 80 feet.

FHWA Traffic Noise Model-

Noise exposure from traffic on Demaree Street was calculated for existing and future (2046) conditions using the FHWA Traffic Noise Model and traffic data obtained from Tulare County Association of Governments (TCAG). A description of the FHWA traffic noise model and methodology used for the analysis 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 L_{dn} 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 May 13, 2024. 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 40 feet from the centerline of Demaree Street. The speed limit posted in the project vicinity was 50 mph (miles per hour). The project vicinity and noise monitoring site location are provided as Figure 2. A photograph showing the Demaree Street 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 calibration noise measurement was conducted for a period of fifteen (15) minutes at the noise measurement site. The results of the comparison are shown in Table IV.

TABLE IV

COMPARISON OF MEASURED AND PREDICTED (FHWA MODEL) NOISE LEVELS RITCHIE RANCH RESIDENTIAL DEVELOPMENT, VISALIA

	Demaree Street
Measurement Start Time	10:30 a.m.
Observed # Autos/Hr.	396
Observed # Medium Trucks/Hr.	12
Observed # Heavy Trucks/Hr.	12
Observed Speed (MPH)	50
Distance, ft. (from center of roadway)	40
L_{eq}, dBA (Measured)	68.9
L_{eq}, dBA (Predicted)	67.1
Difference between Predicted and Measured L_{eq}, dBA	**1.8**

Note: FHWA "soft" site assumed for calculations.
Source: WJV Acoustics, Inc.

From Table IV it may be determined that the traffic noise levels predicted by the FHWA Model were 1.8 dB lower than those measured for the conditions observed at the time of the noise measurements for Demaree Street. This is considered to be reasonable agreement between the noise model and the noise measurements, and therefore no adjustments to the model are necessary.

Annual Average Daily Traffic (AADT) data for Demaree Street in the project vicinity was obtained from TCAG. 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 50 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
RITCHIE RANCH RESIDENTIAL DEVELOPMENT, VISALIA

	Demaree Street	
	Existing Conditions	2046 Traffic Conditions
Annual Avenue Daily Traffic (AADT)	7,019	8,463
Day/Night Split (%)	90/10	
Assumed Vehicle Speed (mph)	50	
% Medium Trucks (% AADT)	2	
% Heavy Trucks (% AADT)	1	

Sources: TCAG
WJV Acoustics, Inc.

Exterior Noise Level Compliance-

Using data from Table V, the FHWA Model, annual average traffic noise exposure was calculated for the closest proposed residential units from Demaree Street. Table VI provides the noise exposure levels for Demaree Street for future 2046 traffic conditions, at the closest proposed residential setbacks from the roadway.

TABLE VI

MODELED TRAFFIC NOISE LEVELS, DEMAREE STREET, dB, L_{dn}
RITCHIE RANCH RESIDENTIAL DEVELOPMENT, VISALIA

Roadway	Existing Conditions	2046 Conditions
Demaree Street	63	64

Source: WJV Acoustics
TCAG

Reference to Table VI indicates that the traffic noise exposure at the closest residential setbacks to Demaree Street would be approximately 63 dB L_{dn} for existing conditions and approximately 64 dB L_{dn} for future (2046) traffic conditions on Demaree Street. Such noise exposure levels do not exceed the City of Visalia exterior noise level standard of 65 dB $L_{dn.}$ Mitigation measures are therefore not required for project noise compliance.

Interior Noise Level Compliance-

The interior noise level standard for the City of Visalia is 45 dB L_{dn}. Worst-case exterior project site noise exposure was determined to be approximately 64 dB L_{dn} for 2046 traffic conditions. This means that the proposed residential construction must be capable of providing a minimum outdoor-to-indoor noise level reduction (NLR) of approximately 19 dB (64-45=19).

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 City of Visalia and HUD 45 dB L_{dn} interior standard at all proposed units. 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 320-lot single-family residential development will comply with applicable City of Visalia exterior and interior noise level criteria. Mitigation measured are not required for project noise compliance and compatibility requirements.

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 site plan, 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

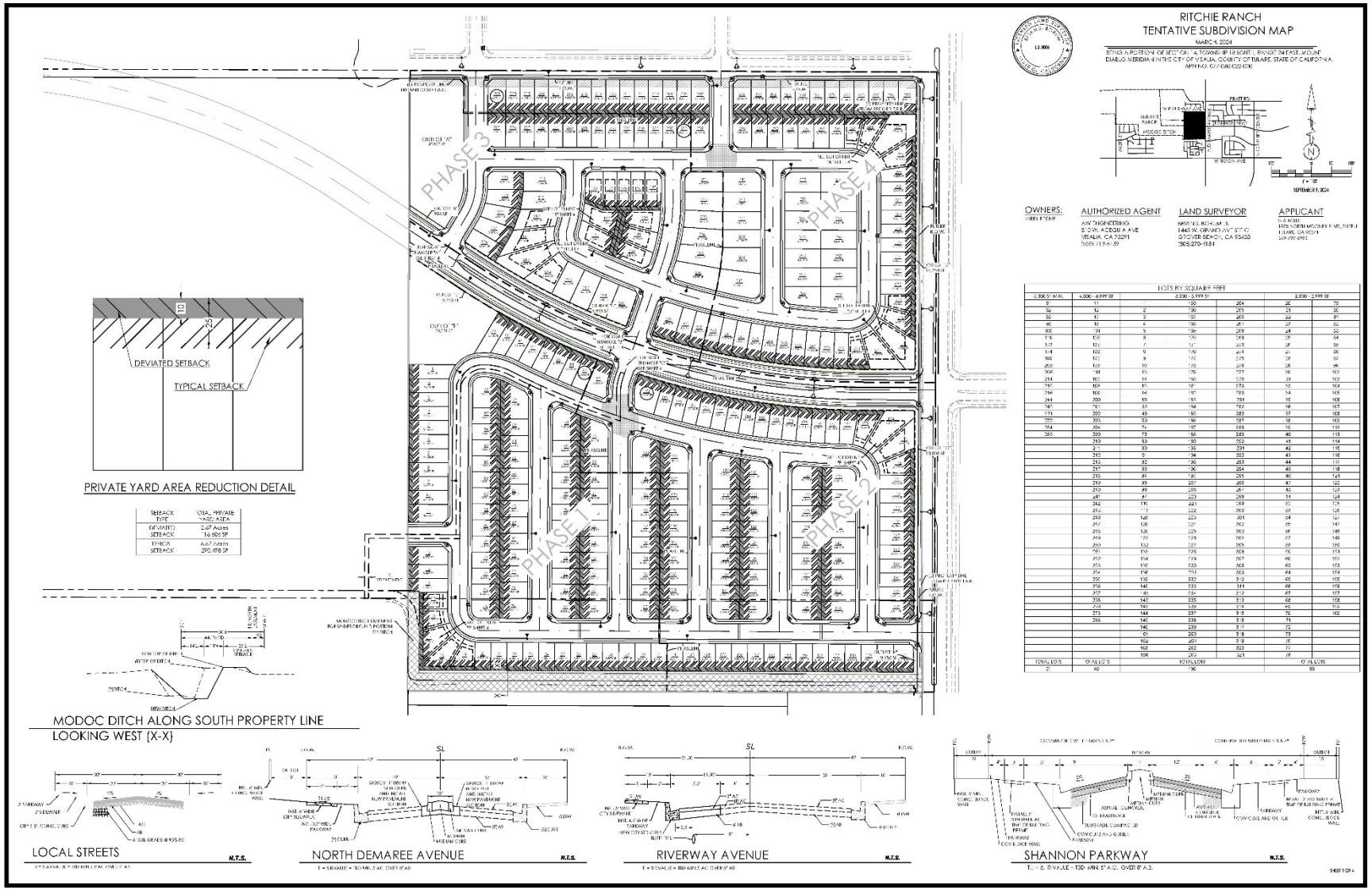


FIGURE 2: PROJECT SITE VICINITY AND NOISE MEASUREMENT LOCATION

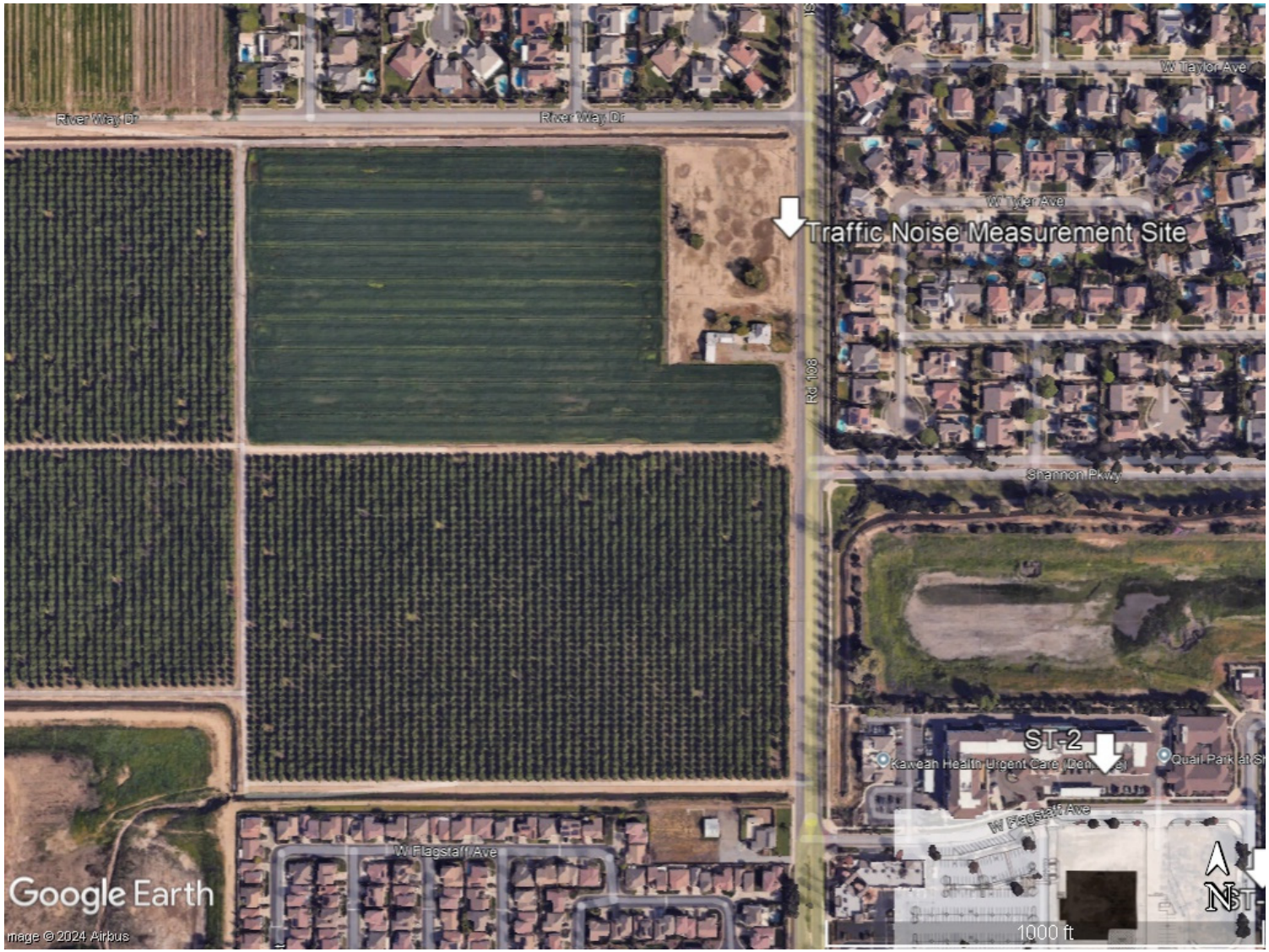


FIGURE 3: AMBIENT NOISE MEASUREMENT SITE



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.

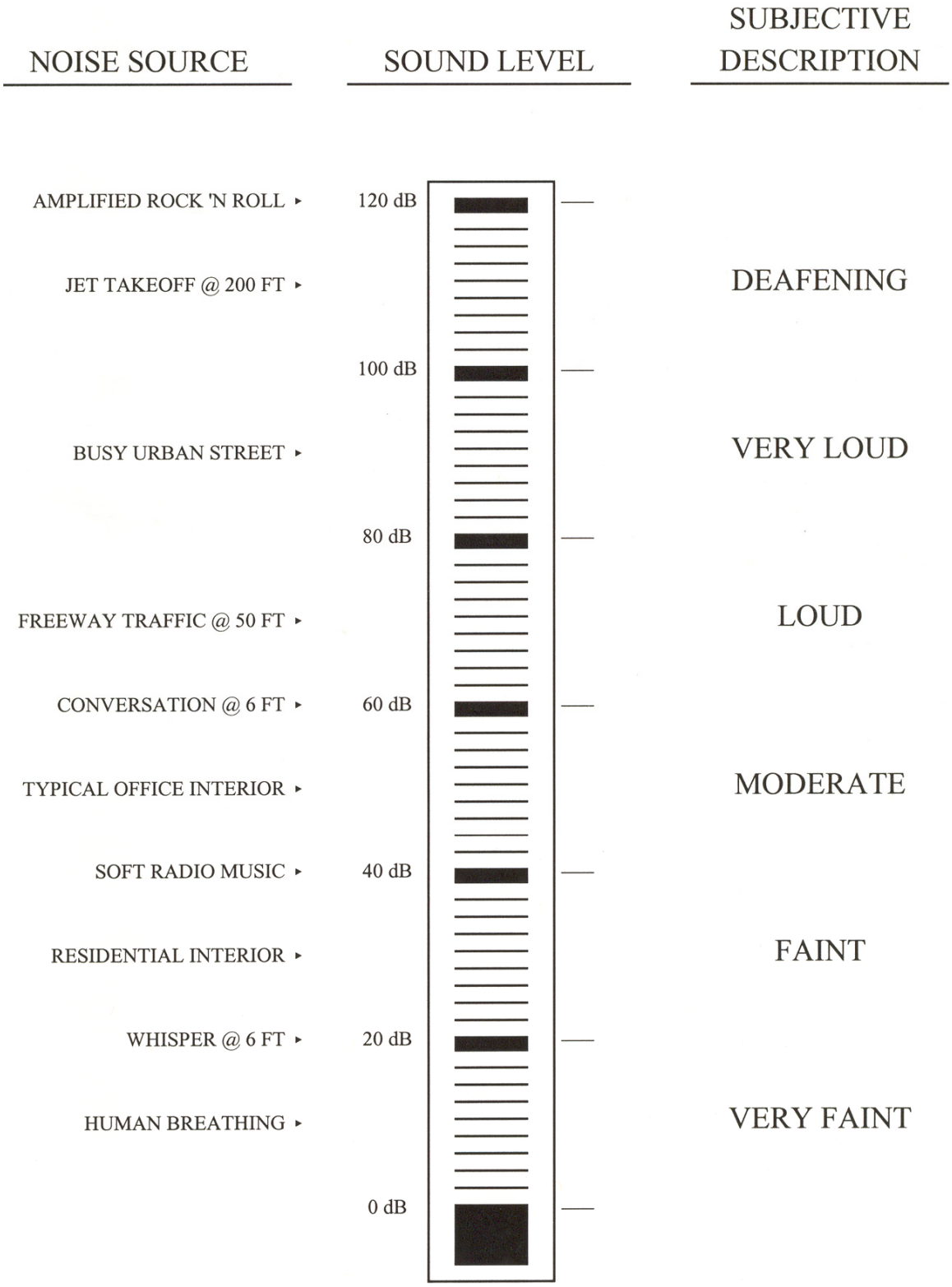
NOISE LEVEL REDUCTION (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of "noise level reduction" combines the effect of the transmission loss 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



Cultural Resource Study and Evaluation for Ritchie Ranch, City of Visalia, Tulare County, California

Nicole Saenz, Cheyenne Good-Peery, and Carlos van Onna

Prepared By

Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

Prepared For

Lennar Homes of California, LLC
8080 N. Palm Street, Suite 110
Fresno, CA 93711

March 2025

USGS Visalia, CA 7.5-quadrangle, T18S, R24E, Sec. 14
44.90-acre Project area; 43.6 acres surveyed
Resources: Modoc Ditch (P-54-003602); 3629 N. Demaree Street (P-54-005810); historic-era isolate (P-54-005811)

MANAGEMENT SUMMARY

At the request of Lennar Homes of California, LLC, Applied EarthWorks, Inc. (Æ) completed a cultural resource study for the proposed Ritchie Ranch Project (Project) in the city of Visalia in Tulare County, California. The proposed Project includes development of a 321-unit, single-family home community on a 44.9-acre lot at the southwest corner of North Demaree Street and West River Way Avenue.

As part of the California Environmental Quality Act (CEQA) review process, the Site Plan Review Committee of the City of Visalia (City) has requested a cultural resource study be conducted for the proposed Project to determine if historical resources are present within the Project area that could be impacted by the proposed development. To assist the City and Lennar Homes of California, LLC 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.

For this study Æ conducted a records search at the Southern San Joaquin Valley Information Center (SSJVIC) of the California Historical Resources Information System (CHRIS); desktop research to better understand the history of land use in the Project area; a search of the Native American Heritage Commission's (NAHC) Sacred Lands File and nongovernmental outreach to local tribes and individuals; an intensive pedestrian survey of the 44.9-acre Project area to identify archaeological and historical built environment cultural resources; and an evaluation of those resources for listing in the CRHR.

The SSJVIC records search revealed three cultural resource investigations have occurred within the Project area and one investigation has occurred in the 0.5-mile search radius. They further reported one previously recorded cultural resource within the Project area—the historical Modoc Ditch (P-54-003602)—and one previously recorded cultural resource within a 0.5-mile search radius—the historical Wutchumna Canal (P-54-004875). A search of the NAHC's Sacred Land 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 conducted an archaeological and historic built environment pedestrian survey of the Project area on August 30, 2024. Archaeologists surveyed 43.6 acres (97 percent) of the 44.9-acre Project area and identified four historic-era artifacts widely dispersed primarily in the northeast corner of the Project area. Æ recorded the items as an isolated find on California Department of Parks and Recreation (DPR) 523-series forms under the temporary number AE-4633-ISO-01, which has now been assigned a permanent CHRIS designation of P-54-005811. Historical research indicated that the scattered items are in the vicinity of a late 1800s farmhouse that was removed in the 1970s. Isolated artifacts, by definition, are not eligible for listing in the CRHR because they lack context and association with other archaeological materials.

Additionally, Æ identified two historic-era built environment resources within the Project area—a previously unrecorded residence at 3629 N. Demaree Street and two segments of the previously recorded Modoc Ditch. Æ evaluated the residence and segments of the Modoc Ditch

for CRHR-eligibility and found both resources ineligible for listing because they do not possess significance under any CRHR evaluation criteria. No further action is recommended for the management of these cultural resources.

Æ's cultural resource study found no historical resources within the Project area that could be impacted by the proposed development. However, because Æ observed isolated historic-era artifacts in the northern half of the Project area that once contained a late nineteenth-century farmhouse, it is possible that buried historic-era refuse deposits, objects, or structural remains may be uncovered during construction. Mitigation Measures CUL-1 through CUL-4, as outlined in Section 6.2, are proposed in the event of unanticipated archaeological discovery or exposure of human remains during construction.

Field notes, maps, and a complete set of photographs from the current study 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.

CONTENTS

1 INTRODUCTION....1
1.1 PROJECT DESCRIPTION....1
1.2 REGULATORY GUIDANCE....1
1.3 PROJECT PERSONNEL....5
1.4 REPORT ORGANIZATION....5

2 SETTING....6
2.1 NATURAL SETTING....6
2.2 PRECONTACT....7
2.3 ETHNOGRAPHY....8
2.4 HISTORIC CONTEXT....9
2.4.1 Early Exploration and Settlement....9
2.4.2 Railroad Expansion and the Beginnings of Visalia....10
2.4.3 Beginnings of Commercial Agriculture....12
2.4.4 Community Development and Post-War Residential Development....12

3 METHODS....14
3.1 RECORDS SEARCH....14
3.2 ARCHIVAL RESEARCH....14
3.3 NATIVE AMERICAN OUTREACH....15
3.4 ARCHAEOLOGICAL AND BUILT ENVIRONMENT FIELD SURVEYS....15

4 FINDINGS....16
4.1 RECORDS SEARCH....16
4.1.1 Previous Cultural Resource Studies....16
4.1.2 Previously Recorded Resources....16
4.2 BACKGROUND RESEARCH....16
4.2.1 Property-Specific History....17
4.3 NATIVE AMERICAN OUTREACH....18
4.4 ARCHAEOLOGICAL SURVEY....19
4.4.1 Historic-era Artifacts....22
4.5 BUILT ENVIRONMENT....23
4.5.1 3629 North Demaree Street....24
4.5.2 Modoc Ditch....30

5 HISTORIC RESOURCE EVALUATIONS....36
5.1 EVALUATION CRITERIA....36
5.2 ASPECTS OF INTEGRITY....37
5.3 CRHR EVALUATIONS....38
5.3.1 3629 North Demaree Street....38
5.3.2 Modoc Ditch....39

6 SUMMARY AND MANAGEMENT RECOMMENDATIONS 42
6.1 SUMMARY 42
6.2 RECOMMENDED MITIGATION 43

7 REFERENCES.....45

APPENDICES

A Personnel Qualifications
B Records Search Results
C Native American Outreach
D Cultural Resource Records

FIGURES AND TABLES

Figure 1-1 Project vicinity in Tulare County, California. 2
Figure 1-2 Project area on USGS Visalia (1969) 7.5-minute topographic quadrangle. 3
Figure 1-3 Aerial view of the Project area.....4
Figure 4-1 Project area overlaid on a 1958 aerial photograph. The non-extant barn associated with the nineteenth-century homestead is visible north of 3629 N. Demaree property.....18
Figure 4-2 Survey coverage and cultural resources map. 20
Figure 4-3 Survey area with excellent ground visibility, facing west from the northwest corner of the Project area. 21
Figure 4-4 Almond orchard in the southern portion of the Project area with poor visibility due to leaves and duff on the ground, facing north. 21
Figure 4-5 Recently plowed and graded portion of the Project area, facing west. 22
Figure 4-6 Almond orchard and agricultural infrastructure in the southern portion of the Project area, facing south. 22
Figure 4-7 Historic-era refuse, clockwise from top left: amethyst glass shard, milk glass shard, whiteware sherd, and ceramic sherd. 23
Figure 4-8 Overview of the single-family residence, facing southwest. 25
Figure 4-9 Primary (east) elevation of the single-family residence, facing slightly southwest.....25
Figure 4-10 South elevation of the single-family residence, facing north. 26
Figure 4-11 View of rear (west) elevation of the single-family residence, facing southeast.....26
Figure 4-12 North elevation of the single-family residence, facing south. 27
Figure 4-13 East elevation of the barn, facing northwest. 28
Figure 4-14 South elevation of the barn, facing north. 28
Figure 4-15 Rear (west) elevation of the barn, facing east. 29
Figure 4-16 North elevation of the barn, facing south. 29
Figure 4-17 Overview of the shed with carport, facing northwest. 30
Figure 4-18 South elevation of the shed, facing north. 30
Figure 4-19 Recorded Segment 1 with vegetation intrusion, facing southwest. 31

Figure 4-20 Evidence of animal burrowing and erosion on Recorded Segment 1, facing southwest.....32
Figure 4-21 East end of Recorded Segment 1 with concrete culvert, facing southeast.....32
Figure 4-22 Recorded Segment 2 with vegetation intrusion and concrete debris, facing west. 33
Figure 4-23 Culvert at east end of Recorded Segment 2, facing southeast. 34
Figure 4-24 Water gate structure where Recorded Segment 2 is turned northward, facing southwest.....34
Figure 4-25 Recorded Segment 2 north of the water gate structure, facing north.....35

Table 4-1 Previous Investigations in the Project Area and 0.5-Mile Search Radius 16

1
INTRODUCTION

At the request of Lennar Homes of California, LLC, (Lennar) Applied EarthWorks, Inc. (Æ) completed a cultural resource study for the Ritchie Ranch Project (Project) within the city of Visalia in Tulare County, California (Figure 1-1). The Project is in the southeast quarter of Section 14 of Township 18 South, Range 24 East, as depicted on the U.S. Geological Survey (USGS) Visalia (1969), California, 7.5-minute topographic quadrangle (Figure 1-2).

1.1 PROJECT DESCRIPTION

Lennar is proposing a 321-unit, single-family home community on 44.9-acres west of North Demaree Street between West River Way Avenue and the southern branch of the Modoc Ditch (Figure 1-3). The proposed Project will extend West Shannon Parkway through the development, construct other standard interior city streets, and develop two approximately 1-acre parks. Plans also include roadside improvements along North Demaree Street, widening of West River Way Avenue, and paving of sidewalks, curbs, and gutters along roadways. The Project area consists of two rectangular portions that are separated by an easement accommodating a modern, undergrounded segment of the Modoc Ditch. The main channel of the Modoc Ditch runs along the southern property line and curves around a portion of the western parcel boundary. Project plans include installing a wooden homesite fence 30 feet from the top of the ditch's bank. An existing branch of the Modoc Ditch that runs along the northern property line will be quitclaimed by the Modoc Ditch Company. Existing structures within the Project area will be demolished prior to construction.

1.2 REGULATORY GUIDANCE

The Project is subject 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. CEQA mandates that public agencies, in this case the City of Visalia (City), consider the impacts of discretionary projects on the environment, including cultural resources. If a project has potential to cause substantial adverse change in the characteristics of an important cultural resource or "historical resource" through demolition, destruction, relocation, alteration, or other means, then the project is judged to have a significant effect on the environment (14 CCR 15064.5[b]).

Historical resources are buildings, sites, structures, objects, or districts, each of which may have historical, precontact, architectural, archaeological, cultural, or scientific importance and is listed or eligible for listing in the California Register of Historical Resources (CRHR). 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 (Public Resource Code [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]).



Figure 1-1 Project vicinity in Tulare County, California.

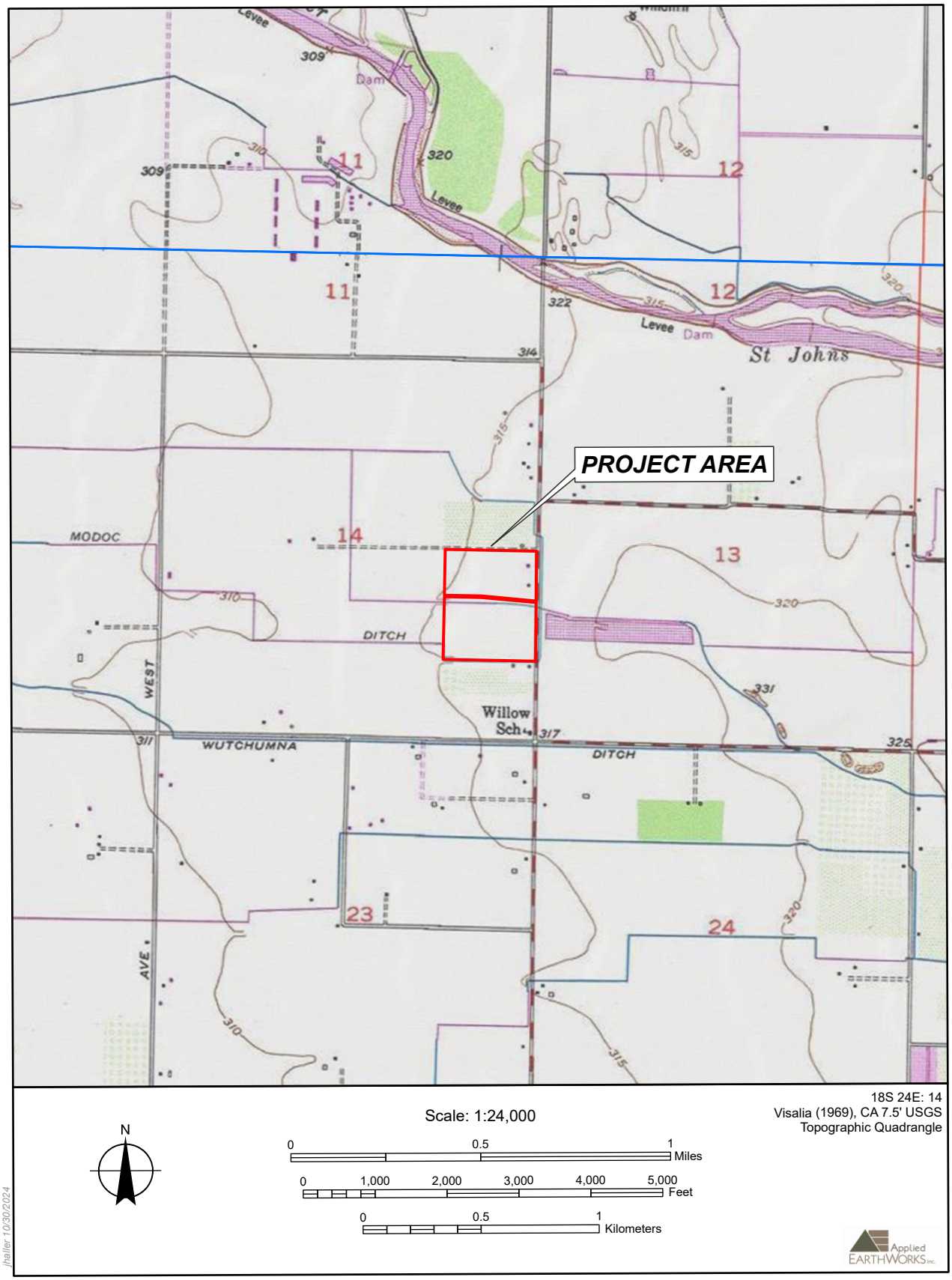


Figure 1-2 Project location on USGS Visalia 7.5-minute topographic quadrangle.



Figure 1-3 Aerial view of the Project Area.

For the purposes of this report, a cultural resource is defined as a precontact or historical (i.e., 45 years old or older) archaeological site or a historical building, structure, or object. The importance or significance of a cultural resource depends on whether it qualifies for inclusion in the CRHR. Cultural resources determined eligible for listing in the CRHR are called "historical resources" (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). It is worth noting here that, as defined at PRC Section 21074(a), a tribal cultural resource (TCR) is a site, feature, place, cultural landscape, sacred place, or object that is of cultural value to a California Native American tribe and is either listed in or eligible for listing in the CRHR or included in a local register of historical resources. TCRs are not included in the identification and assessment efforts of this cultural resource study but will be identified as part of the City's tribal outreach responsibilities under Assembly Bill (AB) 52, if any are present.

1.3 PROJECT PERSONNEL

Æ Principal Archaeologist Anna Hoover (M.S., Registered Professional Archaeologist [RPA] 28576661) served as project manager, providing quality assurance and quality control for the project. Principal Architectural Historian Carlos van Onna (M.A.) oversaw all built environment tasks and co-authored the report. Staff Anthropologist Nicole Saenz (M.S.) co-authored this report. Staff Archaeologist Gabriel Granado (B.A.) and Associate Archaeologist Betsy Rapp (B.A.) conducted the archaeological pedestrian survey and Staff Architectural Historian Julio Olivares (M.A.) conducted the built environment pedestrian survey. Additional built environment tasks, including preparation of report sections and California Department of Parks and Recreation (DPR) forms, were completed by Associate Architectural Historian Cheyenne Good-Peery (B.A.), who also co-authored this report. Æ Principal Archaeologist Emerita Mary Baloian (Ph.D., RPA 15189) reviewed this document for consistency and technical accuracy. Qualifications of supervisory personnel are provided in Appendix A.

1.4 REPORT ORGANIZATION

This report was prepared in accordance with the California Office of Historic Preservation's *Archaeological Resource Management Reports: Recommended Contents and Format* (Office of Historic Preservation 1990). This document consists of seven chapters. Following this introduction, Chapter 2 describes the environmental and cultural context of the Project area. Chapter 3 presents the methods used for archaeological and built environment background research, Native American outreach, and pedestrian surveys, while Chapter 4 discusses the results of these efforts. Chapter 5 presents a CRHR evaluation of identified historic-era built environment resources. Finally, Chapter 6 contains a summary and provides recommendations. A complete listing of references cited is in Chapter 7. Appendix A contains resumes of key personnel. Appendix B presents the records search results and Appendix C contains documentation of communication with the NAHC and local tribal representatives. Appendix D contains DPR forms for identified cultural resources.

Field notes, maps, and a complete set of photographs from the current study are on file at Æ's office in Fresno, California. A copy of the final version of this report will be submitted to the Southern San Joaquin Valley Information Center (SSJVIC) of the California Historical Resources Information System (CHRIS) at California State University, Bakersfield.

2
SETTING

This chapter describes the natural environment within the Project area and surrounding area. It also provides a summary of prehistory and previous archaeological investigations as well as an ethnographic overview. The chapter concludes with an overview of the history of the region and provides specific information about the Project area that provides a context for evaluation of the significance of the cultural resources recorded.

2.1 NATURAL SETTING

The Project area is within the San Joaquin Valley, the southern half of an elongated trough called the Great Valley, a 50-mile-wide lowland that extends approximately 500 miles south from the Cascade Range to the Tehachapi Mountains (Norris and Webb 1976). The San Joaquin Valley parallels the 400-mile-long stretch of the Sierra Nevada geomorphic province, which encompasses a 40- to 100-mile-wide area ranging in elevation from 400 feet above mean sea level (amsl) along the western boundary to more than 14,000 feet amsl in the east (Norris and Webb 1976). The annual rainfall for this area averages about 6–14 inches. Winters are cooler and drier than those in the Sacramento Valley and snow is uncommon (Hill 1984). Summers are generally hot and dry, with temperatures often exceeding 100 degrees Fahrenheit.

Between the Mesozoic and Cenozoic eras, the Great Valley served as a shallow marine embayment containing numerous lakes, primarily within the San Joaquin Valley (Norris and Webb 1976). As a result, the upper levels of the Great Valley floor are composed of alluvium and flood materials. Below these strata are layers of marine and nonmarine rocks, including claystone, sandstone, shale, basalt, andesite, and serpentine. Waters began to diminish about 10 million years ago, eventually dwindling to the drainages, tributaries, and small lakes that exist today (Hill 1984). Playas, remnants of the extinct lakes, are currently used for agricultural activities in the valley (Norris and Webb 1976).

The San Joaquin Valley is roughly oriented north-northwest by south-southeast and is a structural trough filled with thick Quaternary alluvium eroded from the surrounding mountains. The San Joaquin River flows northward up the western side of the valley. A low elevation divide, created by the Kings River alluvial fan, separates the northern portion of the valley from the south, forming the Tulare Basin in the south by preventing the northward flow of water. The Tulare Basin, occupied by Tulare, Buena Vista, and Kern lakes, receives water from the Kings, Kaweah, and Kern rivers.

Before historic drainage projects and modern reclamation, seasonal flooding produced extensive wetlands. Lakes, marshes, and sloughs once covered more than 5,000 square kilometers in the San Joaquin Valley (Moratto 1984). The largest of these was ancient Tulare Lake, which occupied a structural basin formed by downwarping and spanned as much as 45 kilometers across from shore to shore (Davis et al. 1959). Along with Buena Vista and Kern lakes farther to the south, Tulare Lake was also partially contained by geological features peculiar to the southern end of the valley. Alluvial fans extending from the Kings River on the east and Los Gatos Creek on the west coalesced long ago into a ridge, separating the extreme southern end of

the Central Valley from the north (Rosenthal et al. 2007). The lands to the south were so arid that runoff often was not able to maintain a discharge through the alluvium. The resulting natural dam formed by these alluvial fans directed all drainages to the south into the basins of Tulare, Buena Vista, and Kern lakes, contributing to the impoundment of these wetlands (Gifford and Schenck 1926; Rosenthal et al. 2007). At times of flood, Buena Vista and Tulare lakes formerly spilled into a single basin and combined with waters from the Kern, Kaweah, and Kings rivers, flowed into the San Joaquin River system (Oakeshott 1978; Wedel 1941). Both Kern and Tulare lakes fluctuated greatly in size in response to paleoclimatic changes; however, as a result of historic drainage projects, both are now dry most of the time (Arguelles and Moratto 1983).

The Kaweah River flows from a canyon in the Sierra Nevada Range into the Central Valley as a low gradient alluvial fan, often referred to as the Kaweah Delta. The Kaweah River is one of several rivers, including the Kern, Tule, and Kings rivers, all depositing low gradient fans along the eastern San Joaquin Valley and draining the western front of the Sierra Nevada into the Tulare Basin.

Additionally, the tall, steep peaks of the Sierra Nevada effectively block moisture moving eastward from the coast, resulting in a higher level of precipitation on the western slopes. Smaller east–west-trending rivers, like the Kaweah River, drain the Sierra Nevada Range before converging on Tulare Lake. The Kaweah River and its smaller tributaries (such as Mill and Packwood creeks) would have provided habitat for an abundance of food resources such as aquatic plants, fish, beaver, and other animals hunted prehistorically and historically.

The development of agriculture within the Great Valley has resulted in the replacement of native plants and animals with domesticated species. Common native plants would have included white, blue, and live oak as well as walnut, cottonwood, willow, and tule, many of which still occur along the Kaweah River drainage. Also prominent is bulrush, cattail, and various grasses, flowers, and saltbrush. This area has been intensively farmed for many years with few areas of original grassland remaining.

The previously swampy valley floor once provided a lush habitat for a variety of animals including mule deer, tule elk, pronghorn, grizzly bears, black bears, wolves, and mountain lions (Preston 1981). Historic accounts indicate that, due to their vast numbers, the tule elk and pronghorn were a major food source for the Yokuts Indians, explorers, trappers, and others (Clough and Secrest 1984; Wallace 1978). Other mammals noted are the valley coyote, bobcat, gray and kit foxes, and rabbits. The valley's large variety of birds consists of the American osprey, redwing blackbird, marsh hawk, willow and Nuttall's woodpeckers, western meadowlark, and quail. Water sources such as the Kaweah River and adjacent Tulare Lake supported anadromous and freshwater fish species that include salmon, golden trout, river lamprey eel, and white sturgeon.

2.2 PRECONTACT

Reconstruction of past cultural patterns, particularly in the southern San Joaquin Valley, has been stymied by two key factors: geomorphology and human activity (Dillon 2002; Siefkin 1999). The valley floor that encompasses the Project area has been inundated with thick alluvial deposits resulting from granitic and sedimentary outflow from the Kings, Tulare, and Kaweah rivers, particularly during mass flood events. This pattern has continued for millennia and has

resulted in the burial of early to middle Holocene archaeological sites, estimated to be buried at depths of up to 10 meters along the lower stretches of the San Joaquin Valley drainage systems (Moratto 1984:214). Thus, compared to other regions in the state, there is a paucity of archaeological research and a related lack of data from which to build a complete understanding of past human behavior specific to Tulare County.

Nevertheless, available data for sites in valley lacustrine environs help identify key cultural changes within the Project area and surrounding area. The summary of cultural traits presented below is based on a review of San Joaquin Valley lacustrine, riverine, and valley floor site data discussed by Rosenthal et al. (2007). Cultural periods and accompanying dates (given as calibrated calendar years [cal B.C. or A.D.]) are based on chronologies established by Rosenthal et al. (2007:150–159), Moratto (1984:333), McGuire and Garfinkel (1980:49–53), and Bennyhoff and Fredrickson (Fredrickson 1973, 1974).

The Paleoindian Period (11,500–8550 cal B.C.) is represented by ephemeral lacustrine sites dominated by atlatl dart and spear projectile points. The earliest evidence of distinct valley cultural patterns is associated with the Lower Archaic Period (8550–5550 cal B.C.) when crescents and stemmed projectile points were first used. Sites from this period contain dietary evidence of freshwater fish, waterfowl, mussels, deer, and pronghorn. The Middle Archaic (5550–550 cal B.C.) includes a time, estimated between 5950 and 3150 cal B.C., when semipermanent villages first appeared along riverbanks in tandem with larger, more established lacustrine villages. Flaked stone tools were used in abundance, meanwhile ground stone tool kits emerged along with long-distance trade and exchange networks focused on obsidian, shell beads, and ornaments.

New cultural patterns emerged during the Upper Archaic Period (550 cal B.C.–cal A.D. 1100) when a distinct shift in burial practices and new differences in site and artifact types appeared across the valley (Moratto 1984:13, 181, 211; Rosenthal et al. 2007). In particular, the emergence of mound sites throughout the valley along riparian zones and marsh environments occurred. Widespread proliferation of specialized technology is evident, including new types of bone tools, projectile points, and ceremonial objects such as wands and blades. Paleoethnobotanical studies also suggest an expansion in the use of labor-intensive and seasonally abundant resources, including acorns, pine nuts, salmon, and shellfish.

Similarly, the Emergent Period, extending from cal A.D. 1000 to the historic era, is marked by more diverse settlement and burial patterns across the valley, coupled with the replacement of atlatl and dart tool kits with bow-and-arrow technology (i.e., small corner-notched and Desert series projectile points) at about cal A.D. 1000. Fishing tool kits also expanded to include more efficient harpoons, bone fishhooks, and gorge hooks. In the Tulare Basin, pottery obtained via trade appears along with baked clay balls used for cooking and carved clay effigies.

2.3 ETHNOGRAPHY

The late precontact Yokuts resided in nearly all of the San Joaquin Valley as well as the lower Sierra Nevada foothills south of the Fresno River (Moratto 1984). Three divisions of Yokuts—Northern Valley, Southern Valley, and Foothill—included 60 tribelets, each containing a few hundred to several thousand individuals. The Southern Valley Yokuts claimed Tulare, Buena Vista, and Kern lakes, their connecting sloughs, and the lower portions of the Kings, Kaweah,

Tule, and Kern rivers. At the beginning of the historic period, 15 tribelets of Southern Valley Yokuts occupied this area, each speaking a separate dialect of the Yokuts language, all of which have been assigned traditionally to the California Penutian linguistic stock (Moratto 1984; Wallace 1978). The *Tulamni* held Buena Vista Lake and the *Chuxox*i occupied the channels and tule-lined sloughs of the Kern River Delta. On smaller Kern Lake were the *Hometwoli*. Southeast of the Project area, the *Yawelmani* held an extensive strip of territory along the lower foothill stretches of the Kern River (Wallace 1978)

Eighteenth-century Valley Yokuts may have numbered 41,000 persons (Cook 1955), making them the largest ethnic group in precontact California. Kroeber (1939) estimated that Yokuts political units averaged 350 persons each, giving a total aboriginal population of 5,250 for the 15 tribelets of Southern Valley Yokuts. However, a much higher population figure (15,700) was based on estimates and/or head counts for various villages by Spanish expeditions exploring the area in the early nineteenth century (Cook 1955).

The Southern Valley Yokuts lived in permanent villages on high ground adjacent to watercourses and followed a mixed subsistence strategy that emphasized fishing, hunting waterfowl, and intensive collecting of shellfish, roots, and seeds (Moratto 1984; Wallace 1978). Although large communal residences sheltering 10 or more families were built in some places, most Yokuts houses were circular or oval single-family dwellings of tule mats over pole frames (Moratto 1984). Other structures included raised mat-covered granaries containing supplies of dried fish, roots, seeds, and other storable foods. Additionally, every village contained at least one communally owned sweathouse in which the men sweated daily and, on occasion, slept. Apparently, there were no formal structures associated with dances or rituals (Wallace 1978).

After A.D. 1770, the native populations of the San Joaquin Valley were reduced by disease, and settlement patterns were disrupted (as in many parts of California) as a result of Spanish colonial expeditions and mission recruitment. However, even more traumatic impacts to the valley's populations were caused by the epidemic of 1833 and years following. The disease, evidently malaria transmitted initially by beaver trappers from the Columbia River (Cook 1955), struck with such virulence that about 75 percent of the valley people had died by 1846. The Southern Valley Yokuts, residing in their lake-slough-marsh environment, would have been particularly vulnerable to malarial infection. The destruction of the valley's cultures and societies was completed soon after 1848 by the American invasion (Moratto 1984). By 1850, of the estimated 15,700 people constituting the 15 tribelets of the Southern Valley Yokuts, only approximately 3,680 were estimated to still be living (Cook 1955).

2.4 HISTORIC CONTEXT

2.4.1 Early Exploration and Settlement

The Spaniards were the first Europeans to encounter the Southern Valley Yokuts when Pedro Fagés led a group of soldiers through Tejon Pass into the San Joaquin Valley in 1772 (Wallace 1978). Four years later Francisco Garcés also explored the region. Other Europeans did not follow until Lieutenant Gabriel Moraga led a group of Spanish explorers into the valley in 1806 (Clough and Secrest 1984). This party intended to locate new lands for missions, find and return runaway Indians, and relocate stolen livestock.

Expansion of missions in California ceased by the early 1820s as a result of Mexico's independence from Spain, thus preventing the creation of any San Joaquin Valley missions. The Mexican government granted several large tracts of land (ranchos) to individuals during the 1830s and 1840s. In addition, fur trappers began their forays into the California interior. Jedidiah S. Smith likely entered the area during a fur trapping expedition in 1827. Smith's adventures included friendly encounters with the Southern Yokuts near the Kings River and trapping and camping along the San Joaquin River (Clough and Secrest 1984). In 1844, John C. Fremont led an expedition to the Tulare Lake basin; his favorable reports of the Kings River fan foreshadowed the agricultural development of the area (Preston 1981).

The discovery of gold in the Sierra Nevada in 1848 and the accession of California to the Union in 1849 were watershed events in the history of the state and valley. During the late 1840s and early 1850s, prospectors from across the nation and around the world flocked to California to mine the precious ore. Many of the prospectors entered and traveled through the valley via the Stockton–Los Angeles Road, which later became the route for the Butterfield Overland Mail. The road hugged the western edge of the foothills and crossed the countless rivers and streams flowing down from the highlands as well as the valley sloughs.

Although ranching had been a part of the state's economy since the Mexican period, the industry's growth accelerated as many successful prospectors and businessmen reinvested their profits from the gold rush in cattle and sheep herds. In the early days of ranching, sheep were a valued commodity because they not only could be sold for consumption but could be sheared for their wool. From 1857 to 1871, the amount of wool produced in California increased more than twenty fold, while revenue grew an average annual rate of 30 percent (Vandor 1919). Similarly, cattle provided beef and dairy products as well as hides.

By the early 1870s, however, scales began to tip in favor of agriculture. The construction of extensive irrigation systems, typically financed by developers like A. Y. Easterby, converted the valley's dry soils into fertile farmlands. The 1874 "no fence" law underscored the growing dominance of agricultural interests and resulted in both operation and monetary repercussions to the sheep and cattle industry. "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).

2.4.2 Railroad Expansion and the Beginnings of Visalia

The first recorded Euro-American settlement near the Project area was Woodsville, approximately 16 miles south of Visalia. This settlement was founded in December 1850 by a party of 15 men (Visalia Morning Delta 1939:15). The settlers built a cabin at this location; however, an altercation with the local indigenous population resulted in a poor outcome for the settlers. After the massacre at Woodsville, a new group of settlers arrived in what is now Visalia. Their party included cattlemen, lawyers, doctors, merchants, and millwrights. With the events at Woodsville in mind, the Visalia party's priority was to establish a defensive structure, which became known as Fort Visalia. The fort was constructed north of Mill Creek (Mitchell 1983; Visalia Morning Delta 1939); however, the need for Fort Visalia proved to be short lived. By the winter of 1853, settlers had constructed new homes outside the fort walls and planted crops; the

settlement, now called Visalia, was prospering. Euro-Americans continued to settle in the area despite continued reports of hostility between Native Americans and settlers. By 1853, at least 500 people were living in the area (Daily Alta California 1853).

The San Joaquin Valley, and specifically, the cities of Tulare and Visalia, experienced an influx of settlers and economic prosperity in the mid to late 1800s. Economic prosperity was fostered in large part by the arrival of such lines as the Visalia and Goshen Railroad and the Visalia and Tulare Railroad, constructed in 1874 and 1888, respectively (Menefee and Dodge 1913). In 1896, the San Francisco and San Joaquin Valley Railroad commenced construction of a new rail line extending north from Bakersfield. Soon after its completion in 1897, the rail line was sold to the Atchinson, Topeka, and Santa Fe Railroad.

Founded in 1852, Visalia's influence as a pioneer town went beyond its political and economic importance to Tulare County (Menefee and Dodge 1913:34–40). For its first three decades, the town was the commercial hub of the central and southern San Joaquin Valley. It served as a primary transportation node for the valley and contained the regional branch of the U.S. General Land Office (GLO) that issued federal land patents to early settlers. Similar to the scenario played out in Fresno County, economic and infrastructural development in Tulare County occurred initially along the valley's eastern border, where, as noted by the Franciscans more than a half-century earlier, the land offered more resources (oak groves, pasture, flowing creeks) and fewer obstacles (less marshland) to settlement than the valley's west side. An 1867 county map shows quite vividly that property ownership, along with roads and telegraph lines, was concentrated in the Visalia-Woodlake area and, to a lesser extent, around Porterville (Chapman and Gordon 1867). At times, less than 10 pioneer families had purchased land or taken residence around the future site of Tulare (Menefee and Dodge 1913:80–81); even fewer resided along the entire eastern shoreline of Tulare Lake.

Like other parts of the valley, the impact of agriculture on the early economy of Tulare County was negligible, yet the beginnings of numerous developments are traced to this period. Several varieties of fruit—including oranges, apricots, and grapes—that would later become important commodities were initially grown, albeit in small scale, during the 1850s and 1860s (Menefee and Dodge 1913:41–42, 139). Similarly, the adaptability of alfalfa as a livestock feed was recognized as early as 1860, even though its potential was not realized until much later in the century (Menefee and Dodge 1913:137).

Not long after the floods of 1867–1868, the arrival of the Central Pacific Railroad (later Southern Pacific Railroad) prompted the county's population and economy to expand westward. Similar to other valley counties, the railroad chose a route that ran though the sparsely settled central portion of Tulare County rather than its more established east side. In 1872, Tulare, along with towns like Goshen and Tipton, was founded along the railroad's valley main line (Menefee and Dodge 1913:52, 55, 75, 80–84). By connecting the county with the markets of the San Francisco Bay area, the railway created considerable agricultural and business opportunity for the new towns as well as the older eastern communities of Visalia and Porterville, which were linked to the rail network in 1874 and 1888, respectively.

2.4.3 Beginnings of Commercial Agriculture

In addition to Euro-American settlement, the channelization and other manipulations of the valley waterways during the late 1800s forever changed life throughout the valley. The Tulare Irrigation District (TID) was formed on September 21, 1889, encompassing approximately 32,500 acres. At the time, $500,000 in bonds were issued to fund construction of diversion works on the St. Johns River; the purchase of water rights of the Kaweah Canal and Irrigation Company, Rocky Ford Canal and Irrigation Company, and Settlers Ditch Company; and canal construction within the TID (Tulare Irrigation District 2020). Between 1951 and 1964, the TID annexed the Kaweah and Packwood lands and began the extensive process of expanding and overhauling the existing canal system. This process included enlarging and/or relocating canals, installing pipelines, and constructing diversion structures, road crossings, check gates, and siphons (Tulare Irrigation District 2020). In 1982, the TID and Kaweah Delta Water Conservation District joined to form the Kaweah River Power Authority. The initial and continued development of irrigation systems by these and other groups have allowed agriculture to prosper in areas otherwise too dry and barren to grow food crops.

Agriculture continued to prosper in the valley, resulting in the intensification of local farming until the 1930s when individual farmers emerging from the Great Depression no longer found agriculture to be a lucrative endeavor. Since that time, farmland has increasingly been developed for other commercial purposes.

2.4.4 Community Development and Post-War Residential Development

In the 30 years after World War II, 40 million dwellings were constructed in the United States, 30 million of which were single-family residences. Between 1940 and 1970, the nation's population had grown from 132 million to 203 million, and California's vital role in the war effort provided a boost to population numbers in the state. California's population grew from 6.9 million to 20 million between 1940 and 1970, in part because many servicemen permanently settled in the state after the war. California became the nation's most populous state in 1962. All this growth resulted in construction of a total of 6 million dwellings in California between 1945 and 1973, 3.5 million of which were single-family residences. The 1973 oil crisis can be considered the endpoint for the period of significance for this development, as it resulted in a steady decline in housing construction (California Department of Transportation 2011:ii). The post-war period saw large-scale tract housing developments in the major metropolitan areas, where entire subdivisions were laid out and constructed by builders. These suburbs were increasingly accessible through ambitious infrastructure projects accompanying the growing number of automobiles. Historically significant developments in this era typically show a strong connection with certain architects and builders or demonstrate important advancements in construction, use of materials, or planning.

California experienced unprecedented growth during the post-war years; however, Visalia itself grew slowly and remained a relatively small town following its incorporation in 1874. From 1940 to 1970, Visalia's population grew from 8,904 to 27,268 (City of Visalia 2019:7). The city experienced its greatest population growth between 1970 and 1980, when the population nearly doubled from 27,268 to 49,729. This period of growth is reflected in the built environment, as much of Visalia outside the downtown core was developed after 1970 (Smith et al. 2014:3.13-1).

Visalia experienced increased residential development in the mid-twentieth century, which is reflected in historical aerial photographs of that time and ties into contemporary trends on a state and national level.

As a general trend in California, pre-war housing development was significantly smaller in scale and was typically the result of individual efforts. Planned subdivisions were filed at the local government level in the form of a map of the projected lots, which were subsequently sold one at a time or in small segments to individuals or builders. This resulted in a more gradual development of the individual lots, typically with a higher variety in style and type (California Department of Transportation 2011:4–5). In some cases, in historically rural areas, individual lots stem from agricultural colonies created in the second half of the nineteenth century. In smaller agricultural communities, like Visalia, this individual, gradual development appears to have been the norm well into the second half of the twentieth century. This is potentially explained by the vital role farming played in these communities and the inherent necessity of open land. In recent decades, farming has increasingly been supplemented by other employment opportunities, which in turn have fostered larger-scale housing developments.

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 cultural resources and studies within and adjacent to the Project area, archival research, Native American outreach, and intensive archaeological and built environment pedestrian surveys.

3.1 RECORDS SEARCH

At Æ's request, the SSJVIC of the CHRIS at California State University, Bakersfield, performed a records search to identify previously recorded cultural resources and surveys within the Project area and surrounding 0.5-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 ARCHIVAL RESEARCH

Prior to conducting a pedestrian archaeological survey, Æ's historians 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 newspapers, maps, aerial images, atlases, and photographs. Æ reviewed and compiled information from various sources including:

- GLO plat maps (https://glorecords.blm.gov/default.aspx; 1854);
- GLO land patents (https://glorecords.blm.gov/search/default.aspx; 1860, 1863, and 1872);
- Aerial photographs accessed through the Map Aerial Locator Tool maintained by California State University, Fresno (http://malt.lib.csufresno.edu/MALT/; 1946 and 1958);
- Aerial photographs accessed via HistoricAerials.com administered by NETROnline (historicaerials.com; 1942, 1956, 1969, 1984, 1994, 2005, 2010, 2018, and 2020);
- USGS topographic maps accessed via USGS topoView (https://ngmdb.usgs.gov/topoview/; Visalia 1927, 1949, 1950, and 1993);
- Historical maps accessed via David Rumsey Map Collection (https://www.davidrumsey.com/; 1867 *Map of Tulare County* by Chapman and Gordon, 1876 *Map of Tulare County* by P. Y. Baker, 1885 & 1886 *Irrigation Map of the San Joaquin Valley* by W. H. Hall, 1892 *Map of Tulare County* by T. H. Thompson);
- Tulare County Assessor's Office online property records (https://tularecounty.ca.gov/assessor/maps/; APN 077-060-022);

- Historical newspapers accessed via Newspapers.com administered by Ancestry.com (https://www.newspapers.com/); and

- Topographic maps accessed via HistoricAerials.com administered by NETRonline (historicaerials.com; T1923, T1942, T1947, T1965, T1967, T1986, T2012, T2015, T2018, and T2021).

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. Æ contacted the NAHC to request a search of its Sacred Lands File (SLF) 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 with its findings and attached a list of Native American tribes and individuals culturally affiliated with the Project area. Æ prepared and mailed an outreach 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 followed up with a telephone call to each contact to confirm the correspondence was received and to provide an opportunity for comment. 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 52. Æ's record of correspondence is included in Appendix C.

3.4 ARCHAEOLOGICAL AND BUILT ENVIRONMENT FIELD SURVEYS

Æ Archaeologists Gabriel Granado and Betsy Rapp conducted an intensive archaeological pedestrian survey of the Project area using parallel transects spaced 10–15 meters apart. Granado and Rapp documented information on the survey coverage, ground visibility, and other conditions on digital Survey123 Field Record forms. They took photographs of the Project area using an iPad camera. Concurrently with the archaeological pedestrian survey, Æ's Architectural Historian Julio Olivares surveyed the Project area to identify historic-era built environment resources. Identified cultural resources were recorded and photo-documented using an iPad camera and digital Survey123 Field Record forms. All field records and photographs are archived at Æ's office in Fresno, California. Complete documentation of cultural resources within the Project area is included in Appendix D.

4
FINDINGS

This chapter provides results of the SSJVIC records search, background research, Native American outreach, and pedestrian surveys including observations of field conditions and cultural resources identified within the Project area.

4.1 RECORDS SEARCH

On July 29, 2024, the SSJVIC responded to Æ's records search request (Records Search File No. 24-327). In their response, they identified three previous cultural resource investigations within the Project area and one previous investigation in the 0.5-mile search radius. In addition, the records search identified one previously recorded cultural resource within the Project area and one previously recorded cultural resource within the 0.5-mile records search radius (Appendix B).

4.1.1 Previous Cultural Resource Studies

Three previous studies overlap the Project area, covering less than five percent, and one previous investigation is in the 0.5-mile search radius (Table 4-1). All of the studies were conducted more than 10 years ago; including two studies (TU-00041 and TU-01190) that did not include a pedestrian survey.

Table 4-1
Previous Investigations in the Project Area and 0.5-Mile Search Radius

CHRIS Report No.	Author(s)	Year	Title
Within Project Area			
TU-00041	Self, W.	1995	*Class I Overview, Santa Fe Pacific Pipeline Partners, L.P., Proposed Concord to Colton Pipeline Project*
TU-00103	Wikstron, B. and Anderson, E.	1997	*Cultural Resource Survey for the Selma to Bakersfield Fiberoptic Line, Southern San Joaquin Valley, California*
TU-01190	Mitchell, A.R.	1957	*Jim Savage and the Tulareño Indians*
Within 0.5-Mile Radius			
TU-01934	Sauls, C.Y.	2021	*Cultural Resources Assessment for the Belissa Tentative Subdivision Project, City of Visalia, Tulare County, California*

4.1.2 Previously Recorded Resources

There is one previously recorded resource within the Project area, the Modoc Ditch (P-54-003602/CA-TUL-3255H), and one previously recorded resource within the 0.5-mile records search radius, the Wutchumna Canal (P-54-004857/CA-TUL-3027H). The Modoc Ditch is discussed in detail in Section 4.5.2 and Chapter 5.

4.2 BACKGROUND RESEARCH

Æ consulted historical topographic maps, atlases, aerial photographs, land patents, and newspapers to determine the ownership history of the Project area and verify the presence of

historic-era resources. The review revealed substantial turnover in the earliest recorded ownership history within the Project area, with evidence of initial homestead and irrigation development in 1885. Although alterations have taken place over time, extant buildings and structures within the Project area are of historic age.

4.2.1 Property-Specific History

The earliest available record of the Project area is an 1860 GLO land patent issued to Edward Dennis and Philip Henry Hockensmith, who owned area within and beyond the Project area. No further records of these men were found in the archives. An 1863 GLO land patent designates Samuel Smith as the next owner of the Project area. This ownership is confirmed on an 1867 map, which also depicts an unnamed slough outside of the Project area to the north. By 1876, a Tulare County map designates J. E. Lowery as the owner of the Project area. It also shows the still-present Willow School south of the Project area.

The 1885 *Irrigation Map of the San Joaquin Valley* designates C. C. Fisher as the owner of the Project area. According to a later Tulare County atlas, Fisher remained the owner of the Project area through 1892, and his homestead is depicted with an orchard just north of the current residential home at 3629 N. Demaree Street in the Project area. The 1885 irrigation map also shows the main channel of the Modoc Canal flowing outside of the Project area to the south and a branch of this canal running east to west through the southern end of the Project area. The Modoc Canal, later renamed the Modoc Ditch, was originally constructed as a distributary canal of the larger Wutchumna Canal to the northeast in 1876, but ultimately it received its water from the Saint John's River to the north (Grunsky 1898:20). The Modoc Canal was owned and operated by the Modoc Ditch Company, which officially incorporated on September 14, 1891, and was managed by a board of local shareholders who received its waters (Sauls 2021; Tulare County Times 1891). The Modoc Canal was roughly 4 miles long and ran from the south bank of the Saint John's River west toward the community of Goshen by 1898, and it irrigated approximately 1,000 acres of land. Throughout the decades, the Modoc Canal was realigned in some sections and several branches were added. By 1920, the ditch was approximately 6 miles long and irrigated approximately 3,500 acres, only receiving water from the Saint John's River between April and July annually (Sauls 2021).Today, the ditch is maintained by the Kaweah Delta Water Conservation District (City of Visalia 2024).

A 1927 USGS topographical map shows the nineteenth century, non-extant homestead within the northeast portion of the Project area that was first depicted in the 1892 atlas map. The 1927 USGS map also labels the main channel of the Modoc Ditch as running through the southern end of the Project area, with the west end of the Project area ditch segment aligned slightly differently than it is seen today.

The earliest available aerial photograph of the region is from 1946 and shows the current alignment of the Modoc Ditch segment through the Project area, as well as cultivated fields surrounding the current residence at 3629 N. Demaree Street. By 1949, a new branch of the Modoc Ditch is clearly depicted east to west through the Project area, just north of the center. By 1950, the original 1892 homestead appears to have been removed; although an auxiliary building, likely a barn, remains in place. In this same year, the current residential building, barn, and shed at 3629 N. Demaree Street are clearly shown. Subsequent aerial photographs and

topographical maps from 1956, 1958, 1969 show minimal changes to the Project area (Figure 4-1). A 1984 aerial photograph shows that the remaining auxiliary building associated with the original 1892 homestead was removed and the central segment of the Modoc Ditch is undergrounded. There have since been no apparent substantial changes to the Project area that can be gleaned from currently available maps, atlases, and aerials. Most of the Project area is currently used for agricultural purposes.



Figure 4-1 **Project area overlaid on a 1958 aerial photograph. The non-extant barn associated with the nineteenth-century homestead is visible north of 3629 N. Demaree property.**

4.3 NATIVE AMERICAN OUTREACH

On, July 18, 2024, Æ requested a search of the NAHC's SLF and a tribal contact list. On August 13, 2024, the NAHC provided a response and stated that its search of the SLF 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 August 15, 2024, Æ sent a letter describing the Project and its location to:

- Chairperson Robert Ledger of the Dumna Wo-Wah Tribal Government;
- Chairperson Delia Dominguez of the Kitanemuk and Yowlumne Tejon Indians;
- Cultural Specialist 2 Samantha McCarty of the Santa Rosa Rancheria Tachi Yokut Tribe;

- Cultural Specialist 1 Nichole Escalon of the Santa Rosa Rancheria Tachi Yokut Tribe;
- Chairperson Michelle Heredia-Cordova of the Table Mountain Rancheria;
- Cultural Resource Director Bob Pennell of the 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; and
- Chairperson Kenneth Woodrow of the Wuksachi Indian Tribe/Eshom Valley Band.

Æ also distributed these letters via email on August 15, 2024, and followed up with all tribes by telephone on September 16, 2024. To date, Æ has received four responses to their inquiry. On August 15, 2024, Æ received an email from Kerri Vera of the Tule River Indian Tribe stating that the Tribe has no knowledge of sensitive cultural resources within or near the Project area, but requests to be contacted if resources are encountered. Similarly, Samantha McCarty of the Santa Rosa Rancheria Tachi Yokut tribe responded by email on September 23, 2023, requesting to be notified of any finds related to the project. Bob Pennell from Table Mountain Rancheria sent a letter on September 3, 2024, and David Alvares of the Traditional Choinumni Tribe responded by phone on September 16, 2024, both stating that the project is outside of their tribe's area of interest. 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. The City did not receive comment in response to its AB-52 consultation letters sent to all above listed tribal representatives on June 19, 2024.

4.4 ARCHAEOLOGICAL SURVEY

Æ archaeologists Gabrial Granado and Betsy Rapp conducted an intensive archaeological pedestrian survey on August 30, 2024. The archaeological field crew surveyed 43.6 acres (97 percent) of the 44.9-acre Project area (Figure 4-2). To respect the privacy of the current residents, the extant historic-era house and the area immediately surrounding it were not surveyed by archaeologists. This small (1.3-acre) area containing the historic-era house at 3629 N. Demaree Street and its surrounding yard appears routinely cleared and graded. It is unlikely archaeological artifacts or features occur in this area. Ground visibility across the Project was very good at 80 percent, with up to 95 percent visibility in the northern portion of the Project area (Figure 4-3). An almond orchard in the southern portion of the Project area limited ground visibility to 65 percent due to leaves and duff on the ground (Figure 4-4).

The ground was highly disturbed across the entirety of the Project area from decades of agricultural activity. The northern portion of the Project area had recently been plowed, graded, and cleared of vegetation (Figure 4-5). In addition to the extant almond orchard, disturbances in the southern portion of the Project area included agricultural infrastructure such as modern pumps and wells that extended below the ground's surface (Figure 4-6). Æ archaeologists observed four isolated fragments of historic-era glass and ceramic widely scattered in the northern portion of the Project area. They recorded the artifacts as an isolate on DPR forms under the temporary number AE-4633-ISO-01, which has now been assigned the permanent designation P-54-005811 (Appendix D).



Figure 4-2 Survey Coverage and Resources.



Figure 4-3 **Survey area with excellent ground visibility, facing west from the northwest corner of the Project area.**



Figure 4-4 **Almond orchard in the southern portion of the Project area with poor visibility due to leaves and duff on the ground, facing north.**



Figure 4-5 Recently plowed and graded portion of the Project area, facing west.



Figure 4-6 Almond orchard and agricultural infrastructure in the southern portion of the Project area, facing south.

4.4.1 Historic-era Artifacts

P-54-005811 consists of four historic-era artifacts widely scattered in the northern portion of the Project area. The isolate includes one shard of amethyst glass, one shard of milk glass, one ceramic sherd, and one sherd of whiteware (Figure 4-7). Æ archaeologists observed the artifacts on the ground surface in the general vicinity of the non-extant house that stood in the Project

area from 1892 until around 1950; they are likely associated with the historic occupation of that residence. The artifacts were scattered across 1.41 acres and were likely dispersed by agricultural activities, such as plowing. Æ did not observe a spatially discrete concentration of materials or signs of an intact historical artifact deposit. The artifacts were not collected. The DPR isolate record is in Appendix D.

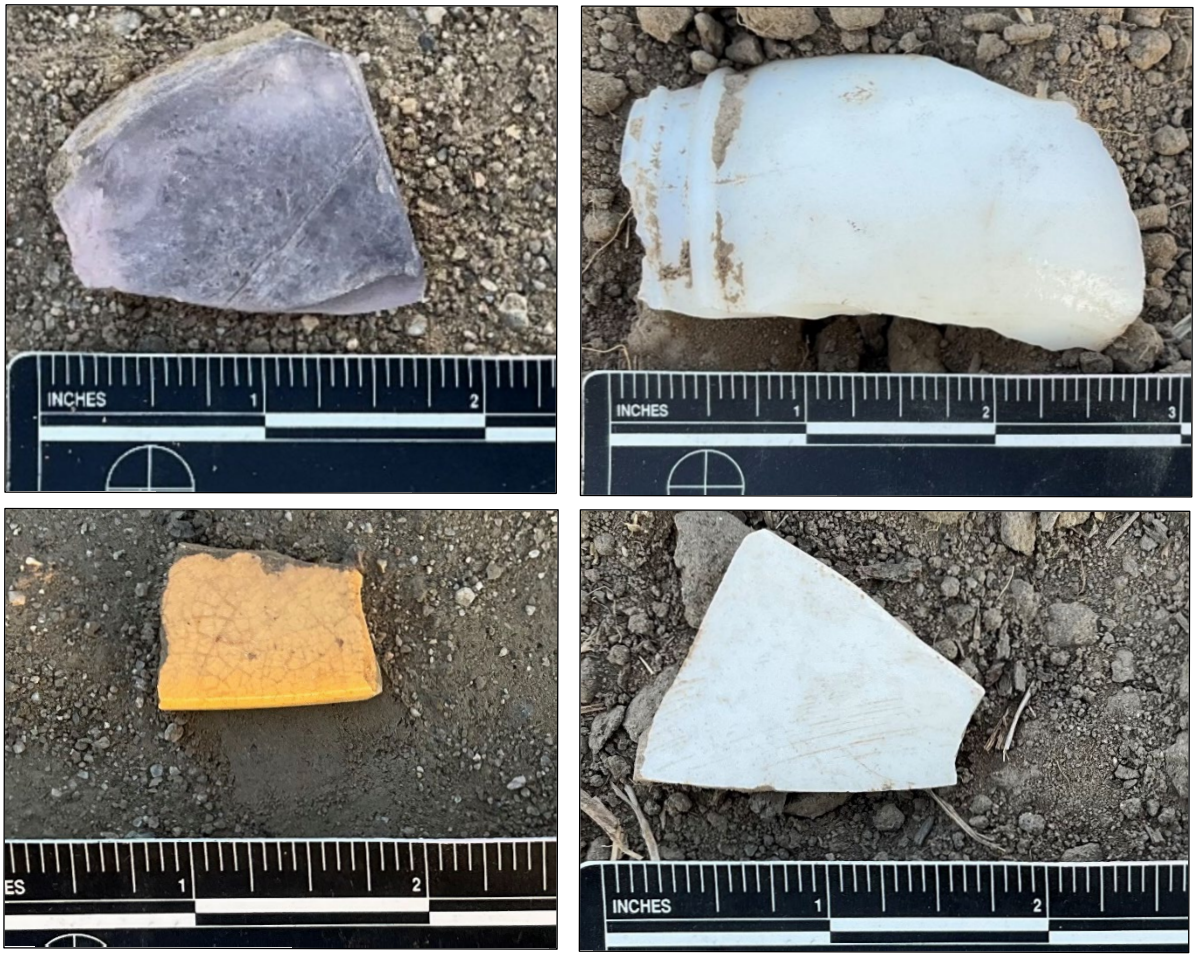


Figure 4-7 Historic-era refuse, clockwise from top left: amethyst glass shard, milk glass shard, whiteware sherd, and ceramic sherd.

4.5 BUILT ENVIRONMENT

On August 30, 2024, Æ Architectural Historian Julio Olivares conducted an intensive built environment survey of the Project area and confirmed one previously unrecorded historic-era residential property and two segments of a previously recorded historic-era ditch are within the Project area. The property at 3629 N. Demaree Street contains a residence and two ancillary buildings. Both ditch segments are part of the previously recorded Modoc Ditch (P-54-003602). Physical descriptions of the resources are provided below. New and updated DPR forms are in Appendix D.

4.5.1 3629 North Demaree Street

The property at 3629 North Demaree Street is within the northeast corner of Assessor's Parcel Number 077-060-022 and consists of three historic-age buildings: a single-family residence, a barn, and a shed. According to available maps and aerial photography, these buildings were likely constructed between 1942 and 1949 (NETROnline 2024; U.S. Geological Survey 1949).

4.5.1.1 Single-Family Residence

The residence is a single-story, rectangular building topped by a cross-hipped roof covered by asphalt shingles with overhanging eaves (Figures 4-8 through 4-12). The central mass of the residence is topped by a high-pitched hipped roof, while a low-pitched, dropped hipped roof wraps around the east, south, and a portion of the west elevations of the residence. A pent roof tops a portion of the west elevation at the northwest corner. The residence is supported by a concrete foundation that includes rectangular foundation vents on some elevations. The walls of the residence are clad in red-painted narrow, vertical wood boards. The corner posts around the house are painted white, complementing the white-painted wood frames that support the fenestration.

A covered entry porch wraps around the southeast corner of the residence and tops the off-center entryway. The porch floor is a poured concrete slab and the roof is supported by squared white columns. A concrete walkway extends from the southeast corner of the porch to the gravel driveway. The driveway is adjacent and parallel to the south elevation of the residence, and it is lined by white posts on the south side.

Primary (East) Elevation. The primary elevation of the residence faces east and includes a portion of the entry porch at the south end. The recessed porch has a brick chimney that protrudes through the roof, and the south-facing side wall of the recessed porch has one double-hung window. Two double-hung windows occupy the north end of the elevation. A set of concrete steps are at the base of the elevation between the two windows. A stone-lined garden bed, containing several decorative shrubs and grasses, fronts the elevation extending on each side of the concrete steps.

South Elevation. The south elevation of the residence includes a portion of the entry porch at the east end. The recessed porch exhibits a pair of large, four-paned windows that hug the corner of the east-facing side wall, forming a corner window. The recessed porch also includes the primary entrance to the residence, which consists of a 15-panel glazed door. A large four-paned window is adjacent to the east of the primary entrance. A small stone-lined garden bed with decorative shrubs fronts the porch. A double-hung window opening is at the far west end of the elevation. The bottom pane of the window is covered by a plywood board, and the top pane has a small vent.

Rear (West) Elevation. The rear elevation of the residence faces west and includes an L-shaped extension at the south end. The L-shaped extension has a single entrance with a 15-panel glazed door. The entrance is fronted by a concrete slab that extends below the carport attached to the shed building, creating a quasi-back patio where the slab is closest to the residence. The north end of the elevation is topped by a pent roof and has two window openings. The smaller opening is closer to the center of the elevation and has a double-hung window. The large square window

toward the north end of the elevation is covered by aluminum shielding. A large heating, ventilation, and air conditioning unit is on the roof above this window.

North Elevation. The north elevation of the residence best illustrates the dropped hipped roof beginning on the primary elevation and the pent roof on the rear elevation. Four double-hung windows are symmetrically placed on the elevation. A water tank with protective posts, as well as a decorative shrub with a pair of cacti, are adjacent to this elevation.



Figure 4-8 Overview of the single-family residence, facing southwest.



Figure 4-9 Primary (east) elevation of the single-family residence, facing slightly southwest.



Figure 4-10 South elevation of the single-family residence, facing north.



Figure 4-11 View of rear (west) elevation of the single-family residence, facing southeast.



Figure 4-12 North elevation of the single-family residence, facing south.

4.5.1.2 Barn

The vernacular-style barn has a low-pitched, front-gabled roof covered by corrugated metal sheets (Figure 4-13 and Figure 4-14). The barn has timber framing, with a central breezeway flanked by two enclosed wings, reminiscent of double-crib style barns. The enclosed portions are clad in corrugated metal sheets. The cladding has been removed from some sections of the barn (Figure 4-15). One exterior entrance without a door is on the north elevation of the barn (Figure 4-16). A shed building abuts the north end of the east elevation.

4.5.1.3 Shed

The shed is a vernacular, utilitarian style building with a low-pitched, front-gabled roof (Figure 4-17). The roof has exposed rafters and is covered by corrugated metal sheet, though some sheets have been removed (Figure 4-18). The timber frame also is clad in corrugated metal sheets. A single light fixture is below the gabled end on the east elevation, and a carport is attached to this elevation. The west elevation of the shed abuts the barn.



Figure 4-13 East elevation of the barn, facing northwest.



Figure 4-14 South elevation of the barn, facing north.



Figure 4-15 Rear (west) elevation of the barn, facing east.



Figure 4-16 North elevation of the barn, facing south.



Figure 4-17 Overview of the shed with carport, facing northwest.



Figure 4-18 South elevation of the shed, facing north.

4.5.2 Modoc Ditch

The Modoc Ditch (P-54-003602) was constructed in 1876 (Grunsky 1898:20). The ditch has changed alignment over time and various branches were added since its initial construction. The current alignment of the main channel of the Modoc Ditch was established sometime between 1927 and 1935 (Bowen 2000:2; Sauls 2021:5). Currently, the Modoc Ditch is approximately 8.5 miles long. It is headed at the Saint Johns River approximately 3.7 miles east of the Project area, and it terminates at a reservoir approximately 4.8 miles west of the Project area. The main channel and one branch of the Modoc Ditch run through the Project area; recorded segments of

the ditch within the Project area are described below. A third segment of the Modoc Ditch crosses halfway through the Project area; however, it is fully undergrounded and appears to be wholly modern. As such, it does not necessitate recordation or further consideration.

4.5.2.1 Recorded Segment 1

An approximately 1,261-foot-long segment of a branch of the Modoc Ditch (P-54-003602) trends east to west along the north boundary of the Project area and is referred to as Recorded Segment 1 for the purposes of this description (Figure 4-2).

Recorded Segment 1 is an earthen ditch (Figure 4-19). The banks of the segment show vegetation intrusion, animal burrowing, and erosion (Figure 4-20). The segment is 3 to 4 feet wide at the base and 15 feet wide from bank to bank. A circular concrete culvert is at the east end of the segment where it runs below North Demaree Street (Figure 4-21). Modern polyvinyl chloride pipes protrude from the south bank of the segment toward the east end.



Figure 4-19 Recorded Segment 1 with vegetation intrusion, facing southwest.



Figure 4-20 Evidence of animal burrowing and erosion on Recorded Segment 1, facing southwest.



Figure 4-21 East end of Recorded Segment 1 with concrete culvert, facing southeast.

4.5.2.2 Recorded Segment 2

An approximately 1,481-foot-long segment of the main channel of the Modoc Ditch (P-54-003602) trends north to south along the south part of the western boundary of the Project area, then west to east along the southern boundary of the Project area. It is referred to as Recorded Segment 2 for the purpose of this description (Figure 4-2).

Recorded Segment 2 is an earthen ditch (Figure 4-22). The segment is littered with concrete debris in multiple sections, and the banks of the segment show vegetation intrusion, animal burrowing, and erosion. The segment is 13 feet wide at the base and 22 feet wide from bank to bank. A large, circular concrete culvert with concrete wings is at the east end of the segment where it runs below North Demaree Street (Figure 4-23). A water gate structure is at the west end of the west to east portion of the segment where it turns northward (Figure 4-24). The water gate structure opens to overflow reservoirs to the west and southwest. The structure consists of two concrete chambers flanking an iron gate and wheel, as well as a concrete channel that directs the water east from the north to south portion of the segment (Figure 4-25). The water gate is topped by metal safety guard rails.



Figure 4-22 Recorded Segment 2 with vegetation intrusion and concrete debris, facing west.



Figure 4-23 Culvert at east end of Recorded Segment 2, facing southeast.



Figure 4-24 Water gate structure where Recorded Segment 2 is turned northward, facing southwest.



Figure 4-25 Recorded Segment 2 north of the water gate structure, facing north.

5
HISTORIC RESOURCE EVALUATIONS

This chapter presents the CRHR evaluation criteria and eligibility evaluations of 3629 N. Demaree Street and recorded segments of the Modoc Ditch. The details of the evaluation are provided below while additional information is provided on the DPR 523-series forms in Appendix D.

5.1 EVALUATION CRITERIA

To determine whether the Project will have a significant impact on a potential historical resource, cultural resources within the Project area must be evaluated for eligibility to be listed in the CRHR. If a resource qualifies as a historical resource, the potential for the Project to cause a significant adverse change to the qualities of the resource that make it eligible will require assessment, and the impacts may be subject to mitigation to reduce the impacts to less than significant. Cultural resources that are not eligible for listing in the CRHR do not require further consideration. The National Park Service (NPS) has established a process for identifying, evaluating, and assessing effects to historic properties (i.e., cultural resources eligible for listing in the National Register of Historic Places). Practically speaking, determinations made within a federal regulatory context are almost always universally accepted for purposes of identifying, evaluating, and assessing impacts under CEQA. Thus, the NPS guidelines are applicable herein.

The first threshold in this process is to ascertain whether a site or built environment resource within the Project area is old enough to be considered a historical resource and, accordingly, eligible for listing in the CRHR. To be eligible for listing in the CRHR, an archaeological or built environment resource must be 45 years old or older. Documentation of resources less than 45 years old also may be filed if those resources have been formally evaluated, regardless of the outcome of the evaluation (Office of Historic Preservation 1995). If a resource is found to meet this age criterion, the following sequential steps apply:

- Classifying the resource as a district, archaeological site, building, structure, or object;
- Determining the theme, context, and relevant thematic period of significance with which the resource is associated;
- Determining whether the resource is historically important under a set of significance criteria; and
- If significant, determining whether the resource retains integrity.

In California, historical resources are usually classified according to *Instructions for Recording Historical Resources*, published by the California Office of Historic Preservation in 1995. This handbook contains listings of resource categories for historical and precontact sites as well as standing structures. For built environment resources, it is additionally helpful to define a property's type (e.g., commercial vs. residential, urban vs. rural, agricultural vs. industrial).

The significance of a historical resource is best understood and judged in relation to a historic context (Office of Historic Preservation 1995). The evaluation process essentially weighs the relative importance of events, people, and places against the larger backdrop of history. Within this process, the context provides the comparative standards and/or examples as well as the theme(s) necessary for this assessment. According to the NPS (1997), a theme is a pattern or trend that has influenced the history of an area over time. A theme is typically couched in geographic (i.e., local, state, or national) and temporal terms to focus and facilitate the evaluation process.

Significance is based on how well a subject resource represents one or more themes through its associations with important events or people and/or through its inherent qualities. A resource must demonstrate more than just association with a theme; it must be a good representative of the theme, capable of illustrating the various thematic elements of a time and place in history.

According to the CEQA Guidelines, for a historical resource to be eligible for listing in the CRHR, it must meet at least one of the criteria defined in California PRC 5024.1(c):

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

2. Is associated with the lives of persons important in our past.

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

4. Has yielded, or may be likely to yield, information important in history or prehistory.

If a resource does not possess historical significance, a discussion of integrity is not required.

5.2 ASPECTS OF INTEGRITY

To be included in the CRHR, a resource must not only possess historical significance but also the physical means to convey such significance—that is, it must possess integrity. Integrity refers to the degree to which a resource retains and expresses its original character. To facilitate this assessment, the NPS (1997) provides the following definition of the seven aspects of integrity. These aspects of integrity have been adopted by the CRHR.

1. Location is the place where the historic property was constructed or the place where the historic event occurred;

2. Design is the combination of elements that create the form, plan, space, structure, and style of a property;

3. Setting is the physical environment of a historic property;

4. Materials are the physical elements that were combined or deposited during a particular period and in a particular pattern or configuration to form a historic property;

5. Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;

6. Feeling is a property's expression of the aesthetic or historic sense of a particular period of time; and

7. Association is the direct link between an important historic event or person and a historic property.

5.3 CRHR EVALUATIONS

Æ evaluated the residential property at 3629 N. Demaree Street and recorded two segments of the Modoc Ditch for CRHR-eligibility, which entailed an assessment of historical significance and a discussion of integrity, if applicable.

5.3.1 3629 North Demaree Street

As detailed in Section 4.2 of the report, the single-family residence, barn, and shed at 3629 N. Demaree Street first appear on an aerial photograph in 1950. According to available maps and aerial photography, it is likely the buildings were constructed between 1942 and 1949 (NETROnline 2024; U.S. Geological Survey 1949). To ascertain whether the residential property at 3629 N. Demaree Street possesses historical significance and has the potential to be eligible for inclusion in the CRHR, a formal discussion of the evaluation criteria is required.

5.3.1.1 Significance

Criterion 1—Associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States: The residential property at 3629 N. Demaree Street consists of three buildings that were likely constructed between 1942 and 1949 (NETROnline 2024; U.S. Geological Survey 1949). Between 1945 and 1973, California experienced a post-war population boom, resulting in the construction of approximately 6 million residential buildings, of which 3.5 million were single-family residences. During this time, Visalia's population grew from 8,904 to 37,268 (City of Visalia 2019:7). The single-family residence, barn, and shed are commonplace within the development of rural parcels during this post-war population boom. No archival evidence revealed that the buildings were associated with any specific events or trends that have made significant contributions to the patterns of California's history and cultural heritage. Therefore, the residential property at 3629 N. Demaree Street is not considered significant under Criterion 1.

Criterion 2—Associated with the lives of persons important to local, California, or national history: Review of regional histories, Tulare County property atlases and maps, and historical newspapers did not reveal any information about the residential property at 3629 N. Demaree Street or individuals associated with the construction of the historic-age buildings on the

property. While historical ownership records for the parcel from the time of construction were unavailable, supplemental research did not reveal significant persons associated with the residence. For this reason, the residential property at 3629 N. Demaree Street is not considered significant under Criterion 2.

Criterion 3—Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values: While the single-family residence at 3629 N. Demaree Street exhibits some recognizable architectural features, it is a common example of residential vernacular architecture seen during the mid-twentieth century in rural settings and is not representative of a single architectural style. It is not distinctive of a type, period, or method of construction, it is not the work of a master, and it does not possess high artistic value. Likewise, the barn and shed buildings were built in a vernacular utilitarian style. The type and method of construction is typical of agricultural and auxiliary buildings during this time. The builder of the barn and shed is unknown; they are not an example of a distinct time, period, or style, are not the work of a master, and lack high artistic values. The residential property at 3629 N. Demaree Street is not considered significant under Criterion 3.

Criterion 4—Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation: Criterion 4 applies to built environment resources if further study has the potential to yield information that cannot be obtained from other sources. However, the residential property at 3629 N. Demaree Street, including its buildings and associated features, is a commonplace example of a ubiquitous resource type in California and has been well-documented. Æ has exhausted available sources and no additional information could be gleaned from subsequent field visits. Therefore, Æ does not anticipate that any additional information can be identified that would prove the resource to be significant. The residential property at 3629 N. Demaree Street is not considered significant under Criterion 4.

5.3.1.2 Eligibility

A discussion of integrity is not required because the resource does not possess historical significance. The residential property at 3629 N. Demaree Street does not possess significance under the CRHR criteria for evaluation; therefore, it is recommended ineligible for listing in the CRHR and does not qualify as a historical resource for the purposes of CEQA.

5.3.2 Modoc Ditch

As detailed in Section 4.2 of the report, the Modoc Ditch, originally known as the Modoc Canal, was constructed in 1876 (Grunsky 1898:20). It was incorporated under the Modoc Canal Company in 1891, and in the following decades, some sections of the Modoc Canal were realigned and expanded from 4 miles long to its current length at approximately 8.5 miles, with several branch additions (Sauls 2021; Tulare County Times 1891). To ascertain whether the Modoc Ditch possesses historical significance, and its recorded segments have the potential to be eligible for inclusion in the CRHR, a formal discussion of the evaluation criteria is required. For this study, only two segments of the Modoc Ditch are within the Project area and were surveyed. As such, the evaluation below is provided for recorded segments of the main channel and a branch of the ditch starting immediately west of North Demaree Street and terminating

approximately 1,300 feet west at the unnamed farm lane along the west boundary of the Project area.

5.3.2.1 Significance

Criterion 1—Associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States: The Modoc Ditch was constructed in 1876 and was one of dozens of canals and ditches established in the 1870s and 1880s in the Visalia region (Grunsky 1898:20; Sauls 2021). The Modoc Ditch is not representative of the earliest ditches in the region; in fact, archival evidence suggests several other canals were constructed in the Kaweah River Delta as early as 1850 (Grunsky 1898). The Modoc Ditch receives its water from the St. John's River, a distributary of the Kaweah River. As such, it operates as a secondary distribution channel for the larger St. John's River. It did not play a critical role in bringing irrigation to the surrounding region and merely aided in the distribution of water to individual agricultural parcels in its immediate area. No evidence suggests that the recorded segments irrigated parcels of particular importance to the greater community. The size and relative irrigation impact of the Modoc Ditch to the Visalia region is considered minor when compared to larger and earlier water conveyance systems within the Kaweah River Delta, such as the Wutchumna Canal or Tulare Canal (Sauls 2021). Therefore, the Modoc Ditch is not considered significant under Criterion 1.

Criterion 2—Associated with the lives of persons important to local, California, or national history: Archival research found no evidence to suggest that the Modoc Ditch is directly linked to individuals significant in the history of the Visalia area. Review of regional histories, Tulare County property atlases, and historical irrigation maps did not reveal any information about the Ditch or individuals associated with their construction. Archival evidence suggests that the Modoc Ditch was named for the Modoc Canal Company, which was responsible for its management and maintenance. The company was relatively small, with a board consisting of individuals who owned parcels along the ditch (Sauls 2021; Tulare County Times 1891). Board members would be replaced when new owners occupied these parcels. Research did not reveal persons of particular significance associated with the Modoc Canal Company or to the parcel containing the recorded segments of the Modoc Ditch. For this reason, the Modoc Ditch is not considered significant under Criterion 2.

Criterion 3—Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values: Significance under Criterion 3, when applied to canals, ditches, and similar linear structures, is measured by distinctive or innovative design, methods of construction, or involvement of a historically significant builder or engineer. Archival research uncovered no information about the original dimensions of the channel (i.e., its shape, width, depth, etc.) or related features within the Modoc Ditch. The main channel (Segment 2) has been realigned throughout the years, and the branch (Segment 1) was added decades after the ditch's original construction. As such, the recorded segments do not represent the original construction of the Modoc Ditch. At present, the recorded segments of the Modoc Ditch and its features are largely modern in appearance. No archival evidence revealed that any individual engineer or builder was associated with the construction of the Modoc Ditch, and the Modoc Ditch therefore does not represent the work of a master engineer or builder. The Modoc Ditch traverses level terrain that did not pose noteworthy

engineering challenges for the irrigation company or its contractors. The Modoc Ditch is not considered significant under Criterion 3.

Criterion 4—Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation: Criterion 4 applies to built environment resources if further study has the potential to yield information that cannot be obtained from other sources. However, the Modoc Ditch is a commonplace example of a ubiquitous resource type in California and have been well-documented. And, in their current form, the segments are largely contemporary in appearance. *Æ* has exhausted available sources and no additional information could be gleaned from subsequent field visits. Therefore, *Æ* does not anticipate that any additional information can be identified that would prove the resource to be significant. The Modoc Ditch is not considered significant under Criterion 4.

5.3.2.2 Eligibility

A discussion of integrity is not required because the resource does not possess historical significance. The recorded segments of the Modoc Ditch do not possess significance under the CRHR criteria for evaluation; therefore, the recorded segments are recommended ineligible for listing in the CRHR and does not qualify as a historical resource for the purposes of CEQA.

6
SUMMARY AND MANAGEMENT RECOMMENDATIONS

At the request of Lennar, Æ conducted a cultural resource study for the proposed Ritchie Ranch Project in the city of Visalia. The Project will involve the construction of a 321-unit, single-family home community, with associated utilities, roadway development and improvements, and two approximately 1-acre public parks on 44.9 acres of land that is currently partially vacant and partially occupied by almond orchards. The Project is subject to CEQA, which mandates public agencies determine whether a proposed project will cause a significant change to the environment, including cultural resources. The Project area occupies the southwest corner at the intersection of North Demaree Street and West River Way Avenue.

To assist Lennar in fulfilling their responsibility under CEQA, Æ conducted a cultural resource study to identify historical resources (i.e., cultural resources listed or eligible for listing in the CRHR) within the Project area. Accordingly, Æ performed background research, obtained a records search from the SSJVIC, requested a search of the NAHC's SLF, conducted outreach to local tribal representatives, and performed an intensive archaeological and historic built environment pedestrian survey of the Project. Additionally, Æ evaluated the historic significance of two historic-era built environment resources for CRHR-eligibility.

6.1 SUMMARY

The records search conducted by the SSJVIC reported one cultural resource within the Project area and one historic-era resource within the 0.5-mile search radius. Additionally, the SSJVIC revealed that three previous studies have occurred within the Project area (overlapping less than 5 percent), and one investigation has been conducted within the 0.5-mile search radius.

The NAHC's SLF search identified no previously recorded tribal resources within or near the Project area. Æ reached out to the interested individuals and tribal communities on the NAHC contact list. Formal government-to-government consultation under Assembly Bill 52 will be conducted by the City. No additional information regarding sensitive or sacred sites was obtained through Æ's Native American outreach efforts.

Æ conducted an archaeological and historic built environment survey of 43.6 acres of the 44.9-acre Project area. A small (1.3-acre) area containing the historic-era house at 3629 North Demaree Street and its surrounding yard were not surveyed to respect the privacy of the current occupants. However, because the yard appears routinely cleared and graded, it is unlikely archaeological artifacts or features exist in this area. Æ archaeologists observed four historic-era artifacts (two pieces of glass, and two ceramic fragments) widely scattered across the northern portion of the Project area. The items were recorded as an isolate (P-54-005811). Isolated finds are not considered eligible for listing on the CRHR, and no further documentation is necessary.

Additionally, Æ confirmed the presence of two historic-era built environment resources within the Project area—a residence at 3629 N. Demaree Street and two segments of the Modoc Ditch. Both resources were evaluated for CRHR-eligibility and found ineligible for listing because they

do not possess significance under the CRHR criteria for evaluation and therefore do not qualify as historical resources for the purposes of CEQA. No further action is recommended for the management of these resources. Æ's cultural resource study found no historical resources within the Project area that could be impacted by the proposed Project.

6.2 RECOMMENDED MITIGATION

Given that the Project area has been occupied and agriculturally cultivated since the 1800s, there is a possibility that additional historic-era resources, such as refuse deposits, foundations, or privies associated with the previous or current homesteads may be uncovered during the Project. Although Æ's study did not identify historical resources within the Project area, mitigation measures are provided below in the event that unanticipated cultural materials are discovered during ground-disturbing activities.

Mitigation Measure CUL-1: If unknown precontact or historic-era cultural resources are encountered during Project activities, all ground-disturbing activities within 50 feet of the find shall cease. A Secretary of the Interior-qualified archaeologist and/or historian, as appropriate to the resource and approved by the City, shall evaluate the significance of the resource and recommend appropriate management measures. The City shall consult with interested Native American representatives in determining appropriate mitigation for unearthed cultural resources if the resources are precontact or Native American in nature. Per CEQA Guidelines Section 15126.4(b)(3), 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 in consultation with the City and interested Native American representatives if the resources are tribal in nature, which may include data recovery or other appropriate measures. If preservation in place is not possible and additional studies or data recovery mitigation is necessary, the qualified archaeologist will prepare a plan outlining the mitigation steps to be approved by the City and the SRR. Once the plan has been implemented and the resources mitigated, construction can recommence based on the direction of the archaeologist and City concurrence. A formal report documenting the results of mitigation must be prepared as outlined in MM CUL-2.

Mitigation Measure CUL-2: In the event that potential cultural resources are identified, a Secretary of the Interior-qualified archaeologist, approved by the City, will be contracted to provide archaeological monitoring services for the duration of the earthmoving activities. All remaining soils that have not been previously disturbed as part of the project will require archaeological observation. Within 60 days of conclusion of the construction activities, the qualified archaeologist shall prepare a report documenting the results of the monitoring activities, including any finds or other resources observed during the project. All discovered cultural resources will be documented on California Department of Parks and Recreation 523 series forms. A copy of the report shall be provided to City, the SRR, and the SSJVIC.

Mitigation Measure CUL-3: As requested by the Santa Rosa Rancheria Tachi Yokut Tribe, the City also will notify the SRR of any inadvertent discoveries within 24 hours of the find. If inadvertent tribal cultural resources are identified, the SRR will be contracted to provide tribal

monitoring services for the duration of the earthmoving activities. All remaining soils that have not been previously disturbed as part of the project will require tribal observation.

Mitigation Measure CUL-4: In the event human remains are uncovered during Project activities, the Tulare County Coroner is to be immediately notified to evaluate the remains, and follow the procedures and protocols set forth in CEQA Guidelines Section 15064.5 (e)(1). If the remains are identified to be those of a Native American person, California Health and Safety Code 7050.5 requires that the county coroner notify the Native American Heritage Commission 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.

7
REFERENCES

Arguelles, Marcus R., and Michael J. Moratto
1983 *Overview of Cultural Resources, Kern and Pixley National Wildlife Refuges, California*. INFOTEC Development, Inc., Sonora, California. Submitted to U.S. Fish and Wildlife Service, Portland, Oregon.

Bowen, Mark
2000 P-54-003502 (CA-TUL-3255H; Modoc Ditch) DPR 523-series resource record (Primary; Linear Feature; Building, Structure, and Object Records). Jones & Stokes Associates, Inc., Sacramento, California. On file, California Historical Resources Information System, Southern San Joaquin Valley Information Center, California State University, Bakersfield.

California Department of Transportation
2011 *Tract Housing in California, 1945–1973: A Context for National Register Evaluation*. California Department of Transportation, Division of Environmental Analysis, Cultural Studies Office, Sacramento, California.

Chapman, H., and J. A. Gordon
1867 *Map of Tulare County, California*, Visalia, California.

City of Visalia
2019 *City of Visalia Housing Element 2020–2023*. City of Visalia Planning Division,, Visalia, California.

2024 Receiving Waters of Visalia, https://www.visalia.city/depts/public_works/urban_runoff_management/receiving_waters_of_visalia.asp, accessed July 25, 2024. Visalia: The Gateway to the Sequoias, Public Works Department City of Visalia.

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.

Cook, Sherburne F.
1955 *The Aboriginal Population of the San Joaquin Valley, California*. Anthropological Records Vol. 16(2). University of California Press, Berkeley and Los Angeles.

Daily Alta California
1853 San Joaquin News: The Flood of the Upper San Joaquin. *Daily Alta California* 8 January:2. California Digital Newspaper Collection, https://cdnc.ucr.edu/?a=d&d=DAC18530108.2.13&srpos=182&e=-------en--20--181--txt-txIN-%22san+joaquin+news%22-------1, accessed December 2018.

Davis, G. H., J. H. Green, F. H. Olmstead, and D. W. Brown
1959 *Groundwater Conditions and Storage Capacity in the San Joaquin Valley, California*. U.S. Geological Survey Water Supply Paper 1469. Prepared in cooperation with California Division of Water Resources, Sacramento.

Dillon, Brian D.
2002 California Paleoindians: Lack of Evidence, or Evidence of Lack? In *Essays in California Archaeology: A Memorial to Franklin Fenenga*, edited by William J. Wallace and Francis A. Riddell, pp. 110–128. Contributions of the University of California Archaeological Research Facility Vol. 60. University of California Press, Berkeley.

Fredrickson, David A.
1973 *Early Cultures of the North Coast Ranges, California*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.

1974 Social Change in Prehistory: A Central California Example. In *'Antap: California Indian Political and Economic Organization*, edited by Lowell John Bean and Thomas F. King, pp. 57–73. Ballena Press Anthropological Papers 2.

Gifford, Edward W., and W. Egbert Schenck
1926 *Archaeology of the Southern San Joaquin Valley, California*. University of California Publications in American Archaeology and Ethnology Vol. 23(1). University of California Press, Berkeley.

Grunsky, Carl Ewald
1898 *Irrigation near Fresno, California*. Water-Supply and Irrigation Papers of the United States Geological Survey No. 18. Department of the Interior, Washington, D.C.

Hill, Mary
1984 *California Landscape*. California Natural History Guide Series No. 48. University of California Press, Berkeley.

Kroeber, Alfred L.
1939 *Cultural and Natural Areas of Native North America*. University of California Publications in American Archaeology and Ethnology Vol. 38. University of California Press, Berkeley.

McGuire, Kelly R., and Alan P. Garfinkel
1980 *Archaeological Investigation in the Southern Sierra Nevada: The Bear Mountain Segment of the Pacific Crest Trail*. Cultural Resources Publications, Archaeology. U.S. Bureau of Land Management, Bakersfield, California.

Menefee, Eugene L., and Fred A. Dodge
1913 *History of Tulare and Kings Counties, California*. Historic Record Company, Los Angeles, California.

Mitchell, Annie R.
1983 *Sites to See: Historical Landmarks in Tulare County*. Panorama West Books, Fresno, California.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, Orlando, Florida.

National Park Service
1997 *How to Apply the National Register Criteria for Evaluation*. National Register Bulletin 15. U.S. Department of the Interior, National Park Service, Cultural Resources Division, Washington, D.C.

NETROnline
2024 Aerial Imagery of 3629 North Demaree Street, Visalia, California, 1942, https://historicaerials.com/viewer, accessed September 11, 2024. Historic Aerials, NETROnline.

Norris, Robert M., and Robert W. Webb
1976 *Geology of California*. Wiley and Sons, Santa Barbara, California.

Oakeshott, Gordon B.
1978 *California's Changing Landscapes: A Guide to the Geology of the State*. 2nd ed. McGraw-Hill, New York.

Office of Historic Preservation
1990 *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*. California Department of Parks and Recreation, Sacramento.

1995 *Instructions for Recording Historical Resources*. California Department of Parks and Recreation, Sacramento.

Preston, William L.
1981 *Vanishing Landscapes: Land and Life in the Tulare Lake Basin*. University of California Press, Berkeley.

Rosenthal, Jeffrey S., Gregory G. White, and Mark Q. Sutton
2007 The Central Valley: A View from the Catbird's Seat. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 147–163. AltaMira Press, Lanham, Maryland.

Sauls, Consuelo Y.
2021 P-54-003502 (CA-TUL-003255h; Modoc Ditch) DPR 523-series resource record (Primary; Linear Feature; Building, Structure, and Object Records). Taylored Archaeology, Fresno, California. On file, California Historical Resources Information System, Southern San Joaquin Valley Information Center, California State University, Bakersfield.

Siefkin, Nelson
1999 *Archaeology of the Redtfeldt Mound (CA-KIN-66), Tulare Basin, California*. Master's thesis, Department of Sociology and Anthropology, California State University, Bakersfield.

Smith, Brandon, Paul Scheibel, and Josh McDonnell
2014 *Visalia General Plan Draft Environmental Impact Report*. City of Visalia, California.

Tulare County Times
1891 City Jottings: Town Topics and Rural Notes—Important Happenings in Visalia and Vicinity. *Tulare County Times* 17 September. Visalia, California.

Tulare Irrigation District
2020 Tulare Irrigation District Profile: History, https://tulareid.org/district-profile#:~:text=History,eventually%20reduced%20to%2032%2C500%20acres, accessed July 15, 2020.

U.S. Geological Survey
1949 *Visalia, Calif.*, Visalia Quadrangle, California, 15-Minute Serries. U.S. Department of the Interior, Washington, D.C.

Vandor, Paul E.
1919 *History of Fresno County, California, with Biographical Sketches*, Vol. 1. 2 vols. Historic Record Company, Los Angeles, California.

Visalia Morning Delta
1939 Early Visalia. 26 May. Visalia, 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.

Wedel, Waldo R.
1941 *Archaeological Investigations at Buena Vista Lake, Kern County, California*. Bureau of American Ethnology Bulletin 130. Smithsonian Institution, Washington, D.C.

APPENDIX A

Personnel Qualifications

ANNA HOOVER

Managing Principal/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

- 25

Education

M.S., Anthropology, focus Archaeology, University of California, Riverside, 2003

B.S., Anthropology, University of California, Riverside, 2000

B.A., Linguistics, University of California, Riverside, 2000

Registrations/Certifications

- Registered Professional Archaeologist 28576661 (current)
- Cultural Consultant, Riverside County #171 (current)
- First aid/CPR
- HAZWOPER (40 hour)

Permits/Licensure

- Principal Investigator, California BLM Statewide Cultural Resources Use Permit CA-24-18

Professional Associations

- Society of California Archaeology
- Association of Environmental Professionals

Professional Experience

2025–	Managing Principal/Principal Archaeologist, Applied EarthWorks, Inc.
2023–2024	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 25 years of experience in archaeological, cultural, and tribal resource management in Central, Coastal, and Southern 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. As a capable Project Manager, she has coordinated dozens of CRM projects during all phases of development. 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.

CARLOS VAN ONNA

Principal Architectural Historian

Areas of Expertise

- Cultural resource management
- Architectural history
- Historic preservation

Years of Experience

- 12

Education

Ph.D. candidate, Architectural History, Utrecht University

M.A., Architectural History and Historic Preservation, Utrecht University, 2010–2011

B.A., Art History, Utrecht University, 2007–2010

Professional Experience

2023–	Principal Architectural Historian, Applied EarthWorks, Inc., Hemet, California
2023	Senior Architectural Historian, PaleoWest, LLC, Los Angeles, California
2022–2023	Senior Planner, Office of Historic Preservation, City of Dallas, Texas
2019–2021	Senior Architectural Historian, Applied EarthWorks, Inc., Fresno, California
2017–2019	Editor/Translator, SDI Media, Los Angeles, California
2016–2017	Subcontractor, GPA Consulting, Los Angeles, California
2015–2016	Project Manager, City of Amsterdam, The Netherlands
2014–2015	Visiting Scholar, Columbia University, New York
2011–2014	Advisor on Cultural History and Urban Development, City of Amsterdam, The Netherlands

Technical Qualifications

Mr. van Onna has been involved in cultural resources management since 2011. His areas of expertise include built environment investigations, preparation of historic resource evaluation reports, and other required documentation for cultural resource management projects. As a Principal Architectural Historian for Applied EarthWorks, Mr. van Onna meets the Secretary of the Interior's professional qualification standards in architectural history. He has prepared technical reports for historical built environment resources to satisfy compliance requirements under the National Historic Preservation Act (NHPA) Section 106 and the California Environmental Quality Act (CEQA), including significance evaluations and eligibility recommendations for inclusion in the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR). Mr. van Onna has previously worked for the City of Amsterdam, Netherlands, coordinating its Municipal Landmarks Project and completing numerous built environment surveys, studies, and historical significance assessments. More recently, he worked for the city of Dallas as a senior planner in the Office of Historic Preservation. At Applied EarthWorks, he leads built environment studies, provides guidance and assistance to project managers and staff, and conducts review of technical documents. Additional skills include archival research, architectural photography, editing, and quality assurance. Through his pursuit of a doctoral degree at Utrecht University, he explores the role of historic preservation in urban public spaces in the United States.

Applied EARTHWORKS Inc.

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
- Exhumations
- Human osteology
- Faunal analysis/zooarchaeology
- Project administration

Years of Experience

- 7

Education

M.S., Forensic Anthropology, Boston University Chobanian and Avedisian School of Medicine, 2023

B.A., Anthropology, University of California, Santa Cruz, 2012

Professional Associations

American Association of Biological Anthropologists

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 and Avedisian School of Medicine. 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. In addition, Ms. Saenz serves as a forensic anthropology analyst at California State University Fresno, where she has performed laboratory case analysis and field exhumations. Ms. Saenz's professional responsibilities include project administration, osteological assessments, outreach with the Native American Heritage Commission and its recommendations, pre-field project preparations, writing technical reports, completing California Department of Parks and Recreation 523-series forms, and assisting with project proposals.

CHEYENNE GOOD-PEERY

Staff Architectural Historian

Areas of Expertise

- Architectural history
- California history
- Environmental history
- Archival and historical research
- CEQA/NEPA application and analysis
- Secretary of the Interior's Standards for the Preservation of Historic Properties

Years of Experience

- 2

Education

B.A., Art History, East Tennessee State University, Johnson City, TN, 2019 (with great distinction)

B.A., Foreign Languages-French, East Tennessee State University, Johnson City, TN, 2019 (with great distinction)

Professional Affiliations

- California Preservation Foundation

Professional Experience

2021– Staff Architectural Historian, Applied EarthWorks, Inc., Fresno, California.

Technical Qualifications

Ms. Good-Peery is a Staff Architectural Historian at Applied EarthWorks, Inc. She received dual Bachelor of Arts degrees in Art History and French from East Tennessee State University in 2019. Ms. Good-Peery's professional responsibilities include policy consistency analysis, historical resource evaluation, significance evaluation, integrity assessment, built environment monitoring, archival and historical research, and architectural field surveys. She maintains all measures to satisfy compliance requirements under Section 106 of the NRHP, CEQA, and local regulations. Since joining Applied EarthWorks, Inc., Ms. Good-Peery has employed her educational background for projects throughout California's central valley, central coast, and southern California, including Fresno, Mariposa, Merced, Kern, Tulare, San Benito, San Luis Obispo, Santa Barbara, San Bernardino, Riverside and Los Angeles Counties. She has prepared evaluations for various types of state historic resources and at-risk properties and performed Section 110 condition assessments at military installations. She has assessed potential adverse effects under 36 CFR 800.5 in support of projects dealing with sensitive or eligible resources. She has also reviewed projects for consistency with the SOI Standards for the Treatment of Historic Properties. She is knowledgeable of urban, rural, residential, commercial, civic, agricultural, transportation, and scientific related properties.

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 7927.005, and from the Freedom of Information Act (5 U.S.C. 552[b][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]).

CHRIS Data Request Form

ACCESS AND USE AGREEMENT NO.: 116.00 **IC FILE NO.:**

To: Southern San Joaquin Valley Information Center

Print Name: Nicole Saenz Date: July 17, 2024

Affiliation: Applied EarthWorks, Inc

Address: 1391 West Shaw Ave, Suite C

City: Fresno State: CA Zip: 93726

Phone: 559-229-1856x121 Fax: Email: nsaenz@appliedearthworks.com

Billing Address (if different than above):

Billing Email: kdenny@appliedearthworks.com Billing Phone:

Project Name / Reference: 4633 Ritchie Ranch

Project Street Address: Southwest corner of Demaree St. and River Way Drive Visalia, CA

County or Counties: Tulare

Township/Range/UTMs: T18S, R24E, Sections 13, 14, 23, 24

USGS 7.5' Quad(s): Visalia, CA

PRIORITY RESPONSE (Additional Fee): yes ☐ / no ☐

TOTAL FEE NOT TO EXCEED: $800.00
(If blank, the Information Center will contact you if the fee is expected to exceed $1,000.00)

Special Instructions:

Information Center Use Only

Date of CHRIS Data Provided for this Request:

Confidential Data Included in Response: yes ☐ / no ☐

Notes:

CHRIS Data Request Form

Mark the request form as needed. Attach a PDF of your project area (with the radius if applicable) mapped on a 7.5' USGS topographic quadrangle to scale 1:24000 ratio 1:1 neither enlarged nor reduced and include a shapefile of your project area, if available. Shapefiles are the current CHRIS standard for submitting digital spatial data for your project area or radius. **Check with the appropriate IC for current availability of digital data products.**

- Documents will be provided in PDF format. Paper copies will only be provided if PDFs are not available at the time of the request or under specially arranged circumstances.
- Location information will be provided as a digital map product (Custom Maps or GIS data) unless the area has not yet been digitized. In such circumstances, the IC may provide hand drawn maps.
- In addition to the $150/hr. staff time fee, client will be charged the Custom Map fee when GIS is required to complete the request [e.g., a map printout or map image/PDF is requested and no GIS Data is requested, or an electronic product is requested (derived from GIS data) but no mapping is requested].

For product fees, see the CHRIS IC Fee Structure on the OHP website.

1. Map Format Choice:

Select One: Custom GIS Maps ☐ GIS Data ☒ Custom GIS Maps **and** GIS Data ☐ No Maps ☐

Any selection below left unmarked will be considered a "no. "

2. Location Information:

	Within project area	Within 0.5 mi. radius
ARCHAEOLOGICAL Resource Locations[1]	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Locations	yes ☒ / no ☐	yes ☒ / no ☐
Report Locations[1]	yes ☒ / no ☐	yes ☒ / no ☐
"Other" Report Locations[2]	yes ☐ / no ☒	yes ☐ / no ☒

3. Database Information:
(contact the IC for product examples, or visit the SSJVIC website for examples)

	Within project area	Within 0.5 mi. radius
ARCHAEOLOGICAL Resource Database[1]		
List (PDF format)	yes ☒ / no ☐	yes ☒ / no ☐
Detail (PDF format)	yes ☒ / no ☐	yes ☒ / no ☐
Excel Spreadsheet	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Database		
List (PDF format)	yes ☒ / no ☐	yes ☒ / no ☐
Detail (PDF format)	yes ☒ / no ☐	yes ☒ / no ☐
Excel Spreadsheet	yes ☒ / no ☐	yes ☒ / no ☐
Report Database[1]		
List (PDF format)	yes ☒ / no ☐	yes ☒ / no ☐
Detail (PDF format)	yes ☒ / no ☐	yes ☒ / no ☐
Excel Spreadsheet	yes ☒ / no ☐	yes ☒ / no ☐
Include "Other" Reports [2]	yes ☒ / no ☐	yes ☒ / no ☐

4. Document PDFs (paper copy only upon request)**:**

	Within project area	Within 0.5 mi. radius
ARCHAEOLOGICAL Resource Records[1]	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Records	yes ☒ / no ☐	yes ☒ / no ☐
Reports[1]	yes ☒ / no ☐	yes ☐ / no ☒
"Other" Reports[2]	yes ☐ / no ☐	yes ☐ / no ☒

CHRIS Data Request Form

5. Eligibility Listings and Documentation:

	Within project area	Within 0.5 mi. radius
OHP Built Environment Resources Directory[3]:		
Directory listing only (Excel format)	yes ☐ / no ☒	yes ☐ / no ☐
Associated documentation[4]	yes ☐ / no ☒	yes ☐ / no ☒
OHP Archaeological Resources Directory[1,5]:		
Directory listing only (Excel format)	yes ☐ / no ☒	yes ☐ / no ☒
Associated documentation[4]	yes ☐ / no ☒	yes ☐ / no ☒
***California Inventory of Historic Resources* (1976):**		
Directory listing only (PDF format)	yes ☒ / no ☐	yes ☒ / no ☐
Associated documentation[4]	yes ☒ / no ☐	yes ☒ / no ☐

6. Additional Information:

The following sources of information may be available through the Information Center. However, several of these sources are now available on the OHP website and can be accessed directly. The Office of Historic Preservation makes no guarantees about the availability, completeness, or accuracy of the information provided through these sources. Indicate below if the Information Center should review and provide documentation (if available) of any of the following sources as part of this request.

Caltrans Bridge Survey	yes ☐ / no ☐
Ethnographic Information	yes ☐ / no ☐
Historical Literature	yes ☐ / no ☐
Historical Maps	yes ☐ / no ☐
Local Inventories	yes ☐ / no ☐
GLO and/or Rancho Plat Maps	yes ☐ / no ☐
Shipwreck Inventory	yes ☐ / no ☐
Soil Survey Maps	yes ☐ / no ☐

---

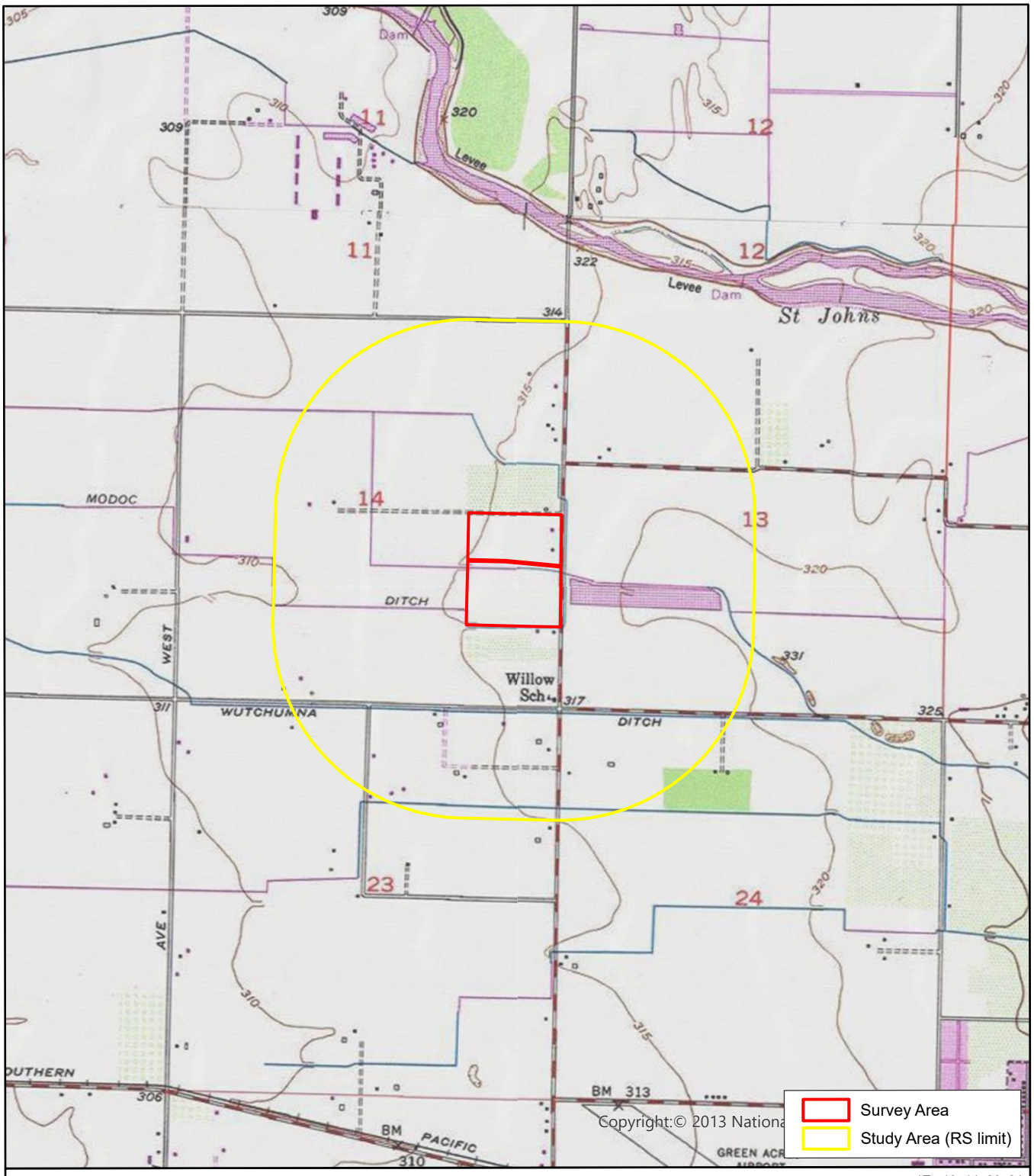
[1] In order to receive archaeological information, requestor must meet qualifications as specified in Section III of the current version of the California Historical Resources Information System Information Center Rules of Operation Manual and be identified as an Authorized User or Conditional User under an active CHRIS Access and Use Agreement.

[2] "Other" Reports GIS layer consists of report study areas for which the report content is almost entirely non-fieldwork related (e.g., local/regional history, or overview) and/or for which the presentation of the study area boundary may or may not add value to a record search.

[3] Provided as Excel spreadsheets with no cost for the rows; the only cost for this component is IC staff time. Includes, but not limited to, information regarding National Register of Historic Places, California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and historic building surveys. Previously known as the HRI and then as the HPD, it is now known as the Built Environment Resources Directory (BERD). The Office of Historic Preservation compiles this documentation and it is the source of the official status codes for evaluated resources.

[4] Associated documentation will vary by resource. Contact the IC for further details.

[5] Provided as Excel spreadsheets with no cost for the rows; the only cost for this component is IC staff time. Previously known as the Archaeological Determinations of Eligibility, now it is known as the Archaeological Resources Directory (ARD). The Office of Historic Preservation compiles this documentation and it is the source of the official status codes for evaluated resources.



Record Search location map for the *Project - Ritchie Ranch AE4633.*

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

7/29/2024

Nicole Saenz
Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

Re: 4633 Ritchie Ranch
Records Search File No.: 24-327

The Southern San Joaquin Valley Information Center received your record search request for the project area referenced above, located on Visalia USGS 7.5' quad. The following reflects the results of the records search for the project area and the 0.5 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:	P-54-003602
Resources within 0.5 mile radius:	P-54-004875
Reports within project area:	TU-00041, 00103, 01190
Reports within 0.5 mile radius:	TU-01934

NOTE: Two "Other" Reports were included in database products, but withheld from PDF copies & GIS, as per request.

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,

Jeremy E David
Assistant Coordinator

Report List

SSJVIC Record Search 24-327

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
TU-00041	BLM - Permit No. CA-95-01-0004; NADB-R - 1141258	1995	Self, William	Class I Overview, Santa Fe Pacific Pipeline Partners, L.P., Proposed Concord to Colton Pipeline Project	William Self Associates	
TU-00103		1997	Wickstrom, Brian and Anderson, Emily	Cultural Resource Survey for the Selma to Bakersfield Fiberoptic Line, Southern San Joaquin Valley, California	KEA Environmental, Inc.	54-003608, 54-003914, 54-003915, 54-003916, 54-003917
TU-01190		1957	Mitchell, Annie R.	Jim Savage and the Tulareño Indians	Westernlore Press	
TU-01934		2021	Sauls, Consuelo Y.	Cultural Resources Assessment for the Belissa Tentative Subdivison Project, City of Visalia, Tulare County, California	Taylored Archaeology	54-003602

Resource List

SSJVIC Record Search 24-327

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-54-003602	CA-TUL-003255H	Resource Name - Modoc Ditch; Modoc Canal	Structure	Historic	HP20	2000 (Mark Bowen, Jones & Stokes); 2021 (Consuelo Sauls, Taylored Archaeology); 2021 (R. Azpitarte, ASM Affiliates, Inc.)	TU-01934, TU-01970
P-54-004875	CA-TUL-003027H	Resource Name - Wutchumna Ditch; Wutchumna Canal; Other - PL-09; Other - 2622-KR-S01	Object	Historic	AH06; HP20	2007 (R. Ottenhoff, L. MacDonald, P. Paramoure and M. Armstrong, Pacific Legacy, Inc.); 2020 (K. Ross, Far Western Anthropological Research Group, Inc.); 2021 (R. Azpitarte, ASM Affiliates, Inc.); 2022 (Consuelo Y. Sauls, Taylored Archaeology)	TU-01906, TU-01938, TU-01970

APPENDIX C

Native American Outreach

Native American Outreach

Ritchie Ranch Cultural Resource Study and Evaluation

Organization	Name	Letter	Email	Phone	Summary of Contact
Dumna Wo-Wah Tribal Government	Robert Ledger	08/15/24	8/15/2024	Message left 9/16/24	No response to date
Kitanemuk & Yowlumne Tejon Indians	Delia Dominguez	8/15/2024	8/15/2024	Message left 9/16/24	No response to date
Santa Rosa Rancheria Tachi Yokut Tribe	Samantha McCarty	8/15/2024	8/15/2024	Called 9/16/24	Responded by email on 9/23/24 requesting that the tribe be notified of any finds related to the project.
Santa Rosa Rancheria Tachi Yokut Tribe	Shana Powers	—	—	—	—
Santa Rosa Rancheria Tachi Yokut Tribe	Nichole Escalon	08/15/24	8/15/2024	Message left 9/16/24	No response to date
Table Mountain Rancheria	Michelle Heredia-	08/15/24	8/15/2024	—	—
Table Mountain Rancheria	Bob Pennell	08/15/24	8/15/2024	—	Sent a letter 9/3/24 stating that this project is beyond TMR's
Traditional Choinumni Tribe	David Alvarez	08/15/24	Email returned undeliverable	Called 9/16/24	Stated that the project is outside of his area of interest.
Tule River Indian Tribe	Neil Peyron	08/15/24	8/15/2024	—	—
Tule River Indian Tribe	Joey Garfield	—	—	—	—
Tule River Indian Tribe	Kerri Vera	08/15/24	8/15/2024	—	Responded 8/15/24 stating that they have no knowledge of sensitive cultural resources within or near the site but request to be contacted if resources are encountered.
Wuksachi Indian Tribe/Eshom Valley Band	Kenneth Woodrow	08/15/24	8/15/2024	Line busy on multiple attempts	No response to date

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: July 18, 2024

Project: 4633 Ritchie Ranch

County: Tulare

USGS Quadrangle Name: Visalia

Township: 18S **Range:** 24E **Section(s):** 14

Company/Firm/Agency: Applied EarthWorks, Inc.

Contact Person: nmsaenz@appliedearthworks.com

Street Address: 1391 W. Shaw Ave., Suite C

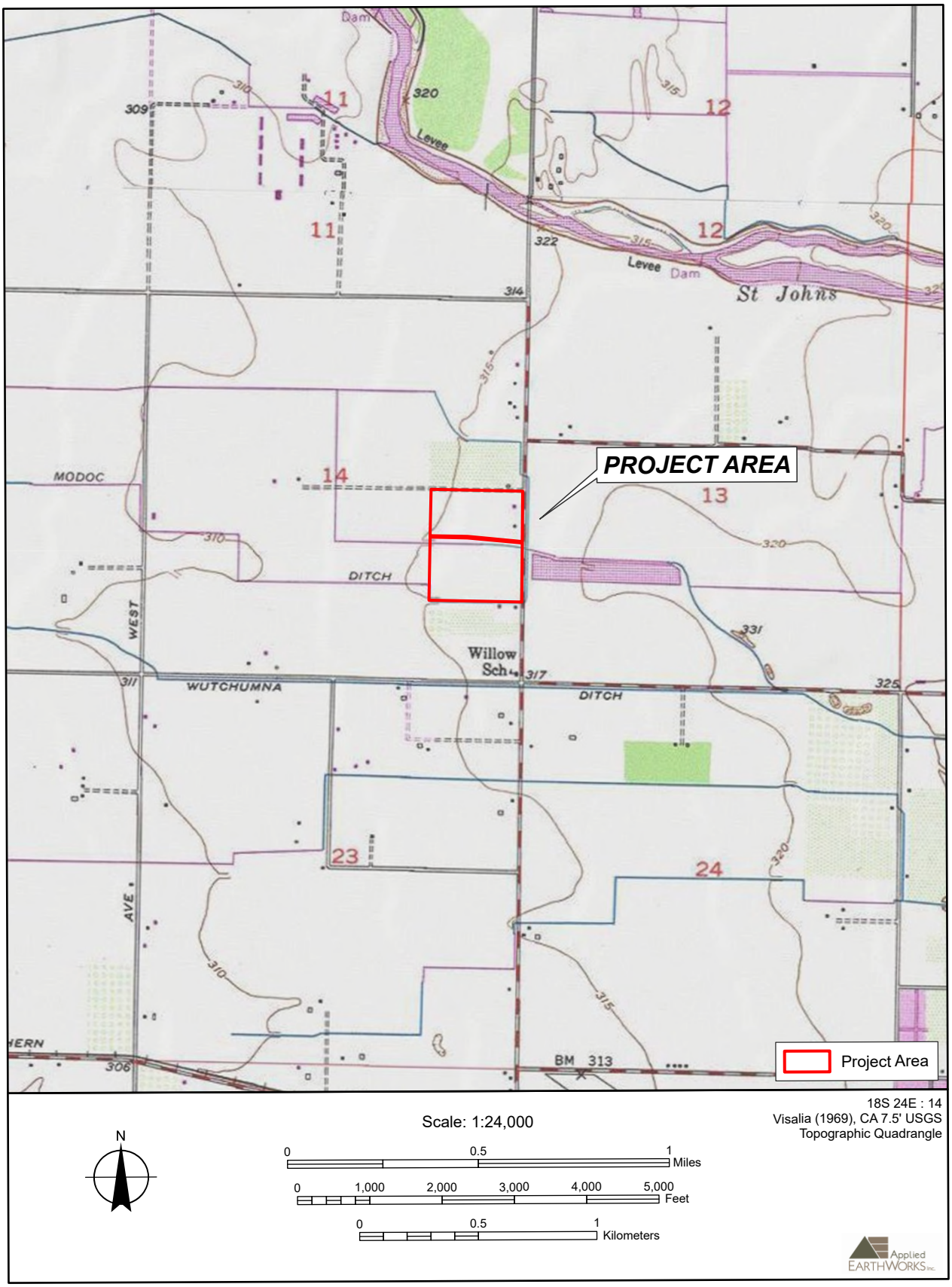
City: Fresno **Zip:** 93711

Phone: (559) 229-1856 x 121

Fax: (559) 229-2019

Email: nsaenz@appliedearthworks.com

Project Description:
Pedestrian survey in advance of a residential development.



Project location map for the *Project - Ritchie Ranch AE4633.*

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Reginald Pagaling
Chumash

VICE-CHAIRPERSON
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

SECRETARY
Sara Dutschke
Miwok

PARLIAMENTARIAN
Wayne Nelson
Luiseño

COMMISSIONER
Isaac Bojorquez
Ohlone-Costanoan

COMMISSIONER
Stanley Rodriguez
Kumeyaay

COMMISSIONER
Laurena Bolden
Serrano

COMMISSIONER
Reid Milanovich
Cahuilla

COMMISSIONER
Bennae Calac
Pauma-Yuima Band of Luiseño Indians

EXECUTIVE SECRETARY
Raymond C. Hitchcock
Miwok, Nisenan

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710

August 13, 2024

Nicole Saenz
Applied EarthWorks, Inc.

Via Email to: nsaenz@appliedearthworks.com

Re: 4633 Ritchie Ranch Project, Tulare County

Dear Ms. Saenz:

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
Tulare County
8/13/2024

Tribe Name	Contact Person	Contact Address	Phone #	Fax #	Email Address
Dumna Wo-Wah Tribal Government	Robert Ledger, Chairperson	2191 West Pico Ave. Fresno, CA, 93705	(559) 540-6346		ledgerrobert@ymail.com
Kitanemuk & Yowlumne Tejon Indians	Delia Dominguez, Chairperson	115 Radio Street Bakersfield, CA, 93305	(626) 339-6785		2deedominguez@gmail.com
Santa Rosa Rancheria Tachi Yokut Tribe	Samantha McCarty, Cultural	P.O. Box 8 Lemoore, CA, 93245	(559) 633-3440		smccarty@tachi-yokut-nsn.gov
Santa Rosa Rancheria Tachi	Shana Powers, THPO	P.O. Box 8 Lemoore, CA, 93245	(559) 423-3900		spowers@tachi-yokut-nsn.gov
Santa Rosa Rancheria Tachi	Nichole Escalon,	P.O. Box 8 Lemoore, CA, 93245	(559) 924-1278		nescalone@tachi-yokut-nsn.gov
Table Mountain Rancheria	Michelle Heredia-Cordova, Chairperson	P.O. Box 410 Friant, CA, 93626	(559) 822-2587	(559) 822-2693	mhcordova@tmr.org
Table Mountain Rancheria	Bob Pennell, Cultural Resource Director	P.O. Box 410 Friant, CA, 93626	(559) 325-0351	(559) 325-0394	rpennell@tmr.org
Traditional Choinumni Tribe	David Alvarez, Chairperson	2415 E. Houston Avenue Fresno, CA, 93720	(559) 217-0396	(559) 292-5057	davealvarez@sbcglobal.net
Tule River Indian Tribe	Neil Peyron, Chairperson	P.O. Box 589 Porterville, CA, 93258	(559) 781-4271	(559) 781-4610	neil.peyron@tulerivertribe-nsn.gov
Tule River Indian Tribe	Joey Garfield, Tribal Archaeologist	P. O. Box 589 Porterville, CA, 93258	(559) 783-8892	(559) 783-8932	joey.garfield@tulerivertribe-nsn.gov
Tule River Indian Tribe	Kerri Vera, Environmental Department	P. O. Box 589 Porterville, CA, 93258	(559) 783-8892	(559) 783-8932	kerri.vera@tulerivertribe-nsn.gov
Wuksachi Indian Tribe/Eshom Valley Band	Kenneth Woodrow, Chairperson	1179 Rock Haven Ct. Salinas, CA, 93906	(831) 443-9702		kwood8934@aol.com

Applied EARTHWORKS Inc.

1391 W. Shaw Ave., Suite C
Fresno, CA 93711-3600
O: (559) 229-1856 | F: (559) 229-2019
www.appliedearthworks.com

August 14, 2024

Nichole Escalon, Cultural Specialist I
Santa Rosa Rancheria Tachi Yokut Tribe
P.O. Box 8
Lemoore, CA, 93245
(559) 633-3900
Transmitted via USPS and email (nescalon@tachi-yokut-nsn.gov)

RE: Ritchie Ranch Survey Project, Merced County, California

Dear Nichole Escalon,

Applied EarthWorks, Inc. (*Æ*) is providing cultural resource services, including archaeological survey, in support of proposed residential development with associated street improvements and utility tie-ins (Project). The Project boundaries are in the City of Visalia, Tulare County, California.

The project area is a 44.9-acre parcel as shown on the Visalia (1969), CA 7.5-minute U.S. Geological Survey topographic quadrangle (see enclosed map). 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 Visalia, *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 Visalia 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 August 13, 2024 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.
Staff Anthropologist, Fresno Office
Applied EarthWorks, Inc.

encl.: Project Map

Nicole Saenz <nsaenz@appliedearthworks.com>

Ritchie Ranch Survey Project in Tulare County, CA

1 message

Samantha McCarty <SMcCarty@tachi-yokut-nsn.gov> Mon, Sep 23, 2024 at 1:35 PM
To: Nicole Saenz <nsaenz@appliedearthworks.com>
Cc: Nichole Escalon <nescalon@tachi-yokut-nsn.gov>

Dear Nicole,

Thank you for contacting the Santa Rosa Rancheria Tachi-Yokut Tribe regarding the Ritchie Ranch Survey Project in Tulare County, CA. The Tribe is requesting to be notified of any discoveries made in relation to this project.

If you have any questions, comments, and or concerns please do not hesitate to contact Nichole or me. Thank you.

Sincerely,

Samantha McCarty

Santa Rosa Rancheria Tachi-Yokut Tribe
Cultural Specialist II
SMcCarty@tachi-yokut-nsn.gov
Cell: (559) 633-6640
Direct Line: (559) 925-2591
Office: (559) 924-1278 x 4091

***PLEASE KEEP ALL CULTURAL STAFF IN EMAILS UNLESS STATED OTHERWISE**

TABLE MOUNTAIN RANCHERIA
TRIBAL GOVERNMENT OFFICE

September 3, 2024

Nicole Saenz, M.S.
Staff Anthropologist, Fresno Office
Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

RE: Applied Earthworks Inc., Ritchie Ranch Survey Project

To: Nicole Saenz,

This is in response to your letter dated, August 14, 2024, regarding, Ritchie Ranch Survey Project in Merced County, California.

We appreciate receiving notice; however, this project site is beyond our area of interest.

Sincerely,

Robert Pennell
Cultural Resources Director

Michelle Heredia-Cordova
Tribal Chairperson

Richard L. Jones
Tribal Vice-Chairperson

Jenna Gosselaar
Tribal Secretary/Treasurer

Samantha Toles-Rodriguez
Tribal Council Member-At-Large

Mark Martinez
Tribal Council Member-At-Large

23736
Sky Harbour Road
Post Office
Box 410
Friant
California
93626
(559) 822-2587
Fax
(559) 822-2693

Nicole Saenz <nsaenz@appliedearthworks.com>

Ritchie Ranch Archaeology Project

2 messages

Nicole Saenz <nsaenz@appliedearthworks.com> Thu, Aug 15, 2024 at 8:31 AM
To: kerri.vera@tulerivertribe-nsn.gov
Cc: Anna Hoover <ahoover@appliedearthworks.com>

Dear Kerri Vera,

Applied EarthWorks, Inc. is providing archaeological services for a project in Visalia, Tulare County, CA. As a result of a recent Native American Heritage Commission (NAHC) Sacred Lands Search for this project, 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.**
Staff Anthropologist - Osteologist - Project Administrator | (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

Tule River Environmental.pdf
1098K

Kerri Vera <Kerri.Vera@tulerivertribe-nsn.gov> Thu, Aug 15, 2024 at 11:29 AM
To: Nicole Saenz <nsaenz@appliedearthworks.com>
Cc: "Felix E. Christman" <Felixe.Christman@tulerivertribe-nsn.gov>

Good morning Nicole, thank you for your email regarding this project. At this time, we do not have any information regarding sensitive cultural resources within or near the project site. If, however, during surveys or project work, resources are encountered, please reach out to us again.

Respectfully,

Kerri Vera - Director
Department of Environmental Protection
Tule River Tribe
POB 589, Porterville CA 93258
ph: 559/781-4271 ext: 5041
email(1): tuleriverenv@yahoo.com
email(2): kerri.vera@tulerivertribe-nsn.gov

From: Nicole Saenz <nsaenz@appliedearthworks.com>
Sent: Thursday, August 15, 2024 8:31 AM
To: Kerri Vera <Kerri.Vera@tulerivertribe-nsn.gov>
Cc: Anna Hoover <ahoover@appliedearthworks.com>
Subject: Ritchie Ranch Archaeology Project

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

[Quoted text hidden]

CONFIDENTIAL—Not for Public Distribution*

APPENDIX D

Cultural Resource Records

*Archaeological site locations are exempt from the California Public Records Act, as specified in Government Code 7927.005, and from the Freedom of Information Act (5 U.S.C. 552[b][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]).

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 54-003602
HRI #
Trinomial CA-TUL-3255H
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

 Resource Name or # Modoc Ditch

P1. Other Identifier: Modoc Canal

***P2. Location: a. County:** Tulare ☐ **Not for Publication** ☒ **Unrestricted**
b. USGS 7.5′ Quad: Visalia, Goshen **Date:** 1969, 1969
T 18S, R 24E; Sec. 13, 14, 15, 16, 18, 27 M.D. **B.M.**
T 18S, R 25E; Sec. 19, 20, 24 M.D. **B.M.**

c. Address: N/A
d. UTM: NAD 83, Zone 11N; West End 283151 **mE** / 4026898 **mN**
East End 295086 **mE** / 4025673 **mN**
e. Other Locational Data: None

***P3a. Description:** The Modoc Ditch is approximately 8.5 miles long and runs east to west. It is headed at the Saint Johns River and terminates at a reservoir. Æ recorded two segments of the Modoc Ditch, including a segment of the main channel and one branch segment, which are described on Linear Feature Record forms below.

***P3b. Resource Attributes:** HP20. Canal/Aqueduct

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other:

***P5a. Photograph or Drawing:**



P5b. Description of Photo: Overview of Recorded Segment 1 with vegetation intrusion, facing southwest

***P6. Date Constructed/Age and Sources:**
☐ Prehistoric ☒ Historic ☐ Both
1876

***P7. Owner and Address:**
Modoc Ditch Company
P.O. Box 366
Farmersville, CA 93223

***P8. Recorded By:** Cheyenne Good-Peery and Julio Olivares,
Applied EarthWorks, Inc.
1391 W. Shaw Avenue,
Fresno, California 93711

***P9. Date Recorded:** August 30, 2024

***P10. Survey Type:** ☒ Intensive
☐ Reconnaissance ☐ Other
Describe: Pedestrian survey

***P11. Report Citation:** Nicole Saenz, Cheyenne Good-Peery, and Carlos van Onna 2025 *Cultural Resource Study and Evaluation for Ritchie Ranch, City of Visalia, California.* Applied EarthWorks, Inc., Fresno, California. Prepared for Lennar Homes of California, LLC, Fresno, California.

***Attachments:**
☐ NONE
☒ Location Map
☒ Sketch Map
☒ Continuation Sheet
☒ Building, Structure, and Object Record
☐ Archaeological Record
☐ District Record
☒ Linear Feature Record
☐ Milling Station Record
☐ Rock Art Record
☐ Artifact Record
☒ Photograph Record
☐ Other (list):

B1. Historic Name: Modoc Canal

B2. Common Name: Modoc Ditch

B3. Original Use: Irrigation Ditch **B4. Present Use:** Irrigation Ditch

***B5. Architectural Style:** N/A (utilitarian)

***B6. Construction History (construction date, alterations, and dates of alterations):** The Modoc Ditch (P-54-003602;CA-TUL-3255H), originally known as the Modoc Canal, was constructed in 1876 (Grunsky 1898:20). It was incorporated under the Modoc Canal Company in 1891, and in the following decades, some sections of the Modoc Canal were realigned and expanded from 4 miles long to its current length at approximately 8.5 miles, with several branch additions (Sauls 2021; Tulare County Times 1891). The ditch has changed alignment over time and various branches were added since its initial construction. The current alignment of the main channel of the Modoc Ditch was established sometime between 1927 and 1935 (Bowen 2000:2; Sauls 2021:5).

***B7. Moved?:** ☒ No ☐ Yes ☐ Unknown Date: Original Location:

***B8. Related Features:** None.

B9. a. Architect: N/A **b. Builder:** Modoc Canal Company

***B10. Significance:** Theme: Early Irrigation Development Area: Tulare County
Period of Significance: N/A Property Type: Canal Applicable Criteria: N/A

The Modoc Canal, later renamed the Modoc Ditch, was originally constructed as a distributary canal of the larger Wutchumna Canal to the northeast in 1876, but ultimately it received its water from the Saint John's River to the north (Grunsky 1898:20). The Modoc Canal was owned and operated by the Modoc Ditch Company, which officially incorporated on September 14, 1891, and was managed by a board of local shareholders who received its waters (Sauls 2021; Tulare County Times 1891). The Modoc Canal was roughly 4 miles long and ran from the south bank of the Saint John's River west toward the community of Goshen by 1898, and it irrigated approximately 1,000 acres of land. The 1885 *Irrigation Map of the San Joaquin Valley* shows the main channel of the Modoc Canal flowing to the south and a branch of this canal running east to west. Throughout the decades, the Modoc Canal was realigned in some sections and several branches were added. By 1920, the ditch was approximately 6 miles long and irrigated approximately 3,500 acres, only receiving water from the Saint John's River between April and July annually (Sauls 2021).Today, the ditch is maintained by the Kaweah Delta Water Conservation District (City of Visalia 2024).

The USGS 1927 topographical map labels the main channel of the Modoc Ditch, with the recorded branch ditch segment aligned slightly different than it is seen today. The earliest available aerial photograph of the region is from 1946 and shows the current alignment of the recorded Modoc Ditch segment, as well as cultivated fields surrounding the current residence at 3629 N. Demaree Street. By 1949, a new branch of the Modoc Ditch is clearly depicted east to west. Subsequent aerials photographs and topographical maps from 1956, 1958, 1969 show minimal changes. A 1984 aerial photograph shows that the central segment of the Modoc Ditch is undergrounded. There have since been no apparent substantial changes that can be gleaned from currently available maps, atlases, and aerial photographs.

Railroad Expansion and the Beginnings of Visalia

The first recorded Euro-American settlement near the subject property was Woodsville, approximately 16 miles south of Visalia. This settlement was founded in December 1850 by a party of 15 men (Visalia Morning Delta 1939:15). The settlers built a cabin at this location; however, an altercation with the local indigenous population resulted in a

This space reserved for official comments.

Sketch Map
See attached Sketch Maps

poor outcome for the settlers. After the massacre at Woodsville, a new group of settlers arrived in what is now Visalia. Their party included cattlemen, lawyers, doctors, merchants, and millwrights. With the events at Woodsville in mind, the Visalia party's priority was to establish a defensive structure which became known as Fort Visalia. The fort was constructed north of Mill Creek (Mitchell 1983; Visalia Morning Delta 1939); however, the need for Fort Visalia proved to be short lived. By the winter of 1853, settlers had constructed new homes outside the fort walls and planted crops; the settlement, now called Visalia, was prospering. Euro-Americans continued to settle in the area despite continued reports of hostility between Native Americans and settlers. By 1853, at least 500 people were living in the area (Daily Alta California 1853).

The San Joaquin Valley, and specifically, the cities of Tulare and Visalia, experienced an influx of settlers and economic prosperity in the mid to late 1800s. Economic prosperity was fostered in large part by the arrival of such lines as the Visalia and Goshen Railroad and the Visalia and Tulare Railroad, constructed in 1874 and 1888, respectively (Menefee and Dodge 1913). In 1896, the San Francisco and San Joaquin Valley Railroad commenced construction of a new rail line extending north from Bakersfield. Soon after its completion in 1897, the rail line was sold to the Atchinson, Topeka, and Santa Fe Railroad.

Founded in 1852, Visalia's influence as a pioneer town went beyond its political and economic importance to Tulare County (Menefee and Dodge 1913:34–40). For its first three decades, the town was the commercial hub of the central and southern San Joaquin Valley. It served as a primary transportation node for the valley and contained the regional branch of the U.S. General Land Office (GLO) that issued federal land patents to early settlers. Similar to the scenario played out in Fresno County, economic and infrastructural development in Tulare County occurred initially along the valley's eastern border, where, as noted by the Franciscans more than a half-century earlier, the land offered more resources (oak groves, pasture, flowing creeks) and fewer obstacles (less marshland) to settlement than the valley's west side. An 1867 county map shows quite vividly that property ownership, along with roads and telegraph lines, was concentrated in the Visalia-Woodlake area and, to a lesser extent, around Porterville (Chapman and Gordon 1867). At times, less than 10 pioneer families had purchased land or taken residence around the future site of Tulare (Menefee and Dodge 1913:80–81); even fewer resided along the entire eastern shoreline of Tulare Lake.

Like other parts of the valley, the impact of agriculture on the early economy of Tulare County was negligible, yet the beginnings of numerous developments are traced to this period. Several varieties of fruit—including oranges, apricots, and grapes—that would later become important commodities were initially grown, albeit in small scale, during the 1850s and 1860s (Menefee and Dodge 1913:41–42, 139). Similarly, the adaptability of alfalfa as a livestock feed was recognized as early as 1860, even though its potential was not realized until much later in the century (Menefee and Dodge 1913:137).

Not long after the floods of 1867–1868, the arrival of the Central Pacific Railroad (later Southern Pacific Railroad) prompted the county's population and economy to expand westward. Similar to other valley counties, the railroad chose a route that ran though the sparsely settled central portion of Tulare County rather than its more established east side. In 1872, Tulare, along with towns like Goshen and Tipton, was founded along the railroad's valley main line (Menefee and Dodge 1913:52, 55, 75, 80–84). By connecting the county with the markets of the San Francisco Bay area, the railway created considerable agricultural and business opportunity for the new towns as well as the older eastern communities of Visalia and Porterville, which were linked to the rail network in 1874 and 1888, respectively.

Beginnings of Commercial Agriculture

In addition to Euro-American settlement, the channelization and other manipulations of the valley waterways during the late 1800s forever changed life throughout the valley. The Tulare Irrigation District (TID) was formed on September 21, 1889, encompassing approximately 32,500 acres. At the time, $500,000 in bonds were issued to fund construction of diversion works on the St. Johns River; the purchase of water rights of the Kaweah Canal and Irrigation Company, Rocky Ford Canal and Irrigation Company, and Settlers Ditch Company; and canal construction within the TID (Tulare Irrigation District 2020). Between 1951 and 1964, the TID annexed the Kaweah and Packwood lands and began the extensive process of expanding and overhauling the existing canal system. This process included enlarging and/or relocating canals, installing pipelines, and constructing diversion structures, road crossings, check gates, and siphons (Tulare Irrigation District 2020). In 1982, the TID and Kaweah Delta Water Conservation District joined to form the Kaweah River Power Authority. The initial and continued development of irrigation systems by these and other groups have allowed agriculture to prosper in areas otherwise too dry and barren to grow food crops.

Agriculture continued to prosper in the valley, resulting in the intensification of local farming until the 1930s when individual farmers emerging from the Great Depression no longer found agriculture to be a lucrative endeavor. Since that time, farmland has increasingly been developed for other commercial purposes.

Evaluation

Criterion 1—Associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States: The Modoc Ditch was constructed in 1876 and was one of dozens of canals and ditches established in the 1870s and 1880s in the Visalia region (Grunsky 1898:20; Sauls 2021). Furthermore, the Modoc Ditch is not representative of the earliest ditches in the region; in fact, archival evidence suggests several other canals were constructed in the Kaweah River Delta as early as 1850 (Grunsky 1898). The Modoc Ditch receives its water from the St. John's River, a distributary of the Kaweah River. As such, it operates as a secondary distribution channel for the larger St. John's River. It did not play a critical role in bringing irrigation to the surrounding region and merely aided in the distribution of water to individual agricultural parcels in its immediate area. No evidence suggests that the recorded segments irrigated parcels of particular importance to the greater community. The size and relative irrigation impact of the Modoc Ditch to the Visalia region is considered minor when compared to larger and earlier water conveyance systems within the Kaweah River Delta, such as the Wutchumna Canal or Tulare Canal (Sauls 2021). Therefore, the Modoc Ditch is not considered significant under Criterion 1.

Criterion 2—Associated with the lives of persons important to local, California, or national history: Archival research found no evidence to suggest that the Modoc Ditch is directly linked to individuals significant in the history of the Visalia area. Review of regional histories, Tulare County property atlases, and historical irrigation maps did not reveal any information about the Ditch or individuals associated with their construction. Archival evidence suggests that the Modoc Ditch was named for the Modoc Canal Company, which was responsible for its management and maintenance. The company was relatively small, with a board consisting of individuals who owned parcels along the ditch (Sauls 2021; Tulare County Times 1891). Board members would be replaced when new owners occupied these parcels. Research did not reveal persons of particular significance associated with the Modoc Canal Company or to the parcel containing the recorded segments of the Modoc Ditch. For this reason, the Modoc Ditch is not considered significant under Criterion 2.

Criterion 3—Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values: Significance under Criterion 3, when applied to canals, ditches, and similar linear structures, is measured by distinctive or innovative design, methods of construction, or involvement of a historically significant builder or engineer. Archival research uncovered no information about the original dimensions of the channel (i.e., its shape, width, depth, etc.) or related features within the Modoc Ditch. The main channel segment has been realigned throughout the years, and the branch segment was added decades after the ditch's original construction. As such, the recorded segments do not represent the original construction of the Modoc Ditch. At present, the recorded segments of the Modoc Ditch and its features are largely modern in appearance. No archival evidence revealed that any individual engineer or builder was associated with the construction of the Modoc Ditch, and the Modoc Ditch therefore does not represent the work of a master engineer or builder. The Modoc Ditch traverses level terrain that did not pose noteworthy engineering challenges for the irrigation company or its contractors. The Modoc Ditch is not considered significant under Criterion 3.

Criterion 4—Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation: Criterion 4 applies to built environment resources if further study has the potential to yield information that cannot be obtained from other sources. However, the Modoc Ditch is a commonplace example of a ubiquitous resource type in California and have been well-documented. And, in their current form, the segments are largely contemporary in appearance. Æ has exhausted available sources and no additional information could be gleaned from subsequent field visits. Therefore, Æ does not anticipate that any additional information can be identified that would prove the resource to be significant. The Modoc Ditch is not considered significant under Criterion 4.

Eligibility

A discussion of integrity is not required because the resource does not possess historical significance. The recorded segments of the Modoc Ditch do not possess significance under the CRHR criteria for evaluation; therefore, the

recorded segments are recommended ineligible for listing in the CRHR and does not qualify as a historical resource for the purposes of CEQA.

B11. Additional Resource Attributes (list attributes and codes): None.

***B12. References:**

Bowen, Mark
2000 P-54-003502 (CA-TUL-3255H; Modoc Ditch) DPR 523-series resource record (Primary; Linear Feature; Building, Structure, and Object Records). Jones & Stokes Associates, Inc., Sacramento, California. On file, California Historical Resources Information System, Southern San Joaquin Valley Information Center, California State University, Bakersfield.

Chapman, H., and J. A. Gordon
1867 Map of Tulare County, California, Visalia, California.

City of Visalia
2024 Receiving Waters of Visalia, https://www.visalia.city/depts/public_works/urban_runoff_management/receiving_waters_of_visalia.asp , accessed July 25, 2024. Visalia: The Gateway to the Sequoias, Public Works Department City of Visalia.

Daily Alta California
1853 San Joaquin News: The Flood of the Upper San Joaquin. *Daily Alta California* 8 January:2, https://cdnc.ucr.edu/?a=d&d=DAC18530108.2.13&srpos=182&e=-------en--20--181--txt-txIN-%22san+joaquin+news%22-------1, accessed December 2018. California Digital Newspaper Collection

Grunsky, Carl Ewald
1898 *Irrigation near Fresno, California*. Water-Supply and Irrigation Papers of the United States Geological Survey No. 18. Department of the Interior, Washington, D.C.

Menefee, Eugene L., and Fred A. Dodge
1913 *History of Tulare and Kings Counties, California*. Historic Record Company, Los Angeles, California.

Mitchell, Annie R.
1983 Sites to See: Historical Landmarks in Tulare County. Panorama West Books, Fresno, California.

Sauls, Consuelo Y.
2021 P-54-003502 (CA-TUL-003255h; Modoc Ditch) DPR 523-series resource record (Primary; Linear Feature; Building, Structure, and Object Records). Taylored Archaeology, Fresno, California. On file, California Historical Resources Information System, Southern San Joaquin Valley Information Center, California State University, Bakersfield.

Tulare County Times
1891 City Jottings: Town Topics and Rural Notes—Important Happenings in Visalia and Vicinity. *Tulare County Times* 17 September. Visalia, California.

Tulare Irrigation District
2020 Tulare Irrigation District Profile: History, https://tulareid.org/district-profile#:~:text=History,eventually%20reduced%20to%2032%2C500%20acres, accessed July 15, 2020.

Visalia Morning Delta
1939 Early Visalia. 26 May. Visalia, California.

B13. Remarks: None.

***B14. Evaluator:** Cheyenne Good-Peery and Carlos van Onna
Date of Evaluation: October 7, 2024

L1. Historic and/or Common Name: Modoc Canal

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:** Segment 1

b. Location of point or segment: NAD 83, Zone 11N; Segment 1 west end: 290365 **mE** / 4026821 **mN**
Segment 1 east end: 290751 **mE** / 4026813 **mN**

L3. Description: Recorded Segment 1
An approximately 1,261-foot-long segment of a branch of the Modoc Ditch trends east to west. The recorded segment of the branch is an earthen ditch. The banks of the segment show vegetation intrusion, animal burrowing, and erosion. The segment is 3 to 4 feet wide at the base and 15 feet wide from bank to bank. A circular concrete culvert is at the east end of the segment ditch where it runs below North Demaree Street. Modern polyvinyl chloride pipes protrude from the south bank of the segment toward the east end.

L4. Dimensions:
- **a. Top Width:** 15 feet
- **b. Bottom Width:** 3-4 feet
- **c. Height or Depth:** N/A
- **d. Length of Segment:** 1,261 feet

L4e. Sketch or Cross Section ☐ attached **Facing:** ☒ none

L5. Associated Resources: Circular concrete culvert

L6. Setting: The recorded segments run through the northwestern outskirts of the city of Visalia, through a mixture of agricultural, residential, and urban landscapes.

L7. Integrity Considerations: The banks of Segment 1 show vegetation intrusion, animal burrowing, and erosion; modern polyvinyl chloride pipes protrude from the south bank of the segment toward the east end.

L8a. Photo, Map, or Drawing:



L8b. Description of Photo, Map, or Drawing: East end of Recorded Segment 1 with concrete culvert, facing southeast.

L9. Remarks: None

L10. Form Prepared By: Cheyenne Good-Peery and Carlos van Onna

L11. Date: October 7, 2024

L1. Historic and/or Common Name: Modoc Canal

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:** Segment 2

b. Location of point or segment: NAD 83, Zone 11N; Segment 2 west end: 290354 **mE** / 4026360 **mN**
Segment 2 east end: 290476 **mE** / 4026350 **mN**

L3. Description: Recorded Segment 2

An approximately 1,481-foot-long segment of the main channel of the Modoc Ditch trends north to south and west to east. The recorded segment of the Modoc Ditch is an earthen ditch. The segment is littered with concrete debris in multiple sections, and the banks of the segment show vegetation intrusion, animal burrowing, and erosion. The segment is 13 feet wide at the base and 22 feet wide from bank to bank. A large, circular concrete culvert with concrete wings is at the east end of the segment where it runs below North Demaree Street. A water gate structure is at the west end of the west to east portion of the segment where it turns northward. The water gate structure opens to overflow reservoirs to the west and southwest. The structure consists of two concrete chambers flanking an iron gate and wheel, as well as a concrete channel that directs the water east from the north to south portion of the segment. The water gate is topped by metal safety guard rails.

L4. Dimensions:

a. Top Width: 22 feet
b. Bottom Width: 13 feet
c. Height or Depth: N/A
d. Length of Segment: 1,481 feet

L4e. Sketch or Cross Section ☐ attached **Facing:** ☒ none

L5. Associated Resources: Circular concrete culvert with wings and water gate structure

L6. Setting: The recorded segments run through the northwestern outskirts of the city of Visalia, through a mixture of agricultural, residential, and urban landscapes.

L7. Integrity Considerations: Segment 2 is littered with concrete debris in multiple sections, and the banks of the segment show vegetation intrusion, animal burrowing, and erosion.

L8a. Photo, Map, or Drawing:



L8b. Description of Photo, Map, or Drawing: Water gate structure where Recorded Segment 2 is turned northward, facing southwest

L9. Remarks: None

L10. Form Prepared By: Cheyenne Good-Peery and Carlos van Onna

L11. Date: October 7, 2024



Evidence of animal burrowing and erosion on Recorded Segment 1, facing southwest.



Overview of the Recorded Segment 2 with vegetation intrusion and concrete debris, facing west.



Culvert at east end of Recorded Segment 2, facing southeast.



Water gate structure where Recorded Segment 2 is turned northward, facing southwest.



Overview of Recorded Segment 2 north of the water gate structure, facing north.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

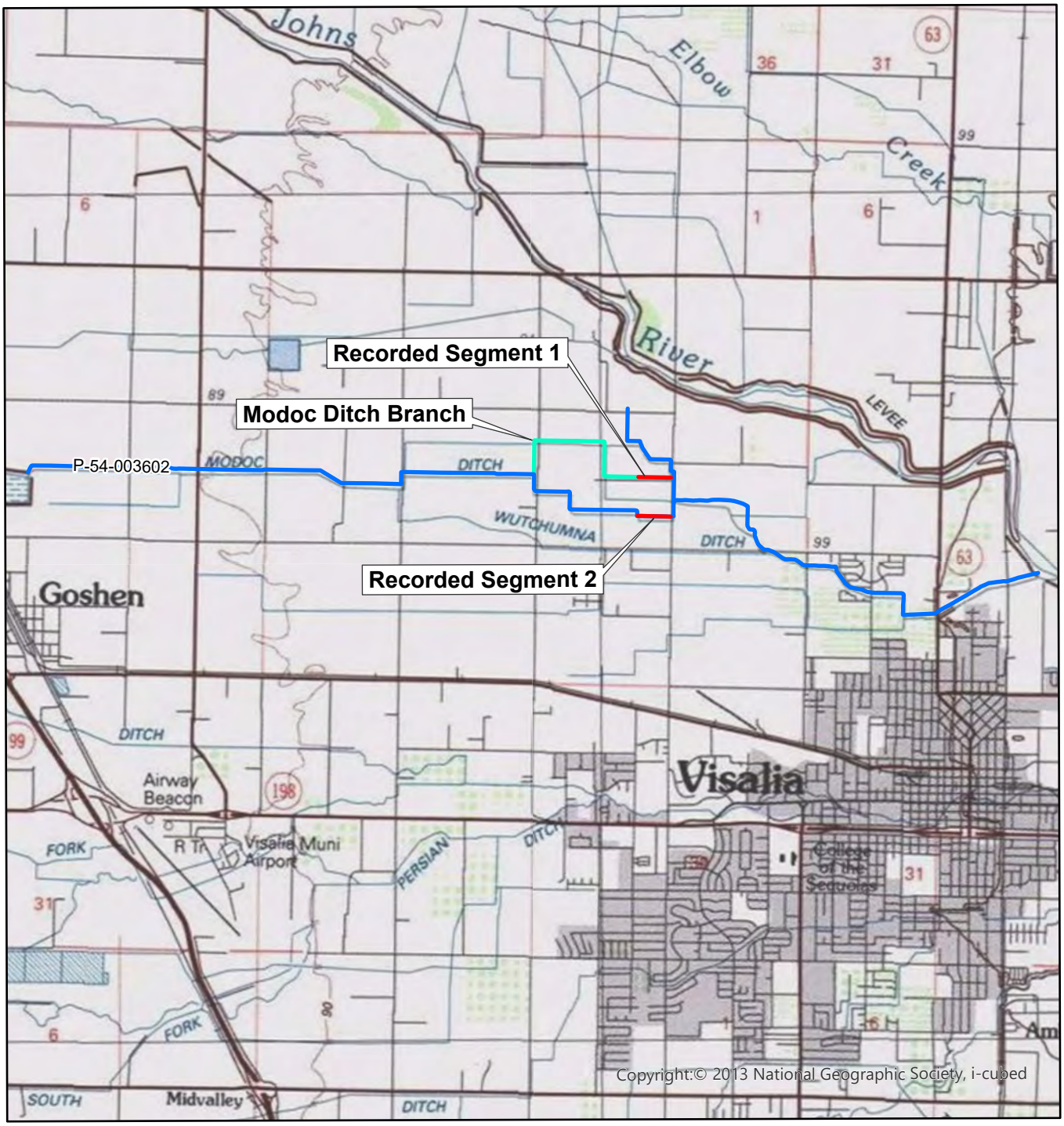
Primary # 54-003602
HRI#
Trinomial CA-TUL-3255H

Resource Name or #: Modoc Ditch

Scale: 1:24,000

Map Name: Visalia (1969), CA, USGS 7.5' quadrangle(s)

Date: 1969



Scale: 1:70,000

N

0 1 2 3 Miles

0 5,000 10,000 15,000 Feet

0 1 2 3 4 Kilometers

Date Recorded: 2024

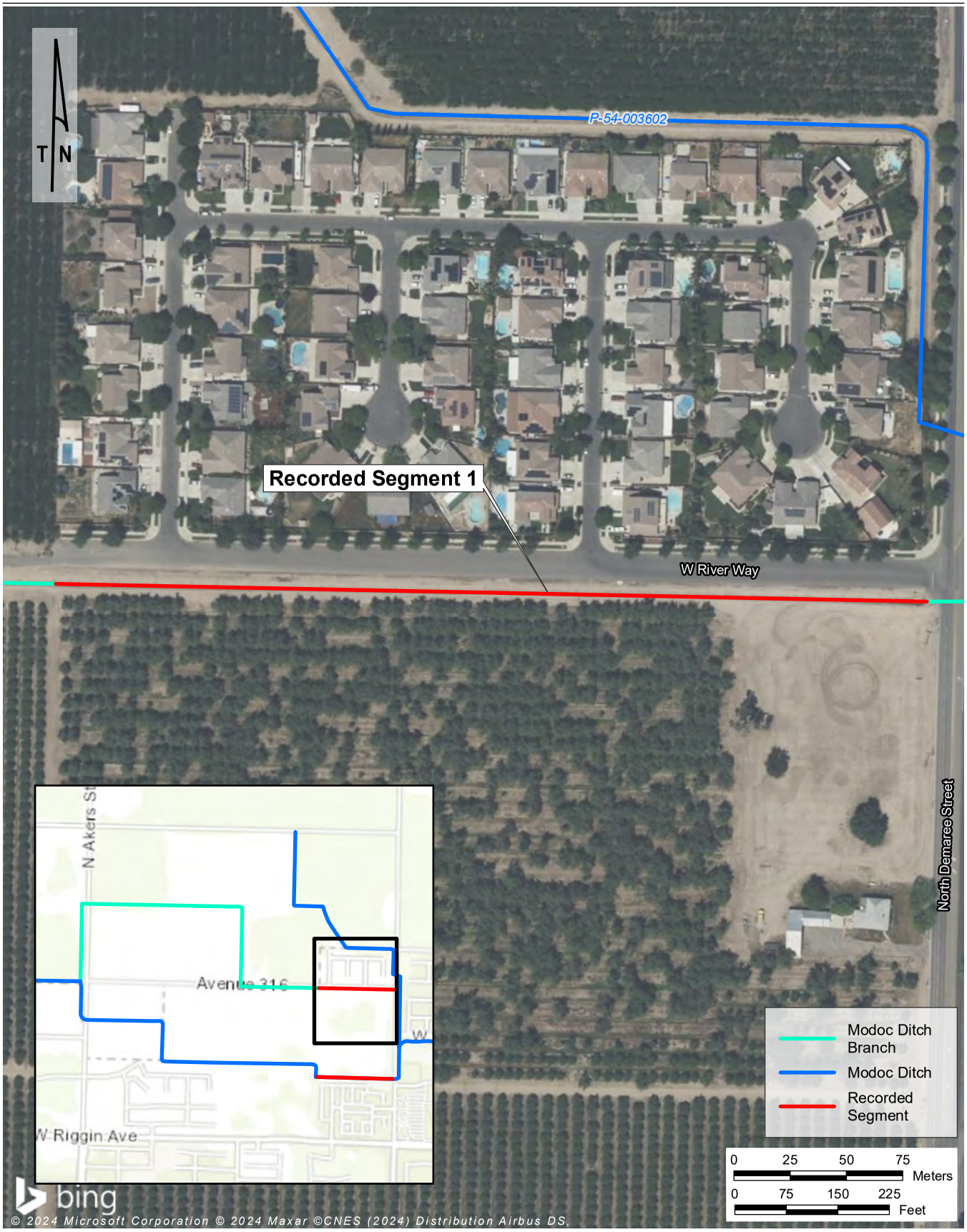
***Required information**

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # 54-003602
HRI#
Trinomial CA-TUL-3255H

Page 10 **of** 11 ***Resource Name or #:** Modoc Ditch

***Drawn by:** J. Haller ***Scale:** 1 inch equals 200 feet ***Date of map:** October 2024

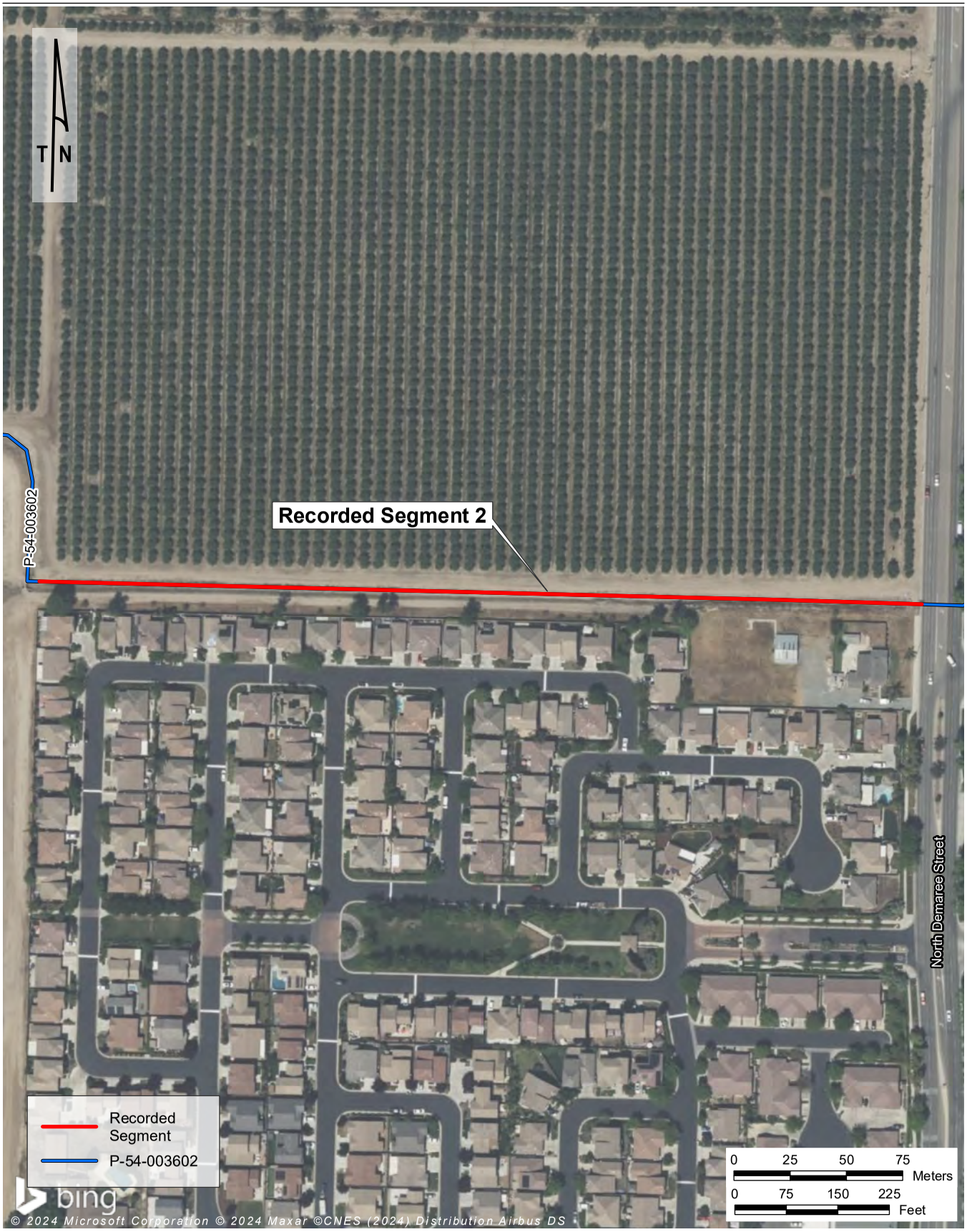


State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # 54-003602
HRI#
Trinomial CA-TUL-3255H

Page 11 **of** 11 ***Resource Name or #:** Modoc Ditch

***Drawn by:** J. Haller ***Scale:** 1 inch equals 200 feet ***Date of map:** October 2024



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 54-005810
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

 Resource Name or # 3629 North Demaree Street

P1. Other Identifier: N/A

***P2. Location: a. County:** Tulare ☐ **Not for Publication** ☒ **Unrestricted**
b. USGS 7.5′ Quad: Visalia **Date:** 1969 T 18S, R 24E; Sec. 14 M.D. **B.M.**
c. Address: 3629 North Demaree Street
d. UTM: NAD 83, Zone 11N; 290714 **mE** / 4026671 **mN**
e. Other Locational Data: None.

***P3a. Description:** The property at 3629 North Demaree Street is within the northeast corner of Assessor's Parcel Number 077-060-22 and consists of three historic-age buildings: a single-family residence, a barn, and a shed.

Single-Family Residence

The residence is a single-story, rectangular building topped by a cross-hipped roof covered by asphalt shingles with overhanging eaves. The central mass of the residence is topped by a high-pitched hipped roof, while a low pitched, dropped hipped roof wraps around the east, south, and a portion of the west elevations of the residence. A pent roof tops a portion of the west elevation at the northwest corner. The residence is supported by a concrete foundation that includes rectangular foundation vents on some elevations. (See Continuation Sheet)

***P3b. Resource Attributes:** HP2. Single family property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other:

***P5a. Photograph or Drawing:**



P5b. Description of Photo: Overview of the single-family residence, facing southwest.

***P6. Date Constructed/Age and Sources:**
☐ Prehistoric ☒ Historic ☐ Both
Between 1942 and 1950

***P7. Owner and Address:**
Larry J. and Mary E. Ritchie
3629 N. Demaree Street
Visalia, CA 93291

***P8. Recorded By:** Cheyenne Good-Peery and Julio Olivares,
Applied EarthWorks, Inc.
1391 W. Shaw Avenue,
Fresno, California 93711

***P9. Date Recorded:** August 30, 2024

***P10. Survey Type:** ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Pedestrian survey

***P11. Report Citation:** Nicole Saenz, Cheyenne Good-Peery, and Carlos van Onna 2025 *Cultural Resource Study and Evaluation for Ritchie Ranch, City of Visalia, California.* Applied EarthWorks, Inc., Fresno, California. Prepared for Lennar Homes of California, LLC, Fresno, California.

***Attachments:**
☐ NONE
☒ Building, Structure, and Object Record
☒ Photograph Record
☒ Location Map
☐ Archaeological Record
☐ Milling Station Record
☐ Other (list):
☒ Sketch Map
☐ District Record
☐ Rock Art Record
☒ Continuation Sheet
☐ Linear Feature Record
☐ Artifact Record

*P3a. **Description (continued):** The walls of the residence are clad in red-painted narrow, vertical wood boards. The corner posts around the house are painted white, complementing the white-painted wood frames that support the fenestration.

A covered entry porch wraps around the southeast corner of the residence and tops the off-center entryway. The porch floor is a poured concrete slab, and the porch roof is supported by squared white columns. A concrete walkway extends from the southeast corner of the porch to the gravel driveway. The driveway is adjacent and parallel to the south elevation of the residence, and it is lined by white posts on the south side.

Primary (East) Elevation. The primary elevation of the residence faces east and includes a portion of the entry porch at the south end. The recessed porch has a brick chimney that protrudes through the roof, and the south-facing side wall of the recessed porch has one double-hung window. Two double-hung windows occupy the north end of the elevation. A set of concrete steps are at the base of the elevation between the two windows. A stone-lined garden bed, containing several decorative shrubs and grasses, fronts the elevation extending on each side of the concrete steps.

South Elevation. The south elevation of the residence includes a portion of the entry porch at the east end. The recessed porch exhibits a pair of large, four-paned windows that hug the corner of the east-facing side wall, forming a corner window. The recessed porch also includes the primary entrance to the residence, which consists of a 15-panel glazed door. A large four-paned window is adjacent to the east of the primary entrance. A small stone-lined garden bed with decorative shrubs fronts the porch. A double-hung window opening is at the far west end of the elevation. The bottom pane of the window is covered by a plywood board, and the top pane has a small vent.

Rear (West) Elevation. The rear elevation of the residence faces west and includes an L-shaped extension at the south end. The L-shaped extension has a single entrance with a 15-panel glazed door. The entrance is fronted by a concrete slab that extends below the carport attached to the shed building, creating a quasi-back patio where the slab is closest to the residence. The north end of the elevation is topped by a pent roof and has two window openings. The smaller opening is closer to the center of the elevation and has a double-hung window. The large square window toward the north end of the elevation is covered by aluminum shielding. A large heating, ventilation, and air conditioning unit is on the roof above this window.

North Elevation. The north elevation of the residence best illustrates the dropped hipped roof beginning on the primary elevation and the pent roof on the rear elevation. Four double-hung windows are symmetrically placed on the elevation. A water tank with protective posts, as well as a decorative shrub with a pair of cacti, are adjacent to this elevation.

Barn

The vernacular-style barn has a low pitched, front-gabled roof covered by corrugated metal sheets. The barn has timber framing, with a central breezeway flanked by two enclosed wings, reminiscent of double-crib style barns. The enclosed portions are clad in corrugated metal sheets. The cladding has been removed from some sections of the barn. One exterior entrance without a door is on the north elevation of the barn. A shed building abuts the north end of the east elevation.

Shed

The shed is a vernacular, utilitarian style building with a low pitched, front-gabled roof. The roof has exposed rafters and is covered by corrugated metal sheet, though some sheets have been removed. The timber frame also is clad in corrugated metal sheets. A single light fixture is below the gabled end on the east elevation, and a car-port is attached to this elevation. The west elevation of the shed abuts the barn.

B1. Historic Name: N/A

B2. Common Name: Single-family residence at 3629 North Demaree Street

B3. Original Use: Residential/Agricultural **B4. Present Use:** Residential/Agricultural

***B5. Architectural Style:** None (vernacular/utilitarian)

***B6. Construction History (construction date, alterations, and dates of alterations):** The single-family residence, barn, and shed at 3629 North Demaree Street first appear on an aerial photograph in 1950. According to available maps and aerial photography, these buildings were likely constructed between 1942 and 1949 (NETROnline 2024; U.S. Geological Survey 1949). There have since been no apparent substantial changes to the existing residence that can be gleaned from currently available maps, atlases, and aerials.

***B7. Moved?:** ☒ No ☐ Yes ☐ Unknown Date: Original Location:

***B8. Related Features:** Barn; Shed with carport

B9. a. Architect: Unknown **b. Builder:** Unknown

***B10. Significance:** Theme: Small-Scale Agriculture Area: Tulare County
Period of Significance: N/A Property Type: Agricultural Residence Applicable Criteria: N/A

The earliest available record of the subject property is an 1860 GLO land patent issued to Edward Dennis and Philip Henry Hockensmith, who owned area within and beyond this property. No further records of these men were found in the archives. An 1863 GLO land patent designates Samuel Smith as the next owner of the property. This ownership is confirmed on an 1867 map. By 1876, a Tulare County map designates J. E. Lowery as the owner of the property. The 1885 *Irrigation Map of the San Joaquin Valley* designates C. C. Fisher as the owner of the subject property. According to a later Tulare County atlas, Fisher remained the owner through 1892, and his homestead is depicted with an orchard just north of the current residential home at 3629 North Demaree Street. A 1927 USGS topographical map shows an earlier (currently non-extant) homestead directly north of the subject property that was first depicted in the 1892 atlas map.

The earliest available aerial photograph of the region is from 1946 and shows cultivated fields surrounding the current residence at 3629 North Demaree Street. By 1950, the original 1892 homestead appears to have been removed; although an auxiliary building, likely a barn, remains in place. In this same year, the current residential building, barn, and shed at 3629 North Demaree Street are clearly shown. Subsequent aerial photographs and topographical maps from 1956, 1958, 1969 show minimal changes to the property. A 1984 aerial photograph shows that the remaining auxiliary building associated with the original 1892 homestead was removed. There have since been no apparent substantial changes that can be gleaned from currently available maps, atlases, and aerials. Most of the surrounding property is currently used for agricultural purposes.

Railroad Expansion and the Beginnings of Visalia

The first recorded Euro-American settlement near the subject property was Woodsville, approximately 16 miles south of Visalia. This settlement was founded in December 1850 by a party of 15 men (Visalia Morning Delta 1939:15). The settlers built a cabin at this location; however, an altercation with the local indigenous population resulted in a poor outcome for the settlers. After the massacre at Woodsville, a new group of settlers arrived in what is now Visalia. Their party included cattlemen, lawyers, doctors, merchants, and millwrights. With the events at Woodsville in mind, the Visalia party's priority was to establish a defensive structure which became known as Fort Visalia. The

This space reserved for official comments.

Sketch Map

See attached Sketch Maps

fort was constructed north of Mill Creek (Mitchell 1983; Visalia Morning Delta 1939); however, the need for Fort Visalia proved to be short lived. By the winter of 1853, settlers had constructed new homes outside the fort walls and planted crops; the settlement, now called Visalia, was prospering. Euro-Americans continued to settle in the area despite continued reports of hostility between Native Americans and settlers. By 1853, at least 500 people were living in the area (Daily Alta California 1853).

The San Joaquin Valley, and specifically, the cities of Tulare and Visalia, experienced an influx of settlers and economic prosperity in the mid to late 1800s. Economic prosperity was fostered in large part by the arrival of such lines as the Visalia and Goshen Railroad and the Visalia and Tulare Railroad, constructed in 1874 and 1888, respectively (Menefee and Dodge 1913). In 1896, the San Francisco and San Joaquin Valley Railroad commenced construction of a new rail line extending north from Bakersfield. Soon after its completion in 1897, the rail line was sold to the Atchinson, Topeka, and Santa Fe Railroad.

Founded in 1852, Visalia's influence as a pioneer town went beyond its political and economic importance to Tulare County (Menefee and Dodge 1913:34–40). For its first three decades, the town was the commercial hub of the central and southern San Joaquin Valley. It served as a primary transportation node for the valley and contained the regional branch of the U.S. General Land Office (GLO) that issued federal land patents to early settlers. Similar to the scenario played out in Fresno County, economic and infrastructural development in Tulare County occurred initially along the valley's eastern border, where, as noted by the Franciscans more than a half-century earlier, the land offered more resources (oak groves, pasture, flowing creeks) and fewer obstacles (less marshland) to settlement than the valley's west side. An 1867 county map shows quite vividly that property ownership, along with roads and telegraph lines, was concentrated in the Visalia-Woodlake area and, to a lesser extent, around Porterville (Chapman and Gordon 1867). At times, less than 10 pioneer families had purchased land or taken residence around the future site of Tulare (Menefee and Dodge 1913:80–81); even fewer resided along the entire eastern shoreline of Tulare Lake.

Like other parts of the valley, the impact of agriculture on the early economy of Tulare County was negligible, yet the beginnings of numerous developments are traced to this period. Several varieties of fruit—including oranges, apricots, and grapes—that would later become important commodities were initially grown, albeit in small scale, during the 1850s and 1860s (Menefee and Dodge 1913:41–42, 139). Similarly, the adaptability of alfalfa as a livestock feed was recognized as early as 1860, even though its potential was not realized until much later in the century (Menefee and Dodge 1913:137).

Not long after the floods of 1867–1868, the arrival of the Central Pacific Railroad (later Southern Pacific Railroad) prompted the county's population and economy to expand westward. Similar to other valley counties, the railroad chose a route that ran though the sparsely settled central portion of Tulare County rather than its more established east side. In 1872, Tulare, along with towns like Goshen and Tipton, was founded along the railroad's valley main line (Menefee and Dodge 1913:52, 55, 75, 80–84). By connecting the county with the markets of the San Francisco Bay area, the railway created considerable agricultural and business opportunity for the new towns as well as the older eastern communities of Visalia and Porterville, which were linked to the rail network in 1874 and 1888, respectively.

Community Development and Post-War Residential Development

In the 30 years after World War II, 40 million dwellings were constructed in the United States, 30 million of which were single-family residences. Between 1940 and 1970, the nation's population had grown from 132 million to 203 million, and California's vital role in the war effort provided a boost to population numbers in the state. California's population grew from 6.9 million to 20 million between 1940 and 1970, in part because many servicemen permanently settled in the state after the war. California became the nation's most populous state in 1962. All this growth resulted in construction of a total of 6 million dwellings in California between 1945 and 1973, 3.5 million of which were single-family residences. The 1973 oil crisis can be considered the endpoint for the period of significance for this development, as it resulted in a steady decline in housing construction (California Department of Transportation 2011:ii). The post-war period saw large-scale tract housing developments in the major metropolitan areas, where entire subdivisions were laid out and constructed by builders. These suburbs were increasingly accessible through ambitious infrastructure projects accompanying the growing number of automobiles. Historically significant developments in this era typically show a strong connection with certain architects and builders or demonstrate important advancements in construction, use of materials, or planning.

California experienced unprecedented growth during the post-war years; however, Visalia itself grew slowly and remained a relatively small town following its incorporation in 1874. From 1940 to 1970, Visalia's population grew

from 8,904 to 27,268 (City of Visalia 2019:7). The city experienced its greatest population growth between 1970 and 1980, when the population nearly doubled from 27,268 to 49,729. This period of growth is reflected in the built environment, as much of Visalia outside the downtown core was developed after 1970 (Smith et al. 2014:3.13-1). Visalia experienced increased residential development in the mid-twentieth century, which is reflected in historical aerial photographs of that time and ties into contemporary trends on a state and national level.

As a general trend in California, pre-war housing development was significantly smaller in scale and was typically the result of individual efforts. Planned subdivisions were filed at the local government level in the form of a map of the projected lots, which were subsequently sold one at a time or in small segments to individuals or builders. This resulted in a more gradual development of the individual lots, typically with a higher variety in style and type (California Department of Transportation 2011:4–5). In some cases, in historically rural areas, individual lots stem from agricultural colonies created in the second half of the nineteenth century. In smaller agricultural communities, like Visalia, this individual, gradual development appears to have been the norm well into the second half of the twentieth century. This is potentially explained by the vital role farming played in these communities and the inherent necessity of open land. In recent decades, farming has increasingly been supplemented by other employment opportunities, which in turn have fostered larger-scale housing developments.

Evaluation

Criterion 1—Associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States: The residential property at 3629 North Demaree Street consists of three buildings that were likely constructed between 1942 and 1949 (NETROnline 2024; U.S. Geological Survey 1949). Between 1945 and 1973, California experienced a post-war population boom, resulting in the construction of approximately 6 million residential buildings, of which 3.5 million were single-family residences. During this time, Visalia's population grew from 8,904 to 37,268 (City of Visalia 2019:7). The single-family residence, barn, and shed are commonplace within the development of rural parcels during this post-war population boom. No archival evidence revealed that the buildings were associated with any specific events or trends that have made significant contributions to the patterns of California's history and cultural heritage. Therefore, the residential property at 3629 North Demaree Street is not considered significant under Criterion 1.

Criterion 2—Associated with the lives of persons important to local, California, or national history: Review of regional histories, Tulare County property atlases and maps, and historical newspapers did not reveal any information about the residential property at 3629 North Demaree Street or individuals associated with the construction of the historic-age buildings on the property. While historical ownership records for the parcel from the time of construction were unavailable, supplemental research did not reveal significant persons associated with the residence. For this reason, the residential property at 3629 North Demaree Street is not considered significant under Criterion 2.

Criterion 3—Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values: While the single-family residence at 3629 North Demaree Street exhibits some recognizable architectural features, it is a common example of residential vernacular architecture seen during the mid-twentieth century in rural settings and is not representative of a single architectural style. It is not distinctive of a type, period, or method of construction, it is not the work of a master, and it does not possess high artistic value. Likewise, the barn and shed buildings were built in a vernacular utilitarian style. The type and method of construction is typical of agricultural and auxiliary buildings during this time. The builder of the barn and shed is unknown; they are not an example of a distinct time, period, or style, are not the work of a master, and lack high artistic values. The residential property at 3629 North Demaree Street is not considered significant under Criterion 3.

Criterion 4—Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation: Criterion 4 applies to built environment resources if further study has the potential to yield information that cannot be obtained from other sources. However, the residential property at 3629 North Demaree Street, including its buildings and associated features, is a commonplace example of a ubiquitous resource type in California and has been well-documented. Æ has exhausted available sources and no additional information could be gleaned from subsequent field visits. Therefore, Æ does not anticipate that any additional information can be identified that would prove the resource to be significant. The residential property at 3629 North Demaree Street is not considered significant under Criterion 4.

Eligibility

A discussion of integrity is not required because the resource does not possess historical significance. The residential property at 3629 North Demaree Street does not possess significance under the CRHR criteria for evaluation; therefore, it is recommended ineligible for listing in the CRHR and does not qualify as a historical resource for the purposes of CEQA.

B11. Additional Resource Attributes (list attributes and codes): HP4. Ancillary building

***B12. References:**

California Department of Transportation
2011 *Tract Housing in California, 1945–1973: A Context for National Register Evaluation*. California Department of Transportation, Division of Environmental Analysis, Cultural Studies Office, Sacramento, California.

Chapman, H., and J. A. Gordon
1867 *Map of Tulare County, California*, Visalia, California.

City of Visalia
2019 *City of Visalia Housing Element 2020–2023*. City of Visalia Planning Division,, Visalia, California.

Daily Alta California
1853 San Joaquin News: The Flood of the Upper San Joaquin. *Daily Alta California* 8 January:2, https://cdnc.ucr.edu/?a=d&d=DAC18530108.2.13&srpos=182&e=-------en--20--181--txt-txIN-%22san+joaquin+news%22-------1, accessed December 2018. California Digital Newspaper Collection

Menefee, Eugene L., and Fred A. Dodge
1913 *History of Tulare and Kings Counties, California*. Historic Record Company, Los Angeles, California.

Mitchell, Annie R.
1983 *Sites to See: Historical Landmarks in Tulare County*. Panorama West Books, Fresno, California.

NETROnline
2024 Aerial Imagery of 3629 North Demaree Street, Visalia, California, 1942, https://historicaerials.com/viewer, accessed September 11, 2024. Historic Aerials, NETROnline.

Smith, Brandon, Paul Scheibel, and Josh McDonnell
2014 *Visalia General Plan Draft Environmental Impact Report*. City of Visalia, California.

U.S. Geological Survey
1949 *Visalia, Calif.* 1:62,500. 15-minute series. U.S. Department of the Interior Geological Survey.

Visalia Morning Delta
1939 Early Visalia. 26 May. Visalia, California.

B13. Remarks: None.

***B14. Evaluator:** Cheyenne Good-Peery and Carlos van Onna
Date of Evaluation: October 7, 2024



Primary (east) elevation of the single-family residence, facing slightly southwest.



South elevation of the single-family residence, facing north.



View of rear (west) elevation of the single-family residence, facing southeast.



North elevation of the single-family residence, facing south.



View of east elevation of the barn, facing northwest.



South elevation of the barn, facing north.



Rear (west) elevation of the barn, facing east.



North elevation of the barn, facing south.



Overview of the shed with carport, facing northwest.



South elevation of the shed, facing north.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

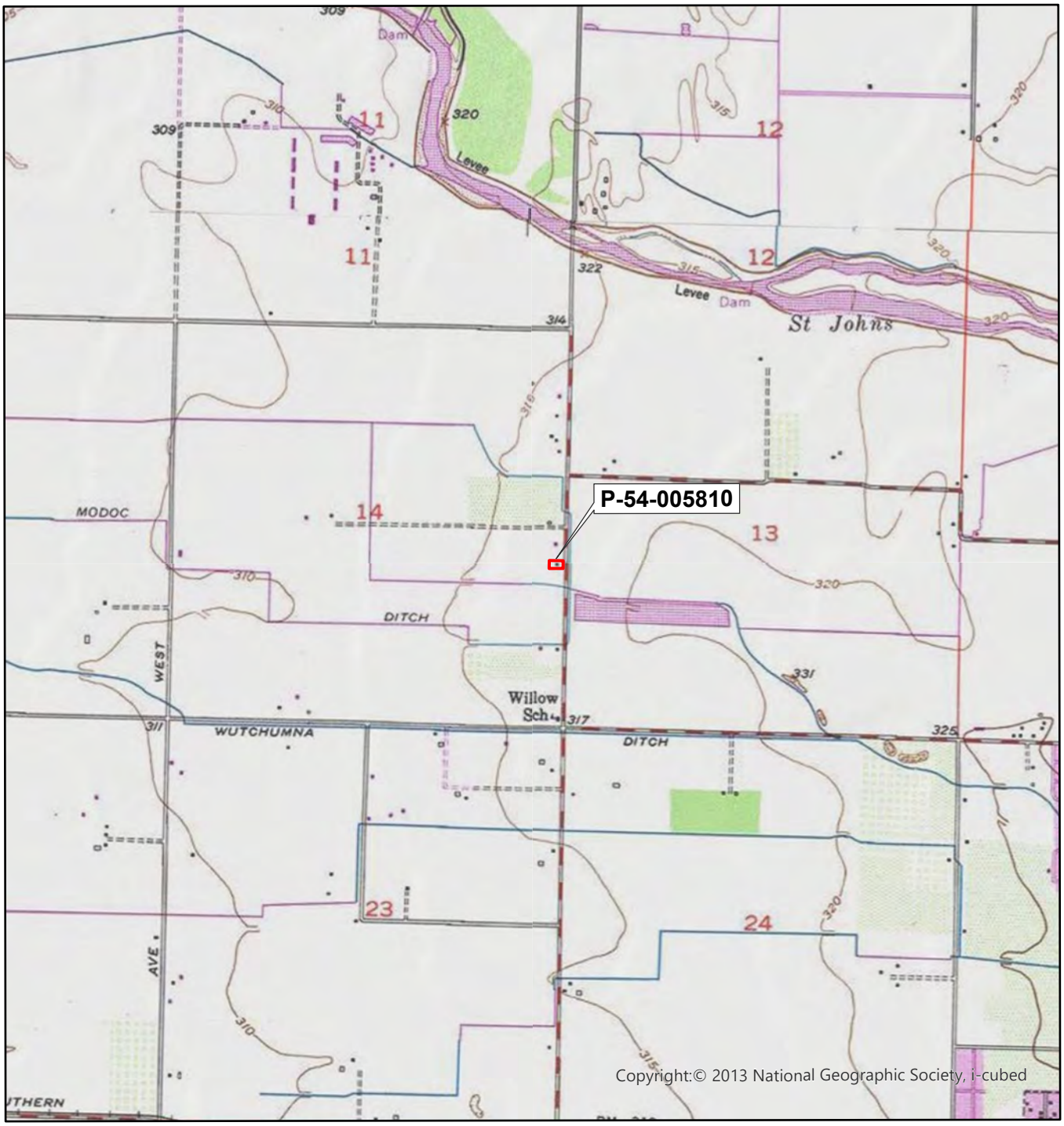
Primary # 54-005810
HRI#
Trinomial

Resource Name or #: 3629 North Demaree Street

Scale: 1:24,000

Map Name: Visalia (1969), CA, USGS 7.5' quadrangle(s)

Date: 1969



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

Date Recorded: 2024

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # 54-005810
HRI#
Trinomial

Page 10 **of** 10 ***Resource Name or #:** 3629 North Demaree Street

***Drawn by:** J. Haller ***Scale:** 1 inch equals 54 feet ***Date of map:** October 2024



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 54-005811
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

 Resource Name or # AE-4633-ISO-01

P1. Other Identifier:

*__P2. Location: a. County:__ Tulare ☒ **Not for Publication** ☐ **Unrestricted**

b. USGS 7.5′ Quad: Visalia, CA **Date:** 1969 T 18S, R24E; NE ¼ **of** SE ¼ **of** Sec.14 MD **B.M.**

c. Address: n/a

d. UTM: NAD 83, Zone 11N; 290644 **mE /** 4026722 **mN**

e. Other Locational Data: From the intersection of River Way Drive and North Demaree Street, the ceramic sherd is 75.7 meters west, 36.0 meters south (UTM 11N 290679/4026782); the amethyst glass shard is 8.7 meters west and 37.0 meters south (UTM 11N 290742/4026781); the milk glass shard is 105.7 meters west and 96.4 meters south (UTM 11N 290644/4026722); and the second ceramic sherd is 290.7 meters west and 198.0 meters south (UTM 11N 290457/4026625).

***P3a. Description:** The isolate is four historic-era artifacts scattered across 1.41-acres in the vicinity of a nonextant historic-era homestead with occupancy on the land dating to the late 1800s. The artifacts include one amethyst glass shard, one milk glass shard, one whiteware sherd, and one ceramic sherd. Decades of agricultural activity in the area have left the land highly disturbed and is likely responsible for the distribution of the artifacts across a large surface area.

***P3b. Resource Attributes:** AH4: Historic Trash Scatter

***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☒ Other: Isolate

***P5a. Photograph or Drawing:**



P5b. Description of Photo: Historic-era artifacts, clockwise from top left: amethyst glass shard; milk glass shard; whiteware sherd; and ceramic sherd.

***P6. Date Constructed/Age and Sources:**
☐ Prehistoric ☒ Historic ☐ Both

***P7. Owner and Address:**
Lennar Homes of California
8080 N. Palm, Suite 110
Fresno, CA 93711

***P8. Recorded By:**
Gabe Granado and Betsy Rapp
Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711-3600

***P9. Date Recorded:** August 30, 2024

***P10. Survey Type:** ☒ Intensive
☐ Reconnaissance ☐ Other
Describe: 10–15-meter intervals

***P11. Report Citation:** Nicole Saenz, Cheyenne Good-Peery, and Carlos van Onna 2025 *Cultural Resource Study and Historic Resource Evaluation for the Ritchie Ranch Project, City of Visalia, California.* Applied EarthWorks, Inc., Fresno, California. Prepared for Lennar Homes of California, LLC, Fresno, California.

***Attachments:**
☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet
☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record
☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record
☐ Photograph Record ☐ Other (list):

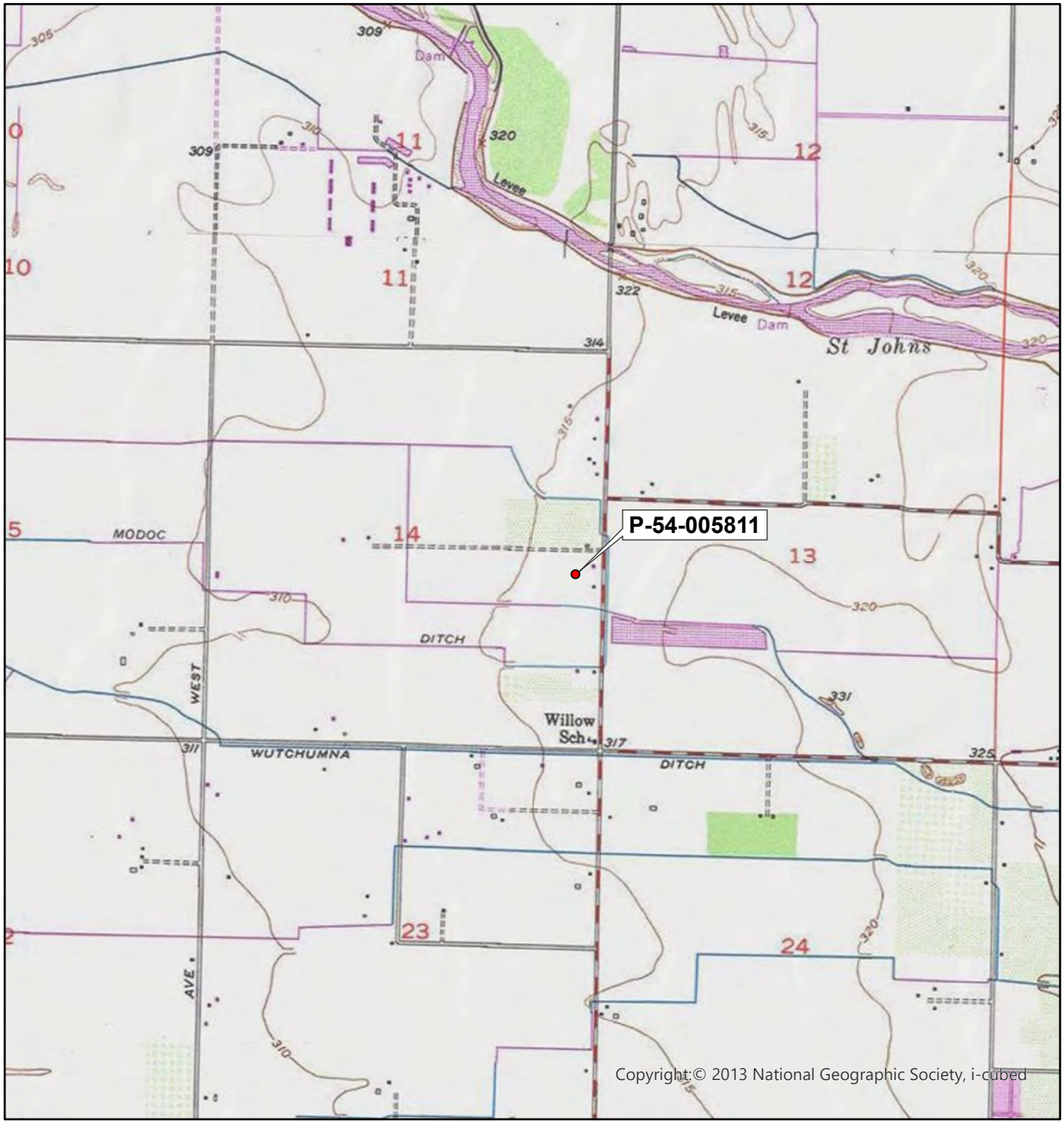
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 54-005811
HRI#
Trinomial

Page 2 **of** 2 **Resource Name or #:** AE-4633-ISO-01 **Scale:** 1:24,000

Map Name: Visalia (1969), CA, USGS 7.5' quadrangle(s) **Date:** 1969



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

Date Recorded: 2024

Ritchie Ranch Residential Development

Air Quality & Greenhouse Gas Impact Assessment
January 2025

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
1.1.1	Summary of Findings	1
1.2	Regulatory	1
1.2.1	Federal Agencies	2
1.2.2	Federal Regulations	3
1.2.3	State Agencies	7
1.2.4	State Regulations	8
1.2.5	Regional Agencies	14
1.2.6	Regional Regulations	16
1.2.7	Local Plans	17
2.0	Environmental Setting	19
2.1	Geographical Locations	19
2.2	Topographic Conditions	19
2.3	Climate Conditions	19
2.4	Anthropogenic (Man-made) Sources	21
2.4.1	Motor Vehicles	22
2.4.2	Agricultural and Other Miscellaneous	23
2.4.3	Industrial Plants	23
2.5	San Joaquin Valley Air Basin Monitoring	23
2.6	Air Quality Standards	26
2.6.1	Ozone (1-hour and 8-hour)	26
2.6.2	Suspended PM (PM10 and PM2.5)	28
2.6.3	Carbon Monoxide (CO)	29
2.6.4	Nitrogen Dioxide (NO2)	30
2.6.5	Sulfur Dioxide (SO2)	32
2.6.6	Lead (Pb)	32
2.6.7	Toxic Air Contaminants (TAC)	33
2.6.8	Odors	35
2.6.9	Naturally Occurring Asbestos (NOA)	36
2.6.10	Greenhouse Gas Emissions	36

3.0 Air Quality Impacts 38
3.1 Methodology 38
3.1.1 CalEEMod 38
3.2 Short-Term Impacts 39
3.3 Long Term Emissions 40
3.3.1 Localized Operational Emissions Ozone/Particulate Matter 40
3.3.2 Localized Operational Emissions 41

4.0 Impact Determinations and Recommended Mitigation 46
4.1 Air Quality 46
4.1.1 Conflict with or obstruct implementation of the applicable air quality plan 46
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 47
4.1.3 Expose sensitive receptors to substantial pollutant concentrations 47
4.1.4 Result in other emissions such as those leading to odors adversely affecting a substantial number of people 49
4.2 Greenhouse Gas Emissions 50
4.2.1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment 50
4.2.2 Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases 51

Appendices
Appendix A – CalEEMod Worksheets 54

List of Tables

1	Ambient Air Quality Standards	10
2	Maximum Pollutant Levels at Visalia's N Church Street Monitoring Station	24
3	Tulare County Attainment Status	25
4	Recommendations on Siting New Sensitive Land Uses Such as Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities	34
5	Screening Levels for Potential Odor Sources	36
6	SJVAPCD Air Quality Thresholds of Significance	38
7	Project Construction Emissions	40
8	Project Operational Emissions (tons/year)	40
9	2005/2020 Operational Green House Gas Emissions	45
10	Project Operational Greenhouse Gas Emissions	45

List of Figures

1	Regional Location	4
2	Project Location	5
3	San Joaquin Valley Air Basin	9

1.0 Introduction

1.1 Description of the Region/Project

The proposed project (Ritchie Ranch) calls for 320 single family residential lots on 44.9 acres of land at the southwest corner of River Way Drive and Demaree Street in the City of Visalia.

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 along with major roadways and highways.

The City of Visalia is located in 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. The climate in Visalia is classified as Mediterranean, with moist cool winters and dry warm summers.

1.1.1 Summary of Findings

The air quality analysis concludes that the project aligns with the City of Visalia's 2035 General Plan and complies with the assumptions used in regional air quality plans, indicating no conflict with these plans. Construction and operational emissions for criteria pollutants, including PM10, PM2.5, and ozone precursors, fall below the San Joaquin Valley Air Pollution Control District's (SJVAPCD) thresholds. The project will not expose sensitive receptors, such as schools and residences, to significant pollutant levels, nor will it generate odorous emissions. Short-term construction impacts, including dust and naturally occurring asbestos (NOA), will be mitigated through dust control measures.

In terms of greenhouse gas (GHG) emissions, the project achieves a 16% reduction in emissions compared to "business as usual" (BAU) levels, though this is below the 29% reduction target set by AB 32. However, the project's emissions remain well below the South Coast Air Quality Management District's (SCAQMD) significance threshold, indicating a minimal impact. Additionally, the project is consistent with state and regional climate plans and policies, contributing to the region's compliance with long-term GHG reduction targets. Overall, the project's impact on air quality and GHG emissions is deemed less than significant, requiring no further mitigation.

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 Visalia and Tulare 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 was 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.

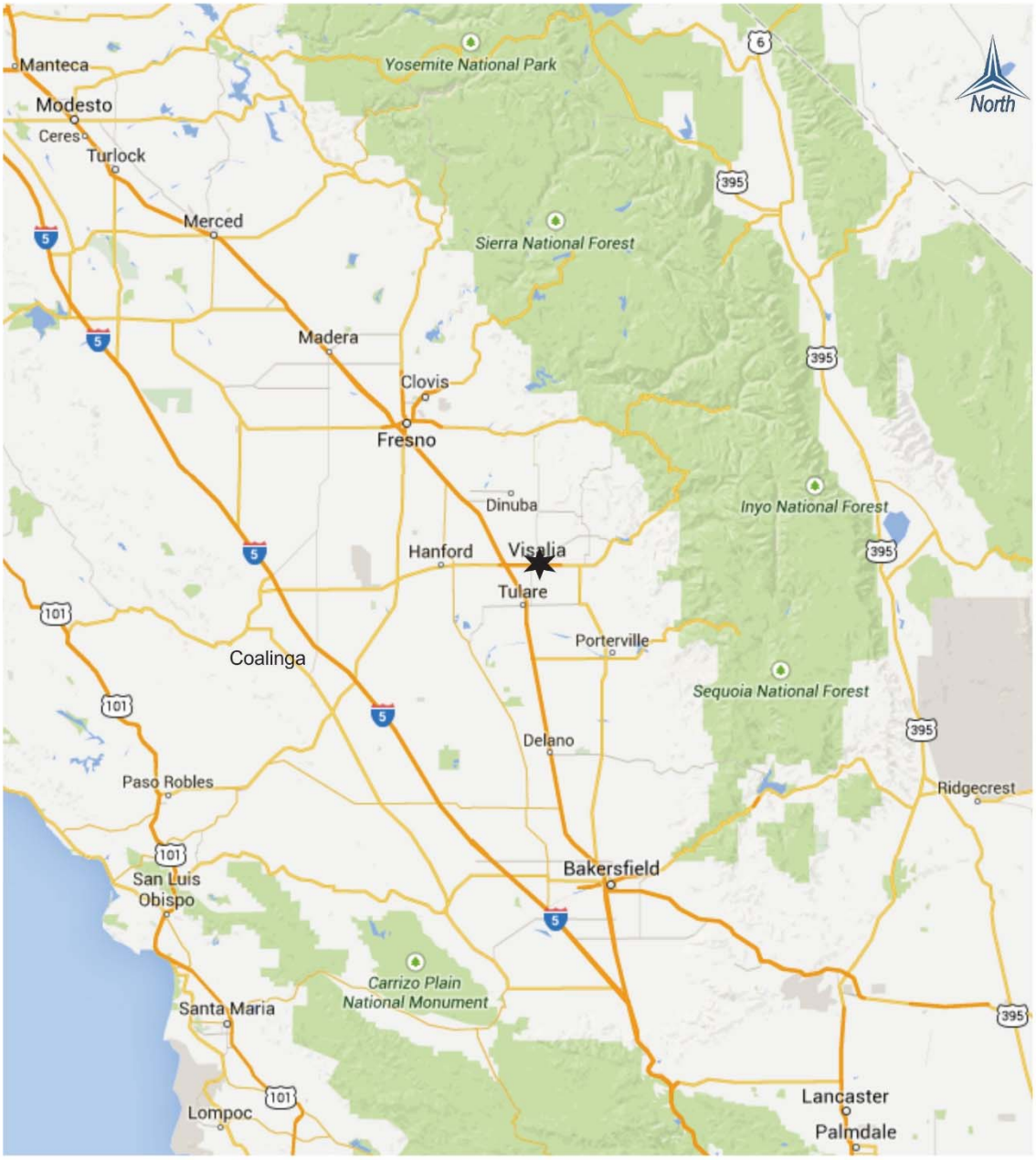
Tulare County is located in a nonattainment area for the 8-hour ozone standard, PM2.5 standard, and PM10 standard.

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.

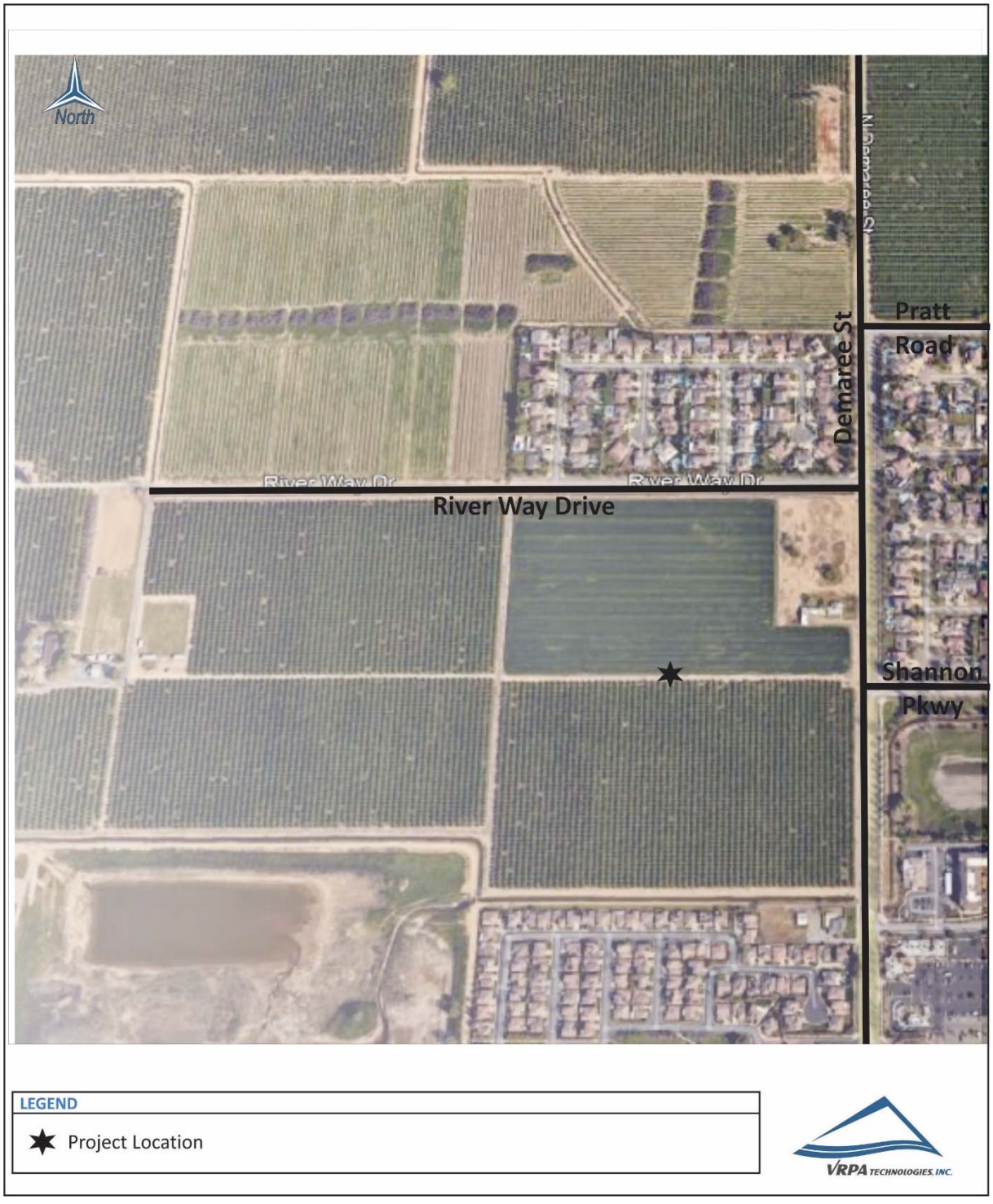
Ritchie Ranch Residential Development **Figure 1**
Regional Location



LEGEND

★ Project Location

Ritchie Ranch Residential Development **Figure 2**
Project Location



- ✓ **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 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 Tulare 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 Tulare 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 Tulare 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.

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

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.

Tract 6475 Residential Development AQ/GHG **Figure 3**
San Joaquin Valley Air Basin

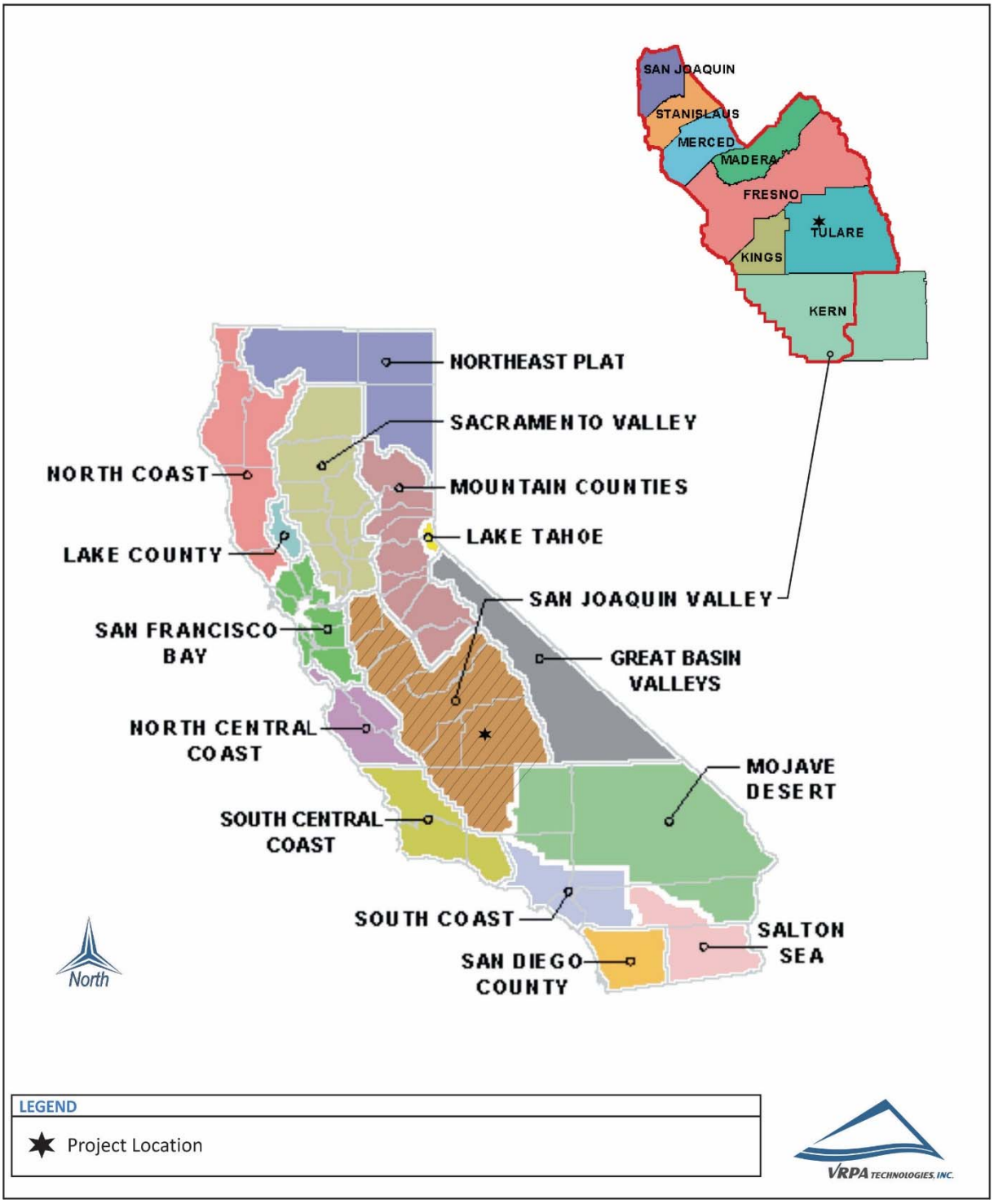


Table 1
Ambient Air Quality Standards

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.

✓ **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 greenhouse gas (GHG) emissions and establishes a cap on statewide GHG emissions. AB 32 has achieved the goal of reducing statewide GHG emissions to 1990 levels by 2020. Now, the goal under AB 32 is to further reduce GHG emissions to 40% below 1990 levels by 2030.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 2030 would represent an approximate 40 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 Tulare 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 Tulare 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 in 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 Tulare 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. The 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 Visalia 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 Visalia General Plan includes various elements, including air quality and greenhouse gases, which address local concerns and provides goals and policies to achieve its development goals.

✓ **City of Visalia Climate Action Plan[1]**

The City of Visalia Climate Action Plan (CAP) was created as one of the first key steps to guiding the development and enhancement of actions designed to reduce Visalia's GHG emissions. The CAP represents the results of a GHG emissions inventory effort which serves as a starting point for the development of a comprehensive municipal and community strategy for addressing GHG emission reduction goals.

The major long-term objectives of the City of Visalia's CAP for the City government and the community as a whole include the following:

- Reduce net GHG emissions from both municipal operations and community activities;
- Promote cleaner and healthier air to breathe;
- Help the City and its residents save on energy costs;

1 City of Visalia Climate Action Plan, December 2013

- Reduce vulnerability to changes in energy availability and price; and
- Increase public awareness of climate change issues.

The City of Visalia selected the years 2020 and 2030 to establish mitigation targets for the CAP. A reduction of 15% below the 2005 baseline year level is the target for 2020. A reduction of 30% below the 2005 baseline year level is the target for 2030.

The City of Visalia has instituted various actions in an effort to meet the year 2020 and 2030 mitigation targets. The measures identified to achieve mitigation targets are organized into five categories: Energy Systems, Transportation, Water and Resource Conservation, Transportation / Land Use, and Waste and Resource Conservation. The project proposes a park consisting of two acres on the westside of the development.

2.0 Environmental Setting

This section describes existing air quality within the San Joaquin Valley Air Basin and in Tulare 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: Tulare, 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

Tulare 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

Tulare 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. The climate in Tulare 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 wind 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, Tulare 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, Tulare 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 to 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 38 percent, while other mobile vehicles, such as trains, planes, and off-road vehicles, contribute another 20 percent in 2021 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 Tulare 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 Tulare 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 Tulare 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 Tulare County including areas north and west of the San Joaquin Valley, can cause or generate emissions that are transported into Tulare 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 Tulare, 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 Tulare 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 Tulare-Garland 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 Tulare 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 Visalia Tulare-Garland Monitoring Station

Pollutant	Time Averaging	2020 Maximums	2021 Maximums	2022* Maximums	Standards	
					National	State
Ozone (O_3)	1 hour	0.127 ppm	0.119 ppm	0.114 ppm	-	0.09 ppm
Ozone (O_3)	8 hour	0.102 ppm	0.097 ppm	0.098 ppm	0.070 ppm	0.070 ppm
Nitrogen Dioxide (NO_2)	1 hour	53.4 ppb	50 ppb	49.7 ppb	100 ppb	0.18 ppm
Nitrogen Dioxide (NO_2)	Annual Average	9.0 ppb	8.0 ppb	9.0 ppb	8.0 ppm	0.030 ppm
Particulates (PM_{10})	24 hour	317.4 µg/m3	299.9 $\mu g/m^3$	132.7 µg/m3	150 $\mu g/m^3$	50 $\mu g/m^3$
Particulates (PM_{10})	Federal Annual Arithmetic Mean	59.4 $\mu g/m^3$	51.7 $\mu g/m^3$	43.6 $\mu g/m^3$	-	20 $\mu g/m^3$
Particulates ($PM_{2.5}$)	24 hour	127.1 $\mu g/m^3$	129.2 $\mu g/m^3$	48.3 $\mu g/m^3$	35 $\mu g/m^3$	-
Particulates ($PM_{2.5}$)	Federal Annual Arithmetic Mean	19.6 $\mu g/m^3$	20.7 $\mu g/m^3$	14.8 $\mu g/m^3$	12 $\mu g/m^3$	12 $\mu g/m^3$

Source: California Air Resources Board (ADAM) Air Pollution Summaries, 2024

*2022 Maximums were extracted from the monitoring station at Visalia and W. Ashland

Table 3
Tulare 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, 2024

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 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 Tulare 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 Tulare 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 Tulare 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 man-made materials and is a major cause of reduced visibility in many parts of the United States.

The CARB found PM10 standards in Tulare County in attainment of Federal standards and nonattainment for State standards. The CARB found PM2.5 standards in Tulare 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 Tulare County as unclassified/attainment of Federal standards and attainment for State standards.

2.6.4 *Nitrogen Dioxide (NO2)*

Nitrogen oxides (NOx) are 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.[2]

2 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 Tulare 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 Tulare 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 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 Tulare 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. TACs are injurious in small quantities and are regulated despite the absence of criteria documents. The identification, regulation, and monitoring of TACs are 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. The ten TACs 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 is 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 Tulare 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 2024

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 2024

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 Tulare 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 2024

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	2.58	2.14	4.59	5.50	0.72	0.36	495.91
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 Tulare 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. Significant 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	16.82	3.03	4.02	0.03	3.24	0.92	3815.17
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 TACs 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 TACs 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 2 miles from both State Route (SR) 63 and State Route (SR) 180 freeway.

Table 4 indicates that new sensitive land uses shouldn't be sited within 500 feet of freeway/urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. The Project is located more than 2 miles from both freeways. 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 Tulare 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 Tulare 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 5105.91 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 are 4203.90 MTCO2eq./year. This represents an achievement of 18% GHG emission reduction on the basis of BAU, which does not meet the 29% GHG emission reduction target.

The estimated total GHG emissions during the construction phase of the Project is 495.91 MT CO2e as shown in Table 10. Construction emissions amortized over a 30-year project lifetime (estimated) yield approximately 16.5 MT CO2e per year. Total operational emissions combined with amortized construction emissions shows that the Project will generate 3,831.7 MT CO2e per year.

The 2022 Scoping Plan recognizes the assessment of a projects GHG impact by employing a threshold of significance recommended by the applicable air district or other lead agencies as a method for evaluating a projects alignment with the State's climate goals in CEQA GHG analyses. This method can be used at the discretion of lead agencies for the purpose of determining if a project would have a potentially significant impact on GHG emissions. The SJVAPCD has not established specific thresholds of significance for GHG emissions.

The CARB, Sacramento Metropolitan Air Quality Management District, and South Coast Air

Quality Management District have established GHG thresholds which provide some perspective on the GHG emissions generated by the Project. Table 10 shows the yearly GHG emissions generated by the Project in comparison to the GHG thresholds established by the CARB, Sacramento Metropolitan Air Quality Management District, and South Coast Air Quality Management District. Yearly GHG emissions generated by the Project, as determined by the CalEEMod model, is approximately 38% to 55% of the respective thresholds identified by the CARB, Sacramento Metropolitan Air Quality Management District, and South Coast Air Quality Management District.

Table 9
2005/2020 Operational greenhouse Gas Emissions

Summary Report	CO_2e
Operational Emissions Per Year (2005)	5105.91 MT/yr
Operational Emissions Per Year (2020)	4203.90 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 Construction Emissions (Amortized Construction Emissions)	495.91 MT/yr (16.5 MT/yr)		
Project Operational Emissions	3,815.2 MT/yr		
Total Project Emissions (Plus amortized construction emissions)	3,831.7 MT/yr		
Emission Threshold	California Air Resources Board 7,000	Sacramento Metropolitan Air Quality Management District 1,100 Construction 10,000 Operational	South Coast Air Quality Management District 10,000
Exceeds Threshold	No	No	No

Source: CalEEMod

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 Visalia 2035 General Plan Update, which was adopted in 2020. The Project is consistent with the currently adopted General Plan for the City of Visalia 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 Tulare 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 Visalia 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 TACs 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 TACs 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 2 miles from State Route (SR) 63 and State Route (SR) 180 freeway. Table 4 indicates that new sensitive land uses shouldn't be sited within 500 feet of freeway/urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. The Project is located more than 2 miles from both freeways. 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 5105.91 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 are 4203.90 MTCO2eq./year. This represents an achievement of 16% 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 Tulare 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 62% 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 represent 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 an 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 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 Tulare County region would achieve the prescribed emissions targets.

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.

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 Visalia 2035 General Plan Update, which was adopted in 2014.

The Project is consistent with the currently adopted General Plan for the City of Visalia 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 62% 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 vehicles, 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

Ritchie Ranch Residential - Tulare County, Annual

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

Ritchie Ranch Residential

Tulare County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	322.00	Dwelling Unit	44.90	487,950.00	921

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	51
Climate Zone	7			**Operational Year**	2024
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project Description

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	579,600.00	487,950.00
tblLandUse	LotAcreage	104.55	44.90
tblWoodstoves	NumberCatalytic	44.90	0.00
tblWoodstoves	NumberNoncatalytic	44.90	0.00

2.0 Emissions Summary

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					
2023	0.2159	2.1440	1.7689	3.7800e-003	0.6326	0.0931	0.7257	0.2815	0.0859	0.3674	0.0000	331.8541	331.8541	0.1012	2.7000e-004	334.4648
2024	0.2506	2.0461	2.5840	5.5000e-003	0.2849	0.0844	0.3693	0.0627	0.0793	0.1420	0.0000	489.3773	489.3773	0.0787	0.0153	495.9103
2025	0.2280	1.8552	2.5070	5.3600e-003	0.1499	0.0707	0.2206	0.0405	0.0665	0.1070	0.0000	478.1740	478.1740	0.0742	0.0152	484.5418
2026	0.2101	1.7448	2.4043	4.9900e-003	0.1304	0.0683	0.1987	0.0352	0.0641	0.0994	0.0000	444.9683	444.9683	0.0755	0.0126	450.6156
2027	4.5943	0.1056	0.1890	3.2000e-004	6.0500e-003	5.0000e-003	0.0111	1.6100e-003	4.7100e-003	6.3200e-003	0.0000	28.4441	28.4441	6.0000e-003	1.2000e-004	28.6284
Maximum	**4.5943**	**2.1440**	**2.5840**	**5.5000e-003**	**0.6326**	**0.0931**	**0.7257**	**0.2815**	**0.0859**	**0.3674**	**0.0000**	**489.3773**	**489.3773**	**0.1012**	**0.0153**	**495.9103**

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

2.1 Overall Construction

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					
2023	0.2159	2.1440	1.7689	3.7800e-003	0.6326	0.0931	0.7257	0.2815	0.0859	0.3674	0.0000	331.8537	331.8537	0.1012	2.7000e-004	334.4644
2024	0.2506	2.0461	2.5840	5.5000e-003	0.2849	0.0844	0.3693	0.0627	0.0793	0.1420	0.0000	489.3769	489.3769	0.0787	0.0153	495.9100
2025	0.2280	1.8552	2.5070	5.3600e-003	0.1499	0.0707	0.2206	0.0405	0.0665	0.1070	0.0000	478.1737	478.1737	0.0742	0.0152	484.5414
2026	0.2101	1.7448	2.4043	4.9900e-003	0.1304	0.0683	0.1987	0.0352	0.0641	0.0994	0.0000	444.9679	444.9679	0.0755	0.0126	450.6152
2027	4.5943	0.1056	0.1890	3.2000e-004	6.0500e-003	5.0000e-003	0.0111	1.6100e-003	4.7100e-003	6.3200e-003	0.0000	28.4441	28.4441	6.0000e-003	1.2000e-004	28.6284
Maximum	**4.5943**	**2.1440**	**2.5840**	**5.5000e-003**	**0.6326**	**0.0931**	**0.7257**	**0.2815**	**0.0859**	**0.3674**	**0.0000**	**489.3769**	**489.3769**	**0.1012**	**0.0153**	**495.9100**

	ROG	NOx	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	**6-6-2023**	**9-5-2023**	0.8343	0.8343
2	**9-6-2023**	**12-5-2023**	1.1790	1.1790
3	**12-6-2023**	**3-5-2024**	0.8042	0.8042
4	**3-6-2024**	**6-5-2024**	0.5622	0.5622
5	**6-6-2024**	**9-5-2024**	0.5613	0.5613
6	**9-6-2024**	**12-5-2024**	0.5574	0.5574
7	**12-6-2024**	**3-5-2025**	0.5258	0.5258

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

8	**3-6-2025**	**6-5-2025**	0.5245	0.5245
9	**6-6-2025**	**9-5-2025**	0.5237	0.5237
10	**9-6-2025**	**12-5-2025**	0.5201	0.5201
11	**12-6-2025**	**3-5-2026**	0.5138	0.5138
12	**3-6-2026**	**6-5-2026**	0.5225	0.5225
13	**6-6-2026**	**9-5-2026**	0.5216	0.5216
14	**9-6-2026**	**12-5-2026**	0.4587	0.4587
15	**12-6-2026**	**3-5-2027**	2.5136	2.5136
16	**3-6-2027**	**6-5-2027**	2.2794	2.2794
		Highest	2.5136	2.5136

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.4496	0.1480	2.4411	9.0000e-004		0.0230	0.0230		0.0230	0.0230	0.0000	143.3983	143.3983	6.4200e-003	2.5600e-003	144.3209
Energy	0.0413	0.3526	0.1500	2.2500e-003		0.0285	0.0285		0.0285	0.0285	0.0000	408.3235	408.3235	7.8300e-003	7.4900e-003	410.7499
Mobile	1.5331	2.5283	14.2353	0.0321	3.1608	0.0280	3.1888	0.8459	0.0263	0.8723	0.0000	3,012.7979	3,012.7979	0.1635	0.1608	3,064.8012
Waste						0.0000	0.0000		0.0000	0.0000	67.3037	0.0000	67.3037	3.9775	0.0000	166.7420
Water						0.0000	0.0000		0.0000	0.0000	6.6559	0.0000	6.6559	0.6836	0.0161	28.5566
Total	**4.0240**	**3.0288**	**16.8265**	**0.0352**	**3.1608**	**0.0795**	**3.2403**	**0.8459**	**0.0778**	**0.9238**	**73.9595**	**3,564.5196**	**3,638.4791**	**4.8389**	**0.1870**	**3,815.1706**

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	2.4496	0.1480	2.4411	9.0000e-004		0.0230	0.0230		0.0230	0.0230	0.0000	143.3983	143.3983	6.4200e-003	2.5600e-003	144.3209
Energy	0.0413	0.3526	0.1500	2.2500e-003		0.0285	0.0285		0.0285	0.0285	0.0000	408.3235	408.3235	7.8300e-003	7.4900e-003	410.7499
Mobile	1.5331	2.5283	14.2353	0.0321	3.1608	0.0280	3.1888	0.8459	0.0263	0.8723	0.0000	3,012.7979	3,012.7979	0.1635	0.1608	3,064.8012
Waste						0.0000	0.0000		0.0000	0.0000	67.3037	0.0000	67.3037	3.9775	0.0000	166.7420
Water						0.0000	0.0000		0.0000	0.0000	6.6559	0.0000	6.6559	0.6836	0.0161	28.5566
Total	**4.0240**	**3.0288**	**16.8265**	**0.0352**	**3.1608**	**0.0795**	**3.2403**	**0.8459**	**0.0778**	**0.9238**	**73.9595**	**3,564.5196**	**3,638.4791**	**4.8389**	**0.1870**	**3,815.1706**

	ROG	NOx	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	6/6/2023	8/14/2023	5	50	
2	Site Preparation	Site Preparation	8/15/2023	9/25/2023	5	30	
3	Grading	Grading	9/26/2023	1/8/2024	5	75	

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

4	Building Construction	Building Construction	1/9/2024	11/9/2026	5	740	
5	Paving	Paving	11/10/2026	1/25/2027	5	55	
6	Architectural Coating	Architectural Coating	1/26/2027	4/12/2027	5	55	

Acres of Grading (Site Preparation Phase): 45

Acres of Grading (Grading Phase): 225

Acres of Paving: 0

Residential Indoor: 988,099; Residential Outdoor: 329,366; 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	116.00	34.00	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	23.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0567	0.5371	0.4911	9.7000e-004		0.0249	0.0249		0.0232	0.0232	0.0000	84.9802	84.9802	0.0238	0.0000	85.5752
Total	**0.0567**	**0.5371**	**0.4911**	**9.7000e-004**		**0.0249**	**0.0249**		**0.0232**	**0.0232**	**0.0000**	**84.9802**	**84.9802**	**0.0238**	**0.0000**	**85.5752**

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

3.2 Demolition - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	1.3100e-003	9.2000e-004	0.0102	3.0000e-005	2.9900e-003	2.0000e-005	3.0000e-003	7.9000e-004	1.0000e-005	8.1000e-004	0.0000	2.4021	2.4021	8.0000e-005	8.0000e-005	2.4270
Total	**1.3100e-003**	**9.2000e-004**	**0.0102**	**3.0000e-005**	**2.9900e-003**	**2.0000e-005**	**3.0000e-003**	**7.9000e-004**	**1.0000e-005**	**8.1000e-004**	**0.0000**	**2.4021**	**2.4021**	**8.0000e-005**	**8.0000e-005**	**2.4270**

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	0.0567	0.5371	0.4911	9.7000e-004		0.0249	0.0249		0.0232	0.0232	0.0000	84.9801	84.9801	0.0238	0.0000	85.5751
Total	**0.0567**	**0.5371**	**0.4911**	**9.7000e-004**		**0.0249**	**0.0249**		**0.0232**	**0.0232**	**0.0000**	**84.9801**	**84.9801**	**0.0238**	**0.0000**	**85.5751**

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

3.2 Demolition - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	1.3100e-003	9.2000e-004	0.0102	3.0000e-005	2.9900e-003	2.0000e-005	3.0000e-003	7.9000e-004	1.0000e-005	8.1000e-004	0.0000	2.4021	2.4021	8.0000e-005	8.0000e-005	2.4270
Total	**1.3100e-003**	**9.2000e-004**	**0.0102**	**3.0000e-005**	**2.9900e-003**	**2.0000e-005**	**3.0000e-003**	**7.9000e-004**	**1.0000e-005**	**8.1000e-004**	**0.0000**	**2.4021**	**2.4021**	**8.0000e-005**	**8.0000e-005**	**2.4270**

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2949	0.0000	0.2949	0.1515	0.0000	0.1515	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0399	0.4129	0.2737	5.7000e-004		0.0190	0.0190		0.0175	0.0175	0.0000	50.1760	50.1760	0.0162	0.0000	50.5817
Total	**0.0399**	**0.4129**	**0.2737**	**5.7000e-004**	**0.2949**	**0.0190**	**0.3139**	**0.1515**	**0.0175**	**0.1690**	**0.0000**	**50.1760**	**50.1760**	**0.0162**	**0.0000**	**50.5817**

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

3.3 Site Preparation - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	9.4000e-004	6.6000e-004	7.3600e-003	2.0000e-005	2.1500e-003	1.0000e-005	2.1600e-003	5.7000e-004	1.0000e-005	5.8000e-004	0.0000	1.7295	1.7295	6.0000e-005	6.0000e-005	1.7475
Total	**9.4000e-004**	**6.6000e-004**	**7.3600e-003**	**2.0000e-005**	**2.1500e-003**	**1.0000e-005**	**2.1600e-003**	**5.7000e-004**	**1.0000e-005**	**5.8000e-004**	**0.0000**	**1.7295**	**1.7295**	**6.0000e-005**	**6.0000e-005**	**1.7475**

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					0.2949	0.0000	0.2949	0.1515	0.0000	0.1515	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0399	0.4129	0.2737	5.7000e-004		0.0190	0.0190		0.0175	0.0175	0.0000	50.1760	50.1760	0.0162	0.0000	50.5817
Total	**0.0399**	**0.4129**	**0.2737**	**5.7000e-004**	**0.2949**	**0.0190**	**0.3139**	**0.1515**	**0.0175**	**0.1690**	**0.0000**	**50.1760**	**50.1760**	**0.0162**	**0.0000**	**50.5817**

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

3.3 Site Preparation - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	9.4000e-004	6.6000e-004	7.3600e-003	2.0000e-005	2.1500e-003	1.0000e-005	2.1600e-003	5.7000e-004	1.0000e-005	5.8000e-004	0.0000	1.7295	1.7295	6.0000e-005	6.0000e-005	1.7475
Total	**9.4000e-004**	**6.6000e-004**	**7.3600e-003**	**2.0000e-005**	**2.1500e-003**	**1.0000e-005**	**2.1600e-003**	**5.7000e-004**	**1.0000e-005**	**5.8000e-004**	**0.0000**	**1.7295**	**1.7295**	**6.0000e-005**	**6.0000e-005**	**1.7475**

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3271	0.0000	0.3271	0.1271	0.0000	0.1271	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1146	1.1908	0.9678	2.1400e-003		0.0491	0.0491		0.0452	0.0452	0.0000	188.1465	188.1465	0.0609	0.0000	189.6677
Total	**0.1146**	**1.1908**	**0.9678**	**2.1400e-003**	**0.3271**	**0.0491**	**0.3762**	**0.1271**	**0.0452**	**0.1723**	**0.0000**	**188.1465**	**188.1465**	**0.0609**	**0.0000**	**189.6677**

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

3.4 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	2.4100e-003	1.6900e-003	0.0188	5.0000e-005	5.5000e-003	3.0000e-005	5.5200e-003	1.4600e-003	3.0000e-005	1.4900e-003	0.0000	4.4199	4.4199	1.5000e-004	1.4000e-004	4.4657
Total	**2.4100e-003**	**1.6900e-003**	**0.0188**	**5.0000e-005**	**5.5000e-003**	**3.0000e-005**	**5.5200e-003**	**1.4600e-003**	**3.0000e-005**	**1.4900e-003**	**0.0000**	**4.4199**	**4.4199**	**1.5000e-004**	**1.4000e-004**	**4.4657**

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					0.3271	0.0000	0.3271	0.1271	0.0000	0.1271	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1146	1.1908	0.9678	2.1400e-003		0.0491	0.0491		0.0452	0.0452	0.0000	188.1463	188.1463	0.0609	0.0000	189.6675
Total	**0.1146**	**1.1908**	**0.9678**	**2.1400e-003**	**0.3271**	**0.0491**	**0.3762**	**0.1271**	**0.0452**	**0.1723**	**0.0000**	**188.1463**	**188.1463**	**0.0609**	**0.0000**	**189.6675**

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

3.4 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	2.4100e-003	1.6900e-003	0.0188	5.0000e-005	5.5000e-003	3.0000e-005	5.5200e-003	1.4600e-003	3.0000e-005	1.4900e-003	0.0000	4.4199	4.4199	1.5000e-004	1.4000e-004	4.4657
Total	**2.4100e-003**	**1.6900e-003**	**0.0188**	**5.0000e-005**	**5.5000e-003**	**3.0000e-005**	**5.5200e-003**	**1.4600e-003**	**3.0000e-005**	**1.4900e-003**	**0.0000**	**4.4199**	**4.4199**	**1.5000e-004**	**1.4000e-004**	**4.4657**

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					0.1374	0.0000	0.1374	0.0228	0.0000	0.0228	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.6500e-003	0.0971	0.0832	1.9000e-004		4.0100e-003	4.0100e-003		3.6900e-003	3.6900e-003	0.0000	16.3559	16.3559	5.2900e-003	0.0000	16.4881
Total	**9.6500e-003**	**0.0971**	**0.0832**	**1.9000e-004**	**0.1374**	**4.0100e-003**	**0.1414**	**0.0228**	**3.6900e-003**	**0.0265**	**0.0000**	**16.3559**	**16.3559**	**5.2900e-003**	**0.0000**	**16.4881**

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	1.9000e-004	1.3000e-004	1.5000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3742	0.3742	1.0000e-005	1.0000e-005	0.3778
Total	**1.9000e-004**	**1.3000e-004**	**1.5000e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3742**	**0.3742**	**1.0000e-005**	**1.0000e-005**	**0.3778**

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					0.1374	0.0000	0.1374	0.0228	0.0000	0.0228	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.6500e-003	0.0971	0.0832	1.9000e-004		4.0100e-003	4.0100e-003		3.6900e-003	3.6900e-003	0.0000	16.3558	16.3558	5.2900e-003	0.0000	16.4881
Total	**9.6500e-003**	**0.0971**	**0.0832**	**1.9000e-004**	**0.1374**	**4.0100e-003**	**0.1414**	**0.0228**	**3.6900e-003**	**0.0265**	**0.0000**	**16.3558**	**16.3558**	**5.2900e-003**	**0.0000**	**16.4881**

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	1.9000e-004	1.3000e-004	1.5000e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3742	0.3742	1.0000e-005	1.0000e-005	0.3778
Total	**1.9000e-004**	**1.3000e-004**	**1.5000e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3742**	**0.3742**	**1.0000e-005**	**1.0000e-005**	**0.3778**

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	0.1884	1.7208	2.0694	3.4500e-003		0.0785	0.0785		0.0738	0.0738	0.0000	296.7669	296.7669	0.0702	0.0000	298.5213
Total	**0.1884**	**1.7208**	**2.0694**	**3.4500e-003**		**0.0785**	**0.0785**		**0.0738**	**0.0738**	**0.0000**	**296.7669**	**296.7669**	**0.0702**	**0.0000**	**298.5213**

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	4.7700e-003	0.1960	0.0578	8.7000e-004	0.0288	1.2600e-003	0.0300	8.3200e-003	1.2100e-003	9.5200e-003	0.0000	83.2907	83.2907	3.8000e-004	0.0125	87.0289
Worker	0.0476	0.0320	0.3722	9.9000e-004	0.1183	5.8000e-004	0.1189	0.0314	5.3000e-004	0.0320	0.0000	92.5897	92.5897	2.8900e-003	2.7900e-003	93.4942
Total	**0.0524**	**0.2280**	**0.4300**	**1.8600e-003**	**0.1470**	**1.8400e-003**	**0.1489**	**0.0398**	**1.7400e-003**	**0.0415**	**0.0000**	**175.8804**	**175.8804**	**3.2700e-003**	**0.0153**	**180.5232**

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	0.1884	1.7208	2.0694	3.4500e-003		0.0785	0.0785		0.0738	0.0738	0.0000	296.7665	296.7665	0.0702	0.0000	298.5209
Total	**0.1884**	**1.7208**	**2.0694**	**3.4500e-003**		**0.0785**	**0.0785**		**0.0738**	**0.0738**	**0.0000**	**296.7665**	**296.7665**	**0.0702**	**0.0000**	**298.5209**

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	4.7700e-003	0.1960	0.0578	8.7000e-004	0.0288	1.2600e-003	0.0300	8.3200e-003	1.2100e-003	9.5200e-003	0.0000	83.2907	83.2907	3.8000e-004	0.0125	87.0289
Worker	0.0476	0.0320	0.3722	9.9000e-004	0.1183	5.8000e-004	0.1189	0.0314	5.3000e-004	0.0320	0.0000	92.5897	92.5897	2.8900e-003	2.7900e-003	93.4942
Total	**0.0524**	**0.2280**	**0.4300**	**1.8600e-003**	**0.1470**	**1.8400e-003**	**0.1489**	**0.0398**	**1.7400e-003**	**0.0415**	**0.0000**	**175.8804**	**175.8804**	**3.2700e-003**	**0.0153**	**180.5232**

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	0.1785	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6549	302.6549	0.0711	0.0000	304.4335
Total	**0.1785**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6549**	**302.6549**	**0.0711**	**0.0000**	**304.4335**

Ritchie Ranch Residential - Tulare 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	4.7600e-003	0.1990	0.0578	8.7000e-004	0.0293	1.2900e-003	0.0306	8.4800e-003	1.2300e-003	9.7100e-003	0.0000	83.4171	83.4171	3.7000e-004	0.0125	87.1553
Worker	0.0448	0.0289	0.3501	9.7000e-004	0.1206	5.6000e-004	0.1211	0.0321	5.2000e-004	0.0326	0.0000	92.1021	92.1021	2.6500e-003	2.6300e-003	92.9530
Total	**0.0495**	**0.2279**	**0.4079**	**1.8400e-003**	**0.1499**	**1.8500e-003**	**0.1518**	**0.0405**	**1.7500e-003**	**0.0423**	**0.0000**	**175.5192**	**175.5192**	**3.0200e-003**	**0.0151**	**180.1083**

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	0.1784	1.6273	2.0991	3.5200e-003		0.0689	0.0689		0.0648	0.0648	0.0000	302.6545	302.6545	0.0711	0.0000	304.4331
Total	**0.1784**	**1.6273**	**2.0991**	**3.5200e-003**		**0.0689**	**0.0689**		**0.0648**	**0.0648**	**0.0000**	**302.6545**	**302.6545**	**0.0711**	**0.0000**	**304.4331**

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	4.7600e-003	0.1990	0.0578	8.7000e-004	0.0293	1.2900e-003	0.0306	8.4800e-003	1.2300e-003	9.7100e-003	0.0000	83.4171	83.4171	3.7000e-004	0.0125	87.1553
Worker	0.0448	0.0289	0.3501	9.7000e-004	0.1206	5.6000e-004	0.1211	0.0321	5.2000e-004	0.0326	0.0000	92.1021	92.1021	2.6500e-003	2.6300e-003	92.9530
Total	**0.0495**	**0.2279**	**0.4079**	**1.8400e-003**	**0.1499**	**1.8500e-003**	**0.1518**	**0.0405**	**1.7500e-003**	**0.0423**	**0.0000**	**175.5192**	**175.5192**	**3.0200e-003**	**0.0151**	**180.1083**

3.5 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1525	1.3904	1.7934	3.0100e-003		0.0588	0.0588		0.0553	0.0553	0.0000	258.5902	258.5902	0.0608	0.0000	260.1099
Total	**0.1525**	**1.3904**	**1.7934**	**3.0100e-003**		**0.0588**	**0.0588**		**0.0553**	**0.0553**	**0.0000**	**258.5902**	**258.5902**	**0.0608**	**0.0000**	**260.1099**

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

3.5 Building Construction - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.9700e-003	0.1689	0.0486	7.3000e-004	0.0251	1.0900e-003	0.0262	7.2400e-003	1.0400e-003	8.2900e-003	0.0000	69.9582	69.9582	3.1000e-004	0.0105	73.0884
Worker	0.0355	0.0220	0.2792	8.0000e-004	0.1030	4.5000e-004	0.1035	0.0274	4.2000e-004	0.0278	0.0000	76.6934	76.6934	2.0400e-003	2.0900e-003	77.3684
Total	**0.0394**	**0.1909**	**0.3278**	**1.5300e-003**	**0.1281**	**1.5400e-003**	**0.1296**	**0.0346**	**1.4600e-003**	**0.0361**	**0.0000**	**146.6516**	**146.6516**	**2.3500e-003**	**0.0126**	**150.4568**

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	0.1525	1.3904	1.7934	3.0100e-003		0.0588	0.0588		0.0553	0.0553	0.0000	258.5899	258.5899	0.0608	0.0000	260.1096
Total	**0.1525**	**1.3904**	**1.7934**	**3.0100e-003**		**0.0588**	**0.0588**		**0.0553**	**0.0553**	**0.0000**	**258.5899**	**258.5899**	**0.0608**	**0.0000**	**260.1096**

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

3.5 Building Construction - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.9700e-003	0.1689	0.0486	7.3000e-004	0.0251	1.0900e-003	0.0262	7.2400e-003	1.0400e-003	8.2900e-003	0.0000	69.9582	69.9582	3.1000e-004	0.0105	73.0884
Worker	0.0355	0.0220	0.2792	8.0000e-004	0.1030	4.5000e-004	0.1035	0.0274	4.2000e-004	0.0278	0.0000	76.6934	76.6934	2.0400e-003	2.0900e-003	77.3684
Total	**0.0394**	**0.1909**	**0.3278**	**1.5300e-003**	**0.1281**	**1.5400e-003**	**0.1296**	**0.0346**	**1.4600e-003**	**0.0361**	**0.0000**	**146.6516**	**146.6516**	**2.3500e-003**	**0.0126**	**150.4568**

3.6 Paving - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0174	0.1631	0.2770	4.3000e-004		7.9500e-003	7.9500e-003		7.3200e-003	7.3200e-003	0.0000	38.0366	38.0366	0.0123	0.0000	38.3441
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0174**	**0.1631**	**0.2770**	**4.3000e-004**		**7.9500e-003**	**7.9500e-003**		**7.3200e-003**	**7.3200e-003**	**0.0000**	**38.0366**	**38.0366**	**0.0123**	**0.0000**	**38.3441**

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

3.6 Paving - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	7.8000e-004	4.8000e-004	6.1500e-003	2.0000e-005	2.2700e-003	1.0000e-005	2.2800e-003	6.0000e-004	1.0000e-005	6.1000e-004	0.0000	1.6899	1.6899	4.0000e-005	5.0000e-005	1.7048
Total	**7.8000e-004**	**4.8000e-004**	**6.1500e-003**	**2.0000e-005**	**2.2700e-003**	**1.0000e-005**	**2.2800e-003**	**6.0000e-004**	**1.0000e-005**	**6.1000e-004**	**0.0000**	**1.6899**	**1.6899**	**4.0000e-005**	**5.0000e-005**	**1.7048**

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	0.0174	0.1631	0.2770	4.3000e-004		7.9500e-003	7.9500e-003		7.3200e-003	7.3200e-003	0.0000	38.0365	38.0365	0.0123	0.0000	38.3441
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0174**	**0.1631**	**0.2770**	**4.3000e-004**		**7.9500e-003**	**7.9500e-003**		**7.3200e-003**	**7.3200e-003**	**0.0000**	**38.0365**	**38.0365**	**0.0123**	**0.0000**	**38.3441**

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

3.6 Paving - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	7.8000e-004	4.8000e-004	6.1500e-003	2.0000e-005	2.2700e-003	1.0000e-005	2.2800e-003	6.0000e-004	1.0000e-005	6.1000e-004	0.0000	1.6899	1.6899	4.0000e-005	5.0000e-005	1.7048
Total	**7.8000e-004**	**4.8000e-004**	**6.1500e-003**	**2.0000e-005**	**2.2700e-003**	**1.0000e-005**	**2.2800e-003**	**6.0000e-004**	**1.0000e-005**	**6.1000e-004**	**0.0000**	**1.6899**	**1.6899**	**4.0000e-005**	**5.0000e-005**	**1.7048**

3.6 Paving - 2027

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	7.7800e-003	0.0729	0.1239	1.9000e-004		3.5600e-003	3.5600e-003		3.2700e-003	3.2700e-003	0.0000	17.0164	17.0164	5.5000e-003	0.0000	17.1540
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.7800e-003**	**0.0729**	**0.1239**	**1.9000e-004**		**3.5600e-003**	**3.5600e-003**		**3.2700e-003**	**3.2700e-003**	**0.0000**	**17.0164**	**17.0164**	**5.5000e-003**	**0.0000**	**17.1540**

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

3.6 Paving - 2027

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	3.3000e-004	1.9000e-004	2.5700e-003	1.0000e-005	1.0200e-003	0.0000	1.0200e-003	2.7000e-004	0.0000	2.7000e-004	0.0000	0.7392	0.7392	2.0000e-005	2.0000e-005	0.7454
Total	**3.3000e-004**	**1.9000e-004**	**2.5700e-003**	**1.0000e-005**	**1.0200e-003**	**0.0000**	**1.0200e-003**	**2.7000e-004**	**0.0000**	**2.7000e-004**	**0.0000**	**0.7392**	**0.7392**	**2.0000e-005**	**2.0000e-005**	**0.7454**

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	7.7800e-003	0.0729	0.1239	1.9000e-004		3.5600e-003	3.5600e-003		3.2700e-003	3.2700e-003	0.0000	17.0164	17.0164	5.5000e-003	0.0000	17.1539
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.7800e-003**	**0.0729**	**0.1239**	**1.9000e-004**		**3.5600e-003**	**3.5600e-003**		**3.2700e-003**	**3.2700e-003**	**0.0000**	**17.0164**	**17.0164**	**5.5000e-003**	**0.0000**	**17.1539**

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

3.6 Paving - 2027

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	3.3000e-004	1.9000e-004	2.5700e-003	1.0000e-005	1.0200e-003	0.0000	1.0200e-003	2.7000e-004	0.0000	2.7000e-004	0.0000	0.7392	0.7392	2.0000e-005	2.0000e-005	0.7454
Total	**3.3000e-004**	**1.9000e-004**	**2.5700e-003**	**1.0000e-005**	**1.0200e-003**	**0.0000**	**1.0200e-003**	**2.7000e-004**	**0.0000**	**2.7000e-004**	**0.0000**	**0.7392**	**0.7392**	**2.0000e-005**	**2.0000e-005**	**0.7454**

3.7 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.5798					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7000e-003	0.0315	0.0498	8.0000e-005		1.4200e-003	1.4200e-003		1.4200e-003	1.4200e-003	0.0000	7.0215	7.0215	3.8000e-004	0.0000	7.0310
Total	**4.5845**	**0.0315**	**0.0498**	**8.0000e-005**		**1.4200e-003**	**1.4200e-003**		**1.4200e-003**	**1.4200e-003**	**0.0000**	**7.0215**	**7.0215**	**3.8000e-004**	**0.0000**	**7.0310**

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

3.7 Architectural Coating - 2027

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	1.6100e-003	9.7000e-004	0.0128	4.0000e-005	5.0400e-003	2.0000e-005	5.0600e-003	1.3400e-003	2.0000e-005	1.3600e-003	0.0000	3.6671	3.6671	9.0000e-005	1.0000e-004	3.6980
Total	**1.6100e-003**	**9.7000e-004**	**0.0128**	**4.0000e-005**	**5.0400e-003**	**2.0000e-005**	**5.0600e-003**	**1.3400e-003**	**2.0000e-005**	**1.3600e-003**	**0.0000**	**3.6671**	**3.6671**	**9.0000e-005**	**1.0000e-004**	**3.6980**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.5798					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7000e-003	0.0315	0.0498	8.0000e-005		1.4200e-003	1.4200e-003		1.4200e-003	1.4200e-003	0.0000	7.0214	7.0214	3.8000e-004	0.0000	7.0310
Total	**4.5845**	**0.0315**	**0.0498**	**8.0000e-005**		**1.4200e-003**	**1.4200e-003**		**1.4200e-003**	**1.4200e-003**	**0.0000**	**7.0214**	**7.0214**	**3.8000e-004**	**0.0000**	**7.0310**

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

3.7 Architectural Coating - 2027

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	1.6100e-003	9.7000e-004	0.0128	4.0000e-005	5.0400e-003	2.0000e-005	5.0600e-003	1.3400e-003	2.0000e-005	1.3600e-003	0.0000	3.6671	3.6671	9.0000e-005	1.0000e-004	3.6980
Total	**1.6100e-003**	**9.7000e-004**	**0.0128**	**4.0000e-005**	**5.0400e-003**	**2.0000e-005**	**5.0600e-003**	**1.3400e-003**	**2.0000e-005**	**1.3600e-003**	**0.0000**	**3.6671**	**3.6671**	**9.0000e-005**	**1.0000e-004**	**3.6980**

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	1.5331	2.5283	14.2353	0.0321	3.1608	0.0280	3.1888	0.8459	0.0263	0.8723	0.0000	3,012.7979	3,012.7979	0.1635	0.1608	3,064.8012
Unmitigated	1.5331	2.5283	14.2353	0.0321	3.1608	0.0280	3.1888	0.8459	0.0263	0.8723	0.0000	3,012.7979	3,012.7979	0.1635	0.1608	3,064.8012

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	3,039.68	3,071.88	2753.10	8,465,617	8,465,617
Total	3,039.68	3,071.88	2,753.10	8,465,617	8,465,617

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	38.40	22.60	39.00	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	0.509869	0.051139	0.167106	0.174849	0.031609	0.007996	0.012006	0.015707	0.000636	0.000471	0.023554	0.001465	0.003592

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	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0413	0.3526	0.1500	2.2500e-003		0.0285	0.0285		0.0285	0.0285	0.0000	408.3235	408.3235	7.8300e-003	7.4900e-003	410.7499
NaturalGas Unmitigated	0.0413	0.3526	0.1500	2.2500e-003		0.0285	0.0285		0.0285	0.0285	0.0000	408.3235	408.3235	7.8300e-003	7.4900e-003	410.7499

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	7.65169e+006	0.0413	0.3526	0.1500	2.2500e-003		0.0285	0.0285		0.0285	0.0285	0.0000	408.3235	408.3235	7.8300e-003	7.4900e-003	410.7499
Total		**0.0413**	**0.3526**	**0.1500**	**2.2500e-003**		**0.0285**	**0.0285**		**0.0285**	**0.0285**	**0.0000**	**408.3235**	**408.3235**	**7.8300e-003**	**7.4900e-003**	**410.7499**

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	7.65169e+006	0.0413	0.3526	0.1500	2.2500e-003		0.0285	0.0285		0.0285	0.0285	0.0000	408.3235	408.3235	7.8300e-003	7.4900e-003	410.7499
Total		**0.0413**	**0.3526**	**0.1500**	**2.2500e-003**		**0.0285**	**0.0285**		**0.0285**	**0.0285**	**0.0000**	**408.3235**	**408.3235**	**7.8300e-003**	**7.4900e-003**	**410.7499**

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	2.55634e+006	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	2.55634e+006	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

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	2.4496	0.1480	2.4411	9.0000e-004		0.0230	0.0230		0.0230	0.0230	0.0000	143.3983	143.3983	6.4200e-003	2.5600e-003	144.3209
Unmitigated	2.4496	0.1480	2.4411	9.0000e-004		0.0230	0.0230		0.0230	0.0230	0.0000	143.3983	143.3983	6.4200e-003	2.5600e-003	144.3209

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	0.4580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.9057					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0141	0.1205	0.0513	7.7000e-004		9.7400e-003	9.7400e-003		9.7400e-003	9.7400e-003	0.0000	139.4928	139.4928	2.6700e-003	2.5600e-003	140.3217
Landscaping	0.0719	0.0275	2.3899	1.3000e-004		0.0133	0.0133		0.0133	0.0133	0.0000	3.9055	3.9055	3.7500e-003	0.0000	3.9992
Total	**2.4496**	**0.1480**	**2.4411**	**9.0000e-004**		**0.0230**	**0.0230**		**0.0230**	**0.0230**	**0.0000**	**143.3983**	**143.3983**	**6.4200e-003**	**2.5600e-003**	**144.3209**

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	0.4580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.9057					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0141	0.1205	0.0513	7.7000e-004		9.7400e-003	9.7400e-003		9.7400e-003	9.7400e-003	0.0000	139.4928	139.4928	2.6700e-003	2.5600e-003	140.3217
Landscaping	0.0719	0.0275	2.3899	1.3000e-004		0.0133	0.0133		0.0133	0.0133	0.0000	3.9055	3.9055	3.7500e-003	0.0000	3.9992
Total	**2.4496**	**0.1480**	**2.4411**	**9.0000e-004**		**0.0230**	**0.0230**		**0.0230**	**0.0230**	**0.0000**	**143.3983**	**143.3983**	**6.4200e-003**	**2.5600e-003**	**144.3209**

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	6.6559	0.6836	0.0161	28.5566
Unmitigated	6.6559	0.6836	0.0161	28.5566

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	20.9796 / 13.2263	6.6559	0.6836	0.0161	28.5566
Total		**6.6559**	**0.6836**	**0.0161**	**28.5566**

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	20.9796 / 13.2263	6.6559	0.6836	0.0161	28.5566
Total		**6.6559**	**0.6836**	**0.0161**	**28.5566**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	67.3037	3.9775	0.0000	166.7420
Unmitigated	67.3037	3.9775	0.0000	166.7420

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	331.56	67.3037	3.9775	0.0000	166.7420
Total		**67.3037**	**3.9775**	**0.0000**	**166.7420**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	331.56	67.3037	3.9775	0.0000	166.7420
Total		**67.3037**	**3.9775**	**0.0000**	**166.7420**

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