

**New Hilmar Unified Elementary School Project
Initial Study**

(State Clearinghouse No. 2019110288)

Appendix 4:

Traffic Impact Analysis

Traffic Impact Analysis Report

Hilmar Unified School District Elementary School

Located on the Northwest Corner of Pearl Street
and Geer Avenue in the community of Hilmar

In Merced County, California

Prepared for:

Odell Planning & Research, Inc.
49346 Road 426, Suite 2
Oakhurst, CA 93644

December 14, 2020

JLB Project No. 044-001



Traffic Engineering, Transportation Planning, & Parking Solutions

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

Phone: (559) 570-8991

www.JLBtraffic.com



Traffic Engineering, Transportation Planning, & Parking Solutions

Traffic Impact Analysis Report

For the Hilmar Unified School District Elementary School located on the Northwest Corner of Pearl Street and Geer Avenue in the community of Hilmar

In Merced County, CA

December 14, 2020

This Traffic Impact Analysis Report has been prepared under the direction of a licensed Traffic Engineer. The licensed Traffic Engineer attests to the technical information contained therein and has judged the qualifications of any technical specialists providing engineering data from which recommendations, conclusions, and decisions are based.

Prepared by:

A handwritten signature in black ink, reading "Jose L Benavides", is written over a horizontal line.

Jose Luis Benavides, PE, TE

President



Traffic Engineering, Transportation Planning, & Parking Solutions

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

Phone: (559) 570-8991

www.JLBtraffic.com

Table of Contents

Introduction and Summary.....	1
Introduction	1
Summary	2
Existing Traffic Conditions.....	2
Existing plus Project Traffic Conditions.....	2
Near Term plus Project Traffic Conditions.....	2
Cumulative Year 2040 No Project Traffic Conditions.....	2
Cumulative Year 2040 plus Project Traffic Conditions.....	3
Queuing Analysis.....	3
Scope of Work	4
Study Facilities	4
Study Intersections	4
Study Scenarios.....	5
Existing Traffic Conditions.....	5
Existing plus Project Traffic Conditions.....	5
Near Term plus Project Traffic Conditions.....	5
Cumulative Year 2040 No Project Traffic Conditions.....	5
Cumulative Year 2040 plus Project Traffic Conditions.....	5
Level of Service Analysis Methodology	6
Criteria of Significance	6
Operational Analysis Assumptions and Defaults	7
Existing Traffic Conditions	8
Roadway Network.....	8
Traffic Signal Warrants.....	8
Results of Existing Level of Service Analysis	9
Existing plus Project Traffic Conditions	12
Project Description.....	12
Project Access	12
Walkways	13
Bikeways	13

Transit	13
Trip Generation.....	14
Trip Distribution	15
Safe Routes to School	15
Vehicle Miles Traveled Analysis	16
Traffic Signal Warrants.....	17
Results of Existing plus Project Level of Service Analysis	18
Near Term plus Project Traffic Conditions.....	25
Description of Near Term Projects.....	25
Traffic Signal Warrants.....	25
Results of Near Term plus Project Level of Service Analysis.....	25
Cumulative Year 2040 No Project Traffic Conditions.....	28
Traffic Signal Warrants.....	28
Results of Cumulative Year 2040 No Project Level of Service Analysis	28
Cumulative Year 2040 plus Project Traffic Conditions	30
Traffic Signal Warrants.....	30
Results of Cumulative Year 2040 plus Project Level of Service Analysis	30
Queuing Analysis	33
Conclusions and Recommendations.....	35
Existing Traffic Conditions.....	35
Existing plus Project Traffic Conditions.....	35
Near Term plus Project Traffic Conditions.....	36
Cumulative Year 2040 No Project Traffic Conditions.....	37
Cumulative Year 2040 plus Project Traffic Conditions.....	37
Queuing Analysis.....	38
Study Participants.....	39
References.....	40

List of Figures

Figure 1: Vicinity Map	10
Figure 2: Existing - Traffic Volumes, Geometrics and Controls.....	11
Figure 3: Project Site Plan	20
Figure 4: Existing Elim Elementary Project Only Trips	21
Figure 5: Future Project Only Trips.....	22
Figure 6: Net New Project Only Trips	23
Figure 7: Existing plus Project - Traffic Volumes, Geometrics and Controls	24
Figure 8: Near Term plus Project - Traffic Volumes, Geometrics and Controls.....	27
Figure 9: Cumulative Year 2040 No Project - Traffic Volumes, Geometrics and Controls.....	29
Figure 10: Cumulative Year 2040 plus Project - Traffic Volumes, Geometrics and Controls	32

List of Tables

Table I: Existing Intersection LOS Results	9
Table II: Existing Elim Elementary School Trip Generation	14
Table III: Future Elim Elementary School Trip Generation	14
Table IV: Proposed Elementary School Trip Generation.....	14
Table V: Difference in Trip Generation.....	15
Table VI: Existing plus Project Intersection LOS Results	19
Table VII: Near Term plus Project Intersection LOS Results.....	26
Table VIII: Cumulative Year 2040 No Project Intersection LOS Results	28
Table IX: Cumulative Year 2040 plus Project Intersection LOS Results	31
Table X: Queuing Analysis.....	34

List of Appendices

Appendix A: Scope of Work
Appendix B: Traffic Counts
Appendix C: Methodology
Appendix D: Existing Traffic Conditions
Appendix E: Existing plus Project Traffic Conditions
Appendix F: Near Term plus Project Traffic Conditions
Appendix G: Cumulative Year 2040 No Project Traffic Conditions
Appendix H: Cumulative Year 2040 plus Project Traffic Conditions
Appendix I: Signal Warrants

Introduction and Summary

Introduction

This Report describes a Traffic Impact Analysis (TIA) prepared by JLB Traffic Engineering, Inc. (JLB) for the Hilmar Unified School District (HUSD). HUSD, hereby referred to as the District, proposes construction of a New Elementary School campus and reconfiguration of the existing Elim Elementary School campus (Project) serving the community of Hilmar in Merced County. The District currently operates two (2) elementary schools serving grades K-5 (one of which is located in the community of Stevenson), a middle school serving grades 6-8, a high school serving grades 9-12, and a continuation school. The District proposes to a) construct a new Elementary School on a turfed area currently being used by Hilmar High School located on the northwest corner of Pearl Street and Geer Avenue and b) reconfigure a portion of the existing Elim Elementary School (Elim) site. Figure 1 shows the location of the proposed Project site relative to the surrounding roadway network.

The Project will include; six (6) classroom buildings housing 25 classrooms; two (2) buildings housing a library, administrative office, and multipurpose room; recreational areas including turfed athletic fields, hardcourts, and a climbing structure; and the addition of new parking areas. The Project also includes removal of facilities and new construction at Elim. As part of the Project, approximately 500 existing students in pre-K-2 grade will relocate from Elim to the Project, leaving Elim with approximately 500 existing students in 3-5 grade. The Project will provide instruction to approximately 600 students in pre-K-2 grade. Moreover, Elim's capacity will increase to 600 students. Ultimately, the Project proposes to increase overall student capacity from approximately 1,000 to 1,200 total students in pre-K-5 grade. Moreover, the Project proposes to reduce the number of classrooms at Elim from 50 to 26. While each campus is anticipated to have a maximum of 60 staff, it is anticipated that some staff will be shared given the proximity of the schools. New driveways from Geer Avenue will serve as the main access to both elementary schools. The "front" of Elim will be moved from Lander Avenue to the northeast corner of the Project site. A parking area with approximately 58 spaces is proposed to be developed along the eastern portion of the proposed Project site. This parking area will serve teachers, administrative staff and visitors. The Project will also provide parallel parking along the east side of campus for teachers and administrative staff. The Project proposes to construct designated vehicle and bus drop-off areas for each campus.

The Project is consistent with the Merced County Hilmar Community Plan, a comprehensive update of the Hilmar Community Specific Plan and its land use map, the Hilmar Specific Urban Development Plan (Hilmar SUDP). It is worth noting that the Project will fulfill a strategy of the Hilmar Community Plan to provide additional school sites away from Lander Avenue to serve current and future residents. The purpose of this Report is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process. The Report primarily focused on evaluating traffic conditions at study intersections that may potentially be impacted by the proposed Project. The Scope of Work was prepared via consultation with Merced County and Caltrans staff.

Summary

The potential traffic impacts of the proposed Project were evaluated in accordance with the standards set forth by the Level of Service (LOS) policy of the Merced County and Caltrans.

Existing Traffic Conditions

- At present, all intersections operate at an acceptable LOS during the both peak periods.

Existing plus Project Traffic Conditions

- JLB analyzed the location of the existing and proposed driveways relative to the existing local roads and driveways in the Project's vicinity. A review of the proposed Project driveways indicates that they are, or will be, located at points that minimize traffic operational impacts to the existing roadway network, namely Pearl Street and Lander Avenue.
- It is recommended that the Project Site Plan incorporate an ADA compliant walkway along its frontage to Geer Avenue and pedestrian facilities that connect to the proposed buildings on campus.
- It is recommended that the Project implement a Class II bike lane along its frontage to Geer Avenue.
- It is estimated that existing Elim generates 1,890 daily trips, 670 AM peak hour trips and 340 PM peak hour trips. At buildout, it is estimated that the future Elim will generate a maximum of 1,134 daily, 402 AM peak hour and 204 PM peak hour trips. At buildout, the proposed Elementary School is estimated to generate a maximum of 1,134 daily, 402 AM peak hour and 204 PM peak hour trips. The proposed Project is estimated to generate an additional 378 daily trips, 134 AM peak hour trips and 68 PM peak hour trips.
- In this case, the Project's average vehicle miles traveled (round-trip) is estimated to be 9.74 miles for future Elim and 9.67 miles for the proposed Elementary school. The 2018 Regional Transportation Plan (RTP) prepared by the Merced County Association of Governments indicates the average trip length under an 'Infill Emphasis' focus is 14.62 miles for the region defined by the County. Per the TA, the 15 percent VMT reduction threshold is 12.43 miles. Since the Project's VMT is projected to be less than the 12.43 miles, the Project's VMT impact is considered less than significant.
- Under this scenario, the intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their acceptable LOS threshold during one or both peak periods. Additional details as to the recommended improvements for these intersections are presented later in this report.

Near Term plus Project Traffic Conditions

- Under this scenario, the intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their acceptable LOS threshold during one or both peak periods. Additional details as to the recommended improvements for these intersections are presented later in this report.

Cumulative Year 2040 No Project Traffic Conditions

- Under this scenario, the intersection of Lander Avenue and Geer Avenue is projected to exceed its LOS threshold during both peak periods. Additional details as to the recommended improvements for these intersections are presented later in this report.

Cumulative Year 2040 plus Project Traffic Conditions

- Under this scenario, the intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their LOS threshold during one or both peak periods. Additional details as to the recommended improvements for these intersections are presented later in this report.

Queuing Analysis

- It is recommended that the County consider left-turn and right-turn lane storage lengths as indicated in the Queuing Analysis.

Scope of Work

The study focused on evaluating traffic conditions at the existing study intersections that may potentially be impacted by the Project. On November 5, 2019, a Draft Scope of Work for the preparation of a TIA for this Project was provided to the County of Merced and Caltrans for their review and comment. Any comments to the Draft Scope of Work were to be provided by November 26, 2019.

On November 26, 2019, the Merced County responded and approved the Scope of Work as presented. On December 2, 2019, Caltrans responded to the Scope of Work. Caltrans requested that the analysis include the intersections of Lander Avenue, also known as State Route 165, and Dayton Avenue along with Lander Avenue and Echo Street.

Based on the comments received, the analysis includes the intersections of Lander Avenue and Dayton Avenue and Lander Avenue and Echo Street as requested by Caltrans. The Scope of Work and the comments received from the lead agency and responsible agencies are included in Appendix A.

Study Facilities

The existing peak hour turning movement counts were conducted at the study intersections in February 2020. The intersection turning movement counts included pedestrian and bicyclist volumes. The traffic counts for the existing study intersections are contained in Appendix B. The existing intersection turning movement volumes, intersection geometrics and traffic controls are illustrated in Figure 2.

Study Intersections

1. Lander Avenue / Echo Street
2. Lander Avenue / Dayton Avenue
3. Project Driveway 1 / Geer Avenue
4. Project Driveway 2 / Geer Avenue
5. Lander Avenue / Geer Avenue

Study Scenarios

Existing Traffic Conditions

This scenario evaluates the Existing Traffic Conditions based on existing traffic volumes and roadway conditions from traffic counts and field surveys conducted in February 2020.

Existing plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Existing plus Project Traffic Conditions. The Existing plus Project traffic volumes were obtained by adding the Net New Project Only Trips to the Existing Traffic Conditions scenario. The Net New Project Only Trips to the study intersections were developed based on existing travel patterns, the existing roadway network, engineering judgment, data provided by the District, knowledge of the study area, existing residential densities, the 2030 Merced County General Plan Circulation Diagram, and the Merced County Hilmar Community Plan Circulation Diagram in the vicinity of the Project.

Near Term plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Near Term plus Project Traffic Conditions. The Near Term plus Project traffic volumes were obtained by expanding existing traffic volumes by an average annual growth rate of 0.4 percent for five (5) years. The average annual growth rate of 0.4 percent was presented in the Scope of Work and approved by Merced County and Caltrans.

Cumulative Year 2040 No Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2040 No Project Traffic Conditions. The Cumulative Year 2040 No Project traffic volumes were obtained by expanding existing traffic volumes by an average annual growth rate of 0.4 percent. The average annual growth rate of 0.4 percent was presented in the Scope of Work and approved by Merced County and Caltrans.

Cumulative Year 2040 plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2040 plus Project Traffic Conditions. The Cumulative Year 2040 plus Project traffic volumes were obtained by adding the Net New Project Only Trips to the Cumulative Year 2040 No Project scenario.

Level of Service Analysis Methodology

Level of Service (LOS) is a qualitative index of the performance of an element of the transportation system. LOS is a rating scale running from “A” to “F”, with “A” indicating no congestion of any kind and “F” indicating unacceptable congestion and delays. LOS in this study describes the operating conditions for signalized and unsignalized intersections.

The *Highway Capacity Manual* (HCM) 6th Edition is the standard reference published by the Transportation Research Board and contains the specific criteria and methods to be used in assessing LOS. Synchro software was used to define LOS in this study. Details regarding these calculations are included in Appendix C.

Criteria of Significance

The 2030 Merced County General Plan has established LOS C or better for roadways located within rural areas, LOS D or better for roadways located outside Urban Communities that serve as connectors between Urban Communities, and LOS D or better for roadways located within Urban Communities. Since all study intersections fall within the Urban Community of Hilmar according to the 2030 Merced County General Plan Circulation Diagram, all study intersections utilize LOS D as the criteria of significance.

Caltrans endeavors to maintain a target LOS at the transition between LOS C and D on State highway facilities consistent with the *Caltrans Guide for the Preparation of Traffic Impact Studies* dated December 2002. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. The State Route 165 Transportation Concept Report has established LOS D as the concept LOS for State Route 165 within the community of Hilmar. Therefore, study facilities within Caltrans’ jurisdiction utilize LOS D as the criteria of significance.

Operational Analysis Assumptions and Defaults

The following operational analysis values, assumptions and defaults were used in this study to ensure a consistent analysis of LOS among the various scenarios.

- Yellow time consistent with the California Manual of Uniform Traffic Control Devices (CA MUTCD) based on approach speeds
- All-red clearance intervals of 1.0 second for all phases
- Walk intervals of 7.0 seconds
- Flashing Don't Walk based on 3.5 feet/second walking speed with yellow plus all-red clearance subtracted and 2.0 seconds added
- All new or modified signals utilize protective left-turn phasing, unless otherwise stated
- Heavy vehicle factor:
 - An average 7 percent on Lander Avenue, per the Caltrans District 10 State Route 165 Transportation Concept Report (TCR) dated November 2015
 - An average 3 percent on Geer Avenue and the Project Driveways
 - An average of 1 percent on Echo Street at Dayton Avenue
- An average of 10 pedestrian calls per hour at all signalized intersections
- The number of observed pedestrians at existing intersections was utilized under all study scenarios
- The observed approach Peak Hour Factor (PHF) at existing intersections was utilized in the Existing, Existing plus Project and Near Term plus Project scenarios
- For the intersections of Project Driveway 1 at Geer Avenue and Project Driveway 2 at Geer Avenue, the following PHF's were utilized in the Existing plus Project and Near Term plus Project scenarios:
 - A PHF of 0.86 during the AM peak
 - A PHF of 0.90 during the PM peak
- For the Cumulative Year 2040 scenarios, the following PHF's were utilized to reflect school traffic operations and an increase in future traffic volumes. As roadways start to reach their saturated flow rates, PHF's tend to increase to 0.90 or higher. The PHF's were established based on historical traffic counts collected by JLB for intersections in proximity of school sites.
 - For the intersections of Project Driveway 1 at Geer Avenue and Project Driveway 2 at Geer Avenue, the following PHF's were utilized:
 - A PHF of 0.86 during the AM peak
 - A PHF of 0.90 during the PM peak
 - A PHF of 0.92, or the existing PHF if higher, is utilized for all other intersections

Existing Traffic Conditions

Roadway Network

The Project site and surrounding study area are illustrated in Figure 1. Important roadways serving the Project are discussed below.

Lander Avenue (State Route 165) is an existing north-south two-lane arterial/highway in the vicinity of the proposed Project site. In this area, Lander Avenue is the only major north-south roadway that bisects the community of Hilmar connecting State Route 99 in Turlock to Interstate 5 south of Los Banos. Lander Avenue is a two-lane conventional highway divided by a two-way left-turn lane between American Avenue and Geer Avenue. The Merced County Hilmar Community Plan designates Lander Avenue as a two-lane divided arterial with on-street parking and sidewalks within the Hilmar Community Planning Area. Outside of the Hilmar Community Planning Area, Lander Avenue is known as State Route 165. The Caltrans District 10 TCR for State Route 165 designates the segment of State Route 165 between Turner Avenue and Bradbury Road as a four-lane expressway with Class III bicycle facilities and sidewalks.

Echo Street is an existing east-west two-lane undivided local street in the vicinity of the proposed Project site. The Merced County Hilmar Community Plan designates Echo Street as a two-lane undivided local street within the Hilmar Community Planning Area.

Dayton Avenue is an existing east-west two-lane undivided local street in the vicinity of the proposed Project site. The Merced County Hilmar Community Plan designates Dayton Avenue as a two-lane undivided local street within the Hilmar Community Planning Area.

Geer Avenue is an existing east-west two-lane undivided collector adjacent to the proposed Project site. In this area, Geer Avenue is a two-lane undivided collector through the Hilmar Community Planning Area. The Merced County Hilmar Community Plan designates Geer Avenue as a two-lane undivided collector west of Camden Drive and a two-lane local roadway east of Camden Drive within the Hilmar Community Planning Area.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Existing Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the existing study intersections satisfy the peak hour signal warrant during either peak period.

Results of Existing Level of Service Analysis

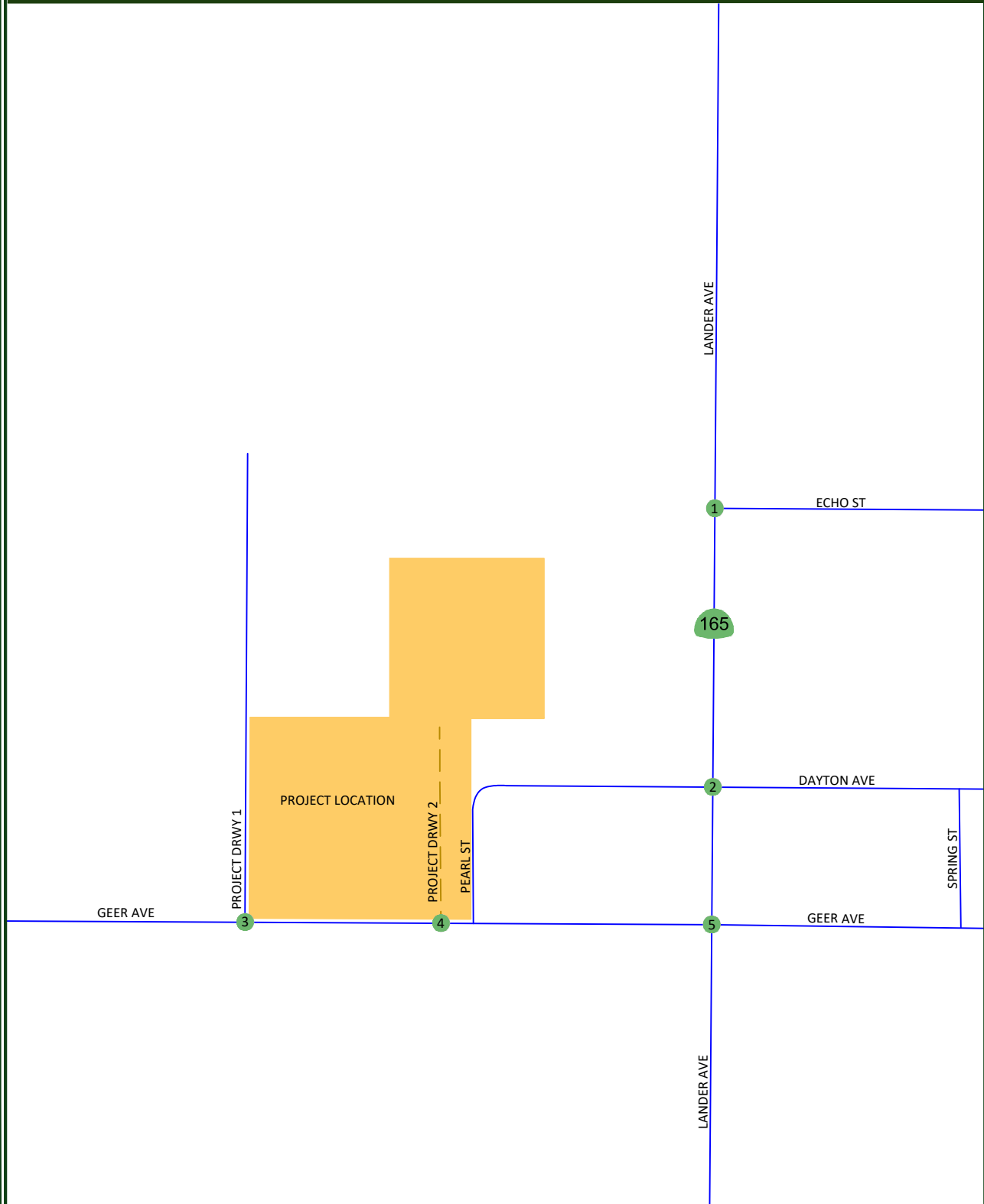
Figure 2 illustrates the Existing turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Existing Traffic Conditions scenario are provided in Appendix D. Table I presents a summary of the Existing peak hour LOS at the study intersections.

At present, all study intersections operate at an acceptable LOS during both peak periods.

Table I: Existing Intersection LOS Results

ID	Intersection Name	Type of Control	AM (7-9) Peak Hour		PM (2-4) Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	Lander Avenue / Echo Street	One-Way Stop	14.4	B	12.3	B
2	Lander Avenue / Dayton Avenue	Two-Way Stop	26.4	D	19.9	C
3	Project Driveway 1 / Geer Avenue	One-Way Stop	13.1	B	10.8	B
4	Project Driveway 2 / Geer Avenue	Does Not Exist	N/A	N/A	N/A	N/A
5	Lander Avenue / Geer Avenue	Two-Way Stop	34.9	D	28.6	D

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



516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

LEGEND

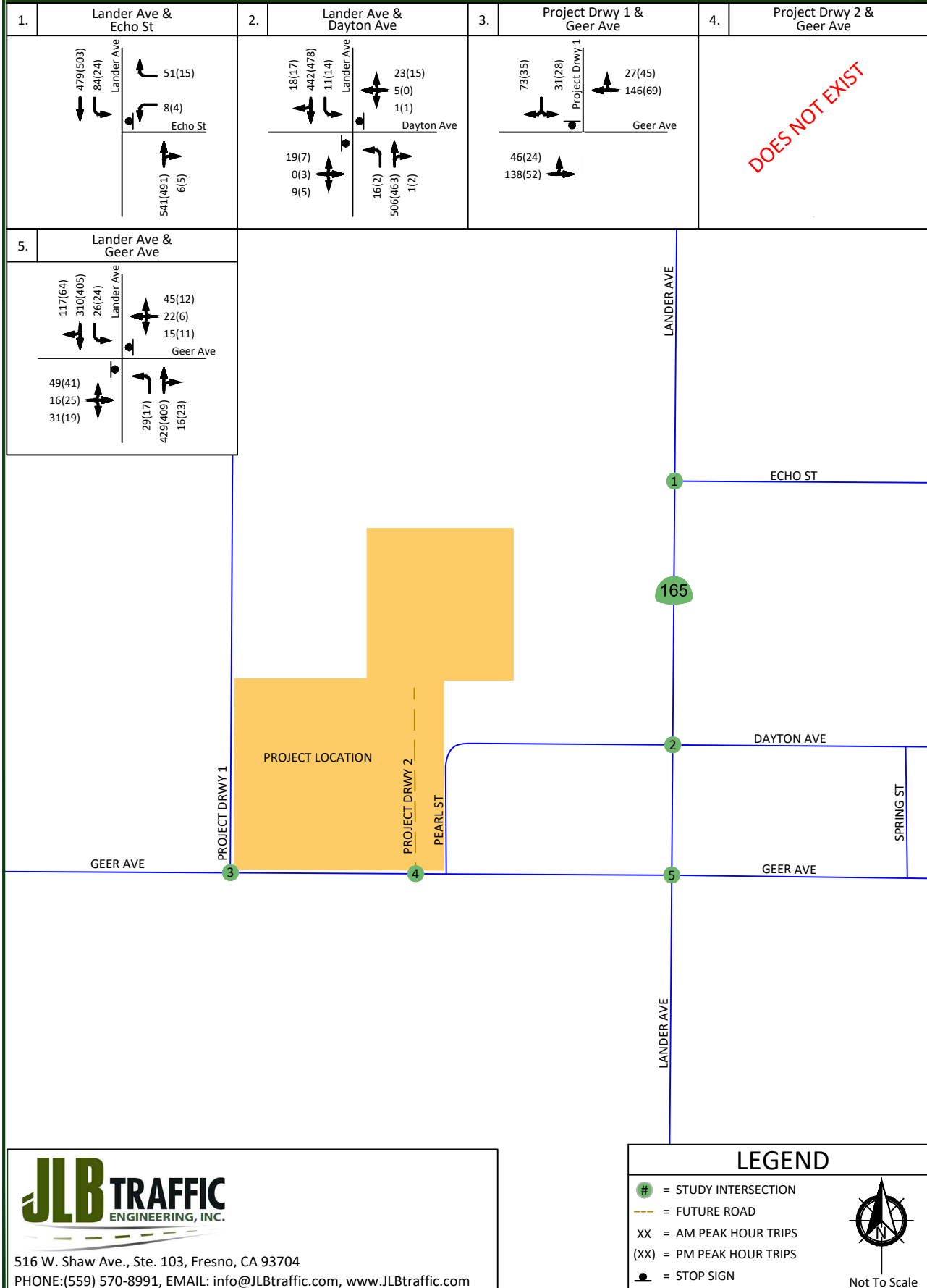
- # = STUDY INTERSECTION
- = FUTURE ROAD



Not To Scale

HUSD Elementary School - Merced County Existing - Traffic Volumes, Geometrics and Controls

Figure 2



Existing plus Project Traffic Conditions

Project Description

The District proposes construction of a New Elementary School campus and reconfiguration of the existing Elim Elementary School campus (Project) serving the community of Hilmar in Merced County. The District currently operates two (2) elementary schools serving grades K-5 (one of which is located in Stevinson), a middle school serving grades 6-8, a high school serving grades 9-12, and a continuation school. The District proposes to a) construct a new Elementary School on a turfed area currently being used by Hilmar High School located on the northwest corner of Pearl Street and Geer Avenue and b) reconfigure a portion of the existing Elim Elementary School (Elim) site. Figure 1 shows the location of the proposed Project site relative to the surrounding roadway network.

The Project will include; six (6) classroom buildings housing 25 classrooms; two (2) buildings housing a library, administrative office, and multipurpose room; recreational areas including turfed athletic fields, hardcourts, and a climbing structure; and the addition of new parking areas. The Project also includes removal of facilities and new construction at Elim. As part of the Project, approximately 500 existing students in pre-K-2 grade will relocate from Elim to the Project, leaving Elim with approximately 500 existing students in 3-5 grade. The Project will provide instruction to approximately 600 students in pre-K-2 grade. Moreover, Elim's capacity will increase to 600 students. Ultimately, the Project proposes to increase overall student capacity from approximately 1,000 to 1,200 total students in pre-K-5 grade. Moreover, the Project proposes to reduce the number of classrooms at Elim from 50 to 26. While each campus is anticipated to have a maximum of 60 staff, it is anticipated that some staff will be shared given the proximity of the schools. New driveways from Geer Avenue will serve as the main access to both elementary schools. The "front" of Elim will be moved from Lander Avenue to the eastern edge of the Project site. A parking area with approximately 58 spaces is proposed to be developed along the eastern portion of the proposed Project site. This parking area will serve teachers, administrative staff and visitors. The Project will also provide parallel parking along the east side of campus for teachers and administrative staff. The Project proposes to construct designated vehicle and bus drop-off areas for each campus.

The Project is consistent with the Merced County Hilmar Community Plan, a comprehensive update of the Hilmar Community Specific Plan and its land use map, the Hilmar Specific Urban Development Plan (Hilmar SUDP). It is worth noting that the Project will fulfill a strategy of the Hilmar Community Plan to provide additional school sites away from Lander Avenue to serve current and future residents. Figure 3 illustrates the latest Project Site Plan.

Project Access

Access to and from the Project will be from two (2) driveways. The main access (Project Driveway 1) is an existing access utilized for shipping and receiving to the Hilmar High School campus. This access point is located along the north side of Geer Avenue approximately 1,300 feet west of Lander Avenue and is proposed as a full access. The other access driveway (Project Driveway 2) is also located along the north side of Geer Avenue approximately 175 feet west of Pearl Street and is proposed as an entrance only access.

JLB analyzed the location of the existing and proposed driveways relative to the existing local roads and driveways in the Project's vicinity. A review of the proposed Project driveways indicates that they are, or will be, located at points that minimize traffic operational impacts to the existing roadway network, namely Pearl Street and Lander Avenue.

Walkways

Currently, walkways exist in the vicinity of the proposed Project site along Lander Avenue, Echo Street, Dayton Avenue east of Lander Avenue, and the majority of the north side of Geer Avenue. The Merced County Hilmar Community Plan suggests that sidewalks are required with all new development. The latest Project Site Plan proposes pedestrian walkways near the northeast corner of the campus with paths toward Elim (east) and Hilmar High School (north). It is recommended that the Project Site Plan incorporate an ADA compliant walkway along its frontage to Geer Avenue and pedestrian facilities that connect to the proposed buildings on campus. With the implementation of the recommended walkways, pedestrians will have adequate and safe pedestrian facilities at all times.

Bikeways

The Merced County Hilmar Community Plan identifies potential bike routes a) Lander Avenue through the community of Hilmar as a Merced County Regional Bicycle Route, b) Echo Street between Lander Avenue and Camden Drive as a Class II Bicycle Route, c) Geer Avenue west of Lander Avenue as a Merced County Regional Bicycle Route, and d) Geer Avenue east of Lander Avenue as a Class II Bicycle Route. Within Hilmar, Lander Avenue serves as the only continuous north-south street, and serves as the primary travel path to several schools. Development of Class II bicycle lane may not be desirable compared to development of an alternative bicycle trail and lane system that keeps bicycles away from State Route 165. A Class I bike path adjacent to Turlock Irrigation District Lateral No. 7, south of Echo Street will become the backbone of the network. Bicycle and pedestrian facilities branching from this trail will ensure non-motorized access to neighborhood focal points such as schools and parks. The Merced County Hilmar Community Plan recommends Class II bike lanes along Lander Avenue and Geer Avenue west of Lander Avenue. Therefore, it is recommended that the Project implement a Class II bike lane along its frontage to Geer Avenue.

Transit

The Bus, Merced's Regional Transit System, is the single public transportation service provider for all of Merced County. At present, no bus routes connect to the community of Hilmar. However, The Bus offers curb-to-curb transit service through Paratransit to individuals that are eligible and have passed the approval process. Paratransit is open for service between 6:00 AM to 8:00 PM on Monday through Friday and 8:00 AM to 6:00 PM on Saturdays and Sundays. Expansion of future transit routes is dependent on transit ridership demand and available funding.

Trip Generation

Trip generation rates for the proposed Project were obtained from the 10th Edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE). Table II presents the trip generation for existing Elim Elementary School with trip generation rates for 1,000 students in pre-K-5 grade. It is estimated that existing Elim generates 1,890 daily trips, 670 AM peak hour trips and 340 PM peak hour trips. Table III presents the trip generation for future Elim with trip generation rates for 600 students in 3-5 grade. At buildout, it is estimated that the future Elim will generate a maximum of 1,134 daily, 402 AM peak hour and 204 PM peak hour trips. Table IV presents the trip generation for the proposed Elementary School will trip generation rates for 600 students in pre-K-2 grade. At buildout, the proposed Elementary School is estimated to generate a maximum of 1,134 daily, 402 AM peak hour and 204 PM peak hour trips. Table V presents the difference in trip generation. As can be seen from Table V, the proposed Project is estimated to generate an additional 378 daily trips, 134 AM peak hour trips and 68 PM peak hour trips.

Table II: Existing Elim Elementary School Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM (7-9) Peak Hour						PM (2-4) Peak Hour					
			Rate	Total	Trip Rate	In	Out	In	Out	Total	Trip Rate	In	Out	In	Out	Total
						%						%				
Elementary School (520)	1,000	students	1.89	1,890	0.67	54	46	362	308	670	0.34	45	55	153	187	340
Total Project Trips				1,890				362	308	670				153	187	340

Table III: Future Elim Elementary School Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM (7-9) Peak Hour						PM (2-4) Peak Hour					
			Rate	Total	Trip Rate	In	Out	In	Out	Total	Trip Rate	In	Out	In	Out	Total
						%						%				
Elementary School (520)	600	students	1.89	1,134	0.67	54	46	217	185	402	0.34	45	55	92	112	204
Total Project Trips				1,134				217	185	402				92	112	204

Table IV: Proposed Elementary School Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM (7-9) Peak Hour						PM (2-4) Peak Hour					
			Rate	Total	Trip Rate	In	Out	In	Out	Total	Trip Rate	In	Out	In	Out	Total
						%						%				
Elementary School (520)	600	students	1.89	1,134	0.67	54	46	217	185	402	0.34	45	55	92	112	204
Total Project Trips				1,134				217	185	402				92	112	204

Table V: Difference in Trip Generation

	<i>Daily</i>	<i>AM (7-9) Peak Hour</i>			<i>PM (2-4) Peak Hour</i>		
	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Existing Elim	1,891	362	308	670	153	187	340
Future Elim & Proposed Elementary	2,268	434	370	804	184	224	408
<i>Difference in Trip Generation</i>	378	72	62	134	31	37	68

Trip Distribution

The Net New Project Only Trips to the study intersections were developed based on data provided by the District, existing travel patterns, the existing roadway network, engineering judgment, knowledge of the study area, existing residential and commercial densities, and the Merced County Hilmar Community Plan in the vicinity of the Project. Figure 4 presents the Existing Elim Elementary Project Only Trips. These are the trip distribution and assignment patterns of approximately 1,000 students attending Elim Elementary School considering access along Lander Avenue. Figure 5 presents the Future Project Only Trips. These are the anticipated trip distribution patterns of the anticipated 1,200 students attending the proposed Project and future Elim assuming access along Geer Avenue. Figure 6 presents the Net New Project Only Trips to the study intersections. The net new trips are simply the difference between the Future Project Only Trips and Existing Elim Elementary Project Only Trips.

Safe Routes to School

The most direct path to the Project site for students residing north of Echo Street would be to either head east or west toward Lander Avenue and then south toward Echo Street. Students may utilize any combination of local streets and/or major roadways to arrive at Lander Avenue and Echo Street. Major roadways include American Avenue and Bloss Avenue, which contain signalized intersections at Lander Avenue with marked crosswalks and pedestrian walkways. The majority of local streets in the area are controlled by a two-way stop with unmarked crosswalks on all approaches and contain pedestrian walkways. Students would meet at the southwest corner of Lander Avenue and Echo Street, which is controlled by a one-way stop on Echo Street and contains marked crosswalks in the westbound and northbound approaches. Students may then continue south along the west side of Lander Avenue toward Dayton Avenue. The intersection of Lander Avenue and Dayton Avenue is controlled by a two-way stop on Dayton Avenue and contains marked crosswalks in the eastbound and westbound approaches. Students may continue west along the north side of Dayton Avenue and then south along the west side of Pearl Street toward Geer Avenue. The intersection of Pearl Street at Geer Avenue is controlled by a one-way stop on Pearl Street and contains unmarked crosswalks on all approaches. Students may then proceed west along the north side of Geer Avenue until reaching the nearest campus entrance.

The most direct path to the Project site for students residing east of Lander Avenue between Echo Street and Geer Avenue would be to head west toward Lander Avenue and then south toward Geer Avenue. The intersection of Lander Avenue and Geer Avenue is controlled by a two-way stop on Geer Avenue and contains unmarked crosswalks on all approaches. Students may continue west along the north side of Geer Avenue toward Pearl Street. The intersection of Pearl Street at Geer Avenue is controlled by a one-way stop on Pearl Street and contains unmarked crosswalks on all approaches. Students may then proceed west along the north side of Geer Avenue until reaching the nearest campus entrance.

The most direct path to the Project site for students residing southeast of Lander Avenue and Geer Avenue would be to head north toward Geer Avenue and then west toward Lander Avenue. The intersection of Lander Avenue and Geer Avenue is controlled by a two-way stop on Geer Avenue and contains unmarked crosswalks on all approaches. Students may continue west along the north side of Geer Avenue toward Pearl Street. The intersection of Pearl Street at Geer Avenue is controlled by a one-way stop on Pearl Street and contains unmarked crosswalks on all approaches. Students may then proceed west along the north side of Geer Avenue until reaching the nearest campus entrance.

The most direct path to the Project site for students residing southwest of Lander Avenue and Geer Avenue would be to head north toward Geer Avenue and then east until reaching the Lander Avenue. The intersection of Lander Avenue and Geer Avenue is controlled by a two-way stop on Geer Avenue and contains unmarked crosswalks on all approaches. Students may continue west along the north side of Geer Avenue toward Pearl Street. The intersection of Pearl Street at Geer Avenue is controlled by a one-way stop on Pearl Street and contains unmarked crosswalks on all approaches. Students may then proceed west along the north side of Geer Avenue until reaching the nearest campus entrance.

Vehicle Miles Traveled Analysis

Senate Bill (SB) 743 (Steinberg 2013) was approved by then Governor Brown on September 27, 2013. SB 743 created a path to revise the definition of transportation impacts according to the California Environmental Quality Act (CEQA). The revised CEQA Guidelines requiring Vehicle Miles Traveled (VMT) Analysis became effective December 28, 2018. However, agencies had until July 1, 2020 to finalize their local guidelines on VMT Analysis. Therefore, as agencies finalize their VMT Analysis protocol, CEQA transportation impacts are to be determined using LOS of intersections and roadways, which is a measure of congestion. The intent of SB 743 is to align CEQA transportation study methodology with and promote the statewide goals and policies of reducing VMT and greenhouse gases (GHG). Three objectives of SB 743 related to development are to reduce GHG, diversify land uses, and focus on creating a multimodal environment. It is hoped that this will spur infill development.

The State of California Governor's Office of Planning and Research (OPR) published a Technical Advisory (TA) on *Evaluating Transportation Impacts in CEQA* (December 2018) to provide advice and recommendations, which agencies and other entities may use at their discretion. The TA acknowledges that lead agencies should set criteria and thresholds for VMT and transportation impacts. However, it provides guidance to residential, office and retail uses, citing these as the most common land uses. Beyond these three land uses, there is no guidance provided for any other land use type. In other words, the TA does not establish any presumptive thresholds or analytical methods for assessing VMT in relation to school projects and operations. The TA also notes that land uses may have a less than significant impact if located within a low VMT areas, in close proximity to a transit route, areas of a region and suggests that screening maps be used for this determination. Furthermore, the TA also notes that local serving retail generally less than 50,000 square feet and projects which yield 110 or fewer trips could be considered not to lead to a significant impact. As of the date of this Report, the County of Merced had not finalized its VMT guidelines. As a result, the VMT analysis presented in this Report was performed pursuant to the TA.

VMT is simply the product of a number of trips and the length of those trips. The first step in a VMT analysis is to establish the baseline average VMT, which requires the definition of a region. The Technical Advisory states that existing VMT may be measured at the regional or city level. On the contrary, the Technical Advisory also notes that VMT analyses should not be truncated due to "jurisdictional or other boundaries." In this case, the Project site is located within a defined service area that is currently being served by Elim Elementary School. When considering the existing Elim Elementary School, the estimated average vehicle miles traveled (round-trip) for existing Elim is 9.30 miles per trip. When considering the Project, the Project's average vehicle miles traveled (round-trip) is estimated to be 9.74 miles for future Elim and 9.67 miles for the proposed Elementary school. Additionally, the proposed Project will incorporate adequate pedestrian and bicycle facilities. The 2018 Regional Transportation Plan (RTP) prepared by the Merced County Association of Governments (MCAG) indicates the average trip length under an 'Infill Emphasis' focus is 14.62 miles for the region defined by the County. Per the TA, the 15 percent VMT reduction threshold is 12.43 miles. Since the Project's VMT is projected to be less than the 12.43 miles, the Project's VMT impact is considered less than significant.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Existing plus Project Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Project Driveway 1 and Geer Avenue is projected to satisfy the peak hour signal warrant during the AM peak period only, while the intersection of Lander Avenue and Geer Avenue is projected to satisfy the peak hour signal warrant during the both peak periods. Based on the signal warrant and engineering judgment, signalization of this intersection is recommended.

Results of Existing plus Project Level of Service Analysis

The Existing plus Project Traffic Conditions scenario assumes that the existing roadway geometrics and traffic controls will remain in place. Figure 7 illustrates the Existing plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Existing plus Project Traffic Conditions scenario are provided in Appendix E. Table VI presents a summary of the Existing plus Project peak hour LOS at the study intersections.

Under this scenario, the study intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their acceptable LOS threshold during one or both peak periods.

The Hilmar Community Plan examined alternative scenarios to alleviate traffic along Lander Avenue that includes additional lane capacity along Lander Avenue, which would eliminate on-street parking, but would not meet Caltrans' lane standards for a Highway designation; and additional traffic lanes that meet Caltrans' Highway Standards. The first alternative was not supported by businesses along Lander Avenue and by the Community in general. The second alternative, which would have increased right-of-way along Lander Avenue, was determined to be infeasible due to the cost associated with right-of-way acquisition and would diminish Hilmar's small-town character. The Highway 165 Bypass has been determined as the most feasible option to alleviate inter-regional traffic as well as heavy truck uses through the community. Until the bypass is constructed, Lander Avenue may temporarily operate at LOS D or below during peak hours, through a General Plan Amendment allowing this LOS scenario that was approved with the Hilmar Community Plan in order to maintain Hilmar's small-town character and facilitate the construction of the Highway 165 Bypass through an update to the bridge and thoroughfare fee. In order to improve LOS at these intersections until that time, it is recommended that the following improvements be implemented.

- Lander Avenue / Dayton Avenue
 - Modify Dayton Avenue access at Lander Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be installed across the intersection along the center of Lander Avenue. With the installation of the raised median island, eastbound and westbound left-turns and through maneuvers would need to be redirected. Eastbound left-turning and through traffic from Dayton Avenue would need to travel south along Pearl Street, east along Geer Avenue towards Lander Avenue. Westbound left-turning and through traffic from Dayton Avenue would need to travel south along Spring Street and west along Geer Avenue towards Lander Avenue.
- Project Driveway 1 / Geer Avenue
 - Modify the westbound through-right lane to a through lane;
 - Add a westbound right-turn lane;
 - Modify the southbound left-right lane to a left-turn lane; and
 - Add a southbound right-turn lane.

- Lander Avenue / Geer Avenue
 - Signalize the intersection with split phasing in the east-west directions. Split phasing is recommended over concurrent left-turn phasing not only due to a large volume imbalance between eastbound and westbound traffic, but also to minimize impacts to existing business and Hilmar's small-town character.

Table VI: Existing plus Project Intersection LOS Results

ID	Intersection Name	Type of Control	AM (7-9) Peak Hour		PM (2-4) Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	Lander Avenue / Echo Street	One-Way Stop	15.5	C	12.6	B
2	Lander Avenue / Dayton Avenue	Two-Way Stop	46.4	E	23.8	C
		Two-Way Stop (Mitigated)	13.9	B	12.4	B
3	Project Driveway 1 / Geer Avenue	One-Way Stop	77.1	F	13.6	B
		One-Way Stop (Mitigated)	23.6	C	11.5	B
4	Project Driveway 2 / Geer Avenue	Uncontrolled	0.2	A	0.3	A
5	Lander Avenue / Geer Avenue	Two-Way Stop	>120.0	F	>120.0	F
		Signalized (Mitigated)	46.5	D	21.0	C

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



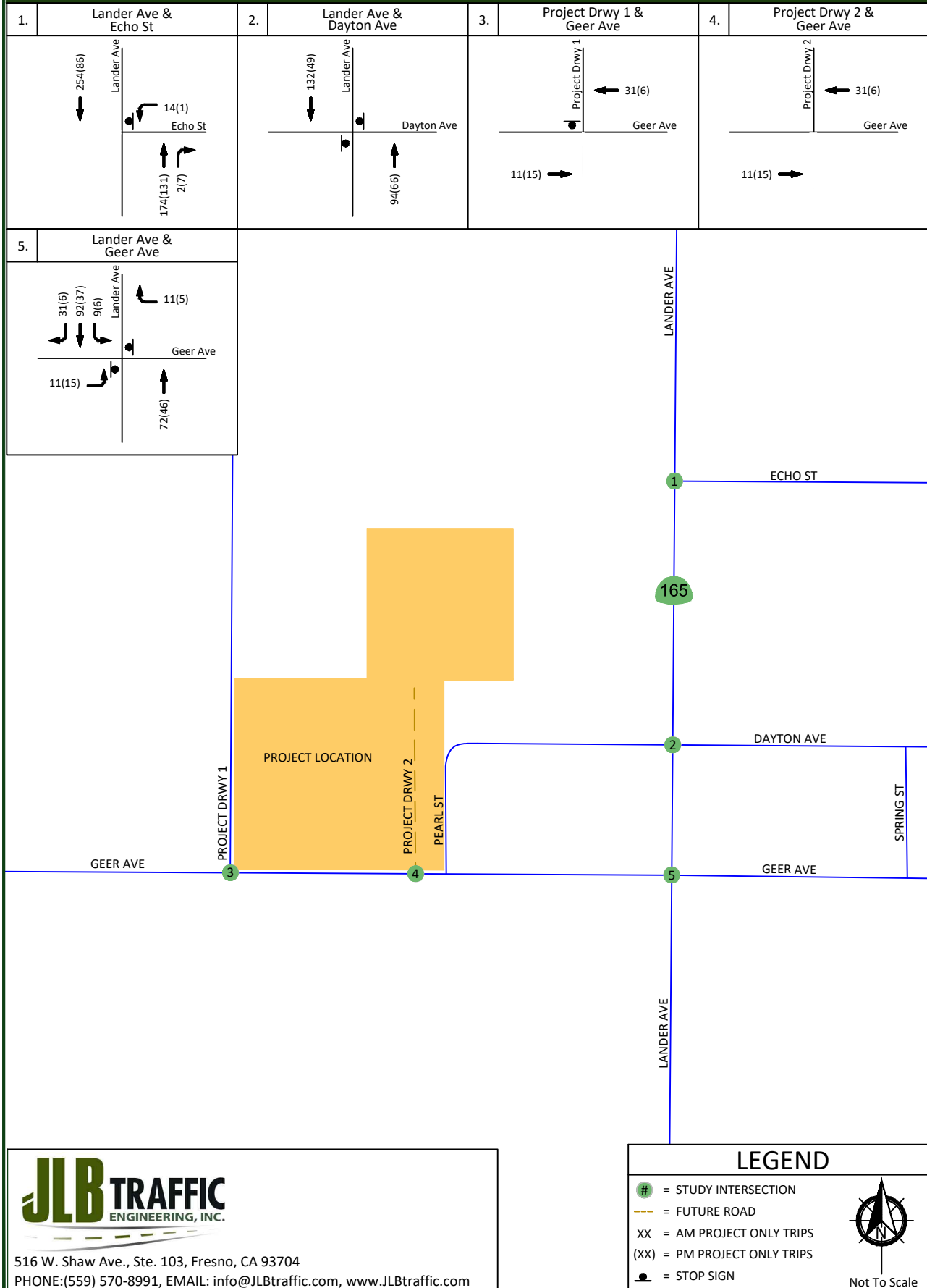
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE: (559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com



Not To Scale

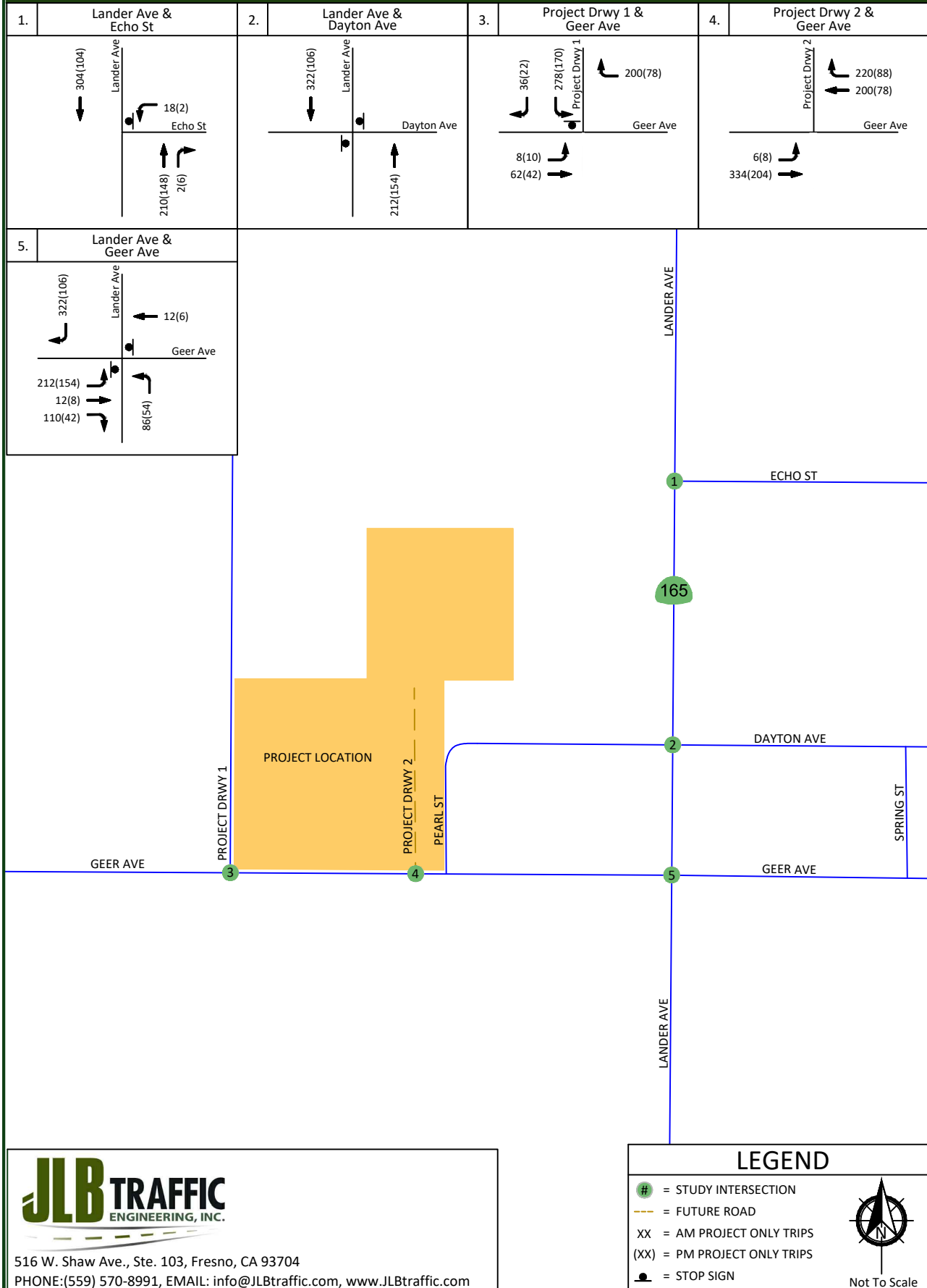
HUSD Elementary School - Merced County Existing Elim Elementary Project Only Trips

Figure 4



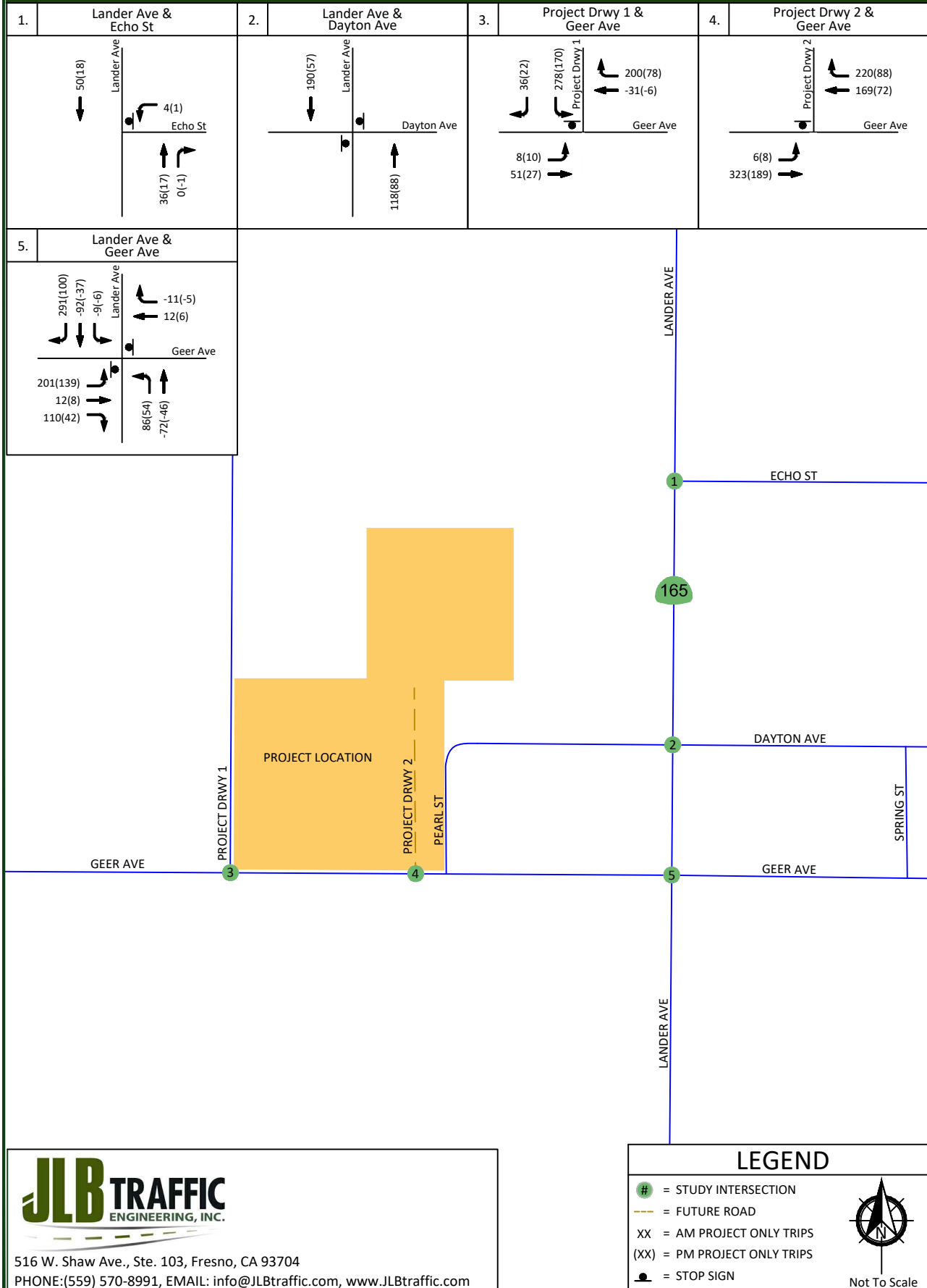
HUSD Elementary School - Merced County Future Project Only Trips

Figure 5



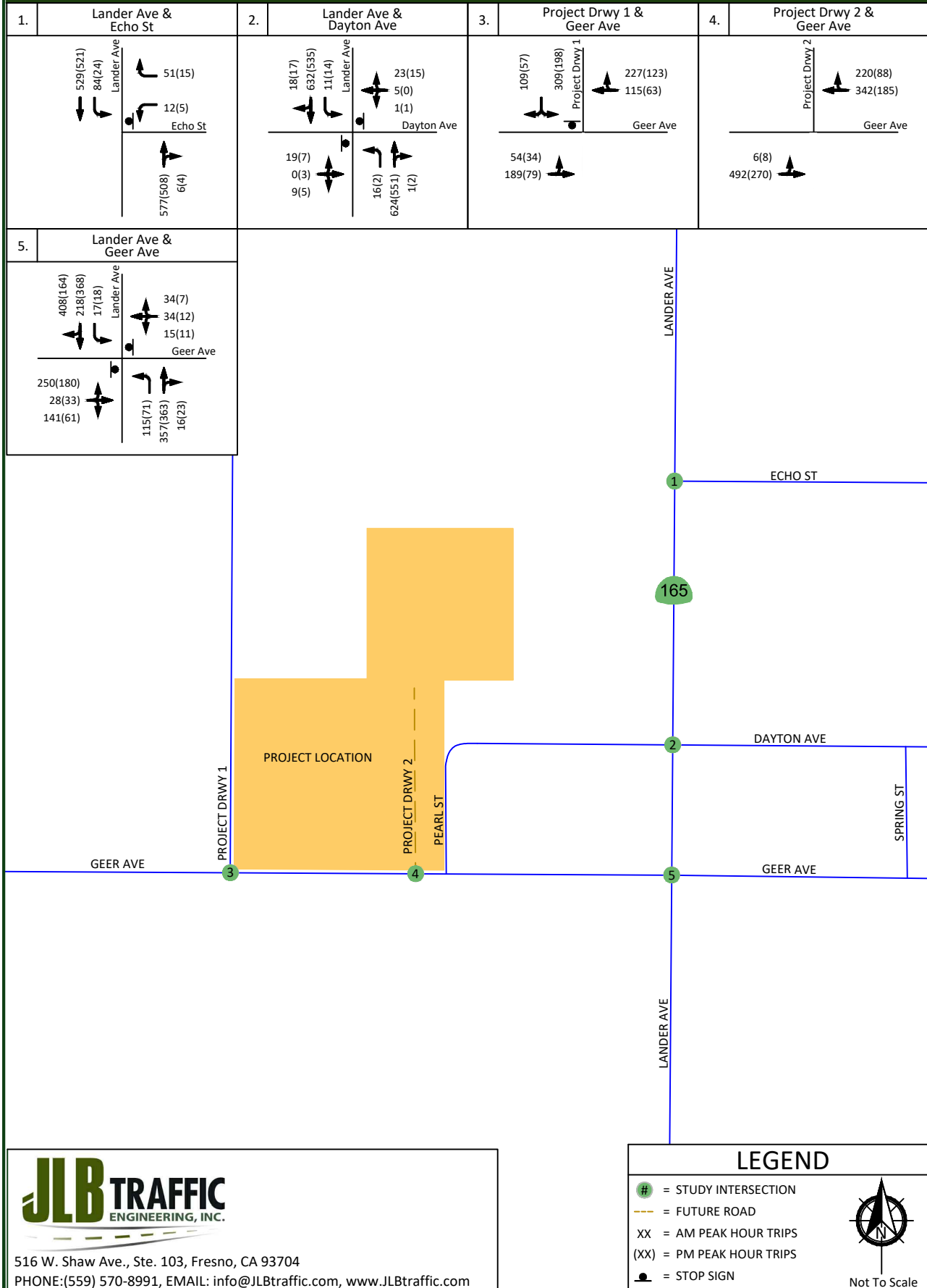
HUSD Elementary School - Merced County Net New Project Only Trips

Figure 6



HUSD Elementary School - Merced County Existing plus Project - Traffic Volumes, Geometrics and Controls

Figure 7



516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE: (559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

LEGEND

- # = STUDY INTERSECTION
- = FUTURE ROAD
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- = STOP SIGN



Not To Scale

Near Term plus Project Traffic Conditions

Description of Near Term Projects

Near Term Projects are approved and/or known projects that are either under construction, built but not fully occupied, are not built but have final site development review (SDR) approval, or for which the lead agency or responsible agencies have knowledge of. The Merced County and Caltrans staff were consulted throughout the preparation of this TIA regarding approved and/or known projects that could potentially impact the study intersections. JLB staff conducted a reconnaissance of the surrounding area to confirm the Near Term Projects. Subsequently, it was agreed that there are no projects approved, near approval, or in the pipeline within the proximity of the Project site.

Due to the lack of Near Term Projects in Hilmar, a growth rate was utilized to expand existing volumes to Year 2025. The growth rate of 0.4 percent, which was agreed upon by County of Merced staff, was applied to undergo this volume expansion. This was the process was used to derive volumes for the Near Term plus Project scenario as opposed to increasing volumes based on the Near Term Projects.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Near Term plus Project Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Lander Avenue and Geer Avenue is projected to satisfy the peak hour signal warrant during the both peak periods. Based on the signal warrant and engineering judgment, signalization of this intersection is recommended.

Results of Near Term plus Project Level of Service Analysis

The Near Term plus Project Traffic Conditions scenario assumes that the existing roadway geometrics and traffic controls will remain in place. Figure 8 illustrates the Near Term plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Near Term plus Project Traffic Conditions scenario are provided in Appendix F. Table VII presents a summary of the Near Term plus Project peak hour LOS at the study intersections.

Under this scenario, the intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their acceptable LOS threshold during one or both peak periods. To improve LOS at these intersections, it is recommended that the following improvements be implemented.

- Lander Avenue / Dayton Avenue
 - Modify Dayton Avenue access at Lander Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be installed across the intersection along the center of Lander Avenue. With the installation of the raised median island, eastbound and westbound left-turns and through maneuvers would need to be redirected. Eastbound left-turning and through traffic from Dayton Avenue would need to travel south along Pearl Street, east along Geer Avenue towards Lander Avenue. Westbound left-turning and through traffic from Dayton Avenue would need to travel south along Spring Street and west along Geer Avenue towards Lander Avenue.
- Project Driveway 1 / Geer Avenue
 - Modify the westbound through-right lane to a through lane;
 - Add a westbound right-turn lane;
 - Modify the southbound left-right lane to a left-turn lane; and
 - Add a southbound right-turn lane.
- Lander Avenue / Geer Avenue
 - Signalize the intersection with split phasing in the east-west directions. Split phasing is recommended over concurrent left-turn phasing not only due to a large volume imbalance between eastbound and westbound traffic, but also to minimize impacts to existing business and Hilmar's small-town character.

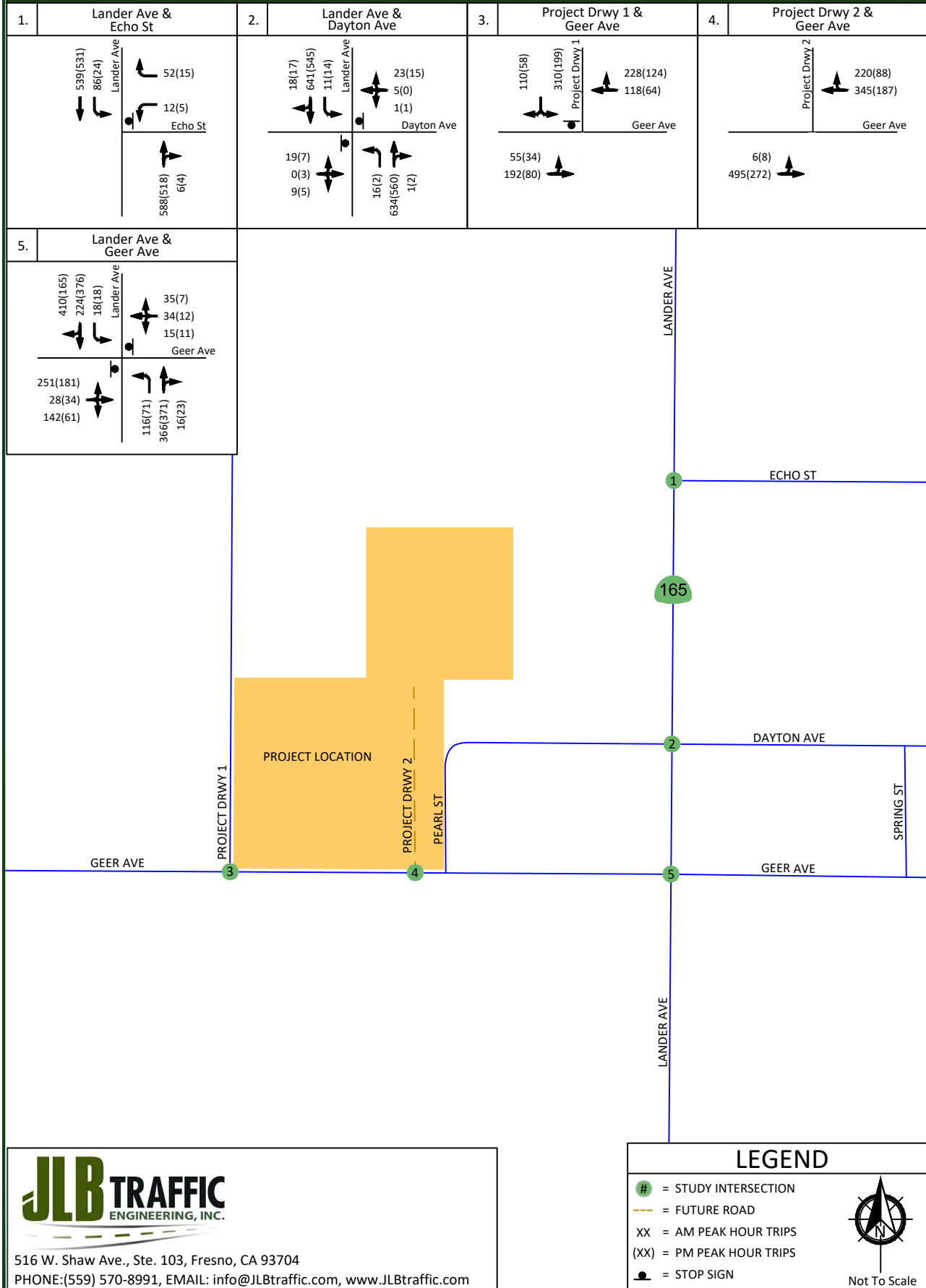
Table VII: Near Term plus Project Intersection LOS Results

ID	Intersection Name	Type of Control	AM (7-9) Peak Hour		PM (2-4) Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	Lander Avenue / Echo Street	One-Way Stop	15.7	C	12.7	B
2	Lander Avenue / Dayton Avenue	Two-Way Stop	48.4	E	24.3	C
		Two-Way Stop (Mitigated)	14.0	B	12.5	B
3	Project Driveway 1 / Geer Avenue	One-Way Stop	82.7	F	13.7	B
		One-Way Stop (Mitigated)	24.2	C	11.5	B
4	Project Driveway 2 / Geer Avenue	Uncontrolled	0.2	A	0.3	A
5	Lander Avenue / Geer Avenue	Two-Way Stop	>120.0	F	>120.0	F
		Signalized (Mitigated)	48.1	D	21.4	C

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

HUSD Elementary School - Merced County Near Term plus Project - Traffic Volumes, Geometrics and Controls

Figure 8



516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE: (559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

Cumulative Year 2040 No Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Cumulative Year 2040 No Project Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Lander Avenue and Geer Avenue is projected to satisfy the peak hour signal warrant during the both peak periods. Based on the signal warrant and engineering judgment, signalization of this intersection is recommended.

Results of Cumulative Year 2040 No Project Level of Service Analysis

The Cumulative Year 2040 No Project Traffic Conditions scenario assumes that the existing roadway geometrics and traffic controls will remain in place. Figure 9 illustrates the Cumulative Year 2040 No Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Cumulative Year 2040 No Project Traffic Conditions scenario are provided in Appendix G. Table VIII presents a summary of the Cumulative Year 2040 No Project peak hour LOS at the study intersections.

Under this scenario, the intersection of Lander Avenue and Geer Avenue is projected to exceed its LOS threshold during both peak periods. To improve the LOS of this intersection, it is recommended that the following improvements be implemented.

- Lander Avenue / Geer Avenue
 - Signalize the intersection with split phasing in the east-west directions. Split phasing is recommended over concurrent left-turn phasing not only due to a large volume imbalance between eastbound and westbound traffic, but also to minimize impacts to existing business and Hilmar's small-town character.

Table VIII: Cumulative Year 2040 No Project Intersection LOS Results

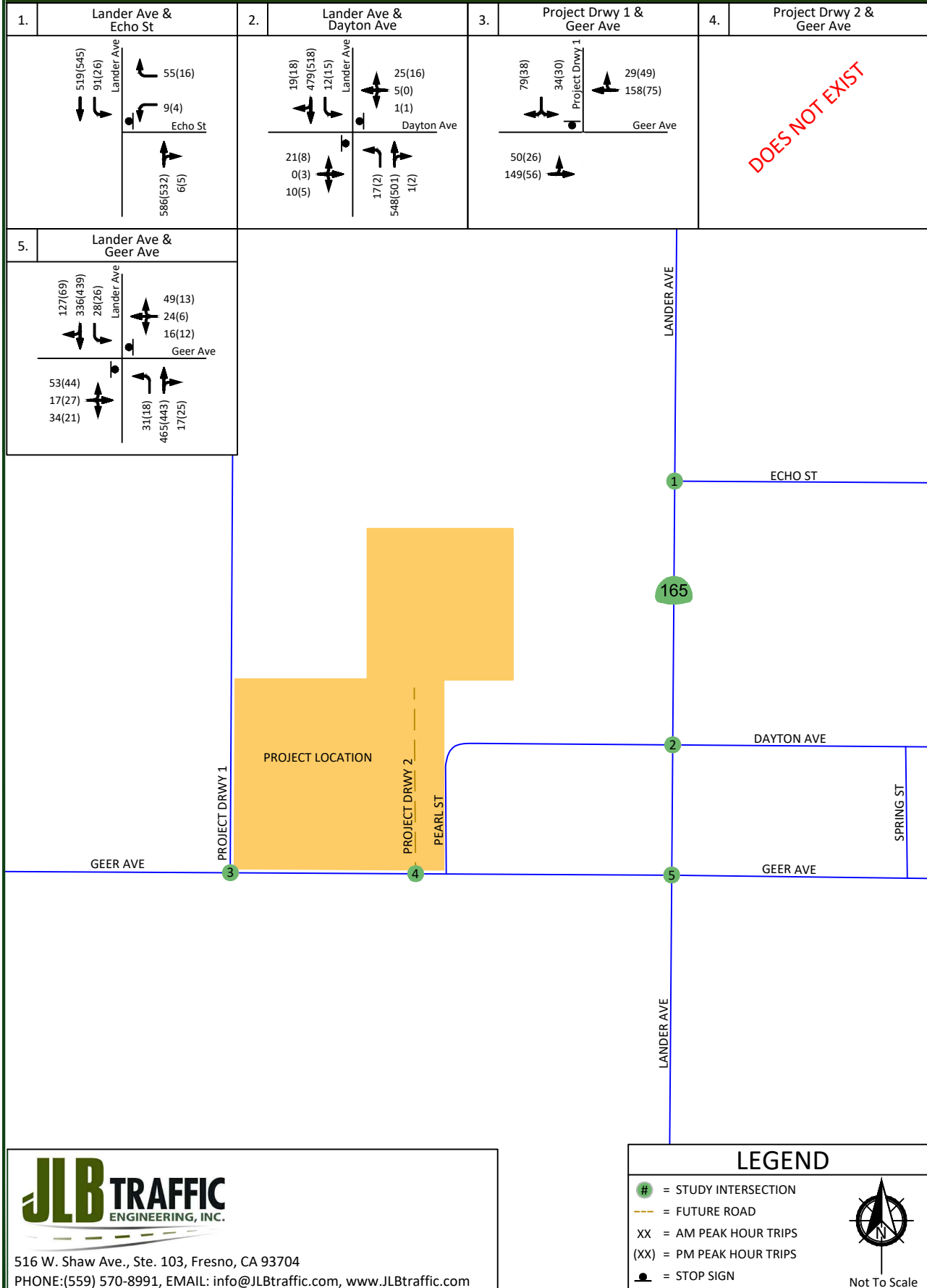
ID	Intersection Name	Type of Control	AM (7-9) Peak Hour		PM (2-4) Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	Lander Avenue / Echo Street	One-Way Stop	14.9	B	12.7	B
2	Lander Avenue / Dayton Avenue	Two-Way Stop	30.2	D	22.5	C
3	Project Driveway 1 / Geer Avenue	One-Way Stop	11.1	B	9.7	A
4	Project Driveway 2 / Geer Avenue	Uncontrolled	N/A	N/A	N/A	N/A
5	Lander Avenue / Geer Avenue	Two-Way Stop	43.3	E	35.5	E
		Signalized (Improved)	16.9	B	14.2	B

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

HUSD Elementary School - Merced County

Cumulative Year 2040 No Project - Traffic Volumes, Geometrics and Controls

Figure 9



Cumulative Year 2040 plus Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the Cumulative Year 2040 plus Project Traffic Conditions scenario. The warrants found in Appendix I were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, the intersection of Lander Avenue and Geer Avenue is projected to satisfy the peak hour signal warrant during the both peak periods. Based on the signal warrant and engineering judgment, signalization of this intersection is recommended.

Results of Cumulative Year 2040 plus Project Level of Service Analysis

The Cumulative Year 2040 plus Project Traffic Conditions scenario assumes that the existing roadway geometrics and traffic controls will remain in place. Figure 10 illustrates the Cumulative Year 2040 plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Cumulative Year 2040 plus Project Traffic Conditions scenario are provided in Appendix H. Table IX presents a summary of the Cumulative Year 2040 plus Project peak hour LOS at the study intersections.

Under this scenario, the intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their LOS threshold during one or both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.

- Lander Avenue / Dayton Avenue
 - Modify Dayton Avenue access at Lander Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be installed across the intersection along the center of Lander Avenue. With the installation of the raised median island, eastbound and westbound left-turns and through maneuvers would need to be redirected. Eastbound left-turning and through traffic from Dayton Avenue would need to travel south along Pearl Street, east along Geer Avenue towards Lander Avenue. Westbound left-turning and through traffic from Dayton Avenue would need to travel south along Spring Street and west along Geer Avenue towards Lander Avenue.
- Project Driveway 1 / Geer Avenue
 - Modify the westbound through-right lane to a through lane;
 - Add a westbound right-turn lane;
 - Modify the southbound left-right lane to a left-turn lane; and
 - Add a southbound right-turn lane.
- Lander Avenue / Geer Avenue
 - Signalize the intersection with split phasing in the east-west directions. Split phasing is recommended over concurrent left-turn phasing not only due to a large volume imbalance between eastbound and westbound traffic, but also to minimize impacts to existing business and Hilmar's small-town character.

Table IX: Cumulative Year 2040 plus Project Intersection LOS Results

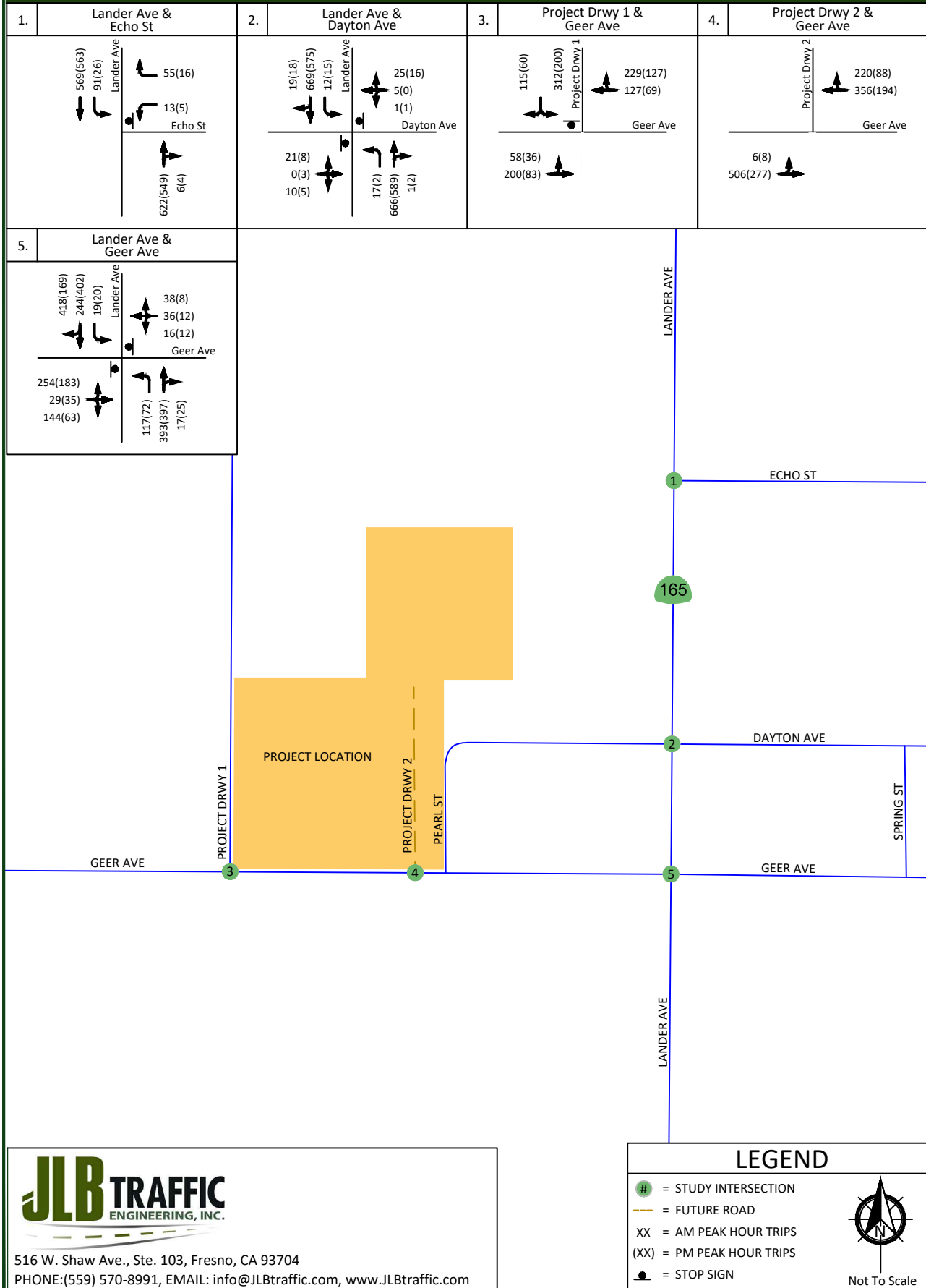
ID	Intersection Name	Type of Control	AM (7-9) Peak Hour		PM (2-4) Peak Hour	
			Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
1	Lander Avenue / Echo Street	One-Way Stop	16.0	C	13.1	B
2	Lander Avenue / Dayton Avenue	Two-Way Stop	56.1	F	27.1	D
		Two-Way Stop (Mitigated)	14.4	B	12.8	B
3	Project Driveway 1 / Geer Avenue	One-Way Stop	99.9	F	14.0	B
		Two-Way Stop (Mitigated)	26.8	D	11.6	B
4	Project Driveway 2 / Geer Avenue	Uncontrolled	0.2	A	0.3	A
5	Lander Avenue / Geer Avenue	Two-Way Stop	>120.0	F	>120.0	F
		Signalized (Mitigated)	49.9	D	22.9	C

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

HUSD Elementary School - Merced County

Cumulative Year 2040 plus Project - Traffic Volumes, Geometrics and Controls

Figure 10



Queuing Analysis

Table X provides a queue length summary for left-turn and right-turn lanes at the study intersections under all study scenarios. The queuing analyses for the study intersections are contained in the LOS worksheets for the respective scenarios. Appendix C contains the methodologies used to evaluate these intersections.

Queuing analyses were completed using Sim Traffic output information. Synchro provides both 50th and 95th percentile maximum queue lengths (in feet). According to the Synchro manual, “the 50th percentile maximum queue is the maximum back of queue on a typical cycle and the 95th percentile queue is the maximum back of queue with 95th percentile volumes.” The queues shown on Table X are the 95th percentile queue lengths for the respective lane movements.

The Highway Design Manual (HDM) provides guidance for determining deceleration lengths for the left-turn and right-turn lanes based on design speeds. Per the HDM criteria, “tapers for right-turn lanes are usually un-necessary since the main line traffic need not be shifted laterally to provide space for the right-turn lane. If, in some rare instances, a lateral shift were needed, the approach taper would use the same formula as for a left-turn lane.” Therefore, a bay taper length pursuant to the Caltrans HDM would need to be added, as necessary, to the recommended storage lengths presented below.

The storage capacity for the Cumulative Year 2040 scenarios shall be based on the SimTraffic output files and engineering judgement. The values in bold presented in Table X are the projected queue lengths that will likely need to be accommodated by the Cumulative Year 2040 scenario. At the remaining approaches, the existing storage capacity will be sufficient to accommodate the maximum queue.

HUSD Elementary School - Merced County
Traffic Impact Analysis Report
December 14, 2020

Table X: Queuing Analysis

ID	Intersection	Existing Queue Storage Length (ft.)		Existing		Existing plus Project		Near Term plus Project		Cumulative Year 2040 No Project		Cumulative Year 2040 plus Project	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Lander Avenue / Echo Street	WB L	165	34	17	44	15	33	12	43	0	39	21
		WB R	>300	64	35	55	42	56	44	59	37	53	33
		NB TR	>300	113	49	122	59	96	34	136	27	116	61
		SB L	250	57	35	60	28	56	26	77	0	72	33
		SB T	>300	83	18	86	75	60	28	79	0	100	51
2	Lander Avenue / Dayton Avenue	EB LTR	>300	54	43	*	*	*	*	45	44	*	*
		EB R	*	*	*	29	21	30	23	*	*	41	26
		WB LTR	>300	49	40	*	*	*	*	53	25	*	*
		WB R	*	*	*	42	37	41	40	*	*	42	42
		NB L	50	21	9	24	0	42	10	24	0	29	9
		NB TR	>300	10	23	36	0	0	18	31	0	44	24
		SB L	55	22	15	32	36	21	30	22	37	64	31
		SB TR	>300	26	0	106	61	120	10	28	40	287	40
3	Project Driveway 1 / Geer Avenue	EB LT	>300	27	15	69	28	59	33	18	0	57	34
		WB TR	>300	0	0	*	*	*	*	0	0	*	*
		WB T	*	*	*	0	0	0	0	*	*	0	0
		WB R	*	*	*	11	19	27	11	*	*	33	13
		SB LR	>300	63	64	*	*	*	*	62	60	*	*
		SB L	*	*	*	110	76	123	72	*	*	125	74
		SB R	*	*	*	47	39	68	48	*	*	53	52
4	Project Driveway 2 / Geer Avenue	EB LT	*	*	*	44	15	47	14	*	*	0	10
		WB TR	*	*	*	0	0	0	0	*	*	0	0
5	Lander Avenue / Geer Avenue	EB LTR	>300	63	76	*	*	*	*	100	59	*	*
		EB LT	*	*	*	296	154	277	164	*	*	352	157
		EB R	*	*	*	61	65	70	66	*	*	236	54
		WB LTR	>300	57	52	120	58	119	66	80	43	166	80
		NB L	50	36	32	137	117	137	127	86	111	152	129
		NB TR	>300	0	10	339	230	303	237	262	192	281	196
		SB L	50	29	30	77	57	72	59	65	37	73	57
		SB TR	>300	15	0	453	330	441	354	260	374	479	380

Note: * = Does not exist or is not projected to exist

Conclusions and Recommendations

Conclusions and recommendations regarding the proposed Project are presented below.

Existing Traffic Conditions

- At present, all study intersections operate at an acceptable LOS during the PM peak period.

Existing plus Project Traffic Conditions

- JLB analyzed the location of the existing and proposed driveways relative to the existing local roads and driveways in the Project's vicinity. A review of the proposed Project driveways indicates that they are, or will be, located at points that minimize traffic operational impacts to the existing roadway network, namely Pearl Street and Lander Avenue.
- It is recommended that the Project Site Plan incorporate an ADA compliant walkway along its frontage to Geer Avenue and pedestrian facilities that connect to the proposed buildings on campus.
- It is recommended that the Project implement a Class II bike lane along its frontage to Geer Avenue.
- It is estimated that existing Elim generates 1,890 daily trips, 670 AM peak hour trips and 340 PM peak hour trips. At buildout, it is estimated that the future Elim will generate a maximum of 1,134 daily, 402 AM peak hour and 204 PM peak hour trips. At buildout, the proposed Elementary School is estimated to generate a maximum of 1,134 daily, 402 AM peak hour and 204 PM peak hour trips. The proposed Project is estimated to generate an additional 378 daily trips, 134 AM peak hour trips and 68 PM peak hour trips.
- In this case, the Project's average vehicle miles traveled (round-trip) is estimated to be 9.74 miles for future Elim and 9.67 miles for the proposed Elementary school. The 2018 Regional Transportation Plan (RTP) prepared by the MCAG indicates the average trip length under an 'Infill Emphasis' focus is 14.62 miles for the region defined by the County. Per the TA, the 15 percent VMT reduction threshold is 12.43 miles. Since the Project's VMT is projected to be less than the 12.43 miles, the Project's VMT impact is considered less than significant.
- Under this scenario, the study intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their acceptable LOS threshold during one or both peak periods.
- The Hilmar Community Plan examined alternative scenarios to alleviate traffic along Lander Avenue that includes additional lane capacity along Lander Avenue, which would eliminate on-street parking, but would not meet Caltrans' lane standards for a Highway designation; and additional traffic lanes that meet Caltrans' Highway Standards. The Highway 165 Bypass has been determined as the most feasible option to alleviate inter-regional traffic as well as heavy truck uses through the community. Until the bypass is constructed, Lander Avenue may temporarily operate at LOS D or below during peak hours, through a General Plan Amendment allowing this LOS scenario that was approved with the Hilmar Community Plan in order to maintain Hilmar's small-town character and facilitate the construction of the Highway 165 Bypass through an update to the bridge and thoroughfare fee. In order to improve LOS at these intersections until that time, it is recommended that the following improvements be implemented.

- Lander Avenue / Dayton Avenue
 - Modify Dayton Avenue access at Lander Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be installed across the intersection along the center of Lander Avenue. With the installation of the raised median island, eastbound and westbound left-turns and through maneuvers would need to be redirected. Eastbound left-turning and through traffic from Dayton Avenue would need to travel south along Pearl Street, east along Geer Avenue towards Lander Avenue. Westbound left-turning and through traffic from Dayton Avenue would need to travel south along Spring Street and west along Geer Avenue towards Lander Avenue.
- Project Driveway 1 / Geer Avenue
 - Modify the westbound through-right lane to a through lane;
 - Add a westbound right-turn lane;
 - Modify the southbound left-right lane to a left-turn lane; and
 - Add a southbound right-turn lane.
- Lander Avenue / Geer Avenue
 - Signalize the intersection with split phasing in the east-west directions. Split phasing is recommended over concurrent left-turn phasing not only due to a large volume imbalance between eastbound and westbound traffic, but also to minimize impacts to existing business and Hilmar's small-town character.

Near Term plus Project Traffic Conditions

- Under this scenario, the intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their acceptable LOS threshold during one or both peak periods. To improve LOS at these intersections it is recommended that the following improvements be implemented.
 - Lander Avenue / Dayton Avenue
 - Modify Dayton Avenue access at Lander Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be installed across the intersection along the center of Lander Avenue. With the installation of the raised median island, eastbound and westbound left-turns and through maneuvers would need to be redirected. Eastbound left-turning and through traffic from Dayton Avenue would need to travel south along Pearl Street, east along Geer Avenue towards Lander Avenue. Westbound left-turning and through traffic from Dayton Avenue would need to travel south along Spring Street and west along Geer Avenue towards Lander Avenue.
 - Project Driveway 1 / Geer Avenue
 - Modify the westbound through-right lane to a through lane;
 - Add a westbound right-turn lane;
 - Modify the southbound left-right lane to a left-turn lane; and
 - Add a southbound right-turn lane.

- Lander Avenue / Geer Avenue
 - Signalize the intersection with split phasing in the east-west directions. Split phasing is recommended over concurrent left-turn phasing not only due to a large volume imbalance between eastbound and westbound traffic, but also to minimize impacts to existing business and Hilmar's small-town character.

Cumulative Year 2040 No Project Traffic Conditions

- Under this scenario, the intersection of Lander Avenue and Geer Avenue is projected to exceed its LOS threshold during both peak periods. To improve the LOS of this intersection, it is recommended that the following improvements be implemented.
 - Lander Avenue / Geer Avenue
 - Signalize the intersection with split phasing in the east-west directions. Split phasing is recommended over concurrent left-turn phasing not only due to a large volume imbalance between eastbound and westbound traffic, but also to minimize impacts to existing business and Hilmar's small-town character.

Cumulative Year 2040 plus Project Traffic Conditions

- Under this scenario, the intersections of Lander Avenue and Dayton Avenue, Project Driveway 1 and Geer Avenue, and Lander Avenue and Geer Avenue are projected to exceed their LOS threshold during one or both peak periods. To improve the LOS at these intersections, it is recommended that the following improvements be implemented.
 - Lander Avenue / Dayton Avenue
 - Modify Dayton Avenue access at Lander Avenue to left-in, right-in and right-out only. To accomplish this, it is recommended that a raised median island be installed across the intersection along the center of Lander Avenue. With the installation of the raised median island, eastbound and westbound left-turns and through maneuvers would need to be redirected. Eastbound left-turning and through traffic from Dayton Avenue would need to travel south along Pearl Street, east along Geer Avenue towards Lander Avenue. Westbound left-turning and through traffic from Dayton Avenue would need to travel south along Spring Street and west along Geer Avenue towards Lander Avenue.
 - Project Driveway 1 / Geer Avenue
 - Modify the westbound through-right lane to a through lane;
 - Add a westbound right-turn lane;
 - Modify the southbound left-right lane to a left-turn lane; and
 - Add a southbound right-turn lane.
 - Lander Avenue / Geer Avenue
 - Signalize the intersection with split phasing in the east-west directions. Split phasing is recommended over concurrent left-turn phasing not only due to a large volume imbalance between eastbound and westbound traffic, but also to minimize impacts to existing business and Hilmar's small-town character.

Queuing Analysis

- It is recommended that the County consider left-turn and right-turn lane storage lengths as indicated in the Queuing Analysis.

Study Participants

JLB Traffic Engineering, Inc. Personnel:

Jose Luis Benavides, PE, TE	Project Manager
Susana Maciel, EIT	Project Engineer
Matthew Arndt, EIT	Engineer I/II
Javier Rios	Engineer I/II
Jove Alcazar, EIT	Engineer I/II
Carlos Ayala-Magana, EIT	Engineer I/II
Jesus Garcia	Engineer I/II
Dennis Wynn	Sr. Engineering Technician
Christian Sanchez	Engineering Aide
Adrian Benavides	Engineering Aide
Justin Barnett	Engineering Aide

Persons Consulted:

Scott Odell	Odell Planning & Research, Inc.
Hilda Sousa	Caltrans
Tom Dumas	Caltrans
Joe Giulian	Merced County
Brian Guerrero	Merced County

References

1. Merced County, Hilmar Community Plan, adopted July 1, 2008.
2. Merced County, *2030 General Plan*, adopted December 10, 2013.
3. Governor's Office of Planning and Research, *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA*, State of California, December 2018.
4. *Guide for the Preparation of Traffic Impact Studies*, Caltrans, dated December 2002.
5. *Trip Generation*, 10th Edition, Washington D.C., Institute of Transportation Engineers, 2017.
6. *2014 California Manual on Uniform Traffic Control Devices*, Caltrans, November 7, 2014.
7. Merced County Association of Government, *Regional Transportation Plan Sustainable Communities Strategy*, Merced County, 2018.

Appendix A: Scope of Work



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

A p p | A

November 5, 2019

Brian Guerrero
Development Services Coordinator
Planning & Community Development Department
Merced County
2222 M Street
Merced, CA 95340

Via Email Only: brian.guerrero@countyofmerced.com

Subject: *Draft Scope of Work for the Preparation of a Traffic Impact Analysis for the Hilmar Unified School District Elementary School Project located in the Community of Hilmar in Merced County (JLB Project 044-001)*

Dear Mr. Guerrero,

JLB Traffic Engineering, Inc. (JLB) hereby submits this Draft Scope of Work for the preparation of a Traffic Impact Analysis (TIA) for the Project proposed by the Hilmar Unified School District (District). The Project consists of modifying the existing Elim Elementary School located along the west side of Highway 165 approximately 850 feet north of Geer Avenue and constructing a new elementary school on the northwest corner of Pearl Street and Geer Avenue in the community of Hilmar in Merced County. The District proposes to a) convert the existing Elim Elementary School from a pre-kindergarten through 5th grade school with 1,000 enrolled students to a 3rd to 5th grade school with a maximum capacity of 500 students and b) construct a new elementary school that will enroll pre-kindergarten through 2nd grade students with a maximum capacity of 600 students. The existing Elim Elementary School will a) reduce its existing staff from 60 to approximately half and classrooms from 50 to 28, b) relocate the front of the school now on Lander Avenue to the back of the site by building a new administrative/multi-purpose room on the traffic circle on site, and c) remove approximately 24 portables. The new elementary school will have approximately 24 classrooms, an administrative office, a multi-purpose room, a library, a hard-court area and a climbing structure. An aerial of the Project vicinity and Project Site Plan are shown in Exhibit A and Exhibit B, respectively.

The purpose of the TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures and identify any critical traffic issues that should be addressed in the on-going planning process. To evaluate the on-site and off-site traffic impacts of the proposed Project, JLB proposes the following Scope of Work.



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

Page | 1

Scope of Work

- To arrive at the future forecast volumes, JLB proposes to utilize an average annual growth rate of 0.4 percent to expand existing traffic volumes by 21 years to arrive at the Cumulative Year 2040 traffic volumes. The average annual growth rate of 0.4 percent is based on a review of Annual Average Daily Traffic (AADT) volumes obtained from Caltrans for State Route 165 near the vicinity of the proposed Project for the last 20 years.
- JLB will obtain recent or schedule and conduct new traffic counts at the study facility(ies) as necessary. These counts will include pedestrians and vehicles.
- JLB will perform a site visit to observe existing traffic conditions, especially during the AM and PM peak hours. Existing roadway conditions including intersection geometrics and traffic controls will be verified.
- JLB will evaluate on-site circulation and provide recommendations as necessary to improve circulation to and within the Project site.
- JLB will prepare CA MUTCD Warrant 3 "Peak Hour" for unsignalized study intersections under all study scenarios.
- JLB will qualitatively analyze existing and planned bikeways in the vicinity of the Project site.
- JLB will qualitatively analyze existing and planned walkways in the vicinity of the Project site.
- JLB will qualitatively analyze existing and planned transit routes in the vicinity of the Project site.
- JLB will forecast trip distribution based on turn count information and knowledge of the existing and planned circulation network in the vicinity of the Project.
- JLB, in consultation with the Environmental Consultant and District staff, will identify the no bussing service boundaries for elementary school students. JLB will use the no bussing boundaries identified and field surveys performed by JLB to conduct a qualitative safe routes to school evaluation.
- JLB will evaluate existing and forecasted levels of service (LOS) at the study intersection(s). JLB will use HCM 6th or HCM 2000 methodologies (as appropriate) within Synchro to perform this analysis for the AM and PM peak hours. JLB will identify the causes of poor LOS.

Study Scenarios

1. Existing Traffic Conditions with needed improvements (if any);
2. Existing plus Project Traffic Conditions with proposed mitigation measures (if any);
3. Near Term plus Project Traffic Conditions with needed improvements (if any);
4. Cumulative Year 2040 No Project Traffic Conditions with needed improvements (if any); and
5. Cumulative Year 2040 plus Project Traffic Conditions with proposed mitigation measures (if any).

Weekday peak hours to be analyzed (Tuesday through Thursday only)

1. 7 - 9 AM peak hour
2. 2 - 4 PM peak hour (to coincide with the school's peak traffic activities)

JLB proposes to analyze the PM peak hour of the generator (the school) between 2 - 4 PM.

Study Intersections

1. Project Driveway 1 / Geer Avenue
2. Project Driveway 2 / Geer Avenue
3. Lander Avenue / Geer Avenue

Queuing analysis is included in the proposed Scope of Work for the study intersection(s) listed above under all study scenarios. This analysis will be utilized to recommend minimum storage lengths for left-turn and right-turn lanes at all study intersections.

Study Segments

1. none

Project Trip Generation

The trip generation rates for the proposed Project were obtained from the 10th Edition of the Trip Generation Manual published by the Institute of Transportation Engineers (ITE). Table I presents the trip generation for the existing Elim Elementary School with trip generation rates for Elementary School. The existing Elim Elementary School is estimated to generate a maximum of 1,890 daily trips, 670 AM peak hour trips and 340 PM peak hour trips. Table II presents the trip generation for the future Elim Elementary School with trip generation rates for Elementary School. With the construction of the proposed Project, Elim Elementary School is estimated to generate a maximum of 945 daily trips, 335 AM peak hour trips and 170 PM peak hour trips. Table III presents the trip generation for the proposed Project with trip generation rates for Elementary School. At buildout, the proposed Project is estimated to generate a maximum of 1,134 daily trips, 402 AM peak hour trips and 204 PM peak hour trips. As can be seen from Table IV, the net new total trip generation estimated to be generated by the Project site is 189 daily trips, 67 AM peak hour trips and 34 PM peak hour trips.

Table I: Existing Elim Elementary School Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM (7-9) Peak Hour						PM (2-4) Peak Hour					
			Rate	Total	Trip Rate	In	Out	In	Out	Total	Trip Rate	In	Out	In	Out	Total
						%						%				
Elementary School (520)	1,000	students	1.89	1,890	0.67	54	46	362	308	670	0.34	45	55	153	187	340
Total Project Trips				1,890				362	308	670				153	187	340

Table II: Future Elim Elementary School Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM (7-9) Peak Hour						PM (2-4) Peak Hour					
			Rate	Total	Trip Rate	In	Out	In	Out	Total	Trip Rate	In	Out	In	Out	Total
						%						%				
Elementary School (520)	500	students	1.89	945	0.67	54	46	181	154	335	0.34	45	55	77	93	170
Total Project Trips				945				181	154	335				77	93	170

Table III: New Elementary School Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM (7-9) Peak Hour						PM (2-4) Peak Hour					
			Rate	Total	Trip Rate	In	Out	In	Out	Total	Trip Rate	In	Out	In	Out	Total
						%						%				
Elementary School (520)	600	students	1.89	1,134	0.67	54	46	217	185	402	0.34	45	55	92	112	204
Total Project Trips				1,134				217	185	402				92	112	204

Table IV: Net New Total Trip Generation

Land Use (ITE Code)	Size	Unit	Daily		AM (7-9) Peak Hour						PM (2-4) Peak Hour					
			Rate	Total	Trip Rate	In	Out	In	Out	Total	Trip Rate	In	Out	In	Out	Total
						%						%				
Elementary School (520)	100	students	1.89	189	0.67	54	46	36	31	67	0.34	45	55	15	19	34
Total Project Trips				189				36	31	67				15	19	34

Near Term Projects to be Included

JLB is unaware of other projects in the vicinity of the proposed Project that have the ability to impact traffic operations in the Near Term scenario. However, JLB will include in the Near Term scenario, near term projects provided to us by responsible agencies. These would include near term projects that the County of Merced or Caltrans has knowledge of and for which it is anticipated that said project(s) is/are projected to be whole or partially built by the near term project year 2024 and for which the County of Merced or Caltrans provides JLB with near term project details. Near term project details include project description, location, proposed land uses with breakdowns and type of residential units and amount of square footages for non-residential uses.

The above Scope of Work is based on our understanding of this Project and our experience with similar TIAs. In the absence of comments by November 26, 2019 it will be assumed that the Scope of Work is acceptable to the agency(ies) that have not submitted any comments. If you have any questions or require additional information, please contact me by phone at (559) 317-6273 or by e-mail at smaciel@JLBtraffic.com. We sincerely appreciate your time and attention to this matter.

Sincerely,

Susana Maciel

Susana Maciel
Project Engineer

cc: Joe Guilian, Merced County
Hilda Sousa, Caltrans District 10
Jose Benavides, JLB Traffic Engineering, Inc.

Z:\01 Projects\044 Merced County\044-001 Hilmar ES TIA\Draft Scope of Work\L11052019 Draft Scope of Work (044-001).docx



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

Exhibit A – Project Aerial

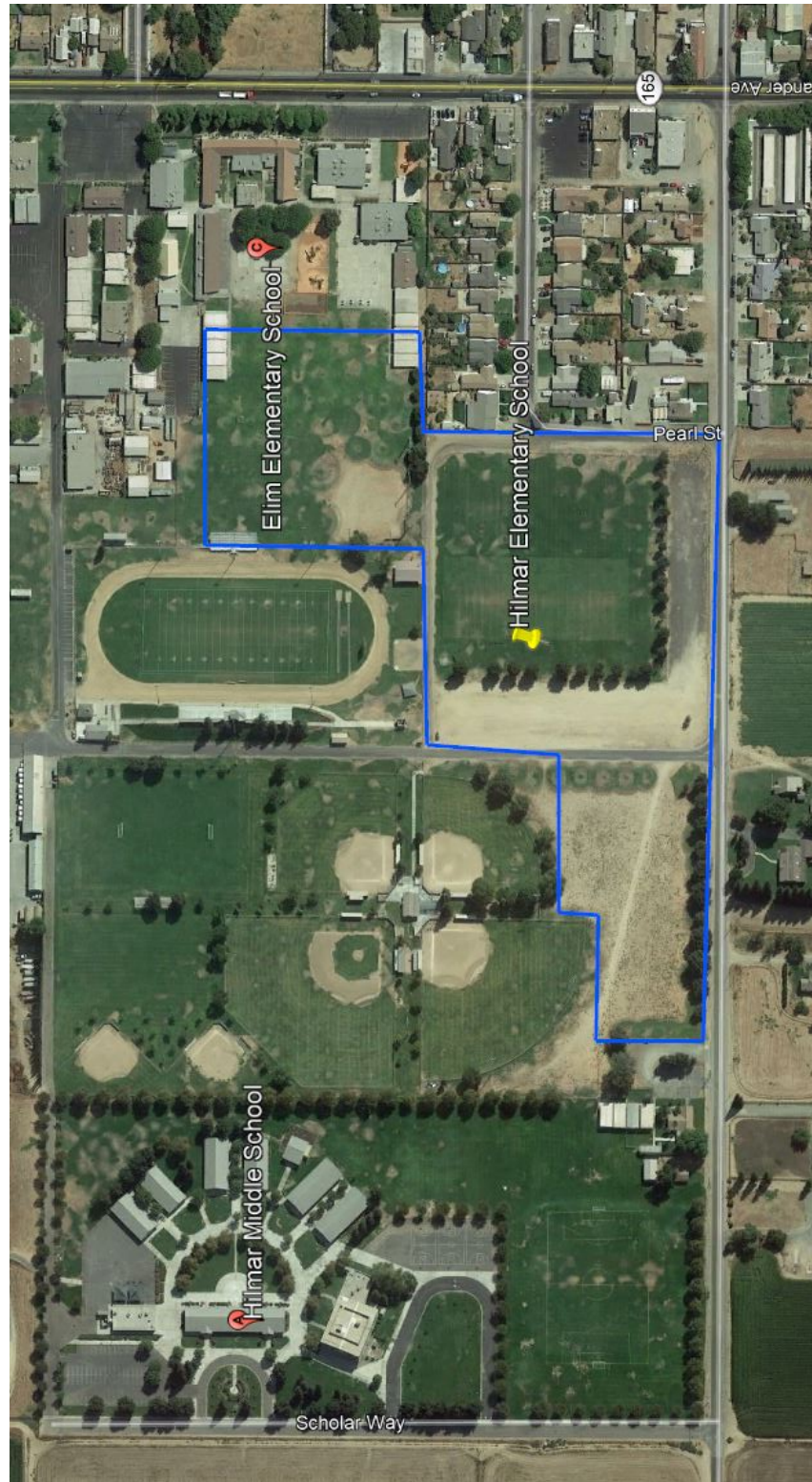


Exhibit B – Project Site Plan



Susana Maciel

From: Guerrero, Brian <Brian.Guerrero@countyofmerced.com>
Sent: Tuesday, November 26, 2019 2:09 PM
To: Susana Maciel
Subject: RE: HUSD Elementary School TIA: Draft Scope of Work

Hi Susana,

At this time Merced CED has no preliminary comments on the project and scope of work. Staff is looking forward to the final analysis when completed and will provide comments at that time if needed. Have a great holiday!

Regards,

Brian Guerrero

From: Susana Maciel <smaciel@jlbtraffic.com>
Sent: Wednesday, November 20, 2019 10:04 AM
To: Guerrero, Brian <Brian.Guerrero@countyofmerced.com>
Cc: Giulian, Joe <Joe.Giulian@countyofmerced.com>; Sousa, Hilda (Hilda.Sousa@dot.ca.gov) <Hilda.Sousa@dot.ca.gov>; Jose Benavides <jbenavides@jlbtraffic.com>
Subject: RE: HUSD Elementary School TIA: Draft Scope of Work

Happy Wednesday All,

It is my understanding that the Request for Preliminary Comment was sent out to agencies and nearby property owners and residents last Thursday.

I have attached it to this email to aid in your review of the Draft Scope of Work for the Hilmar Elementary School TIA, which is also attached. I look forward to receiving your comments in the coming days. Also, if you have no comments, please let me know as well.

I appreciate your time.

Best,

Susana Maciel, EIT
Project Engineer



Traffic Engineering, Transportation Planning and Parking Solutions
Certified Disadvantaged Business Enterprise (DBE) and Small Business Enterprise (SBE)

From: Susana Maciel
Sent: Tuesday, November 12, 2019 1:55 PM

To: bguerrero@co.merced.ca.us

Cc: jgiulian@co.merced.ca.us; Sousa, Hilda (Hilda.Sousa@dot.ca.gov) <hilda.sousa@dot.ca.gov>; Jose Benavides (jbenavides@jlbtraffic.com) <jbenavides@jlbtraffic.com>

Subject: RE: HUSD Elementary School TIA: Draft Scope of Work

Good afternoon, Mr. Guerrero,

I hope your review of the Draft Scope of Work is going well. As a reminder, I am available to help answer any questions that may arise.

I look forward to hearing from you soon.

Best,

Susana Maciel, EIT
Project Engineer



Traffic Engineering, Transportation Planning and Parking Solutions

Certified Disadvantaged Business Enterprise (DBE) and Small Business Enterprise (SBE)

From: Susana Maciel

Sent: Tuesday, November 05, 2019 2:36 PM

To: bguerrero@co.merced.ca.us

Cc: jgiulian@co.merced.ca.us; Sousa, Hilda (Hilda.Sousa@dot.ca.gov) <hilda.sousa@dot.ca.gov>; Jose Benavides (jbenavides@jlbtraffic.com) <jbenavides@jlbtraffic.com>

Subject: HUSD Elementary School TIA: Draft Scope of Work

Good afternoon, Mr. Guerrero,

Attached is a Draft Scope of Work for the preparation of a Traffic Impact Analysis Report for the Hilmar Unified School District Elementary School Project located in the community of Hilmar in Merced County.

I kindly ask that you take some time to review and comment on the proposed Scope of Work. In the absence of comments by November 26th it will be assumed that the proposed Scope of Work is acceptable to the agency(ies) that have not submitted any comments.

If you have any questions or require any additional information, please feel welcome to contact me by phone at 559.317.6273 or by email at smaciel@jlbtraffic.com. I sincerely appreciate your time and attention to this matter and look forward to hearing from you all soon.

Best,

Susana Maciel, EIT
Project Engineer

DEPARTMENT OF TRANSPORTATION

OFFICE OF THE DISTRICT 10 DIRECTOR

P.O. BOX 2048, STOCKTON, CA 95201

(1976 E. DR. MARTIN LUTHER KING JR. BOULEVARD 95205)

PHONE (209) 948-7943

FAX (209) 948-3895

TTY 711

www.dot.ca.gov

*Making Conservation
a California Way of Life.*

December 2, 2019

**10-MER-165-PM 32.868
New Elementary School Project
Hilmar Unified School District**

Mr. Jim Bullock
Director of Capital Projects, Operations & Safety
Hilmar Unified School District
7807 N Lander Avenue
Hilmar, CA 95324

Dear Mr. Bullock:

Thank you for the opportunity to review the Draft Scope of Work for the preparation of a Traffic Impact Analysis for the New Elementary School Project. The Department has the following comments:

1. On page one of Draft Scope of Work under the Study Intersections please add the following Intersections: (Shown in Bold)

1. Project Driveway 1 / Geer Avenue
2. Project Driveway 2 / Geer Avenue
3. SR-165 (Lander Avenue) / Geer Avenue
- 4. SR-165 (Lander Avenue)/Dayton Avenue**
- 5. SR-165 (Lander Avenue)/Echo Street**

2. Provide Synchro/SimTraffic analysis for our review and comments.

Given the importance of mobility options, this project should provide an assessment of how various transportation options will be incorporated into the site. Specifically, pedestrian and bicycle access to and through the subject site should be provided.

Any work within the State's right-of-way will require an encroachment permit from Caltrans and must be done to our engineering and environmental

Mr. Bullock
December 2, 2019
Page 2

standards, and at no cost to the State. The conditions of approval and the requirements for the encroachment permit are issued at the sole discretion of the Permits Office. For more information regarding the encroachment permit process, please visit our Encroachment Permit Website at: <https://dot.ca.gov/programs/traffic-operations/ep> or you can contact their office at (209)948-7891.

If you have any questions, please contact Hilda Sousa at (209) 942-6184 (email: hilda.sousa@dot.ca.gov) or me at (209) 941-1921. We look forward to continuing to work with you in a cooperative manner.

Sincerely,

A handwritten signature in blue ink, appearing to read "Tom Dumas", with a stylized flourish at the end.

TOM DUMAS, Chief
Office of Metropolitan Planning

Appendix B: Traffic Counts



www.JLBtraffic.com
info@JLBtraffic.com

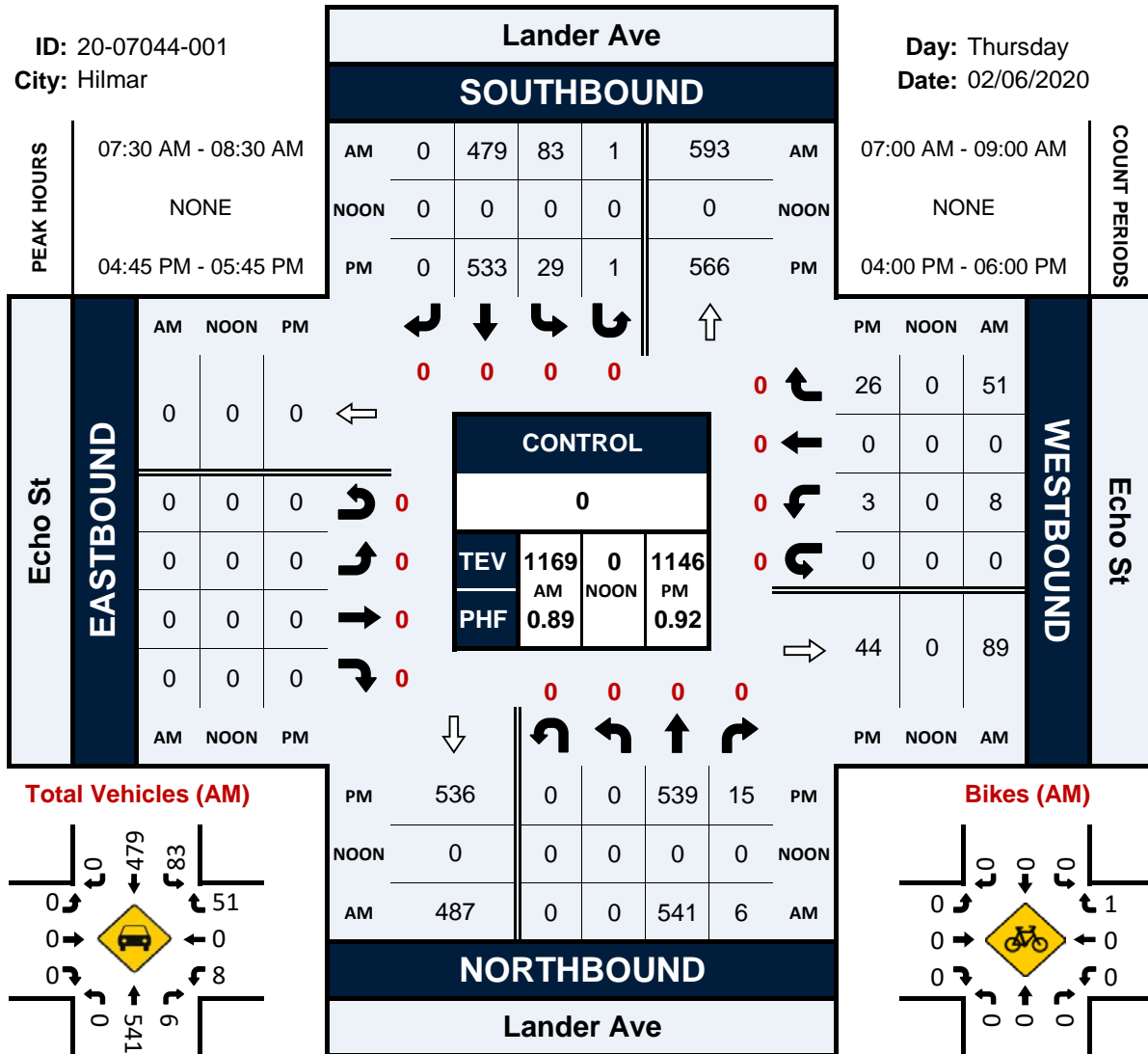
516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

Lander Ave & Echo St

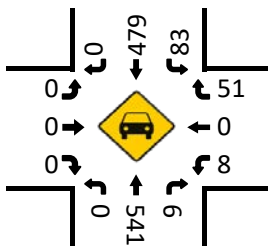
Peak Hour Turning Movement Count

ID: 20-07044-001
City: Hilmar

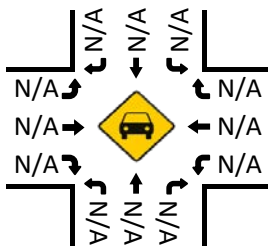
Day: Thursday
Date: 02/06/2020



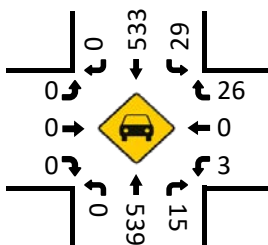
Total Vehicles (AM)



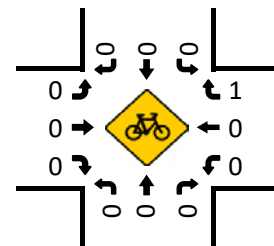
Total Vehicles (Noon)



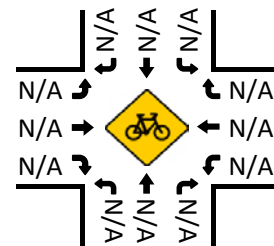
Total Vehicles (PM)



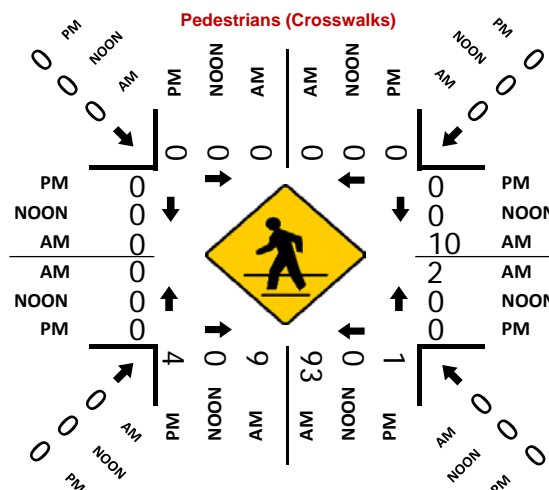
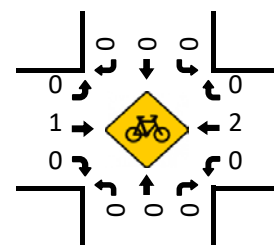
Bikes (AM)



Bikes (Noon)



Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Echo St
City: Hilmar
Control:

Project ID: 20-07044-001
Date: 2/6/2020

Total

NS/EW Streets:	Lander Ave				Lander Ave				Echo St				Echo St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:00 AM	0	86	0	0	1	100	0	0	0	0	0	0	2	0	7	0	196
7:15 AM	0	112	0	0	5	99	0	0	0	0	0	0	2	0	10	0	228
7:30 AM	0	141	0	0	11	105	0	1	0	0	0	0	3	0	7	0	268
7:45 AM	0	153	3	0	24	119	0	0	0	0	0	0	3	0	15	0	317
8:00 AM	0	151	1	0	36	118	0	0	0	0	0	0	1	0	21	0	328
8:15 AM	0	96	2	0	12	137	0	0	0	0	0	0	1	0	8	0	256
8:30 AM	0	99	1	0	3	76	0	0	0	0	0	0	1	0	3	0	183
8:45 AM	0	100	0	0	1	78	0	0	0	0	0	0	2	0	2	0	183
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	938	7	0	93	832	0	1	0	0	0	0	15	0	73	0	1959
	0.00%	99.26%	0.74%	0.00%	10.04%	89.85%	0.00%	0.11%					17.05%	0.00%	82.95%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM				83	479	0	1	0	0	0	0	8	0	51	0	TOTAL
PEAK HR VOL :	0	541	6	0	0.576	0.874	0.000	0.250	0.000	0.000	0.000	0.000	0.667	0.000	0.607	0.000	1169
PEAK HR FACTOR :	0.000	0.884	0.500	0.000	0.914				0.670				0.670				0.891
	0.877																
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	150	3	0	5	142	0	1	0	0	0	0	0	0	6	0	307
4:15 PM	0	125	2	1	8	126	0	0	0	0	0	0	4	0	3	0	269
4:30 PM	0	105	1	0	6	117	0	0	0	0	0	0	1	0	2	0	232
4:45 PM	0	127	0	0	6	146	0	0	0	0	0	0	2	0	4	0	285
5:00 PM	0	138	7	0	7	124	0	1	0	0	0	0	0	0	11	0	288
5:15 PM	0	157	5	0	10	135	0	0	0	0	0	0	0	0	6	0	313
5:30 PM	0	117	3	0	6	128	0	0	0	0	0	0	1	0	5	0	260
5:45 PM	0	91	2	0	6	114	0	0	0	0	0	0	1	0	9	0	223
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	1010	23	1	54	1032	0	2	0	0	0	0	9	0	46	0	2177
	0.00%	97.68%	2.22%	0.10%	4.96%	94.85%	0.00%	0.18%					16.36%	0.00%	83.64%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM				29	533	0	1	0	0	0	0	3	0	26	0	TOTAL
PEAK HR VOL :	0	539	15	0	0.725	0.913	0.000	0.250	0.000	0.000	0.000	0.000	0.375	0.000	0.591	0.000	1146
PEAK HR FACTOR :	0.000	0.858	0.536	0.000	0.926				0.659				0.659				0.915
	0.855																

National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Echo St
City: Hilmar
Control: 0

Project ID: 20-07044-001
Date: 2/6/2020

Bikes

NS/EW Streets:	Lander Ave				Lander Ave				Echo St				Echo St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
PEAK HR :	07:30 AM - 08:30 AM				0	0	0	0	0	0	0	0	0	0	1	0	1
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.250	0	0.250
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	0	0	0	0	1	0	0	0	1	0	0	0	3	1	0	6
PEAK HR :	04:45 PM - 05:45 PM				0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	75.00%	25.00%	0.00%	0.00%
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
PEAK HR FACTOR :	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.375

National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Echo St
City: Hilmar

Project ID: 20-07044-001
Date: 2/6/2020

Pedestrians (Crosswalks)

NS/EW Streets:	Lander Ave		Lander Ave		Echo St		Echo St		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	6	0	3	0	0	9
7:30 AM	0	0	0	14	0	4	0	0	18
7:45 AM	0	0	0	29	0	0	0	0	29
8:00 AM	0	0	3	44	2	5	0	0	54
8:15 AM	0	0	6	6	0	1	0	0	13
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
APPROACH %'s :	0	0	9	99	2	13	0	0	123
PEAK HR :	07:30 AM - 08:30 AM		8.33%	91.67%	13.33%	86.67%			
PEAK HR VOL :	0	0	9	93	2	10	0	0	114
PEAK HR FACTOR :			0.375	0.528	0.250	0.500			0.528
			0.543		0.429				

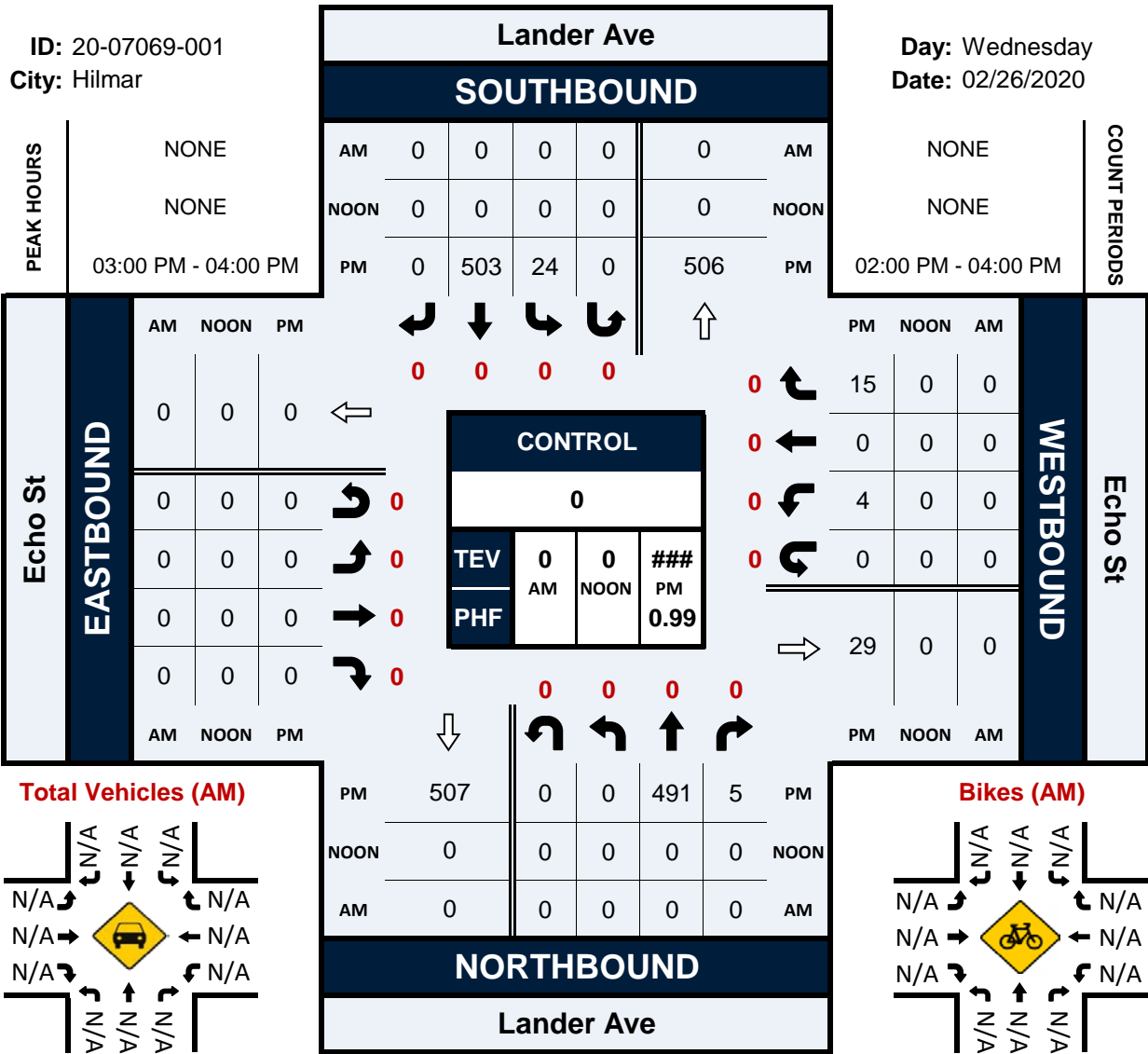
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	2	0	0	0	0	0	2
4:15 PM	0	0	0	2	0	2	0	0	4
4:30 PM	0	0	0	4	0	0	0	0	4
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	2	0	0	0	0	0	2
5:15 PM	0	0	1	1	0	0	0	0	2
5:30 PM	0	0	1	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
APPROACH %'s :	0	0	6	7	0	2	0	0	15
PEAK HR :	04:45 PM - 05:45 PM		46.15%	53.85%	0.00%	100.00%			
PEAK HR VOL :	0	0	4	1	0	0	0	0	5
PEAK HR FACTOR :			0.500	0.250					0.625
			0.625						

Lander Ave & Echo St

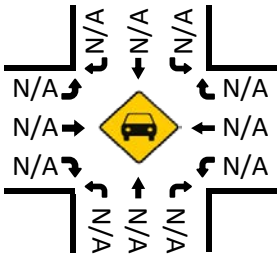
Peak Hour Turning Movement Count

ID: 20-07069-001
City: Hilmar

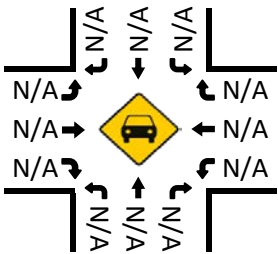
Day: Wednesday
Date: 02/26/2020



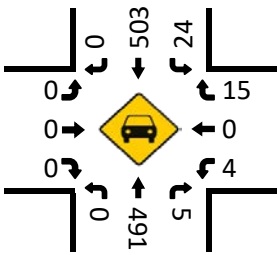
Total Vehicles (AM)



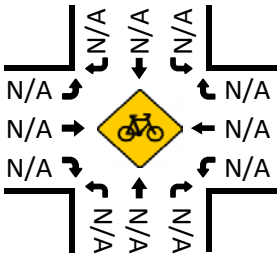
Total Vehicles (Noon)



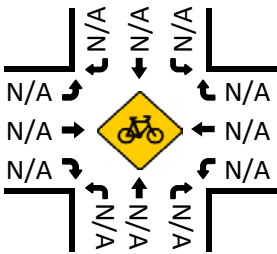
Total Vehicles (PM)



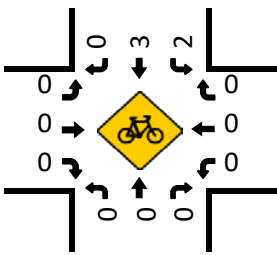
Bikes (AM)



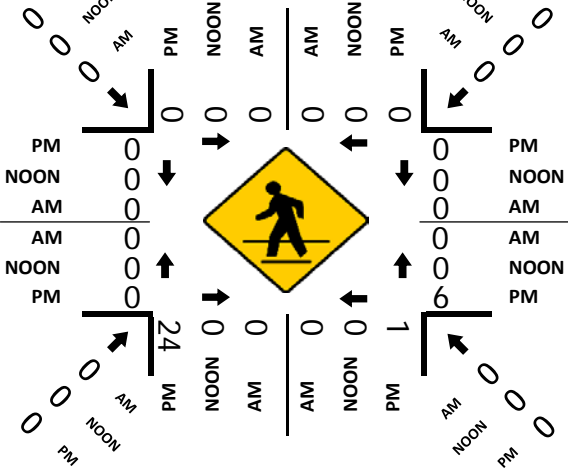
Bikes (NOON)



Bikes (PM)



Pedestrians (Crosswalks)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Echo St
City: Hilmar
Control:

Project ID: 20-07069-001
Date: 2020-02-26

Total

NS/EW Streets:		Lander Ave				Lander Ave				Echo St				Echo St				
PM		NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
	2:00 PM	0	90	3	0	2	108	0	0	0	0	0	0	0	0	6	0	209
	2:15 PM	0	75	0	0	6	110	0	0	0	0	0	0	1	0	5	0	197
	2:30 PM	0	111	3	0	2	127	0	0	0	0	0	0	1	0	3	0	247
	2:45 PM	0	105	1	1	4	138	0	0	0	0	0	0	0	0	2	0	251
	3:00 PM	0	115	1	0	7	136	0	0	0	0	0	0	2	0	3	0	264
	3:15 PM	0	126	1	0	2	124	0	0	0	0	0	0	1	0	5	0	259
	3:30 PM	0	128	1	0	7	116	0	0	0	0	0	0	0	0	3	0	255
	3:45 PM	0	122	2	0	8	127	0	0	0	0	0	0	1	0	4	0	264
TOTAL VOLUMES :		NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :		0	872	12	1	38	986	0	0	0	0	0	0	6	0	31	0	1946
		0.00%	98.53%	1.36%	0.11%	3.71%	96.29%	0.00%	0.00%					16.22%	0.00%	83.78%	0.00%	
PEAK HR :		03:00 PM - 04:00 PM																TOTAL
PEAK HR VOL :		0	491	5	0	24	503	0	0	0	0	0	0	4	0	15	0	1042
PEAK HR FACTOR :		0.000	0.959	0.625	0.000	0.750	0.925	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.750	0.000	0.987
		0.961				0.921								0.792				

Location: Lander Ave & Echo St
City: Hilmar
Control: 0

Bikes

[illegible]

National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Echo St
City: Hilmar

Project ID: 20-07069-001
Date: 2020-02-26

Pedestrians (Crosswalks)

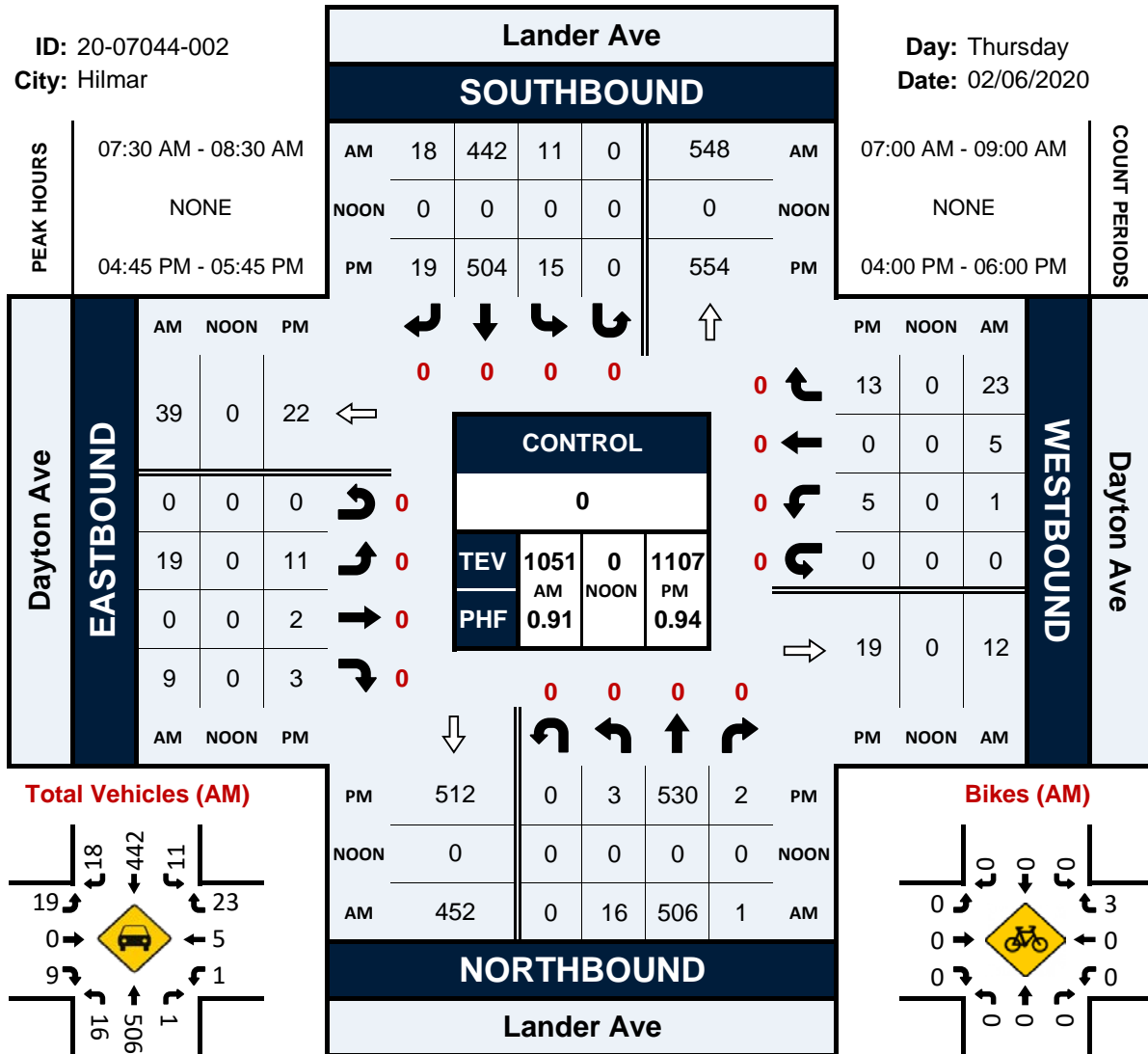
NS/EW Streets:	Lander Ave		Lander Ave		Echo St		Echo St		
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
2:00 PM	0	0	2	1	1	1	0	0	5
2:15 PM	0	0	0	1	0	1	0	0	2
2:30 PM	0	0	2	0	0	0	0	0	2
2:45 PM	0	0	5	3	1	0	0	0	9
3:00 PM	0	0	8	1	1	0	0	0	10
3:15 PM	0	0	16	0	5	0	0	0	21
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
APPROACH %'s :	0	0	33	6	8	2	0	0	49
			84.62%	15.38%	80.00%	20.00%			
PEAK HR :	03:00 PM - 04:00 PM								TOTAL
PEAK HR VOL :	0	0	24	1	6	0	0	0	31
PEAK HR FACTOR :			0.375	0.250	0.300	0.300			0.369
			0.391		0.300				

Lander Ave & Dayton Ave

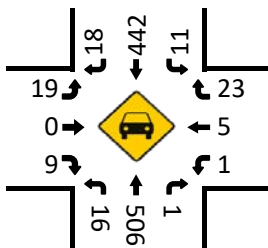
Peak Hour Turning Movement Count

ID: 20-07044-002
City: Hilmar

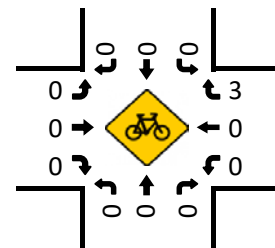
Day: Thursday
Date: 02/06/2020



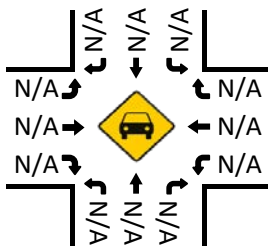
Total Vehicles (AM)



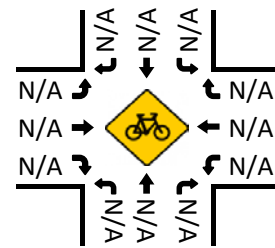
Bikes (AM)



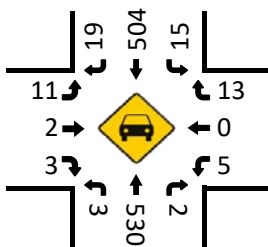
Total Vehicles (Noon)



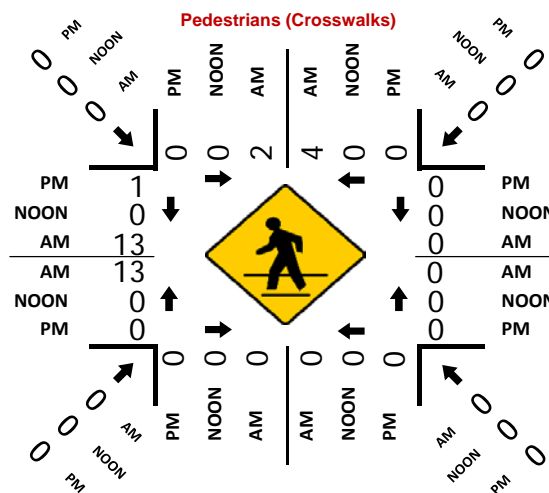
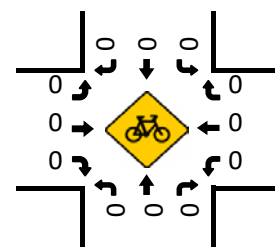
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Dayton Ave
City: Hilmar
Control:

Project ID: 20-07044-002
Date: 2/6/2020

Total

NS/EW Streets:	Lander Ave				Lander Ave				Dayton Ave				Dayton Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:00 AM	1	84	0	0	0	100	2	0	1	0	0	0	0	0	4	0	192
7:15 AM	0	112	0	0	1	93	2	0	1	0	0	0	0	0	4	0	213
7:30 AM	3	137	0	0	0	103	1	0	1	0	2	0	1	3	2	0	253
7:45 AM	9	153	0	0	3	100	11	0	5	0	0	0	0	1	6	0	288
8:00 AM	4	143	1	0	6	101	3	0	7	0	5	0	0	1	10	0	281
8:15 AM	0	73	0	0	2	138	3	0	6	0	2	0	0	0	5	0	229
8:30 AM	0	102	0	0	0	76	0	0	0	0	0	0	0	0	0	0	178
8:45 AM	0	92	0	0	2	71	1	0	0	0	0	0	0	0	4	0	170
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	17	896	1	0	14	782	23	0	21	0	9	0	1	5	35	0	1804
	1.86%	98.03%	0.11%	0.00%	1.71%	95.48%	2.81%	0.00%	70.00%	0.00%	30.00%	0.00%	2.44%	12.20%	85.37%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM				11	442	18	0	19	0	9	0	1	5	23	0	TOTAL
PEAK HR VOL :	16	506	1	0	0.458	0.801	0.409	0.000	0.679	0.000	0.450	0.000	0.250	0.417	0.575	0.000	1051
PEAK HR FACTOR :	0.444	0.827	0.250	0.000		0.823				0.583				0.659			0.912
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	1	141	2	0	3	140	5	0	2	0	0	0	1	0	5	0	300
4:15 PM	0	119	0	0	6	122	7	0	4	0	0	0	0	1	0	0	259
4:30 PM	0	99	2	0	4	113	5	0	1	0	0	0	0	1	3	0	228
4:45 PM	1	119	0	0	5	137	2	0	2	0	0	0	1	0	1	0	268
5:00 PM	1	142	0	0	4	113	8	0	3	2	3	0	3	0	5	0	284
5:15 PM	0	156	1	0	1	125	6	0	3	0	0	0	0	0	1	0	293
5:30 PM	1	113	1	0	5	129	3	0	3	0	0	0	1	0	6	0	262
5:45 PM	2	80	1	0	4	107	4	0	2	0	0	0	0	1	6	0	207
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	6	969	7	0	32	986	40	0	20	2	3	0	6	3	27	0	2101
	0.61%	98.68%	0.71%	0.00%	3.02%	93.19%	3.78%	0.00%	80.00%	8.00%	12.00%	0.00%	16.67%	8.33%	75.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM				15	504	19	0	11	2	3	0	5	0	13	0	TOTAL
PEAK HR VOL :	3	530	2	0	0.750	0.920	0.594	0.000	0.917	0.250	0.250	0.000	0.417	0.000	0.542	0.000	1107
PEAK HR FACTOR :	0.750	0.849	0.500	0.000		0.934				0.500				0.563			0.945

Location: Lander Ave & Dayton Ave
City: Hilmar
Control: 0

Project ID: 20-07044-002
Date: 2/6/2020

Bikes

[illegible]

National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Dayton Ave
City: Hilmar

Project ID: 20-07044-002
Date: 2/6/2020

Pedestrians (Crosswalks)

NS/EW Streets:	Lander Ave		Lander Ave		Dayton Ave		Dayton Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	1	1
7:45 AM	0	0	0	0	0	0	4	2	6
8:00 AM	0	2	0	0	0	0	7	5	14
8:15 AM	2	2	0	0	0	0	2	5	11
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB 2	WB 4	EB 0	WB 0	NB 0	SB 0	NB 13	SB 13	TOTAL 32
APPROACH %'s :	33.33%	66.67%					50.00%	50.00%	
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	2	4			0	0	13	13	32
PEAK HR FACTOR :	0.250	0.500					0.464	0.650	0.571
	0.375						0.542		

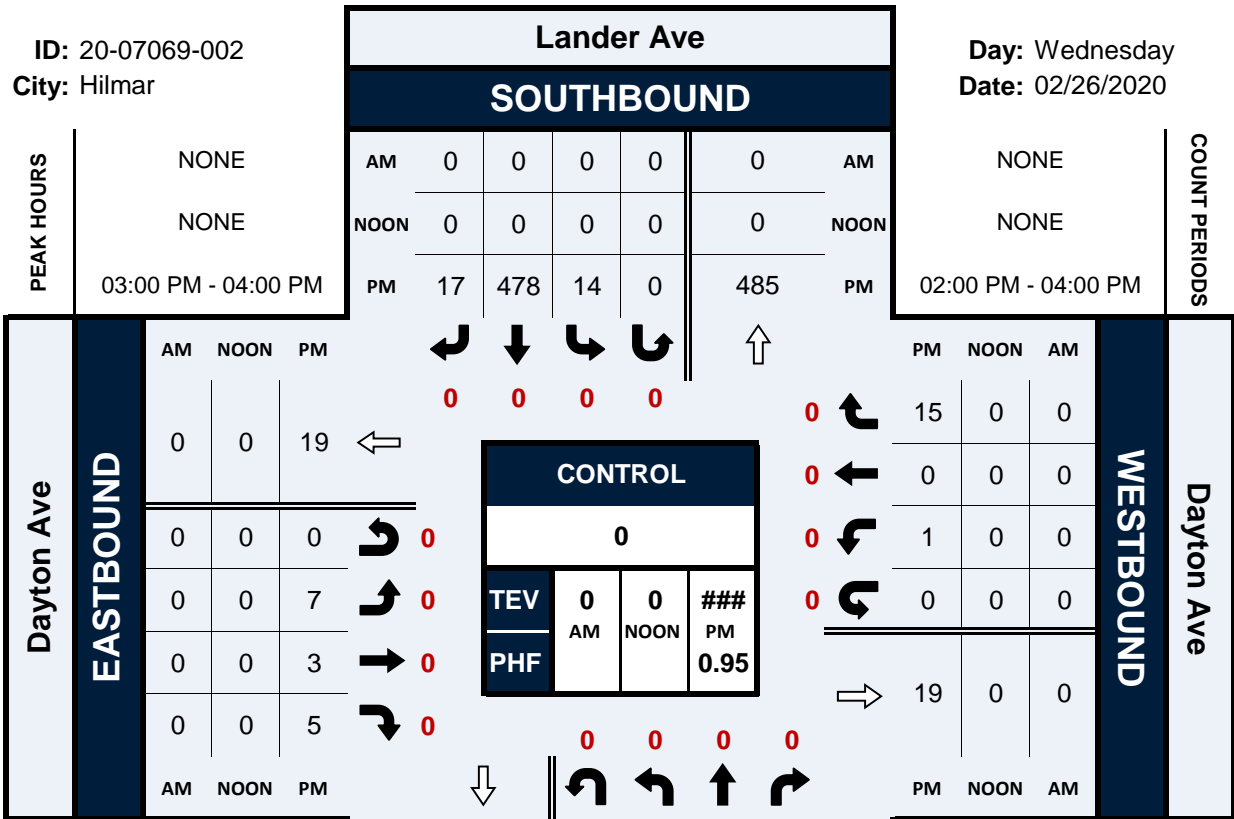
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	1	1
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB 0	WB 0	EB 0	WB 0	NB 0	SB 0	NB 0	SB 1	TOTAL 1
APPROACH %'s :							0.00%	100.00%	
PEAK HR :	04:45 PM - 05:45 PM								TOTAL
PEAK HR VOL :	0	0			0	0	0	1	1
PEAK HR FACTOR :							0.250	0.250	0.250
							0.250		

Lander Ave & Dayton Ave

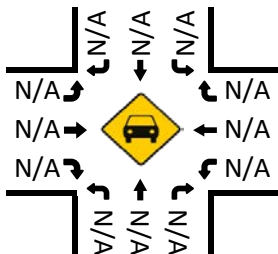
Peak Hour Turning Movement Count

ID: 20-07069-002
City: Hilmar

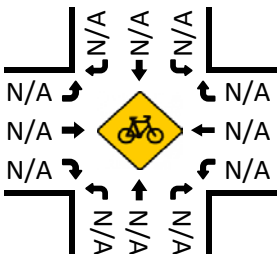
Day: Wednesday
Date: 02/26/2020



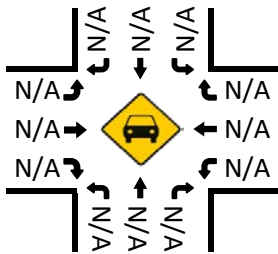
Total Vehicles (AM)



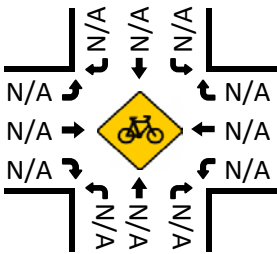
Bikes (AM)



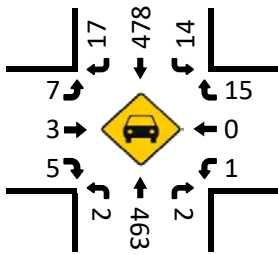
Total Vehicles (Noon)



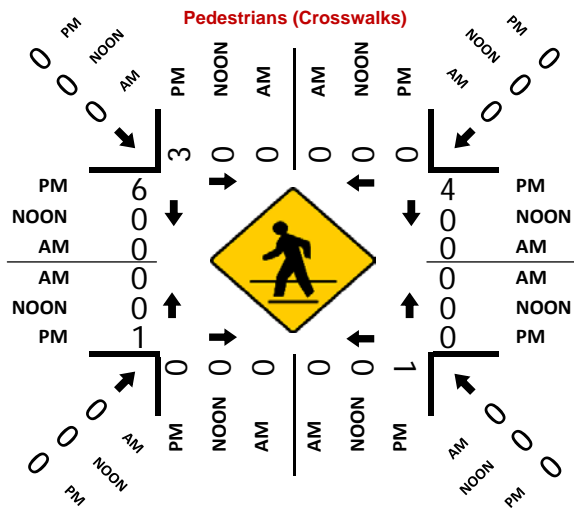
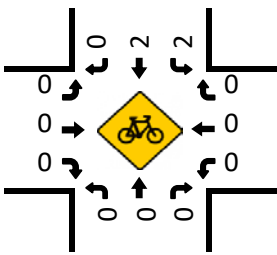
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Dayton Ave
City: Hilmar
Control:

Project ID: 20-07069-002
Date: 2020-02-26

Total

NS/EW Streets:		Lander Ave				Lander Ave				Dayton Ave				Dayton Ave				
PM		NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
		0 NL	0 NT	0 NR	0 NU	0 SL	0 ST	0 SR	0 SU	0 EL	0 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
	2:00 PM	0	84	0	0	3	105	5	0	3	0	0	0	0	1	3	0	204
	2:15 PM	0	71	0	0	0	107	2	0	0	0	0	0	0	0	3	0	183
	2:30 PM	1	107	0	0	3	107	4	0	4	0	1	0	0	0	3	0	230
	2:45 PM	0	94	0	0	6	129	3	0	3	0	0	0	1	1	1	0	238
	3:00 PM	2	108	1	0	1	127	4	0	1	0	3	0	0	0	1	0	248
	3:15 PM	0	115	1	0	4	120	9	0	5	2	2	0	0	0	6	0	264
	3:30 PM	0	124	0	0	2	107	3	0	0	1	0	0	1	0	5	0	243
	3:45 PM	0	116	0	0	7	124	1	0	1	0	0	0	0	0	3	0	252
TOTAL VOLUMES :		NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :		3	819	2	0	26	926	31	0	17	3	6	0	2	2	25	0	1862
		0.36%	99.39%	0.24%	0.00%	2.64%	94.20%	3.15%	0.00%	65.38%	11.54%	23.08%	0.00%	6.90%	6.90%	86.21%	0.00%	
PEAK HR :		03:00 PM - 04:00 PM																TOTAL
PEAK HR VOL :		2	463	2	0	14	478	17	0	7	3	5	0	1	0	15	0	1007
PEAK HR FACTOR :		0.250	0.933	0.500	0.000	0.500	0.941	0.472	0.000	0.350	0.375	0.417	0.000	0.250	0.000	0.625	0.000	0.954
		0.942				0.957				0.417				0.667				

Location: Lander Ave & Dayton Ave
City: Hilmar
Control: 0

Project ID: 20-07069-002
Date: 2020-02-26

Bikes

[illegible]

National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Dayton Ave
City: Hilmar

Project ID: 20-07069-002
Date: 2020-02-26

Pedestrians (Crosswalks)

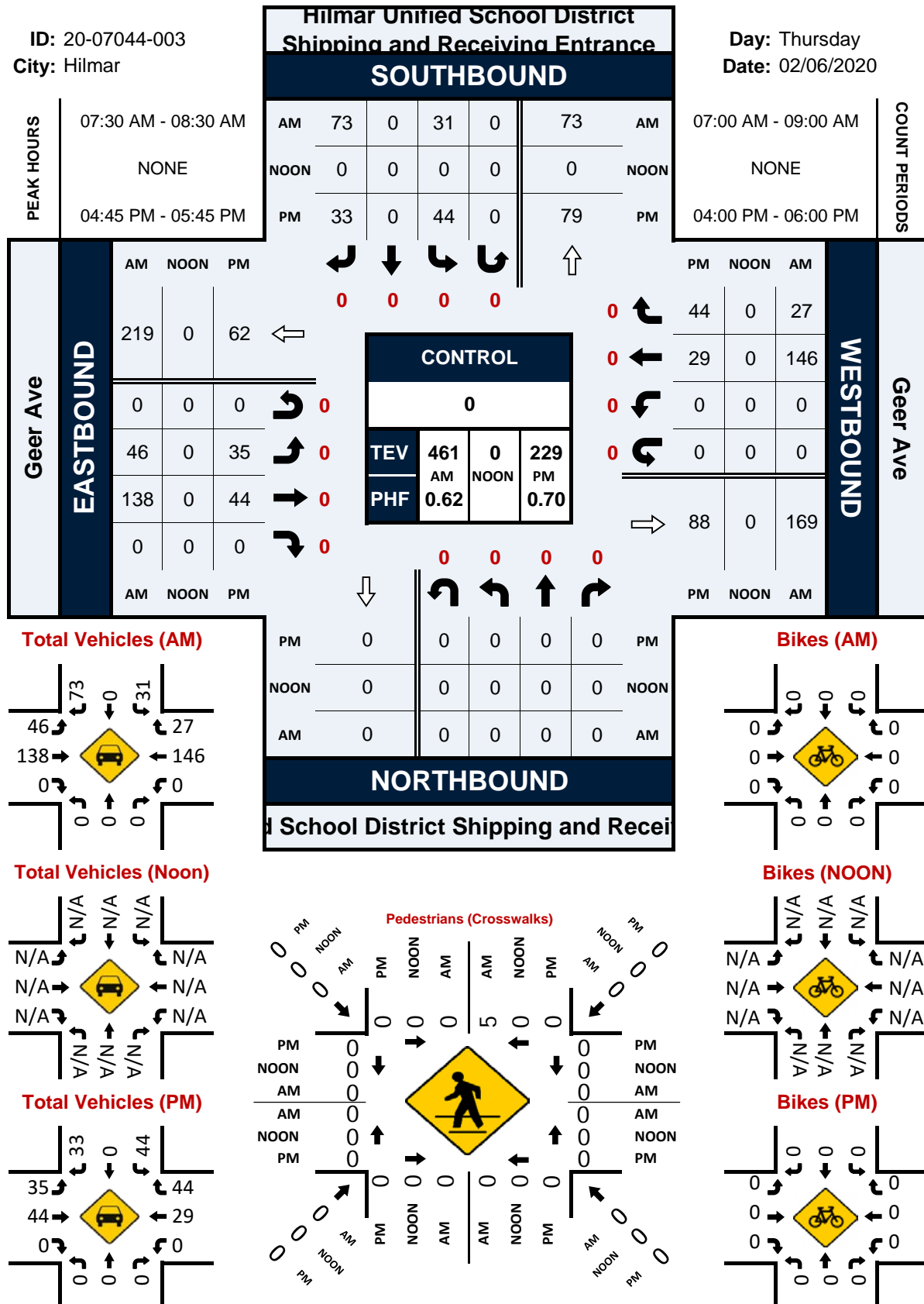
NS/EW Streets:	Lander Ave		Lander Ave		Dayton Ave		Dayton Ave		
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
2:00 PM	0	0	0	0	0	0	0	4	4
2:15 PM	0	0	0	0	0	0	0	1	1
2:30 PM	0	0	0	0	0	0	1	0	1
2:45 PM	0	0	0	0	0	0	0	0	0
3:00 PM	1	0	0	0	0	4	1	5	11
3:15 PM	1	0	0	0	0	0	0	1	2
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	1	0	0	1	0	0	0	0	2
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
APPROACH %'s :	3	0	0	1	0	4	2	11	21
	100.00%	0.00%	0.00%	100.00%	0.00%	100.00%	15.38%	84.62%	
PEAK HR :	03:00 PM - 04:00 PM								TOTAL
PEAK HR VOL :	3	0	0	1	0	4	1	6	15
PEAK HR FACTOR :	0.750			0.250		0.250	0.250	0.300	0.341
	0.750		0.250		0.250		0.292		

Hilmar Unified School District Shipping and Receiving Entrance & Geer Ave

Peak Hour Turning Movement Count

ID: 20-07044-003
City: Hilmar

Day: Thursday
Date: 02/06/2020



Intersection Turning Movement Count

Project ID: 20-07044-003
Date: 2/6/2020

Total

NS/EW Streets:	Hillmar Unified School District Shipping and Receiving Entrance				Hillmar Unified School District Shipping and Receiving Entrance				Geer Ave				Geer Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0 NL	0 NT	0 NR	0 NU	0 SL	0 ST	0 SR	0 SU	0 EL	0 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	TOTAL
7:00 AM	0	0	0	0	0	0	3	0	3	1	0	0	0	3	1	0	11
7:15 AM	0	0	0	0	1	0	3	0	3	3	0	0	0	9	1	0	20
7:30 AM	0	0	0	0	5	0	5	0	4	13	0	0	0	22	9	0	58
7:45 AM	0	0	0	0	5	0	24	0	27	34	0	0	0	50	7	0	147
8:00 AM	0	0	0	0	11	0	33	0	10	74	0	0	0	49	9	0	186
8:15 AM	0	0	0	0	10	0	11	0	5	17	0	0	0	25	2	0	70
8:30 AM	0	0	0	0	0	0	0	0	1	10	0	0	0	3	2	0	16
8:45 AM	0	0	0	0	0	0	0	0	1	2	0	0	0	4	0	0	7
TOTAL VOLUMES : APPROACH %'s :	0	0	0	0	32	0	79	0	54	154	0	0	0	0	165	31	515
					28.83%	0.00%	71.17%	0.00%	25.96%	74.04%	0.00%	0.00%	0.00%	84.18%	15.82%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL : PEAK HR FACTOR :	0 0.000	0 0.000	0 0.000	0 0.000	31 0.705	0 0.000	73 0.553	0 0.000	46 0.426	138 0.466	0 0.000	0 0.000	0 0.000	146 0.730	27 0.750	0 0.000	461 0.620
					0.591				0.548				0.746				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0 NL	0 NT	0 NR	0 NU	0 SL	0 ST	0 SR	0 SU	0 EL	0 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	TOTAL
4:00 PM	0	0	0	0	4	0	4	0	6	8	0	0	0	11	4	0	37
4:15 PM	0	0	0	0	2	0	2	0	3	8	0	0	0	11	5	0	31
4:30 PM	0	0	0	0	3	0	3	0	5	3	0	0	0	10	5	0	29
4:45 PM	0	0	0	0	4	0	1	0	5	4	0	0	0	5	9	0	28
5:00 PM	0	0	0	0	18	0	14	0	10	19	0	0	0	10	11	0	82
5:15 PM	0	0	0	0	20	0	14	0	16	6	0	0	0	7	17	0	80
5:30 PM	0	0	0	0	2	0	4	0	4	15	0	0	0	7	7	0	39
5:45 PM	0	0	0	0	0	0	3	0	4	4	0	0	0	4	7	0	22
TOTAL VOLUMES : APPROACH %'s :	0	0	0	0	53	0	45	0	44	67	0	0	0	65	65	0	348
					54.08%	0.00%	45.92%	0.00%	43.17%	55.83%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL : PEAK HR FACTOR :	0 0.000	0 0.000	0 0.000	0 0.000	44 0.550	0 0.000	33 0.589	0 0.000	35 0.547	44 0.579	0 0.000	0 0.000	0 0.000	29 0.725	44 0.647	0 0.000	229 0.698
					0.566				0.681				0.760				

Location: Hilmar Unified School District Shipping and Receiving Entrance & Geer Ave
City: Hilmar
Control: 0

Project ID: 20-07044-003
Date: 2/6/2020

Bikes

[illegible]

National Data & Surveying Services

Intersection Turning Movement Count

Location: Hilmar Unified School District Shipping and Receiving Entrance & Ge Project ID: 20-07044-003
City: Hilmar Date: 2/6/2020

Pedestrians (Crosswalks)

NS/EW Streets:	Hilmar Unified School District Shipping and		Hilmar Unified School District Shipping and		Geer Ave		Geer Ave	
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
7:00 AM	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0
7:45 AM	0	2	0	0	0	0	0	0
8:00 AM	0	3	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0
8:30 AM	0	1	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB
APPROACH %'s :	0	6	0	0	0	0	0	0
PEAK HR :	0.00% 100.00%							
PEAK HR VOL :	07:30 AM - 08:30 AM							
PEAK HR FACTOR :	0	5	0	0	0	0	0	0
		0.417						
								TOTAL
								6
								5
								0.417

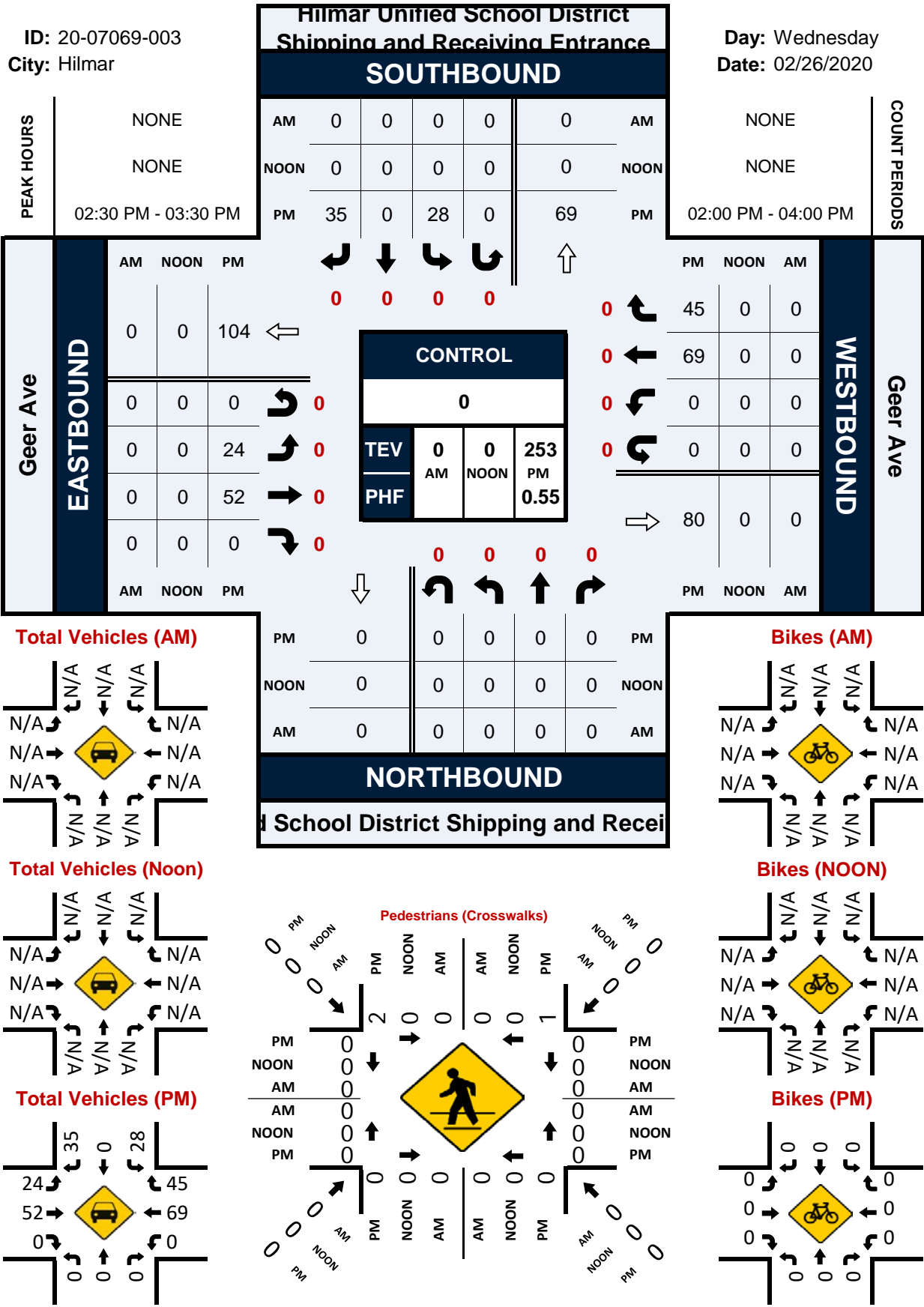
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG	
	EB	WB	EB	WB	NB	SB	NB	SB
4:00 PM	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB
APPROACH %'s :	0	0	0	0	0	0	0	0
PEAK HR :	04:45 PM - 05:45 PM							
PEAK HR VOL :	0	0	0	0	0	0	0	0
PEAK HR FACTOR :								
								TOTAL
								0
								0
								0

Hilmar Unified School District Shipping and Receiving Entrance & Geer Ave

Peak Hour Turning Movement Count

ID: 20-07069-003
City: Hilmar

Day: Wednesday
Date: 02/26/2020



National Data & Surveying Services

Intersection Turning Movement Count

Location: Hilmar Unified School District Shipping and Receiving Entrance & Geer Ave
City: Hilmar
Control:

Project ID: 20-07069-003
Date: 2020-02-26

Total

NS/EW Streets:	Hilmar Unified School District Shipping and Receiving Entrance				Hilmar Unified School District Shipping and Receiving Entrance				Geer Ave				Geer Ave				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
2:00 PM	0	0	0	0	5	0	6	0	1	3	0	0	0	9	15	0	39
2:15 PM	0	0	0	0	6	0	2	0	5	6	0	0	0	5	10	0	34
2:30 PM	0	0	0	0	3	0	1	0	5	2	0	0	0	5	7	0	23
2:45 PM	0	0	0	0	2	0	1	0	5	4	0	0	0	15	14	0	41
3:00 PM	0	0	0	0	12	0	24	0	5	19	0	0	0	36	20	0	116
3:15 PM	0	0	0	0	11	0	9	0	9	27	0	0	0	13	4	0	73
3:30 PM	0	0	0	0	2	0	2	0	2	8	0	0	0	2	0	0	16
3:45 PM	0	0	0	0	0	0	5	0	1	11	0	0	0	7	5	0	29
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	0	0	0	41	0	50	0	33	80	0	0	0	92	75	0	371
					45.05%	0.00%	54.95%	0.00%	29.20%	70.80%	0.00%	0.00%	0.00%	55.09%	44.91%	0.00%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	0	0	0	0	28	0	35	0	24	52	0	0	0	69	45	0	253
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.583	0.000	0.365	0.000	0.667	0.481	0.000	0.000	0.000	0.479	0.563	0.000	0.545
							0.438				0.528				0.509		

Location: Hilmar Unified School District Shipping and Receiving Entrance & Geer Ave
City: Hilmar
Control: 0

Project ID: 20-07069-003
Date: 2020-02-26

Bikes

[illegible]

Intersection Turning Movement Count

City: Hilmar

Date: 2020-02-26

NS/EW Streets:

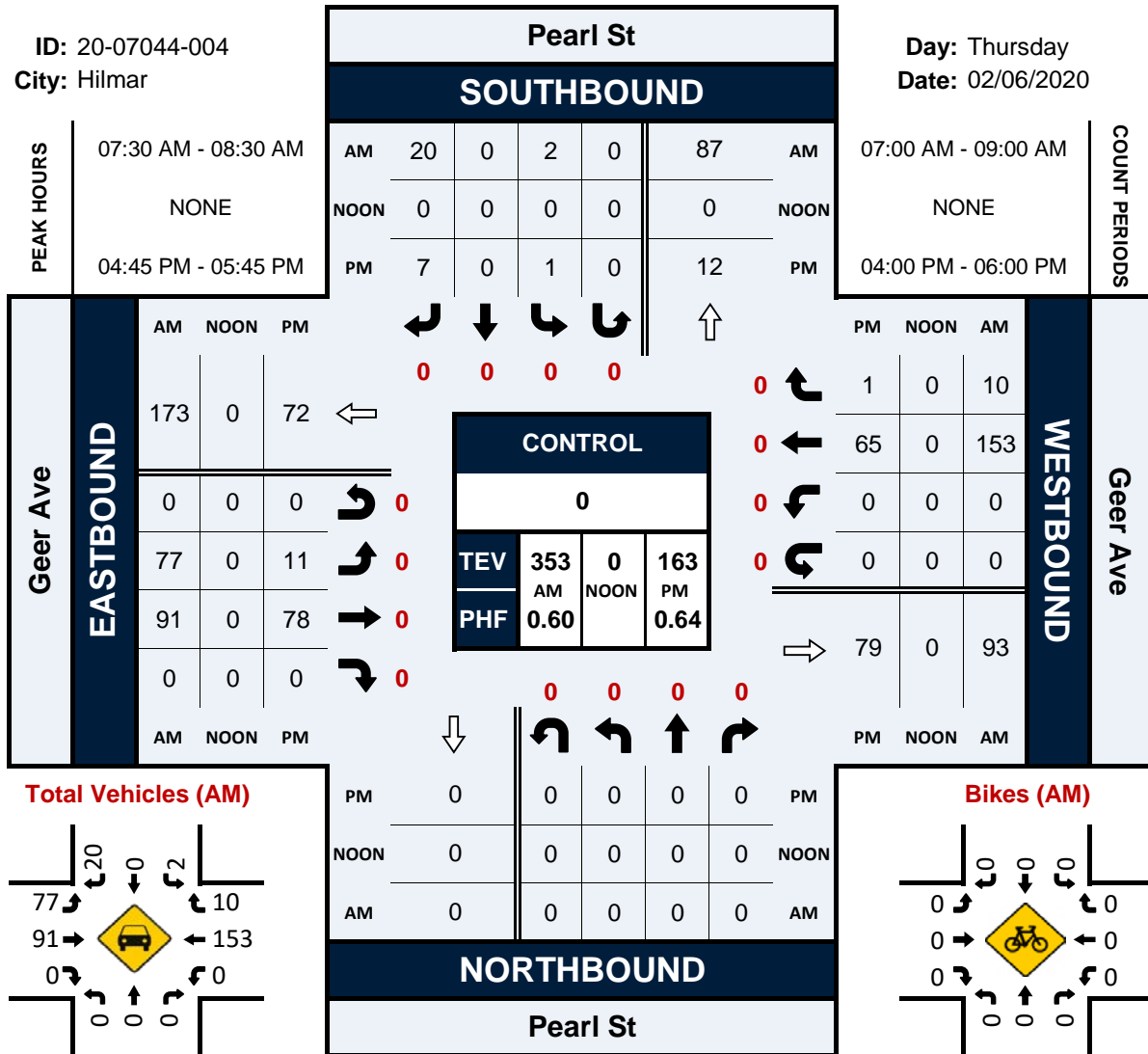
NS/EW Streets:	Hilmar Unified School District Shipping and		Hilmar Unified School District Shipping and		Geer Ave		Geer Ave		
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
2:00 PM	0	0	0	0	0	0	0	0	0
2:15 PM	3	0	0	0	0	0	0	0	3
2:30 PM	0	1	0	0	0	0	0	0	1
2:45 PM	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0
3:15 PM	2	0	0	0	0	0	0	0	2
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES : APPROACH %'s :	EB 5	WB 1	EB 0	WB 0	NB 0	SB 0	NB 0	SB 0	TOTAL 6
	83.33% 16.67%								
PEAK HR :	02:30 PM - 03:30 PM								TOTAL
PEAK HR VOL :	2	1	0	0	0	0	0	0	3
PEAK HR FACTOR :	0.250	0.250							0.375
	0.375								

Pearl St & Geer Ave

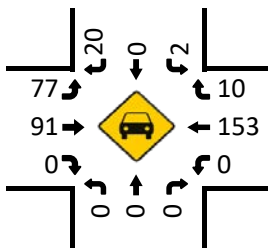
Peak Hour Turning Movement Count

ID: 20-07044-004
City: Hilmar

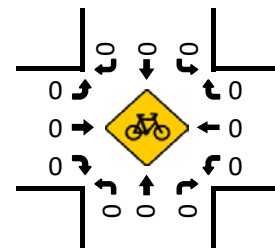
Day: Thursday
Date: 02/06/2020



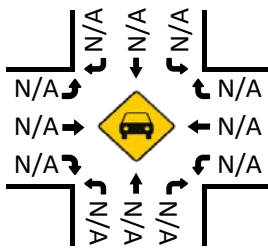
Total Vehicles (AM)



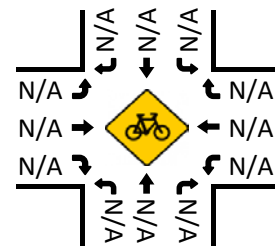
Bikes (AM)



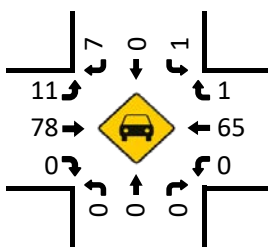
Total Vehicles (Noon)



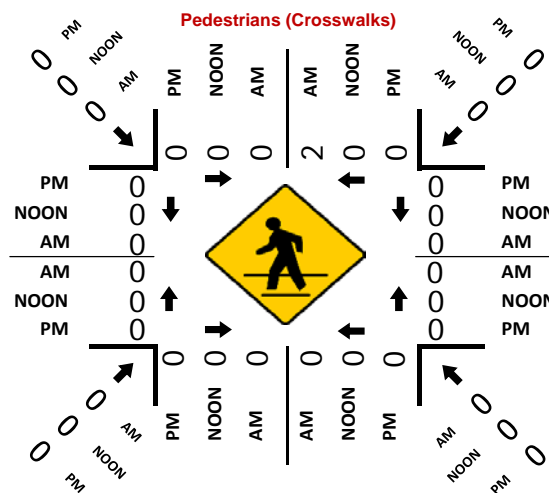
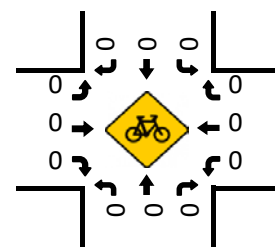
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Pearl St & Geer Ave
City: Hilmar
Control:

Project ID: 20-07044-004
Date: 2/6/2020

Total

NS/EW Streets:	Pearl St				Pearl St				Geer Ave				Geer Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:00 AM	0	0	0	0	1	0	0	0	0	1	0	0	0	4	0	0	6
7:15 AM	0	0	0	0	0	0	1	0	0	4	0	0	0	9	0	0	14
7:30 AM	0	0	0	0	2	0	2	0	3	15	0	0	0	30	0	0	52
7:45 AM	0	0	0	0	0	0	8	0	17	21	0	0	0	50	4	0	100
8:00 AM	0	0	0	0	0	0	5	0	48	37	0	0	0	51	6	0	147
8:15 AM	0	0	0	0	0	0	5	0	9	18	0	0	0	22	0	0	54
8:30 AM	0	0	0	0	1	0	0	0	0	11	0	0	0	5	0	0	17
8:45 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	4	0	0	6
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	0	0	0	4	0	21	0	78	108	0	0	0	175	10	0	396
PEAK HR :	07:30 AM - 08:30 AM				16.00%	0.00%	84.00%	0.00%	41.94%	58.06%	0.00%	0.00%	0.00%	94.59%	5.41%	0.00%	
PEAK HR VOL :	0	0	0	0	2	0	20	0	77	91	0	0	0	153	10	0	TOTAL
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.250	0.000	0.625	0.000	0.401	0.615	0.000	0.000	0.000	0.750	0.417	0.000	353
							0.688				0.494				0.715		0.600
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	0	0	0	0	0	0	0	0	1	10	0	0	0	15	0	0	26
4:15 PM	0	0	0	0	0	0	4	0	2	9	0	0	0	12	0	0	27
4:30 PM	0	0	0	0	0	0	3	0	0	6	0	0	0	13	0	0	22
4:45 PM	0	0	0	0	0	0	0	0	0	8	0	0	0	13	0	0	21
5:00 PM	0	0	0	0	1	0	2	0	9	29	0	0	0	22	1	0	64
5:15 PM	0	0	0	0	0	0	3	0	0	25	0	0	0	18	0	0	46
5:30 PM	0	0	0	0	0	0	2	0	2	16	0	0	0	12	0	0	32
5:45 PM	0	0	0	0	1	0	1	0	0	4	0	0	0	10	0	0	16
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	0	0	0	2	0	15	0	14	107	0	0	0	115	1	0	254
PEAK HR :	04:45 PM - 05:45 PM				11.76%	0.00%	88.24%	0.00%	11.57%	88.43%	0.00%	0.00%	0.00%	99.14%	0.86%	0.00%	
PEAK HR VOL :	0	0	0	0	1	0	7	0	11	78	0	0	0	65	1	0	TOTAL
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.250	0.000	0.583	0.000	0.306	0.672	0.000	0.000	0.000	0.739	0.250	0.000	163
							0.667				0.586				0.717		0.637

Location: Pearl St & Geer Ave
City: Hilmar
Control: 0

Bikes

[illegible]

Intersection Turning Movement Count

Project ID: 20-07044-004
Date: 2/6/2020

NS/EW Streets:

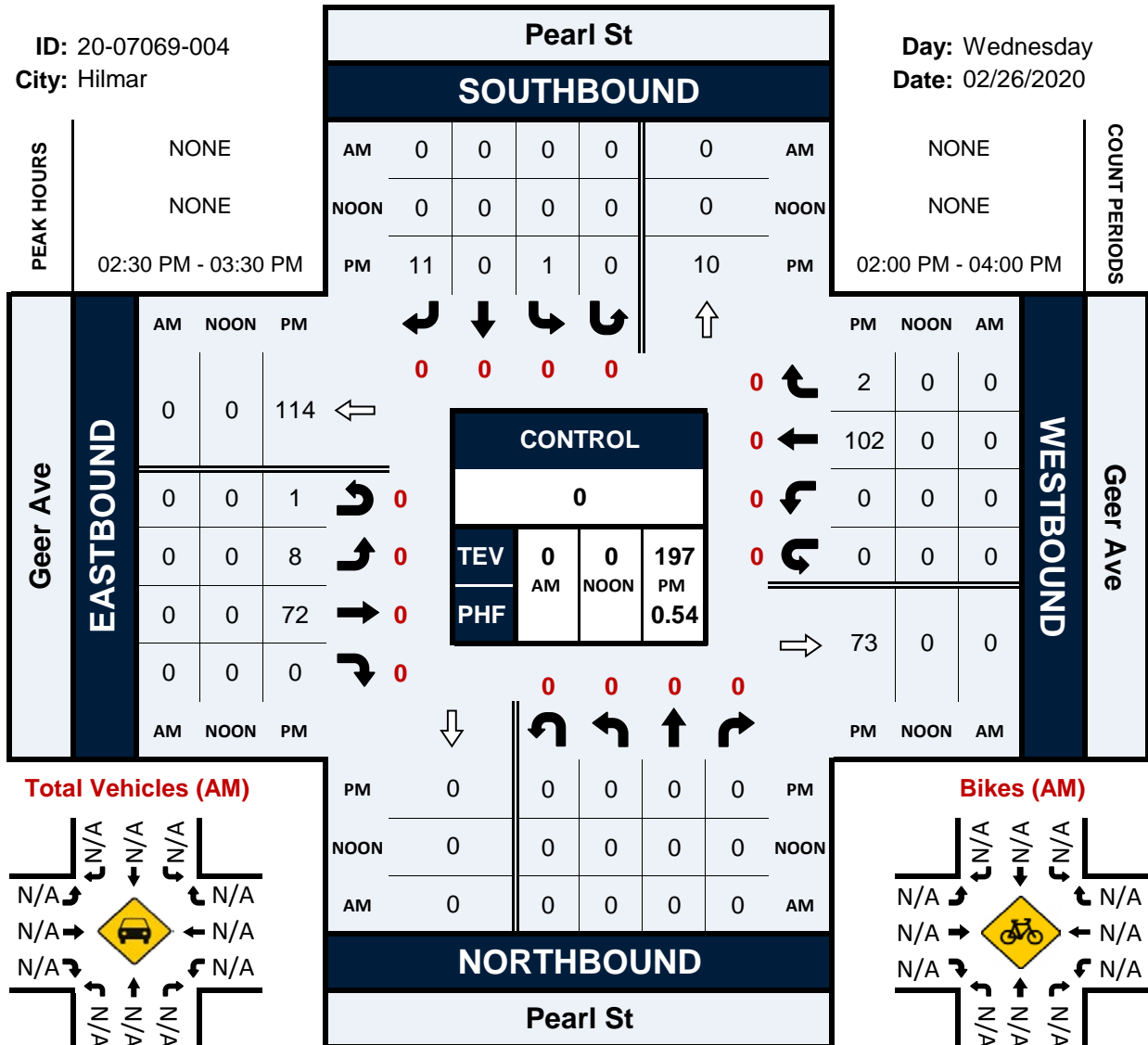
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES : APPROACH %'s :	EB 0	WB 0	EB 0	WB 0	NB 0	SB 0	NB 0	SB 0	TOTAL 0
PEAK HR :	04:45 PM - 05:45 PM								TOTAL
PEAK HR VOL :	0 0		0	0	0	0	0	0	0
PEAK HR FACTOR :									

Pearl St & Geer Ave

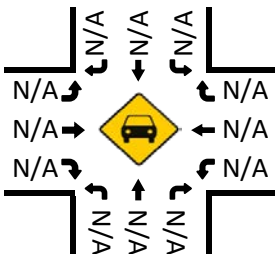
Peak Hour Turning Movement Count

ID: 20-07069-004
City: Hilmar

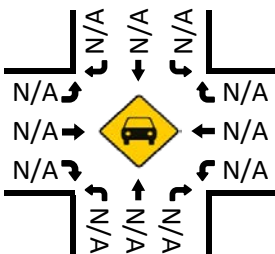
Day: Wednesday
Date: 02/26/2020



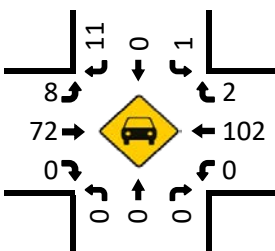
Total Vehicles (AM)



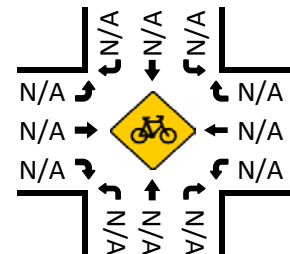
Total Vehicles (Noon)



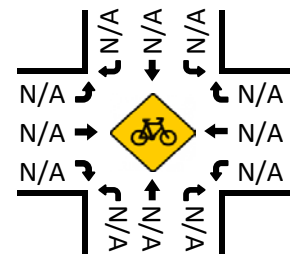
Total Vehicles (PM)



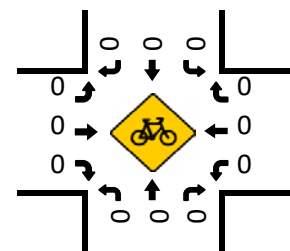
Bikes (AM)



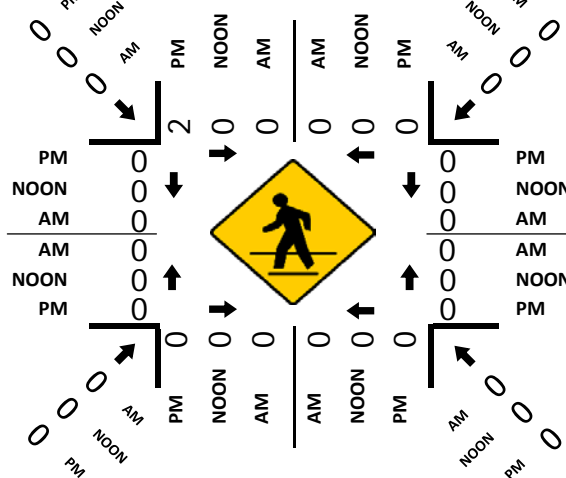
Bikes (Noon)



Bikes (PM)



Pedestrians (Crosswalks)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Pearl St & Geer Ave
City: Hilmar
Control:

Project ID: 20-07069-004
Date: 2020-02-26

Total

NS/EW Streets:	Pearl St				Pearl St				Geer Ave				Geer Ave				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	0 NT	0 NR	0 NU	0 SL	0 ST	0 SR	0 SU	0 EL	0 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
2:00 PM	0	0	0	0	0	0	2	0	1	8	0	0	0	24	0	0	35
2:15 PM	0	0	0	0	0	0	0	0	0	10	0	0	0	12	0	0	22
2:30 PM	0	0	0	0	1	0	1	0	0	5	0	0	0	13	1	0	21
2:45 PM	0	0	0	0	0	0	2	0	0	5	0	1	0	24	0	0	32
3:00 PM	0	0	0	0	0	0	6	0	3	29	0	0	0	53	1	0	92
3:15 PM	0	0	0	0	0	0	2	0	5	33	0	0	0	12	0	0	52
3:30 PM	0	0	0	0	1	0	0	0	0	8	0	0	0	2	0	0	11
3:45 PM	0	0	0	0	0	0	1	0	2	11	0	0	0	13	0	0	27
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	0	0	0	0	2	0	14	0	11	109	0	1	0	153	2	0	292
					12.50%	0.00%	87.50%	0.00%	9.09%	90.08%	0.00%	0.83%	0.00%	98.71%	1.29%	0.00%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	0	0	0	0	1	0	11	0	8	72	0	1	0	102	2	0	197
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.250	0.000	0.458	0.000	0.400	0.545	0.000	0.250	0.000	0.481	0.500	0.000	0.535
							0.500				0.533				0.481		

Project ID: 20-07069-004
Date: 2020-02-26

National Data & Surveying Services

Intersection Turning Movement Count

Location: Pearl St & Geer Ave
City: Hilmar

Project ID: 20-07069-004
Date: 2020-02-26

Pedestrians (Crosswalks)

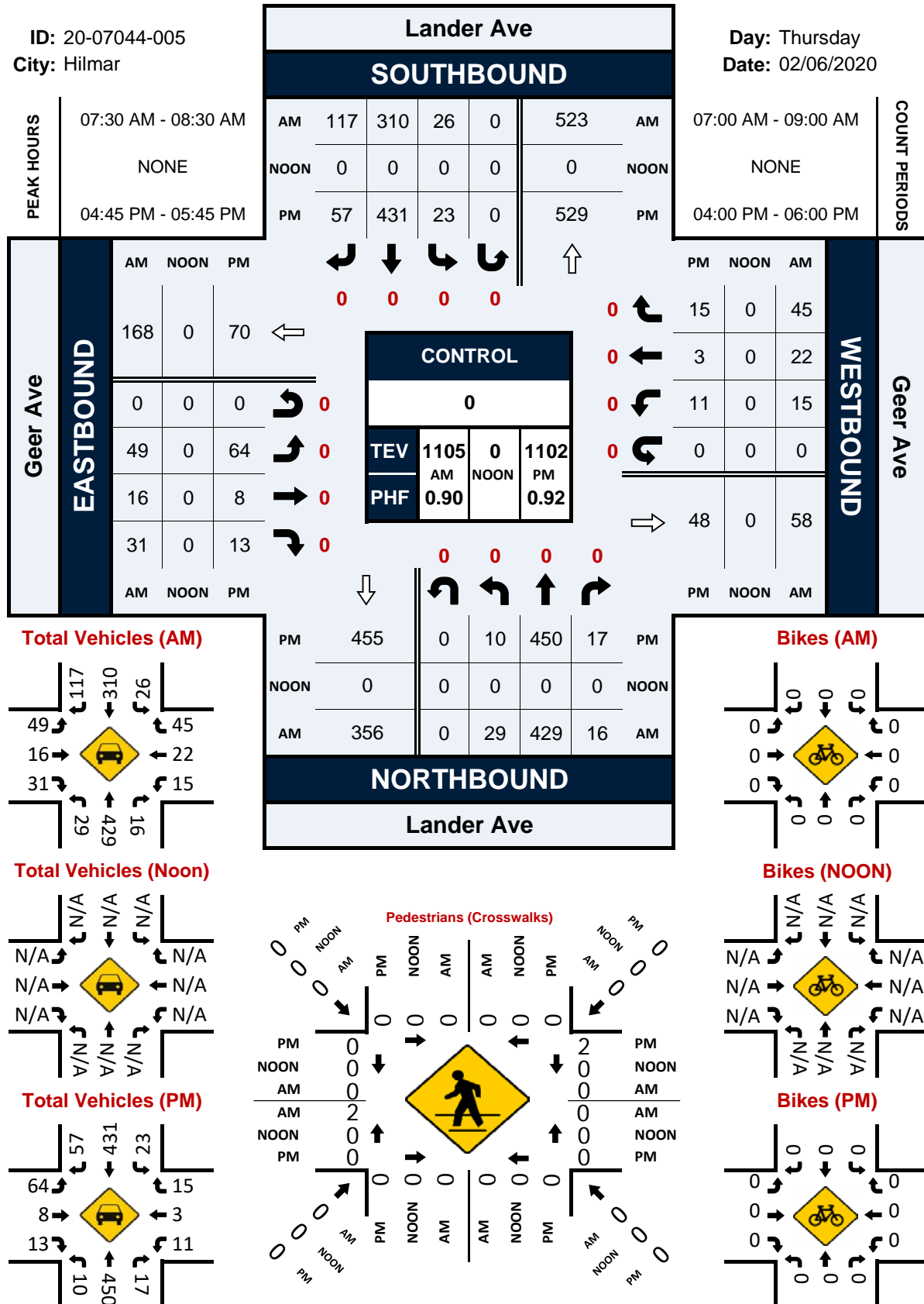
NS/EW Streets:	Pearl St		Pearl St		Geer Ave		Geer Ave		
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
2:00 PM	0	0	0	0	0	0	0	0	0
2:15 PM	3	0	0	0	0	0	0	0	3
2:30 PM	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0
3:15 PM	2	0	0	0	0	0	0	0	2
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB 5	WB 0	EB 0	WB 0	NB 0	SB 0	NB 0	SB 0	TOTAL 5
APPROACH %'s :	100.00%	0.00%							
PEAK HR :	02:30 PM - 03:30 PM								TOTAL
PEAK HR VOL :	2	0	0	0	0	0	0	0	2
PEAK HR FACTOR :	0.250	0.250							0.250

Lander Ave & Geer Ave

Peak Hour Turning Movement Count

ID: 20-07044-005
City: Hilmar

Day: Thursday
Date: 02/06/2020



National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Geer Ave
City: Hilmar
Control:

Project ID: 20-07044-005
Date: 2/6/2020

Total

NS/EW Streets:	Lander Ave				Lander Ave				Geer Ave				Geer Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
7:00 AM	1	77	2	0	2	97	3	0	2	1	2	0	2	0	4	0	193
7:15 AM	3	113	1	0	2	85	5	0	2	0	1	0	7	1	4	0	224
7:30 AM	1	119	4	0	5	77	25	0	11	3	4	0	4	5	9	0	267
7:45 AM	11	138	5	0	5	60	34	0	8	6	5	0	4	9	16	0	301
8:00 AM	17	110	4	0	7	63	35	0	17	5	18	0	5	8	17	0	306
8:15 AM	0	62	3	0	9	110	23	0	13	2	4	0	2	0	3	0	231
8:30 AM	2	87	4	0	3	71	3	0	8	1	3	0	1	0	5	0	188
8:45 AM	1	86	1	0	2	65	3	0	1	0	0	0	2	0	3	0	164
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	36	792	24	0	35	628	131	0	62	18	37	0	27	23	61	0	1874
	4.23%	92.96%	2.82%	0.00%	4.41%	79.09%	16.50%	0.00%	52.99%	15.38%	31.62%	0.00%	24.32%	20.72%	54.95%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	29	429	16	0	26	310	117	0	49	16	31	0	15	22	45	0	1105
PEAK HR FACTOR :	0.426	0.777	0.800	0.000	0.722	0.705	0.836	0.000	0.721	0.667	0.431	0.000	0.750	0.611	0.662	0.000	0.903
			0.769				0.798				0.600				0.683		
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	
4:00 PM	5	129	4	0	4	128	12	0	6	3	3	0	1	0	6	0	301
4:15 PM	3	113	7	0	10	107	7	0	5	4	1	0	3	3	0	0	263
4:30 PM	3	93	5	0	4	98	11	0	5	0	0	0	1	3	6	0	229
4:45 PM	2	109	5	0	8	118	11	0	5	1	2	0	2	0	1	0	264
5:00 PM	4	125	6	0	3	95	20	0	18	4	5	0	5	2	4	0	291
5:15 PM	2	120	4	0	8	103	16	0	27	2	4	0	4	1	8	0	299
5:30 PM	2	96	2	0	4	115	10	0	14	1	2	0	0	0	2	0	248
5:45 PM	1	78	2	0	1	103	7	0	5	0	2	0	3	2	1	0	205
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :	22	863	35	0	42	867	94	0	85	15	19	0	19	11	28	0	2100
	2.39%	93.80%	3.80%	0.00%	4.19%	86.44%	9.37%	0.00%	71.43%	12.61%	15.97%	0.00%	32.76%	18.97%	48.28%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	10	450	17	0	23	431	57	0	64	8	13	0	11	3	15	0	1102
PEAK HR FACTOR :	0.625	0.900	0.708	0.000	0.719	0.913	0.713	0.000	0.593	0.500	0.650	0.000	0.550	0.375	0.469	0.000	0.921
			0.883				0.932				0.644				0.558		

Location: Lander Ave & Geer Ave
City: Hilmar
Control: 0

Bikes

[illegible]

National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Geer Ave
City: Hilmar

Project ID: 20-07044-005
Date: 2/6/2020

Pedestrians (Crosswalks)

NS/EW Streets:	Lander Ave		Lander Ave		Geer Ave		Geer Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	2	0	2
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
APPROACH %'s :	0	0	0	0	0	0	2	0	2
PEAK HR :	07:30 AM - 08:30 AM						100.00%	0.00%	
PEAK HR VOL :	0	0	0	0	0	0	2	0	2
PEAK HR FACTOR :							0.250	0.250	0.250

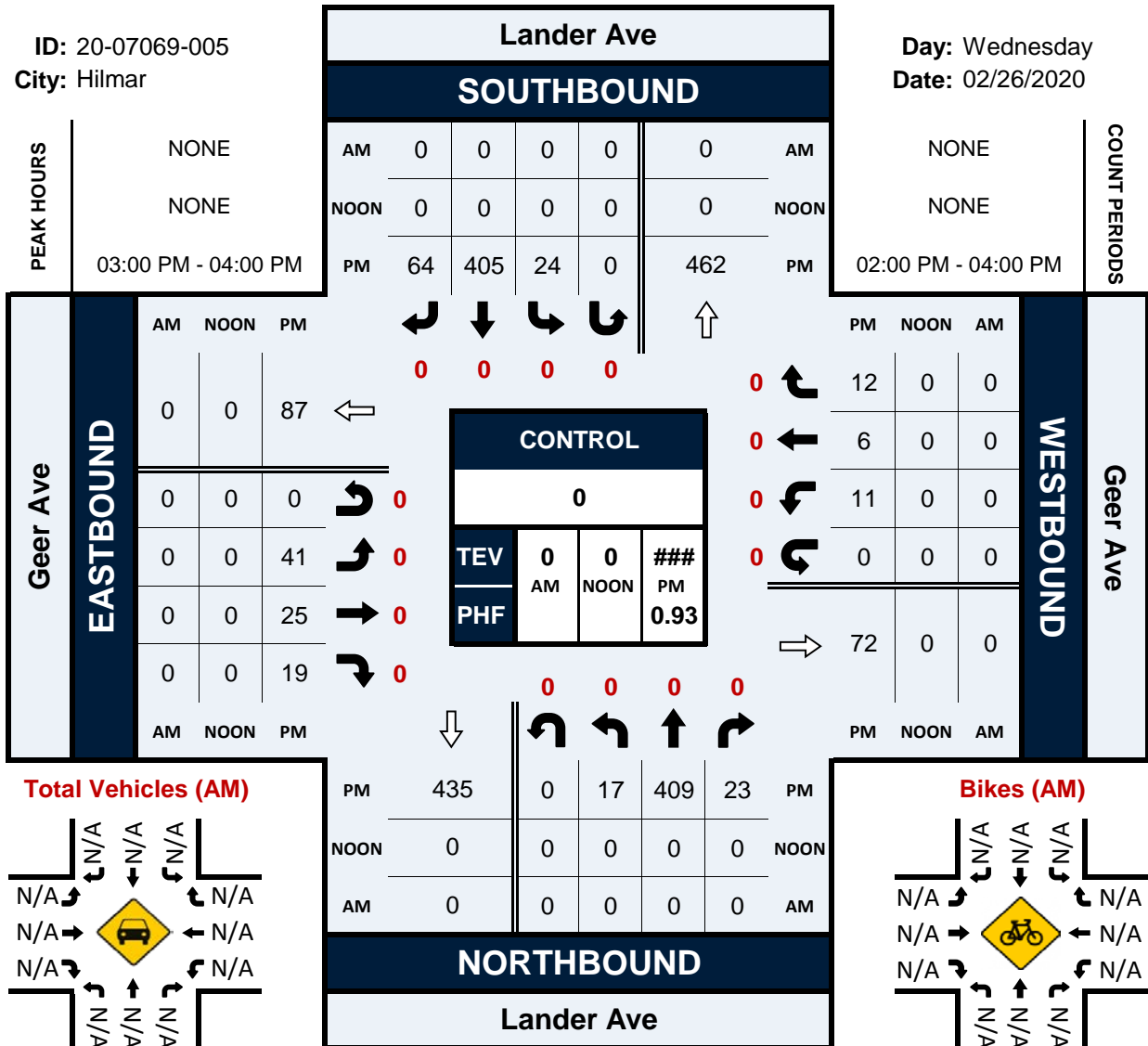
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL
	EB	WB	EB	WB	NB	SB	NB	SB	
4:00 PM	0	0	0	0	0	0	0	1	1
4:15 PM	0	1	0	0	0	0	0	0	1
4:30 PM	1	0	0	0	0	2	0	0	3
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	2	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES :	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
APPROACH %'s :	1	1	0	0	0	4	0	1	7
PEAK HR :	50.00%	50.00%			0.00%	100.00%	0.00%	100.00%	
PEAK HR VOL :	0	0	0	0	0	2	0	0	2
PEAK HR FACTOR :					0.250	0.250			0.250

Lander Ave & Geer Ave

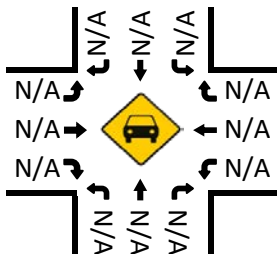
Peak Hour Turning Movement Count

ID: 20-07069-005
City: Hilmar

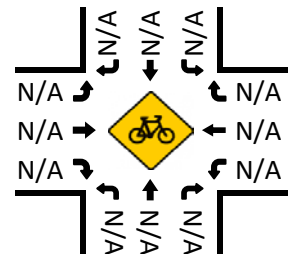
Day: Wednesday
Date: 02/26/2020



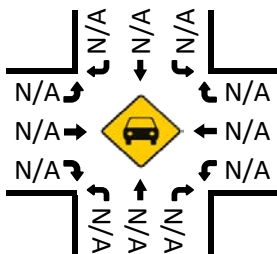
Total Vehicles (AM)



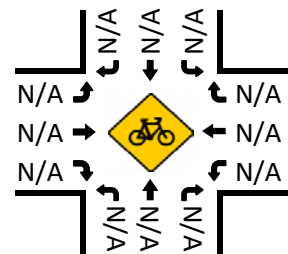
Bikes (AM)



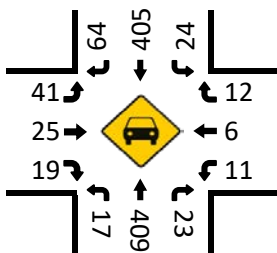
Total Vehicles (Noon)



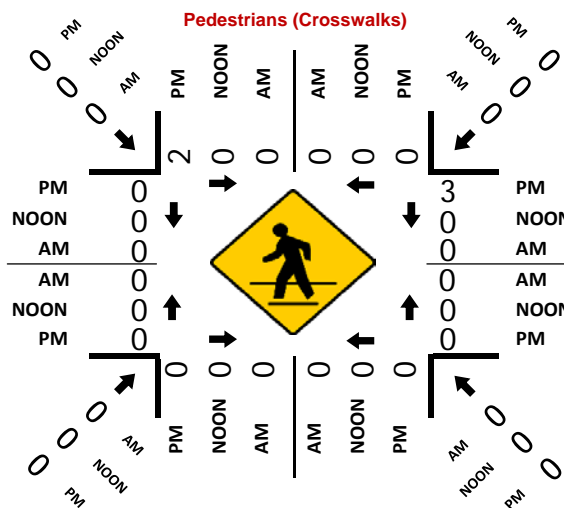
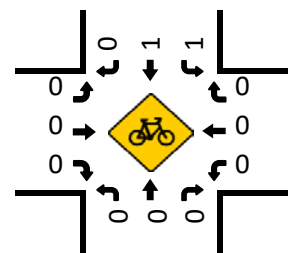
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Lander Ave & Geer Ave
City: Hilmar
Control:

Project ID: 20-07069-005
Date: 2020-02-26

Total

NS/EW Streets:		Lander Ave				Lander Ave				Geer Ave				Geer Ave				
PM		NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL	
2:00 PM	2	79	3	0	5	78	21	0	6	2	1	0	4	3	2	0	206	
2:15 PM	5	62	5	0	5	98	7	0	11	3	1	0	2	2	2	0	205	
2:30 PM	5	90	3	0	4	100	12	0	5	3	1	0	2	1	7	1	234	
2:45 PM	4	93	4	0	8	100	22	0	4	1	0	0	3	1	2	0	242	
3:00 PM	10	93	4	0	9	89	41	0	11	8	8	0	1	4	5	0	283	
3:15 PM	2	102	4	0	5	109	9	0	19	8	8	0	3	1	4	0	274	
3:30 PM	1	111	11	0	8	99	3	0	6	5	2	0	5	0	0	0	251	
3:45 PM	4	103	4	0	2	108	11	0	5	4	1	0	2	1	3	0	248	
TOTAL VOLUMES :		NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
APPROACH %'s :		33	733	38	0	46	781	126	0	67	34	24	0	22	13	25	1	1943
		4.10%	91.17%	4.73%	0.00%	4.83%	81.95%	13.22%	0.00%	53.60%	27.20%	19.20%	0.00%	36.07%	21.31%	40.98%	1.64%	
PEAK HR :		03:00 PM - 04:00 PM																TOTAL
PEAK HR VOL :		17	409	23	0	24	405	64	0	41	25	19	0	11	6	12	0	1056
PEAK HR FACTOR :		0.425	0.921	0.523	0.000	0.667	0.929	0.390	0.000	0.539	0.781	0.594	0.000	0.550	0.375	0.600	0.000	0.933
		0.913				0.887				0.607				0.725				

Project ID: 20-07069-005
Date: 2020-02-26

Intersection Turning Movement Count

Project ID: 20-07069-005
Date: 2020-02-26

NS/EW Streets:	Lander Ave		Lander Ave		Geer Ave		Geer Ave				
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		TOTAL		
	EB	WB	EB	WB	NB	SB	NB	SB			
	2:00 PM	0	0	0	0	0	0	0		0	
	2:15 PM	0	0	0	0	0	0	0		0	
	2:30 PM	0	0	0	0	0	0	0		0	
	2:45 PM	0	1	0	0	0	0	0		1	
	3:00 PM	0	0	0	0	0	1	0		0	1
	3:15 PM	2	0	0	0	0	2	0		0	4
	3:30 PM	0	0	0	0	0	0	0		0	0
	3:45 PM	0	0	0	0	0	0	0		0	0
TOTAL VOLUMES :	2	1	0	0	0	3	0	0	6		
APPROACH %'s :	66.67%	33.33%			0.00%	100.00%					
PEAK HR :	03:00 PM - 04:00 PM								TOTAL		
PEAK HR VOL :	2	0	0	0	0	3	0	0	5		
PEAK HR FACTOR :	0.250					0.375			0.313		
	0.250				0.375						

Appendix C: Methodology



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

A p p | C

Levels of Service Methodology

The description and procedures for calculating capacity and level of service (LOS) are found in the Transportation Research Board, Highway Capacity Manual (HCM). The HCM 2010 represents the research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level of service (LOS), from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish a LOS.

Urban Streets (Automobile Mode)

The term "urban streets" refers to urban arterials and collectors, including those in downtown areas. Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials. Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals. Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing taxicabs, buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

Flow Characteristics

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control.

The street environment includes the geometric characteristics of the facility, the character of roadside activity, and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway/access point density, spacing between signalized intersections, existence of parking, level of pedestrian and bicyclist activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic controls (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds; however, such controls are needed to establish right-of-way.



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

Page | C-1

Levels of Service (automobile Mode)

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service (LOS). The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

LOS A describes primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal. Travel speeds exceed 85 of the base free flow speed (FFS).

LOS B describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67 and 85 percent of the base FFS.

LOS C describes stable operations. The ability to maneuver and change lanes in midblock location may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50 and 67 percent of the base FFS.

LOS D indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volumes, inappropriate signal timing, at the boundary intersections. The travel speed is between 40 and 50 percent of the base FFS.

LOS E is characterized unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30 and 40 percent of the base FFS.

LOS F is characterized by street flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30 percent or less of the base FFS.

Table A-1: Urban Street Levels of Service (Automobile Mode)

Travel Speed as a Percentage of Base Free-Flow Speed (%)	LOS by Critical Volume-to-Capacity Ratio ^a	
	≤1.0	>1.0
>85	A	F
>67 to 85	B	F
>50 to 67	C	F
>40 to 50	D	F
>30 to 40	E	F
≤30	F	F

a = The Critical volume-to-capacity ratio is based on consideration of the through movement-to-capacity ratio at each boundary intersection in the subject direction of travel. The critical volume-to-capacity ratio is the largest ratio of those considered.

Source: Highway Capacity Manual 2010, Exhibit 16-4. Urban Street LOS Criteria (Automobile Mode)

Intersection Levels of Service

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs.

Signalized Intersections – Performance Measures

For signalized intersections the performance measures include automobile volume-to-capacity ratio, automobile delay, queue storage length, ratio of pedestrian delay, pedestrian circulation area, pedestrian perception score, bicycle delay, and bicycle perception score. LOS is also considered a performance measure. For the automobile mode average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A LOS designation is given to the weighted average control delay to better describe the level of operation. A description of LOS for signalized intersections is found in Table A-2.

Table A-2: Signalized Intersection Level of Service Description (Automobile Mode)

Level of Service	Description	Average Control Delay (seconds per vehicle)
A	Operations with a control delay of 10 seconds/vehicle or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when volume-to-capacity ratio is and either progression is exceptionally favorable or the cycle length is very short. If it's due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.	≤10
B	Operations with control delay between 10.1 to 20.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.	>10.0 to 20.0
C	Operations with average control delays between 20.1 to 35.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.	>20 to 35
D	Operations with control delay between 35.1 to 55.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop, and individual cycle failures are noticeable.	>35 to 55
E	Operations with control delay between 55.1 to 80.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.	>55 to 80
F	Operations with unacceptable control delay exceeding 80.0 seconds/vehicle and a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.	>80

Source: Highway Capacity Manual 2010

Unsignalized Intersections

The HCM 2010 procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, i. e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

All-Way Stop Controlled Intersections

All-way stop controlled intersections is a form of traffic controls in which all approaches to an intersection are required to stop. Similar to signalized intersections, at all-way stop controlled intersections the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection as a whole. In other words the delay measured for all-way stop controlled intersections is a measure of the average delay for all vehicles passing through the intersection during the peak hour. A LOS designation is given to the weighted average control delay to better describe the level of operation.

Two-Way Stop Controlled Intersections

Two-way stop controlled (TWSC) intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At TWSC intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay are determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A LOS for TWSC intersection is determined by the computed or measured control delay for each minor movement. LOS is not defined for the intersection as a whole for three main reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at the typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay from all vehicles; and (c) the resulting low delay can mask important LOS deficiencies for minor movements. Table A-3 provides a description of LOS at unsignalized intersections.

Table A-3: Unsignalized Intersection Level of Service Description (Automobile Mode)

Control Delay (seconds per vehicle)	LOS by Volume-to-Capacity Ratio	
	$v/c \leq 1.0$	$v/c > 1.0$
≤ 10	A	F
>10 to 15	B	F
>15 to 25	C	F
>25 to 35	D	F
>35 to 50	E	F
>50	F	F

Source: HCM 2010 Exhibit 19-1.

Appendix D: Existing Traffic Conditions








www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

A p p | D

HCM 6th TWSC
1: Lander Avenue & Echo Street

Existing AM Peak
10/27/2020

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	51	541	6	84	479
Future Vol, veh/h	8	51	541	6	84	479
Conflicting Peds, #/hr	102	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	9	57	608	7	94	538

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1452	624	0	0	627
Stage 1	624	-	-	-	-
Stage 2	828	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11
Critical Hdwy Stg 1	5.41	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209
Pot Cap-1 Maneuver	145	487	-	-	960
Stage 1	536	-	-	-	-
Stage 2	431	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	117	481	-	-	949
Mov Cap-2 Maneuver	243	-	-	-	-
Stage 1	530	-	-	-	-
Stage 2	350	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	1.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 243 481	949	-
HCM Lane V/C Ratio	-	- 0.037 0.119	0.099	-
HCM Control Delay (s)	-	- 20.4 13.5	9.2	-
HCM Lane LOS	-	- C B	A	-
HCM 95th %tile Q(veh)	-	- 0.1 0.4	0.3	-

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Existing AM Peak
10/27/2020

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	19	0	9	1	5	23	16	506	1	11	442	18
Future Vol, veh/h	19	0	9	1	5	23	16	506	1	11	442	18
Conflicting Peds, #/hr	6	0	0	0	0	6	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	21	0	10	1	5	25	18	556	1	12	486	20




Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1160	1139	522	1118	1149	563	532	0	0	557	0	0
Stage 1	546	546	-	593	593	-	-	-	-	-	-	-
Stage 2	614	593	-	525	556	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	173	202	557	185	199	528	1041	-	-	1019	-	-
Stage 1	524	520	-	494	495	-	-	-	-	-	-	-
Stage 2	481	495	-	538	514	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	153	191	543	178	188	525	1015	-	-	1019	-	-
Mov Cap-2 Maneuver	153	191	-	178	188	-	-	-	-	-	-	-
Stage 1	502	501	-	485	486	-	-	-	-	-	-	-
Stage 2	442	486	-	522	495	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	26.4		15.3		0.3		0.2	
HCM LOS	D		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1015	-	-	199	381	1019	-
HCM Lane V/C Ratio	0.017	-	-	0.155	0.084	0.012	-
HCM Control Delay (s)	8.6	-	-	26.4	15.3	8.6	-
HCM Lane LOS	A	-	-	D	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.3	0	-

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Existing AM Peak
10/27/2020

Intersection						
Int Delay, s/veh	3.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	46	138	146	27	31	73
Future Vol, veh/h	46	138	146	27	31	73
Conflicting Peds, #/hr	5	0	0	5	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	62	62	62	62	62	62
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	74	223	235	44	50	118
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	284	0	-	0	633	262
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	371	-
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	1273	-	-	-	442	774
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	696	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1267	-	-	-	408	770
Mov Cap-2 Maneuver	-	-	-	-	408	-
Stage 1	-	-	-	-	724	-
Stage 2	-	-	-	-	693	-
Approach	EB	WB		SB		
HCM Control Delay, s	2	0		13.1		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1267	-	-	-	609	
HCM Lane V/C Ratio	0.059	-	-	-	0.275	
HCM Control Delay (s)	8	0	-	-	13.1	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1	

HCM 6th TWSC
5: Lander Avenue & Geer Avenue

Existing AM Peak
10/27/2020

Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	49	16	31	15	22	45	29	429	16	26	310	117
Future Vol, veh/h	49	16	31	15	22	45	29	429	16	26	310	117
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3	3	7	3	3	7	3
Mvmt Flow	54	18	34	17	24	50	32	477	18	29	344	130






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1056	1028	411	1043	1084	486	476	0	0	495	0	0
Stage 1	469	469	-	550	550	-	-	-	-	-	-	-
Stage 2	587	559	-	493	534	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	202	233	639	207	216	579	1081	-	-	1064	-	-
Stage 1	573	559	-	518	514	-	-	-	-	-	-	-
Stage 2	494	509	-	556	523	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	160	219	638	176	203	579	1079	-	-	1064	-	-
Mov Cap-2 Maneuver	160	219	-	176	203	-	-	-	-	-	-	-
Stage 1	555	543	-	502	499	-	-	-	-	-	-	-
Stage 2	417	494	-	495	508	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	34.9	22	0.5	0.5
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1079	-	-	224 302	1064	-	-
HCM Lane V/C Ratio	0.03	-	-	0.476 0.302	0.027	-	-
HCM Control Delay (s)	8.4	-	-	34.9 22	8.5	-	-
HCM Lane LOS	A	-	-	D C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.4 1.2	0.1	-	-

HCM 6th TWSC
1: Lander Avenue & Echo Street

Existing PM Peak
10/27/2020

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	15	491	5	24	503
Future Vol, veh/h	4	15	491	5	24	503
Conflicting Peds, #/hr	25	0	0	6	6	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	4	15	496	5	24	508

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1086	505	0	0	507	0
Stage 1	505	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	240	569	-	-	1063	-
Stage 1	608	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	228	566	-	-	1057	-
Mov Cap-2 Maneuver	362	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	535	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 362 566	1057	-
HCM Lane V/C Ratio	-	- 0.011 0.027	0.023	-
HCM Control Delay (s)	-	- 15.1 11.5	8.5	-
HCM Lane LOS	-	- C B	A	-
HCM 95th %tile Q(veh)	-	- 0 0.1	0.1	-

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Existing PM Peak
10/27/2020

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	7	3	5	1	0	15	2	463	2	14	478	17
Future Vol, veh/h	7	3	5	1	0	15	2	463	2	14	478	17
Conflicting Peds, #/hr	3	0	1	1	0	3	7	0	4	4	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	7	3	5	1	0	16	2	487	2	15	503	18




Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1052	1046	520	1043	1054	495	528	0	0	493	0	0
Stage 1	549	549	-	496	496	-	-	-	-	-	-	-
Stage 2	503	497	-	547	558	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	205	229	558	208	227	577	1044	-	-	1076	-	-
Stage 1	522	518	-	558	547	-	-	-	-	-	-	-
Stage 2	553	546	-	523	513	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	195	223	554	200	221	573	1037	-	-	1072	-	-
Mov Cap-2 Maneuver	195	223	-	200	221	-	-	-	-	-	-	-
Stage 1	517	507	-	555	544	-	-	-	-	-	-	-
Stage 2	535	543	-	507	502	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.9	12.3	0	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1037	-	-	257 513	1072	-	-
HCM Lane V/C Ratio	0.002	-	-	0.061 0.033	0.014	-	-
HCM Control Delay (s)	8.5	-	-	19.9 12.3	8.4	-	-
HCM Lane LOS	A	-	-	C B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2 0.1	0	-	-

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Existing PM Peak
10/27/2020

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	24	52	69	45	28	35
Future Vol, veh/h	24	52	69	45	28	35
Conflicting Peds, #/hr	3	0	0	3	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	55	55	55	55	55	55
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	44	95	125	82	51	64
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	210	0	-	0	352	169
Stage 1	-	-	-	-	169	-
Stage 2	-	-	-	-	183	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1355	-	-	-	644	872
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	846	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1351	-	-	-	618	870
Mov Cap-2 Maneuver	-	-	-	-	618	-
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	843	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.4	0		10.8		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1351	-	-	-	737	
HCM Lane V/C Ratio	0.032	-	-	-	0.155	
HCM Control Delay (s)	7.8	0	-	-	10.8	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5	

HCM 6th TWSC
5: Lander Avenue & Geer Avenue

Existing PM Peak
10/27/2020

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	41	25	19	11	6	12	17	409	23	24	405	64
Future Vol, veh/h	41	25	19	11	6	12	17	409	23	24	405	64
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3	3	7	3	3	7	3
Mvmt Flow	44	27	20	12	6	13	18	440	25	26	435	69

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1022	1026	470	1037	1048	458	504	0	0	468	0	0
Stage 1	522	522	-	492	492	-	-	-	-	-	-	-
Stage 2	500	504	-	545	556	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	213	234	591	208	227	601	1055	-	-	1088	-	-
Stage 1	536	529	-	557	546	-	-	-	-	-	-	-
Stage 2	551	539	-	521	511	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	197	224	591	176	217	598	1055	-	-	1085	-	-
Mov Cap-2 Maneuver	197	224	-	176	217	-	-	-	-	-	-	-
Stage 1	527	516	-	546	535	-	-	-	-	-	-	-
Stage 2	523	528	-	465	499	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	28.6		20.5		0.3		0.4	
HCM LOS	D		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1055	-	-	242	263	1085	-
HCM Lane V/C Ratio	0.017	-	-	0.378	0.119	0.024	-
HCM Control Delay (s)	8.5	-	-	28.6	20.5	8.4	-
HCM Lane LOS	A	-	-	D	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.7	0.4	0.1	-

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	72	94	140	55	110
Average Queue (ft)	8	35	47	28	25
95th Queue (ft)	34	64	113	57	83
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	72	55	30	31	31	54
Average Queue (ft)	24	22	4	1	5	5
95th Queue (ft)	54	49	21	10	22	26
Link Distance (ft)	633	1229		349		706
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50		55	
Storage Blk Time (%)			0	0		0
Queuing Penalty (veh)			0	0		0

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	31	78
Average Queue (ft)	7	42
95th Queue (ft)	27	63
Link Distance (ft)	1296	1245
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	76	76	31	51	47
Average Queue (ft)	36	35	12	7	2
95th Queue (ft)	63	57	36	29	15
Link Distance (ft)	784	2629			349
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			50	50	
Storage Blk Time (%)			0	0	0
Queuing Penalty (veh)			0	0	0

Zone Summary

Zone wide Queuing Penalty: 0

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	30	51	101	32	31
Average Queue (ft)	3	10	8	11	3
95th Queue (ft)	17	35	49	35	18
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	53	31	28	52	30
Average Queue (ft)	15	15	1	4	2
95th Queue (ft)	43	40	9	23	15
Link Distance (ft)	633	1229		349	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			50		55
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	29	80
Average Queue (ft)	3	38
95th Queue (ft)	15	64
Link Distance (ft)	1296	1245
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	94	76	54	30	31
Average Queue (ft)	41	19	8	1	8
95th Queue (ft)	76	52	32	10	30
Link Distance (ft)	784	2629		295	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			50		50
Storage Blk Time (%)			0	0	0
Queuing Penalty (veh)			1	0	0

Zone Summary

Zone wide Queuing Penalty: 1






Appendix E: Existing plus Project Traffic Conditions



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

A p p | E

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	51	577	6	84	529
Future Vol, veh/h	12	51	577	6	84	529
Conflicting Peds, #/hr	102	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	13	57	648	7	94	594
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1548	664	0	0	667	0
Stage 1	664	-	-	-	-	-
Stage 2	884	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	126	462	-	-	927	-
Stage 1	514	-	-	-	-	-
Stage 2	405	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	101	457	-	-	916	-
Mov Cap-2 Maneuver	225	-	-	-	-	-
Stage 1	508	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	15.5	0	1.3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 225 457	916	-		
HCM Lane V/C Ratio	-	- 0.06 0.125	0.103	-		
HCM Control Delay (s)	-	- 22 14	9.4	-		
HCM Lane LOS	-	- C B	A	-		
HCM 95th %tile Q(veh)	-	- 0.2 0.4	0.3	-		

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Existing plus Project AM Peak

11/09/2020

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	19	0	9	1	5	23	16	624	1	11	632	18
Future Vol, veh/h	19	0	9	1	5	23	16	624	1	11	632	18
Conflicting Peds, #/hr	6	0	0	0	0	6	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	21	0	10	1	5	25	18	686	1	12	695	20

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1499	1478	731	1457	1488	693	741	0	0	687	0	0
Stage 1	755	755	-	723	723	-	-	-	-	-	-	-
Stage 2	744	723	-	734	765	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	101	126	423	108	125	445	870	-	-	912	-	-
Stage 1	402	418	-	419	432	-	-	-	-	-	-	-
Stage 2	408	432	-	413	414	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	87	119	413	103	118	442	848	-	-	912	-	-
Mov Cap-2 Maneuver	87	119	-	103	118	-	-	-	-	-	-	-
Stage 1	384	402	-	410	423	-	-	-	-	-	-	-
Stage 2	369	423	-	398	398	-	-	-	-	-	-	-




Approach	EB		WB		NB		SB	
HCM Control Delay, s	46.4		19.6		0.2		0.1	
HCM LOS	E		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	848	-	-	117	279	912	-
HCM Lane V/C Ratio	0.021	-	-	0.263	0.114	0.013	-
HCM Control Delay (s)	9.3	-	-	46.4	19.6	9	-
HCM Lane LOS	A	-	-	E	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0.4	0	-

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Existing plus Project AM Peak

11/09/2020

Intersection						
Int Delay, s/veh	32.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	54	189	115	227	309	109
Future Vol, veh/h	54	189	115	227	309	109
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	63	220	134	264	359	127
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	403	0	-	0	617	271
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	346	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1150	-	-	-	452	765
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	714	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1145	-	-	-	419	761
Mov Cap-2 Maneuver	-	-	-	-	419	-
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	710	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.9	0		77.1		
HCM LOS				F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1145	-	-	-	475	
HCM Lane V/C Ratio	0.055	-	-	-	1.023	
HCM Control Delay (s)	8.3	0	-	-	77.1	
HCM Lane LOS	A	A	-	-	F	
HCM 95th %tile Q(veh)	0.2	-	-	-	14.2	

HCM Unsignalized Intersection Capacity Analysis

4: Geer Avenue & Project Driveway 2

Existing plus Project AM Peak

11/09/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰			
Traffic Volume (veh/h)	6	492	342	220	0	0
Future Volume (Veh/h)	6	492	342	220	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	7	572	398	256	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	654				1112	526
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	654				1112	526
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	100
cM capacity (veh/h)	928				228	550
Direction, Lane #	EB 1	WB 1				
Volume Total	579	654				
Volume Left	7	0				
Volume Right	0	256				
cSH	928	1700				
Volume to Capacity	0.01	0.38				
Queue Length 95th (ft)	1	0				
Control Delay (s)	0.2	0.0				
Lane LOS	A					
Approach Delay (s)	0.2	0.0				
Approach LOS						
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		34.8%		ICU Level of Service		A
Analysis Period (min)		15				






Intersection												
Int Delay, s/veh	278.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	250	28	141	15	34	34	115	357	16	17	218	408
Future Vol, veh/h	250	28	141	15	34	34	115	357	16	17	218	408
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3	3	7	3	3	7	3
Mvmt Flow	278	31	157	17	38	38	128	397	18	19	242	453

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1209	1180	471	1263	1397	406	697	0	0	415	0	0
Stage 1	509	509	-	662	662	-	-	-	-	-	-	-
Stage 2	700	671	-	601	735	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	~ 159	189	591	146	140	643	895	-	-	1139	-	-
Stage 1	545	536	-	449	458	-	-	-	-	-	-	-
Stage 2	428	453	-	485	424	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 100	159	590	80	118	643	893	-	-	1139	-	-
Mov Cap-2 Maneuver	~ 100	159	-	80	118	-	-	-	-	-	-	-
Stage 1	466	526	-	385	393	-	-	-	-	-	-	-
Stage 2	312	388	-	330	416	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, \$ 1069.8		56.3	2.3	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	893	-	-	144 157	1139	-	-
HCM Lane V/C Ratio	0.143	-	-	3.233 0.587	0.017	-	-
HCM Control Delay (s)	9.7	-	-	\$ 1069.8 56.3	8.2	-	-
HCM Lane LOS	A	-	-	F F	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	44.1 3.1	0.1	-	-

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

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	15	508	4	24	521
Future Vol, veh/h	5	15	508	4	24	521
Conflicting Peds, #/hr	25	0	0	6	6	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	5	15	513	4	24	526

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1120	521	0	0	523
Stage 1	521	-	-	-	-
Stage 2	599	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11
Critical Hdwy Stg 1	5.41	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209
Pot Cap-1 Maneuver	229	557	-	-	1049
Stage 1	598	-	-	-	-
Stage 2	551	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	217	554	-	-	1043
Mov Cap-2 Maneuver	353	-	-	-	-
Stage 1	594	-	-	-	-
Stage 2	526	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 353 554	1043	-
HCM Lane V/C Ratio	-	- 0.014 0.027	0.023	-
HCM Control Delay (s)	-	- 15.3 11.7	8.5	-
HCM Lane LOS	-	- C B	A	-
HCM 95th %tile Q(veh)	-	- 0 0.1	0.1	-

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Existing plus Project PM Peak

11/09/2020

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	7	3	5	1	0	15	2	551	2	14	535	17
Future Vol, veh/h	7	3	5	1	0	15	2	551	2	14	535	17
Conflicting Peds, #/hr	3	0	1	1	0	3	7	0	4	4	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	7	3	5	1	0	16	2	580	2	15	563	18




Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1205	1199	580	1196	1207	588	588	0	0	586	0	0
Stage 1	609	609	-	589	589	-	-	-	-	-	-	-
Stage 2	596	590	-	607	618	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	161	186	516	164	184	511	992	-	-	994	-	-
Stage 1	484	487	-	496	497	-	-	-	-	-	-	-
Stage 2	492	497	-	485	482	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	152	181	512	157	179	508	985	-	-	990	-	-
Mov Cap-2 Maneuver	152	181	-	157	179	-	-	-	-	-	-	-
Stage 1	480	476	-	493	494	-	-	-	-	-	-	-
Stage 2	474	494	-	469	471	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.8	13.4	0	0.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	985	-	-	207	446	990	-
HCM Lane V/C Ratio	0.002	-	-	0.076	0.038	0.015	-
HCM Control Delay (s)	8.7	-	-	23.8	13.4	8.7	-
HCM Lane LOS	A	-	-	C	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-

Intersection

Int Delay, s/veh 6.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	34	79	63	123	198	57
Future Vol, veh/h	34	79	63	123	198	57
Conflicting Peds, #/hr	3	0	0	3	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	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	38	88	70	137	220	63

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	210	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.13	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.227	-	-
Pot Cap-1 Maneuver	1355	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1351	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	13.6
HCM LOS			B

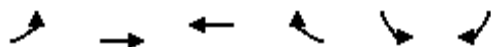
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1351	-	-	-	701
HCM Lane V/C Ratio	0.028	-	-	-	0.404
HCM Control Delay (s)	7.7	0	-	-	13.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	2

HCM Unsignalized Intersection Capacity Analysis

4: Geer Avenue & Project Driveway 2

Existing plus Project PM Peak

11/09/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰			
Traffic Volume (veh/h)	8	270	185	88	0	0
Future Volume (Veh/h)	8	270	185	88	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	300	206	98	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	304				573	255
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	304				573	255
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	100
cM capacity (veh/h)	1251				476	781
Direction, Lane #	EB 1	WB 1				
Volume Total	309	304				
Volume Left	9	0				
Volume Right	0	98				
cSH	1251	1700				
Volume to Capacity	0.01	0.18				
Queue Length 95th (ft)	1	0				
Control Delay (s)	0.3	0.0				
Lane LOS	A					
Approach Delay (s)	0.3	0.0				
Approach LOS						
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		24.0%		ICU Level of Service		A
Analysis Period (min)		15				

Intersection												
Int Delay, s/veh	58.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	180	33	61	11	12	7	71	363	23	18	368	164
Future Vol, veh/h	180	33	61	11	12	7	71	363	23	18	368	164
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3	3	7	3	3	7	3
Mvmt Flow	194	35	66	12	13	8	76	390	25	19	396	176

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1089	1092	484	1131	1168	408	572	0	0	418	0	0
Stage 1	522	522	-	558	558	-	-	-	-	-	-	-
Stage 2	567	570	-	573	610	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	~ 192	214	581	180	193	641	996	-	-	1136	-	-
Stage 1	536	529	-	512	510	-	-	-	-	-	-	-
Stage 2	507	504	-	503	483	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 166	194	581	127	175	638	996	-	-	1133	-	-
Mov Cap-2 Maneuver	~ 166	194	-	127	175	-	-	-	-	-	-	-
Stage 1	495	520	-	472	470	-	-	-	-	-	-	-
Stage 2	449	464	-	409	475	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	275.5		29.2		1.4		0.3	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	996	-	-	202	181	1133	-
HCM Lane V/C Ratio	0.077	-	-	1.459	0.178	0.017	-
HCM Control Delay (s)	8.9	-	-	275.5	29.2	8.2	-
HCM Lane LOS	A	-	-	F	D	A	-
HCM 95th %tile Q(veh)	0.2	-	-	17.8	0.6	0.1	-

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

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Existing plus Project AM Peak

11/10/2020

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗	↗	↗		↗	↗	
Traffic Vol, veh/h	0	0	9	0	0	23	16	643	1	11	632	18
Future Vol, veh/h	0	0	9	0	0	23	16	643	1	11	632	18
Conflicting Peds, #/hr	6	0	0	0	0	6	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	0	0	10	0	0	25	18	707	1	12	695	20
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	731	-	-	714	741	0	0	708	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.21	-	-	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.309	-	-	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	0	0	423	0	0	433	870	-	-	895	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	413	-	-	431	848	-	-	895	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	13.9		13.9		0.2		0.2					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	848	-	-	413	431	895	-	-				
HCM Lane V/C Ratio	0.021	-	-	0.024	0.059	0.014	-	-				
HCM Control Delay (s)	9.3	-	-	13.9	13.9	9.1	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-				

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Existing plus Project AM Peak

11/10/2020




















Intersection						
Int Delay, s/veh	10.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Vol, veh/h	54	189	115	227	309	109
Future Vol, veh/h	54	189	115	227	309	109
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	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	86	86	86	86	86	86
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	63	220	134	264	359	127
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	403	0	-	0	485	139
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	346	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1150	-	-	-	539	907
Stage 1	-	-	-	-	885	-
Stage 2	-	-	-	-	714	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1145	-	-	-	500	903
Mov Cap-2 Maneuver	-	-	-	-	500	-
Stage 1	-	-	-	-	825	-
Stage 2	-	-	-	-	710	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.9	0		23.6		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1145	-	-	-	500	903
HCM Lane V/C Ratio	0.055	-	-	-	0.719	0.14
HCM Control Delay (s)	8.3	0	-	-	28.5	9.6
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	0.2	-	-	-	5.8	0.5

HCM 6th Signalized Intersection Summary

5: Lander Avenue & Geer Avenue

Existing plus Project AM Peak

11/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	269	28	141	16	39	34	115	357	16	17	217	408
Future Volume (veh/h)	269	28	141	16	39	34	115	357	16	17	217	408
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	1796	1796	1856	1796	1796
Adj Flow Rate, veh/h	299	31	157	18	43	38	128	397	18	19	241	453
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	7	7	3	7	7
Cap, veh/h	331	34	324	23	56	49	156	891	40	36	250	469
Arrive On Green	0.21	0.21	0.21	0.07	0.07	0.07	0.09	0.52	0.52	0.02	0.45	0.45
Sat Flow, veh/h	1608	167	1572	313	748	661	1767	1705	77	1767	557	1048
Grp Volume(v), veh/h	330	0	157	99	0	0	128	0	415	19	0	694
Grp Sat Flow(s),veh/h/ln	1775	0	1572	1721	0	0	1767	0	1782	1767	0	1605
Q Serve(g_s), s	18.8	0.0	9.1	5.8	0.0	0.0	7.4	0.0	15.0	1.1	0.0	43.6
Cycle Q Clear(g_c), s	18.8	0.0	9.1	5.8	0.0	0.0	7.4	0.0	15.0	1.1	0.0	43.6
Prop In Lane	0.91		1.00	0.18		0.38	1.00		0.04	1.00		0.65
Lane Grp Cap(c), veh/h	365	0	324	128	0	0	156	0	931	36	0	719
V/C Ratio(X)	0.90	0.00	0.49	0.77	0.00	0.00	0.82	0.00	0.45	0.53	0.00	0.97
Avail Cap(c_a), veh/h	391	0	346	366	0	0	164	0	931	96	0	733
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.1	0.0	36.3	47.1	0.0	0.0	46.4	0.0	15.4	50.2	0.0	27.8
Incr Delay (d2), s/veh	22.8	0.0	1.1	9.4	0.0	0.0	26.2	0.0	0.3	11.5	0.0	24.7
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	10.3	0.0	3.5	2.8	0.0	0.0	4.3	0.0	5.7	0.6	0.0	20.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.9	0.0	37.4	56.4	0.0	0.0	72.6	0.0	15.7	61.8	0.0	52.6
LnGrp LOS	E	A	D	E	A	A	E	A	B	E	A	D
Approach Vol, veh/h	487				99				543			
Approach Delay, s/veh	54.7				56.4				29.1			
Approach LOS	D				E				C			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	59.0		25.9	14.0	51.3		12.3				
Change Period (Y+Rc), s	* 4.2	4.9		4.6	4.9	* 4.9		4.6				
Max Green Setting (Gmax), s	* 5.6	51.3		22.8	9.6	* 47		22.0				
Max Q Clear Time (g_c+I1), s	3.1	17.0		20.8	9.4	45.6		7.8				
Green Ext Time (p_c), s	0.0	2.6		0.5	0.0	0.8		0.3				

Intersection Summary

HCM 6th Ctrl Delay	46.5
HCM 6th LOS	D

Notes

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

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Existing plus Project PM Peak

11/10/2020

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↰			↰	↰	↰		↰	↰	
Traffic Vol, veh/h	0	0	5	0	0	15	2	558	2	14	535	17
Future Vol, veh/h	0	0	5	0	0	15	2	558	2	14	535	17
Conflicting Peds, #/hr	3	0	1	1	0	3	7	0	4	4	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	0	0	5	0	0	16	2	587	2	15	563	18

Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	580	-	-	595	588	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.21	-	-	6.21	4.11	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.309	-	-	3.309	2.209	-
Pot Cap-1 Maneuver	0	0	516	0	0	506	992	-
Stage 1	0	0	-	0	0	-	-	-
Stage 2	0	0	-	0	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	512	-	-	503	985	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-






Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	12.4	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	985	-	-	512	503	984	-
HCM Lane V/C Ratio	0.002	-	-	0.01	0.031	0.015	-
HCM Control Delay (s)	8.7	-	-	12.1	12.4	8.7	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Existing plus Project PM Peak

11/10/2020




















Intersection						
Int Delay, s/veh	5.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	34	79	63	123	198	57
Future Vol, veh/h	34	79	63	123	198	57
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	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	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	38	88	70	137	220	63
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	210	0	-	0	237	73
Stage 1	-	-	-	-	73	-
Stage 2	-	-	-	-	164	-
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	1355	-	-	-	749	986
Stage 1	-	-	-	-	947	-
Stage 2	-	-	-	-	863	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1351	-	-	-	722	983
Mov Cap-2 Maneuver	-	-	-	-	722	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	860	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.3	0		11.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1351	-	-	-	722	983
HCM Lane V/C Ratio	0.028	-	-	-	0.305	0.064
HCM Control Delay (s)	7.7	0	-	-	12.2	8.9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3	0.2

HCM 6th Signalized Intersection Summary

5: Lander Avenue & Geer Avenue

Existing plus Project PM Peak

11/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	187	36	61	12	12	7	71	363	23	18	367	164
Future Volume (veh/h)	187	36	61	12	12	7	71	363	23	18	367	164
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1796	1796	1856	1796	1796
Adj Flow Rate, veh/h	201	39	66	13	13	8	76	390	25	19	395	176
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	7	7	3	7	7
Cap, veh/h	270	52	285	28	28	17	107	737	47	40	461	205
Arrive On Green	0.18	0.18	0.18	0.04	0.04	0.04	0.06	0.44	0.44	0.02	0.39	0.39
Sat Flow, veh/h	1492	289	1572	666	666	410	1767	1670	107	1767	1177	525
Grp Volume(v), veh/h	240	0	66	34	0	0	76	0	415	19	0	571
Grp Sat Flow(s),veh/h/ln	1781	0	1572	1743	0	0	1767	0	1777	1767	0	1702
Q Serve(g_s), s	7.5	0.0	2.1	1.1	0.0	0.0	2.5	0.0	10.0	0.6	0.0	18.0
Cycle Q Clear(g_c), s	7.5	0.0	2.1	1.1	0.0	0.0	2.5	0.0	10.0	0.6	0.0	18.0
Prop In Lane	0.84		1.00	0.38		0.24	1.00		0.06	1.00		0.31
Lane Grp Cap(c), veh/h	323	0	285	73	0	0	107	0	784	40	0	666
V/C Ratio(X)	0.74	0.00	0.23	0.47	0.00	0.00	0.71	0.00	0.53	0.47	0.00	0.86
Avail Cap(c_a), veh/h	670	0	591	656	0	0	163	0	993	151	0	940
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	20.5	27.4	0.0	0.0	27.0	0.0	11.9	28.2	0.0	16.3
Incr Delay (d2), s/veh	3.4	0.0	0.4	4.6	0.0	0.0	8.3	0.0	0.6	8.4	0.0	5.7
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	3.1	0.0	0.7	0.5	0.0	0.0	1.2	0.0	3.2	0.3	0.0	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.0	0.0	20.9	31.9	0.0	0.0	35.3	0.0	12.5	36.7	0.0	22.0
LnGrp LOS	C	A	C	C	A	A	D	A	B	D	A	C
Approach Vol, veh/h		306			34			491			590	
Approach Delay, s/veh		24.9			31.9			16.0			22.5	
Approach LOS		C			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	30.7		15.2	8.4	27.8		7.0				
Change Period (Y+Rc), s	* 4.2	4.9		4.6	4.9	* 4.9		4.6				
Max Green Setting (Gmax), s	* 5	32.7		22.0	5.4	* 32		22.0				
Max Q Clear Time (g_c+I1), s	2.6	12.0		9.5	4.5	20.0		3.1				
Green Ext Time (p_c), s	0.0	2.3		1.2	0.0	2.9		0.1				

Intersection Summary

HCM 6th Ctrl Delay	21.0
HCM 6th LOS	C

Notes

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

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	52	78	171	74	101
Average Queue (ft)	15	27	40	31	29
95th Queue (ft)	44	55	122	60	86
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	L	TR	L	TR
Maximum Queue (ft)	31	52	31	97	49	157
Average Queue (ft)	7	16	5	5	8	31
95th Queue (ft)	29	42	24	36	32	106
Link Distance (ft)	633	1229		343		706
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50		55	
Storage Blk Time (%)			0	0	0	4
Queuing Penalty (veh)			0	0	2	0

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	WB	SB	SB
Directions Served	LT	R	L	R
Maximum Queue (ft)	119	24	147	64
Average Queue (ft)	23	2	64	28
95th Queue (ft)	69	11	110	47
Link Distance (ft)	1284			1232
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250	250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Geer Avenue & Project Driveway 2

Movement	EB
Directions Served	LT
Maximum Queue (ft)	116
Average Queue (ft)	7
95th Queue (ft)	44
Link Distance (ft)	422
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	EB	WB	NB	NB	B8	SB	SB
Directions Served	LT	R	LTR	L	TR	T	L	TR
Maximum Queue (ft)	349	76	159	124	366	327	89	397
Average Queue (ft)	185	39	61	92	184	27	28	292
95th Queue (ft)	296	61	120	137	339	153	77	453
Link Distance (ft)	772		2629		276	2278		343
Upstream Blk Time (%)					8			9
Queuing Penalty (veh)					0			55
Storage Bay Dist (ft)		250		50			50	
Storage Blk Time (%)	4			53	27		6	51
Queuing Penalty (veh)	6			197	31		35	9

Network Summary

Network wide Queuing Penalty: 336

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	31	31	124	31	139
Average Queue (ft)	2	17	12	7	17
95th Queue (ft)	15	42	59	28	75
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	SB	SB
Directions Served	R	R	L	TR
Maximum Queue (ft)	31	31	53	180
Average Queue (ft)	4	12	10	7
95th Queue (ft)	21	37	36	61
Link Distance (ft)	633	1229		706
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			55	
Storage Blk Time (%)			0	1
Queuing Penalty (veh)			1	0

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	WB	SB	SB
Directions Served	LT	R	L	R
Maximum Queue (ft)	31	50	91	44
Average Queue (ft)	7	2	48	21
95th Queue (ft)	28	19	76	39
Link Distance (ft)	1284			1232
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250	250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Geer Avenue & Project Driveway 2

Movement	EB
Directions Served	LT
Maximum Queue (ft)	31
Average Queue (ft)	2
95th Queue (ft)	15
Link Distance (ft)	422
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	161	76	96	124	285	89	402
Average Queue (ft)	91	32	22	52	126	18	196
95th Queue (ft)	154	65	58	117	230	57	330
Link Distance (ft)	772		2629		282		349
Upstream Blk Time (%)					0		3
Queuing Penalty (veh)					0		15
Storage Bay Dist (ft)		250		50		50	
Storage Blk Time (%)				20	23	1	39
Queuing Penalty (veh)				76	16	7	7

Network Summary

Network wide Queuing Penalty: 123






Appendix F: Near Term plus Project Traffic Conditions



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

A p p | F

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	52	588	6	86	539
Future Vol, veh/h	12	52	588	6	86	539
Conflicting Peds, #/hr	102	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	13	58	661	7	97	606
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1579	677	0	0	680	0
Stage 1	677	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	121	455	-	-	917	-
Stage 1	507	-	-	-	-	-
Stage 2	398	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	97	450	-	-	907	-
Mov Cap-2 Maneuver	220	-	-	-	-	-
Stage 1	501	-	-	-	-	-
Stage 2	321	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	15.7	0	1.3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 220	450	907	-	
HCM Lane V/C Ratio	-	- 0.061	0.13	0.107	-	
HCM Control Delay (s)	-	- 22.4	14.2	9.4	-	
HCM Lane LOS	-	- C	B	A	-	
HCM 95th %tile Q(veh)	-	- 0.2	0.4	0.4	-	

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Near Term plus Project AM Peak




11/09/2020

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	19	0	9	1	5	23	16	634	1	11	641	18
Future Vol, veh/h	19	0	9	1	5	23	16	634	1	11	641	18
Conflicting Peds, #/hr	6	0	0	0	0	6	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	21	0	10	1	5	25	18	697	1	12	704	20

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1519	1498	740	1477	1508	704	750	0	0	698	0	0
Stage 1	764	764	-	734	734	-	-	-	-	-	-	-
Stage 2	755	734	-	743	774	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	98	123	418	105	121	439	864	-	-	903	-	-
Stage 1	398	414	-	413	427	-	-	-	-	-	-	-
Stage 2	402	427	-	409	410	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	84	116	408	100	114	436	843	-	-	903	-	-
Mov Cap-2 Maneuver	84	116	-	100	114	-	-	-	-	-	-	-
Stage 1	380	398	-	404	418	-	-	-	-	-	-	-
Stage 2	364	418	-	394	394	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	48.4		20		0.2		0.1	
HCM LOS	E		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	843	-	-	113	272	903	-
HCM Lane V/C Ratio	0.021	-	-	0.272	0.117	0.013	-
HCM Control Delay (s)	9.4	-	-	48.4	20	9	-
HCM Lane LOS	A	-	-	E	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0.4	0	-

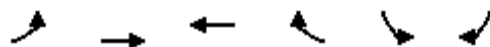
Intersection						
Int Delay, s/veh	34.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	55	192	118	228	310	110
Future Vol, veh/h	55	192	118	228	310	110
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	64	223	137	265	360	128
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	407	0	-	0	626	275
Stage 1	-	-	-	-	275	-
Stage 2	-	-	-	-	351	-
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	1146	-	-	-	446	761
Stage 1	-	-	-	-	769	-
Stage 2	-	-	-	-	710	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1141	-	-	-	413	757
Mov Cap-2 Maneuver	-	-	-	-	413	-
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	706	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.9	0		82.7		
HCM LOS	F					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1141	-	-	-	-	469
HCM Lane V/C Ratio	0.056	-	-	-	-	1.041
HCM Control Delay (s)	8.3	0	-	-	-	82.7
HCM Lane LOS	A	A	-	-	-	F
HCM 95th %tile Q(veh)	0.2	-	-	-	-	14.8

HCM Unsignalized Intersection Capacity Analysis

4: Geer Avenue & Project Driveway 2

Near Term plus Project AM Peak

11/09/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰			
Traffic Volume (veh/h)	6	495	345	220	0	0
Future Volume (Veh/h)	6	495	345	220	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	7	576	401	256	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	657				1119	529
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	657				1119	529
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	100
cM capacity (veh/h)	926				226	548
Direction, Lane #	EB 1	WB 1				
Volume Total	583	657				
Volume Left	7	0				
Volume Right	0	256				
cSH	926	1700				
Volume to Capacity	0.01	0.39				
Queue Length 95th (ft)	1	0				
Control Delay (s)	0.2	0.0				
Lane LOS	A					
Approach Delay (s)	0.2	0.0				
Approach LOS						
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		34.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM 6th TWSC
5: Lander Avenue & Geer Avenue

Near Term plus Project AM Peak

11/09/2020






Intersection												
Int Delay, s/veh	300.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	251	28	142	15	34	35	116	366	16	18	224	410
Future Vol, veh/h	251	28	142	15	34	35	116	366	16	18	224	410
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3	3	7	3	3	7	3
Mvmt Flow	279	31	158	17	38	39	129	407	18	20	249	456

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1232	1202	479	1286	1421	416	707	0	0	425	0	0
Stage 1	519	519	-	674	674	-	-	-	-	-	-	-
Stage 2	713	683	-	612	747	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	~ 153	184	585	141	136	634	887	-	-	1129	-	-
Stage 1	538	531	-	443	452	-	-	-	-	-	-	-
Stage 2	421	448	-	479	419	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 94	154	584	77	114	634	885	-	-	1129	-	-
Mov Cap-2 Maneuver	~ 94	154	-	77	114	-	-	-	-	-	-	-
Stage 1	459	520	-	378	386	-	-	-	-	-	-	-
Stage 2	305	383	-	323	411	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, \$ 1165.4		59.8	2.3	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	885	-	-	136	153	1129	-
HCM Lane V/C Ratio	0.146	-	-	3.44	0.61	0.018	-
HCM Control Delay (s)	9.8	-	-	\$ 1165.4	59.8	8.2	-
HCM Lane LOS	A	-	-	F	F	A	-
HCM 95th %tile Q(veh)	0.5	-	-	45.3	3.3	0.1	-

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

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	15	518	4	24	531
Future Vol, veh/h	5	15	518	4	24	531
Conflicting Peds, #/hr	25	0	0	6	6	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	5	15	523	4	24	536
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1140	531	0	0	533	0
Stage 1	531	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	223	550	-	-	1040	-
Stage 1	592	-	-	-	-	-
Stage 2	545	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	211	547	-	-	1034	-
Mov Cap-2 Maneuver	348	-	-	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	520	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.7	0	0.4			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 348 547 1034	-	-		
HCM Lane V/C Ratio	-	- 0.015 0.028 0.023	-	-		
HCM Control Delay (s)	-	- 15.5 11.8 8.6	-	-		
HCM Lane LOS	-	- C B A	-	-		
HCM 95th %tile Q(veh)	-	- 0 0.1 0.1	-	-		

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Near Term plus Project PM Peak




11/09/2020

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	7	3	5	1	0	15	2	560	2	14	545	17
Future Vol, veh/h	7	3	5	1	0	15	2	560	2	14	545	17
Conflicting Peds, #/hr	3	0	1	1	0	3	7	0	4	4	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	7	3	5	1	0	16	2	589	2	15	574	18

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1225	1219	591	1216	1227	597	599	0	0	595	0	0
Stage 1	620	620	-	598	598	-	-	-	-	-	-	-
Stage 2	605	599	-	618	629	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	156	181	509	159	179	505	983	-	-	986	-	-
Stage 1	477	481	-	491	492	-	-	-	-	-	-	-
Stage 2	486	492	-	478	477	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	148	176	505	152	174	502	976	-	-	982	-	-
Mov Cap-2 Maneuver	148	176	-	152	174	-	-	-	-	-	-	-
Stage 1	473	470	-	488	489	-	-	-	-	-	-	-
Stage 2	468	489	-	462	467	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	24.3		13.5		0		0.2	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	976	-	-	202	439	982	-
HCM Lane V/C Ratio	0.002	-	-	0.078	0.038	0.015	-
HCM Control Delay (s)	8.7	-	-	24.3	13.5	8.7	-
HCM Lane LOS	A	-	-	C	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0	-

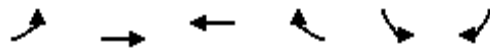
Intersection						
Int Delay, s/veh	6.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	34	80	64	124	199	58
Future Vol, veh/h	34	80	64	124	199	58
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	38	89	71	138	221	64
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	212	0	-	0	308	143
Stage 1	-	-	-	-	143	-
Stage 2	-	-	-	-	165	-
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	1352	-	-	-	682	902
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	862	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1348	-	-	-	657	899
Mov Cap-2 Maneuver	-	-	-	-	657	-
Stage 1	-	-	-	-	853	-
Stage 2	-	-	-	-	859	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.3	0		13.7		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1348	-	-	-	699	
HCM Lane V/C Ratio	0.028	-	-	-	0.409	
HCM Control Delay (s)	7.7	0	-	-	13.7	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	2	

HCM Unsignalized Intersection Capacity Analysis

4: Geer Avenue & Project Driveway 2

Near Term plus Project PM Peak

11/09/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩			
Traffic Volume (veh/h)	8	272	187	88	0	0
Future Volume (Veh/h)	8	272	187	88	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	302	208	98	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	306				577	257
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306				577	257
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	100
cM capacity (veh/h)	1249				473	779
Direction, Lane #	EB 1	WB 1				
Volume Total	311	306				
Volume Left	9	0				
Volume Right	0	98				
cSH	1249	1700				
Volume to Capacity	0.01	0.18				
Queue Length 95th (ft)	1	0				
Control Delay (s)	0.3	0.0				
Lane LOS	A					
Approach Delay (s)	0.3	0.0				
Approach LOS						
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		24.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM 6th TWSC
5: Lander Avenue & Geer Avenue

Near Term plus Project PM Peak

11/09/2020

Intersection												
Int Delay, s/veh	62.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	181	34	61	11	12	7	71	371	23	18	376	164
Future Vol, veh/h	181	34	61	11	12	7	71	371	23	18	376	164
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3	3	7	3	3	7	3
Mvmt Flow	195	37	66	12	13	8	76	399	25	19	404	176

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1106	1109	492	1149	1185	417	580	0	0	427	0	0
Stage 1	530	530	-	567	567	-	-	-	-	-	-	-
Stage 2	576	579	-	582	618	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	~ 187	209	575	175	188	634	989	-	-	1127	-	-
Stage 1	531	525	-	507	505	-	-	-	-	-	-	-
Stage 2	501	499	-	497	479	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 162	189	575	123	170	631	989	-	-	1124	-	-
Mov Cap-2 Maneuver	~ 162	189	-	123	170	-	-	-	-	-	-	-
Stage 1	490	516	-	467	465	-	-	-	-	-	-	-
Stage 2	443	459	-	402	471	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	296.5		30.2		1.4		0.3	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	989	-	-	197	175	1124	-
HCM Lane V/C Ratio	0.077	-	-	1.506	0.184	0.017	-
HCM Control Delay (s)	8.9	-	-	296.5	30.2	8.3	-
HCM Lane LOS	A	-	-	F	D	A	-
HCM 95th %tile Q(veh)	0.2	-	-	18.5	0.7	0.1	-

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

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Near Term plus Project AM Peak






11/10/2020

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗	↗	↗		↗	↗	
Traffic Vol, veh/h	0	0	9	0	0	23	16	653	1	11	641	18
Future Vol, veh/h	0	0	9	0	0	23	16	653	1	11	641	18
Conflicting Peds, #/hr	6	0	0	0	0	6	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	0	0	10	0	0	25	18	718	1	12	704	20
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	740	-	-	725	750	0	0	719	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.21	-	-	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.309	-	-	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	0	0	418	0	0	427	864	-	-	887	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	408	-	-	425	843	-	-	887	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	14		14		0.2		0.1					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	843	-	-	408	425	887	-	-				
HCM Lane V/C Ratio	0.021	-	-	0.024	0.059	0.014	-	-				
HCM Control Delay (s)	9.4	-	-	14	14	9.1	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-				

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Near Term plus Project AM Peak

11/10/2020

Intersection						
Int Delay, s/veh	10.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	55	192	118	228	310	110
Future Vol, veh/h	55	192	118	228	310	110
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	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	86	86	86	86	86	86
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	64	223	137	265	360	128
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	407	0	-	0	493	142
Stage 1	-	-	-	-	142	-
Stage 2	-	-	-	-	351	-
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	1146	-	-	-	534	903
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	710	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1141	-	-	-	495	899
Mov Cap-2 Maneuver	-	-	-	-	495	-
Stage 1	-	-	-	-	822	-
Stage 2	-	-	-	-	706	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.9	0		24.2		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1141	-	-	-	495	899
HCM Lane V/C Ratio	0.056	-	-	-	0.728	0.142
HCM Control Delay (s)	8.3	0	-	-	29.4	9.7
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	0.2	-	-	-	5.9	0.5

HCM 6th Signalized Intersection Summary

5: Lander Avenue & Geer Avenue

Near Term plus Project AM Peak

11/10/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱		↰	↱	
Traffic Volume (veh/h)	270	28	142	16	39	35	116	366	16	18	223	410
Future Volume (veh/h)	270	28	142	16	39	35	116	366	16	18	223	410
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	1796	1796	1856	1796	1796
Adj Flow Rate, veh/h	300	31	158	18	43	39	129	407	18	20	248	456
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	7	7	3	7	7
Cap, veh/h	331	34	324	23	56	50	157	894	40	37	254	467
Arrive On Green	0.21	0.21	0.21	0.08	0.08	0.08	0.09	0.52	0.52	0.02	0.45	0.45
Sat Flow, veh/h	1609	166	1572	309	739	671	1767	1707	76	1767	566	1040
Grp Volume(v), veh/h	331	0	158	100	0	0	129	0	425	20	0	704
Grp Sat Flow(s),veh/h/ln	1775	0	1572	1719	0	0	1767	0	1783	1767	0	1606
Q Serve(g_s), s	19.1	0.0	9.3	6.0	0.0	0.0	7.5	0.0	15.6	1.2	0.0	45.1
Cycle Q Clear(g_c), s	19.1	0.0	9.3	6.0	0.0	0.0	7.5	0.0	15.6	1.2	0.0	45.1
Prop In Lane	0.91		1.00	0.18		0.39	1.00		0.04	1.00		0.65
Lane Grp Cap(c), veh/h	365	0	324	129	0	0	157	0	933	37	0	721
V/C Ratio(X)	0.91	0.00	0.49	0.77	0.00	0.00	0.82	0.00	0.46	0.54	0.00	0.98
Avail Cap(c_a), veh/h	388	0	343	361	0	0	163	0	933	96	0	722
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.6	0.0	36.8	47.6	0.0	0.0	47.0	0.0	15.6	50.8	0.0	28.3
Incr Delay (d2), s/veh	23.6	0.0	1.1	9.4	0.0	0.0	26.7	0.0	0.3	11.5	0.0	27.5
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	10.5	0.0	3.6	2.9	0.0	0.0	4.4	0.0	6.0	0.6	0.0	21.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.2	0.0	37.9	57.0	0.0	0.0	73.6	0.0	16.0	62.3	0.0	55.8
LnGrp LOS	E	A	D	E	A	A	E	A	B	E	A	E
Approach Vol, veh/h		489			100			554			724	
Approach Delay, s/veh		55.7			57.0			29.4			56.0	
Approach LOS		E			E			C			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	59.8		26.2	14.2	52.0		12.5				
Change Period (Y+Rc), s	* 4.2	4.9		4.6	4.9	* 4.9		4.6				
Max Green Setting (Gmax), s	* 5.7	51.1		22.9	9.7	* 47		22.0				
Max Q Clear Time (g_c+I1), s	3.2	17.6		21.1	9.5	47.1		8.0				
Green Ext Time (p_c), s	0.0	2.7		0.5	0.0	0.0		0.3				

Intersection Summary

HCM 6th Ctrl Delay	48.1
HCM 6th LOS	D

Notes

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

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Near Term plus Project PM Peak

11/10/2020

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↰			↰	↰	↰		↰	↰	
Traffic Vol, veh/h	0	0	5	0	0	15	2	567	2	14	545	17
Future Vol, veh/h	0	0	5	0	0	15	2	567	2	14	545	17
Conflicting Peds, #/hr	3	0	1	1	0	3	7	0	4	4	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	0	0	5	0	0	16	2	597	2	15	574	18

Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	591	-	-	605	599	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.21	-	-	6.21	4.11	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.309	-	-	3.309	2.209	-
Pot Cap-1 Maneuver	0	0	509	0	0	500	983	-
Stage 1	0	0	-	0	0	-	-	-
Stage 2	0	0	-	0	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	505	-	-	497	976	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	12.5	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	976	-	-	505	497	975	-
HCM Lane V/C Ratio	0.002	-	-	0.01	0.032	0.015	-
HCM Control Delay (s)	8.7	-	-	12.2	12.5	8.7	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-




















Intersection						
Int Delay, s/veh	5.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↕	↕	↕
Traffic Vol, veh/h	34	80	64	124	199	58
Future Vol, veh/h	34	80	64	124	199	58
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	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	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	38	89	71	138	221	64
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	212	0	-	0	239	74
Stage 1	-	-	-	-	74	-
Stage 2	-	-	-	-	165	-
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	1352	-	-	-	747	985
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	862	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1348	-	-	-	720	982
Mov Cap-2 Maneuver	-	-	-	-	720	-
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	859	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.3	0		11.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1348	-	-	-	720	982
HCM Lane V/C Ratio	0.028	-	-	-	0.307	0.066
HCM Control Delay (s)	7.7	0	-	-	12.2	8.9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3	0.2

HCM 6th Signalized Intersection Summary

5: Lander Avenue & Geer Avenue

Near Term plus Project PM Peak

11/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	188	37	61	12	12	7	71	371	23	18	375	165
Future Volume (veh/h)	188	37	61	12	12	7	71	371	23	18	375	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1796	1796	1856	1796	1796
Adj Flow Rate, veh/h	202	40	66	13	13	8	76	399	25	19	403	177
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	7	7	3	7	7
Cap, veh/h	270	54	286	28	28	17	106	743	47	40	468	205
Arrive On Green	0.18	0.18	0.18	0.04	0.04	0.04	0.06	0.44	0.44	0.02	0.40	0.40
Sat Flow, veh/h	1487	294	1572	666	666	410	1767	1672	105	1767	1183	520
Grp Volume(v), veh/h	242	0	66	34	0	0	76	0	424	19	0	580
Grp Sat Flow(s),veh/h/ln	1781	0	1572	1743	0	0	1767	0	1777	1767	0	1703
Q Serve(g_s), s	7.6	0.0	2.1	1.1	0.0	0.0	2.5	0.0	10.3	0.6	0.0	18.5
Cycle Q Clear(g_c), s	7.6	0.0	2.1	1.1	0.0	0.0	2.5	0.0	10.3	0.6	0.0	18.5
Prop In Lane	0.83		1.00	0.38		0.24	1.00		0.06	1.00		0.31
Lane Grp Cap(c), veh/h	324	0	286	73	0	0	106	0	790	40	0	673
V/C Ratio(X)	0.75	0.00	0.23	0.47	0.00	0.00	0.71	0.00	0.54	0.47	0.00	0.86
Avail Cap(c_a), veh/h	662	0	584	647	0	0	161	0	981	149	0	929
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.9	0.0	20.7	27.7	0.0	0.0	27.3	0.0	12.0	28.6	0.0	16.4
Incr Delay (d2), s/veh	3.4	0.0	0.4	4.6	0.0	0.0	8.5	0.0	0.6	8.5	0.0	6.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.7	0.5	0.0	0.0	1.2	0.0	3.3	0.3	0.0	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.4	0.0	21.1	32.3	0.0	0.0	35.9	0.0	12.6	37.0	0.0	22.7
LnGrp LOS	C	A	C	C	A	A	D	A	B	D	A	C
Approach Vol, veh/h		308			34			500			599	
Approach Delay, s/veh		25.2			32.3			16.1			23.1	
Approach LOS		C			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	31.2		15.4	8.5	28.3		7.1				
Change Period (Y+Rc), s	* 4.2	4.9		4.6	4.9	* 4.9		4.6				
Max Green Setting (Gmax), s	* 5	32.7		22.0	5.4	* 32		22.0				
Max Q Clear Time (g_c+I1), s	2.6	12.3		9.6	4.5	20.5		3.1				
Green Ext Time (p_c), s	0.0	2.4		1.2	0.0	2.9		0.1				

Intersection Summary

HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C

Notes

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

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	31	53	142	55	76
Average Queue (ft)	10	31	34	31	20
95th Queue (ft)	33	56	96	56	60
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	NB	SB	SB
Directions Served	R	R	L	L	TR
Maximum Queue (ft)	31	31	52	31	196
Average Queue (ft)	8	16	15	4	26
95th Queue (ft)	30	41	42	21	120
Link Distance (ft)	633	1229			706
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			50	55	
Storage Blk Time (%)			0		4
Queuing Penalty (veh)			1		0

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	WB	SB	SB
Directions Served	LT	R	L	R
Maximum Queue (ft)	90	53	154	93
Average Queue (ft)	19	4	79	38
95th Queue (ft)	59	27	123	68
Link Distance (ft)	1284			1232
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250	250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Geer Avenue & Project Driveway 2

Movement	EB
Directions Served	LT
Maximum Queue (ft)	97
Average Queue (ft)	10
95th Queue (ft)	47
Link Distance (ft)	422
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	EB	WB	NB	NB	B8	SB	SB
Directions Served	LT	R	LTR	L	TR	T	L	TR
Maximum Queue (ft)	328	90	119	124	348	63	89	415
Average Queue (ft)	167	42	69	76	167	3	27	272
95th Queue (ft)	277	70	119	137	303	24	72	441
Link Distance (ft)	772		2629		276	2278		343
Upstream Blk Time (%)					3			8
Queuing Penalty (veh)					0			54
Storage Bay Dist (ft)		250		50			50	
Storage Blk Time (%)	3			35	28		8	50
Queuing Penalty (veh)	4			132	33		48	9

Network Summary

Network wide Queuing Penalty: 281

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	31	52	74	31	52
Average Queue (ft)	2	17	7	6	6
95th Queue (ft)	12	44	34	26	28
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	L	TR	L	TR
Maximum Queue (ft)	31	31	30	55	31	30
Average Queue (ft)	5	15	1	2	8	1
95th Queue (ft)	23	40	10	18	30	10
Link Distance (ft)	633	1229		343		706
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50		55	
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	WB	SB	SB
Directions Served	LT	R	L	R
Maximum Queue (ft)	52	22	88	47
Average Queue (ft)	9	1	46	22
95th Queue (ft)	33	11	72	48
Link Distance (ft)	1284			1232
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250	250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Geer Avenue & Project Driveway 2

Movement	EB
Directions Served	LT
Maximum Queue (ft)	31
Average Queue (ft)	2
95th Queue (ft)	14
Link Distance (ft)	422
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	293	75	96	125	272	89	389
Average Queue (ft)	88	32	22	57	124	22	193
95th Queue (ft)	164	66	66	127	237	59	354
Link Distance (ft)	772		2629		276		343
Upstream Blk Time (%)					0		1
Queuing Penalty (veh)					0		6
Storage Bay Dist (ft)		250		50		50	
Storage Blk Time (%)	1			17	18	4	38
Queuing Penalty (veh)	0			67	13	19	7

Network Summary

Network wide Queuing Penalty: 112






Appendix G: Cumulative Year 2040 No Project Traffic Conditions



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

A p p | G

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	55	586	6	91	519
Future Vol, veh/h	9	55	586	6	91	519
Conflicting Peds, #/hr	102	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	10	60	637	7	99	564
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1517	653	0	0	656	0
Stage 1	653	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	132	469	-	-	936	-
Stage 1	520	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	105	464	-	-	925	-
Mov Cap-2 Maneuver	230	-	-	-	-	-
Stage 1	514	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.9	0	1.4			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 230 464	925	-		
HCM Lane V/C Ratio	-	- 0.043 0.129	0.107	-		
HCM Control Delay (s)	-	- 21.3 13.9	9.4	-		
HCM Lane LOS	-	- C B	A	-		
HCM 95th %tile Q(veh)	-	- 0.1 0.4	0.4	-		

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Cumulative Year 2040 No Project AM Peak

10/27/2020

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	21	0	10	1	5	25	17	548	1	12	479	19
Future Vol, veh/h	21	0	10	1	5	25	17	548	1	12	479	19
Conflicting Peds, #/hr	6	0	0	0	0	6	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
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, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	23	0	11	1	5	27	18	596	1	13	521	21

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1239	1217	558	1196	1227	603	568	0	0	597	0	0
Stage 1	584	584	-	633	633	-	-	-	-	-	-	-
Stage 2	655	633	-	563	594	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	153	182	531	164	179	501	1009	-	-	985	-	-
Stage 1	499	500	-	470	475	-	-	-	-	-	-	-
Stage 2	457	475	-	513	495	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	134	172	518	157	169	498	984	-	-	985	-	-
Mov Cap-2 Maneuver	134	172	-	157	169	-	-	-	-	-	-	-
Stage 1	478	481	-	462	466	-	-	-	-	-	-	-
Stage 2	417	466	-	496	476	-	-	-	-	-	-	-




Approach	EB	WB	NB	SB
HCM Control Delay, s	30.2	16	0.3	0.2
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	984	-	-	176	360	985	-
HCM Lane V/C Ratio	0.019	-	-	0.191	0.094	0.013	-
HCM Control Delay (s)	8.7	-	-	30.2	16	8.7	-
HCM Lane LOS	A	-	-	D	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.3	0	-

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Cumulative Year 2040 No Project AM Peak

10/27/2020

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	149	158	29	34	79
Future Vol, veh/h	50	149	158	29	34	79
Conflicting Peds, #/hr	5	0	0	5	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	54	162	172	32	37	86
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	209	0	-	0	463	193
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	270	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	1356	-	-	-	555	846
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1350	-	-	-	525	842
Mov Cap-2 Maneuver	-	-	-	-	525	-
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	769	-
Approach	EB	WB		SB		
HCM Control Delay, s	2	0		11.1		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1350	-	-	-	713	
HCM Lane V/C Ratio	0.04	-	-	-	0.172	
HCM Control Delay (s)	7.8	0	-	-	11.1	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	

HCM 6th TWSC
5: Lander Avenue & Geer Avenue

Cumulative Year 2040 No Project AM Peak






10/27/2020

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	53	17	34	16	24	49	31	465	17	28	336	127
Future Vol, veh/h	53	17	34	16	24	49	31	465	17	28	336	127
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
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	7	3	3	7	3
Mvmt Flow	58	18	37	17	26	53	34	505	18	30	365	138

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1118	1087	436	1104	1147	514	505	0	0	523	0	0
Stage 1	496	496	-	582	582	-	-	-	-	-	-	-
Stage 2	622	591	-	522	565	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	183	215	618	188	198	558	1055	-	-	1038	-	-
Stage 1	554	544	-	497	497	-	-	-	-	-	-	-
Stage 2	473	493	-	536	506	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	141	202	617	157	186	558	1053	-	-	1038	-	-
Mov Cap-2 Maneuver	141	202	-	157	186	-	-	-	-	-	-	-
Stage 1	535	527	-	481	481	-	-	-	-	-	-	-
Stage 2	392	477	-	472	490	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	43.3		24.6		0.5		0.5	
HCM LOS	E		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1053	-	-	202	279	1038	-
HCM Lane V/C Ratio	0.032	-	-	0.56	0.347	0.029	-
HCM Control Delay (s)	8.5	-	-	43.3	24.6	8.6	-
HCM Lane LOS	A	-	-	E	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	3	1.5	0.1	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	16	532	5	26	545
Future Vol, veh/h	4	16	532	5	26	545
Conflicting Peds, #/hr	25	0	0	6	6	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	4	16	537	5	26	551

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1174	546	0	0	548
Stage 1	546	-	-	-	-
Stage 2	628	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11
Critical Hdwy Stg 1	5.41	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209
Pot Cap-1 Maneuver	213	540	-	-	1027
Stage 1	582	-	-	-	-
Stage 2	534	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	201	537	-	-	1021
Mov Cap-2 Maneuver	338	-	-	-	-
Stage 1	579	-	-	-	-
Stage 2	508	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 338	537	1021
HCM Lane V/C Ratio	-	- 0.012	0.03	0.026
HCM Control Delay (s)	-	- 15.8	11.9	8.6
HCM Lane LOS	-	- C	B	A
HCM 95th %tile Q(veh)	-	- 0	0.1	0.1

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Cumulative Year 2040 No Project PM Peak

10/27/2020

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	8	3	5	1	0	16	2	501	2	15	518	18
Future Vol, veh/h	8	3	5	1	0	16	2	501	2	15	518	18
Conflicting Peds, #/hr	3	0	1	1	0	3	7	0	4	4	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	8	3	5	1	0	17	2	527	2	16	545	19

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1138	1131	563	1128	1139	535	571	0	0	533	0	0
Stage 1	594	594	-	536	536	-	-	-	-	-	-	-
Stage 2	544	537	-	592	603	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	179	204	528	182	202	547	1007	-	-	1040	-	-
Stage 1	493	495	-	530	525	-	-	-	-	-	-	-
Stage 2	525	524	-	494	490	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	198	524	175	196	543	1000	-	-	1036	-	-
Mov Cap-2 Maneuver	170	198	-	175	196	-	-	-	-	-	-	-
Stage 1	489	484	-	527	522	-	-	-	-	-	-	-
Stage 2	506	521	-	478	479	-	-	-	-	-	-	-




Approach	EB		WB		NB		SB	
HCM Control Delay, s	22.5		12.7		0		0.2	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1000	-	-	223	483	1036	-
HCM Lane V/C Ratio	0.002	-	-	0.076	0.037	0.015	-
HCM Control Delay (s)	8.6	-	-	22.5	12.7	8.5	-
HCM Lane LOS	A	-	-	C	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Cumulative Year 2040 No Project PM Peak

10/27/2020

Intersection						
Int Delay, s/veh	3.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	26	56	75	49	30	38
Future Vol, veh/h	26	56	75	49	30	38
Conflicting Peds, #/hr	3	0	0	3	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	28	61	82	53	33	41
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	138	0	-	0	229	112
Stage 1	-	-	-	-	112	-
Stage 2	-	-	-	-	117	-
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	1440	-	-	-	757	938
Stage 1	-	-	-	-	910	-
Stage 2	-	-	-	-	906	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1436	-	-	-	737	935
Mov Cap-2 Maneuver	-	-	-	-	737	-
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	903	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.4	0		9.7		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1436	-	-	-	836	
HCM Lane V/C Ratio	0.02	-	-	-	0.088	
HCM Control Delay (s)	7.6	0	-	-	9.7	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3	

HCM 6th TWSC
5: Lander Avenue & Geer Avenue

Cumulative Year 2040 No Project PM Peak

10/27/2020

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	44	27	21	12	6	13	18	443	25	26	439	69
Future Vol, veh/h	44	27	21	12	6	13	18	443	25	26	439	69
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3	3	7	3	3	7	3
Mvmt Flow	47	29	23	13	6	14	19	476	27	28	472	74

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1105	1109	509	1122	1133	495	546	0	0	506	0	0
Stage 1	565	565	-	531	531	-	-	-	-	-	-	-
Stage 2	540	544	-	591	602	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	187	209	562	182	202	573	1018	-	-	1054	-	-
Stage 1	508	506	-	530	524	-	-	-	-	-	-	-
Stage 2	524	517	-	492	487	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	171	199	562	150	192	570	1018	-	-	1051	-	-
Mov Cap-2 Maneuver	171	199	-	150	192	-	-	-	-	-	-	-
Stage 1	498	492	-	519	512	-	-	-	-	-	-	-
Stage 2	494	506	-	433	474	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	35.5		23.2		0.3		0.4	
HCM LOS	E		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1018	-	-	214	231	1051	-
HCM Lane V/C Ratio	0.019	-	-	0.462	0.144	0.027	-
HCM Control Delay (s)	8.6	-	-	35.5	23.2	8.5	-
HCM Lane LOS	A	-	-	E	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.2	0.5	0.1	-

HCM 6th Signalized Intersection Summary

5: Lander Avenue & Geer Avenue

Cumulative Year 2040 No Project AM Peak

11/06/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↖		↗	↖	
Traffic Volume (veh/h)	53	17	34	16	24	49	31	465	17	28	336	127
Future Volume (veh/h)	53	17	34	16	24	49	31	465	17	28	336	127
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	1796	1796	1856	1796	1796
Adj Flow Rate, veh/h	58	18	37	17	26	53	34	505	18	30	365	138
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	7	7	3	7	7
Cap, veh/h	79	25	50	23	35	72	68	675	24	61	462	175
Arrive On Green	0.09	0.09	0.09	0.08	0.08	0.08	0.04	0.39	0.39	0.03	0.37	0.37
Sat Flow, veh/h	878	273	560	296	453	924	1767	1724	61	1767	1241	469
Grp Volume(v), veh/h	113	0	0	96	0	0	34	0	523	30	0	503
Grp Sat Flow(s),veh/h/ln	1711	0	0	1674	0	0	1767	0	1785	1767	0	1710
Q Serve(g_s), s	2.9	0.0	0.0	2.5	0.0	0.0	0.9	0.0	11.4	0.8	0.0	11.8
Cycle Q Clear(g_c), s	2.9	0.0	0.0	2.5	0.0	0.0	0.9	0.0	11.4	0.8	0.0	11.8
Prop In Lane	0.51		0.33	0.18		0.55	1.00		0.03	1.00		0.27
Lane Grp Cap(c), veh/h	154	0	0	130	0	0	68	0	699	61	0	637
V/C Ratio(X)	0.73	0.00	0.00	0.74	0.00	0.00	0.50	0.00	0.75	0.49	0.00	0.79
Avail Cap(c_a), veh/h	835	0	0	817	0	0	200	0	1291	200	0	1237
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.0	0.0	0.0	20.3	0.0	0.0	21.2	0.0	11.8	21.4	0.0	12.6
Incr Delay (d2), s/veh	6.6	0.0	0.0	7.9	0.0	0.0	5.6	0.0	1.6	5.9	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	1.1	0.0	0.0	0.4	0.0	3.5	0.4	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.5	0.0	0.0	28.3	0.0	0.0	26.8	0.0	13.4	27.3	0.0	14.8
LnGrp LOS	C	A	A	C	A	A	C	A	B	C	A	B
Approach Vol, veh/h		113			96			557			533	
Approach Delay, s/veh		26.5			28.3			14.3			15.5	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	22.5		8.7	6.6	21.7		8.1				
Change Period (Y+Rc), s	* 4.2	4.9		4.6	4.9	* 4.9		4.6				
Max Green Setting (Gmax), s	* 5.1	32.6		22.0	5.1	* 33		22.0				
Max Q Clear Time (g_c+I1), s	2.8	13.4		4.9	2.9	13.8		4.5				
Green Ext Time (p_c), s	0.0	3.0		0.5	0.0	3.0		0.4				

Intersection Summary

HCM 6th Ctrl Delay	16.9
HCM 6th LOS	B

Notes

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

HCM 6th Signalized Intersection Summary

5: Lander Avenue & Geer Avenue

Cumulative Year 2040 No Project PM Peak

11/06/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	44	27	21	12	6	13	18	443	25	26	439	69
Future Volume (veh/h)	44	27	21	12	6	13	18	443	25	26	439	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1796	1796	1856	1796	1796
Adj Flow Rate, veh/h	47	29	23	13	6	14	19	476	27	28	472	74
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	7	7	3	7	7
Cap, veh/h	67	42	33	29	13	31	42	682	39	59	603	95
Arrive On Green	0.08	0.08	0.08	0.04	0.04	0.04	0.02	0.41	0.41	0.03	0.40	0.40
Sat Flow, veh/h	827	510	405	664	307	715	1767	1683	95	1767	1516	238
Grp Volume(v), veh/h	99	0	0	33	0	0	19	0	503	28	0	546
Grp Sat Flow(s),veh/h/ln	1741	0	0	1686	0	0	1767	0	1779	1767	0	1753
Q Serve(g_s), s	2.3	0.0	0.0	0.8	0.0	0.0	0.4	0.0	9.8	0.7	0.0	11.4
Cycle Q Clear(g_c), s	2.3	0.0	0.0	0.8	0.0	0.0	0.4	0.0	9.8	0.7	0.0	11.4
Prop In Lane	0.47		0.23	0.39		0.42	1.00		0.05	1.00		0.14
Lane Grp Cap(c), veh/h	142	0	0	74	0	0	42	0	720	59	0	698
V/C Ratio(X)	0.70	0.00	0.00	0.45	0.00	0.00	0.45	0.00	0.70	0.48	0.00	0.78
Avail Cap(c_a), veh/h	914	0	0	885	0	0	228	0	1370	228	0	1351
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	0.0	0.0	19.6	0.0	0.0	20.2	0.0	10.3	19.9	0.0	11.0
Incr Delay (d2), s/veh	6.0	0.0	0.0	4.2	0.0	0.0	7.5	0.0	1.2	5.9	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.4	0.0	0.0	0.2	0.0	2.8	0.3	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	0.0	0.0	23.7	0.0	0.0	27.7	0.0	11.6	25.8	0.0	13.0
LnGrp LOS	C	A	A	C	A	A	C	A	B	C	A	B
Approach Vol, veh/h		99			33			522			574	
Approach Delay, s/veh		24.8			23.7			12.2			13.6	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.6	21.9		8.0	5.9	21.6		6.4				
Change Period (Y+Rc), s	* 4.2	4.9		4.6	4.9	* 4.9		4.6				
Max Green Setting (Gmax), s	* 5.4	32.3		22.0	5.4	* 32		22.0				
Max Q Clear Time (g_c+I1), s	2.7	11.8		4.3	2.4	13.4		2.8				
Green Ext Time (p_c), s	0.0	3.0		0.4	0.0	3.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

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

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	72	56	211	97	119
Average Queue (ft)	11	34	47	38	26
95th Queue (ft)	43	59	136	77	79
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	32	52	31	95	31	77
Average Queue (ft)	24	24	5	3	4	4
95th Queue (ft)	45	53	24	31	22	28
Link Distance (ft)	633	1229		349		706
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50		55	
Storage Blk Time (%)			0	0		0
Queuing Penalty (veh)			0	0		0

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	31	76
Average Queue (ft)	3	40
95th Queue (ft)	18	62
Link Distance (ft)	1296	1245
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	WB	NB	NB	B8	SB	SB
Directions Served	LTR	LTR	L	TR	T	L	TR
Maximum Queue (ft)	138	118	124	385	110	89	402
Average Queue (ft)	58	47	33	138	4	23	134
95th Queue (ft)	100	80	86	262	36	65	260
Link Distance (ft)	784	2629		295	2278		349
Upstream Blk Time (%)				2			1
Queuing Penalty (veh)				0			4
Storage Bay Dist (ft)			50			50	
Storage Blk Time (%)			2	26		1	27
Queuing Penalty (veh)			10	8		5	7

Zone Summary

Zone wide Queuing Penalty: 35

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	NB
Directions Served	R	TR
Maximum Queue (ft)	31	31
Average Queue (ft)	12	6
95th Queue (ft)	37	27
Link Distance (ft)	1262	706
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	SB	SB
Directions Served	LTR	LTR	L	TR
Maximum Queue (ft)	31	29	31	47
Average Queue (ft)	24	6	12	9
95th Queue (ft)	44	25	37	40
Link Distance (ft)	633	1229		706
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			55	
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	SB
Directions Served	LR
Maximum Queue (ft)	55
Average Queue (ft)	44
95th Queue (ft)	60
Link Distance (ft)	1245
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	53	31	125	164	31	401
Average Queue (ft)	45	24	38	109	12	193
95th Queue (ft)	59	43	111	192	37	374
Link Distance (ft)	784	2629		295		349
Upstream Blk Time (%)						6
Queuing Penalty (veh)						33
Storage Bay Dist (ft)			50		50	
Storage Blk Time (%)			3	22	0	34
Queuing Penalty (veh)			13	4	0	9

Zone Summary

Zone wide Queuing Penalty: 59






Appendix H: Cumulative Year 2040 plus Project Traffic Conditions



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

A p p | H

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	55	622	6	91	569
Future Vol, veh/h	13	55	622	6	91	569
Conflicting Peds, #/hr	102	0	0	12	12	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	14	60	676	7	99	618

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1610	692	0	0	695	0
Stage 1	692	-	-	-	-	-
Stage 2	918	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	116	446	-	-	905	-
Stage 1	499	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	92	441	-	-	895	-
Mov Cap-2 Maneuver	215	-	-	-	-	-
Stage 1	494	-	-	-	-	-
Stage 2	314	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 215 441	895	-
HCM Lane V/C Ratio	-	- 0.066 0.136	0.111	-
HCM Control Delay (s)	-	- 22.9 14.4	9.5	-
HCM Lane LOS	-	- C B	A	-
HCM 95th %tile Q(veh)	-	- 0.2 0.5	0.4	-

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Cumulative Year 2040 plus Project AM Peak




11/10/2020

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	21	0	10	1	5	25	17	666	1	12	669	19
Future Vol, veh/h	21	0	10	1	5	25	17	666	1	12	669	19
Conflicting Peds, #/hr	6	0	0	0	0	6	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
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, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	23	0	11	1	5	27	18	724	1	13	727	21
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1573	1551	764	1530	1561	731	774	0	0	725	0	0
Stage 1	790	790	-	761	761	-	-	-	-	-	-	-
Stage 2	783	761	-	769	800	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	90	114	405	96	113	423	846	-	-	882	-	-
Stage 1	385	403	-	399	415	-	-	-	-	-	-	-
Stage 2	388	415	-	395	399	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	76	107	395	91	106	421	825	-	-	882	-	-
Mov Cap-2 Maneuver	76	107	-	91	106	-	-	-	-	-	-	-
Stage 1	367	387	-	390	406	-	-	-	-	-	-	-
Stage 2	348	406	-	378	383	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	56.1		20.6		0.2		0.2					
HCM LOS	F		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	825	-	-	103	264	882	-	-				
HCM Lane V/C Ratio	0.022	-	-	0.327	0.128	0.015	-	-				
HCM Control Delay (s)	9.5	-	-	56.1	20.6	9.1	-	-				
HCM Lane LOS	A	-	-	F	C	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	1.3	0.4	0	-	-				

HCM 6th TWSC
3: Geer Avenue & Project Driveway 1

Cumulative Year 2040 plus Project AM Peak

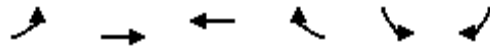
11/10/2020

Intersection						
Int Delay, s/veh	41.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	58	200	127	229	312	115
Future Vol, veh/h	58	200	127	229	312	115
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	67	233	148	266	363	134
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	419	0	-	0	653	286
Stage 1	-	-	-	-	286	-
Stage 2	-	-	-	-	367	-
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	1135	-	-	-	430	751
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1130	-	-	-	397	747
Mov Cap-2 Maneuver	-	-	-	-	397	-
Stage 1	-	-	-	-	705	-
Stage 2	-	-	-	-	696	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.9	0		99.9		
HCM LOS	F					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1130	-	-	-	454	
HCM Lane V/C Ratio	0.06	-	-	-	1.094	
HCM Control Delay (s)	8.4	0	-	-	99.9	
HCM Lane LOS	A	A	-	-	F	
HCM 95th %tile Q(veh)	0.2	-	-	-	16.6	

HCM Unsignalized Intersection Capacity Analysis Cumulative Year 2040 plus Project AM Peak

4: Geer Avenue & Project Driveway 2

11/10/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩			
Traffic Volume (veh/h)	6	506	356	220	0	0
Future Volume (Veh/h)	6	506	356	220	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	7	588	414	256	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	670				1144	542
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	670				1144	542
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	100
cM capacity (veh/h)	916				218	538
Direction, Lane #	EB 1	WB 1				
Volume Total	595	670				
Volume Left	7	0				
Volume Right	0	256				
cSH	916	1700				
Volume to Capacity	0.01	0.39				
Queue Length 95th (ft)	1	0				
Control Delay (s)	0.2	0.0				
Lane LOS	A					
Approach Delay (s)	0.2	0.0				
Approach LOS						
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		35.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM 6th TWSC
5: Lander Avenue & Geer Avenue

Cumulative Year 2040 plus Project AM Peak

11/10/2020






Intersection												
Int Delay, s/veh	324.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	254	29	144	16	36	38	117	393	17	19	244	418
Future Vol, veh/h	254	29	144	16	36	38	117	393	17	19	244	418
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
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	7	3	3	7	3
Mvmt Flow	276	32	157	17	39	41	127	427	18	21	265	454

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1266	1235	494	1319	1453	436	721	0	0	445	0	0
Stage 1	536	536	-	690	690	-	-	-	-	-	-	-
Stage 2	730	699	-	629	763	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	~ 145	176	573	133	130	618	876	-	-	1110	-	-
Stage 1	527	522	-	434	445	-	-	-	-	-	-	-
Stage 2	412	440	-	469	412	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 86	147	572	71	109	618	874	-	-	1110	-	-
Mov Cap-2 Maneuver	~ 86	147	-	71	109	-	-	-	-	-	-	-
Stage 1	450	511	-	371	380	-	-	-	-	-	-	-
Stage 2	295	376	-	314	403	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, \$ 1292.9		69.2	2.2	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	874	-	-	125	146	1110	-
HCM Lane V/C Ratio	0.146	-	-	3.713	0.67	0.019	-
HCM Control Delay (s)	9.8	-	-	\$ 1292.9	69.2	8.3	-
HCM Lane LOS	A	-	-	F	F	A	-
HCM 95th %tile Q(veh)	0.5	-	-	46.2	3.8	0.1	-

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

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	16	549	4	26	563
Future Vol, veh/h	5	16	549	4	26	563
Conflicting Peds, #/hr	25	0	0	6	6	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	165	0	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	1	1	7	1	1	7
Mvmt Flow	5	16	555	4	26	569

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1209	563	0	0	565	0
Stage 1	563	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	203	528	-	-	1012	-
Stage 1	572	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	192	525	-	-	1006	-
Mov Cap-2 Maneuver	329	-	-	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	498	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT
Capacity (veh/h)	-	- 329 525	1006	-
HCM Lane V/C Ratio	-	- 0.015 0.031	0.026	-
HCM Control Delay (s)	-	- 16.1 12.1	8.7	-
HCM Lane LOS	-	- C B	A	-
HCM 95th %tile Q(veh)	-	- 0 0.1	0.1	-

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Cumulative Year 2040 plus Project PM Peak




11/10/2020

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	8	3	5	1	0	16	2	589	2	15	575	18
Future Vol, veh/h	8	3	5	1	0	16	2	589	2	15	575	18
Conflicting Peds, #/hr	3	0	1	1	0	3	7	0	4	4	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	8	3	5	1	0	17	2	620	2	16	605	19

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1291	1284	623	1281	1292	628	631	0	0	626	0	0
Stage 1	654	654	-	629	629	-	-	-	-	-	-	-
Stage 2	637	630	-	652	663	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	141	166	488	143	164	485	956	-	-	960	-	-
Stage 1	457	465	-	472	477	-	-	-	-	-	-	-
Stage 2	467	476	-	458	460	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	133	161	484	137	159	482	950	-	-	956	-	-
Mov Cap-2 Maneuver	133	161	-	137	159	-	-	-	-	-	-	-
Stage 1	453	454	-	469	474	-	-	-	-	-	-	-
Stage 2	448	473	-	442	449	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.1	14	0	0.2
HCM LOS	D	B		

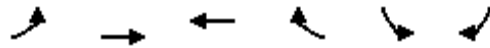
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	950	-	-	180	420	956	-
HCM Lane V/C Ratio	0.002	-	-	0.094	0.043	0.017	-
HCM Control Delay (s)	8.8	-	-	27.1	14	8.8	-
HCM Lane LOS	A	-	-	D	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0.1	-

Intersection						
Int Delay, s/veh	6.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	36	83	69	127	200	60
Future Vol, veh/h	36	83	69	127	200	60
Conflicting Peds, #/hr	3	0	0	3	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	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	40	92	77	141	222	67
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	221	0	-	0	323	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	172	-
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	1342	-	-	-	669	893
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	856	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1338	-	-	-	644	890
Mov Cap-2 Maneuver	-	-	-	-	644	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	853	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.4	0		14		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1338	-	-	-	688	
HCM Lane V/C Ratio	0.03	-	-	-	0.42	
HCM Control Delay (s)	7.8	0	-	-	14	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0.1	-	-	-	2.1	

HCM Unsignalized Intersection Capacity Analysis Cumulative Year 2040 plus Project PM Peak

4: Geer Avenue & Project Driveway 2

11/10/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩			
Traffic Volume (veh/h)	8	277	194	88	0	0
Future Volume (Veh/h)	8	277	194	88	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	308	216	98	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	314				591	265
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	314				591	265
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	100
cM capacity (veh/h)	1241				464	771
Direction, Lane #	EB 1	WB 1				
Volume Total	317	314				
Volume Left	9	0				
Volume Right	0	98				
cSH	1241	1700				
Volume to Capacity	0.01	0.18				
Queue Length 95th (ft)	1	0				
Control Delay (s)	0.3	0.0				
Lane LOS	A					
Approach Delay (s)	0.3	0.0				
Approach LOS						
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		24.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM 6th TWSC
5: Lander Avenue & Geer Avenue

Cumulative Year 2040 plus Project PM Peak

11/10/2020

Intersection												
Int Delay, s/veh	80											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	183	35	63	12	12	8	72	397	25	20	402	169
Future Vol, veh/h	183	35	63	12	12	8	72	397	25	20	402	169
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	3	3	3	3	7	3	3	7	3
Mvmt Flow	197	38	68	13	13	9	77	427	27	22	432	182

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1175	1178	523	1218	1256	446	614	0	0	457	0	0
Stage 1	567	567	-	598	598	-	-	-	-	-	-	-
Stage 2	608	611	-	620	658	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	~ 168	190	552	157	171	610	961	-	-	1099	-	-
Stage 1	507	505	-	487	489	-	-	-	-	-	-	-
Stage 2	481	483	-	474	460	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 143	171	552	106	154	607	961	-	-	1096	-	-
Mov Cap-2 Maneuver	~ 143	171	-	106	154	-	-	-	-	-	-	-
Stage 1	466	495	-	447	448	-	-	-	-	-	-	-
Stage 2	423	443	-	377	451	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s\$	391.2	34.3	1.3	0.3
HCM LOS	F	D		







Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	961	-	-	176	157	1096	-
HCM Lane V/C Ratio	0.081	-	-	1.717	0.219	0.02	-
HCM Control Delay (s)	9.1	-	-	\$ 391.2	34.3	8.3	-
HCM Lane LOS	A	-	-	F	D	A	-
HCM 95th %tile Q(veh)	0.3	-	-	21.1	0.8	0.1	-

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

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Cumulative Year 2040 plus Project AM Peak

11/10/2020

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	10	0	0	25	17	687	1	12	669	19
Future Vol, veh/h	0	0	10	0	0	25	17	687	1	12	669	19
Conflicting Peds, #/hr	6	0	0	0	0	6	26	0	0	0	0	26
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	50	-	-	55	-	-
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, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	0	0	11	0	0	27	18	747	1	13	727	21
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	764	-	-	754	774	0	0	748	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.21	-	-	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.309	-	-	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	0	0	405	0	0	411	846	-	-	865	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	395	-	-	409	825	-	-	865	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	14.4		14.4		0.2		0.2					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	825	-	-	395	409	865	-	-				
HCM Lane V/C Ratio	0.022	-	-	0.028	0.066	0.015	-	-				
HCM Control Delay (s)	9.5	-	-	14.4	14.4	9.2	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-				

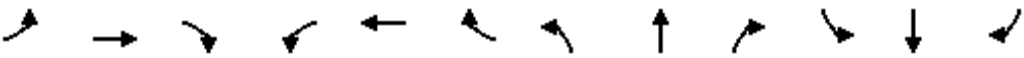
Intersection						
Int Delay, s/veh	11.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↖	↗
Traffic Vol, veh/h	58	200	127	229	312	115
Future Vol, veh/h	58	200	127	229	312	115
Conflicting Peds, #/hr	5	0	0	5	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	250	250	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	67	233	148	266	363	134
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	419	0	-	0	520	153
Stage 1	-	-	-	-	153	-
Stage 2	-	-	-	-	367	-
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	1135	-	-	-	515	890
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1130	-	-	-	475	886
Mov Cap-2 Maneuver	-	-	-	-	475	-
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	696	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.9	0		26.8		
HCM LOS	D					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1130	-	-	-	475	886
HCM Lane V/C Ratio	0.06	-	-	-	0.764	0.151
HCM Control Delay (s)	8.4	0	-	-	33.1	9.8
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	0.2	-	-	-	6.6	0.5

HCM 6th Signalized Intersection Summary

5: Lander Avenue & Geer Avenue

Cumulative Year 2040 plus Project AM Peak

11/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱		↰	↱	
Traffic Volume (veh/h)	275	29	144	17	41	38	117	393	17	19	243	418
Future Volume (veh/h)	275	29	144	17	41	38	117	393	17	19	243	418
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	1796	1796	1856	1796	1796
Adj Flow Rate, veh/h	299	32	157	18	45	41	127	427	18	21	264	454
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	7	7	3	7	7
Cap, veh/h	329	35	323	23	58	53	155	892	38	39	266	457
Arrive On Green	0.21	0.21	0.21	0.08	0.08	0.08	0.09	0.52	0.52	0.02	0.45	0.45
Sat Flow, veh/h	1604	172	1572	297	744	678	1767	1711	72	1767	592	1018
Grp Volume(v), veh/h	331	0	157	104	0	0	127	0	445	21	0	718
Grp Sat Flow(s),veh/h/ln	1775	0	1572	1719	0	0	1767	0	1783	1767	0	1610
Q Serve(g_s), s	19.2	0.0	9.3	6.3	0.0	0.0	7.4	0.0	16.8	1.2	0.0	46.7
Cycle Q Clear(g_c), s	19.2	0.0	9.3	6.3	0.0	0.0	7.4	0.0	16.8	1.2	0.0	46.7
Prop In Lane	0.90		1.00	0.17		0.39	1.00		0.04	1.00		0.63
Lane Grp Cap(c), veh/h	364	0	323	134	0	0	155	0	930	39	0	723
V/C Ratio(X)	0.91	0.00	0.49	0.78	0.00	0.00	0.82	0.00	0.48	0.55	0.00	0.99
Avail Cap(c_a), veh/h	384	0	340	359	0	0	161	0	930	96	0	723
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.9	0.0	37.0	47.7	0.0	0.0	47.3	0.0	16.1	51.0	0.0	28.9
Incr Delay (d2), s/veh	24.2	0.0	1.1	9.2	0.0	0.0	26.8	0.0	0.4	11.5	0.0	31.7
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	10.6	0.0	3.6	3.0	0.0	0.0	4.3	0.0	6.4	0.7	0.0	22.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	0.0	38.1	56.9	0.0	0.0	74.1	0.0	16.5	62.5	0.0	60.5
LnGrp LOS	E	A	D	E	A	A	E	A	B	E	A	E
Approach Vol, veh/h	488				104				572			
Approach Delay, s/veh	56.4				56.9				29.3			
Approach LOS	E				E				C			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	59.8		26.2	14.1	52.2		12.8				
Change Period (Y+Rc), s	* 4.2	4.9		4.6	4.9	* 4.9		4.6				
Max Green Setting (Gmax), s	* 5.7	51.2		22.8	9.6	* 47		22.0				
Max Q Clear Time (g_c+I1), s	3.2	18.8		21.2	9.4	48.7		8.3				
Green Ext Time (p_c), s	0.0	2.8		0.4	0.0	0.0		0.4				

Intersection Summary

HCM 6th Ctrl Delay 49.9

HCM 6th LOS D

Notes

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

HCM 6th TWSC
2: Lander Avenue & Dayton Avenue

Cumulative Year 2040 plus Project PM Peak






11/10/2020

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↰			↰	↰	↰		↰	↰	
Traffic Vol, veh/h	0	0	5	0	0	16	2	597	2	15	575	18
Future Vol, veh/h	0	0	5	0	0	16	2	597	2	15	575	18
Conflicting Peds, #/hr	3	0	1	1	0	3	7	0	4	4	0	7
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	50	-	-	55	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	7	1	1	7	1
Mvmt Flow	0	0	5	0	0	17	2	628	2	16	605	19

Major/Minor	Minor2		Minor1		Major1		Major2	
Conflicting Flow All	-	-	623	-	-	636	631	0
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.21	-	-	6.21	4.11	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.309	-	-	3.309	2.209	-
Pot Cap-1 Maneuver	0	0	488	0	0	480	956	-
Stage 1	0	0	-	0	0	-	-	-
Stage 2	0	0	-	0	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	484	-	-	477	950	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	12.8	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	950	-	-	484	477	950	-
HCM Lane V/C Ratio	0.002	-	-	0.011	0.035	0.017	-
HCM Control Delay (s)	8.8	-	-	12.5	12.8	8.9	-
HCM Lane LOS	A	-	-	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0.1	-

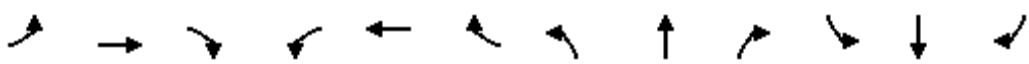
Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	36	83	69	127	200	60
Future Vol, veh/h	36	83	69	127	200	60
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	250	250	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	40	92	77	141	222	67
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	221	0	-	0	252	80
Stage 1	-	-	-	-	80	-
Stage 2	-	-	-	-	172	-
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	1342	-	-	-	734	977
Stage 1	-	-	-	-	941	-
Stage 2	-	-	-	-	856	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1338	-	-	-	706	974
Mov Cap-2 Maneuver	-	-	-	-	706	-
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	853	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.4	0		11.6		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1338	-	-	-	706	974
HCM Lane V/C Ratio	0.03	-	-	-	0.315	0.068
HCM Control Delay (s)	7.8	0	-	-	12.4	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3	0.2

HCM 6th Signalized Intersection Summary

5: Lander Avenue & Geer Avenue

Cumulative Year 2040 plus Project PM Peak

11/10/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱	↰	↱		↰	↱	
Traffic Volume (veh/h)	191	38	63	13	12	8	72	397	25	20	401	169
Future Volume (veh/h)	191	38	63	13	12	8	72	397	25	20	401	169
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1796	1796	1856	1796	1796
Adj Flow Rate, veh/h	205	41	68	14	13	9	77	427	27	22	431	182
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	7	7	3	7	7
Cap, veh/h	271	54	287	29	27	19	105	759	48	45	491	207
Arrive On Green	0.18	0.18	0.18	0.04	0.04	0.04	0.06	0.45	0.45	0.03	0.41	0.41
Sat Flow, veh/h	1484	297	1572	676	627	434	1767	1671	106	1767	1199	506
Grp Volume(v), veh/h	246	0	68	36	0	0	77	0	454	22	0	613
Grp Sat Flow(s),veh/h/ln	1781	0	1572	1737	0	0	1767	0	1777	1767	0	1705
Q Serve(g_s), s	8.1	0.0	2.3	1.3	0.0	0.0	2.7	0.0	11.6	0.8	0.0	20.6
Cycle Q Clear(g_c), s	8.1	0.0	2.3	1.3	0.0	0.0	2.7	0.0	11.6	0.8	0.0	20.6
Prop In Lane	0.83		1.00	0.39		0.25	1.00		0.06	1.00		0.30
Lane Grp Cap(c), veh/h	325	0	287	74	0	0	105	0	807	45	0	698
V/C Ratio(X)	0.76	0.00	0.24	0.48	0.00	0.00	0.74	0.00	0.56	0.49	0.00	0.88
Avail Cap(c_a), veh/h	632	0	558	616	0	0	148	0	937	143	0	894
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	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	0.0	21.7	29.0	0.0	0.0	28.7	0.0	12.4	29.8	0.0	16.9
Incr Delay (d2), s/veh	3.6	0.0	0.4	4.8	0.0	0.0	10.8	0.0	0.6	8.0	0.0	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.8	0.6	0.0	0.0	1.4	0.0	3.8	0.4	0.0	8.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	0.0	22.1	33.8	0.0	0.0	39.5	0.0	13.0	37.8	0.0	25.1
LnGrp LOS	C	A	C	C	A	A	D	A	B	D	A	C
Approach Vol, veh/h		314			36			531			635	
Approach Delay, s/veh		26.5			33.8			16.9			25.5	
Approach LOS		C			C			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	33.1		15.9	8.6	30.3		7.3				
Change Period (Y+Rc), s	* 4.2	4.9		4.6	4.9	* 4.9		4.6				
Max Green Setting (Gmax), s	* 5	32.7		22.0	5.2	* 33		22.0				
Max Q Clear Time (g_c+I1), s	2.8	13.6		10.1	4.7	22.6		3.3				
Green Ext Time (p_c), s	0.0	2.5		1.2	0.0	2.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C

Notes

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

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	53	57	152	94	188
Average Queue (ft)	12	29	45	38	31
95th Queue (ft)	39	53	116	72	100
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	L	TR	L	TR
Maximum Queue (ft)	53	52	31	100	114	457
Average Queue (ft)	12	15	8	7	15	86
95th Queue (ft)	41	42	29	44	64	287
Link Distance (ft)	633	1229		349		706
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50		55	
Storage Blk Time (%)			0	0		10
Queuing Penalty (veh)			0	0		1

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	WB	SB	SB
Directions Served	LT	R	L	R
Maximum Queue (ft)	70	52	154	58
Average Queue (ft)	22	8	75	32
95th Queue (ft)	57	33	125	53
Link Distance (ft)	1284			1232
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250	250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Geer Avenue & Project Driveway 2

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	EB	WB	NB	NB	B8	SB	SB
Directions Served	LT	R	LTR	L	TR	T	L	TR
Maximum Queue (ft)	406	370	249	124	354	71	89	428
Average Queue (ft)	204	71	82	89	172	2	24	318
95th Queue (ft)	352	236	166	152	281	23	73	479
Link Distance (ft)	772		2629		282	2278		349
Upstream Blk Time (%)					2			14
Queuing Penalty (veh)					0			92
Storage Bay Dist (ft)		250		50			50	
Storage Blk Time (%)	8			33	30		6	53
Queuing Penalty (veh)	11			136	35		42	10

Network Summary

Network wide Queuing Penalty: 327

Intersection: 1: Lander Avenue & Echo Street

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	31	31	119	31	100
Average Queue (ft)	4	10	15	9	9
95th Queue (ft)	21	33	61	33	51
Link Distance (ft)		1262	706		1414
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	165			250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Lander Avenue & Dayton Avenue

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	L	TR	L	TR
Maximum Queue (ft)	31	76	29	55	31	112
Average Queue (ft)	6	12	1	4	8	6
95th Queue (ft)	26	42	9	24	31	40
Link Distance (ft)	633	1229		343		706
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			50		55	
Storage Blk Time (%)				0		1
Queuing Penalty (veh)				0		0

Intersection: 3: Geer Avenue & Project Driveway 1

Movement	EB	WB	SB	SB
Directions Served	LT	R	L	R
Maximum Queue (ft)	54	40	105	66
Average Queue (ft)	8	1	41	25
95th Queue (ft)	34	13	74	52
Link Distance (ft)	1284			1232
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250	250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Geer Avenue & Project Driveway 2

Movement	EB
Directions Served	LT
Maximum Queue (ft)	29
Average Queue (ft)	1
95th Queue (ft)	10
Link Distance (ft)	422
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Lander Avenue & Geer Avenue

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	TR
Maximum Queue (ft)	195	56	97	124	224	89	432
Average Queue (ft)	87	28	32	68	111	20	212
95th Queue (ft)	157	54	80	129	196	57	380
Link Distance (ft)	772		2629		276		343
Upstream Blk Time (%)							3
Queuing Penalty (veh)							16
Storage Bay Dist (ft)		250		50		50	
Storage Blk Time (%)				26	23	0	39
Queuing Penalty (veh)				108	17	0	8

Network Summary

Network wide Queuing Penalty: 149

Appendix I: Signal Warrants



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

A p p | I

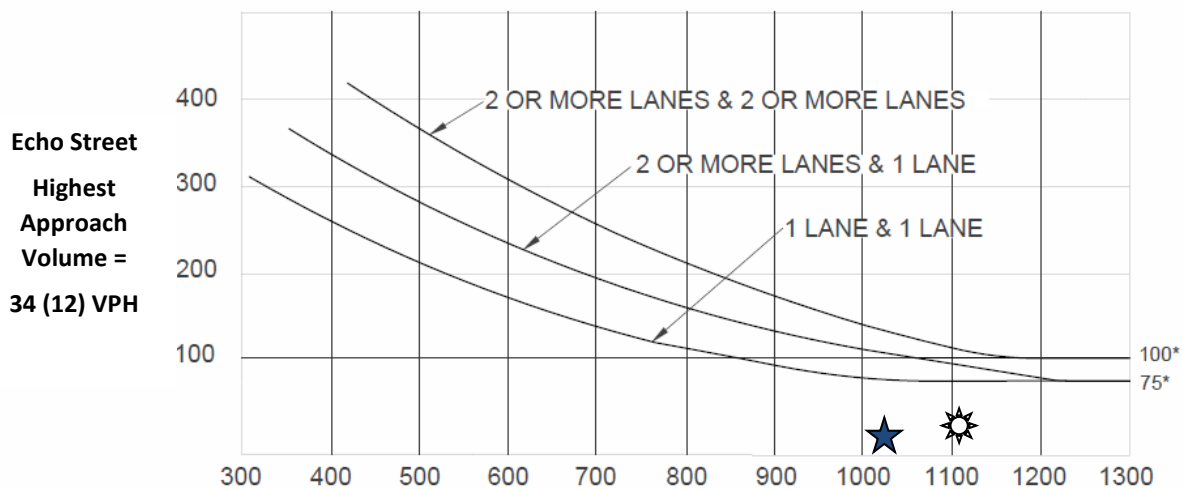
Warrant 3: Peak Hour (Rural)

Existing Traffic Conditions

1. Lander Avenue / Echo Street

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Lander Avenue Total of Both Approaches =

1110 (1023) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

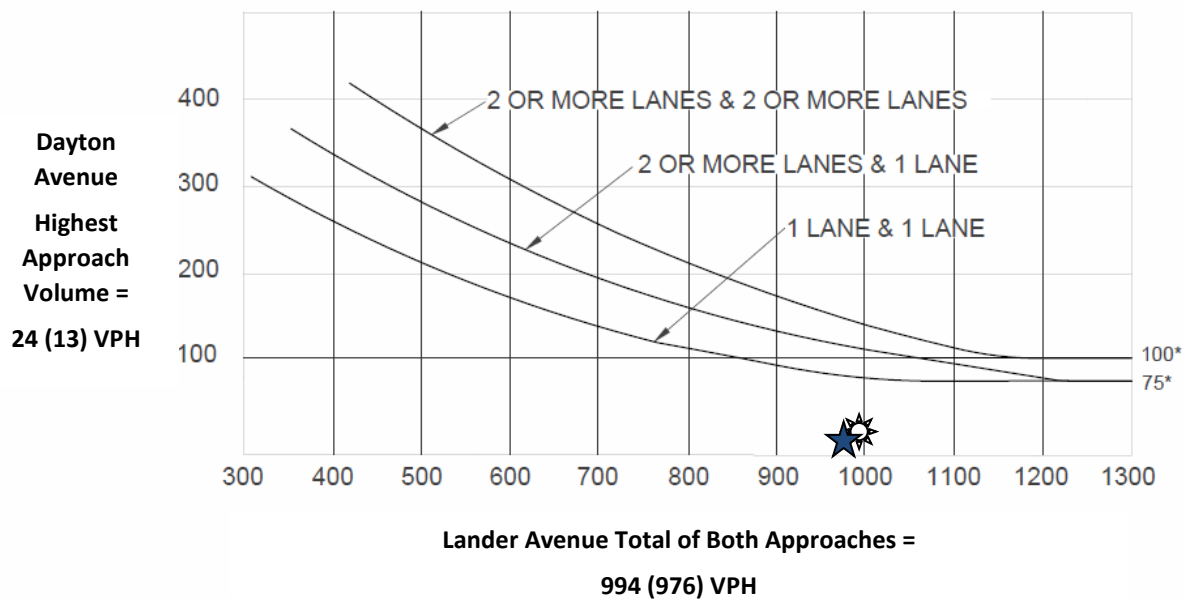
Fresno, CA 93704

(559) 570-8991

Warrant 3: Peak Hour (Rural)

Existing Traffic Conditions
2. Lander Avenue / Dayton Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



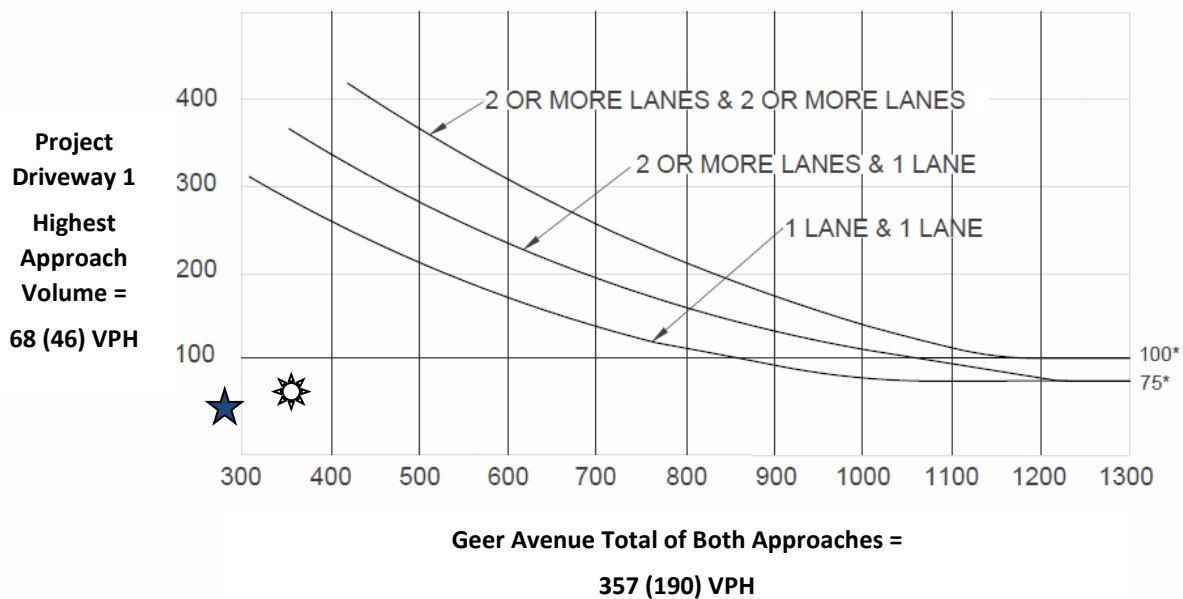
PM Peak Hour – Signal Warrant is Not Met

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

Warrant 3: Peak Hour (Rural)

Existing Traffic Conditions
3. Project Driveway 1 / Geer Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



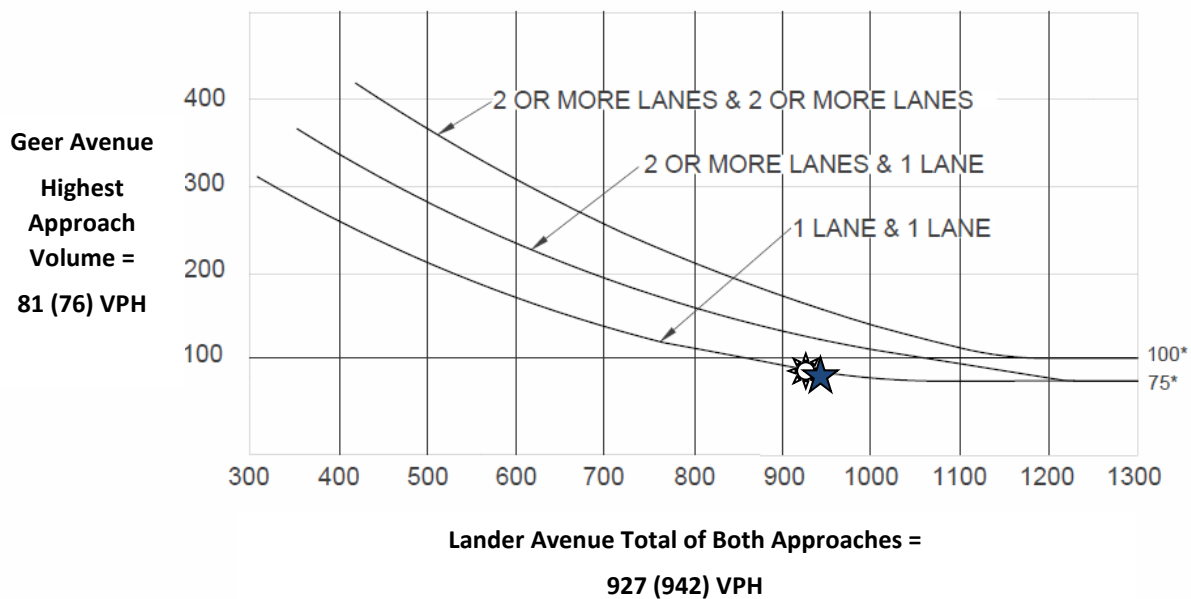
PM Peak Hour – Signal Warrant is Not Met

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

Warrant 3: Peak Hour (Rural)

Existing Traffic Conditions
5. Lander Avenue / Geer Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

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



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

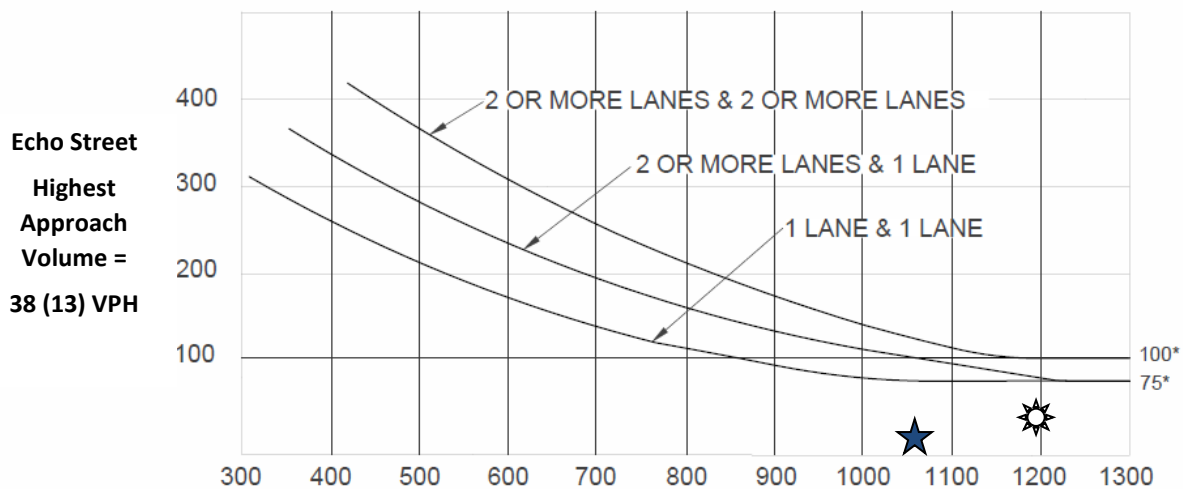
Warrant 3: Peak Hour (Rural)

Existing plus Project Traffic Conditions

1. Lander Avenue / Echo Street

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Lander Avenue Total of Both Approaches =

1196 (1057) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

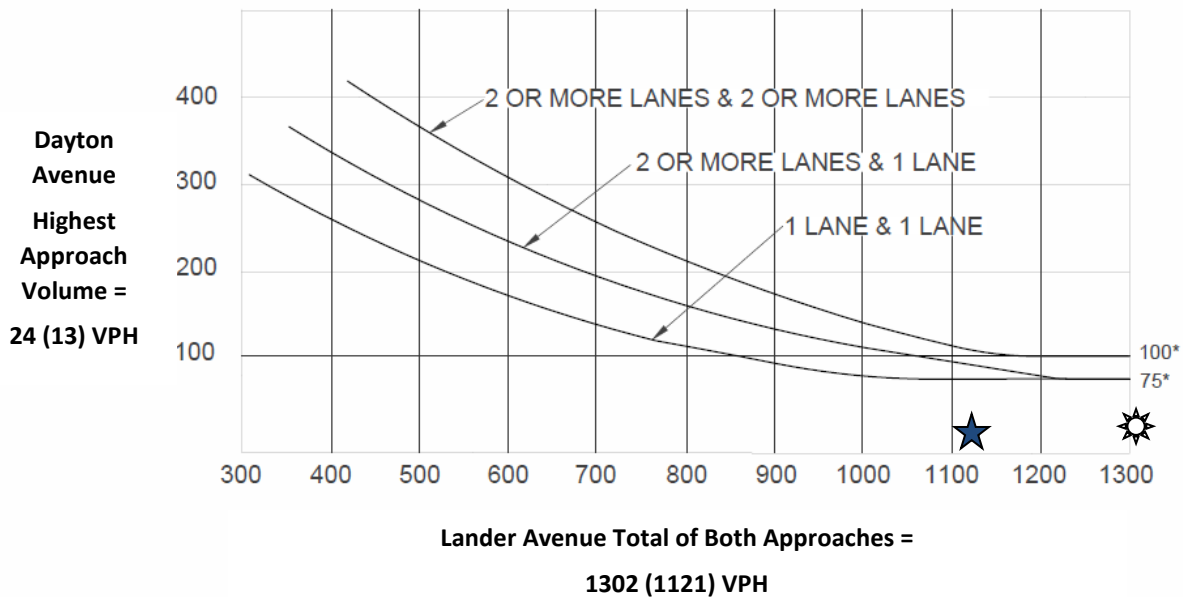
Warrant 3: Peak Hour (Rural)

Existing plus Project Traffic Conditions

2. Lander Avenue / Dayton Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

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



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

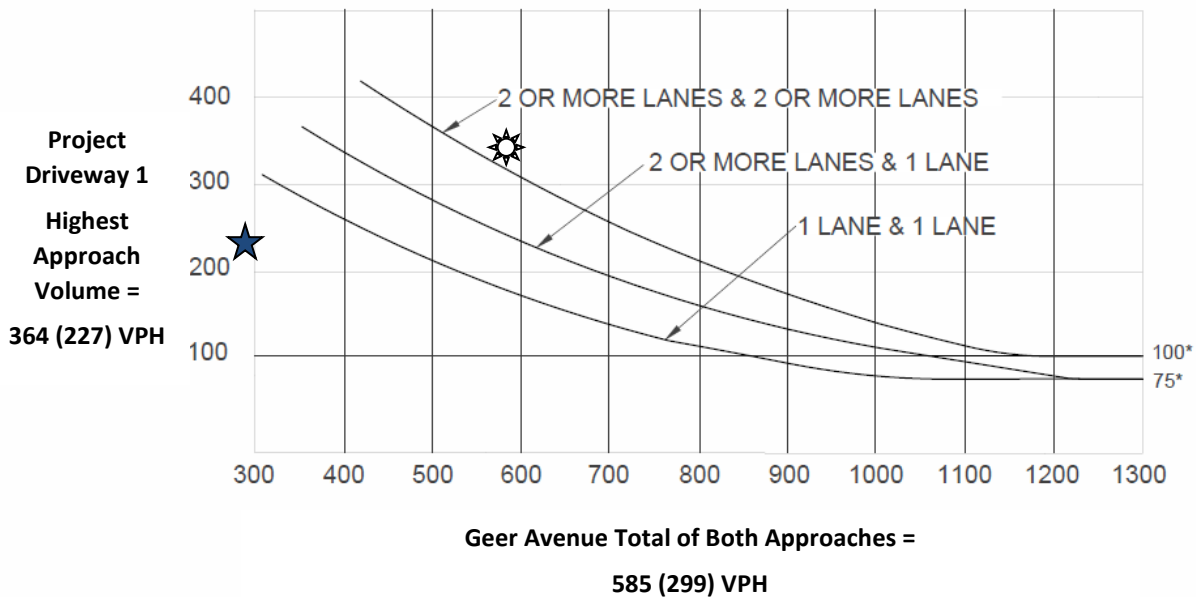
Warrant 3: Peak Hour (Rural)

Existing plus Project Traffic Conditions

3. Project Driveway 1 / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Met



PM Peak Hour – Signal Warrant is Not Met

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



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

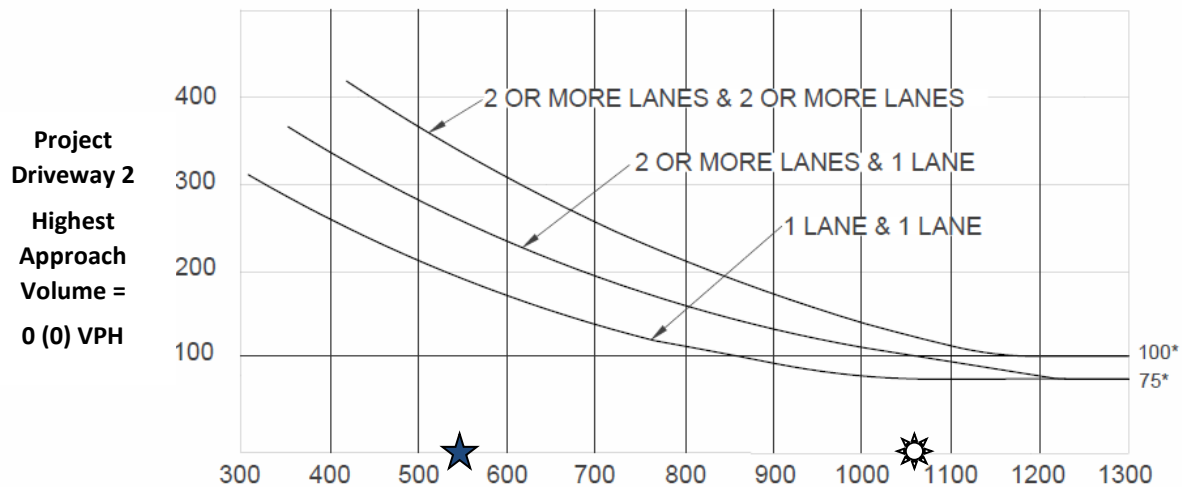
Warrant 3: Peak Hour (Rural)

Existing plus Project Traffic Conditions

4. Project Driveway 2 / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Geer Avenue Total of Both Approaches =

1060 (551) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

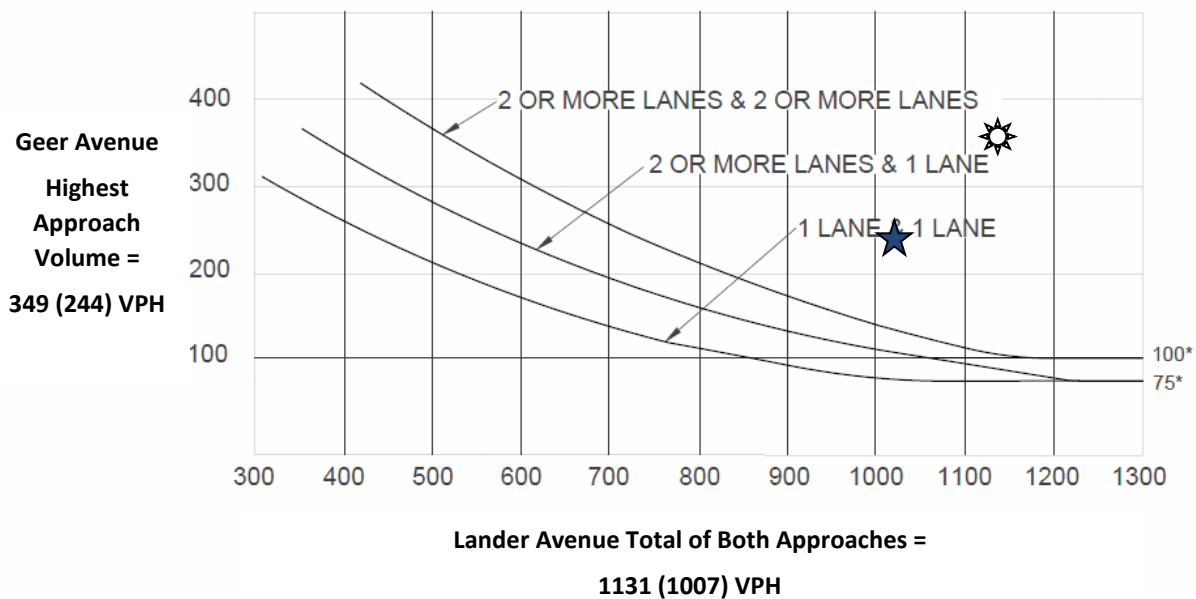
Warrant 3: Peak Hour (Rural)

Existing plus Project Traffic Conditions

5. Lander Avenue / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Met



PM Peak Hour – Signal Warrant is Met

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



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

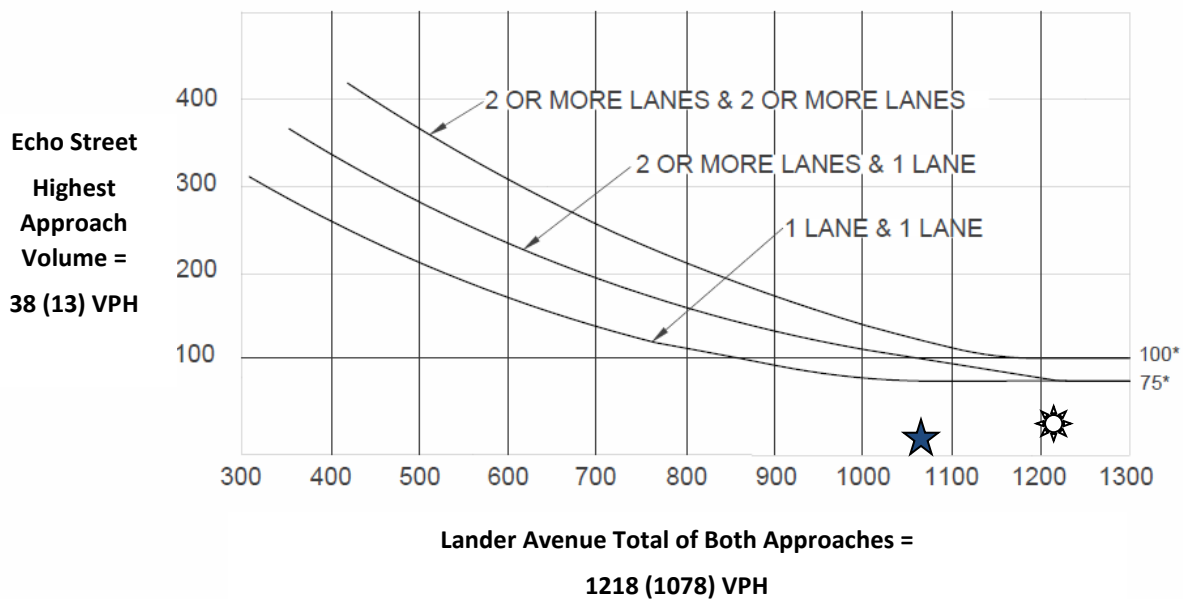
Warrant 3: Peak Hour (Rural)

Near Term plus Project Traffic Conditions

1. Lander Avenue / Echo Street

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

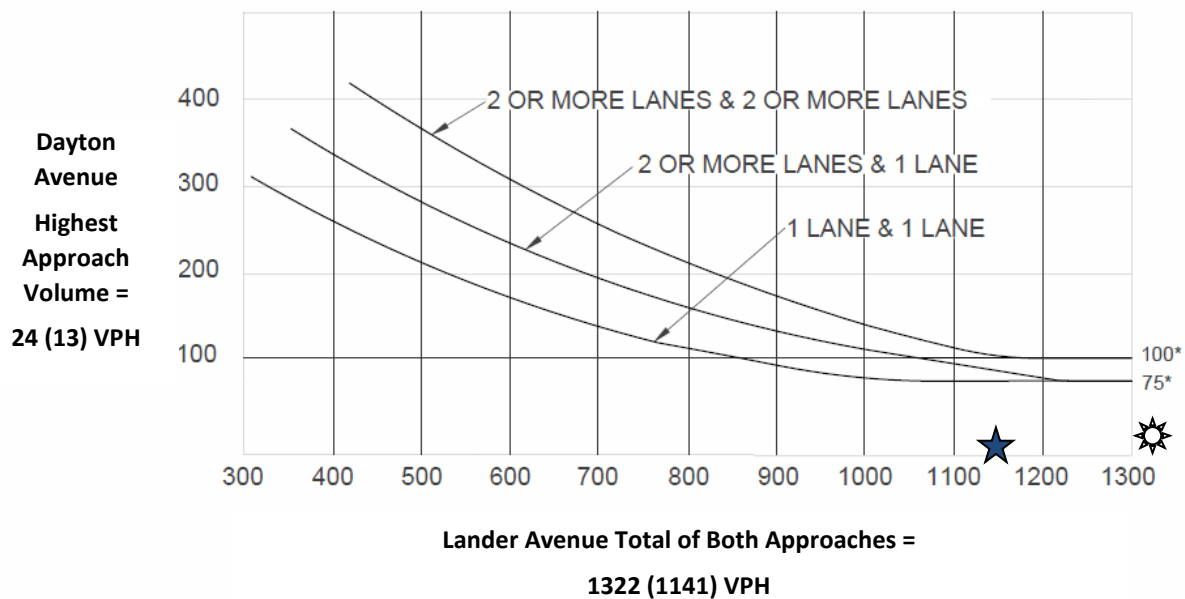
Warrant 3: Peak Hour (Rural)

Near Term plus Project Traffic Conditions

2. Lander Avenue / Dayton Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

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

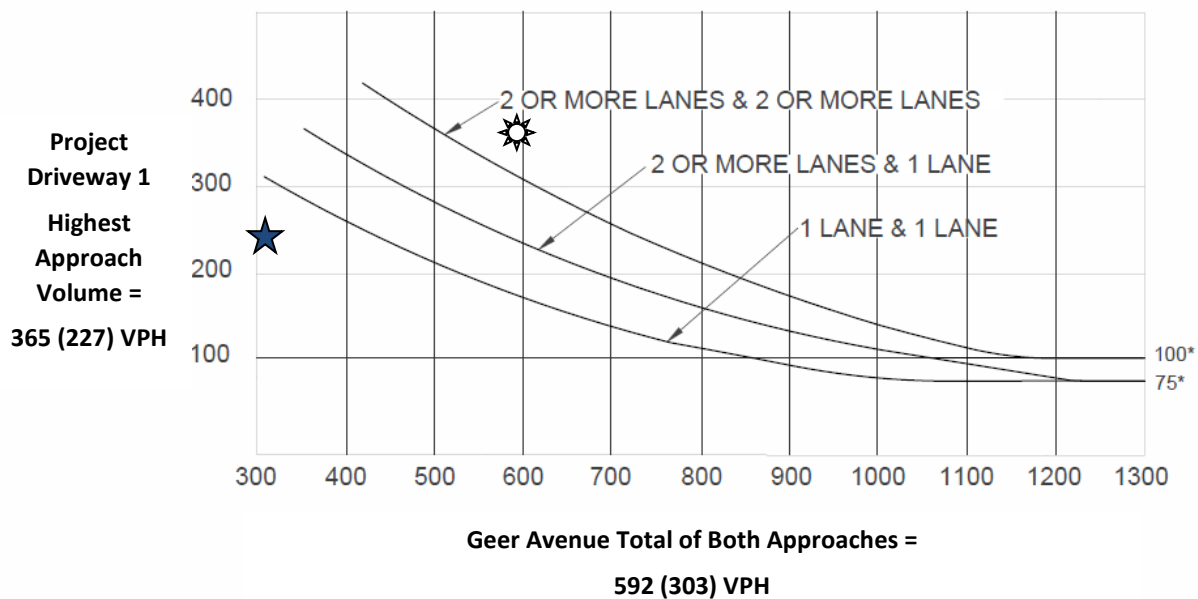
Warrant 3: Peak Hour (Rural)

Near Term plus Project Traffic Conditions

3. Project Driveway 1 / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Met



PM Peak Hour – Signal Warrant is Not Met

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



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

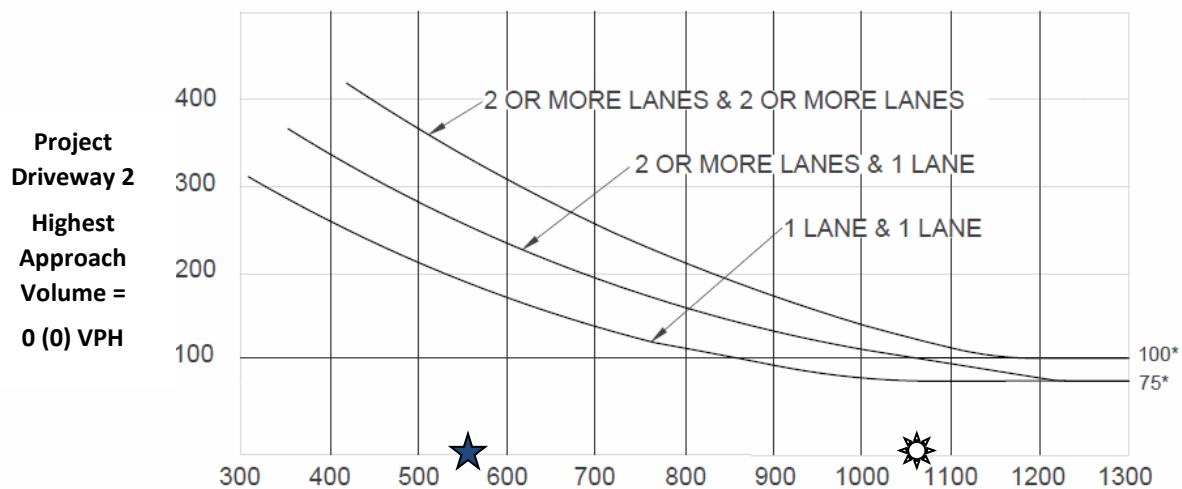
Warrant 3: Peak Hour (Rural)

Near Term plus Project Traffic Conditions

4. Project Driveway 2 / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Geer Avenue Total of Both Approaches =

1067 (555) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

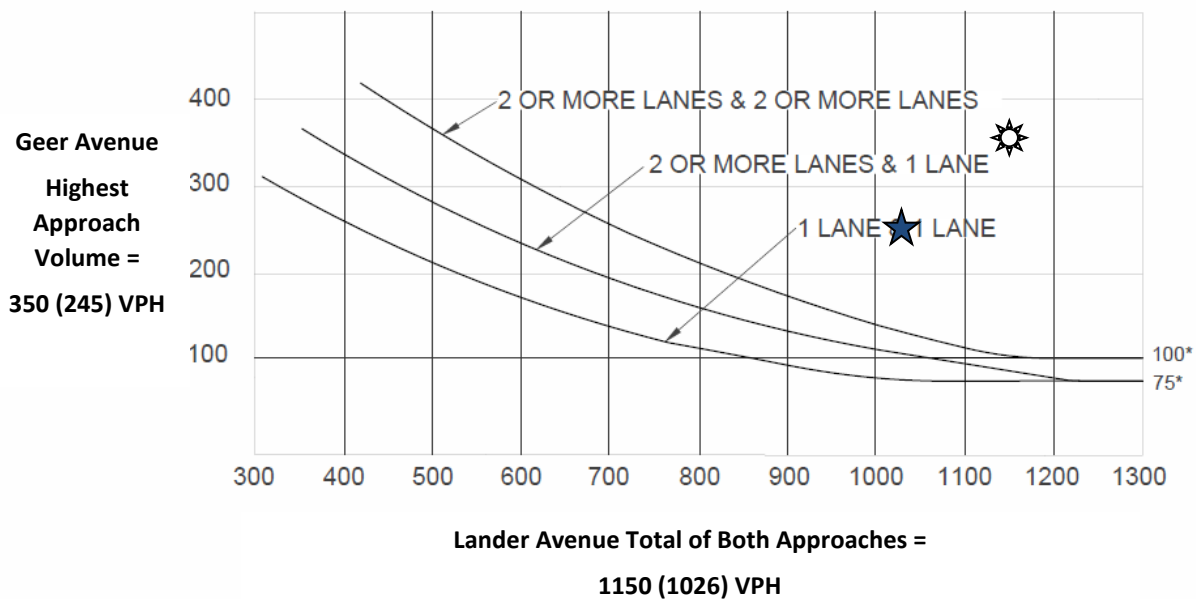
Warrant 3: Peak Hour (Rural)

Near Term plus Project Traffic Conditions

5. Lander Avenue / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Met



PM Peak Hour – Signal Warrant is Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

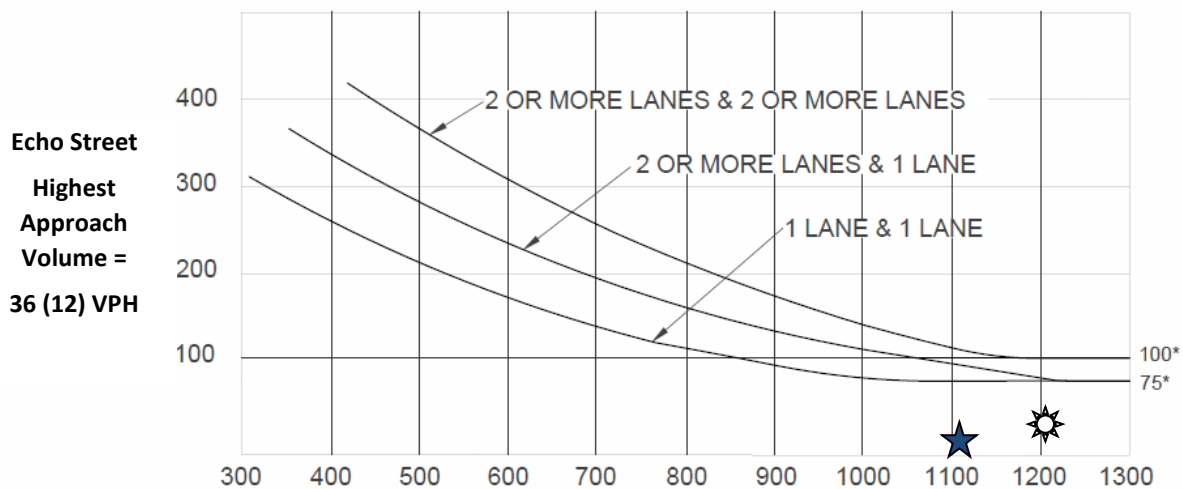
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 No Project Traffic Conditions

1. Lander Avenue / Echo Street

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Lander Avenue Total of Both Approaches =

1202 (1108) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

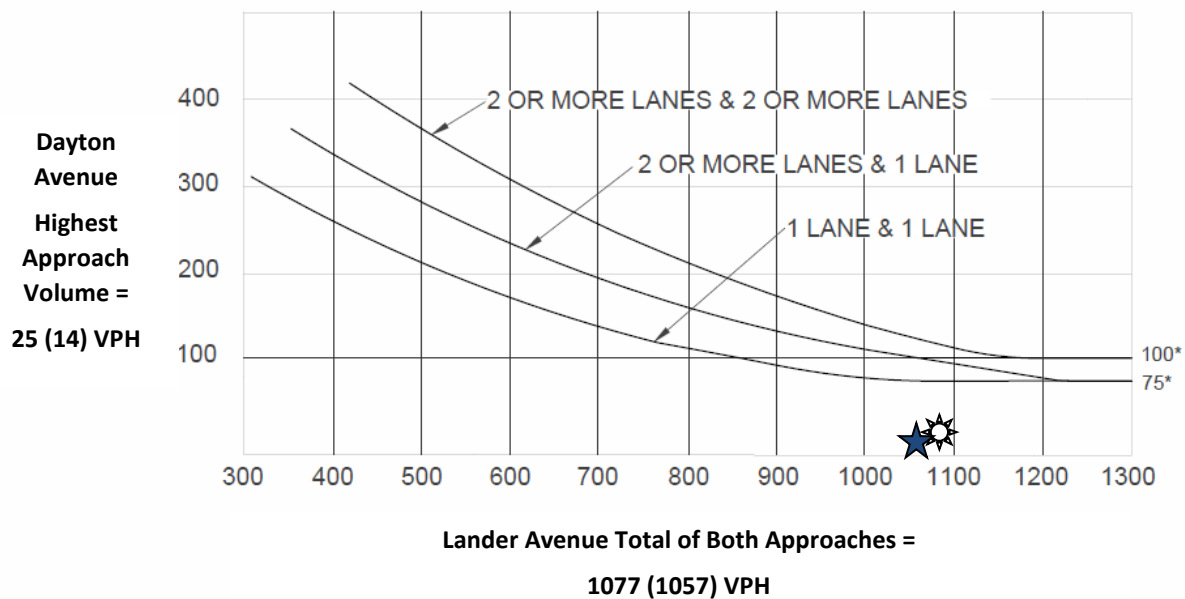
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 No Project Traffic Conditions

2. Lander Avenue / Dayton Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

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

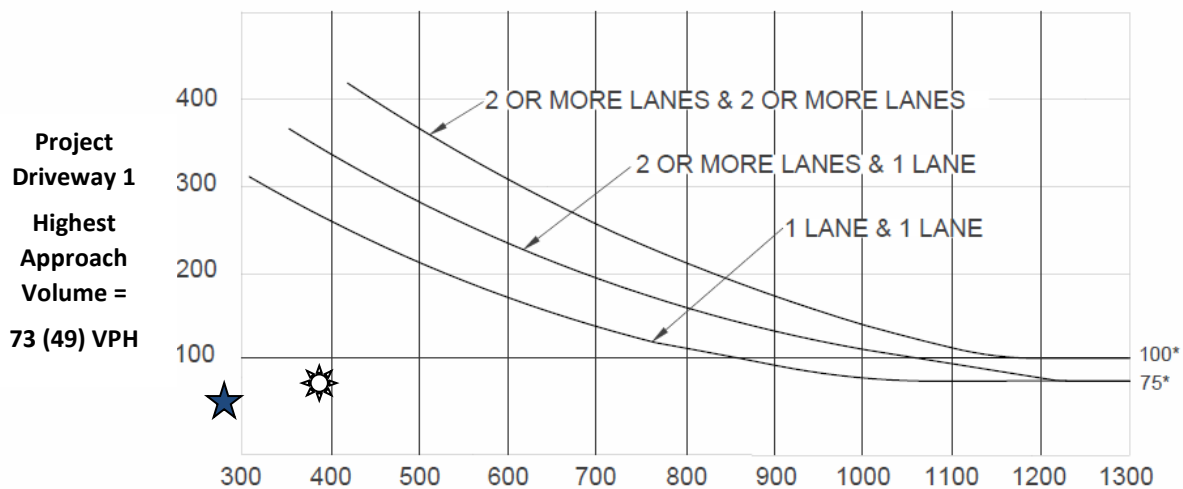
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 No Project Traffic Conditions

3. Project Driveway 1 / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Geer Avenue Total of Both Approaches =

387 (206) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

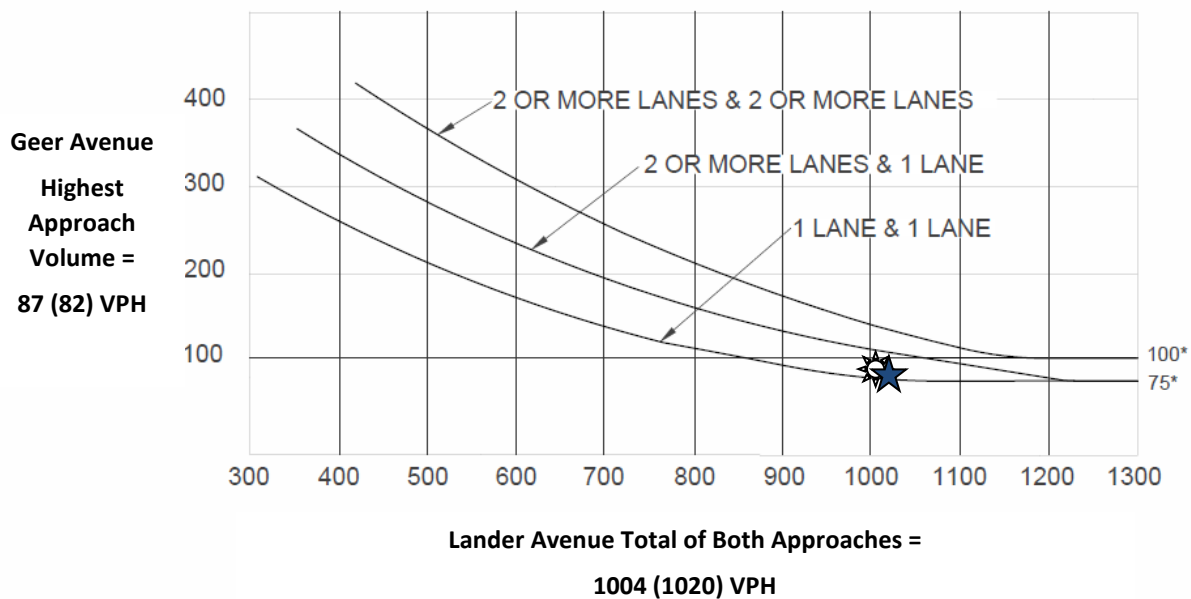
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 No Project Traffic Conditions

5. Lander Avenue / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Met



PM Peak Hour – Signal Warrant is Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

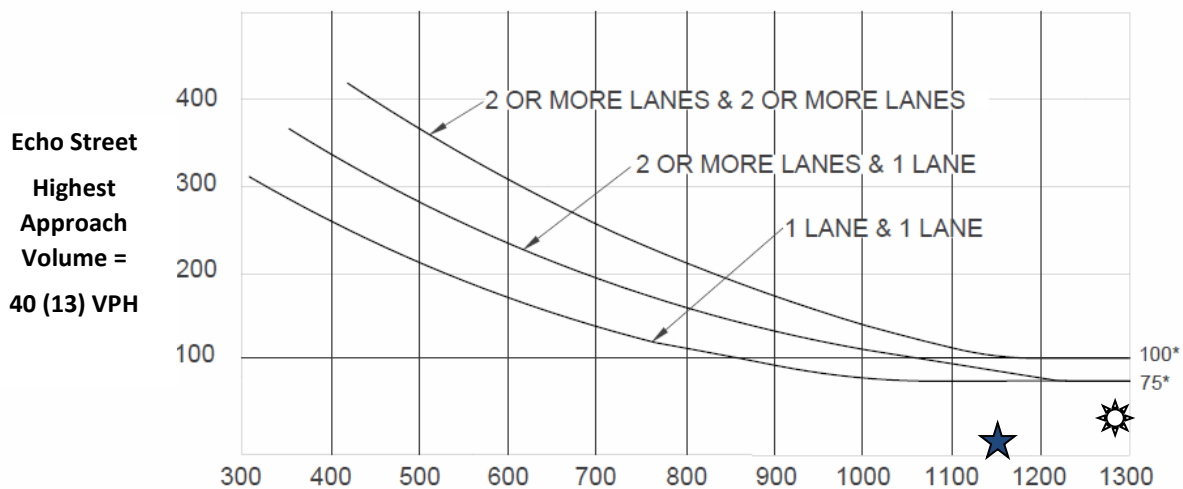
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions

1. Lander Avenue / Echo Street

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Lander Avenue Total of Both Approaches =

1288 (1142) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

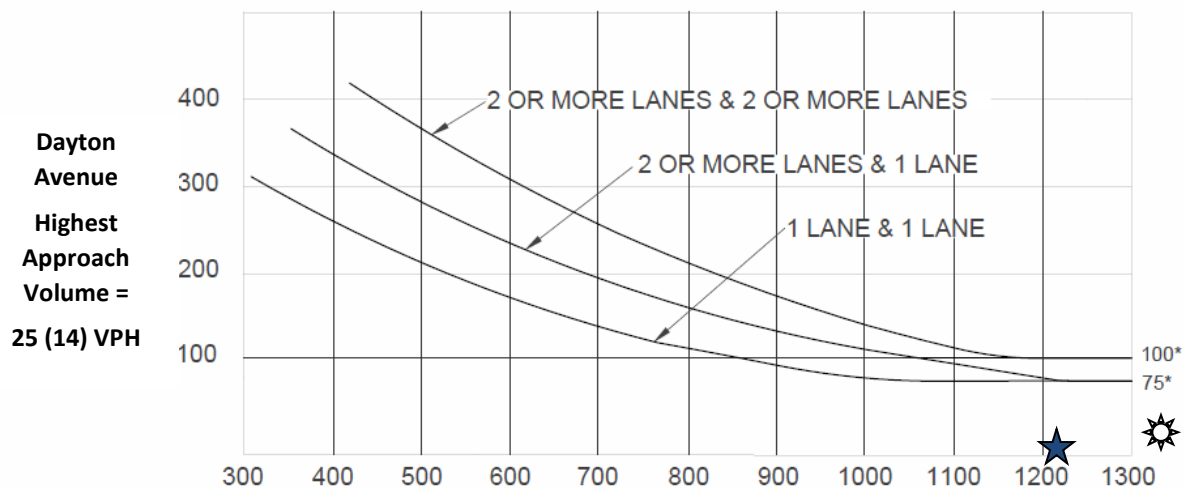
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions

2. Lander Avenue / Dayton Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Lander Avenue Total of Both Approaches =

1385 (1202) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

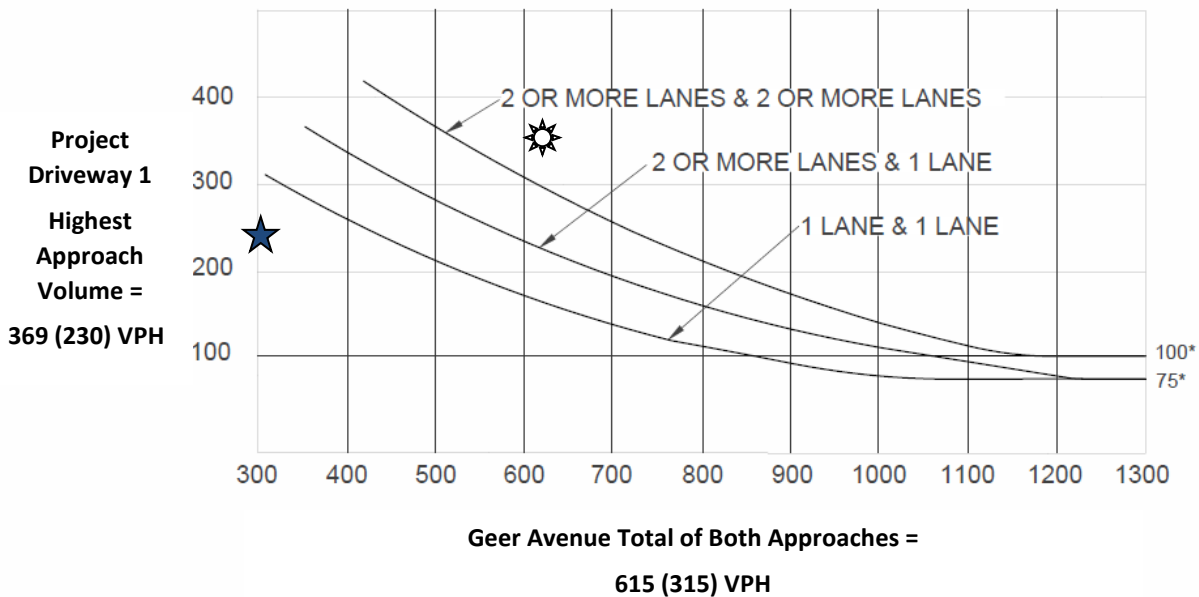
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions

3. Project Driveway 1 / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Met



PM Peak Hour – Signal Warrant is Not Met

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



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

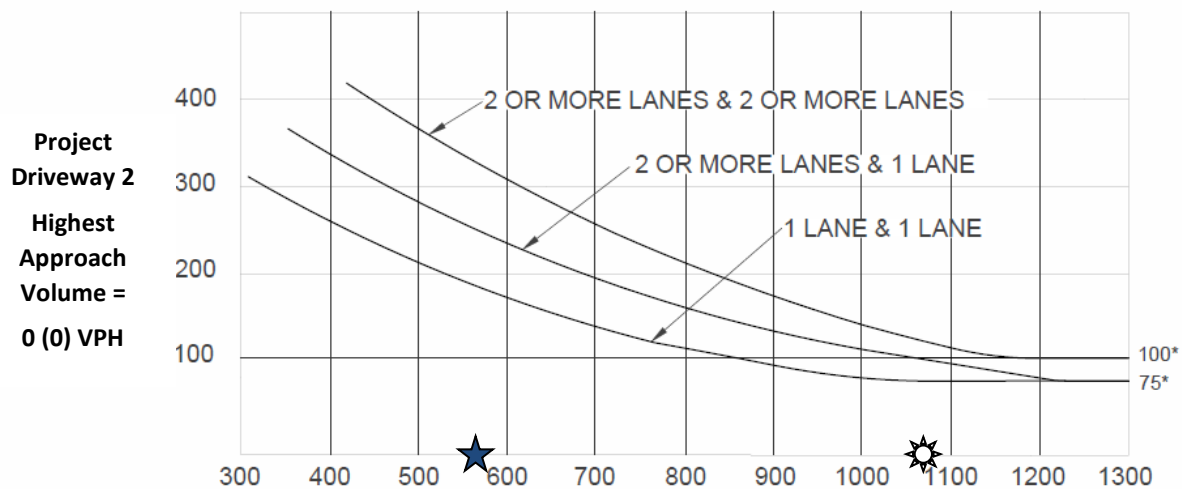
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions

4. Project Driveway 2 / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



Geer Avenue Total of Both Approaches =

1088 (567) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Not Met



PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)

Chapter 4C: Traffic Control Signal Needs Studies

Part 4: Highway Traffic Signals

November 7, 2014



www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

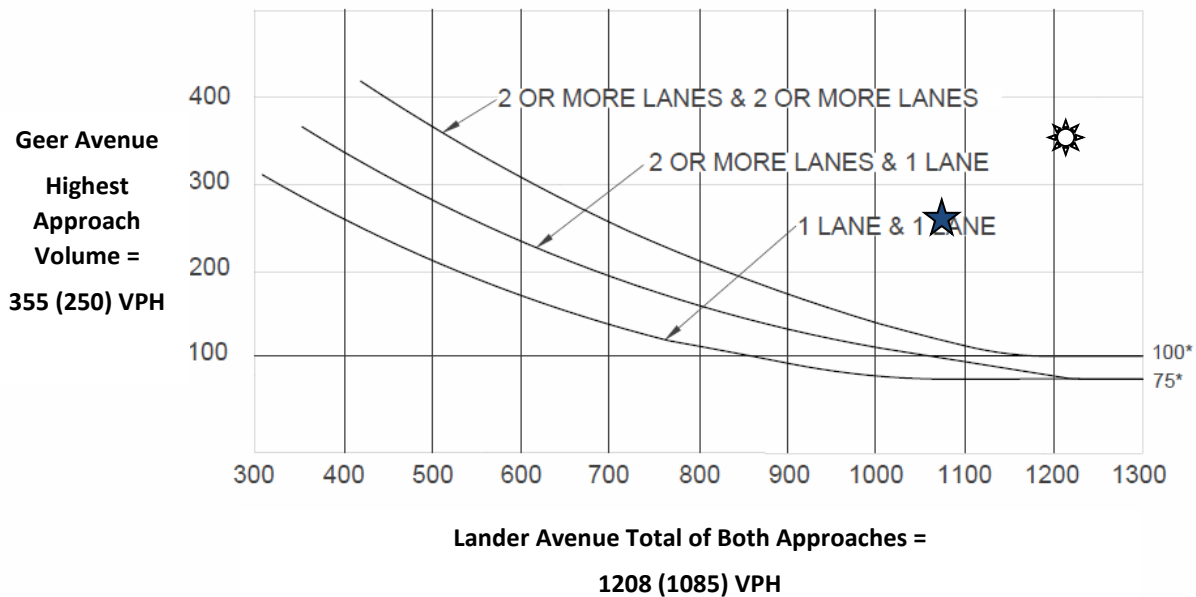
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions

5. Lander Avenue / Geer Avenue

AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.



AM Peak Hour – Signal Warrant is Met



PM Peak Hour – Signal Warrant is Met

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



www.JLBtraffic.com
info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991