

# LIBERTY CHARTER HS

## Focused Traffic Impact Study



NOVEMBER 2018 | FINAL

Prepared By:

**Kimley»»Horn**

**SDC PDS RCVD 11-20-18  
MUP15-027**

## Contents

EXECUTIVE SUMMARY .....	1-1
1 INTRODUCTION.....	1-1
1.1 Project Description .....	1-1
1.2 Analysis Scenarios.....	1-1
2 METHODOLOGY .....	2-1
2.1 Study Intersections.....	2-1
2.2 Analysis Process.....	2-1
2.3 Significance Determination .....	2-4
3 EXISTING CONDITIONS .....	3-1
3.1 Road Network .....	3-1
3.2 Traffic Volumes .....	3-3
3.3 Intersection Analysis .....	3-3
3.4 Roadway Segment Analysis .....	3-3
4 PROJECT TRAFFIC .....	4-1
4.1 Trip Generation .....	4-1
4.2 Trip Distribution .....	4-1
4.3 Trip Assignment .....	4-1
5 EXISTING WITH PROJECT CONDITIONS .....	5-1
5.1 Road Network .....	5-1
5.2 Traffic Volumes .....	5-1
5.3 Intersection Analysis .....	5-1
5.4 Roadway Segment Analysis .....	5-1
6 OTHER TOPICS .....	6-1
6.1 Transit .....	6-1
6.2 Drop-off and Pick-up Operation .....	6-1
6.3 Parking .....	6-1
6.4 Gap Study .....	6-1

## Figures

Figure 1-1 Regional Vicinity Map .....	1-2
Figure 1-2 Proposed Site Plan .....	1-3
Figure 3-1 Existing Conditions Intersection and Roadway Geometrics .....	3-2
Figure 3-2 Existing Traffic Volumes .....	3-4
Figure 4-1 Project Trip Distribution .....	4-2
Figure 4-2 Project Trip Assignment .....	4-3
Figure 5-1 Existing with Project Peak-Hour Traffic Volumes .....	5-3
Figure 6-1 Conceptual Striping Plan along Chase Avenue .....	6-2

## Tables

Table 2-1 Study Intersections .....	2-1
Table 2-2 Level of Service (LOS) Criteria for Intersections .....	2-2
Table 2-3 County of San Diego Roadway Segment Capacity and Level of Service .....	2-3
Table 2-4 Significance Criteria For Facilities in Study Area.....	2-4
Table 3-1 Existing Conditions Peak-Hour Intersection LOS Analysis Summary .....	3-5
Table 3-2 Existing Conditions Roadway Segment LOS Summary .....	3-6
Table 4-1 Trip Generation Summary .....	4-1
Table 5-1 Existing with Project Conditions Peak-Hour Intersection LOS Summary.....	5-4
Table 5-2 Existing with Project Conditions Roadway Segment LOS Analysis Summary.....	5-5
Table 5-3 Existing with Project Mitigated Conditions Roadway Segment LOS Summary .....	5-6

## Appendices

**Appendix A** Existing Traffic Signal Timing Sheet

**Appendix B** Traffic Count Sheets

**Appendix C** Synchro Peak-Hour Intersection Analysis Sheets

**Appendix D** Trip Generation and Gap Study Memorandum, August 2018

**Appendix E** Transit Service Information



## EXECUTIVE SUMMARY

This study, prepared by Kimley-Horn and Associates, Inc., evaluates the potential traffic-related impacts associated with the construction of a new Charter High School near the intersection of Chase Avenue and Jamacha Road (SR-54) in the County of San Diego.

Plans for this project are still in the early stages of development, but as currently envisioned, the project would accommodate a maximum of 450 students. Access to the site would be provided along the south side of Chase Avenue with an entry only driveway approximately 600 feet west of the intersection of Jamacha Road (SR-54) and an exit only driveway approximately 400 feet west of Jamacha Road.

The proposed project would generate a total of 585 new daily trips, including 117 (82 in, 35 out) morning peak-hour trips, 99 (33 in, 66 out) afternoon (school traffic) peak-hour trips, and 59 (23 in, 36 out) afternoon (commuter traffic) peak-hour trips.

Based on the County of San Diego criteria for determining traffic related impact, the project would have a direct traffic related impact along Chase Avenue between the westernmost driveway and Jamacha Road. To mitigate this traffic direct impact, the project will widen Chase Avenue to provide a second eastbound lane and will provide sufficient space to accommodate a westbound left-turn lane onto the site. The roadway widening is consistent with Chase Avenue ultimate classification per the Valle de Oro Mobility Element, which states that Chase Avenue is classified as a 4.1B Major Road with Bike Lanes.

The proposed project does not have a traffic related impact at intersections within the study area.

The County's Transportation Impact Fee (TIF) Program/Ordinance provides a mechanism for projects to mitigate cumulative impacts with a "fair share" fee payment. The TIF Program identifies transportation facilities needed to address cumulative impacts caused by future growth. TIF payments are divided into funds for the local Area, Regional, State Highway and Ramps and, if applicable, the Regional Transportation Congestion Improvement Program (RTCIP) to account for future transportation improvement projects. The Liberty Charter High School project is located within the Valle de Oro local fee area within the South region. Payment of TIF mitigates cumulative impacts to less than significant.

# 1 INTRODUCTION

The following traffic impact study has been prepared to determine and evaluate the potential impacts associated with the construction of a new Liberty Charter High School site. **Figure 1-1** depicts the location of the project site in a regional context.

## 1.1 PROJECT DESCRIPTION

The Literacy First Charter Schools District is proposing to construct a new Charter High School site on a vacant 8.83 acre parcel located within the Community of Valle de Oro, in the County of San Diego. **Figure 1-2** shows the proposed site plan for the project. As shown in the site plan, the site is located along the south side of Chase Avenue just west of Jamacha Road (SR-54).

Plans for this project are still in the early stages of development, but as currently envisioned, the project would accommodate a maximum of 450 students. Access to the site would be provided along the south side of Chase Avenue with an entry only driveway approximately 600 feet west of the intersection of Jamacha Road (SR-54) and an exit right-out only driveway approximately 400 feet west of Jamacha Road.

The site would serve 9<sup>th</sup> thru 12<sup>th</sup> grade students. Classes would start at 8:30 a.m. and conclude at 3:30 p.m. Mondays thru Fridays.

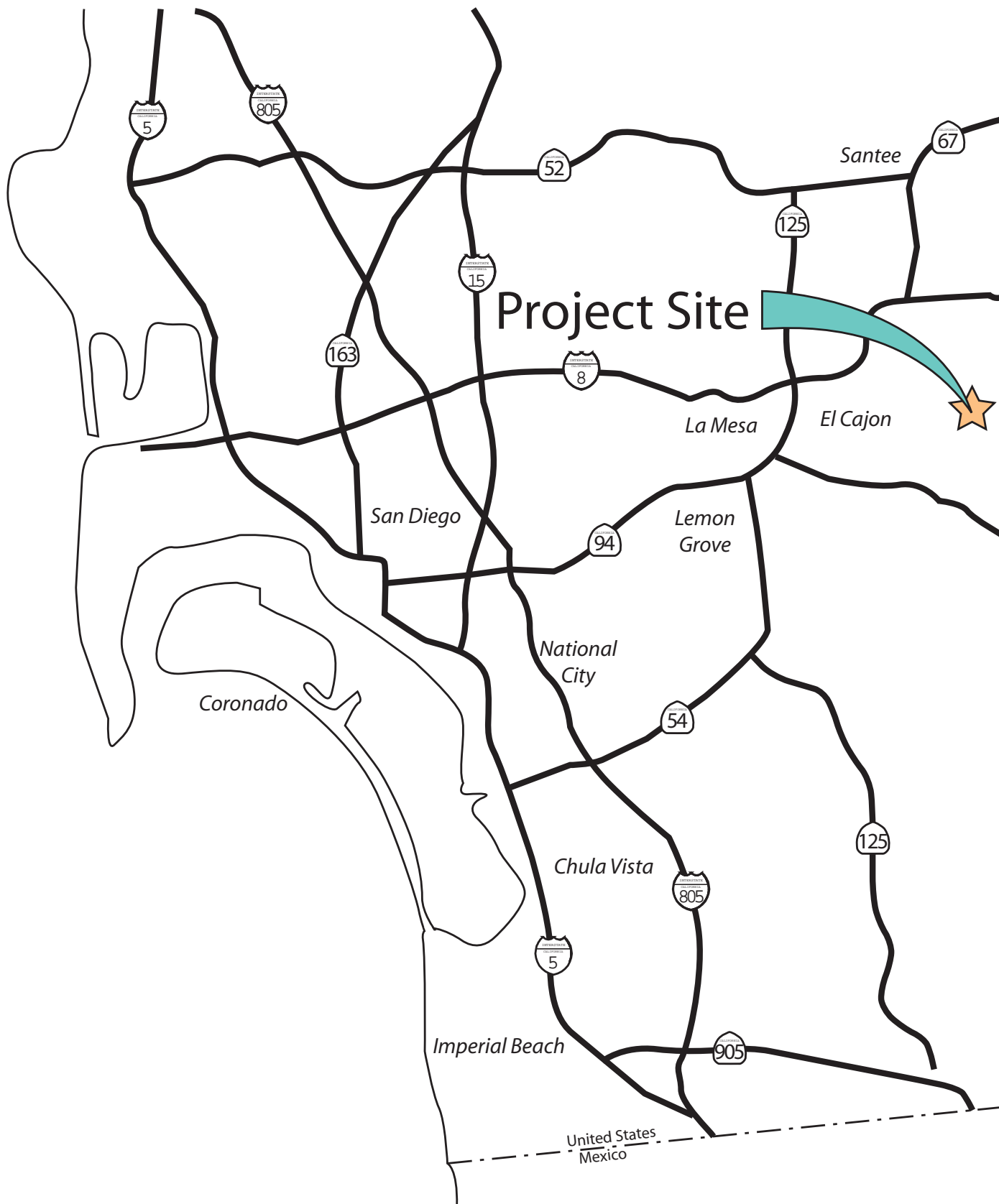
School special events would include the following activities:

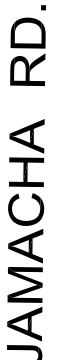
- Parent Orientation Meeting held in late August from 6:00 p.m. to 8:00 p.m.
- Back to School Night held in early September from 7:00 p.m. to 9:00 p.m.
- Open House held in mid-March from 7:00 p.m. to 9:00 p.m.
- Student Body activities during one Friday or Saturday night of each month from 7:00 p.m. to 9:00 p.m.
- Athletic contests are held on Tuesdays and Thursday from 3:30 p.m. to 9:00 p.m.
- Drama production held in late April or early March from 7:00 p.m. to 9:00 p.m.

## 1.2 ANALYSIS SCENARIOS

A total of two scenarios were analyzed as part of the project, which are listed below:

- 1) Existing Conditions (2014): Represents the traffic conditions of the existing street network.
- 2) Existing with Project Conditions (2014): Represents the existing traffic conditions with the addition of the proposed project. Project impacts under this scenario are considered direct impacts.





## 2 METHODOLOGY

The following section describes the methodology used to determine study intersections, perform capacity analysis, and determine significant impacts.

### 2.1 STUDY INTERSECTIONS

The study area was defined based on the estimated traffic generation, likely project traffic patterns, procedures summarized in the *County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements*, Second Modification dated August 24, 2011, and discussions with CALTRANS. The intersections listed in **Table 2-1** were identified for evaluation because they represent primary ingress/egress to and from the project site and the surrounding community.

As shown in Table 2-1, two of the study intersections are signalized and the remaining two are unsignalized intersections. All study intersections are located within the County of San Diego's limits. The intersection of Chase Avenue and Jamacha Road (SR-54) is currently controlled by Caltrans.

Table 2-1 Study Intersections

	Intersection	Traffic Control
1	Chase Avenue and Jamacha Road (SR-54)	Traffic Signal (Caltrans)
2	Project Entry Driveway and Chase Avenue (Future intersection)	Uncontrolled intersection
3	Project Exit Driveway and Chase Avenue (Future intersection)	One-Way Stop Controlled
4	Hillsdale Road and Jamacha Road (SR-54)	Traffic Signal (Caltrans)

### 2.2 ANALYSIS PROCESS

The analysis process includes determining the a.m. and p.m. peak-hour operations at the study intersections and operations daily along the roadway segments. Intersections will be measured and quantified by using the Synchro traffic analysis software package. Results will be compared to the County's thresholds and determined if the project has any significant traffic impacts.

#### 2.2.1 ANALYSIS SOFTWARE

To analyze the operations of both signalized and unsignalized intersections, Synchro 10 (Trafficware) was used for the analysis. Synchro 10 uses the methodologies outlined in the 2000 Highway Capacity Manual (HCM). The existing intersection peak-hour factor (PHF) was used for the intersection of Chase Avenue and Jamacha Road (SR-54). A PHF of 0.92 was used for both future intersections.

Existing traffic signal timing parameters were provided by Caltrans for the intersections of Chase Avenue at Jamacha Road (SR-54) and Hillsdale Road at Jamacha Road (SR-54). Copies of the traffic signal timing plans are included in **Appendix A**.

#### 2.2.2 SIGNALIZED AND UNSIGNALIZED INTERSECTIONS

The 2000 Highway Capacity Manual (HCM) published by the Transportation Research Board establishes a system whereby highway facilities are rated for their ability to process traffic volumes. The terminology "level of service" is used to provide a "qualitative" evaluation based on certain "quantitative" calculations, which are related to empirical values.

Level of service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and loss of travel time. Specifically, LOS criteria are stated in terms of the average control delay per vehicle for the peak 15-minute period within the hour analyzed. The average control delay includes initial deceleration delay, queue move-up time, and final acceleration time in addition to the stop delay. The level of service for unsignalized intersections is determined by the

computed or measured control delay and is defined for each minor movement. The criteria for the various levels of service designations for signalized and unsignalized intersections are given in **Table 2-2**.

Within the County of San Diego, all signalized and unsignalized intersections are considered deficient if they operate at LOS E or F.

Table 2-2 Level of Service (LOS) Criteria for Intersections

LOS	Signalized (Control Delay) (sec/veh) <sup>(a)</sup>	Unsignalized (Control Delay) (sec/veh) <sup>(b)</sup>	Description
<b>A</b>	≤10.0	≤10.0	Operations with very low delay and most vehicles do not stop.
<b>B</b>	>10.0 and ≤20.0	>10.0 and ≤15.0	Operations with good progression but with some restricted movement.
<b>C</b>	>20.0 and ≤35.0	>15.0 and ≤25.0	Operations where a significant number of vehicles are stopping with some backup and light congestion.
<b>D</b>	>35.0 and ≤55.0	>25.0 and ≤35.0	Operations where congestion is noticeable, longer delays occur, and many vehicles stop. The proportion of vehicles not stopping declines.
<b>E</b>	>55.0 and ≤80.0	>35.0 and ≤50.0	Operations where there is significant delay, extensive queuing, and poor progression.
<b>F</b>	>80.0	>50.0	Operations that are unacceptable to most drivers, when the arrival rates exceed the capacity of the intersection.
Source:			
(a)	2000 Highway Capacity Manual, Chapter 16, Page 2, Exhibit 16-2		
(b)	2000 Highway Capacity Manual, Chapter 17, Page 2, Exhibit 17-2		

### 2.2.3 ROADWAY SEGMENTS

In order to determine the impacts on the study area roadway segments, **Table 2-3** has been developed by the County of San Diego and is used as a reference. The segment traffic volumes under LOS E as shown in this table are considered at capacity because at LOS E the v/c Ratio is equal to 1.0.

Table 2-3 County of San Diego Roadway Segment Capacity and Level of Service

Road Class	Lanes	A	B	C	D	E
<b>Expressway (6.1)</b>	6	<36,000	<54,000	<70,000	<86,000	<108,000
<b>Prime Arterial</b>	6	<22,200	<37,000	<44,600	<50,000	<57,000
<b>Major Road 4.1A</b>	4	<14,800	<24,700	<29,600	<33,400	<37,000
<b>Major Road 4.1B w/Intermittent Turn Lanes (4.1B)</b>	4	<13,700	<22,800	<27,400	<30,800	<34,200
<b>Collector</b>	4	<13,700	<22,800	<27,400	<30,800	<34,200
<b>Boulevard w/Raised Median (4.2A)</b>	4	<18,000	<21,000	<24,000	<27,000	<30,000
<b>Boulevard w/Intermittent Turn Lanes (4.2B)</b>	4	<16,800	<19,600	<22,500	<25,000	<28,000
<b>Town Collector</b>	2	<3,000	<6,000	<9,500	<13,500	<19,000
<b>Community Collector w/Raised Median (2.1A)</b>	2	<10,000	<11,700	<13,400	<15,000	<19,000
<b>Community Collector w/Continuous Left Turn Lane (2.1B)</b>	2	<3,000	<6,000	<9,500	<13,500	<19,000
<b>Community Collector w/Intermittent Left Turn (2.1C)</b>	2	<3,000	<6,000	<9,500	<13,500	<19,000
<b>Community Collector w/Passing Lane (2.1D)</b>	2	<3,000	<6,000	<9,500	<13,500	<19,000
<b>Community Collector No Median (2.1E)</b>	2	<1,900	<4,100	<7,100	<10,900	<16,200
<b>Light Collector w/Raised Median (2.2A)</b>	2	<3,000	<6,000	<9,500	<13,500	<19,000
<b>Light Collector w/Continuous Left Turn Lane (2.2B)</b>	2	<3,000	<6,000	<9,500	<13,500	<19,000
<b>Light Collector w/Intermittent Left Turn (2.2C)</b>	2	<3,000	<6,000	<9,500	<13,500	<19,000
<b>Light Collector w/Passing Lane (2.2D)</b>	2	<3,000	<6,000	<9,500	<13,500	<19,000
<b>Light Collector No Median (2.1E)</b>	2	<1,900	<4,100	<7,100	<10,900	<16,200
<b>Rural Collector, Rural Light Collector, Rural Mountain and Recreational Parkway</b>	2	<1,900	<4,100	<7,100	<10,900	<16,200
<b>Minor Collector w/Raised Median (2.3A)</b>	2	<3,000	<6,000	<7,000	<8,000	<9,000
<b>Minor Collector w/Intermittent Left Turn (2.3B)</b>	2	<3,000	<6,000	<7,000	<8,000	<9,000
<b>Minor Collector No Median (2.3C)</b>	2	<1,900	<4,100	<6,000	<7,000	<8,000
<b>Notes:</b> * The values shown are subject to adjustment based on the geometry of the roadway, side frictions, and other relevant factors as determined by the Director, Department of Public Works. ** Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors. *** Rural Residential Collectors and Rural Residential Roads are intended to serve areas with lot sizes of 2 acres or more which do not have a demand for on-street parking. On-street parking is not assured for these cross sections. Additional right-of-way is needed if on-street parking is in paved area. **** See Tables 2A and 2B for roadway surfacing and right-of-way widths. Source: County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements, Second Modification dated August 24, 2011. Table 1						

## 2.3 SIGNIFICANCE DETERMINATION

*The County of San Diego Guidelines for Determining Significance and Report Format and Content Requirement – Transportation and Traffic*, last modified in August 24, 2011, was used as a reference to determine the project impacts to intersections and roadway segments within the County of San Diego. At intersections, the measure of effectiveness (MOE) is based on seconds of delay or the addition of peak-hour trips to a critical movement. On roadway segments, the MOE is based on allowable increases in the ADT for a circulation element road.

**Table 2-4** shows the County of San Diego's criteria for determining levels of significance at intersections and roadway segments. Per the County of San Diego's guidelines, a LOS D operation is acceptable.

Table 2-4 Significance Criteria For Facilities in Study Area

Facility	Measures of Effectiveness (MOE)	Significance Threshold <sup>(a)</sup>
Signalized Intersection	Seconds of delay/Peak-hour trips on critical movement	At LOS E, > 2.0 seconds of delay At LOS F, > 1.0 seconds of delay or 5 peak-hour trips on a critical movement
Unsignalized Intersection	Peak-hour trips	At LOS E, 20 peak-hour trips on a critical movement At LOS F, 5 peak-hour trips on a critical movement
Roadway Segment	Average Daily Traffic (ADT)	At LOS E, >200 ADT for a 2-lane road, >400 ADT for a 4-lane road, and >600 ADT for a 6-lane road At LOS F, >100 ADT for a 2-lane road, >200 ADT for a 4-lane road, and >300 ADT for a 6-lane road
Notes: Source: County of San Diego Guidelines for Determining Significance and Report Format and Content Requirement – Transportation and Traffic, last modified in August 24, 2011		
(a) Significance threshold applies only when the type of facility operates at LOS E or F.		

Two classes of impacts are measured for significance: Direct impacts and cumulative impacts. Direct traffic impacts are those projected to occur with the addition of the proposed project traffic to existing traffic volumes where the County significance criteria (as applicable) are exceeded. Direct impacts are deemed to be mitigated when mitigation measures improve the intersection or roadway segment to an acceptable level of service or equal to or to a level that is better than pre-project conditions.

Cumulative traffic impacts are those projected to occur when project traffic is added to “future traffic,” and where this resulting combined future traffic exceeds County significance criteria. Future traffic is based on additional proposed developments in the area (short-term cumulative) or when the affected community plan area reaches full planned build out (long-term cumulative). A project would be considered to have a cumulatively considerable impact when the addition of the project traffic to a future cumulative impact caused by other developments exceeds the County significance criteria. The County's Transportation Impact Fee (TIF) Program/Ordinance provides a mechanism for project's to mitigate cumulative impacts with a “fair share” fee payment. The TIF Program identifies transportation facilities needed to address cumulative impacts caused by future growth. TIF payments are divided into funds for the local Area, Regional, State Highway and Ramps and, if applicable, the Regional Transportation Congestion Improvement Program (RTCIP) to account for future transportation improvement projects. The Liberty Charter High School project is located within the Valle de Oro local fee area within the South region. Payment of TIF mitigates cumulative impacts to less than significant.



## 3 EXISTING CONDITIONS

This section summarizes the existing roadway circulation network, daily and peak-hour traffic volumes, and operations at the study intersections and roadway segments.

### 3.1 ROAD NETWORK

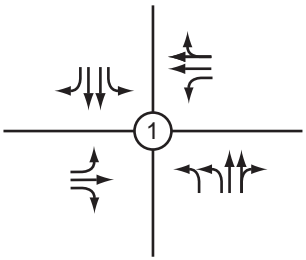
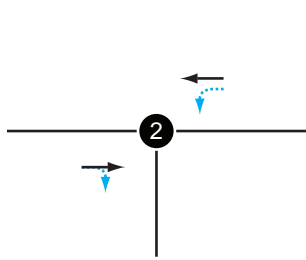
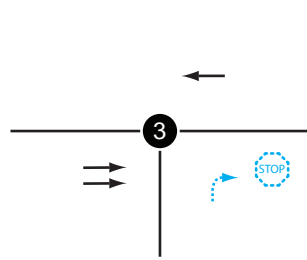
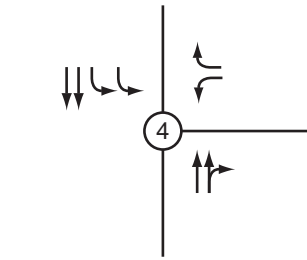
The following provides a description of the existing street system within the vicinity of the project area.

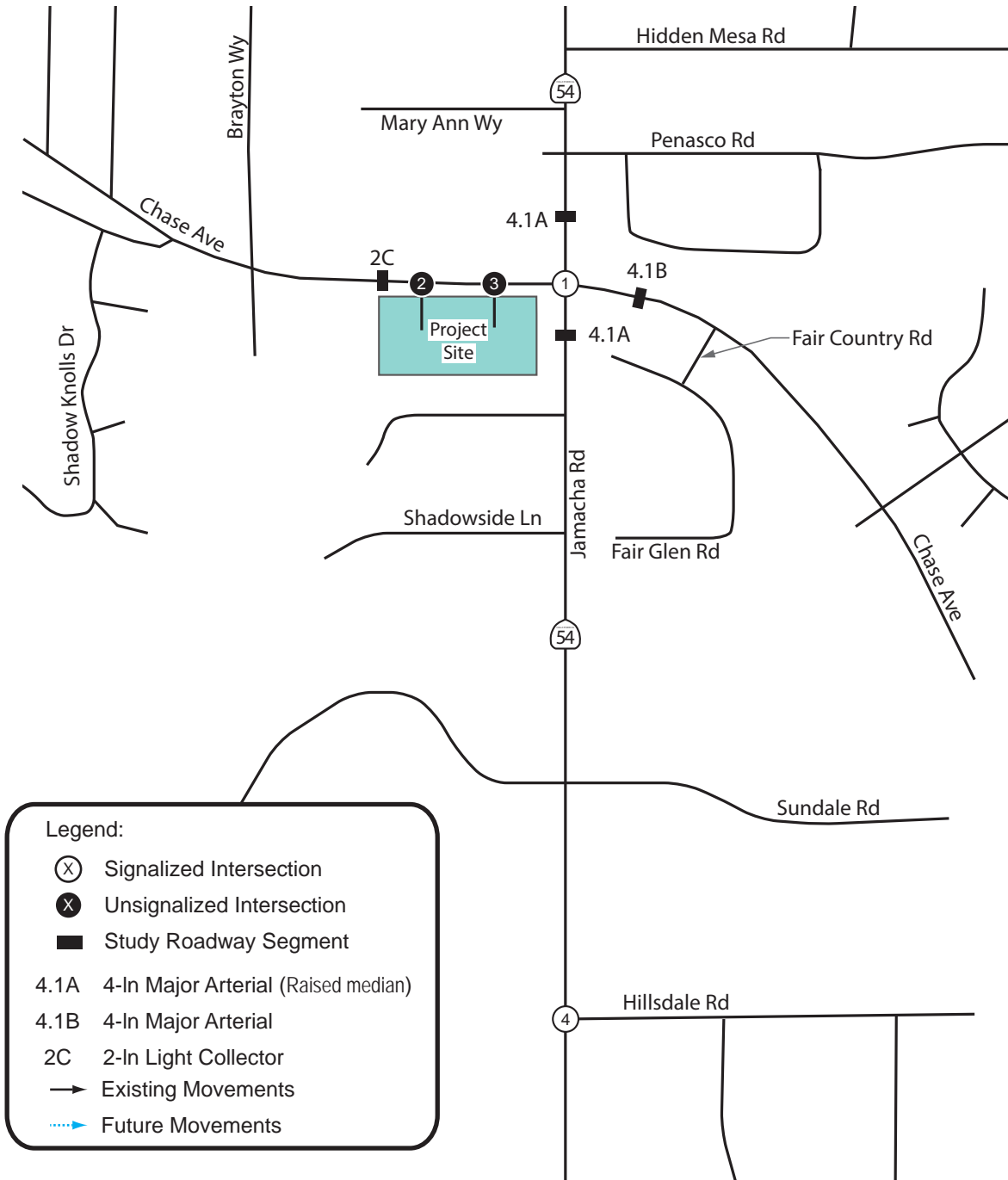
**Chase Avenue** functions as an east/west two-lane light collector along the proposed School frontage and to the west of the site, but it is classified as a four-lane major arterial. Along the project's frontage, sidewalks are only provided along the north side for approximately 100 feet, the rest of the roadway only provides an asphalt dike to separate the edge of pavement from the parkway. Chase Avenue functions as a four-lane major with two lanes in each direction and a painted median. East of Jamacha Road (SR-54), Chase Avenue is built to its ultimate classification of a four-lane major with intermittent left-turn pockets (4.1B), which includes sidewalks, curb and gutter along both sides of the roadway. Parking is not allowed along Chase Avenue due to the existence of a Class II bike lane. The posted speed limit along Chase Avenue is 45 miles per hour.

**Jamacha Road (SR-54)** functions as a north/south four-lane major arterial within the study area. Sidewalk, curb and gutter are provided along both sides of the roadway. Jamacha Road (SR-54) is built to its ultimate classification of a four-lane major Road north of Chase Avenue. South of Chase Avenue, Jamacha Road (SR-64) is classified as a six-lane prime arterial per the Valle de Oro's Mobility Element. Parking is not allowed along Jamacha Road (SR-54) due to the existence of a Class II bike lane. The posted speed limit along Jamacha Road (SR-54) is 45 miles per hour. Jamacha Road (SR-54) is part of Caltrans' transportation network.

**Hillsdale Road** functions as a east/west two-lane light collector within the study area. The roadway does not have sidewalks or curb and gutter. Parking is not allowed along Hillsdale Road due to the existence of a Class II bike lane. The posted speed limit along Hillsdale Road is 40 miles per hour in the eastbound direction, the speed limit is not posted on the westbound direction.

**Figure 3-1** shows the geometrics of the study intersections and roadway segments for the Existing scenario.

Chase Avenue / Jamacha Road	Chase Avenue / Project Driveway 1	Chase Avenue / Project Driveway 2	Hillsdale Road / Jamacha Road
			



## 3.2 TRAFFIC VOLUMES

Existing a.m. (7:00 to 9:00 a.m.) and p.m. (2:00 to 6:00 p.m.) peak-hour turning movement counts were conducted by National Data Services at the intersection of Chase Avenue and Jamacha Road (SR-54) in October 2014. The 24-hour roadway machine counts along the roadway segments within the study area were also collected by National Data Services in October 2014. Existing a.m. (7:00 to 9:00 a.m.) and p.m. (2:00 to 6:00 p.m.) peak-hour turning movement counts were conducted by National Data Services at the intersection of Hillsdale Road and Jamacha Road (SR-54) in February 2015.

**Figure 3-2** illustrates the Existing condition traffic volumes for the study area.

**Appendix B** contains the existing peak-hour traffic volume data at the study intersections and the existing ADT volume data for the roadway segments.

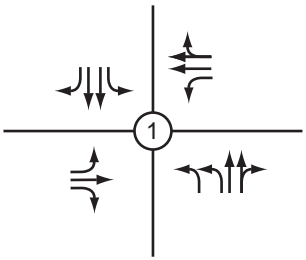
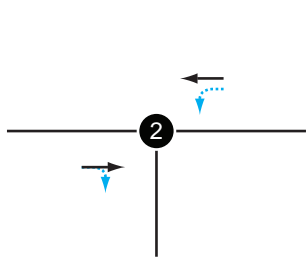
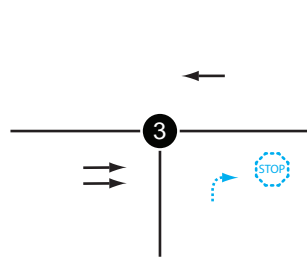
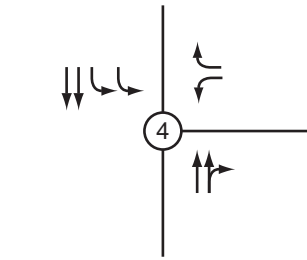
## 3.3 INTERSECTION ANALYSIS

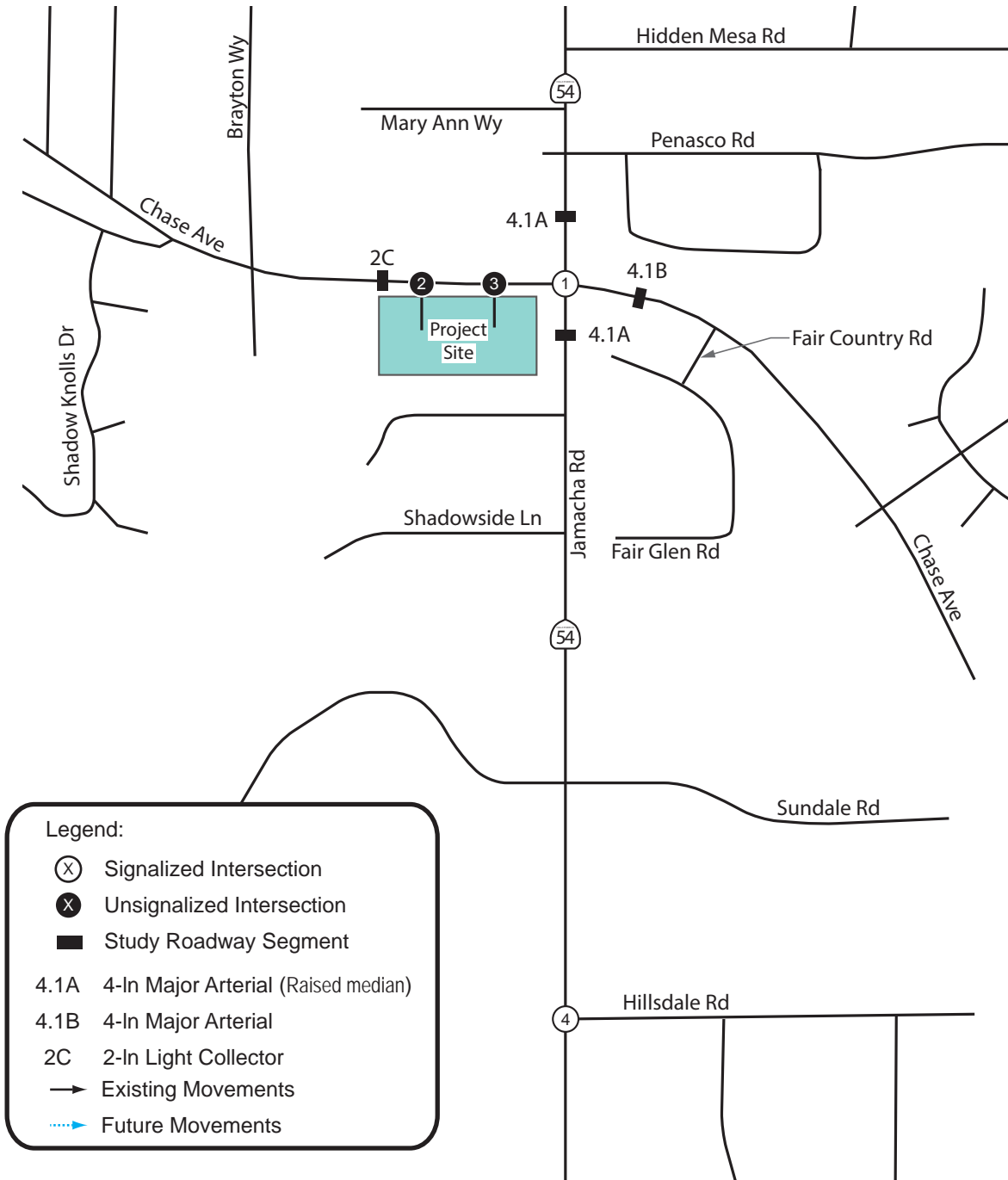
**Table 3-1** displays the LOS analysis results for the study intersections under Existing Conditions. As shown in the table, the intersection of Chase Avenue and Jamacha Road (SR-54) operates at LOS D during all three peak-hour periods evaluated and the intersection of Hillsdale Road and Jamacha Road (SR-54) operates at a LOS C or better during all three peak-hour periods evaluated.

**Appendix C** contains the peak-hour intersections LOS calculation worksheets.

## 3.4 ROADWAY SEGMENT ANALYSIS

**Table 3-2** displays the roadway segment analysis under Existing Conditions. As shown in the table, the roadway segments of Jamacha Road (SR-54) included in the study currently operates at LOS C. The segment of Chase Avenue east of Jamacha Road (SR-54) operates at LOS A. West of Jamacha Road, Chase Avenue operates at LOS F.

Chase Avenue / Jamacha Road	Chase Avenue / Project Driveway 1	Chase Avenue / Project Driveway 2	Hillsdale Road / Jamacha Road
			



**TABLE 3-1**  
**EXISTING CONDITIONS**  
**PEAK-HOUR INTERSECTION LOS SUMMARY**

INTERSECTION		TRAFFIC CONTROL	PEAK HOUR	EXISTING	
				DELAY (a)	LOS (b)
1	Jamacha Rd & Chase Ave	Signal	AM	38.5	D
			PM (School)	47.0	D
			PM (Commuter)	45.0	D
4	Jamacha Rd & Hillsdale Rd	Signal	AM	22.4	C
			PM (School)	22.9	C
			PM (Commuter)	13.0	B

Notes:

(a) Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At a two-way stop-controlled intersection, delay refers to the worst movement.

(b) LOS calculations are based on the methodology outlined in the *2000 Highway Capacity Manual* and performed using Synchro

\\Sndfp01\ca\_snd1\SND\_TPTO\095981000-Literacy First Charter HS\Excel\981000IN01.xlsm]Existing

**TABLE 3-2  
EXISTING CONDITIONS  
ROADWAY SEGMENT LOS SUMMARY**

ROADWAY SEGMENT	ROADWAY CLASSIFICATION (a)	LOS E CAPACITY	ADT (b)	V/C RATIO (c)	LOS
<b>Jamacha Rd</b>					
Chase Avenue to Penasco Road	4 Lane Major Road (4.1A)	37,000	26,170	0.707	C
Chase Ave to Shadowside Ln	4 Lane Major Road (4.1A)	37,000	27,383	0.74	C
<b>Chase Avenue</b>					
Jamacha Rd to Fair County Rd	4 Lane Major Road (4.1B)	34,200	11,884	0.347	A
Jamacha Road to Dwy 1	2 Lane Light Collector without Median	16,200	18,434	1.138	<b>F</b>
Dwy 1 to Brayton Wy	2 Lane Light Collector without Median	16,200	18,434	1.138	<b>F</b>
Notes: <b>Bold</b> values indicate roadway segments operating at LOS E or F. (a) Existing roads street classification is based on the County of San Diego's Public Road Standards. (b) Average Daily Traffic (ADT) volumes for the roadway segments were provided by National Data & Surveying Services and measured in October 2014. (c) The v/c Ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.					

K:\SND\_TPTO\095981000-Literacy First Charter HS\Excel\981000RS01.xlsm]Existing

## 4 PROJECT TRAFFIC

The following section describes the trip generation, distribution, and assignment related to the proposed Liberty Charter High School Project.

### 4.1 TRIP GENERATION

Trip generation for the proposed Liberty Charter HS project was estimated using the San Diego Association of Government (SANDAG) *Brief Guide of Vehicular Traffic Generation rates for the San Diego Region, April 2002*. Since these traffic generation rates do not provide rates for the afternoon school dismissal period, the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9<sup>th</sup> Edition*, was used to estimate the traffic generation from the site during the afternoon period between 3:00 and 4:00 p.m. **Table 4-1** summarizes the trip generation for the proposed project. As shown in the table, the proposed project would generate a total of 585 new daily trips, including 117 (82 in, 35 out) morning peak-hour trips, 99 (33 in, 66 out) afternoon (school traffic) peak-hour trips, and 59 (23 in, 36 out) afternoon (commuter traffic) peak-hour trips.

A Trip Generation and Parking Study Memorandum was completed by Kimley Horn in December 2014 to evaluate the vehicular traffic generation and parking utilization rate for the existing Liberty Charter High School site. For the memorandum, daily, AM and PM peak hour number of vehicles generated by the site were calculated. In addition, a Trip Generation and Gap Study Memorandum was completed by Kimley Horn in August 2018. In this memorandum, additional traffic analysis was completed to determine the potential traffic-related impacts associated with the construction of the new Liberty Charter High School using the existing observed traffic generation rates contained in the December 2014 Memorandum. The August 2018 Memorandum concluded that the results of the study area intersections and roadway segments analysis under Existing with Project Conditions during the AM peak hour are consistent with the findings in this report. The Trip Generation and Gap Study Memorandum is meant to supplement the analysis completed in this report and is included in **Appendix D**.

### 4.2 TRIP DISTRIBUTION

Traffic trip distribution for the Liberty Charter HS project was based on the proposed access locations, roadway network within the study area and anticipated residence of student population. It is anticipated that a large percentage of the student population will reside within the City of El Cajon. **Figure 4-1** illustrates the anticipated traffic distribution for the Liberty Charter HS project.

### 4.3 TRIP ASSIGNMENT

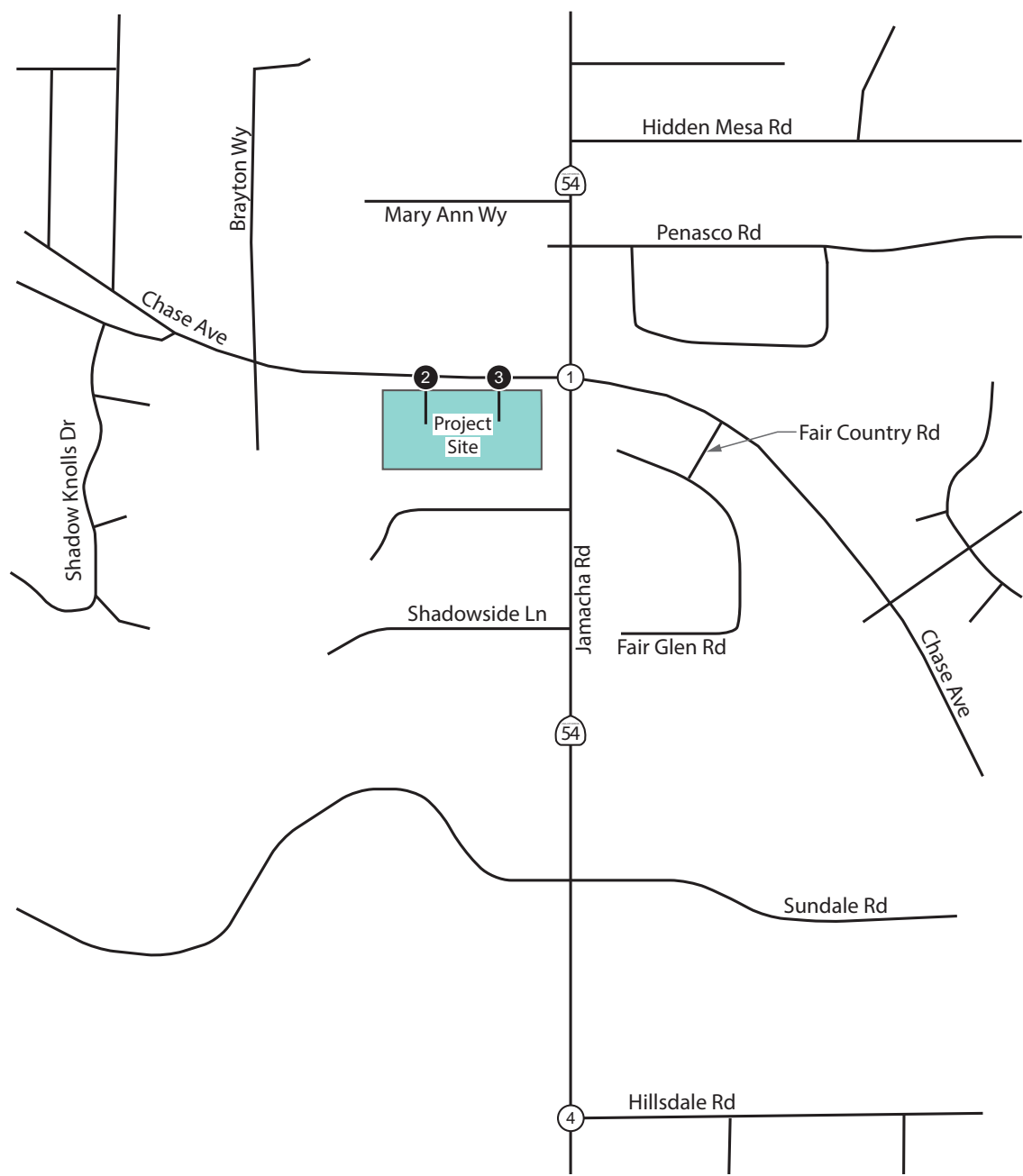
Based on the project trip distributions, daily, a.m. and p.m. (both school and commuter traffic) peak-hour project trips were assigned to the local roadway network and through the study intersections. **Figure 4-2** shows the resulting traffic assignment for the proposed project.

**Table 4-1** Trip Generation Summary

Liberty High School

1	Jamacha Road 33%  (40%) (20%) (40%)	20% Chase Avenue  32%	2	85% Chase Avenue  15% Project Driveway 1	3	85% Chase Avenue  Project Driveway 2 (100%)	4	Jamacha Road (35%) (5%) 5% Hillsdale Rd  27%
---	--	--------------------------------	---	--	---	---	---	--

Legend  
X% / (Y%) = IN / OUT PERCENT DISTRIBUTION





Liberty High School

Legend

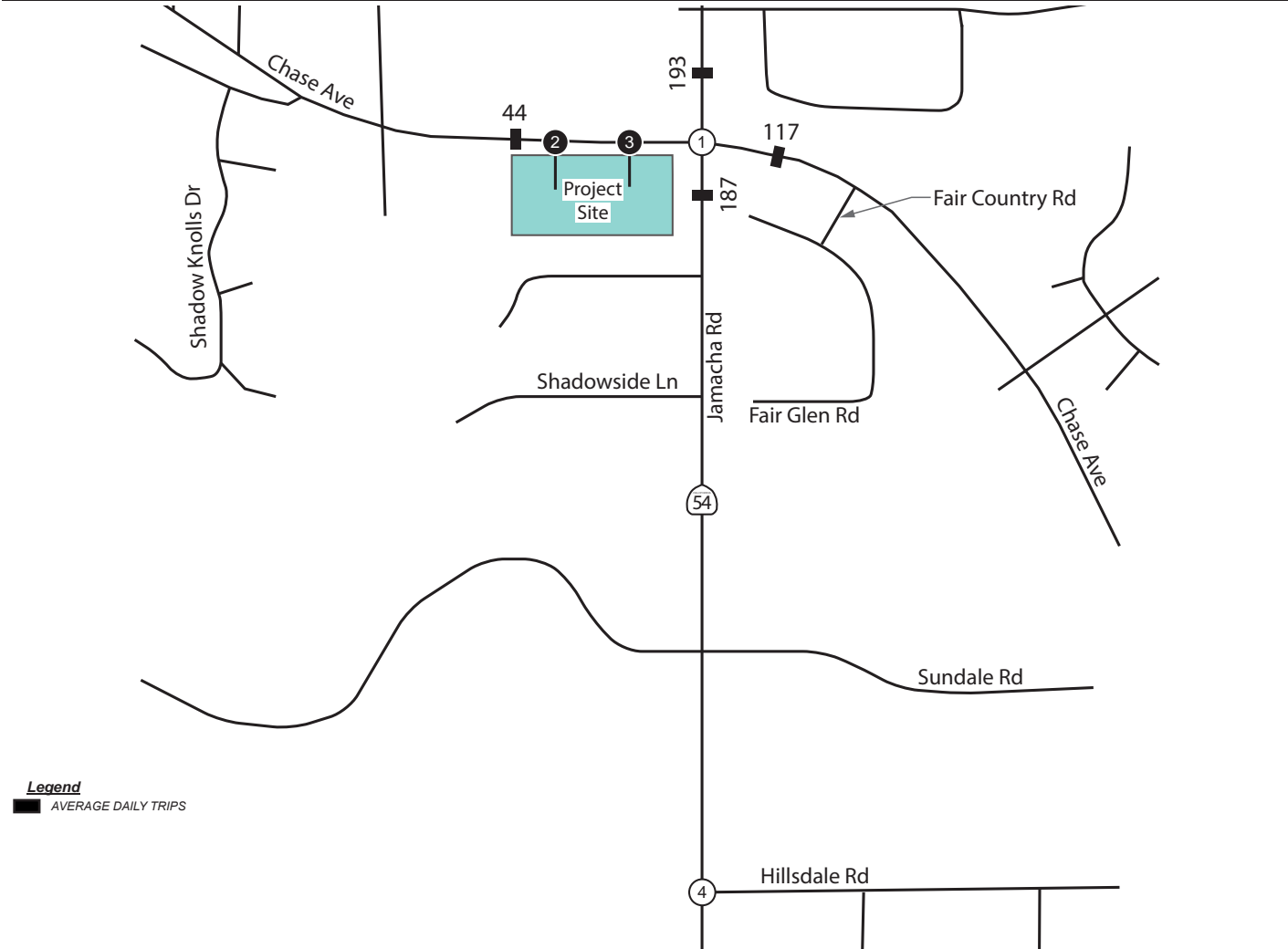
X / Y = 7:45 to 8:45 am / 3:00 to 4:00 pm  
TURNING VOLUMES

1	27 / 11 ↺ Jamacha Road ↻ 16 / 7 Chase Avenue	2	70 / 28 ↺ Chase Avenue	3	70 / 28 ↺ Chase Avenue	4	12 / 23 ↺ Jamacha Road ↻ 4 / 2 Hillsdale Rd ↻ 22 / 9
14 / 26 7 / 13 14 / 26 ↺ ↻ ↺	26 / 11 ↺	12 / 5 ↺ Project Driveway 1		Project Driveway 2 ↺ 35 / 66			

Legend

Z = 4:45 to 5:45 pm TURNING VOLUMES

1	8 ↺ Jamacha Road ↻ 5 Chase Avenue	2	20 ↺ Chase Avenue	3	20 ↺ Chase Avenue	4	13 ↺ Jamacha Road ↻ 1 Hillsdale Rd ↻ 6
14 7 14 ↺ ↻ ↺	7 ↺	3 ↺ Project Driveway 1		Project Driveway 2 ↺ 36			



Legend

■ AVERAGE DAILY TRIPS

## 5 EXISTING WITH PROJECT CONDITIONS

This section provides a description of existing conditions with the addition of the proposed Liberty Charter HS project traffic.

### 5.1 ROAD NETWORK

With the construction of the new project site, the following roadway improvements will be completed:

- Chase Avenue will be widened between the west end of the project site to the intersection of Jamacha Road (SR-54) to accommodate an additional eastbound travel lane.
- Chase Avenue will be restriped to accommodate a 300 feet long westbound left-turn pocket into the site.

All other intersection and roadway segment configuration will remain as shown under existing conditions.

With the construction of the new project site, the following intersection improvements will be completed:

- Sidewalks and curb ramps at the intersection of Jamacha Road and Chase Avenue will be reconstructed to current standards per Caltrans DIB 82-06.
- The intersection of Jamacha Road and Chase Avenue will be reconstructed to integrate motorized, transit, pedestrian and bicycle travel per Caltrans Complete Streets Deputy Directive-64-R1.

### 5.2 TRAFFIC VOLUMES

Traffic volumes for the Existing with Project conditions were estimated by adding the project traffic to the existing traffic volumes. **Figure 5-1** illustrates the Existing with Project conditions traffic volumes for intersections and roadway segments.

### 5.3 INTERSECTION ANALYSIS

**Table 5-1** displays the LOS analysis results for the study intersections under the existing with and without the proposed project. As shown in the table, all study intersections would operate at LOS D or better with the addition of the project traffic. The proposed project would not have a direct traffic related impact at the intersections within the study area. **Appendix C** contains the peak-hour intersections LOS calculation worksheets.

### 5.4 ROADWAY SEGMENT ANALYSIS

**Table 5-2** displays the roadway segments analysis under existing with and without the proposed project traffic. As shown in the table, with the addition of the traffic generated by the project, a direct traffic related impact would be caused along Chase Avenue between the western most project driveway and Jamacha Road (SR 54). West of the project, Chase Avenue will operate at LOS F, however, based on the County of San Diego's thresholds, the traffic associated with the proposed project would not cause a significant impact along this section of the roadway. **Table 5-3** shows the results of the same roadway segment analysis with the widening of Chase Avenue as previously described. As shown in the table, with the proposed roadway widening to be constructed as part of the project, the segment of Chase Avenue between the western most project driveway and Jamacha Road (SR 54) would operate at LOS C. With the proposed widening of Chase Avenue, the project would not have a traffic related impact along the roadway segments within the study area.

Liberty High School

Legend

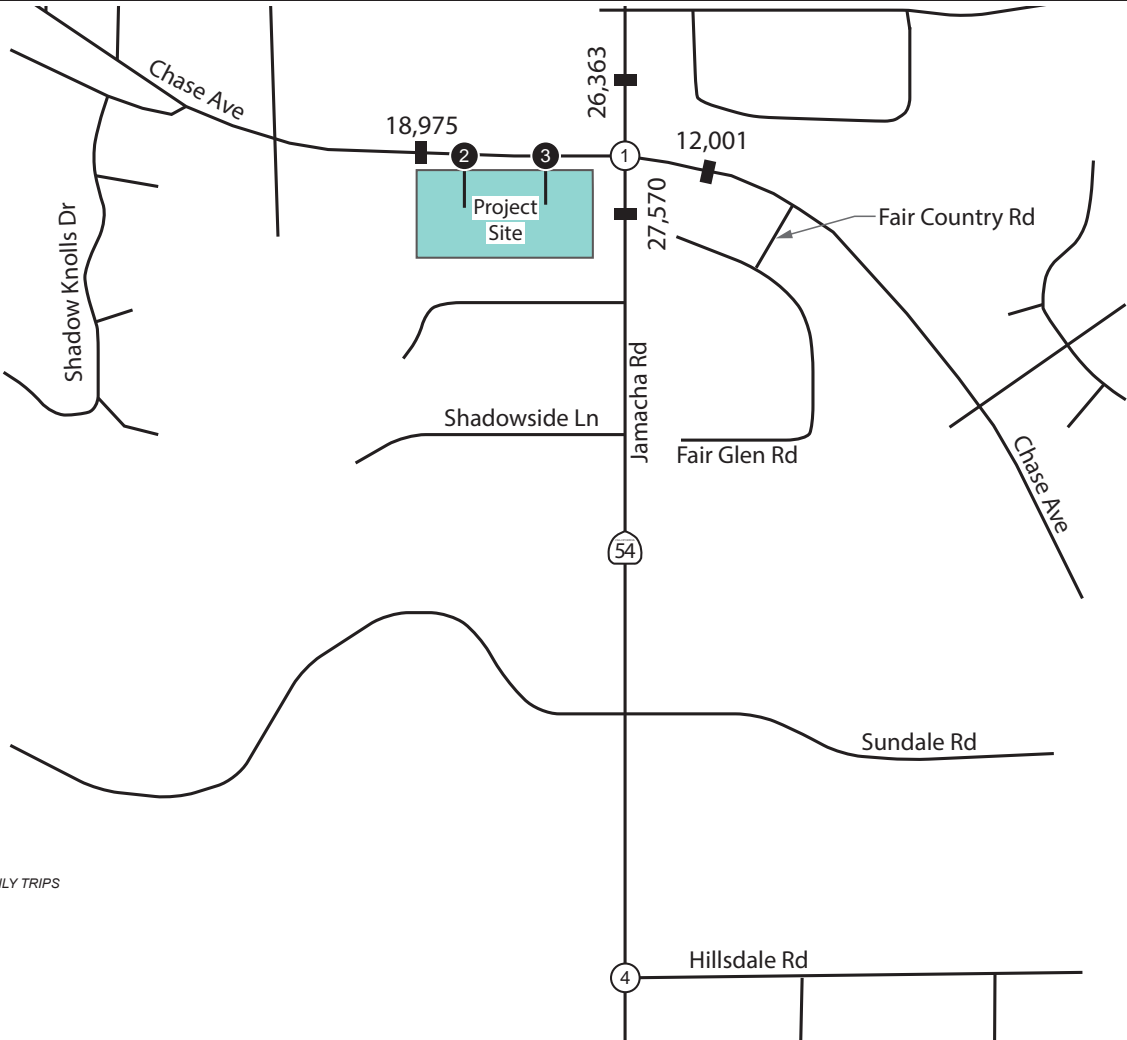
X / Y = 7:45 to 8:45 am / 3:00 to 4:00 pm  
TURNING VOLUMES

1		2		3		4	
↻ 181 / 87 ↻ 682 / 791 ↻ 137 / 179 Jamacha Road		↻ 200 / 190 ↻ 412 / 305 ↻ 21 / 50 Chase Avenue		↻ 834 / 677 ↻ 70 / 28 Chase Avenue		↻ 904 / 705 Chase Avenue	
105 / 184 226 / 381 336 / 352 ↻ ↻ ↻ ↻ ↻ ↻		310 / 314 664 / 816 12 / 28 ↻ ↻ ↻ ↻ ↻ ↻		632 / 852 12 / 5 ↻ ↻ ↻ Project Driveway 1		632 / 852 ↻ Project Driveway 2 35 / 66 ↻	
						↻ 1035 / 884 ↻ 112 / 80 Jamacha Road	
						↻ 82 / 91 ↻ 242 / 249 Hillsdale Rd	
						↻ 915 / 953 ↻ 198 / 195	

Legend

Z = 4:45 to 5:45 pm TURNING VOLUMES

1	83 ↻ 816 ↻ 167 Jamacha Road	↻ ↻ 157 ↻ 210 ↻ 31	2	↻ ↻ 528 ↻ 20	3	↻ ↻ 548	4	↻ ↻ 1126 ↻ 37 Jamacha Road	↻ ↻ 25 ↻ 126				
	Chase Avenue								Chase Avenue		Chase Avenue		Hillsdale Rd
	199 415 409 ↻ ↻ ↻	↻ 255 ↻ 752 ↻ 26 ↻							↻ ↻ 988 ↻ ↻ Project Driveway 1	↻ ↻ 988 ↻ ↻ Project Driveway 2	↻ 36	↻ 882 ↻ 142	



Legend

■ AVERAGE DAILY TRIPS

**TABLE 5-1**  
**EXISTING WITH PROJECT CONDITIONS**  
**PEAK-HOUR INTERSECTION LOS SUMMARY**

INTERSECTION		PEAK HOUR	EXISTING BASELINE		EXISTING BASELINE PLUS PROJECT			
			DELAY (a)	LOS (b)	DELAY (a)	LOS (b)	Δ (c)	SIGNIFICANT?
1	Jamacha Rd & Chase Ave	AM	38.5	D	40.6	D	2.1	NO
		PM (School)	47.0	D	49.4	D	2.4	NO
		PM (Commuter)	45.0	D	47.1	D	2.1	NO
2	Chase Ave & Dwy 1	AM	This intersection will be constructed as part of the project		9.4	A	-	NO
		PM (School)			10.1	B	-	NO
		PM (Commuter)			10.8	B	-	NO
3	Chase Ave & Dwy 2	AM	This intersection will be constructed as part of the project		13.8	B	-	NO
		PM (School)			19.2	C	-	NO
		PM (Commuter)			20.8	C	-	NO
4	Jamacha Rd & Hillsdale Rd	AM	22.4	C	22.5	C	0.1	NO
		PM (School)	22.9	C	22.9	C	0.0	NO
		PM (Commuter)	13.0	B	12.3	B	-0.7	NO

Notes:

(a) Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At a one-way stop-controlled intersection, delay refers to the worst movement.

(b) LOS calculations are based on the methodology outlined in the *2000 Highway Capacity Manual* and performed using Synchro

(c) Change in delay due to addition of project traffic

**TABLE 5-2**  
**EXISTING WITH PROJECT CONDITIONS**  
**ROADWAY SEGMENT LOS SUMMARY**

ROADWAY SEGMENT	ROADWAY CLASSIFICATION	LOS E CAPACITY	EXISTING BASELINE			EXISTING PLUS PROJECT			Δ in ADT	Δ in V/C	SIGNIFICANT?
			ADT	V/C RATIO (a)	LOS	ADT	V/C RATIO (a)	LOS			
Jamacha Rd											
Chase Avenue to Penasco Road	4 Lane Major Road (4.1A)	37,000	26,170	0.707	C	26,363	0.713	C	193	0.006	NO
Chase Ave to Shadowside Ln	4 Lane Major Road (4.1A)	37,000	27,383	0.74	C	27,570	0.745	C	187	0.005	NO
Chase Avenue											
Jamacha Rd to Fair County Rd	4 Lane Major Road (4.1B)	34,200	11,884	0.347	A	12,001	0.351	A	117	0.004	NO
Jamacha Road to Dwy 1	2 Lane Light Collector without Median	16,200	18,434	1.138	F	18,975	1.171	F	541	0.033	YES
West of Dwy 1	2 Lane Light Collector without Median	16,200	18,434	1.138	F	18,478	1.141	F	44	0.003	NO

Notes:

**Bold** values indicate roadway segments operating at LOS E or F. **Bold and shaded** values indicate a project significant impact

(a) The v/c Ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.

**TABLE 5-3**  
**EXISTING WITH PROJECT MITIGATED CONDITIONS**  
**ROADWAY SEGMENT LOS SUMMARY**

ROADWAY SEGMENT	WITH PROJECT ADT	BEFORE IMPROVEMENT				AFTER IMPROVEMENT			
		ROADWAY CLASSIFICATION	LOS E CAPACITY	V/C RATIO (a)	LOS	ROADWAY CLASSIFICATION	LOS E CAPACITY	V/C RATIO (a)	LOS
Chase Avenue									
Jamacha Road to Dwy 1	18,975	2 Lane Light Collector without Median	16,200	1.171	F	3 Lane Major Road	25,650	0.74	C
Notes: Bold values indicate roadway segments operating at LOS E or F. (a) The v/c Ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity. A 3 Lane Major Road (4.1B) represents the half width improvements along Chase Ave between Driveway 1 and Jamacha Road. This roadway is classified as a 4 Lane Major Road (4.1B). The capacity for 3 lane facility this roadway classification was assumed to be 0.75% of the full capacity 4 lane facility									

K:\SND\_TPTO\095981000-Literacy First Charter HS\Excel\981000RS01.xlsm\Existing WP Mit

## 6 OTHER TOPICS

This section provides a description of transit, drop-off and pick-up operations and parking evaluation for the project.

### 6.1 TRANSIT

The project site location is currently served by the following Metropolitan Transit System (MTS) bus route:

- Route 816 runs from the El Cajon Transit Center to the Cuyamaca College via Marshall Avenue, Main Street, Washington Avenue and Jamacha Road (SR-54). The closest bus stop to the site is located at the intersection of Chase Avenue and Jamacha Road (SR 54), which is approximately 600 feet from the site entrance. The route provides service ranging with headways every 30 minutes from Monday to Friday from 5:45 am to 7:09 pm. Service is not provided on weekends and or holidays.

No changes in transit services or major change to the stop locations are proposed as part of this project. A copy of the route maps and timetables for the trolley and bus routes can be found in **Appendix E**. However, with the construction of the new project site, the southbound bus stops on Jamacha Road near Chase Avenue will be upgraded per section 4.3.16 of Caltrans DIB 82-06.

### 6.2 DROP-OFF AND PICK-UP OPERATION

As currently designed, the project site will provide two access driveways along Chase Avenue. The westernmost driveway will function as an entry only uncontrolled driveway, while the easternmost driveway will operate as an exit right-out only driveway. Access in and out of these driveways will be controlled with pavement markings and signs to indicate the directionality of the driveways. Figure 6-1 shows the proposed pavement markings and sign installations.

Within the site, approximately 700 linear feet of drop-off/pick-up area will be provided, which would accommodate 28 vehicles queuing on-site at any given time. The 28 vehicles storage space would accommodate typical drop-off/pick-up operations of the school.

### 6.3 PARKING

Per the County of San Diego's Zoning Ordinance 6764, the proposed site will be required to provide the following:

- 1 parking space per employee;
- 15 parking spaces for visitors; and
- 0.25 parking spaces per student;

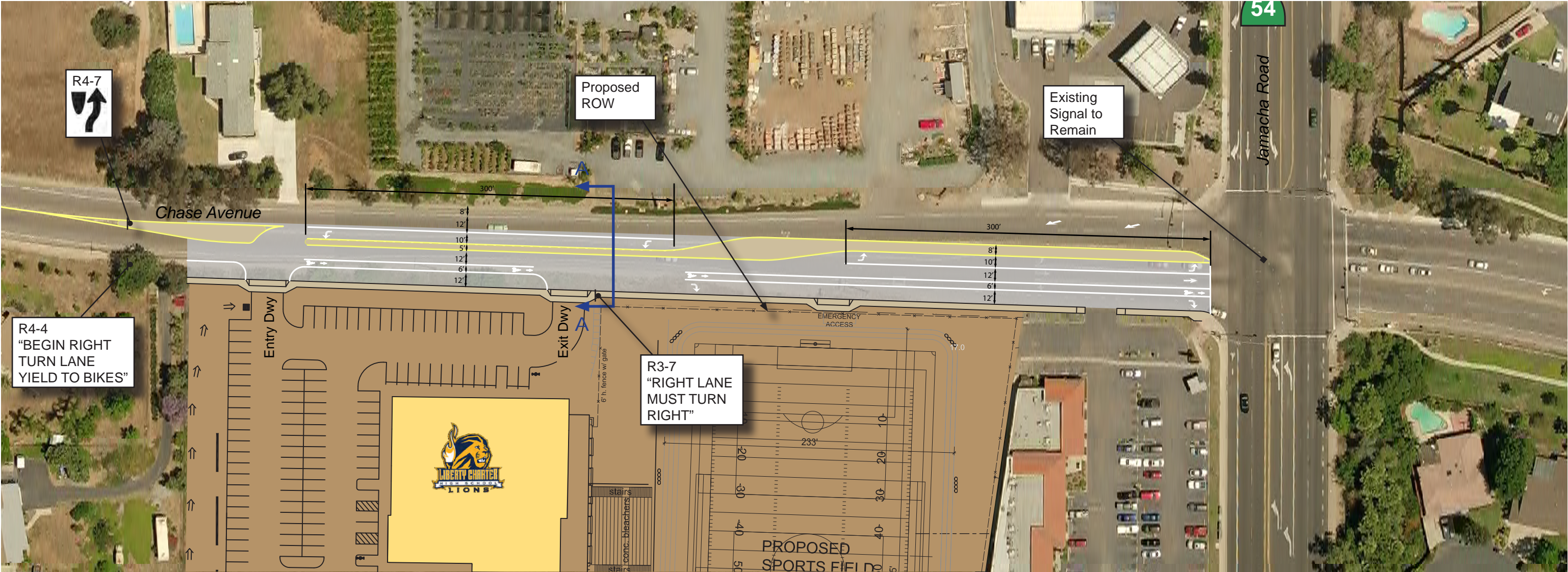
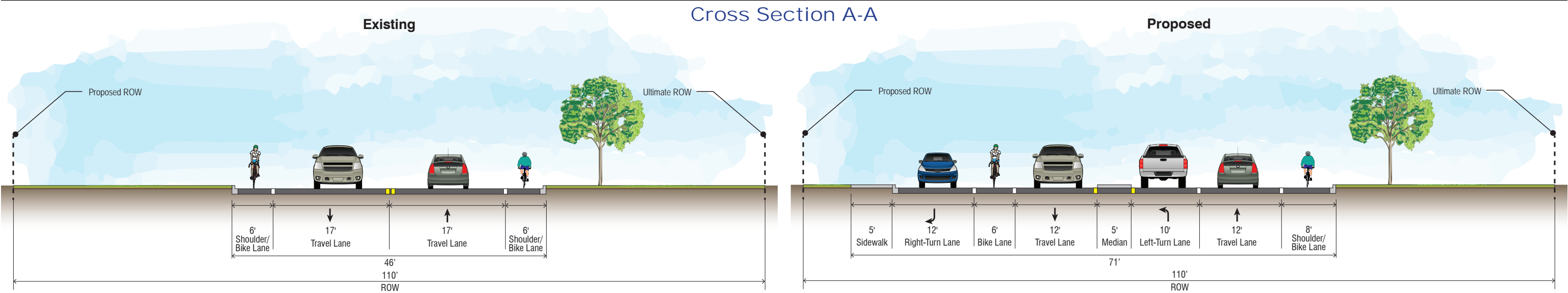
Based on the above listed rates, the project is required to provide the following parking spaces:

- 33 parking spaces for employees;
- 15 parking spaces for visitors; and
- 113 parking spaces for students ( $0.25 \times 450 = 113$ )

The total parking spaces required by the site is 161. As currently designed, the project will provide a total of 161 parking spaces, including 3 accessible standard parking spaces and 1 van accessible space.

In addition to the vehicular parking spaces, the site will provide a minimum of 45 bicycle parking spaces.







## 6.4 GAP STUDY

A Trip Generation and Gap Study Memorandum was completed by Kimley Horn in August 2018 to determine if there were enough gaps in eastbound traffic on Chase Avenue to permit the westbound vehicles to turn left into the new school site. In the context of the study performed, a *gap* refers to the time duration (in seconds), measured at the same point in space, between the rear bumper and the front bumper of two consecutive vehicles. A figure displaying the definition of a gap and how it was observed in context to the Liberty Charter High School site is included in **Appendix D**. Based on the field observations and Gap Study performed in September 2016, the Memorandum recommended to shift the starting time for the new school so that it is not between 8:00 and 8:15 AM. Making the school time earlier or later will avoid conflicts with the heavy eastbound traffic volumes that occur on Chase Avenue between 8:00 and 8:30 AM and process vehicles into the site more quickly. The Gap Study and Memorandum is meant to supplement the analysis completed in this report and is included in **Appendix D**.

## APPENDIX A

---

### EXISTING TRAFFIC SIGNAL TIMING SHEET

3/19/2013

INTERVAL	PHASE TIMING								PRE-EMPTION	F							
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
0 WALK	1	7	1	7	1	7	1	7	CLK RST	PERMIT	1	2	3	4	5	6	7
1 DONT WALK	1	29	1	29	1	29	1	29	RR1 CLR	RED LOCK	1	2	3	4	5	6	7
2 MIN GREEN	5	10	5	5	5	10	5	5	EVA DLY	YEL LOCK							
3 TYPE 3 DET	0	0	0	0	0	0	0	0	EVA CLR	V RECALL	2				6		
4 ADD/VEH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	EVB DLY	P RECALL							
5 PASSAGE	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0	EVB CLR	RED PHASES	2		4		6		8
6 MAX GAP	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0	EVC DLY	RT OLA							
7 MIN GAP	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0	EVC CLR	RT OLB							
8 MAX EXT	20	25	25	25	20	25	25	25	EVD DLY	DBL ENTRY							
9 MAX 2	30	70		35	30	70		45	EVD CLR	MAX 2 PHASES	1	2		4	5	6	8
A MAX 3									MO	LAG PHASES							
B									DAY	RED REST							
C REDUCE BY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RR2 CLR	REST-IN-WALK							
D EVERY	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		MAX 3 PHASES							
E YELLOW	3.2	4.3	3.2	4.3	3.2	4.3	3.2	4.3		YEL START UP	2				6		
F RED	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	SEC	FIRST PHASE		3				7	
3.5' PED XING FT		102		102		102		102			1	2	3	4	5	6	7
BIKE XING FT																	

Note: Speed=45MPH

ENTRIES IN THESE LOCATIONS CAN BE CHANGED IN CCI FLASH ONLY



FOC LONG FAILURE	
FOD SHORT FAILURE	
FOE	30
FOF	5

FCO	3
FC1	3
FC2	10
FCA	0.0
FCB	0.0
FCC	0.0
FCD	0.0

FDO TB SELECT	1
FD3 PED SELECT	0
FD4 7 WIRE	0
FD5 PERMISSIVE	0
FD8 OS SEEKING	1

CO5 FLASH TYPE	1
CC2 DOWNLOAD	1

	CONTROL PLANS									Y-COORD		LAG PHASE		FLAGS							
	1	2	3	4	5	6	7	8	9	C	D	E	F	1	2	3	4	5	6	7	8
0 CYCLE LENGTH													LAG FZ FREE		2		4		6		8
1 FZ1 GRN FCTR												GAPOUT CP1	LAG FZ CP 1								1
2												GAPOUT CP2	LAG FZ CP 2								2
3 FZ3 GRN FCTR												GAPOUT CP3	LAG FZ CP 3								3
4 FZ4 GRN FCTR												GAPOUT CP4	LAG FZ CP 4								4
5 FZ5 GRN FCTR												GAPOUT CP5	LAG FZ CP 5								5
6												GAPOUT CP6	LAG FZ CP 6								6
7 FZ7 GRN FCTR												GAPOUT CP7	LAG FZ CP 7								7
8 FZ8 GRN FCTR												GAPOUT CP8	LAG FZ CP 8								8
9 MULTI CYCLE												GAPOUT CP9	LAG FZ CP 9								9
A OFFSET A											OFFSET		LAG C COORD								A
B OFFSET B													LAG D COORD								B
C OFFSET C													COORD FAZES		2			6			C
D FZ 3 EXT																					D
E FZ 7 EXT																					E
F OFFSET INTRPT																					F

CO1 MANUAL CP  
CO2 MASTER CP  
CO3 CURRENT CP  
CO4 LAST CP  
CO7 TRNSMT CP  
COD MANUAL OFFSET  
CAO LOCAL CYCLE TIMER  
CBO MASTER CYCLE TIMER  
CAA LOCAL OFFSET  
CBA MASTER OFFSET

FEATURE		LOCATION	
1	OFF	1	ON
1		1	1
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	

COO = 1

CCB/CDB OFFSET TIMER  
CCC/CDC LAG GREEN TIMER  
CCD/CDD FORCE OFF TIMER  
CCE/CDE LONG GREEN TIMER  
CCF/CDF NO GREEN TIMER

E PAGE

		D								E								F									
		FLAGS								FLAGS								FLAGS									
	MAX	1	2	3	4	5	6	7	8	MIN	1	2	3	4	5	6	7	8	PED	1	2	3	4	5	6	7	8
0	RCL									RCL									RCL								
1	CP 1									CP 1									CP 1								
2	CP 2									CP 2									CP 2								
3	CP 3									CP 3									CP 3								
4	CP 4									CP 4									CP 4								
5	CP 5									CP 5									CP 5								
6	CP 6									CP 6									CP 6								
7	CP 7									CP 7									CP 7								
8	CP 8									CP 8									CP 8								
9	CP 9									CP 9									CP 9								
A																			RCL 1								
B																			RCL 2								
C																											
D																											
E																											
F																											
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8

E		FLAGS								F		FLAGS							
FUNCTION	1	2	3	4	5	6	7	8	FUNCTION	1	2	3	4	5	6	7	8		
0									CODE 4					5			0		
1									CODE 5	1							1		
2									C-RECALL								2		
3									D-RECALL								3		
4									EXCLUSIVE								4		
5									2 PHD	2							5		
6									6 PHD						6		6		
7									4 PHD			4					7		
8									8 PHD							8	8		
9																	9		
A	OLA NOT								OLA ON								A		
B	OLB NOT								OLB ON								B		
C	OLC NOT								OLC ON								C		
D	OLD NOT								OLD ON								D		
E																	E		
F																	F		
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		

## LAST POWER FAILURE REGISTER

HOUR = D-A-E

MINUTE = D-B-E

DAY = D-C-E

## LAST FLASH TIME REGISTER

HOUR = D-A-E

MINUTE, = D-B-E

DAY = D-C-H

RCL 1 = TIME OF DAY MAX RECALL (1ST SELECT) PHASES

(CALL ACTIVE LIGHTS)

RCL 2 = TIME OF DAY MAX RECALL (2ND SELECT) PHASES

(CALL ACTIVE LIGHTS)

## D-E-E = C8 VERSION NUMBER

D-E-F = LITHIUM BATTERY CONDITION

84 = BALD

85 = GOOD

3/19/2013

9 PAGE CO9 = 0 or 1

9 PAGE CO9 = 2

TIME OF DAY ACTIVITY TABLE												
7+EVENT+HR+MIN+ACT+"E"+ON/OFF+DOW	LTS											
HR	MIN	ACT	OFF	ON	S	M	T	W	T	F	S	
0	07	00	5	ON		2	3	4	5	6	7	
1	08	20	5			2	3	4	5	6		
2	14	19	4	ON		2	3	4	5	6		
3	15	14	4			2	3	4	5	6		
4	06	00	2	ON	1	2	3	4	5	6	7	
5	19	00	2		1	2	3	4	5	6	7	
6												
7												
8												
9												
A												
B												
C												
D												
E												
F												

ACTIVITY CODE

- 1 TYPE OF MAX TERMINATION
- 2 MAX 2
- 3 MAX 3
- 4 COND SERV (1ST SELECT)
- 5 COND SERV (2ND SELECT)
- 6 ENERGIZE AUX OUTPUT-RED
- 7 ENERGIZE AUX OUTPUT-GREEN

CONTROL PLAN TIME OF DAY												
9+EVENT+HR+MIN+CP+OS+E+DOW												
HR	MIN	CP	OS	S	M	T	W	T	F	S		
0												
1												
2												
3												
4												
5												
6												
7												
8												
9												
A												
B												
C												
D												
E												
F												

CONTROL PLAN TIME OF DAY												
9+EVENT+HR+MIN+CP+OS+E+DOW												
HR	MIN	CP	OS	S	M	T	W	T	F	S		
0												
1												
2												
3												
4												
5												
6												
7												
8												
9												
A												
B												
C												
D												
E												
F												

- 8 ENERGIZE AUX OUTPUT-YELLOW
- 9 TIME OF DAY MAX RECALL (1ST SELECT)
- A TRAFFIC ACT. MAX 2 OPERATION
- B TIME OF DAY MAX RECALL (2ND SELECT)
- C YELLOW YIELD COORDINATION
- D YELLOW YIELD COORDINATION
- E TIME OF DAY FREE OPERATION
- F FLASHING OPERATION

ORIGINAL SCALE IN INCHES

21/01/2008 11:26/2008 11:24

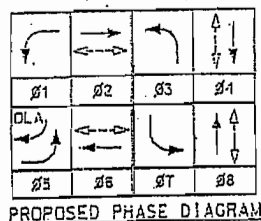
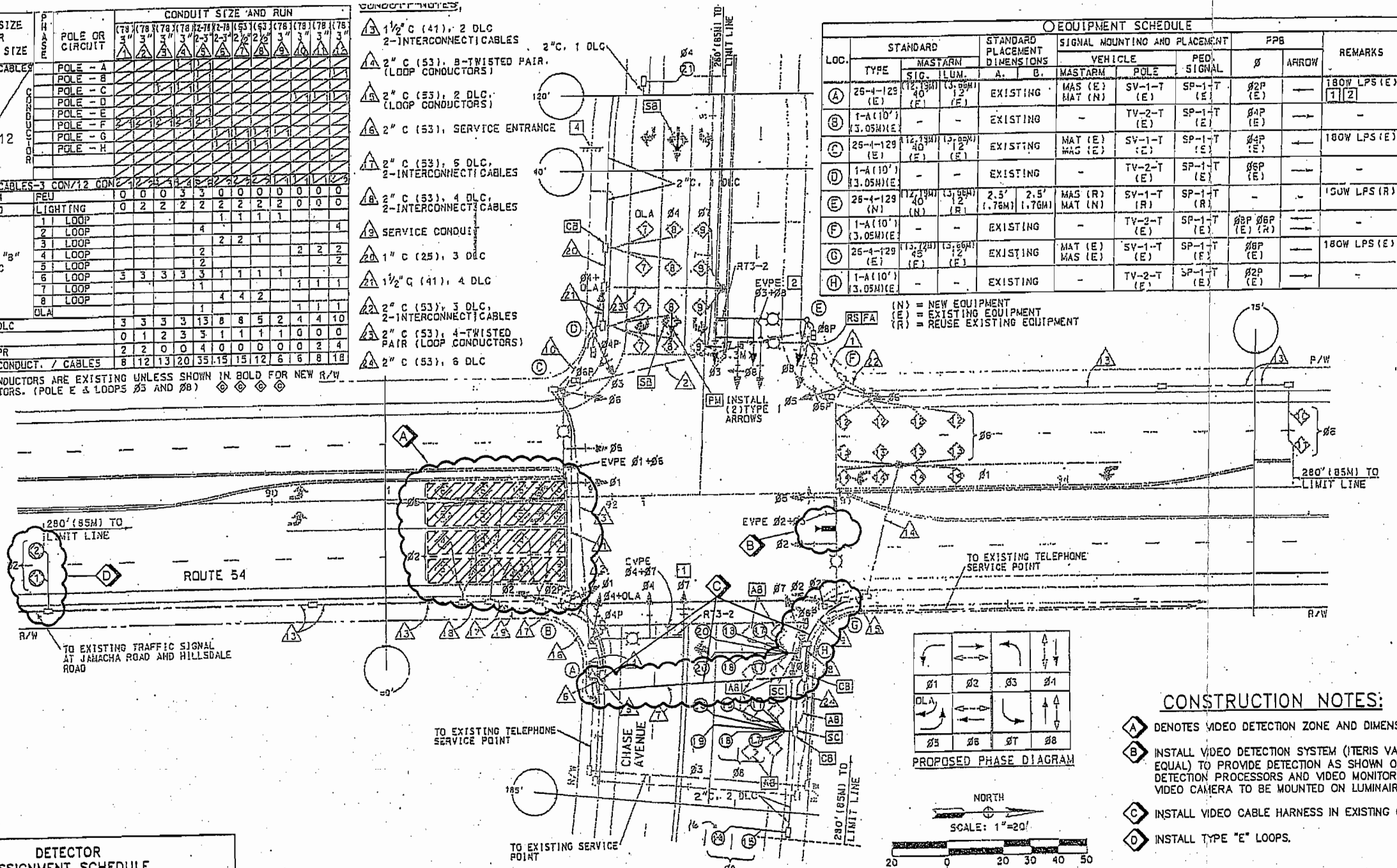
AWG SIZE OR CABLE SIZE	POLE OR CIRCUIT	CONDUIT SIZE AND RUN															
		(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)	(78)
NO. 14 CABLES	POLE - A																
	POLE - B																
	POLE - C																
	POLE - D																
	POLE - E																
	POLE - F																
	POLE - G																
	POLE - H																
12																	
TOTAL CABLES - 3 CON/12 CON		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	FEU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	LIGHTING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYPE "B" DLC	1 LOOP																
	2 LOOP																
	3 LOOP																
	4 LOOP																
	5 LOOP																
	6 LOOP																
	7 LOOP																
	8 LOOP																
TOTAL DLC		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
V-DLC		0	1	2	3	3	1	1	1	1	0	0	0	0	0	0	0
V-DLC PR		2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CONDUCT. / CABLES		8	12	13	20	35	15	15	12	6	6	8	18				

ALL CONDUCTORS ARE EXISTING UNLESS SHOWN IN BOLD FOR NEW R/W  
CONDUCTORS. (POLE E & LOOPS #3 AND #8)

- CONDUIT NOTES:
- 1 1/2" C (41), 2 DLC  
2-INTERCONNECT CABLES
  - 2" C (53), 8-TWISTED PAIR  
(LOOP CONDUCTORS)
  - 2" C (53), 2 DLC  
(LOOP CONDUCTORS)
  - 2" C (53), SERVICE ENTRANCE
  - 2" C (53), 5 DLC,  
2-INTERCONNECT CABLES
  - 2" C (53), 4 DLC,  
2-INTERCONNECT CABLES
  - SERVICE CONDUIT
  - 1" C (25), 3 DLC
  - 1 1/2" C (41), 4 DLC
  - 2" C (53), 3 DLC,  
2-INTERCONNECT CABLES
  - 2" C (53), 4-TWISTED  
PAIR (LOOP CONDUCTORS)
  - 2" C (53), 6 DLC

O EQUIPMENT SCHEDULE											
LOC.	STANDARD			STANDARD PLACEMENT DIMENSIONS		SIGNAL MOUNTING AND PLACEMENT			PPS		REMARKS
	TYPE	MASTARM		A.	B.	VEHICLE		PED. SIGNAL	Ø	ARROW	
		SIG.	LUM.			MASTARM	POLE				
(A)	25-4-129 (E)	12, 30M 40 (F)	13, 60M 12 (E)	EXISTING		MAS (E) MAT (N)	SV-1-T (E)	SP-1-T (E)	Ø2P (E)	→	180W LPS (E) 1   2
(B)	1-A (10') 3.05M (E)	-	-	EXISTING		-	TV-2-T (E)	SP-1-T (E)	ØAP (E)	→	-
(C)	25-4-129 (E)	12, 30M 40 (F)	13, 60M 12 (E)	EXISTING		MAT (E) MAS (E)	SV-1-T (E)	SP-1-T (E)	ØAP (E)	→	180W LPS (E)
(D)	1-A (10') 3.05M (E)	-	-	EXISTING		-	TV-2-T (E)	SP-1-T (E)	ØSP (E)	→	-
(E)	25-4-129 (N)	12, 30M 40 (N)	13, 60M 12 (R)	2.5' (.78M)	2.5' (1.76M)	MAS (R) MAT (N)	SV-1-T (R)	SP-1-T (R)	-	→	150W LPS (R)
(F)	1-A (10') 3.05M (E)	-	-	EXISTING		-	TV-2-T (E)	SP-1-T (E)	ØSP ØBP (E) (R)	↔	-
(G)	25-4-129 (E)	13, 24M 45 (F)	13, 60M 12 (F)	EXISTING		MAT (E) MAS (E)	SV-1-T (E)	SP-1-T (E)	ØBP (E)	→	180W LPS (E)
(H)	1-A (10') 3.05M (E)	-	-	EXISTING		-	TV-2-T (E)	SP-1-T (E)	Ø2P (E)	→	-

(N) = NEW EQUIPMENT  
(E) = EXISTING EQUIPMENT  
(R) = REUSE EXISTING EQUIPMENT



# CONSTRUCTION NOTES:

- A DENOTES VIDEO DETECTION ZONE AND DIMENSIONS OF DETECTION ZONE.
- B INSTALL VIDEO DETECTION SYSTEM (ITERIS VANTAGE EDGE OR APPROVED EQUAL) TO PROVIDE DETECTION AS SHOWN ON PLANS INCLUDING VIDEO DETECTION PROCESSORS AND VIDEO MONITORS IN CONTROLLER CABINET. VIDEO CAMERA TO BE MOUNTED ON LUMINAIRE MAST ARM.
- C INSTALL VIDEO CABLE HARNESS IN EXISTING CONDUIT AS SHOWN.
- D INSTALL TYPE "E" LOOPS.

DETECTOR ASSIGNMENT SCHEDULE			
NO.	PHASE	SLOT	COMMENTS
1	2 ADV	212U	EXISTING
2	2 ADV	212L	EXISTING
3	2	214U	
4	2	214L	
5	5	511U	
6	5	511L	
7	4	416U	EXISTING
8	4	416L	EXISTING
9	7	715U	EXISTING
10	6	612U	EXISTING
11	6	612L	EXISTING
12	6	614U	EXISTING
13	6	614L	EXISTING
14	1	111U	EXISTING

PLANS PREPARED UNDER THE SUPERVISION OF:  
BILL E. DARNELL, R.C.E. No. 22336 DATE  
DESIGN ENGINEER LICENSE EXPIRES 9-30-09  
**Darnell & Associates, Inc.**  
1448 FRONT STREET, THIRD FLOOR  
SAN DIEGO, CA 92101  
(619) 233-9373  
DWG:080902TS-1A.dwg DATE:11-24-08 BY: SN/JM



**LEE & RO, Inc.**  
San Diego, California

DRAWING REFERENCES:

REV	DATE	DESCRIPTION	BY	APPD
DESIGN BY:		SCALE:		
DRAWN BY:		CHECKED BY:		
RONALD D. GRUNOW, P.E. SENIOR CIVIL ENGINEER		C30458 RCE NO.		DATE
RECORD DRAWINGS ENGINEER OF WORK		C30458 RCE NO.		DATE

**OTAY WATER DISTRICT**  
2554 SWANWATER SPRINGS BOULEVARD  
SPRING VALLEY, CA 91978-2096  
619 - 670-2223

**JAMACHA ROAD 36-INCH POTABLE WATER PIPELINE  
TRAFFIC SIGNAL MODIFICATION**

JAMACHA ROAD AND CHASE AVENUE

TS-6

WILLIAM E. HOFFER, P.E.  
ENGINEERING MANAGER

C46145  
RCE NO.

DATE

DRAWING NO.

100% DRAWINGS

11/5/2014

INTERVAL		PHASE TIMING								PRE-EMPTION		F										
		1	2	3	4	5	6	7	8	9	E		F									
0	WALK	1	7	1	1	1	1	7	1	CLK RST	EV SEL	0	PERMIT	1	2	3	4	5	6	7	8	0
1	DONT WALK	1	23	1	1	1	1	27	1		RR1 CLR	15	RED LOCK									1
2	MIN GREEN	10	6	1	1	1	6	2	7		EVA DLY	0	YEL LOCK									2
3	TYPE 3 DET	0	0	0	0	0	0	0	0		EVA CLR	5	V RECALL		2				6			3
4	ADD/VEH	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		EVB DLY	0	P RECALL									4
5	PASSAGE	2.0	3.0	0.9	0.9	0.9	3.0	1.0	3.0		EVB CLR	5	RED PHASES		2					7	8	5
6	MAX GAP	2.0	3.0	0.9	0.9	0.9	3.0	1.0	3.0		EVC DLY	0	RT OLA									6
7	MIN GAP	2.0	3.0	0.9	0.9	0.9	3.0	1.0	3.0		EVC CLR	5	RT OLB									7
8	MAX EXT	15	25	9	9	9	25	36	25		EVD DLY	0	DBL ENTRY									8
9	MAX 2		70				70			YR	EVD CLR	5	MAX 2 PHASES		2				6			9
A	MAX 3									MO	MAX EV	255	LAG PHASES	READ ONLY								A
B										DAY	RR2 CLR	15	RED REST									B
C	REDUCE BY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				REST-IN-WALK									C
D	EVERY	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	DOW			MAX 3 PHASES									D
E	YELLOW	3.7	5.2	3.0	3.0	3.0	5.2	3.0	4.4	MIN			YEL START UP		2				6			E
F	RED	1.5	1.5	0.0	0.0	0.0	1.5	0.0	1.5	SEC			FIRST PHASE							8	F	
3.5'	PED XING FT		82					96						1	2	3	4	5	6	7	8	
	BIKE XING FT	110	85				90		100													

Note: Exclusive 7 PED

ENTRIES IN THESE LOCATIONS CAN BE CHANGED IN CCI FLASH ONLY



FOC LONG FAILURE	
FOD SHORT FAILURE	
FOE	30
FOF	5

FCO	3
FC1	3
FC2	10
FCA	0.0
FCB	0.0
FCC	0.0
FCD	0.0

FDO TB SELECT	1
FD3 PED SELECT	0
FD4 7 WIRE	0
FD5 PERMISSIVE	0
FD8 OS SEEKING	1

CO5 FLASH TYPE	1
CC2 DOWNLOAD	1



	CONTROL PLANS									Y-COORD				LAG PHASE		FLAGS								
	1	2	3	4	5	6	7	8	9		C	D	E		F		1	2	3	4	5	6	7	8
0 CYCLE LENGTH																LAG FZ FREE		2		4		6		8
1 FZ1 GRN FCTR													GAPOUT CP1		LAG FZ CP 1									1
2													GAPOUT CP2		LAG FZ CP 2									2
3 FZ3 GRN FCTR													GAPOUT CP3		LAG FZ CP 3									3
4 FZ4 GRN FCTR										PERM TIME			GAPOUT CP4		LAG FZ CP 4									4
5 FZ5 GRN FCTR										LAG OFFSET			GAPOUT CP5		LAG FZ CP 5									5
6										FORCE OFF			GAPOUT CP6		LAG FZ CP 6									6
7 FZ7 GRN FCTR										LONG GRN			GAPOUT CP7		LAG FZ CP 7									7
8 FZ8 GRN FCTR										NO GREEN			GAPOUT CP8		LAG FZ CP 8									8
9 MULTI CYCLE													GAPOUT CP9		LAG FZ CP 9									9
A OFFSET A										OFFSET					LAG C COORD									A
B OFFSET B															LAG D COORD									B
C OFFSET C															COORD FAZES		2				6			C
D FZ 3 EXT																								D
E FZ 7 EXT																								E
F OFFSET INTRPT																								F

CO1 MANUAL CP  
 CO2 MASTER CP  
 CO3 CURRENT CP  
 CO4 LAST CP  
 CO7 TRNSMT CP  
 COD MANUAL OFFSET  
 CAO LOCAL CYCLE TIMER  
 CBO MASTER CYCLE TIMER  
 CAA LOCAL OFFSET  
 CBA MASTER OFFSET

FEATURE		LOCATION	
OFF	ON	OFF	ON
1		1	
2		2	2
3		3	
4		4	
5		5	16
6		6	32
7		7	
8		8	

COO = 2

CCB/CDB OFFSET TIMER  
 CCC/CDC LAG GREEN TIMER  
 CCD/CDD FORCE OFF TIMER  
 CCE/CDE LONG GREEN TIMER  
 CCF/CDF NO GREEN TIMER

9/24/2013

E PAGE

	D	FLAGS								E	FLAGS								F	FLAGS								
		MAX	1	2	3	4	5	6	7		8	MIN	1	2	3	4	5	6		7	8	PED	1	2	3	4	5	6
0	RCL									RCL										RCL								
1	CP 1									CP 1										CP 1								
2	CP 2									CP 2										CP 2								
3	CP 3									CP 3										CP 3								
4	CP 4									CP 4										CP 4								
5	CP 5									CP 5										CP 5								
6	CP 6									CP 6										CP 6								
7	CP 7									CP 7										CP 7								
8	CP 8									CP 8										CP 8								
9	CP 9									CP 9										CP 9								
A																				RCL 1								
B																				RCL 2								
C																												
D																												
E																												
F																												
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	

LAST POWER FAILURE REGISTER

E	FLAGS								F	FLAGS									
	FUNCTION	1	2	3	4	5	6	7		8	FUNCTION	1	2	3	4	5	6	7	8
0										CODE 4								0	
1										CODE 5								1	
2										C-RECALL								2	
3										D-RECALL								3	
4										EXCLUSIVE								4	
5										2 PED			2					5	
6										6 PED					6			6	
7										4 PED				4				7	
8										8 PED							7	8	
9																		9	
A	OLA NOT									OLA ON								A	
B	OLB NOT									OLB ON								B	
C	OLC NOT									OLC ON								C	
D	OLD NOT									OLD ON								D	
E																		E	
F																		F	
		1	2	3	4	5	6	7	8			1	2	3	4	5	6	7	8

HOUR = D-A-E  
MINUTE = D-B-E  
DAY = D-C-E

RCL 1 = TIME OF DAY MAX RECALL (1ST SELECT) PHASES  
(CALL ACTIVE LIGHTS)  
RCL 2 = TIME OF DAY MAX RECALL (2ND SELECT) PHASES  
(CALL ACTIVE LIGHTS)

LAST FLASH TIME REGISTER

HOUR = D-A-F  
MINUTE = D-B-F  
DAY = D-C-F

D-E-E = C8 VERSION NUMBER  
D-E-F = LITHIUM BATTERY CONDITION

84 = BAD  
85 = GOOD

3/19/2013

9 PAGE

CO9 = 0 or 1

9 PAGE

CO9 = 2

PAGE 4

TIME OF DAY ACTIVITY TABLE

7+EVENT+HR+MIN+ACT+"E"+ON/OFF+DOW LTS												
HR	MIN	ACT	OFF	ON	S	M	T	W	T	F	S	
0	06	00	2	ON	1	2	3	4	5	6	7	
1	19	00	2		1	2	3	4	5	6	7	
2												
3												
4												
5												
6												
7												
8												
9												
A												
B												
C												
D												
E												
F												

ACTIVITY CODE

- 1 TYPE OF MAX TERMINATION
- 2 MAX 2
- 3 MAX 3
- 4 COND SERV (1ST SELECT)
- 5 COND SERV (2ND SELECT)
- 6 ENERGIZE AUX OUTPUT-RED
- 7 ENERGIZE AUX OUTPUT-GREEN

CONTROL PLAN TIME OF DAY

9+EVENT+HR+MIN+CP+OS+E+DOW												
HR	MIN	CP	OS	S	M	T	W	T	F	S		
0				1	2	3	4	5	6	7		
1												
2												
3												
4												
5												
6												
7												
8												
9												
A												
B												
C												
D												
E												
F												

CONTROL PLAN TIME OF DAY

9+EVENT+HR+MIN+CP+OS+E+DOW												
HR	MIN	CP	OS	S	M	T	W	T	F	S		
0				1	2	3	4	5	6	7		
1												
2												
3												
4												
5												
6												
7												
8												
9												
A												
B												
C												
D												
E												
F												

8 ENERGIZE AUX OUTPUT-YELLOW

- 9 TIME OF DAY MAX RECALL (1ST SELECT)
- A TRAFFIC ACT. MAX 2 OPERATION
- B TIME OF DAY MAX RECALL (2ND SELECT)
- C YELLOW YIELD COORDINATION
- D YELLOW YIELD COORDINATION
- E TIME OF DAY FREE OPERATION
- F FLASHING OPERATION

# CONDUIT NOTES:

1 - Exist 1 1/2"C, 2 dlc,  
2 sic  
RC 2 dlc  
ADD: 1 DLC

2 - Exist 1 1/2"C, 2 dlc,  
2 sic  
ADD: 1 DLC

NAC 3 - Exist 3"C, WITH  
1 3csc  
1 12csc  
1 evc  
2#10(ltg)

NAC 4 - Exist 1 1/2"C, WITH  
2#8(slg)  
2#10(ltg)  
3#14(peu)

5 - Exist 3"C, WITH  
2 3csc  
2 12csc  
2 dlc  
2 evc  
1 vch  
2#8(slg)  
2#10(ltg)  
ADD: 1 DLC

6 - Exist 1"C, 2 sic,  
ADD: 1 DLC

7 - Exist 3"C, WITH  
2 3csc  
2 12csc  
2 dlc  
2 sic  
2#10(ltg)  
ADD: 1 DLC

NAC 8 - Exist 3"C, WITH  
2 3csc  
2 12csc  
1 vch  
2#10(ltg)

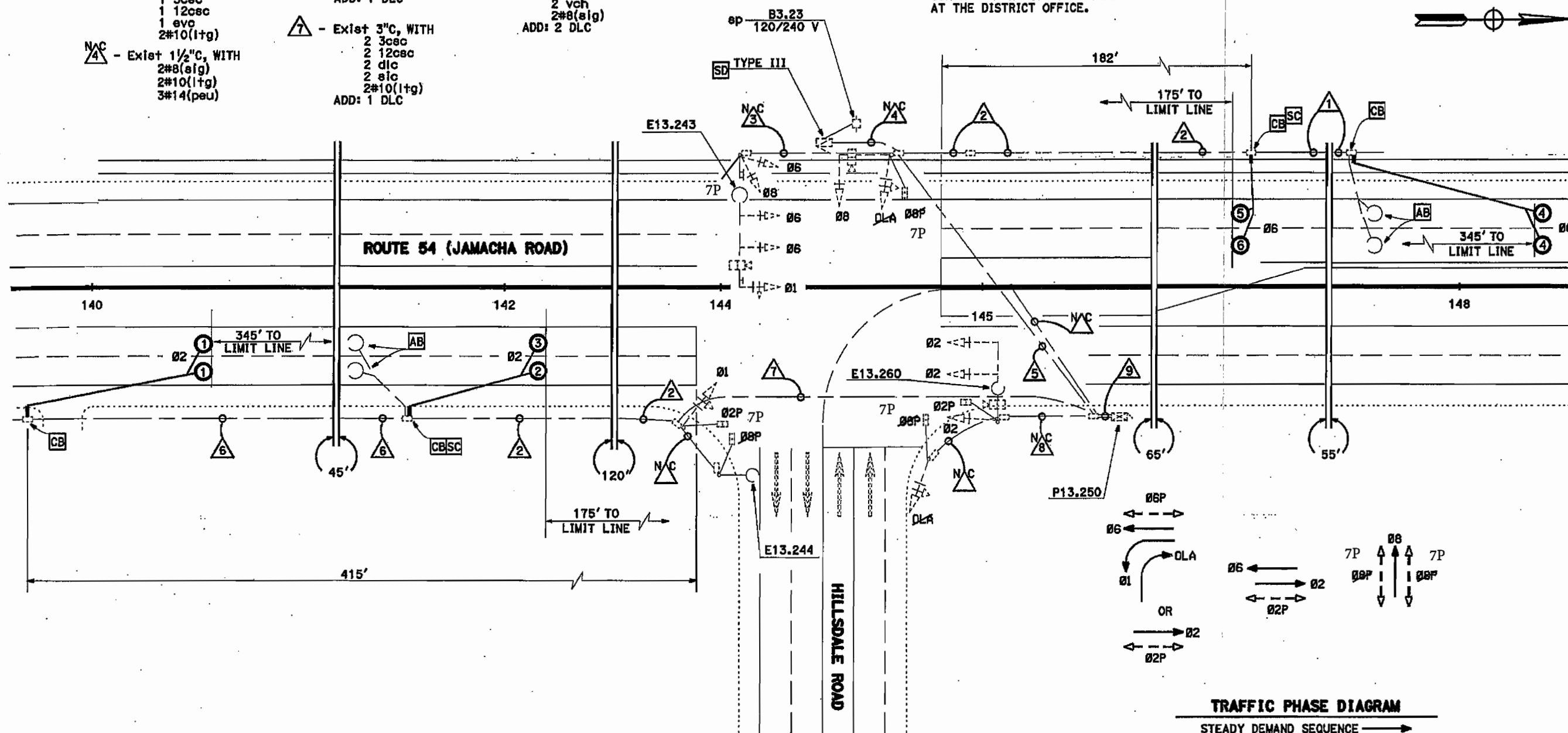
9 - Exist 3"C AND 4"C, WITH  
6 3csc  
6 12csc  
4 dlc  
3 evc  
4 sic  
2 vch  
2#8(slg)  
ADD: 2 DLC

# NOTES:

- 1 - Exist SIGNAL AND LIGHTING PARTIALLY SHOWN ONLY.
- 2 - Exist SIGNAL, LIGHTING STANDARD AND ASSOCIATED EQUIPMENT TO REMAIN UNLESS OTHERWISE NOTED.
- 3 - Exist CONDUIT, PULL BOXES AND DETECTOR LOOPS TO REMAIN UNLESS OTHERWISE NOTED.
- 4 - FOR ACCURATE RIGHT OF WAY DATA, CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	54, 75	Var	15	18

Enrique P. Bernal 09-17-13  
REGISTERED ELECTRICAL ENGINEER  
PLANS APPROVAL DATE 00-00-00  
DATE 09-17-13  
No. 15675  
Exp. 6-30-14  
ELECTRICIAN  
STATE OF CALIFORNIA



SIGNAL P13.250  
ROUTE 54 (JAMACHA ROAD)  
AT HILLSDALE ROAD

SIGNAL AND LIGHTING  
(LOCATION 2)

SCALE: 1" = 20'

E-8

APPROVED FOR ELECTRICAL WORK ONLY

RELATIVE BORDER SCALE  
IS IN INCHES

0 1 2 3

UNIT 2771

PROJECT NUMBER & PHASE

11000203491

## APPENDIX B

---

### TRAFFIC COUNT SHEETS

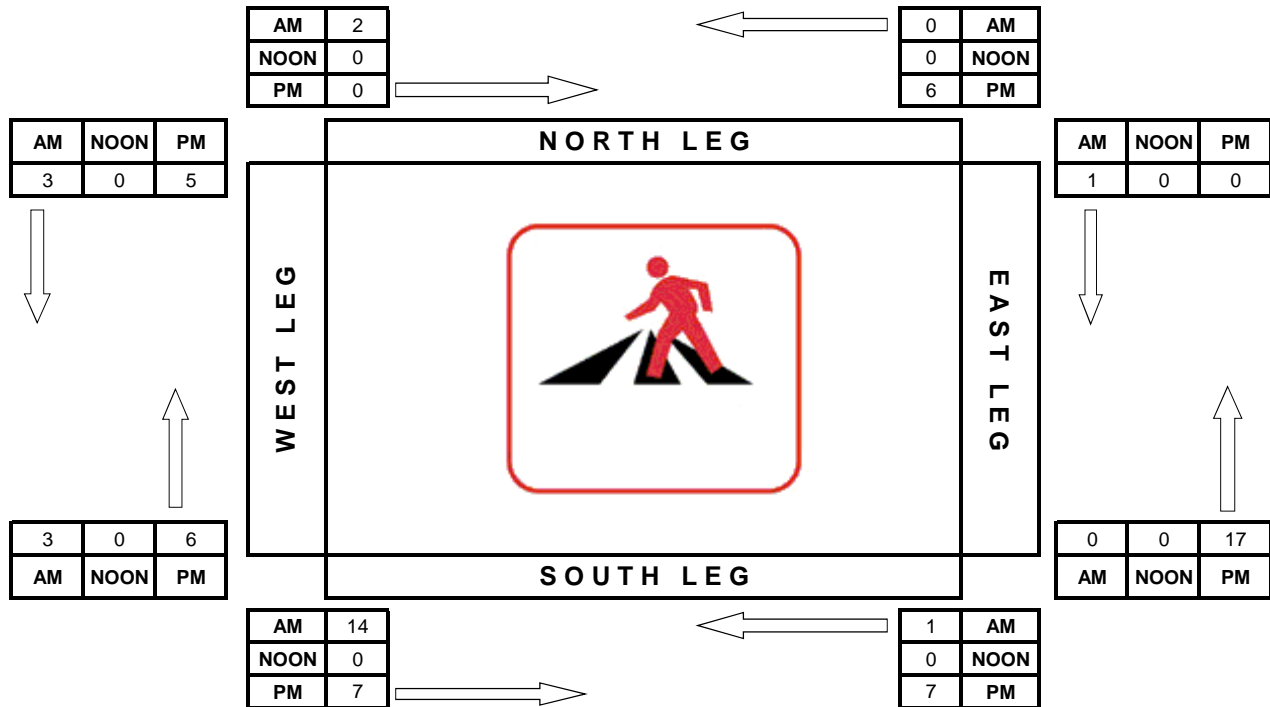
PREPARED BY NATIONAL DATA & SURVEYING SERVICES

Pedestrian Count Peak Hour

PROJECT#: 14-4252-001  
 N/S Street: Jamacha Rd  
 E/W Street: Chase Ave  
 DATE: 10/7/2014  
 CITY: El Cajon

DAY: Tuesday

	Start:	End:
AM	7:00	9:00
NOON		
PM	14:30	18:00



PREPARED BY NATIONAL DATA & SURVEYING SERVICES

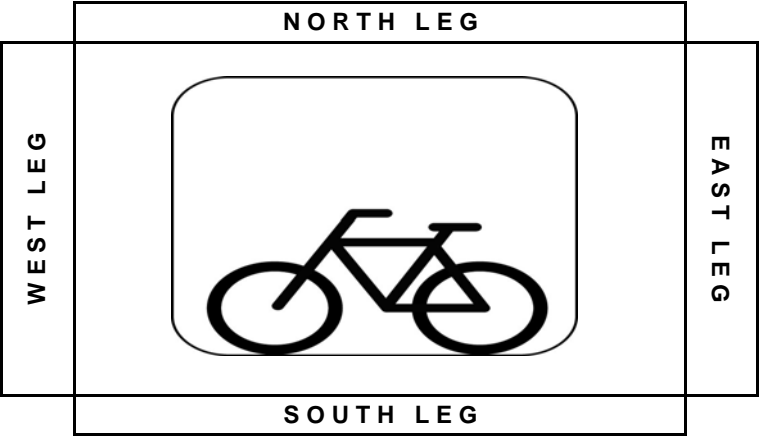
Bicycle Count Peak Hour

PROJECT#: 14-4252-001  
N/S Street: Jamacha Rd  
E/W Street: Chase Ave  
DATE: 10/7/2014  
CITY: El Cajon

DAY: Tuesday

	Start:	End:
AM	7:00	9:00
NOON		
PM	14:30	18:00

AM	0	2	0
NOON	0	0	0
PM	0	0	0



AM	NOON	PM
0	0	3
0	0	0
0	0	1



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



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



# Intersection Turning Movement

Prepared by:  
National Data & Surveying Services

Project ID: 14-4252-001

Day: Tuesday

City: El Cajon

Date: 10/7/2014

AM														
NS/EW Streets:	Jamacha Rd			Jamacha Rd			Chase Ave			Chase Ave			TOTAL	
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND				
LANES:	NL 2	NT 2	NR 0	SL 1	ST 2	SR 1	EL 1	ET 1	ER 1	WL 1	WT 2	WR 0		
7:00 AM	66	148	5	76	152	31	8	85	96	6	106	55	834	
7:15 AM	99	148	6	58	136	35	15	57	56	13	129	72	824	
7:30 AM	79	170	1	30	206	44	23	28	58	6	90	46	781	
7:45 AM	85	163	0	22	226	48	18	50	99	5	111	54	881	
8:00 AM	80	174	3	52	146	37	31	78	88	4	97	52	842	
8:15 AM	71	175	5	46	173	38	23	32	50	7	102	62	784	
8:30 AM	48	152	4	17	137	31	19	59	85	5	86	32	675	
8:45 AM	77	139	2	19	196	29	17	29	69	5	76	45	703	
TOTAL VOLUMES : APPROACH %'s :	NL 605 31.84%	NT 1269 66.79%	NR 26 1.37%	SL 320 16.12%	ST 1372 69.12%	SR 293 14.76%	EL 154 13.13%	ET 418 35.64%	ER 601 51.24%	WL 51 4.03%	WT 797 62.95%	WR 418 33.02%	6324	
PEAK HR START TIME :	715 AM													TOTAL
PEAK HR VOL :	343	655	10	162	714	164	87	213	301	28	427	224	3328	
PEAK HR FACTOR :	0.981			0.878			0.763			0.793			0.944	

CONTROL : Signalized

284 664 12 137 682 154 91 219 322 21 396 200

UTURNS			
NB	SB	EB	WB
0	0	0	0
0	0	1	0
0	0	0	0
0	0	0	1
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
NB 0	SB 0	EB 1	WB 1



Prepared by:  
**National Data & Surveying Services**

## National Data & Surveying Services

**Date:** 10/7/2014

[illegible]

3-4 School	303	816	28	179	791	76	158	368	326	50	298	190
4:45 to 5:45 Comm	248	752	26	167	816	75	185	408	395	31	205	157

# ITM Peak Hour Summary

Prepared by:

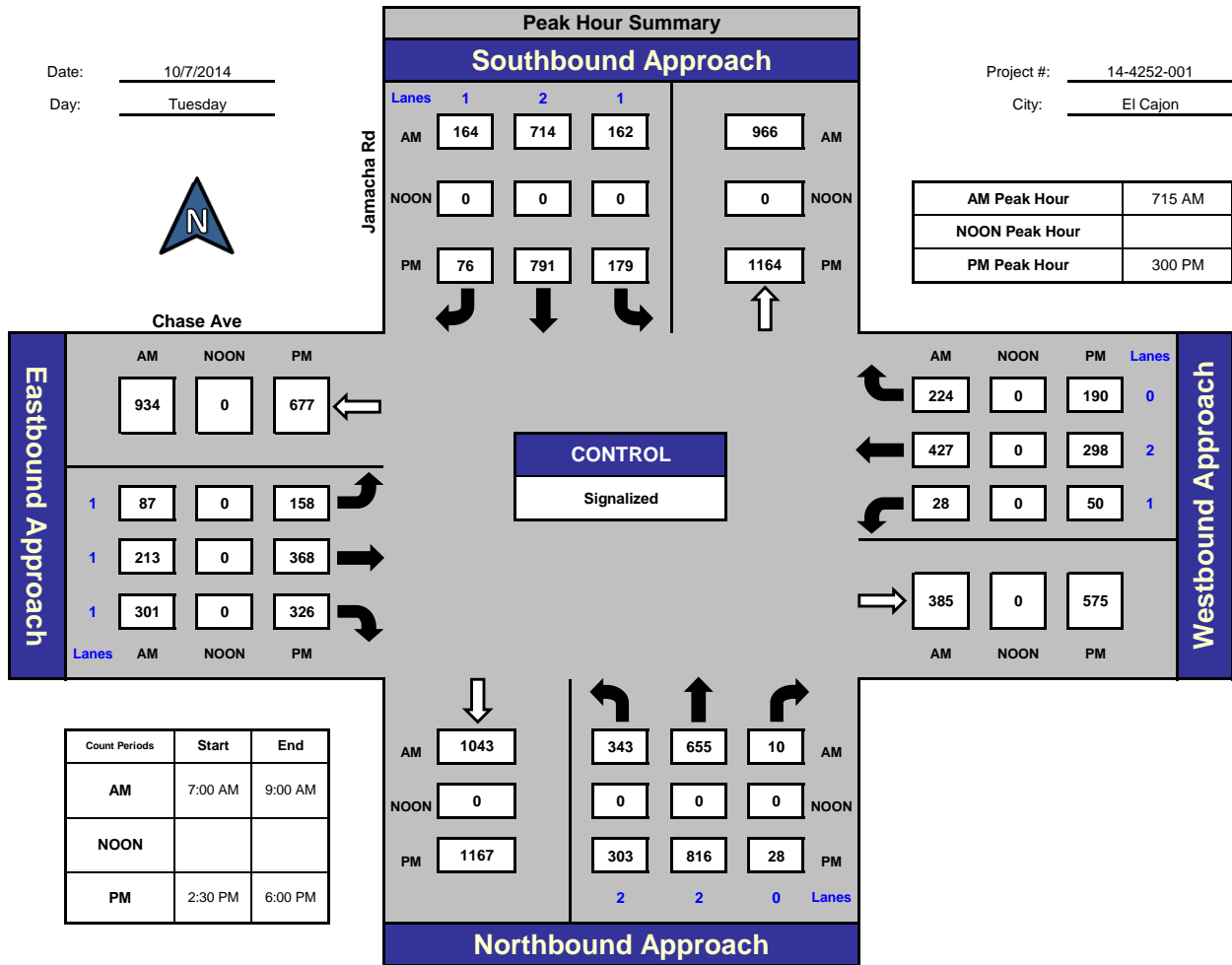


National Data & Surveying Services

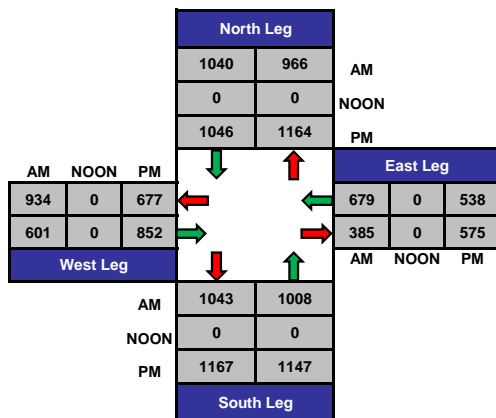
## Jamacha Rd and Chase Ave, El Cajon

Date: 10/7/2014  
Day: Tuesday

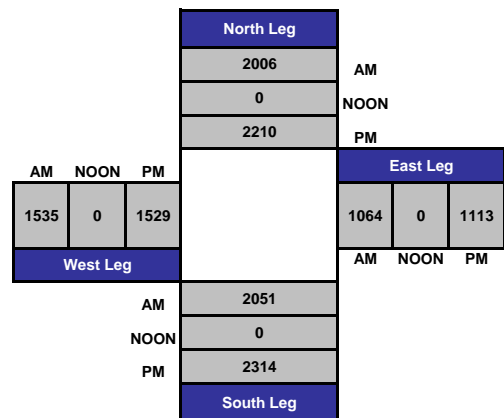
Project #: 14-4252-001  
City: El Cajon



### Total Ins & Outs



### Total Volume Per Leg



# Intersection Turning Movement

Prepared by:

## National Data & Surveying Services

Project ID: 15-4045-001

Day: Thursday

City: El Cajon

Date: 2/5/2015

AM													
NS/EW Streets:	Jamacha Rd			Jamacha Rd			Hillsdale Rd			Hillsdale Rd			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	2	0	2	2	0	0	0	0	0	2	0	
7:00 AM		139	134	75	163					50		30	591
7:15 AM		186	73	69	147					110		64	649
7:30 AM		194	39	11	268					57		14	583
7:45 AM		259	32	24	315					41		16	687
8:00 AM		217	80	49	217					61		26	650
8:15 AM		194	48	28	215					89		33	607
8:30 AM		223	38	9	276					51		3	600
8:45 AM		214	36	10	269					58		5	592
<b>TOTAL VOLUMES :</b>	NL 0	NT 1626	NR 480	SL 275	ST 1870	SR 0	EL 0	ET 0	ER 0	WL 517	WT 0	WR 191	TOTAL 4959
<b>APPROACH %'s :</b>	0.00%	77.21%	22.79%	12.82%	87.18%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	73.02%	0.00%	26.98%	

PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	856	224	153	947	0	0	0	0	269	0	120	2569
PEAK HR FACTOR :	0.909			0.811			0.000			0.559			0.935

CONTROL : Signalized

UTURNS			
NB	SB	EB	WB

NB	SB	EB	WB
0	0	0	0

# Intersection Turning Movement

Prepared by:

## National Data & Surveying Services

Project ID: 15-4045-001

Day: Thursday

City: El Cajon

Date: 2/5/2015

PM													
NS/EW Streets:	Jamacha Rd			Jamacha Rd			Hillsdale Rd			Hillsdale Rd			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	2	0	2	2	0	0	0	0	0	2	0	
2:30 PM		200	36	10	205					23		10	484
2:45 PM		254	73	25	230					20		3	605
3:00 PM		194	56	45	197					89		48	629
3:15 PM		215	54	8	208					85		23	593
3:30 PM		278	39	11	246					45		13	632
3:45 PM		257	46	13	210					30		5	561
4:00 PM		258	51	13	234					41		11	608
4:15 PM		208	29	8	190					34		12	481
4:30 PM		210	29	10	237					34		8	528
4:45 PM		213	33	5	265					40		8	564
5:00 PM		214	31	7	271					22		6	551
5:15 PM		253	44	10	302					29		3	641
5:30 PM		196	34	13	275					35		7	560
5:45 PM		128	20	6	165					3		2	324
TOTAL VOLUMES :	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
APPROACH %'s :	0	3078	575	184	3235	0	0	0	0	530	0	159	7761
	0.00%	84.26%	15.74%	5.38%	94.62%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	76.92%	0.00%	23.08%	
PEAK HR START TIME :	245 PM												TOTAL
PEAK HR VOL :	0	941	222	89	881	0	0	0	0	239	0	87	2459
PEAK HR FACTOR :	0.889			0.944			0.000			0.595			0.973

CONTROL : Signalized

UTURNS			
NB	SB	EB	WB

NB	SB	EB	WB
0	0	0	0

# Intersection Turning Movement

Prepared by:  
National Data & Surveying Services

## Jamacha Rd and Hillsdale Rd , El Cajon

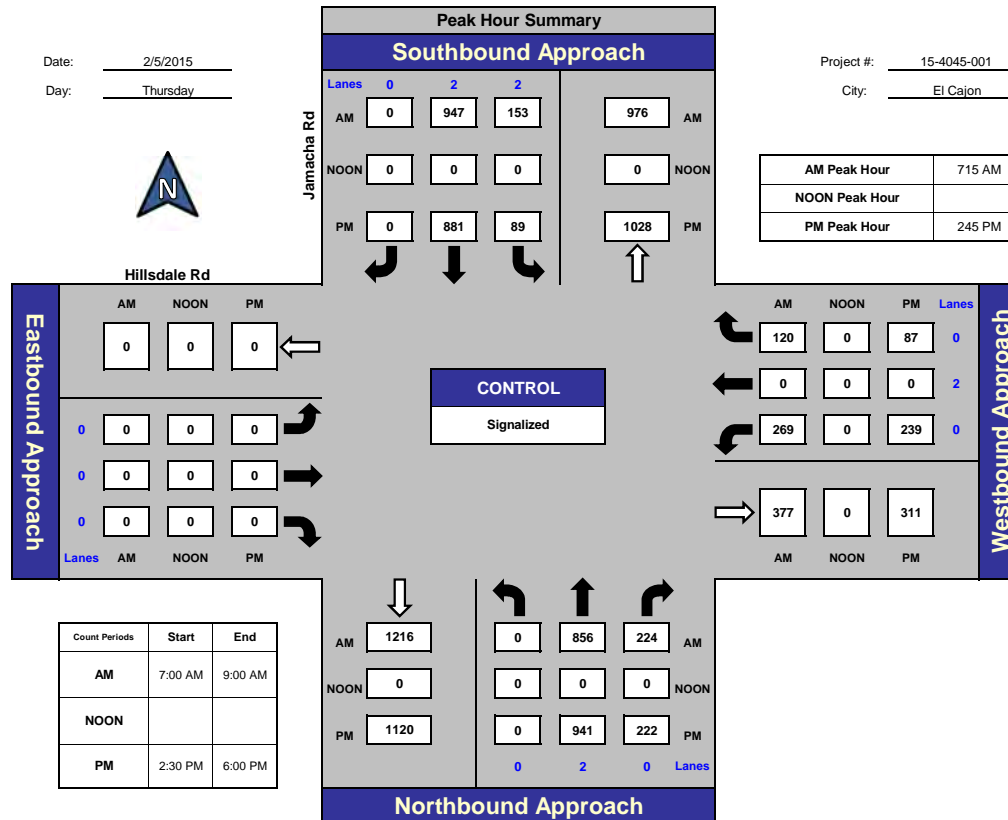
Date: 2/5/2015

Day: Thursday

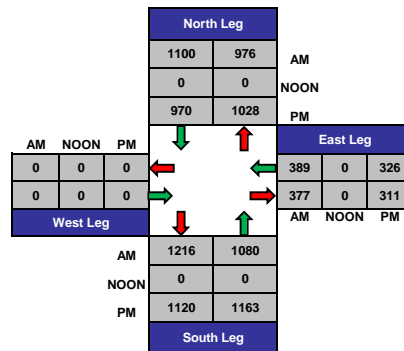


Project #: 15-4045-001

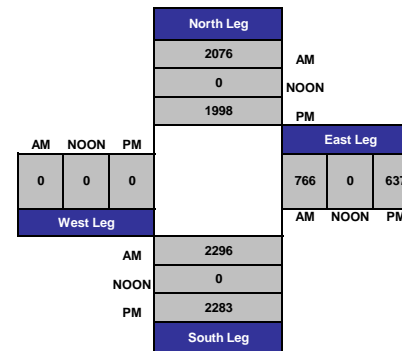
City: El Cajon



### Total Ins & Outs



### Total Volume Per Leg



## DAY: Thursday

BIKES

**VOLUME**

Jamacha Rd N/O Chase Ave

Day: Tuesday  
Date: 10/7/2014City: El Cajon  
Project #: CA14\_4253\_001

DAILY TOTALS					NB	SB	EB					WB	Total	
					13,166	13,004						0		
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL		
00:00	16	9			25		12:00	174	202			376		
00:15	14	12			26		12:15	205	160			365		
00:30	8	16			24		12:30	197	185			382		
00:45	8	46	17	54	25	100	12:45	202	778	208	755	410	1533	
01:00	14	4			18		13:00	181	183			364		
01:15	6	10			16		13:15	179	189			368		
01:30	5	7			12		13:30	198	255			453		
01:45	7	32	5	26	12	58	13:45	235	793	213	840	448	1633	
02:00	8	6			14		14:00	302	228			530		
02:15	9	4			13		14:15	230	189			419		
02:30	5	3			8		14:30	215	234			449		
02:45	5	27	1	14	6	41	14:45	220	967	244	895	464	1862	
03:00	9	7			16		15:00	296	259			555		
03:15	5	7			12		15:15	299	289			588		
03:30	5	13			18		15:30	265	250			515		
03:45	5	24	12	39	17	63	15:45	298	1158	227	1025	525	2183	
04:00	14	4			18		16:00	264	227			491		
04:15	8	21			29		16:15	271	225			496		
04:30	26	25			51		16:30	276	250			526		
04:45	24	72	23	73	47	145	16:45	286	1097	238	940	524	2037	
05:00	21	39			60		17:00	297	265			562		
05:15	39	51			90		17:15	251	252			503		
05:30	38	73			111		17:30	268	266			534		
05:45	70	168	62	225	132	393	17:45	240	1056	268	1051	508	2107	
06:00	75	85			160		18:00	233	210			443		
06:15	75	133			208		18:15	213	209			422		
06:30	104	185			289		18:30	211	208			419		
06:45	133	387	263	666	396	1053	18:45	241	898	184	811	425	1709	
07:00	204	261			465		19:00	183	149			332		
07:15	225	229			454		19:15	169	128			297		
07:30	246	285			531		19:30	165	133			298		
07:45	243	918	291	1066	534	1984	19:45	135	652	104	514	239	1166	
08:00	252	238			490		20:00	122	112			234		
08:15	248	249			497		20:15	134	106			240		
08:30	212	196			408		20:30	126	109			235		
08:45	195	907	238	921	433	1828	20:45	139	521	100	427	239	948	
09:00	160	204			364		21:00	130	80			210		
09:15	144	167			311		21:15	98	77			175		
09:30	140	166			306		21:30	116	61			177		
09:45	139	583	169	706	308	1289	21:45	90	434	54	272	144	706	
10:00	129	158			287		22:00	58	66			124		
10:15	144	141			285		22:15	33	50			83		
10:30	168	182			350		22:30	39	36			75		
10:45	144	585	176	657	320	1242	22:45	54	184	28	180	82	364	
11:00	187	148			335		23:00	39	36			75		
11:15	184	190			374		23:15	22	27			49		
11:30	198	192			390		23:30	31	25			56		
11:45	193	762	204	734	397	1496	23:45	25	117	25	113	50	230	
TOTALS	4511	5181			9692		TOTALS	8655	7823			16478		
SPLIT %	46.5%	53.5%			37.0%		SPLIT %	52.5%	47.5%			63.0%		

DAILY TOTALS			NB	SB	EB			WB	Total		
			13,166	13,004				0			
AM Peak Hour	07:30	07:00			07:30	PM Peak Hour	15:00	17:00			15:00
AM Pk Volume	989	1066			2052	PM Pk Volume	1158	1051			2183
Pk Hr Factor	0.981	0.916			0.961	Pk Hr Factor	0.968	0.980			0.928
7 - 9 Volume	1825	1987	0	0	3812	4 - 6 Volume	2153	1991	0	0	4144
7 - 9 Peak Hour	07:30	07:00			07:30	4 - 6 Peak Hour	16:15	17:00			16:45
7 - 9 Pk Volume	989	1066	0	0	2052	4 - 6 Pk Volume	1130	1051	0	0	2123
Pk Hr Factor	0.981	0.916	0.000	0.000	0.961	Pk Hr Factor	0.951	0.980	0.000	0.000	0.944

**VOLUME**

Jamacha Rd S/O Chase Ave

Day: Tuesday  
Date: 10/7/2014City: El Cajon  
Project #: CA14\_4253\_002

DAILY TOTALS					NB	SB	EB					WB	Total
					13,484	13,899						0	0
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL	
00:00	19	19			38		12:00	201	228			429	
00:15	15	11			26		12:15	212	181			393	
00:30	20	22			42		12:30	238	205			443	
00:45	16	70	14	66	30	136	12:45	226	877	217	831	443	1708
01:00	12	9			21		13:00	164	203			367	
01:15	6	12			18		13:15	179	179			358	
01:30	8	12			20		13:30	191	257			448	
01:45	6	32	8	41	14	73	13:45	251	785	201	840	452	1625
02:00	10	6			16		14:00	307	248			555	
02:15	10	3			13		14:15	223	212			435	
02:30	11	10			21		14:30	207	247			454	
02:45	5	36	3	22	8	58	14:45	225	962	261	968	486	1930
03:00	10	10			20		15:00	281	297			578	
03:15	5	6			11		15:15	257	309			566	
03:30	5	13			18		15:30	263	277			540	
03:45	7	27	12	41	19	68	15:45	362	1163	279	1162	641	2325
04:00	9	2			11		16:00	264	270			534	
04:15	12	19			31		16:15	257	274			531	
04:30	24	28			52		16:30	230	267			497	
04:45	30	75	23	72	53	147	16:45	277	1028	271	1082	548	2110
05:00	19	32			51		17:00	280	303			583	
05:15	49	50			99		17:15	220	342			562	
05:30	49	67			116		17:30	234	328			562	
05:45	81	198	53	202	134	400	17:45	235	969	298	1271	533	2240
06:00	96	65			161		18:00	226	261			487	
06:15	101	110			211		18:15	189	255			444	
06:30	127	165			292		18:30	212	207			419	
06:45	156	480	228	568	384	1048	18:45	204	831	199	922	403	1753
07:00	219	243			462		19:00	157	172			329	
07:15	248	212			460		19:15	172	145			317	
07:30	255	275			530		19:30	171	132			303	
07:45	244	966	324	1054	568	2020	19:45	142	642	113	562	255	1204
08:00	255	230			485		20:00	122	123			245	
08:15	238	237			475		20:15	133	107			240	
08:30	213	234			447		20:30	125	91			216	
08:45	223	929	263	964	486	1893	20:45	138	518	99	420	237	938
09:00	189	240			429		21:00	131	103			234	
09:15	159	157			316		21:15	97	77			174	
09:30	152	164			316		21:30	118	74			192	
09:45	164	664	181	742	345	1406	21:45	105	451	71	325	176	776
10:00	131	159			290		22:00	57	70			127	
10:15	133	137			270		22:15	38	61			99	
10:30	179	197			376		22:30	43	34			77	
10:45	173	616	167	660	340	1276	22:45	51	189	35	200	86	389
11:00	202	169			371		23:00	43	38			81	
11:15	209	176			385		23:15	26	28			54	
11:30	224	204			428		23:30	33	32			65	
11:45	215	850	210	759	425	1609	23:45	24	126	27	125	51	251
TOTALS	4943	5191			10134		TOTALS	8541	8708			17249	
SPLIT %	48.8%	51.2%			37.0%		SPLIT %	49.5%	50.5%			63.0%	

DAILY TOTALS					NB	SB					EB	WB	Total	
					13,484	13,899					0	0	27,383	
AM Peak Hour	07:15	07:30			07:30		PM Peak Hour	15:00	17:00			15:00		
AM Pk Volume	1002	1066			2058		PM Pk Volume	1163	1271			2325		
Pk Hr Factor	0.982	0.823			0.906		Pk Hr Factor	0.803	0.929			0.907		
7 - 9 Volume	1895	2018	0	0	3913		4 - 6 Volume	1997	2353	0	0	4350		
7 - 9 Peak Hour	07:15	07:30			07:30		4 - 6 Peak Hour	16:15	17:00			16:45		
7 - 9 Pk Volume	1002	1066	0	0	2058		4 - 6 Pk Volume	1044	1271	0	0	2255		
Pk Hr Factor	0.982	0.823	0.000	0.000	0.906		Pk Hr Factor	0.932	0.929	0.000	0.000	0.967		



**VOLUME**

Chase Ave E/O Jamacha Rd

Day: Tuesday  
Date: 10/7/2014City: El Cajon  
Project #: CA14\_4253\_003

DAILY TOTALS					NB	SB						EB	WB						Total
					0	0						5,954	5,930						11,884
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL							TOTAL
00:00			10	6	16		12:00			59	58	117							
00:15			8	5	13		12:15			63	75	138							
00:30			5	2	7		12:30			76	89	165							
00:45			5	28	2	15	12:45			81	279	94	316	175	595				
01:00			5	3	8		13:00			64	66	130							
01:15			2	2	4		13:15			96	97	193							
01:30			2	1	3		13:30			72	87	159							
01:45			2	11	1	7	13:45			115	347	106	356	221	703				
02:00			5	5	10		14:00			118	152	270							
02:15			1	0	1		14:15			102	80	182							
02:30			0	0	0		14:30			134	79	213							
02:45			2	8	0	5	14:45			177	531	70	381	247	912				
03:00			3	0	3		15:00			175	179	354							
03:15			2	2	4		15:15			150	186	336							
03:30			0	6	6		15:30			119	96	215							
03:45			3	8	4	12	15:45			125	569	67	528	192	1097				
04:00			1	10	11		16:00			127	88	215							
04:15			2	4	6		16:15			177	86	263							
04:30			4	19	23		16:30			169	86	255							
04:45			1	8	18	51	16:45			148	621	99	359	247	980				
05:00			4	26	30		17:00			163	110	273							
05:15			5	47	52		17:15			154	90	244							
05:30			8	35	43		17:30			141	100	241							
05:45			11	28	53	161	17:45			109	567	86	386	195	953				
06:00			19	66	85		18:00			119	78	197							
06:15			28	97	125		18:15			126	84	210							
06:30			56	84	140		18:30			119	111	230							
06:45			191	294	346	696	18:45			97	461	125	398	222	859				
07:00			176	170	346		19:00			89	52	141							
07:15			106	197	303		19:15			82	58	140							
07:30			67	157	224		19:30			67	36	103							
07:45			73	422	237	1110	19:45			69	307	28	174	97	481				
08:00			127	162	289		20:00			60	43	103							
08:15			85	165	250		20:15			70	63	133							
08:30			86	131	217		20:30			48	51	99							
08:45			48	346	175	931	20:45			68	246	32	189	100	435				
09:00			43	92	135		21:00			47	28	75							
09:15			58	75	133		21:15			48	19	67							
09:30			34	56	90		21:30			36	16	52							
09:45			43	178	109	467	21:45			33	164	8	71	41	235				
10:00			33	61	94		22:00			28	14	42							
10:15			37	76	113		22:15			25	14	39							
10:30			46	61	107		22:30			23	9	32							
10:45			43	159	106	420	22:45			20	96	8	45	28	141				
11:00			53	50	103		23:00			23	8	31							
11:15			50	52	102		23:15			11	8	19							
11:30			51	75	126		23:30			16	4	20							
11:45			57	211	105	436	23:45			15	65	6	26	21	91				
TOTALS			1701	2701	4402		TOTALS			4253	3229	7482							
SPLIT %			38.6%	61.4%	37.0%		SPLIT %			56.8%	43.2%	63.0%							

DAILY TOTALS					NB	SB						EB	WB						Total
					0	0						5,954	5,930						11,884
AM Peak Hour			06:45	07:00	06:45		PM Peak Hour			16:15	14:45	14:45							
AM Pk Volume			540	688	1219		PM Pk Volume			657	531	1152							
Pk Hr Factor			0.707	0.873	0.881		Pk Hr Factor			0.928	0.714	0.814							
7 - 9 Volume	0	0	768	1273	2041		4 - 6 Volume	0	0	1188	745	1933							
7 - 9 Peak Hour			07:00	07:00	07:00		4 - 6 Peak Hour			16:15	16:45	16:15							
7 - 9 Pk Volume	0	0	422	688	1110		4 - 6 Pk Volume	0	0	657	399	1038							
Pk Hr Factor	0.000	0.000	0.599	0.873	0.802		Pk Hr Factor	0.000	0.000	0.928	0.907	0.951							

**VOLUME**

Chase Ave W/O Jamacha Rd

Day: Tuesday  
Date: 10/7/2014City: El Cajon  
Project #: CA14\_4253\_004

DAILY TOTALS					NB	SB						EB	WB						Total
					0	0						9,802	8,632						18,434
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL							TOTAL
00:00			20	7	27		12:00			145	125	270							
00:15			11	13	24		12:15			117	109	226							
00:30			17	12	29		12:30			142	150	292							
00:45			3	51	17	49	12:45			138	542	125	509	263	1051				
01:00			14	6	20		13:00			146	105	251							
01:15			8	4	12		13:15			139	134	273							
01:30			7	10	17		13:30			140	123	263							
01:45			2	31	0	20	13:45			176	601	127	489	303	1090				
02:00			7	2	9		14:00			166	198	364							
02:15			3	4	7		14:15			150	133	283							
02:30			3	4	7		14:30			206	125	331							
02:45			6	19	3	13	14:45			224	746	109	565	333	1311				
03:00			6	1	7		15:00			251	206	457							
03:15			4	4	8		15:15			225	161	386							
03:30			3	8	11		15:30			187	142	329							
03:45			3	16	4	17	15:45			220	883	147	656	367	1539				
04:00			1	11	12		16:00			201	129	330							
04:15			4	12	16		16:15			285	142	427							
04:30			7	18	25		16:30			230	101	331							
04:45			9	21	28	69	16:45			241	957	145	517	386	1474				
05:00			4	36	40		17:00			240	128	368							
05:15			17	63	80		17:15			263	132	395							
05:30			19	68	87		17:30			242	132	374							
05:45			18	58	83	250	17:45			206	951	109	501	315	1452				
06:00			31	116	147		18:00			227	123	350							
06:15			55	149	204		18:15			184	106	290							
06:30			87	155	242		18:30			178	129	307							
06:45			155	328	191	611	18:45			165	754	123	481	288	1235				
07:00			183	197	380		19:00			145	75	220							
07:15			108	284	392		19:15			131	66	197							
07:30			132	203	335		19:30			96	73	169							
07:45			175	598	234	918	19:45			98	470	57	271	155	741				
08:00			194	227	421		20:00			119	59	178							
08:15			118	198	316		20:15			79	73	152							
08:30			161	180	341		20:30			76	63	139							
08:45			116	589	182	787	20:45			116	390	44	239	160	629				
09:00			118	142	260		21:00			91	41	132							
09:15			83	120	203		21:15			66	31	97							
09:30			79	121	200		21:30			75	40	115							
09:45			102	382	109	492	21:45			66	298	40	152	106	450				
10:00			86	119	205		22:00			52	30	82							
10:15			83	87	170		22:15			56	33	89							
10:30			103	90	193		22:30			41	20	61							
10:45			86	358	116	412	22:45			43	192	13	96	56	288				
11:00			128	103	231		23:00			33	15	48							
11:15			98	123	221		23:15			14	10	24							
11:30			125	136	261		23:30			25	17	42							
11:45			123	474	106	468	23:45			21	93	8	50	29	143				
TOTALS			2925	4106	7031		TOTALS			6877	4526	11403							
SPLIT %			41.6%	58.4%	38.1%		SPLIT %			60.3%	39.7%	61.9%							

DAILY TOTALS					NB	SB						EB	WB						Total
					0	0						9,802	8,632						18,434
AM Peak Hour			07:45	07:15	07:15		PM Peak Hour			16:15	15:00	15:00							
AM Pk Volume			648	948	1557		PM Pk Volume			996	656	1539							
Pk Hr Factor			0.835	0.835	0.925		Pk Hr Factor			0.874	0.796	0.842							
7 - 9 Volume	0	0	1187	1705	2892		4 - 6 Volume	0	0	1908	1018	2926							
7 - 9 Peak Hour			07:45	07:15	07:15		4 - 6 Peak Hour			16:15	16:45	16:45							
7 - 9 Pk Volume	0	0	648	948	1557		4 - 6 Pk Volume	0	0	996	537	1523							
Pk Hr Factor	0.000	0.000	0.835	0.835	0.925		Pk Hr Factor	0.000	0.000	0.874	0.926	0.964							























## APPENDIX C

---

### SYNCHRO PEAK-HOUR INTERSECTION ANALYSIS SHEETS

Existing Conditions  
1: Jamacha Road & Chase Avenue

AM Peak  
Timing Plan: Default

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	219	322	21	396	200	284	664	12	137	682	154
Future Volume (vph)	91	219	322	21	396	200	284	664	12	137	682	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1543	1770	3345		3433	3529		1770	3539	1534
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1543	1770	3345		3433	3529		1770	3539	1534
Peak-hour factor, PHF	0.80	0.80	0.80	0.77	0.77	0.77	0.98	0.98	0.98	0.88	0.88	0.88
Adj. Flow (vph)	114	274	402	27	514	260	290	678	12	156	775	175
RTOR Reduction (vph)	0	0	234	0	58	0	0	1	0	0	0	113
Lane Group Flow (vph)	114	274	169	27	716	0	290	689	0	156	775	62
Confl. Peds. (#/hr)	2		15	15		2	6		1	1		6
Confl. Bikes (#/hr)												2
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	8.3	34.7	34.7	5.2	31.6		12.2	36.9		12.5	37.2	37.2
Effective Green, g (s)	8.3	34.7	34.7	5.2	31.6		12.2	36.9		12.5	37.2	37.2
Actuated g/C Ratio	0.08	0.31	0.31	0.05	0.29		0.11	0.33		0.11	0.34	0.34
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	133	586	485	83	958		379	1180		200	1193	517
v/s Ratio Prot	c0.06	0.15		0.02	c0.21		0.08	0.20		c0.09	c0.22	
v/s Ratio Perm			0.11									0.04
v/c Ratio	0.86	0.47	0.35	0.33	0.75		0.77	0.58		0.78	0.65	0.12
Uniform Delay, d1	50.4	30.4	29.1	50.9	35.7		47.7	30.3		47.6	31.0	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.6	0.6	0.4	2.3	3.2		8.9	2.1		17.7	2.7	0.5
Delay (s)	89.0	31.0	29.5	53.1	39.0		56.6	32.5		65.2	33.8	25.7
Level of Service	F	C	C	D	D		E	C		E	C	C
Approach Delay (s)		38.6			39.4			39.6			36.9	
Approach LOS		D			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			38.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			110.3			Sum of lost time (s)				21.0		
Intersection Capacity Utilization			78.9%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Existing Conditions  
4: Jamacha Road & Hillsdale Rd























AM Peak  
Timing Plan: Default



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	242	78	893	198	110	1023
Future Volume (vph)	242	78	893	198	110	1023
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9	6.7		5.2	6.7
Lane Util. Factor	1.00	1.00	0.95		0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3434		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3434		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	263	85	971	215	120	1112
RTOR Reduction (vph)	0	70	9	0	0	0
Lane Group Flow (vph)	263	15	1177	0	120	1112
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)				2		
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	27.4	27.4	96.3		11.3	112.8
Effective Green, g (s)	27.4	27.4	96.3		11.3	112.8
Actuated g/C Ratio	0.18	0.18	0.63		0.07	0.74
Clearance Time (s)	5.9	5.9	6.7		5.2	6.7
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	317	283	2164		253	2612
v/s Ratio Prot	c0.15		c0.34		0.03	c0.31
v/s Ratio Perm		0.01				
v/c Ratio	0.83	0.05	0.54		0.47	0.43
Uniform Delay, d1	60.4	52.0	15.9		67.9	7.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	16.2	0.1	1.0		1.4	0.5
Delay (s)	76.7	52.0	16.9		69.3	8.1
Level of Service	E	D	B		E	A
Approach Delay (s)	70.7		16.9			14.1
Approach LOS	E		B			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			22.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			152.8		Sum of lost time (s)	17.8
Intersection Capacity Utilization			67.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Existing Conditions  
1: Jamacha Road & Chase Avenue

PM Peak School  
Timing Plan: DEFAULT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	368	326	50	298	190	303	816	28	179	791	76
Future Volume (vph)	158	368	326	50	298	190	303	816	28	179	791	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1542	1770	3310		3433	3516		1770	3539	1521
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1542	1770	3310		3433	3516		1770	3539	1521
Peak-hour factor, PHF	0.88	0.88	0.88	0.72	0.72	0.72	0.82	0.82	0.82	0.89	0.89	0.89
Adj. Flow (vph)	180	418	370	69	414	264	370	995	34	201	889	85
RTOR Reduction (vph)	0	0	185	0	88	0	0	2	0	0	0	57
Lane Group Flow (vph)	180	418	185	69	590	0	370	1027	0	201	889	28
Confl. Peds. (#/hr)	6		14	14		6	11		17	17		11
Confl. Bikes (#/hr)			1						1			2
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	14.1	34.7	34.7	6.5	27.1		15.5	37.4		15.7	37.6	37.6
Effective Green, g (s)	14.1	34.7	34.7	6.5	27.1		15.5	37.4		15.7	37.6	37.6
Actuated g/C Ratio	0.12	0.30	0.30	0.06	0.24		0.13	0.32		0.14	0.33	0.33
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	216	560	464	99	777		461	1140		241	1154	496
v/s Ratio Prot	0.10	c0.22		0.04	c0.18		0.11	c0.29		c0.11	0.25	
v/s Ratio Perm			0.12									0.02
v/c Ratio	0.83	0.75	0.40	0.70	0.76		0.80	0.90		0.83	0.77	0.06
Uniform Delay, d1	49.5	36.3	32.0	53.4	41.1		48.4	37.2		48.5	35.0	26.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	23.2	5.4	0.6	19.2	4.3		9.7	11.4		21.3	5.0	0.2
Delay (s)	72.6	41.7	32.6	72.6	45.4		58.1	48.6		69.8	40.0	26.9
Level of Service	E	D	C	E	D		E	D		E	D	C
Approach Delay (s)		44.0			47.9			51.1			44.1	
Approach LOS		D			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			47.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			115.3			Sum of lost time (s)				21.0		
Intersection Capacity Utilization			84.9%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

Existing Conditions  
4: Jamacha Road & Hillsdale Rd























PM Peak School  
Timing Plan: DEFAULT



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	249	89	944	195	77	861
Future Volume (vph)	249	89	944	195	77	861
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9	6.7		5.2	6.7
Lane Util. Factor	1.00	1.00	0.95		0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3441		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3441		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	97	1026	212	84	936
RTOR Reduction (vph)	0	79	8	0	0	0
Lane Group Flow (vph)	271	18	1230	0	84	936
Confl. Bikes (#/hr)				1		
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	27.9	27.9	96.8		10.3	112.3
Effective Green, g (s)	27.9	27.9	96.8		10.3	112.3
Actuated g/C Ratio	0.18	0.18	0.63		0.07	0.73
Clearance Time (s)	5.9	5.9	6.7		5.2	6.7
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	323	289	2179		231	2600
v/s Ratio Prot	c0.15		c0.36		0.02	c0.26
v/s Ratio Perm		0.01				
v/c Ratio	0.84	0.06	0.56		0.36	0.36
Uniform Delay, d1	60.3	51.6	16.0		68.1	7.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	17.1	0.1	1.1		1.0	0.4
Delay (s)	77.4	51.7	17.0		69.1	7.7
Level of Service	E	D	B		E	A
Approach Delay (s)	70.6		17.0			12.7
Approach LOS	E		B			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			22.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			152.8		Sum of lost time (s)	17.8
Intersection Capacity Utilization			57.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Existing Conditions  
1: Jamacha Road & Chase Avenue

PM Peak  
Timing Plan: Default

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	408	395	31	205	157	248	752	26	167	816	75
Future Volume (vph)	185	408	395	31	205	157	248	752	26	167	816	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1543	1770	3284		3433	3516		1770	3539	1522
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1543	1770	3284		3433	3516		1770	3539	1522
Peak-hour factor, PHF	0.88	0.88	0.88	0.72	0.72	0.72	0.82	0.82	0.82	0.89	0.89	0.89
Adj. Flow (vph)	210	464	449	43	285	218	302	917	32	188	917	84
RTOR Reduction (vph)	0	0	206	0	125	0	0	2	0	0	0	55
Lane Group Flow (vph)	210	464	243	43	378	0	302	947	0	188	917	29
Confl. Peds. (#/hr)	6		14	14		6	11		17	17		11
Confl. Bikes (#/hr)			1						1			2
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	12.7	34.9	34.9	4.1	26.3		13.1	36.9		13.8	37.6	37.6
Effective Green, g (s)	12.7	34.9	34.9	4.1	26.3		13.1	36.9		13.8	37.6	37.6
Actuated g/C Ratio	0.11	0.32	0.32	0.04	0.24		0.12	0.33		0.12	0.34	0.34
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	203	587	486	65	780		406	1172		220	1202	516
v/s Ratio Prot	c0.12	c0.25		c0.02	0.12		0.09	c0.27		c0.11	0.26	
v/s Ratio Perm			0.16									0.02
v/c Ratio	1.03	0.79	0.50	0.66	0.48		0.74	0.81		0.85	0.76	0.06
Uniform Delay, d1	49.0	34.6	30.8	52.6	36.4		47.2	33.7		47.5	32.6	24.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	72.5	7.2	0.8	22.5	0.5		7.2	6.0		26.1	4.6	0.2
Delay (s)	121.5	41.7	31.6	75.1	36.8		54.4	39.7		73.6	37.2	24.8
Level of Service	F	D	C	E	D		D	D		E	D	C
Approach Delay (s)		52.6			39.8			43.3			42.1	
Approach LOS		D			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			45.0			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			110.7			Sum of lost time (s)				21.0		
Intersection Capacity Utilization			85.6%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												



Existing Conditions  
4: Jamacha Road & Hillsdale Rd

PM Peak  
Timing Plan: Default

























Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	126	24	876	142	35	1113
Future Volume (vph)	126	24	876	142	35	1113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9	6.7		5.2	6.7
Lane Util. Factor	1.00	1.00	0.95		0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3459		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3459		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	137	26	952	154	38	1210
RTOR Reduction (vph)	0	23	3	0	0	0
Lane Group Flow (vph)	137	3	1103	0	38	1210
Confl. Bikes (#/hr)				3		
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	19.7	19.7	139.0		6.3	150.5
Effective Green, g (s)	19.7	19.7	139.0		6.3	150.5
Actuated g/C Ratio	0.11	0.11	0.76		0.03	0.82
Clearance Time (s)	5.9	5.9	6.7		5.2	6.7
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	190	170	2630		118	2913
v/s Ratio Prot	c0.08		0.32		0.01	c0.34
v/s Ratio Perm		0.00				
v/c Ratio	0.72	0.02	0.42		0.32	0.42
Uniform Delay, d1	78.9	72.9	7.7		86.2	4.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	12.6	0.0	0.5		1.6	0.4
Delay (s)	91.5	72.9	8.2		87.8	4.8
Level of Service	F	E	A		F	A
Approach Delay (s)	88.6		8.2			7.3
Approach LOS	F		A			A

Intersection Summary

HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	182.8	Sum of lost time (s)	17.8
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			











Existing with Project Conditions  
1: Jamacha Road & Chase Avenue

AM Peak  
Timing Plan: Default

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	226	336	21	412	200	310	664	12	137	682	181
Future Volume (vph)	105	226	336	21	412	200	310	664	12	137	682	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1543	1770	3330		3433	3529		1770	3539	1486
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1543	1770	3330		3433	3529		1770	3539	1486
Peak-hour factor, PHF	0.80	0.80	0.80	0.77	0.77	0.77	0.98	0.98	0.98	0.88	0.88	0.88
Adj. Flow (vph)	131	282	420	27	535	260	316	678	12	156	775	206
RTOR Reduction (vph)	0	0	230	0	53	0	0	1	0	0	0	115
Lane Group Flow (vph)	131	283	190	27	742	0	316	689	0	156	775	91
Confl. Peds. (#/hr)	22		15	15		22	26		1	1		26
Confl. Bikes (#/hr)												2
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	8.7	35.9	35.9	5.3	32.5		12.6	36.7		12.4	36.5	36.5
Effective Green, g (s)	8.7	35.9	35.9	5.3	32.5		12.6	36.7		12.4	36.5	36.5
Actuated g/C Ratio	0.08	0.32	0.32	0.05	0.29		0.11	0.33		0.11	0.33	0.33
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	138	600	497	84	972		388	1163		197	1160	487
v/s Ratio Prot	c0.07	0.15		0.02	c0.22		c0.09	0.20		0.09	c0.22	
v/s Ratio Perm			0.12									0.06
v/c Ratio	0.95	0.47	0.38	0.32	0.76		0.81	0.59		0.79	0.67	0.19
Uniform Delay, d1	51.1	30.1	29.1	51.3	35.9		48.2	31.1		48.2	32.2	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	60.5	0.6	0.5	2.2	3.6		12.3	2.2		19.2	3.1	0.8
Delay (s)	111.6	30.7	29.6	53.5	39.5		60.6	33.3		67.4	35.2	27.6
Level of Service	F	C	C	D	D		E	C		E	D	C
Approach Delay (s)		42.9			40.0			41.9			38.3	
Approach LOS		D			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			40.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			111.3			Sum of lost time (s)				21.0		
Intersection Capacity Utilization			86.6%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												










Existing with Project Conditions  
2: School Driveway 1 & Chase Avenue

AM Peak  
Timing Plan: Default

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	632	12	70	834	0	0
Future Volume (Veh/h)	632	12	70	834	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	687	13	76	907	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)				712		
pX, platoon unblocked					0.77	
vC, conflicting volume			700		1752	694
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			700		1828	694
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		100	100
cM capacity (veh/h)			897		59	443
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	700	76	907	0		
Volume Left	0	76	0	0		
Volume Right	13	0	0	0		
cSH	1700	897	1700	1700		
Volume to Capacity	0.41	0.08	0.53	0.00		
Queue Length 95th (ft)	0	7	0	0		
Control Delay (s)	0.0	9.4	0.0	0.0		
Lane LOS		A		A		
Approach Delay (s)	0.0	0.7		0.0		
Approach LOS				A		
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			47.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Existing with Project Conditions  
3: School Driveway 2 & Chase Avenue

AM Peak  
Timing Plan: Default

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	632	0	0	904	0	35
Future Volume (Veh/h)	632	0	0	904	0	35
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	687	0	0	983	0	38
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)				422		
pX, platoon unblocked					0.77	
vC, conflicting volume			687		1670	687
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			687		1721	687
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	91
cM capacity (veh/h)			907		75	447
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	687	983	38			
Volume Left	0	0	0			
Volume Right	0	0	38			
cSH	1700	1700	447			
Volume to Capacity	0.40	0.58	0.09			
Queue Length 95th (ft)	0	0	7			
Control Delay (s)	0.0	0.0	13.8			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	13.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			57.6%	ICU Level of Service		B
Analysis Period (min)			15			

Existing with Project Conditions  
4: Jamacha Road & Hillsdale Rd























AM Peak  
Timing Plan: Default



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	242	82	915	198	112	1035
Future Volume (vph)	242	82	915	198	112	1035
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9	6.7		5.2	6.7
Lane Util. Factor	1.00	1.00	0.95		0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3436		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3436		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	263	89	995	215	122	1125
RTOR Reduction (vph)	0	73	9	0	0	0
Lane Group Flow (vph)	263	16	1201	0	122	1125
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)				2		
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	27.4	27.4	96.3		11.3	112.8
Effective Green, g (s)	27.4	27.4	96.3		11.3	112.8
Actuated g/C Ratio	0.18	0.18	0.63		0.07	0.74
Clearance Time (s)	5.9	5.9	6.7		5.2	6.7
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	317	283	2165		253	2612
v/s Ratio Prot	c0.15		c0.35		0.04	c0.32
v/s Ratio Perm		0.01				
v/c Ratio	0.83	0.06	0.55		0.48	0.43
Uniform Delay, d1	60.4	52.0	16.1		67.9	7.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	16.2	0.1	1.0		1.4	0.5
Delay (s)	76.7	52.1	17.1		69.4	8.2
Level of Service	E	D	B		E	A
Approach Delay (s)	70.5		17.1			14.2
Approach LOS	E		B			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			22.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			152.8		Sum of lost time (s)	17.8
Intersection Capacity Utilization			68.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						











Existing with Project Conditions  
1: Jamacha Road & Chase Avenue

PM Peak School  
Timing Plan: PM Peak School

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	381	352	50	305	190	314	816	28	179	791	87
Future Volume (vph)	184	381	352	50	305	190	314	816	28	179	791	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	1.00		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1542	1770	3288		3433	3516		1770	3539	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1542	1770	3288		3433	3516		1770	3539	1468
Peak-hour factor, PHF	0.88	0.88	0.88	0.72	0.72	0.72	0.82	0.82	0.82	0.89	0.89	0.89
Adj. Flow (vph)	209	433	400	69	424	264	383	995	34	201	889	98
RTOR Reduction (vph)	0	0	228	0	83	0	0	2	0	0	0	67
Lane Group Flow (vph)	209	433	172	69	605	0	383	1027	0	201	889	31
Confl. Peds. (#/hr)	26		14	14		26	32		17	17		32
Confl. Bikes (#/hr)			1						1			2
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	14.6	36.2	36.2	6.5	28.1		15.8	37.4		15.7	37.3	37.3
Effective Green, g (s)	14.6	36.2	36.2	6.5	28.1		15.8	37.4		15.7	37.3	37.3
Actuated g/C Ratio	0.12	0.31	0.31	0.06	0.24		0.14	0.32		0.13	0.32	0.32
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	221	577	477	98	791		464	1125		237	1130	468
v/s Ratio Prot	c0.12	0.23		0.04	c0.18		0.11	c0.29		c0.11	0.25	
v/s Ratio Perm			0.11									0.02
v/c Ratio	0.95	0.75	0.36	0.70	0.77		0.83	0.91		0.85	0.79	0.07
Uniform Delay, d1	50.7	36.2	31.3	54.2	41.3		49.2	38.1		49.4	36.1	27.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	45.1	5.5	0.5	20.5	4.4		11.4	12.7		23.5	5.6	0.3
Delay (s)	95.8	41.7	31.8	74.7	45.7		60.6	50.8		72.9	41.7	27.9
Level of Service	F	D	C	E	D		E	D		E	D	C
Approach Delay (s)		48.7			48.4			53.4			45.8	
Approach LOS		D			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			49.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			116.8			Sum of lost time (s)			21.0			
Intersection Capacity Utilization			91.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												










Existing with Project Conditions  
2: School Driveway 1 & Chase Avenue

PM Peak School  
Timing Plan: PM Peak School

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	852	5	28	677	0	0
Future Volume (Veh/h)	852	5	28	677	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	926	5	30	736	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)				712		
pX, platoon unblocked					0.81	
vC, conflicting volume			931		1724	928
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			931		1778	928
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			735		70	325
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	931	30	736	0		
Volume Left	0	30	0	0		
Volume Right	5	0	0	0		
cSH	1700	735	1700	1700		
Volume to Capacity	0.55	0.04	0.43	0.00		
Queue Length 95th (ft)	0	3	0	0		
Control Delay (s)	0.0	10.1	0.0	0.0		
Lane LOS		B		A		
Approach Delay (s)	0.0	0.4		0.0		
Approach LOS				A		
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			48.5%		ICU Level of Service	A
Analysis Period (min)			15			

Existing with Project Conditions  
3: School Driveway 2 & Chase Avenue

PM Peak School  
Timing Plan: PM Peak School

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	852	0	0	705	0	66
Future Volume (Veh/h)	852	0	0	705	0	66
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	926	0	0	766	0	72
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				422		
pX, platoon unblocked					0.80	
vC, conflicting volume			926		1692	926
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			926		1740	926
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	78
cM capacity (veh/h)			738		77	326
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	926	766	72			
Volume Left	0	0	0			
Volume Right	0	0	72			
cSH	1700	1700	326			
Volume to Capacity	0.54	0.45	0.22			
Queue Length 95th (ft)	0	0	21			
Control Delay (s)	0.0	0.0	19.2			
Lane LOS			C			
Approach Delay (s)	0.0	0.0	19.2			
Approach LOS			C			
<b>Intersection Summary</b>						
Average Delay			0.8			
Intersection Capacity Utilization			55.6%	ICU Level of Service		B
Analysis Period (min)			15			



Existing with Project Conditions  
4: Jamacha Road & Hillsdale Rd























PM Peak School  
Timing Plan: PM Peak School



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	249	91	953	195	80	884
Future Volume (vph)	249	91	953	195	80	884
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9	6.7		5.2	6.7
Lane Util. Factor	1.00	1.00	0.95		0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3442		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3442		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	99	1036	212	87	961
RTOR Reduction (vph)	0	81	8	0	0	0
Lane Group Flow (vph)	271	18	1240	0	87	961
Confl. Bikes (#/hr)				1		
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	27.9	27.9	96.7		10.4	112.3
Effective Green, g (s)	27.9	27.9	96.7		10.4	112.3
Actuated g/C Ratio	0.18	0.18	0.63		0.07	0.73
Clearance Time (s)	5.9	5.9	6.7		5.2	6.7
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	323	289	2178		233	2600
v/s Ratio Prot	c0.15		c0.36		0.03	c0.27
v/s Ratio Perm		0.01				
v/c Ratio	0.84	0.06	0.57		0.37	0.37
Uniform Delay, d1	60.3	51.6	16.1		68.1	7.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	17.1	0.1	1.1		1.0	0.4
Delay (s)	77.4	51.7	17.2		69.1	7.8
Level of Service	E	D	B		E	A
Approach Delay (s)	70.5		17.2			12.9
Approach LOS	E		B			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			22.9		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			152.8		Sum of lost time (s)	17.8
Intersection Capacity Utilization			58.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						











Existing with Project Conditions  
1: Jamacha Road & Chase Avenue

PM Peak  
Timing Plan: Default

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	415	409	31	210	157	255	752	26	167	816	83
Future Volume (vph)	199	415	409	31	210	157	255	752	26	167	816	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		0.97	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.98		1.00	1.00		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1543	1770	3262		3433	3518		1770	3539	1474
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1543	1770	3262		3433	3518		1770	3539	1474
Peak-hour factor, PHF	0.88	0.88	0.88	0.72	0.72	0.72	0.82	0.82	0.82	0.89	0.89	0.89
Adj. Flow (vph)	226	472	465	43	292	218	311	917	32	188	917	93
RTOR Reduction (vph)	0	0	214	0	122	0	0	2	0	0	0	61
Lane Group Flow (vph)	226	472	251	43	388	0	311	947	0	188	917	32
Confl. Peds. (#/hr)	26		14	14		26	31		17	17		31
Confl. Bikes (#/hr)			1						1			2
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	12.9	35.6	35.6	4.1	26.8		12.9	37.3		13.4	37.8	37.8
Effective Green, g (s)	12.9	35.6	35.6	4.1	26.8		12.9	37.3		13.4	37.8	37.8
Actuated g/C Ratio	0.12	0.32	0.32	0.04	0.24		0.12	0.33		0.12	0.34	0.34
Clearance Time (s)	4.7	5.8	5.8	4.7	5.8		4.7	5.8		4.7	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	204	595	493	65	784		397	1177		212	1200	500
v/s Ratio Prot	c0.13	c0.25		0.02	c0.12		0.09	c0.27		c0.11	0.26	
v/s Ratio Perm			0.16									0.02
v/c Ratio	1.11	0.79	0.51	0.66	0.49		0.78	0.80		0.89	0.76	0.06
Uniform Delay, d1	49.2	34.5	30.8	53.0	36.5		47.9	33.7		48.3	32.8	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	94.9	7.2	0.8	22.5	0.5		9.7	5.9		32.7	4.7	0.2
Delay (s)	144.1	41.7	31.6	75.4	37.0		57.6	39.6		81.0	37.5	25.1
Level of Service	F	D	C	E	D		E	D		F	D	C
Approach Delay (s)		57.6			39.9			44.1			43.3	
Approach LOS		E			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			47.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			111.4			Sum of lost time (s)			21.0			
Intersection Capacity Utilization			90.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												







Existing with Project Conditions  
2: School Driveway 1 & Chase Avenue

PM Peak  
Timing Plan: Default

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	988	3	20	528	0	0
Future Volume (Veh/h)	988	3	20	528	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1074	3	22	574	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)				712		
pX, platoon unblocked				0.88		
vC, conflicting volume				1077	1694	1076
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				1077	1721	1076
tC, single (s)				4.1	6.4	6.2
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				97	100	100
cM capacity (veh/h)				647	83	267
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	1077	22	574	0		
Volume Left	0	22	0	0		
Volume Right	3	0	0	0		
cSH	1700	647	1700	1700		
Volume to Capacity	0.63	0.03	0.34	0.00		
Queue Length 95th (ft)	0	3	0	0		
Control Delay (s)	0.0	10.8	0.0	0.0		
Lane LOS				B	A	
Approach Delay (s)	0.0	0.4		0.0		
Approach LOS				A		
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			55.5%	ICU Level of Service		B
Analysis Period (min)			15			

Existing with Project Conditions  
3: School Driveway 2 & Chase Avenue

PM Peak  
Timing Plan: Default

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↘	
Traffic Volume (veh/h)	988	0	0	548	0	36
Future Volume (Veh/h)	988	0	0	548	0	36
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1074	0	0	596	0	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)				422		
pX, platoon unblocked					0.87	
vC, conflicting volume			1074		1670	1074
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1074		1696	1074
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	85
cM capacity (veh/h)			649		88	267
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1074	596	39			
Volume Left	0	0	0			
Volume Right	0	0	39			
cSH	1700	1700	267			
Volume to Capacity	0.63	0.35	0.15			
Queue Length 95th (ft)	0	0	13			
Control Delay (s)	0.0	0.0	20.8			
Lane LOS			C			
Approach Delay (s)	0.0	0.0	20.8			
Approach LOS			C			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			62.0%	ICU Level of Service		B
Analysis Period (min)			15			

Existing with Project Conditions  
4: Jamacha Road & Hillsdale Rd

PM Peak  
Timing Plan: Default



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	126	25	882	142	37	1126
Future Volume (vph)	126	25	882	142	37	1126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.9	5.9	6.7		5.2	6.7
Lane Util. Factor	1.00	1.00	0.95		0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3460		3433	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3460		3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	137	27	959	154	40	1224
RTOR Reduction (vph)	0	24	5	0	0	0
Lane Group Flow (vph)	137	3	1108	0	40	1224
Confl. Bikes (#/hr)				3		
Turn Type	Prot	Perm	NA		Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	17.2	17.2	109.8		8.0	123.0
Effective Green, g (s)	17.2	17.2	109.8		8.0	123.0
Actuated g/C Ratio	0.11	0.11	0.72		0.05	0.80
Clearance Time (s)	5.9	5.9	6.7		5.2	6.7
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	199	178	2486		179	2848
v/s Ratio Prot	c0.08		c0.32		0.01	c0.35
v/s Ratio Perm		0.00				
v/c Ratio	0.69	0.02	0.45		0.22	0.43
Uniform Delay, d1	65.2	60.3	8.9		69.4	4.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	9.5	0.0	0.6		0.6	0.5
Delay (s)	74.7	60.3	9.5		70.1	4.9
Level of Service	E	E	A		E	A
Approach Delay (s)	72.4		9.5			7.0
Approach LOS	E		A			A
<b>Intersection Summary</b>						
HCM 2000 Control Delay			12.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			152.8		Sum of lost time (s)	17.8
Intersection Capacity Utilization			48.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

## APPENDIX D

---

TRIP GENERATION AND GAP STUDY MEMORANDUM, AUGUST 2018



## MEMORANDUM

To: Jerry Keough  
Literacy First Charter Schools

From: Leo Espelet, P.E., T.E.  
Kimley-Horn and Associates, Inc.

Date: August 17, 2018

Subject: Liberty Charter High School - Trip Generation and Gap Study Memorandum

The following memorandum was prepared to evaluate the potential traffic-related impacts related to the vehicular traffic generation of the new Charter High School near the intersection of Chase Avenue and Jamacha Road (SR-54) in the county of San Diego. The following memorandum will also summarize the results of the existing Gap Study completed on Chase Avenue.

## PREVIOUS DOCUMENTATION

The Liberty Charter High School is currently located in the City of Lemon Grove at the intersection of Palm Street and Golden Avenue. The existing school has an enrollment of 320 students. Plans are in the early stages of development to relocate the existing school to a site on the south side of Chase Avenue, close to the intersection of Chase Avenue and Jamacha Road (SR-54). The new school would accommodate a maximum of 450 students. Two traffic evaluations for the Liberty Charter High School were completed previously, results are described in more detail below.

### Trip Generation and Parking Study Memorandum

A Trip Generation and Parking Study Memorandum was completed by Kimley-Horn and Associates (Kimley-Horn) in December of 2014. For the memorandum, counts were collected at the main entrance driveway of the existing Liberty Charter High School site. Based on the counts collected, daily, AM and PM peak hour number of vehicles generated by the site were calculated. The resulting number of vehicle trips is presented in the table below.

*Table 1 – Observed Vehicular Traffic Generation at Existing School Site*

Daily	AM Peak Hour (7:30 – 8:30)			PM Peak Hour (4:30 – 5:30)		
	In	Out	Total	In	Out	Total
607	124	95	219	28	52	80

As shown in the table, the existing Liberty Charter High School generates over 600 daily trips and over 200 trips in the AM peak hour. It is important to note that at the time of this data collection effort the Liberty Charter High School had an enrollment of 320 students. **A copy of the trip generation study is included as an attachment.**

### Liberty Charter HS Focused Traffic Impact Study

A Focused Traffic Impact Study (TIS) was completed by Kimley-Horn in May of 2017. In the study, traffic-related impacts associated with the construction of the new Charter High School were evaluated based on the *County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements*.

Trip generation for the proposed Liberty Charter High School was estimated using the San Diego Association of Government (SANDAG) *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002*. The table below presents the trip generation assumed in the TIS for the proposed project.

Table 2 – Proposed Project Trip Generation

Land Use as listed in SANDAG	Units <sup>1</sup>	Trip Rate <sup>2</sup>	Daily	AM Peak Hour					PM Peak Hour (Commuter)				
				% ADT <sup>2</sup>	In: Out Ratio <sup>2</sup>	In	Out	Total	% ADT <sup>2</sup>	In: Out Ratio <sup>2</sup>	In	Out	Total
High School	450 st	1.3 / st	585	20%	7 : 3	82	35	117	10%	4 : 6	23	36	59

Notes:

1. st = Maximum Student Enrollment
2. Trip rates for daily, AM, PM Peak (Commuter) are referenced from the Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, SANDAG, April 2002.

As shown in the table, with a maximum enrollment of 450 students it was assumed that the new Liberty Charter High School would generate 585 daily trips and 117 trips in the AM peak hour.

As part of the TIS, Existing with Project Conditions were analyzed at the study area intersections and roadway segments. It was found that all study intersections would operate at a Level of Service (LOS) D or better with the addition of the project traffic. It was also found that with the addition of the proposed project, a direct traffic related impact would be caused along Chase Avenue between the western most project driveway and Jamacha Road. As part of the project, Chase Avenue will be widened along this roadway segment to accommodate an additional eastbound travel lane and a westbound left-turn pocket into the site. With this proposed roadway widening, Chase Avenue between the western most project driveway and Jamacha Road would operate at an acceptable LOS, and therefore the project would not have a traffic related impact at this roadway segment. West of the project, Chase Avenue is expected to operate at a LOS F, however based on the County of San Diego thresholds, the traffic associated with the proposed project would not cause a significant impact along this section of the roadway. The TIS concluded that the proposed project would not have a traffic related impact at the intersections and roadway segments within the study area.

### ADDITIONAL EVALUATION

At the inquiry of the project team, additional traffic analysis was completed to determine the potential traffic-related impacts associated with the construction of the new Liberty Charter High School using



the traffic generations rates observed at the existing Liberty Charter High School site. Below is the trip generation used and the analysis results.

### Trip Generation

Trip generation for the proposed Liberty Charter High School project was estimated using the vehicular traffic generation rates observed at the existing school site. The table below presents the trip generation for the proposed project with an expected total enrollment of 450 students.

Table 3 – Proposed Project Trip Generation with Observed Rates

	Units <sup>1</sup>	Trip Rate	Daily Trips	AM Peak Hour					
				% of ADT	In: Out Ratio		In	Out	Total
Observed	320 st	1.9	607	36%	57%	43%	124	95	219
Projected	450 st	1.9	854	36%	57%	43%	174	134	308

Note:

1. Maximum Student Enrollment

As shown in the table, with a maximum enrollment of 450 students it is assumed that the new Liberty Charter High School would generate 854 daily trips and 308 trips in the AM peak hour. These totals are larger than the trip generation assumed in the TIS, which were estimated using *SANDAG Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*. The table below presents the difference between the trip generation estimated using SANDAG rates and the trip generation estimated using the observed rates for the proposed project.

Table 4 – Difference in Proposed Project Trip Generation

Rates Used	Units <sup>3</sup>	Trip Rate	Daily Trips	AM Peak Hour					
				% of ADT	In: Out Ratio		In	Out	Total
Observed <sup>1</sup>	450 st	1.9	854	36%	57%	43%	174	134	308
SANDAG <sup>2</sup>	450 st	1.3	585	20%	70%	30%	82	35	117
<b>Difference</b>		<b>0.60</b>	<b>269</b>	<b>16%</b>	<b>-13%</b>	<b>13%</b>	<b>92</b>	<b>99</b>	<b>191</b>

Note:

1. Observed rates are based on on data collected at the existing Liberty Charter High School site in the City of Lemon Grove in November of 2014.

2. Trip rates for daily and AM Peak are referenced from the Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, SANDAG, April 2002.

3. Maximum Student Enrollment

As shown in the table, the observed rates will result in approximately 269 more daily trips generated and approximately 191 more trips in the AM peak hour.

## Results

As part of the additional evaluation, the study area intersections and roadway segments were analyzed under Existing with Project Conditions during the AM peak hour. Traffic volumes for the Existing with Project Conditions were estimated by adding the proposed project traffic (using the trip generation with observed rates) to the existing traffic volumes used in the TIS. **Existing with Project Conditions AM peak hour traffic volumes are included as an attachment.**

### Intersection Analysis

The table below, displays the LOS analysis results for the study intersections under the existing with and without the proposed project traffic (using observed rates).

Table 5 – Existing with Project Conditions AM Peak Intersection LOS

Intersection		Existing Baseline		Existing plus Project		D (c)	Significant?
		Delay (a)	LOS (b)	Delay (a)	LOS (b)		
1	Jamacha Rd & Chase Ave	41.1	D	46.7	D	5.6	NO
2	Chase Ave & Dwy 1	This intersection will be constructed as part of the project		10.0	A	-	NO
3	Chase Ave & Dwy 2	This intersection will be constructed as part of the project		10.8	B	-	NO
4	Jamacha Rd & Hillside Rd	19.3	B	22.3	C	3.0	NO

Notes:

- (a) Delay refers to the average control delay for the entire intersection, measured in seconds per vehicle. At a one-way stop-controlled intersection, delay refers to the worst movement.
- (b) LOS calculations are based on the methodology outlined in the 2010 Highway Capacity Manual and performed using Synchro.
- (c) Change in delay due to addition of project traffic.

The plus project condition analysis of the intersection of Jamacha Rd and Chase Ave includes the addition of a second EB through travel lane to be constructed as a project feature.

As shown in the table, all study intersections are expected to operate at LOS D or better with the addition of the project traffic. Therefore, the proposed project does not have a direct traffic related impact at the intersections within the study area. **Synchro worksheets for the Existing Plus Project with Observed Trip Generation are included as attachments.**

### Roadway Segment Analysis

The table below displays the roadway segment analysis under existing with and without the proposed project traffic (using observed rates).

Table 6 – Existing with Project Conditions Roadway Segment LOS

ROADWAY SEGMENT	ROADWAY CLASSIFICATION	LOS E CAPACITY	EXISTING BASELINE			EXISTING PLUS PROJECT			D in ADT	D in V/C	SIGNIFICANT ?
			ADT	V/C RATIO (a)	LOS	ADT	V/C RATIO (a)	LOS			
Jamacha Road											
Chase Ave to Penasco Rd	4 Lane Major Road (4.1A)	37,000	26,170	0.707	C	26,452	0.715	C	282	0.008	NO
Chase Ave to Shadowside Ln	4 Lane Major Road (4.1A)	37,000	27,383	0.74	C	27,656	0.747	C	273	0.007	NO
Chase Avenue											
Jamacha Rd to Fair County Rd	4 Lane Major Road (4.1B)	34,200	11,884	0.347	A	12,055	0.352	A	171	0.005	NO
Jamacha Road to Dwy 1	2 Lane Light Collector without Median	16,200	18,434	1.138	F	19,224	1.187	F	790	0.049	YES
West of Dwy 1	2 Lane Light Collector without Median	16,200	18,434	1.138	F	18,498	1.142	F	64	0.004	NO

Notes:

**Bold** values indicate roadway segments operating at LOS E or F. **Bold and shaded** values indicate a project significant impact.

(a) the v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity.

As shown in the table, with the addition of the project, a direct traffic related impact is expected to be caused along Chase Avenue between the western most project driveway and Jamacha Road (SR 54). West of the project, Chase Avenue is expected to operate at LOS F, however, based on the County of San Diego's thresholds, the traffic associated with the project would not cause a significant impact along this section of the roadway.

As stated previously, Chase Avenue will be widened along this roadway segment as part of the project to accommodate an additional eastbound travel lane and a westbound left-turn pocket into the site. The table below shows the results of the impacted roadway segment with the widening of Chase Avenue. As shown in the table, with the proposed roadway widening to be constructed as part of the project, the segment of Chase Avenue between the western most project driveway and Jamacha Road is expected to operate at LOS C. Therefore, the project would not have a traffic related impact along the roadway segments within the study area.

Table 7 – Existing with Project Mitigated Conditions Roadway Segment LOS

ROADWAY SEGMENT	WITH PROJECT ADT	BEFORE IMPROVEMENT				AFTER IMPROVEMENT			
		ROADWAY CLASSIFICATION	LOS E CAPACITY	V/C RATIO (a)	LOS	ROADWAY CLASSIFICATION	LOS E CAPACITY	V/C RATIO (a)	LOS
Chase Avenue									
Jamacha Road to Dwy 1	19,244	2 Lane Light Collector without Median	18,434	1.187	F	3 Lane Major Road	25,650	0.749	C

Notes:

**Bold** values indicate roadway segments operating at LOS E or F.

(a) The v/c ratio is calculated by dividing the ADT volume by each respective roadway segment's capacity

A 3 Lane Major Road (4.1B) represents the half width improvements along Chase Avenue between Driveway 1 and Jamacha Road. This roadway is classified as a 4 Lane Major Road (4.1B). The capacity for 3 lane facility was assumed to be 0.75% of the full capacity of the 4 lane facility.

## GAP STUDY

To confirm the findings of the synchro analysis, Kimely-Horn visited the proposed site of the new Liberty Charter High School. Observations were completed on Thursday September 29, 2016 between 7:45 and 8:45 AM. As part of the observations, Kimley-Horn performed a Gap Study to record the existing gaps along Chase Avenue during the anticipated morning peak based on the existing Liberty Charter High School schedule. In the context of the study, a *gap* refers to the time duration (in seconds), measured at the same point in space, between the rear bumper and the front bumper of two consecutive vehicles. The Gap Study was performed to determine if there were enough gaps in eastbound traffic on Chase Avenue to permit the westbound vehicles to turn left into the new school site. **A summary sheet of the observed gaps is included as an attachment.**

A total of 131 acceptable gap were observed within the eastbound traffic on Chase Avenue. Most of the observed gaps were between 5 and 15 seconds in length. Based on the observed gaps, it is estimated that the unsignalized left-turn movement at proposed driveway 1 would be able to process approximately 507 vehicles within a 1-hour period. This is much higher than the anticipated left-turn demand.

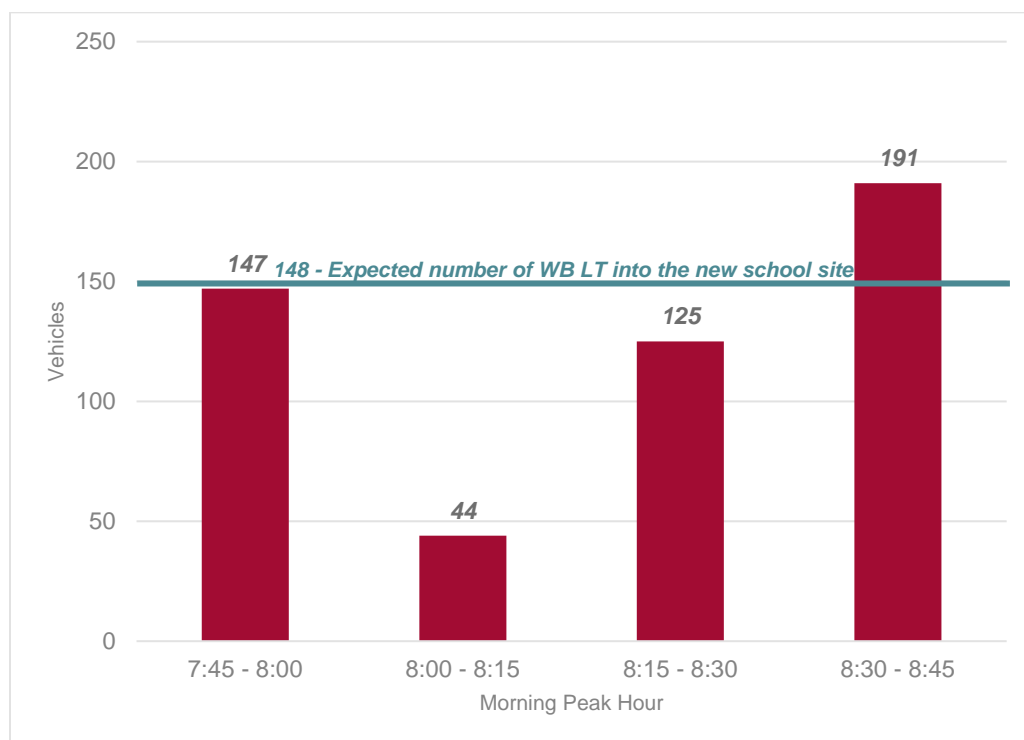
While the field observations showed that there will be acceptable gaps, most of these gaps occurred from 7:45 to 8:00 AM and 8:30 to 8:45 AM. Between 8:00 and 8:15 AM there were few acceptable gaps. Based on the field observations, it was seen that there is a significant shift in traffic directionality between the eastbound and westbound traffic along Chase Avenue between 8:00 and 8:15 AM. The existing counts also show that westbound traffic is heavier before 8:00 AM, and after 8:00 AM eastbound traffic becomes heavier. Queuing for the eastbound approach at the intersection of Chase Avenue and Jamacha Road was also observed between 8:10 and 8:18 AM. The queue was observed to block the proposed driveway 1 (school entrance driveway).

## SUMMARY OF FINDINGS

Based on the additional traffic analysis results, while using the observed trip generation rates will result in approximately 269 more daily trips and approximately 191 more trips in the AM peak hour compared to the SANDAG *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region Rates*, the results of the study area intersections and roadway segments analysis under Existing with Project Conditions during the AM peak hour will remain similar. As shown in the tables above, with the proposed Chase Avenue roadway widening to be constructed as part of the project, the project will not have any traffic related impact along the roadway segments and at the intersections within the study area.

Based on the field observations at the proposed new school site and the Gap Study performed in September of 2016, it is recommended to shift the starting time for the new school so that it is not between 8:00 and 8:15 AM. **Exhibit 1** displays the number of vehicles that are expected to be able to make the westbound left turn movement at proposed driveway 1 for each 15-minute time period between 7:45 and 8:45 AM. As shown in the Exhibit, almost all the expected number of westbound left turning vehicles will be able to make it into the site from 7:45 to 8:00 AM and all of them from 8:30 to 8:45 AM. Making the school time earlier or later will avoid conflicts with the heavy eastbound traffic volumes that occur on Chase Avenue between 8:00 and 8:30 AM and process vehicles into the site more quickly. It will also avoid conflicts with the large queues the occur between 8:00 and 8:15 AM at the intersection of Chase Avenue and Jamacha Road that were observed to block the proposed driveway 1 (school entrance driveway).

*Exhibit 1 – Number of Vehicles Processed at Proposed Driveway 1*



## APPENDIX A

---

### TRIP GENERATION AND PARKING STUDY MEMORANDUM



## MEMORANDUM

To: Jerry Keough  
Literacy First Charter Schools

From: Leo Espelet, T.E.  
Kimley-Horn and Associates, Inc.

Date: December 15, 2014

Subject: Trip Generation and Parking Study Memorandum

The following memorandum was prepared to evaluate the vehicular traffic generation and parking utilization rate for the existing Liberty Charter High School site in the City of Lemon Grove. This document will also summarize survey results regarding transportation mode choice to school by students, faculty, and staff.

### *Vehicular Traffic Generation*

To summarize the existing vehicular traffic generated by the existing site, 24-hour machine counts were collected from Monday through Friday, November 17 to 21, 2014, at the main entrance driveway to the school. Additional counts were collected at the Palm Street cul-de-sac located west of Camino de Las Palmas to verify the use of this street as a student drop-off location. 48-hour video cameras were installed to observe the two on-site driveways just past the main entrance to account for vehicle trips generated by Mt. Vernon Elementary School and the Lemon Grove District. **Figure 1** illustrates the location where the traffic data was collected.

The daily, AM peak-hour, and PM peak-hour number of vehicles generated by the site were calculated by subtracting the number of vehicles utilizing the two on-site driveways from the total number of vehicles entering at the school's main entrance. The cul-de-sac on Palm Street was not regularly used as a student loading zone based on the collected traffic counts and therefore was not included in the vehicular trip generation calculation. The resulting number of vehicular traffic trips is presented in **Table 1**. The raw traffic counts are provided in **Appendix A**.

**Table 1 - Summary of Vehicular Traffic Generation**

	Daily	AM Peak-Hour (7:30-8:30)			PM Peak-Hour (4:30-5:30)		
		In	Out	Total	In	Out	Total
Observed	607	124	95	219	28	52	80
SANDAG <sup>a</sup>	416	58	25	83	17	25	42
+ / -	191	66	70	136	11	27	38

<sup>a</sup> SANDAG Vehicular Traffic Generation Rates for the San Diego Region (2002)







As shown in the table, Liberty Charter High School generates more daily vehicular traffic trips (+191), AM peak-hour vehicular traffic trips (+136), and PM peak-hour vehicular traffic trips (+38) than the theoretical inbound trip generation.

### ***Parking Utilization Rate***

Parking utilization rate on the Liberty Charter High School site was evaluated by collecting parking occupancy counts every 30 minutes between 7:45 a.m. and 4:45 p.m. Parking information was collected for Zone A, the smaller parking area adjacent to Palm Street at the north end of the site and Zone B, the larger parking area located at the northeast corner of the site. **Figure 2** illustrates the zones included within the parking occupancy study. Parking occupancy information was collected by National Data and Surveying Services from Tuesday, November 18, 2014 to Thursday, November 20, 2014 and is provided in **Appendix B**.

**Table 2** illustrates the summary of the parking observations for the two zones. As shown in the table, the regular parking spaces in Zone A were more than 80% occupied between 10:15 a.m. and 12:45 p.m. while at least two of the four district parking spaces were occupied beginning at 8:45 a.m. In Zone B, the regular parking spaces were occupied between 71% and 76% from 8:15 a.m. to 3:15 p.m. Overall, parking utilization rate patterns correspond with the school bell times.

Based on the parking observations, the existing site provides an adequate number of parking spaces to serve the existing Liberty Charter High School enrollment of 320 students. During a typical school day, less than 80% of the total available regular parking spaces in both on-site parking areas were occupied. Assuming a 90% maximum parking occupancy rate as the parking design criteria, the current site would require approximately 49 parking spaces, which corresponds to 0.153 spaces per student. Based on this rate, the proposed school site to accommodate 450 students would require 69 regular parking spaces.

The number of required parking spaces based on existing utilization rates would be lower than the number required by County of San Diego rates. Based on the County of San Diego rates a high school accommodating 450 student would require approximately 158 parking spaces (assuming 30 employees), which is 89 more spaces than what was estimated using the current parking utilization rate. The number of parking space requirements for the County of San Diego is provided in **Appendix C**.

### ***Parking and Transportation Mode Choice Survey***

To validate the data obtained from the trip generation and parking observations and to understand the transportation mode choice for students, faculty and staff, a four question survey was given to all students and staff regarding transportation mode to the school, where they parked, and difficulty of finding parking. A copy of the survey is provided in **Appendix D**. All surveys were completed on November 19, 2014. The returned surveys were summarized and the responses are presented in the pie chart figures below.



**TABLE 2**  
**PARKING UTILIZATION RATE**

Zone	ZONE A						ZONE B					
Parking Space Type	REGULAR		HANDICAP		LEMON GROVE DISTRICT		REGULAR		HANDICAP		REGULAR BLOCKED	
Total Spaces	12	% Occupied	2	% Occupied	4	% Occupied	45	% Occupied	2	% Occupied	3	% Occupied
Time of Day												
7:45 AM	2	17%	0	0%	0	0%	19	42%	0	0%	0	0%
8:15 AM	7	58%	0	0%	1	25%	33	73%	0	0%	0	0%
8:45 AM	7	58%	0	0%	2	50%	32	71%	0	0%	0	0%
9:15 AM	9	75%	1	50%	3	75%	32	71%	0	0%	0	0%
9:45 AM	9	75%	0	0%	2	50%	33	73%	0	0%	0	0%
10:15 AM	10	83%	0	0%	3	75%	32	71%	0	0%	0	0%
10:45 AM	10	83%	0	0%	2	50%	32	71%	0	0%	0	0%
11:15 AM	10	83%	0	0%	3	75%	33	73%	0	0%	0	0%
11:45 AM	11	92%	0	0%	3	75%	33	73%	0	0%	0	0%
12:15 PM	10	83%	0	0%	3	75%	34	76%	0	0%	0	0%
12:45 PM	10	83%	0	0%	3	75%	34	76%	0	0%	0	0%
1:15 PM	8	67%	0	0%	3	75%	33	73%	0	0%	0	0%
1:45 PM	8	67%	0	0%	2	50%	33	73%	0	0%	0	0%
2:15 PM	8	67%	0	0%	2	50%	34	76%	0	0%	0	0%
2:45 PM	8	67%	0	0%	3	75%	33	73%	0	0%	0	0%
3:15 PM	8	67%	0	0%	3	75%	32	71%	0	0%	0	0%
3:45 PM	7	58%	0	0%	3	75%	24	53%	0	0%	0	0%
4:15 PM	6	50%	0	0%	3	75%	15	33%	0	0%	0	0%

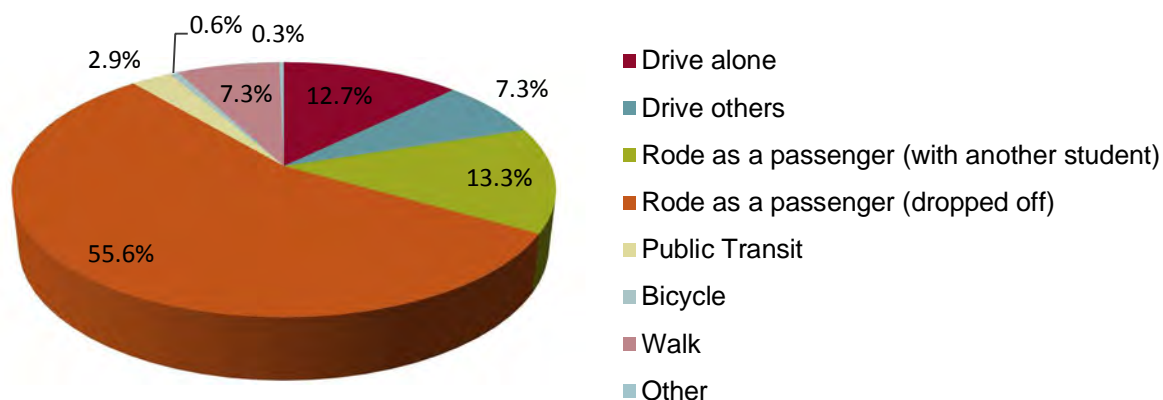
**Notes:**

Parking occupancy data was provided by National Data and Surveying Services. The data was observed from Tuesday, November 18, 2014 to Thursday November 20, 2014. Bold values indicate occupancy greater than 80%.

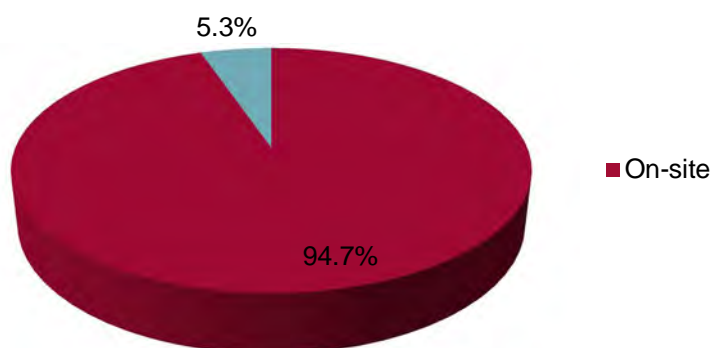
Occupied parking space data was averaged over three days from Tuesday, November 18, 2014 to Thursday November 20, 2014.



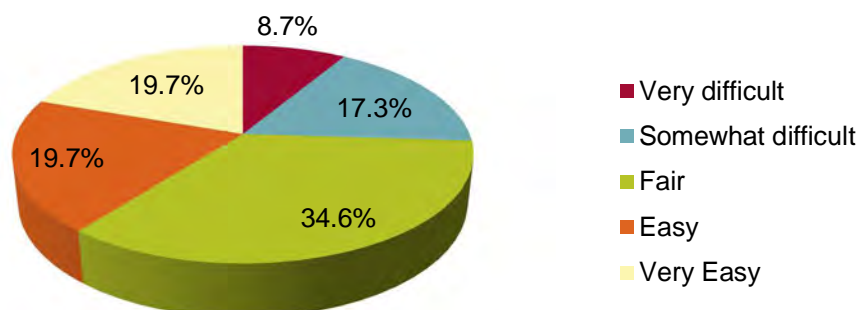
What is your primary transportation mode to get to campus?



If you drive to Campus, where do you park?



In your opinion, how difficult is finding parking around this facility?



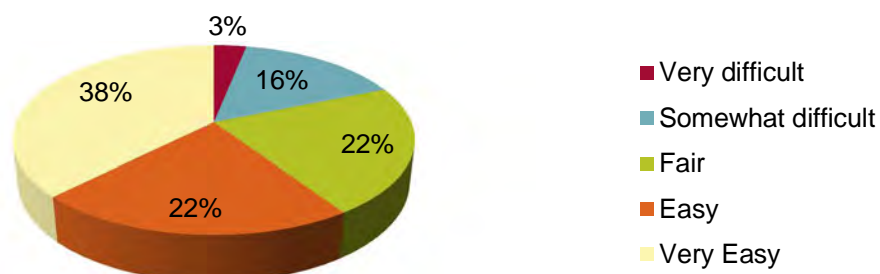
Based on responses from 277 students, 22 faculty, and 5 staff members, approximately 68.9% of the school rode as a passenger to get to campus, 20% drove, while the remaining 11.1% took alternative methods. Of the respondents who drove to campus, approximately 95% parked on campus while the other 5% street parked their vehicles. In regards to the difficulty of finding parking around the school, approximately 39.4% felt it was easy or very easy to find parking, 34.6% felt it was fair, while 26% felt parking was either difficult or very difficult.

The results of the survey validate the vehicular trip generation and parking utilization rate findings for the Liberty Charter High School. The higher vehicular trip generation of the school and availability of parking spaces within the school lots can be associated to the significant portion of students who are dropped off and need to be picked up after school (~69%). Students who need to be picked up and dropped off at school will require their parents to make an inbound and outbound trip during both morning drop off and afternoon pick up periods, as opposed to students and staff who typically drive into school once in the morning and leave in the afternoon. The survey results also indicated only 11% walked, biked, or used public transit as their primary mode of transportation, resulting in a much larger portion who account for vehicular trips.

Public transit use was not found to account for a significant portion of school trips for students, faculty, and staff. The survey reported only three percent of respondents used public transit, indicating transit is not as heavily used as previously assumed.

The survey results regarding parking do not necessarily align with the results of the parking analysis. According to the parking analysis, the smaller Zone A was typically near capacity while the larger Zone B parking area was only occupied up to 76% during school hours. The survey indicated that 95% of drivers park on-site, which suggests there is ample parking on-site for the school. However, 26% of survey responses indicated that parking was either somewhat or very difficult on campus, despite 11 open regular spaces in the Zone B parking area. However, it should be noted that the responses regarding parking difficulty was highly impacted by students and staff not driving to school. The results of parking difficulty by driving respondents, shown below, indicate that the percentage of people who found it difficult to find parking dropped to 19% while the percentage of people who found parking easy increased from 39% to 60%.

In your opinion, how difficult is finding parking around this facility? [Drivers only]



**Conclusion**

The trip generation and parking utilization rate data collected for the school indicates that Liberty Charter High School generates a higher number of vehicular traffic trips than SANDAG trip generation estimates and provides a sufficient number of parking spaces for the site. Key findings from this memorandum are summarized below.

- Liberty Charter generated 191 more daily vehicular trips, 136 more AM peak-hour trips, and 38 more PM peak-hour trips than the SANDAG trip generation estimate for a 320 student high school
- The cul-de-sac on Palm Street was not regularly used as a student loading zone
- The regular parking spaces in Zone A were more than 80% occupied between 10:15 a.m. and 12:45 p.m.
- The regular parking spaces in Zone B were occupied between 71% and 76% from 8:15 a.m. to 3:15 p.m. and correspond to school bell times
- The school site based on existing parking utilization would require approximately 49 regular parking spaces for students, faculty, and staff assuming a 90% maximum parking occupancy, which corresponds to 0.153 regular parking spaces per student.
- The number of required parking spaces for 450 students at Liberty Charter based on existing utilization rates (69) would be 89 parking spaces less than the design requirements by County of San Diego (158 spaces assuming 30 employees).
- 69% of school survey respondents reported being dropped off at school, 20% reported driving, and 11% rode public transit, biked, or walked to campus
- Only 3% of respondents ride public transit as their primary mode of transportation to school

Please contact me at 619.744.0136 or at [leo.espelet@kimley-horn.com](mailto:leo.espelet@kimley-horn.com) should you have any questions.

Sincerely,



Leo Espelet, T.E.  
RTE 2678

**Attachments**

- Appendix A – Traffic Counts
- Appendix B – Parking Utilization Data
- Appendix C – County of San Diego Parking Requirements (high school)
- Appendix D – Survey Questionnaire

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Golden Ave S/O Palm St

Day: Monday  
Date: 11/17/2014

City: Lemon Grove  
Project #: CA14\_4288\_001

DAILY TOTALS					NB	SB	EB					WB	Total
					13	356						0	0
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
00:00	0	0			0	12:00	1	5			6		
00:15	0	0			0	12:15	0	1			1		
00:30	0	0			0	12:30	0	6			6		
00:45	0	0			0	12:45	0	1	3	15	16		
01:00	0	0			0	13:00	0	3			3		
01:15	0	0			0	13:15	0	2			2		
01:30	0	0			0	13:30	0	2			2		
01:45	0	0			0	13:45	0	3		10	10		
02:00	0	1			1	14:00	0	1			1		
02:15	0	0			0	14:15	0	4			4		
02:30	0	0			0	14:30	0	5			5		
02:45	0	0	1		1	14:45	0	7		17	17		
03:00	0	0			0	15:00	0	10			10		
03:15	0	0			0	15:15	0	10			10		
03:30	1	1			2	15:30	0	30			30		
03:45	0	1	0	1	2	15:45	0	26		76	76		
04:00	0	0			0	16:00	0	8			8		
04:15	0	0			0	16:15	0	6			6		
04:30	0	0			0	16:30	0	2			2		
04:45	1	1	1	1	2	16:45	0	12		28	28		
05:00	2	0			2	17:00	0	10			10		
05:15	0	2			2	17:15	0	7			7		
05:30	2	0			2	17:30	0	5			5		
05:45	1	5	0	2	7	17:45	0	3		25	25		
06:00	0	1			1	18:00	0	0			0		
06:15	1	0			1	18:15	0	1			1		
06:30	0	1			1	18:30	0	0			0		
06:45	1	2	2	4	6	18:45	0	0		1	1		
07:00	0	7			7	19:00	0	0			0		
07:15	0	13			13	19:15	0	0			0		
07:30	0	18			18	19:30	0	0			0		
07:45	0	41		79	41	19:45	0	0			0		
08:00	0	54			54	20:00	0	0			0		
08:15	1	11			12	20:15	0	0			0		
08:30	0	3			3	20:30	0	0			0		
08:45	0	1	1	69	1	20:45	0	0			0		
09:00	0	0			0	21:00	0	0			0		
09:15	1	2			3	21:15	0	0			0		
09:30	0	3			3	21:30	0	0			0		
09:45	0	1	4	9	4	21:45	0	0			0		
10:00	0	2			2	22:00	0	0			0		
10:15	1	3			4	22:15	0	0			0		
10:30	0	1			1	22:30	0	0			0		
10:45	0	1	2	8	2	22:45	0	0			0		
11:00	0	3			3	23:00	0	0			0		
11:15	0	2			2	23:15	0	0			0		
11:30	0	2			2	23:30	0	0			0		
11:45	0	3		10	3	23:45	0	0			0		
TOTALS	12	184			196	TOTALS	1	172			173		
SPLIT %	6.1%	93.9%			53.1%	SPLIT %	0.6%	99.4%			46.9%		

DAILY TOTALS					NB	SB	EB	WB	Total
					13	356	0	0	369
AM Peak Hour	04:45	07:15		07:15	PM Peak Hour	12:00	15:00		15:00
AM Pk Volume	5	126		126	PM Pk Volume	1	76		76
Pk Hr Factor	0.625	0.583		0.583	Pk Hr Factor	0.250	0.633		0.633
7 - 9 Volume	1	148	0	0	4 - 6 Volume	0	53	0	0
7 - 9 Peak Hour	07:30	07:15		07:15	4 - 6 Peak Hour		16:45		16:45
7 - 9 Pk Volume	1	126	0	0	4 - 6 Pk Volume	0	34	0	0
Pk Hr Factor	0.250	0.583	0.000	0.000	Pk Hr Factor	0.000	0.708	0.000	0.708

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Golden Ave S/O Palm St

Day: Tuesday  
Date: 11/18/2014

City: Lemon Grove  
Project #: CA14\_4288\_001

DAILY TOTALS					NB	SB					EB	WB	Total
					22	341					0	0	363
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
00:00	0	0			0	12:00	0	3			3		
00:15	0	0			0	12:15	0	1			1		
00:30	0	0			0	12:30	0	5			5		
00:45	0	0			0	12:45	0	2	11		2	11	
01:00	0	0			0	13:00	0	2			2		
01:15	0	0			0	13:15	0	6			6		
01:30	0	0			0	13:30	0	2			2		
01:45	0	0			0	13:45	0	1	11		1	11	
02:00	0	0			0	14:00	0	1			1		
02:15	0	0			0	14:15	0	4			4		
02:30	0	0			0	14:30	0	3			3		
02:45	0	0			0	14:45	0	5	13		5	13	
03:00	0	0			0	15:00	0	17			17		
03:15	0	0			0	15:15	1	12			13		
03:30	0	1			1	15:30	0	37			37		
03:45	0	0	1		0	15:45	0	1	12	78	12	79	
04:00	1	0			1	16:00	0	9			9		
04:15	0	0			0	16:15	0	8			8		
04:30	0	0			0	16:30	0	4			4		
04:45	0	1	4	4	4	16:45	0	3	24		3	24	
05:00	2	0			2	17:00	0	8			8		
05:15	0	0			0	17:15	0	11			11		
05:30	1	0			1	17:30	0	6			6		
05:45	1	4	0		1	17:45	0	0	25		0	25	
06:00	0	1			1	18:00	0	0			0		
06:15	0	2			2	18:15	0	1			1		
06:30	0	0			0	18:30	0	0			0		
06:45	0	4	7		4	18:45	0	0	1		0	1	
07:00	1	6			7	19:00	0	0			0		
07:15	3	7			10	19:15	0	0			0		
07:30	3	22			25	19:30	0	0			0		
07:45	5	12	40	75	45	19:45	0	0			0		
08:00	1	49			50	20:00	0	0			0		
08:15	1	10			11	20:15	0	0			0		
08:30	0	7			7	20:30	0	0			0		
08:45	1	3	0	66	1	20:45	0	0			0		
09:00	1	2			3	21:00	0	0			0		
09:15	0	1			1	21:15	0	0			0		
09:30	0	3			3	21:30	0	0			0		
09:45	0	1	6	12	6	21:45	0	0			0		
10:00	0	1			1	22:00	0	0			0		
10:15	0	2			2	22:15	0	0			0		
10:30	0	1			1	22:30	0	0			0		
10:45	0	1	5		1	22:45	0	1	1		1	1	
11:00	0	2			2	23:00	0	0			0		
11:15	0	0			0	23:15	0	0			0		
11:30	0	4			4	23:30	0	0			0		
11:45	0	1	7		1	23:45	0	0			0		
TOTALS	21	177			198	TOTALS	1	164			165		
SPLIT %	10.6%	89.4%			54.5%	SPLIT %	0.6%	99.4%			45.5%		

DAILY TOTALS					NB	SB					EB	WB	Total
					22	341					0	0	363
AM Peak Hour	07:00	07:30			07:30	PM Peak Hour	14:30	15:00			15:00		
AM Pk Volume	12	121			131	PM Pk Volume	1	78			79		
Pk Hr Factor	0.600	0.617			0.655	Pk Hr Factor	0.250	0.527			0.534		
7 - 9 Volume	15	141	0	0	156	4 - 6 Volume	0	49	0	0	49		
7 - 9 Peak Hour	07:00	07:30			07:30	4 - 6 Peak Hour		16:45			16:45		
7 - 9 Pk Volume	12	121	0	0	131	4 - 6 Pk Volume	0	28	0	0	28		
Pk Hr Factor	0.600	0.617	0.000	0.000	0.655	Pk Hr Factor	0.000	0.636	0.000	0.000	0.636		



# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Golden Ave S/O Palm St

Day: Wednesday

Date: 11/19/2014

City: Lemon Grove

Project #: CA14\_4288\_001

DAILY TOTALS					NB	SB	EB					WB	Total
					13	355						0	0
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
00:00	0	0			0	12:00	0	3			3		
00:15	0	0			0	12:15	0	5			5		
00:30	0	0			0	12:30	0	0			0		
00:45	0	0			0	12:45	0	0	8		8		
01:00	0	0			0	13:00	0	1			1		
01:15	0	0			0	13:15	0	0			0		
01:30	0	0			0	13:30	0	0			0		
01:45	0	0			0	13:45	0	1	2		2		
02:00	0	0			0	14:00	0	3			3		
02:15	0	0			0	14:15	0	3			3		
02:30	0	0			0	14:30	0	6			6		
02:45	0	0			0	14:45	0	4	16		16		
03:00	0	0			0	15:00	1	12			13		
03:15	0	0			0	15:15	0	16			16		
03:30	0	1			1	15:30	0	32			32		
03:45	0	0	1		0	15:45	0	1	16	76	77		
04:00	0	1			1	16:00	0	12			12		
04:15	0	0			0	16:15	0	5			5		
04:30	0	1			1	16:30	0	3			3		
04:45	0	4	6		4	16:45	0	6	26		26		
05:00	0	1			1	17:00	0	10			10		
05:15	0	0			0	17:15	0	7			7		
05:30	2	0			2	17:30	0	2			2		
05:45	0	2	0	1	0	17:45	0	5	24		24		
06:00	0	3			3	18:00	1	2			3		
06:15	0	1			1	18:15	0	0			0		
06:30	0	0			0	18:30	0	0			0		
06:45	1	1	0	4	1	18:45	0	1	1	3	4		
07:00	1	4			5	19:00	0	0			0		
07:15	0	17			17	19:15	0	1			1		
07:30	2	22			24	19:30	0	0			0		
07:45	2	5	44	87	46	19:45	0	0	1		1		
08:00	0	52			52	20:00	0	1			1		
08:15	1	11			12	20:15	0	0			0		
08:30	0	6			6	20:30	0	0			0		
08:45	0	1	1	70	1	20:45	0	0	1		1		
09:00	0	3			3	21:00	0	0			0		
09:15	0	2			2	21:15	0	0			0		
09:30	0	2			2	21:30	0	0			0		
09:45	0	3	10		3	21:45	0	1	1		1		
10:00	0	1			1	22:00	0	0			0		
10:15	0	2			2	22:15	0	0			0		
10:30	1	3			4	22:30	0	0			0		
10:45	0	1	0	6	0	22:45	0	0			0		
11:00	0	1			1	23:00	0	1			1		
11:15	1	3			4	23:15	0	0			0		
11:30	0	5			5	23:30	0	0			0		
11:45	0	1	2	11	2	23:45	0	0	1		1		
TOTALS	11	196			207	TOTALS	2	159			161		
SPLIT %	5.3%	94.7%			56.3%	SPLIT %	1.2%	98.8%			43.8%		

DAILY TOTALS					NB	SB	EB	WB	Total
					13	355	0	0	368
AM Peak Hour	07:00	07:15		07:15	PM Peak Hour	14:15	15:00		15:00
AM Pk Volume	5	135		139	PM Pk Volume	1	76		77
Pk Hr Factor	0.625	0.649		0.668	Pk Hr Factor	0.250	0.594		0.602
7 - 9 Volume	6	157	0	0	4 - 6 Volume	0	50	0	0
7 - 9 Peak Hour	07:00	07:15		07:15	4 - 6 Peak Hour		16:00		16:00
7 - 9 Pk Volume	5	135		139	4 - 6 Pk Volume	0	26	0	0
Pk Hr Factor	0.625	0.649	0.000	0.000	Pk Hr Factor	0.000	0.542	0.000	0.542

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Golden Ave S/O Palm St

Day: Thursday  
Date: 11/20/2014

City: Lemon Grove  
Project #: CA14\_4288\_001

DAILY TOTALS					NB	SB	EBWB					Total
					15	346						0
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL	
00:00	0	0			0	12:00	0	2			2	
00:15	0	0			0	12:15	0	3			3	
00:30	0	0			0	12:30	0	0			0	
00:45	0	0			0	12:45	0	2	7		7	
01:00	0	0			0	13:00	0	3			3	
01:15	0	0			0	13:15	0	2			2	
01:30	0	0			0	13:30	0	1			1	
01:45	0	0			0	13:45	0	3	9		9	
02:00	0	0			0	14:00	0	2			2	
02:15	0	0			0	14:15	0	3			3	
02:30	0	0			0	14:30	0	2			2	
02:45	0	0			0	14:45	1	5	12		13	
03:00	0	0			0	15:00	0	9			9	
03:15	0	0			0	15:15	0	9			9	
03:30	0	1			1	15:30	0	32			32	
03:45	0	0	1		0	15:45	0	15	65		65	
04:00	1	0			1	16:00	0	6			6	
04:15	0	0			0	16:15	0	6			6	
04:30	0	1			1	16:30	0	5			5	
04:45	2	3	2	3	4	16:45	0	4	21		21	
05:00	1	3			4	17:00	0	11			11	
05:15	1	0			1	17:15	0	11			11	
05:30	0	1			1	17:30	0	4			4	
05:45	1	3	1	5	2	17:45	0	1	27		27	
06:00	0	1			1	18:00	0	0			0	
06:15	0	1			1	18:15	0	1			1	
06:30	0	2			2	18:30	1	0			1	
06:45	0	5	9		5	18:45	0	1	0	1	2	
07:00	1	3			4	19:00	0	0			0	
07:15	1	7			8	19:15	0	0			0	
07:30	4	23			27	19:30	0	0			0	
07:45	0	6	43	76	43	19:45	0	0			0	
08:00	0	66			66	20:00	0	0			0	
08:15	0	10			10	20:15	0	0			0	
08:30	0	4			4	20:30	0	0			0	
08:45	0	2	82		2	20:45	0	0			0	
09:00	0	5			5	21:00	0	0			0	
09:15	0	2			2	21:15	0	0			0	
09:30	0	0			0	21:30	0	0			0	
09:45	0	3	10		3	21:45	0	0			0	
10:00	0	4			4	22:00	0	0			0	
10:15	0	2			2	22:15	0	0			0	
10:30	0	3			3	22:30	0	0			0	
10:45	1	1	5	14	6	22:45	0	0			0	
11:00	0	0			0	23:00	0	0			0	
11:15	0	2			2	23:15	0	0			0	
11:30	0	1			1	23:30	0	0			0	
11:45	0	1	4		1	23:45	0	0			0	
TOTALS	13	204			217	TOTALS	2	142			144	
SPLIT %	6.0%	94.0%			60.1%	SPLIT %	1.4%	98.6%			39.9%	

DAILY TOTALS					NB	SB					EB	WB	Total	
					15	346					0	0	361	
AM Peak Hour	06:45	07:30			07:30		PM Peak Hour	14:00	15:00				15:00	
AM Pk Volume	6	142			146		PM Pk Volume	1	65				65	
Pk Hr Factor	0.375	0.538			0.553		Pk Hr Factor	0.250	0.508				0.508	
7 - 9 Volume	6	158	0	0	164		4 - 6 Volume	0	48	0	0		48	
7 - 9 Peak Hour	07:00	07:30			07:30		4 - 6 Peak Hour		16:30				16:30	
7 - 9 Pk Volume	6	142	0	0	146		4 - 6 Pk Volume	0	31	0	0		31	
Pk Hr Factor	0.375	0.538	0.000	0.000	0.553		Pk Hr Factor	0.000	0.705	0.000	0.000		0.705	

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Golden Ave S/O Palm St

Day: Friday

Date: 11/21/2014

City: Lemon Grove

Project #: CA14\_4288\_001

DAILY TOTALS					NB	SB	EB					WB	Total
					8	341						0	0
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
00:00	0	0			0	12:00	0	29			29		
00:15	0	0			0	12:15	0	19			19		
00:30	0	0			0	12:30	0	6			6		
00:45	0	0			0	12:45	0	2	56		56		
01:00	0	1			1	13:00	0	2			2		
01:15	0	0			0	13:15	0	2			2		
01:30	0	0			0	13:30	0	3			3		
01:45	0	0	1		0	13:45	0	2	9		9		
02:00	0	0			0	14:00	0	1			1		
02:15	0	0			0	14:15	0	2			2		
02:30	0	0			0	14:30	0	1			1		
02:45	0	0			0	14:45	0	0	4		4		
03:00	0	0			0	15:00	0	0			0		
03:15	0	0			0	15:15	0	0			0		
03:30	0	1			1	15:30	0	0			0		
03:45	0	0	1		0	15:45	0	0			0		
04:00	0	0			0	16:00	0	2			2		
04:15	0	0			0	16:15	0	0			0		
04:30	0	1			1	16:30	0	1			1		
04:45	2	2	4	5	6	16:45	0	0	3		3		
05:00	0	3			3	17:00	0	0			0		
05:15	0	0			0	17:15	0	1			1		
05:30	0	1			1	17:30	0	0			0		
05:45	0	1	5		1	17:45	0	0	1		1		
06:00	0	1			1	18:00	0	0			0		
06:15	0	1			1	18:15	0	0			0		
06:30	0	1			1	18:30	0	0			0		
06:45	0	0	3		0	18:45	0	0			0		
07:00	0	10			10	19:00	0	0			0		
07:15	0	10			10	19:15	0	0			0		
07:30	0	23			23	19:30	0	0			0		
07:45	1	1	50	93	51	19:45	0	0			0		
08:00	0	81			81	20:00	0	0			0		
08:15	0	11			11	20:15	0	0			0		
08:30	0	3			3	20:30	0	0			0		
08:45	0	9	104		9	20:45	0	0			0		
09:00	1	2			3	21:00	0	0			0		
09:15	0	2			2	21:15	0	0			0		
09:30	0	1			1	21:30	0	0			0		
09:45	1	2	3	8	4	21:45	0	0			0		
10:00	0	1			1	22:00	0	0			0		
10:15	0	3			3	22:15	0	0			0		
10:30	1	2			3	22:30	0	0			0		
10:45	0	1	2	8	2	22:45	0	0			0		
11:00	0	5			5	23:00	0	0			0		
11:15	0	8			8	23:15	0	0			0		
11:30	1	12			13	23:30	0	0			0		
11:45	1	2	15	40	16	23:45	0	0			0		
TOTALS	8	268			276	TOTALS		73			73		
SPLIT %	2.9%	97.1%			79.1%	SPLIT %		100.0%			20.9%		

DAILY TOTALS					NB	SB	EB	WB	Total
					8	341	0	0	349
AM Peak Hour	04:00	07:30		07:30	PM Peak Hour		12:00		12:00
AM Pk Volume	2	165		166	PM Pk Volume		56		56
Pk Hr Factor	0.250	0.509		0.512	Pk Hr Factor		0.483		0.483
7 - 9 Volume	1	197	0	0	4 - 6 Volume	0	4	0	0
7 - 9 Peak Hour	07:00	07:30		07:30	4 - 6 Peak Hour		16:00		16:00
7 - 9 Pk Volume	1	165	0	0	4 - 6 Pk Volume	0	3	0	0
Pk Hr Factor	0.250	0.509	0.000	0.000	Pk Hr Factor	0.000	0.375	0.000	0.000

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Palm St W/O Camino De Las Palmas

Day: Monday  
Date: 11/17/2014

City: Lemon Grove  
Project #: CA14\_4288\_002

DAILY TOTALS					NB	SB	EB					WB	Total
					0	0	18					17	35
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
00:00			0	0	0	12:00			1	0	1		
00:15			0	0	0	12:15			0	0	0		
00:30			0	0	0	12:30			0	0	0		
00:45			0	0	0	12:45			0	1	0		
01:00			0	0	0	13:00			0	1	1		
01:15			0	0	0	13:15			0	0	0		
01:30			0	0	0	13:30			0	0	0		
01:45			0	0	0	13:45			0	0	1		
02:00			0	0	0	14:00			0	0	0		
02:15			0	0	0	14:15			0	0	0		
02:30			0	0	0	14:30			0	0	0		
02:45			0	0	0	14:45			0	1	1		
03:00			0	0	0	15:00			2	0	2		
03:15			0	0	0	15:15			0	1	1		
03:30			0	0	0	15:30			2	1	3		
03:45			0	0	0	15:45			0	4	0		
04:00			0	0	0	16:00			1	1	2		
04:15			0	0	0	16:15			0	0	0		
04:30			0	0	0	16:30			0	1	1		
04:45			0	0	0	16:45			0	1	0		
05:00			0	0	0	17:00			1	2	3		
05:15			0	0	0	17:15			1	0	1		
05:30			0	0	0	17:30			0	0	0		
05:45			0	0	0	17:45			0	2	0		
06:00			0	0	0	18:00			0	0	0		
06:15			1	0	1	18:15			0	0	0		
06:30			0	0	0	18:30			0	0	0		
06:45			0	1	0	18:45			1	1	0		
07:00			0	0	0	19:00			0	0	0		
07:15			0	0	0	19:15			0	0	0		
07:30			0	1	1	19:30			0	0	0		
07:45			1	1	0	19:45			0	1	1		
08:00			0	0	0	20:00			0	0	0		
08:15			0	0	0	20:15			1	0	1		
08:30			0	0	0	20:30			0	0	0		
08:45			0	1	1	20:45			0	1	0		
09:00			0	1	1	21:00			0	0	0		
09:15			0	1	1	21:15			0	0	0		
09:30			0	0	0	21:30			0	0	0		
09:45			1	1	0	21:45			0	0	0		
10:00			0	0	0	22:00			0	0	0		
10:15			0	0	0	22:15			0	0	0		
10:30			0	0	0	22:30			0	0	0		
10:45			0	0	0	22:45			0	0	0		
11:00			1	0	1	23:00			0	0	0		
11:15			2	2	4	23:15			0	1	1		
11:30			1	0	1	23:30			0	0	0		
11:45			0	4	1	23:45			1	1	0		
TOTALS	7				7	14	TOTALS	11				10	21
SPLIT %	50.0%				50.0%	40.0%	SPLIT %	52.4%				47.6%	60.0%

DAILY TOTALS			NB	SB							EB	WB	Total	
			0	0							18	17	35	
AM Peak Hour			10:45	08:30	11:00	PM Peak Hour			14:45	14:45	14:45			
AM Pk Volume			4	3	7	PM Pk Volume			4	3	7			
Pk Hr Factor			0.500	0.750	0.438	Pk Hr Factor			0.500	0.750	0.583			
7 - 9 Volume			0	0	1	2	3	4 - 6 Volume		0	0	3	4	7
7 - 9 Peak Hour			07:00	07:00	07:00	4 - 6 Peak Hour			16:30	16:15	16:30			
7 - 9 Pk Volume			0	0	1	1	2	4 - 6 Pk Volume		0	0	2	3	5
Pk Hr Factor			0.000	0.000	0.250	0.250	0.500	Pk Hr Factor		0.000	0.000	0.500	0.375	0.417

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Palm St W/O Camino De Las Palmas

Day: Tuesday  
Date: 11/18/2014

City: Lemon Grove  
Project #: CA14\_4288\_002

DAILY TOTALS					NB	SB	EB					WB	Total
					0	0	22					20	42
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
00:00			0	0	0	12:00			0	0	0		
00:15			0	0	0	12:15			0	0	0		
00:30			0	0	0	12:30			0	0	0		
00:45			0	0	0	12:45			0	1	1		
01:00			0	0	0	13:00			2	0	2		
01:15			0	0	0	13:15			1	0	1		
01:30			0	0	0	13:30			0	0	0		
01:45			0	0	0	13:45			0	3	3		
02:00			0	0	0	14:00			0	0	0		
02:15			0	0	0	14:15			0	0	0		
02:30			0	0	0	14:30			1	0	1		
02:45			0	0	0	14:45			0	1	1		
03:00			0	0	0	15:00			1	1	2		
03:15			0	0	0	15:15			0	2	2		
03:30			0	0	0	15:30			2	3	5		
03:45			0	0	0	15:45			0	3	3		
04:00			0	0	0	16:00			0	0	0		
04:15			0	0	0	16:15			0	0	0		
04:30			0	0	0	16:30			1	2	3		
04:45			0	0	0	16:45			0	1	1		
05:00			0	0	0	17:00			0	0	0		
05:15			0	0	0	17:15			0	0	0		
05:30			0	0	0	17:30			0	0	0		
05:45			0	0	0	17:45			1	1	2		
06:00			0	0	0	18:00			0	0	0		
06:15			1	0	1	18:15			1	1	2		
06:30			0	0	0	18:30			0	0	0		
06:45			1	2	3	18:45			0	1	1		
07:00			0	0	0	19:00			0	0	0		
07:15			0	0	0	19:15			1	1	2		
07:30			0	0	0	19:30			0	0	0		
07:45			0	0	0	19:45			0	1	1		
08:00			1	1	2	20:00			0	0	0		
08:15			1	1	2	20:15			0	0	0		
08:30			0	0	0	20:30			0	0	0		
08:45			0	2	2	20:45			0	0	0		
09:00			0	1	1	21:00			0	0	0		
09:15			0	1	1	21:15			0	0	0		
09:30			0	0	0	21:30			0	0	0		
09:45			1	1	2	21:45			0	0	0		
10:00			0	0	0	22:00			0	0	0		
10:15			0	0	0	22:15			0	0	0		
10:30			1	0	1	22:30			0	0	0		
10:45			1	2	3	22:45			0	0	0		
11:00			1	1	2	23:00			1	0	1		
11:15			0	0	0	23:15			0	0	0		
11:30			0	0	0	23:30			0	0	0		
11:45			1	2	3	23:45			1	2	3		
TOTALS	9				8	17	TOTALS	13				12	25
SPLIT %	52.9%				47.1%	40.5%	SPLIT %	52.0%				48.0%	59.5%

DAILY TOTALS			NB	SB	EB			WB			Total
			0	0							22
AM Peak Hour			10:15	08:00	08:00	PM Peak Hour			12:30	14:45	14:45
AM Pk Volume			3	3	5	PM Pk Volume			3	6	9
Pk Hr Factor			0.750	0.750	0.625	Pk Hr Factor			0.375	0.500	0.450
7 - 9 Volume	0	0	2	3	5	4 - 6 Volume	0	0	2	3	5
7 - 9 Peak Hour			07:30	08:00	08:00	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume	0	0	2	3	5	4 - 6 Pk Volume	0	0	1	2	3
Pk Hr Factor	0.000	0.000	0.500	0.750	0.625	Pk Hr Factor	0.000	0.000	0.250	0.250	0.250

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Palm St W/O Camino De Las Palmas

Day: Wednesday

Date: 11/19/2014

City: Lemon Grove

Project #: CA14\_4288\_002

DAILY TOTALS				NB	SB	EB				WB	Total
				0	0	25				24	49
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			0	0	0
00:15			0	0	0	12:15			1	1	2
00:30			0	0	0	12:30			1	3	4
00:45			0	0	0	12:45			1	3	4
01:00			0	0	0	13:00			2	1	3
01:15			0	0	0	13:15			0	0	0
01:30			0	0	0	13:30			0	0	0
01:45			0	0	0	13:45			0	2	2
02:00			0	0	0	14:00			0	0	0
02:15			0	0	0	14:15			0	1	1
02:30			0	0	0	14:30			0	0	0
02:45			0	0	0	14:45			0	0	0
03:00			0	0	0	15:00			1	0	1
03:15			0	0	0	15:15			0	0	0
03:30			0	0	0	15:30			1	1	2
03:45			0	0	0	15:45			0	2	2
04:00			0	0	0	16:00			1	1	2
04:15			0	0	0	16:15			0	0	0
04:30			0	0	0	16:30			2	2	4
04:45			0	0	0	16:45			0	3	3
05:00			0	0	0	17:00			0	0	0
05:15			0	0	0	17:15			0	0	0
05:30			0	0	0	17:30			0	1	1
05:45			0	0	0	17:45			0	0	0
06:00			0	0	0	18:00			1	1	2
06:15			1	0	1	18:15			1	0	1
06:30			0	0	0	18:30			0	0	0
06:45			0	1	1	18:45			1	3	4
07:00			1	0	1	19:00			0	0	0
07:15			2	2	4	19:15			0	0	0
07:30			0	0	0	19:30			0	0	0
07:45			0	3	3	19:45			0	0	0
08:00			0	0	0	20:00			0	1	1
08:15			1	0	1	20:15			0	0	0
08:30			0	0	0	20:30			0	0	0
08:45			0	1	1	20:45			1	1	2
09:00			0	1	1	21:00			0	0	0
09:15			0	0	0	21:15			0	0	0
09:30			0	1	1	21:30			0	0	0
09:45			2	2	4	21:45			0	1	1
10:00			1	1	2	22:00			0	0	0
10:15			0	0	0	22:15			0	0	0
10:30			0	0	0	22:30			0	0	0
10:45			0	1	1	22:45			0	0	0
11:00			1	0	1	23:00			0	0	0
11:15			1	1	2	23:15			0	0	0
11:30			1	1	2	23:30			0	0	0
11:45			0	3	3	23:45			0	0	0
TOTALS	11 9				20	TOTALS	14 15				29
SPLIT %	55.0% 45.0%				40.8%	SPLIT %	48.3% 51.7%				59.2%

DAILY TOTALS			NB	SB	EBWB				Total	
			0	0					25	24
AM Peak Hour			06:30	11:45	11:45	PM Peak Hour			12:15	12:15
AM Pk Volume			3	5	7	PM Pk Volume			5	10
Pk Hr Factor			0.375	0.417	0.438	Pk Hr Factor			0.625	0.625
7 - 9 Volume	0	0	4	2	6	4 - 6 Volume	0	0	3	7
7 - 9 Peak Hour			07:00	07:00	07:00	4 - 6 Peak Hour			16:00	16:00
7 - 9 Pk Volume	0	0	3	2	5	4 - 6 Pk Volume	0	0	3	6
Pk Hr Factor	0.000	0.000	0.375	0.250	0.313	Pk Hr Factor	0.000	0.000	0.375	0.375

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Palm St W/O Camino De Las Palmas

Day: Thursday  
Date: 11/20/2014

City: Lemon Grove  
Project #: CA14\_4288\_002

DAILY TOTALS					NB	SB	EB					WB	Total	
					0	0	17					17	34	
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL		
00:00			0	0	0		12:00			0	0	0		
00:15			0	0	0		12:15			0	0	0		
00:30			0	0	0		12:30			0	0	0		
00:45			0	0	0		12:45			0	0	0		
01:00			0	0	0		13:00			0	1	1		
01:15			0	1	1		13:15			0	0	0		
01:30			1	1	2		13:30			0	0	0		
01:45			1	2	0	2	13:45			0	0	1	0	1
02:00			0	0	0		14:00			0	0	0		
02:15			0	0	0		14:15			0	0	0		
02:30			0	0	0		14:30			0	0	0		
02:45			0	1	1	1	14:45			0	0	0		
03:00			0	0	0		15:00			1	0	1		
03:15			0	0	0		15:15			0	0	0		
03:30			0	0	0		15:30			0	0	0		
03:45			1	1	0	1	15:45			0	1	0	0	1
04:00			0	0	0		16:00			0	0	0		
04:15			0	0	0		16:15			1	1	2		
04:30			0	0	0		16:30			0	1	1		
04:45			0	0	0		16:45			0	1	0	2	3
05:00			0	0	0		17:00			0	0	0		
05:15			0	0	0		17:15			0	0	0		
05:30			0	0	0		17:30			0	0	0		
05:45			0	0	0		17:45			0	1	1	1	1
06:00			1	0	1		18:00			0	0	0		
06:15			0	0	0		18:15			0	0	0		
06:30			0	0	0		18:30			0	0	0		
06:45			0	1	0	1	18:45			0	0	0		
07:00			0	0	0		19:00			0	0	0		
07:15			3	3	6		19:15			1	0	1		
07:30			0	0	0		19:30			0	0	0		
07:45			0	3	0	3	19:45			0	1	1	1	2
08:00			0	0	0		20:00			1	0	1		
08:15			0	0	0		20:15			0	0	0		
08:30			1	0	1		20:30			0	0	0		
08:45			0	1	0	1	20:45			0	1	0	0	1
09:00			0	1	1		21:00			0	0	0		
09:15			0	0	0		21:15			0	0	0		
09:30			0	1	1		21:30			0	0	0		
09:45			0	0	2	2	21:45			0	0	0		
10:00			2	0	2		22:00			0	0	0		
10:15			0	0	0		22:15			0	0	0		
10:30			0	1	1		22:30			0	0	0		
10:45			1	3	1	2	22:45			0	0	0		
11:00			1	0	1		23:00			0	0	0		
11:15			0	1	1		23:15			0	0	0		
11:30			1	1	2		23:30			0	0	0		
11:45			0	2	0	2	23:45			0	0	0		
TOTALS			13	12	25		TOTALS			4	5	9		
SPLIT %			52.0%	48.0%	73.5%		SPLIT %			44.4%	55.6%	26.5%		

DAILY TOTALS			NB	SB	EB			WB			Total
			0	0							17
AM Peak Hour			06:30	06:30	06:30	PM Peak Hour			19:15	15:45	15:45
AM Pk Volume			3	3	6	PM Pk Volume			2	2	3
Pk Hr Factor			0.250	0.250	0.250	Pk Hr Factor			0.500	0.500	0.375
7 - 9 Volume	0	0	4	3	7	4 - 6 Volume	0	0	1	3	4
7 - 9 Peak Hour			07:00	07:00	07:00	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume	0	0	3	3	6	4 - 6 Pk Volume	0	0	1	2	3
Pk Hr Factor	0.000	0.000	0.250	0.250	0.250	Pk Hr Factor	0.000	0.000	0.250	0.500	0.375

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Palm St W/O Camino De Las Palmas

Day: Friday

Date: 11/21/2014

City: Lemon Grove

Project #: CA14\_4288\_002

DAILY TOTALS					NB	SB	EB					WB	Total
					0	0	27					28	55
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
00:00			0	0	0	12:00			0	1	1		
00:15			0	0	0	12:15			0	0	0		
00:30			0	0	0	12:30			0	0	0		
00:45			0	0	0	12:45			1	1	2		
01:00			0	0	0	13:00			0	0	0		
01:15			0	0	0	13:15			0	0	0		
01:30			0	0	0	13:30			0	0	0		
01:45			0	0	0	13:45			0	0	0		
02:00			0	0	0	14:00			1	1	2		
02:15			0	2	2	14:15			0	1	1		
02:30			1	1	2	14:30			0	1	1		
02:45			0	1	0	14:45			1	2	3		
03:00			0	0	0	15:00			3	3	6		
03:15			0	0	0	15:15			0	0	0		
03:30			1	0	1	15:30			0	0	0		
03:45			0	1	0	15:45			0	3	3		
04:00			0	0	0	16:00			0	0	0		
04:15			0	0	0	16:15			0	0	0		
04:30			0	0	0	16:30			2	1	3		
04:45			0	0	0	16:45			1	3	4		
05:00			0	0	0	17:00			0	0	0		
05:15			0	0	0	17:15			0	0	0		
05:30			0	0	0	17:30			0	0	0		
05:45			0	1	1	17:45			0	0	0		
06:00			0	0	0	18:00			0	0	0		
06:15			1	0	1	18:15			0	1	1		
06:30			0	0	0	18:30			0	0	0		
06:45			2	3	1	18:45			1	1	2		
07:00			0	0	0	19:00			0	0	0		
07:15			2	2	4	19:15			0	0	0		
07:30			0	0	0	19:30			0	0	0		
07:45			0	2	0	19:45			0	0	0		
08:00			0	0	0	20:00			1	1	2		
08:15			0	0	0	20:15			0	0	0		
08:30			1	0	1	20:30			0	0	0		
08:45			0	1	0	20:45			0	1	1		
09:00			0	2	2	21:00			0	0	0		
09:15			0	0	0	21:15			0	0	0		
09:30			1	1	2	21:30			0	0	0		
09:45			1	2	1	21:45			0	0	0		
10:00			0	0	0	22:00			0	1	1		
10:15			0	0	0	22:15			0	0	0		
10:30			2	2	4	22:30			1	0	1		
10:45			0	2	0	22:45			0	1	1		
11:00			0	0	0	23:00			0	0	0		
11:15			1	1	2	23:15			0	0	0		
11:30			0	0	0	23:30			0	0	0		
11:45			2	3	2	23:45			0	0	0		
TOTALS	15				16	31	TOTALS	12				12	24
SPLIT %	48.4%				51.6%	56.4%	SPLIT %	50.0%				50.0%	43.6%

DAILY TOTALS			NB	SB	EB			WB			Total
			0	0							27
AM Peak Hour			06:30	09:00	06:30	PM Peak Hour			14:15	14:15	14:15
AM Pk Volume			4	4	7	PM Pk Volume			4	6	10
Pk Hr Factor			0.500	0.500	0.438	Pk Hr Factor			0.333	0.500	0.417
7 - 9 Volume	0	0	3	2	5	4 - 6 Volume	0	0	3	1	4
7 - 9 Peak Hour			07:00	07:00	07:00	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume	0	0	2	2	4	4 - 6 Pk Volume	0	0	3	1	4
Pk Hr Factor	0.000	0.000	0.250	0.250	0.250	Pk Hr Factor	0.000	0.000	0.375	0.250	0.333



Prepared by NDS/ATD

## VOLUME

Eastern Driveway s/o Palm St

**Day:** Wednesday

**Date:** 11/19/2014

**City:** Lemon Grove

**Project #:** CA14\_4290\_001n

DAILY TOTALS	NB	SB	EB	WB	Total
	17	17	0	0	34

AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00	0	0			0	12:00	0	0			0
0:15	0	0			0	12:15	0	0			0
0:30	0	0			0	12:30	0	0			0
0:45	0	0			0	12:45	0	0			0
1:00	0	0			0	13:00	0	0			0
1:15	0	0			0	13:15	0	0			0
1:30	0	0			0	13:30	0	0			0
1:45	0	0			0	13:45	0	0			0
2:00	0	0			0	14:00	0	0			0
2:15	0	0			0	14:15	0	0			0
2:30	0	0			0	14:30	0	0			0
2:45	0	0			0	14:45	0	0			0
3:00	0	0			0	15:00	0	0			0
3:15	0	0			0	15:15	0	0			0
3:30	0	0			0	15:30	0	0			0
3:45	0	0			0	15:45	0	0			0
4:00	1	1			2	16:00	0	0			0
4:15	0	0			0	16:15	0	0			0
4:30	0	1			1	16:30	0	0			0
4:45	2	3	1	3	3 6	16:45	0	0			0
5:00	0	1			1	17:00	0	0			0
5:15	1	1			2	17:15	0	0			0
5:30	1	0			1	17:30	0	0			0
5:45	1	3	2	4	3 7	17:45	0	0			0
6:00	2	1			3	18:00	0	0			0
6:15	0	0			0	18:15	0	0			0
6:30	0	0			0	18:30	0	0			0
6:45	0	2	0	1	0 3	18:45	0	0			0
7:00	0	0			0	19:00	0	0			0
7:15	0	1			1	19:15	0	0			0
7:30	0	0			0	19:30	0	0			0
7:45	1	1	0	1	1 2	19:45	0	0			0
8:00	0	0			0	20:00	0	0			0
8:15	1	1			2	20:15	0	0			0
8:30	0	2			2	20:30	0	0			0
8:45	0	1	0	3	0 4	20:45	0	0			0
9:00	2	0			2	21:00	0	0			0
9:15	0	1			1	21:15	0	0			0
9:30	1	0			1	21:30	0	0			0
9:45	0	3	1	2	1 5	21:45	0	0			0
10:00	0	1			1	22:00	0	0			0
10:15	1	0			1	22:15	0	0			0
10:30	1	1			2	22:30	0	0			0
10:45	0	2	0	2	0 4	22:45	0	0			0
11:00	1	0			1	23:00	0	0			0
11:15	0	1			1	23:15	0	0			0
11:30	0	0			0	23:30	0	0			0
11:45	1	2	0	1	1 3	23:45	0	0			0
TOTALS	17	17			34	TOTALS					0
SPLIT %	50.0%	50.0%			100.0%	SPLIT %					0.0%

DAILY TOTALS	NB	SB	EB	WB	Total
	17	17	0	0	34

AM Peak Hour	5:15	4:30					5:15	PM Peak Hour						
AM Pk Volume	5	4					9	PM Pk Volume						
Pk Hr Factor	0.625	1.000					0.750	Pk Hr Factor						
7 - 9 Volume	2	4	0	0	6				4 - 6 Volume	0	0	0	0	0
7 - 9 Peak Hour	7:30	7:45					7:45	4 - 6 Peak Hour						
7 - 9 Pk Volume	2	3	0	0	5				4 - 6 Pk Volume	0	0	0	0	0
Pk Hr Factor	0.500	0.375	0.000	0.000	0.625				Pk Hr Factor	0.000	0.000	0.000	0.000	0.000

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Eastern Driveway s/o Palm St

Day: Thursday  
Date: 11/20/2014

City: Lemon Grove  
Project #: CA14\_4290\_001n

DAILY TOTALS					NB	SB						EB	WB	Total
					13	13						0	0	26
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
0:00	0	0			0	12:00	0	0			0			
0:15	0	0			0	12:15	0	0			0			
0:30	0	0			0	12:30	0	0			0			
0:45	0	0			0	12:45	0	0			0			
1:00	0	0			0	13:00	0	0			0			
1:15	0	0			0	13:15	0	0			0			
1:30	0	0			0	13:30	0	0			0			
1:45	0	0			0	13:45	0	0			0			
2:00	0	0			0	14:00	0	0			0			
2:15	0	0			0	14:15	0	0			0			
2:30	0	0			0	14:30	0	0			0			
2:45	0	0			0	14:45	0	0			0			
3:00	0	0			0	15:00	0	0			0			
3:15	0	0			0	15:15	0	0			0			
3:30	0	0			0	15:30	0	0			0			
3:45	0	0			0	15:45	0	0			0			
4:00	0	1			1	16:00	0	0			0			
4:15	1	0			1	16:15	0	0			0			
4:30	0	0			0	16:30	0	0			0			
4:45	0	1	1	2	1 3	16:45	0	0			0			
5:00	2	2			4	17:00	0	0			0			
5:15	1	0			1	17:15	0	0			0			
5:30	0	1			1	17:30	0	0			0			
5:45	1	4	1	4	2 8	17:45	0	0			0			
6:00	1	0			1	18:00	0	0			0			
6:15	0	0			0	18:15	0	0			0			
6:30	0	0			0	18:30	0	0			0			
6:45	0	1	0		0 1	18:45	0	0			0			
7:00	0	0			0	19:00	0	0			0			
7:15	0	0			0	19:15	0	0			0			
7:30	0	1			1	19:30	0	0			0			
7:45	0	0	1		0 1	19:45	0	0			0			
8:00	0	0			0	20:00	0	0			0			
8:15	1	0			1	20:15	0	0			0			
8:30	0	1			1	20:30	0	0			0			
8:45	0	1	0	1	0 2	20:45	0	0			0			
9:00	1	1			2	21:00	0	0			0			
9:15	1	1			2	21:15	0	0			0			
9:30	1	0			1	21:30	0	0			0			
9:45	0	3	1	3	1 6	21:45	0	0			0			
10:00	1	0			1	22:00	0	0			0			
10:15	0	1			1	22:15	0	0			0			
10:30	0	0			0	22:30	0	0			0			
10:45	0	1	1	2	1 3	22:45	0	0			0			
11:00	1	0			1	23:00	0	0			0			
11:15	0	0			0	23:15	0	0			0			
11:30	0	0			0	23:30	0	0			0			
11:45	1	2	0		1 2	23:45	0	0			0			
TOTALS	13	13			26	TOTALS					0			
SPLIT %	50.0%	50.0%			100.0%	SPLIT %					0.0%			

DAILY TOTALS					NB	SB					EB	WB	Total	
					13	13					0	0	26	
AM Peak Hour	5:00	4:45			5:00		PM Peak Hour							
AM Pk Volume	4	4			8		PM Pk Volume							
Pk Hr Factor	0.500	0.500			0.500		Pk Hr Factor							
7 - 9 Volume	1	2	0	0	3		4 - 6 Volume	0	0	0	0	0	0	
7 - 9 Peak Hour	7:30	7:00			7:30		4 - 6 Peak Hour							
7 - 9 Pk Volume	1	1	0	0	2		4 - 6 Pk Volume	0	0	0	0	0	0	
Pk Hr Factor	0.250	0.250	0.000	0.000	0.500		Pk Hr Factor	0.000	0.000	0.000	0.000	0.000	0.000	

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Western Driveway s/o Palm St

Day: Wednesday

Date: 11/19/2014

City: Lemon Grove

Project #: CA14\_4290\_002n

DAILY TOTALS					NB	SB						EB	WB						Total
					25	25						0	0						50
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL							
0:00	0	0			0		12:00	0	0			0							
0:15	0	0			0		12:15	1	0			1							
0:30	0	0			0		12:30	1	0			1							
0:45	0	0			0		12:45	0	2	0		0	2						
1:00	0	0			0		13:00	2	0			2							
1:15	0	0			0		13:15	1	0			1							
1:30	0	0			0		13:30	0	0			0							
1:45	0	0			0		13:45	1	4	0		1	4						
2:00	0	0			0		14:00	0	0			0							
2:15	0	0			0		14:15	1	0			1							
2:30	0	0			0		14:30	1	0			1							
2:45	0	0			0		14:45	1	3	1	1	2	4						
3:00	0	0			0		15:00	0	0			0							
3:15	0	0			0		15:15	0	0			0							
3:30	0	0			0		15:30	0	0			0							
3:45	0	0			0		15:45	1	1	0		1	1						
4:00	0	0			0		16:00	0	0			0							
4:15	0	0			0		16:15	0	0			0							
4:30	0	1			1		16:30	0	0			0							
4:45	0	4	5		4	5	16:45	3	3	2	2	5	5						
5:00	0	0			0		17:00	0	0			0							
5:15	0	0			0		17:15	0	0			0							
5:30	0	0			0		17:30	0	0			0							
5:45	0	0			0		17:45	0	0			0							
6:00	0	1			1		18:00	0	0			0							
6:15	0	1			1		18:15	0	0			0							
6:30	1	0			1		18:30	0	0			0							
6:45	0	1	0	2	0	3	18:45	0	0			0							
7:00	0	2			2		19:00	0	0			0							
7:15	0	1			1		19:15	0	0			0							
7:30	2	1			3		19:30	0	0			0							
7:45	0	2	1	5	1	7	19:45	0	0			0							
8:00	0	0			0		20:00	0	0			0							
8:15	1	1			2		20:15	0	0			0							
8:30	0	2			2		20:30	0	0			0							
8:45	0	1	0	3	0	4	20:45	0	0			0							
9:00	0	0			0		21:00	0	0			0							
9:15	0	1			1		21:15	0	0			0							
9:30	0	0			0		21:30	0	0			0							
9:45	1	1	1	2	2	3	21:45	0	0			0							
10:00	0	0			0		22:00	0	0			0							
10:15	2	1			3		22:15	0	0			0							
10:30	1	0			1		22:30	0	0			0							
10:45	0	3	1	2	1	5	22:45	0	0			0							
11:00	2	0			2		23:00	0	0			0							
11:15	0	0			0		23:15	0	0			0							
11:30	2	2			4		23:30	0	0			0							
11:45	0	4	1	3	1	7	23:45	0	0			0							
TOTALS	12	22			34		TOTALS	13	3			16							
SPLIT %	35.3%	64.7%			68.0%		SPLIT %	81.3%	18.8%			32.0%							

DAILY TOTALS					NB	SB						EB	WB						Total
					25	25						0	0						50
AM Peak Hour	10:15	4:00			7:00		PM Peak Hour	12:15	16:00			16:00							
AM Pk Volume	5	5			7		PM Pk Volume	4	2			5							
Pk Hr Factor	0.625	0.313			0.583		Pk Hr Factor	0.500	0.250			0.250							
7 - 9 Volume	3	8	0	0	11		4 - 6 Volume	3	2	0	0	5							
7 - 9 Peak Hour	7:30	7:00			7:00		4 - 6 Peak Hour	16:00	16:00			16:00							
7 - 9 Pk Volume	3	5	0	0	7		4 - 6 Pk Volume	3	2	0	0	5							
Pk Hr Factor	0.375	0.625	0.000	0.000	0.583		Pk Hr Factor	0.250	0.250	0.000	0.000	0.250							

# APPENDIX A

Prepared by NDS/ATD

## VOLUME

Western Driveway s/o Palm St

Day: Thursday  
Date: 11/20/2014

City: Lemon Grove  
Project #: CA14\_4290\_002n

DAILY TOTALS					NB	SB	EB					WB	Total
					18	18	0					0	36
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
0:00	0	0			0	12:00	1	0			1		
0:15	0	0			0	12:15	1	0			1		
0:30	0	0			0	12:30	0	0			0		
0:45	0	0			0	12:45	0	2	0		2		
1:00	0	0			0	13:00	0	0			0		
1:15	0	0			0	13:15	0	0			0		
1:30	0	0			0	13:30	2	0			2		
1:45	0	0			0	13:45	0	2	0		2		
2:00	0	0			0	14:00	0	0			0		
2:15	0	0			0	14:15	0	0			0		
2:30	0	0			0	14:30	0	0			0		
2:45	0	0			0	14:45	1	1	0		1		
3:00	0	0			0	15:00	0	0			0		
3:15	0	0			0	15:15	1	0			1		
3:30	0	0			0	15:30	2	1			3		
3:45	0	0			0	15:45	0	3	0	1	4		
4:00	0	0			0	16:00	0	0			0		
4:15	0	0			0	16:15	0	0			0		
4:30	0	1			1	16:30	0	0			0		
4:45	0	4	5		4	16:45	0	0			0		
5:00	0	0			0	17:00	0	0			0		
5:15	0	0			0	17:15	0	0			0		
5:30	0	0			0	17:30	0	0			0		
5:45	0	0			0	17:45	0	0			0		
6:00	0	1			1	18:00	0	0			0		
6:15	0	0			0	18:15	0	0			0		
6:30	0	1			1	18:30	0	0			0		
6:45	1	1	0	2	1	18:45	0	0			0		
7:00	1	0			1	19:00	0	0			0		
7:15	1	2			3	19:15	0	0			0		
7:30	0	1			1	19:30	0	0			0		
7:45	1	3	0	3	1	19:45	0	0			0		
8:00	0	1			1	20:00	0	0			0		
8:15	0	2			2	20:15	0	0			0		
8:30	1	0			1	20:30	0	0			0		
8:45	0	1	1	4	1	20:45	0	0			0		
9:00	1	0			1	21:00	0	0			0		
9:15	0	1			1	21:15	0	0			0		
9:30	0	0			0	21:30	0	0			0		
9:45	1	2	0	1	1	21:45	0	0			0		
10:00	2	2			4	22:00	0	0			0		
10:15	0	0			0	22:15	0	0			0		
10:30	0	0			0	22:30	0	0			0		
10:45	0	2	0	2	0	22:45	0	0			0		
11:00	0	0			0	23:00	0	0			0		
11:15	1	0			1	23:15	0	0			0		
11:30	0	0			0	23:30	0	0			0		
11:45	0	1	0		0	23:45	0	0			0		
TOTALS	10	17			27	TOTALS	8	1			9		
SPLIT %	37.0%	63.0%			75.0%	SPLIT %	88.9%	11.1%			25.0%		

DAILY TOTALS					NB	SB	EB	WB	Total
					18	18	0	0	36
AM Peak Hour	6:30	4:00		6:30	PM Peak Hour	14:45	14:45		14:45
AM Pk Volume	3	5		6	PM Pk Volume	4	1		5
Pk Hr Factor	0.750	0.313		0.500	Pk Hr Factor	0.500	0.250		0.417
7 - 9 Volume	4	7	0	0	4 - 6 Volume	0	0	0	0
7 - 9 Peak Hour	7:00	7:15		7:00	4 - 6 Peak Hour	0	0	0	0
7 - 9 Pk Volume	3	4	0	0	4 - 6 Pk Volume	0	0	0	0
Pk Hr Factor	0.750	0.500	0.000	0.000	Pk Hr Factor	0.000	0.000	0.000	0.000

# APPENDIX B

Prepared by National Data & Surveying Services

## Parking Study

Location Liberty Charter High  
City Lemon Grove

Day Tuesday  
Date 11/18/2014

Time	Regular	Zone A HC	District People	Sub Total	Regular	Zone B HC	Regular Blocked	Sub Total	Grand Total
Spaces	12	2	4	18	45	2	3	50	68
7:45	2	0	0	2	19	0	0	19	21
8:15	9	0	0	9	30	0	0	30	39
8:45	8	1	4	13	30	0	0	30	43
9:15	8	1	4	13	30	0	0	30	43
9:45	8	0	4	12	31	0	0	31	43
10:15	10	0	3	13	30	0	0	30	43
10:45	10	0	3	13	30	0	0	30	43
11:15	11	0	3	14	31	0	0	31	45
11:45	12	0	3	15	30	0	0	30	45
12:15	12	0	3	15	32	0	0	32	47
12:45	11	0	3	14	32	0	0	32	46
13:15	8	0	4	12	30	0	0	30	42
13:45	8	0	3	11	31	0	0	31	42
14:15	8	0	3	11	31	0	0	31	42
14:45	9	0	4	13	30	0	0	30	43
15:15	8	0	3	11	29	0	0	29	40
15:45	6	0	3	9	23	0	0	23	32
16:15	5	0	3	8	13	0	0	13	21

# APPENDIX B

Prepared by National Data & Surveying Services

## Parking Study

**Location** Liberty Charter High  
**City** Lemon Grove

**Day** Wednesday  
**Date** 11/19/2014

Time	Regular	Zone A HC	District People	Sub Total	Regular	Zone B HC	Regular Blocked	Sub Total	Grand Total
<b>Spaces</b>	<b>12</b>	<b>2</b>	<b>4</b>	<b>18</b>	<b>45</b>	<b>2</b>	<b>3</b>	<b>50</b>	<b>68</b>
7:45	2	0	0	2	21	0	0	21	23
8:15	7	0	0	7	35	0	0	35	42
8:45	8	0	2	10	35	0	0	35	45
9:15	11	0	2	13	35	0	0	35	48
9:45	12	0	2	14	36	0	0	36	50
10:15	12	0	2	14	35	0	0	35	49
10:45	11	1	1	13	35	0	0	35	48
11:15	11	0	2	13	35	0	0	35	48
11:45	12	0	4	16	36	0	0	36	52
12:15	10	0	2	12	37	0	0	37	49
12:45	12	0	3	15	36	0	0	36	51
13:15	11	0	2	13	36	0	0	36	49
13:45	11	0	2	13	36	0	0	36	49
14:15	9	0	2	11	37	0	0	37	48
14:45	9	0	3	12	35	0	0	35	47
15:15	10	0	4	14	34	0	0	34	48
15:45	9	0	4	13	24	0	0	24	37
16:15	7	0	3	10	17	0	0	17	27

# APPENDIX B

Prepared by National Data & Surveying Services

## Parking Study

Location Liberty Charter High  
City Lemon Grove

Day Thursday  
Date 11/20/2014

Time	Regular	Zone A HC	District People	Sub Total	Regular	Zone B HC	Regular Blocked	Sub Total	Grand Total
Spaces	12	2	4	18	45	2	3	50	68
7:45	2	0	0	2	18	0	0	18	20
8:15	5	0	2	7	33	0	0	33	40
8:45	6	0	1	7	32	0	0	32	39
9:15	7	1	2	10	32	0	0	32	42
9:45	8	1	1	10	32	0	0	32	42
10:15	8	0	3	11	32	0	0	32	43
10:45	10	0	2	12	32	0	0	32	44
11:15	8	1	3	12	32	0	0	32	44
11:45	9	0	2	11	32	0	0	32	43
12:15	8	0	3	11	33	0	0	33	44
12:45	7	0	3	10	33	0	0	33	43
13:15	5	0	3	8	33	0	0	33	41
13:45	6	0	2	8	33	0	0	33	41
14:15	6	0	1	7	33	0	0	33	40
14:45	5	0	3	8	33	0	0	33	41
15:15	5	0	3	8	32	0	0	32	40
15:45	7	0	3	10	24	0	0	24	34
16:15	6	0	3	9	14	0	0	14	23

# APPENDIX B

Prepared by National Data & Surveying Services

## Parking Study

**Location** Liberty Charter High  
**City** Lemon Grove

**Day** Tues - Thurs  
**Date** 11/18 - 11/20

Time	Regular	Zone A HC	District People	Sub Total	Regular	Zone B HC	Regular Blocked	Sub Total	Grand Total
<b>Spaces</b>	<b>12</b>	<b>2</b>	<b>4</b>	<b>18</b>	<b>45</b>	<b>2</b>	<b>3</b>	<b>50</b>	<b>68</b>
7:45	2	0	0	2	19	0	0	19	21
8:15	7	0	1	8	33	0	0	33	41
8:45	7	0	2	9	32	0	0	32	41
9:15	9	1	3	13	32	0	0	32	45
9:45	9	0	2	11	33	0	0	33	44
10:15	10	0	3	13	32	0	0	32	45
10:45	10	0	2	12	32	0	0	32	44
11:15	10	0	3	13	33	0	0	33	46
11:45	11	0	3	14	33	0	0	33	47
12:15	10	0	3	13	34	0	0	34	47
12:45	10	0	3	13	34	0	0	34	47
13:15	8	0	3	11	33	0	0	33	44
13:45	8	0	2	10	33	0	0	33	43
14:15	8	0	2	10	34	0	0	34	44
14:45	8	0	3	11	33	0	0	33	44
15:15	8	0	3	11	32	0	0	32	43
15:45	7	0	3	10	24	0	0	24	34
16:15	6	0	3	9	15	0	0	15	24



<b>Senior High School</b>  Auditorium, Basketball Stadium, or Football Stadium <i>(whichever has the greatest occupancy)</i>  Bicycle Parking	The Sum of the Following: 1     Parking space per employee 15    Parking spaces for visitors 0.25 Parking spaces per student 0.2   Parking space per seat minus employee, visitor, and student spaces provided above 0.1   Bike space per student
<b>College and University</b> (Educational institutions beyond the 12 <sup>th</sup> grade)  Auditorium, Basketball Stadium, or Football Stadium <i>(whichever has the greatest occupancy)</i>  Bicycle Parking	The Sum of the Following: 0.7   Parking spaces per faculty member/staff 0.3   Parking spaces per student 25    Parking spaces for visitors 0.2   Parking space per seat minus employee, visitor, and student spaces provided above 0.05 Bike space per student
<b>Other Educational Institutions</b> Including Private or Charitable Institutions Offering Instruction, Training, or Learning Opportunities <i>When located in a commercial center consisting of 10  KSF GFA or more and this use does not comprise  more than 25% of the total GFA of the commercial  center, this section does not apply. See Section 6762  Retail Sales and Services.</i>  Bicycle Parking	1     Parking space per employee plus  The Greater of the Following: 0.5   Parking space per student/trainee, OR 0.3   Parking space per KSF GFA  0.1   Bike space per student
<b>MEDICAL CARE FACILITIES</b>	
<b>Hospital</b> Acute, General  Bicycle Parking	2.5   Parking spaces per bed  0.05 Bike space per car space but not less than 3
<b>Medical Office</b>  Bicycle Parking	5     Parking spaces per KSF GFA 0.1   Bike space per car space but not less than 3
<b>Other Medical Care Facilities</b> Other Facilities Providing Overnight Medical Care (e.g. mental/psychiatric institutions, intermediate care homes, nursing homes, etc.)  Bicycle Parking	0.33 Parking spaces per bed  0.05   Bike space per car space but not less than 3

Note: KSF GFA: Thousand Square Feet of Gross Floor Area

(Added by Ord. No. 10251 (N.S.) adopted 2-6-13. Formerly Sec. 6766, 6770 & 6772.)



## APPENDIX D

Kimley»Horn

### LIBERTY CHARTER HS TRANSPORTATION SURVEY

Please take a moment to answer the following questions for the Liberty Charter High School transportation survey. Your responses will provide valuable information for the Liberty Charter High School transportation/parking study. Your participation and feedback is greatly appreciated.

#### Are you a student, faculty, or staff?

- ☐ Student
- ☐ Faculty
- ☐ Staff

#### What is your primary transportation mode to get to campus?

- ☐ Drive alone
- ☐ Drive others: How many including yourself \_\_\_\_\_
- ☐ Ride as passenger (with another student)
- ☐ Ride as passenger (dropped off)
- ☐ Public Transit (Bus/Trolley/etc.)
- ☐ Bicycle
- ☐ Walk
- ☐ Other \_\_\_\_\_

#### If you drive to Campus, where do you park?

- ☐ On-site
- ☐ Street Parking

#### In your opinion. How difficult is finding parking around this School Site?

- ☐ Not Applicable
- ☐ Very Difficult
- ☐ Somewhat Difficult
- ☐ Fair
- ☐ Easy
- ☐ Very Easy

If you drove today, please indicate on the map with an "X" where you parked your vehicle.

If you parked outside of the shown area, where did you park? \_\_\_\_\_

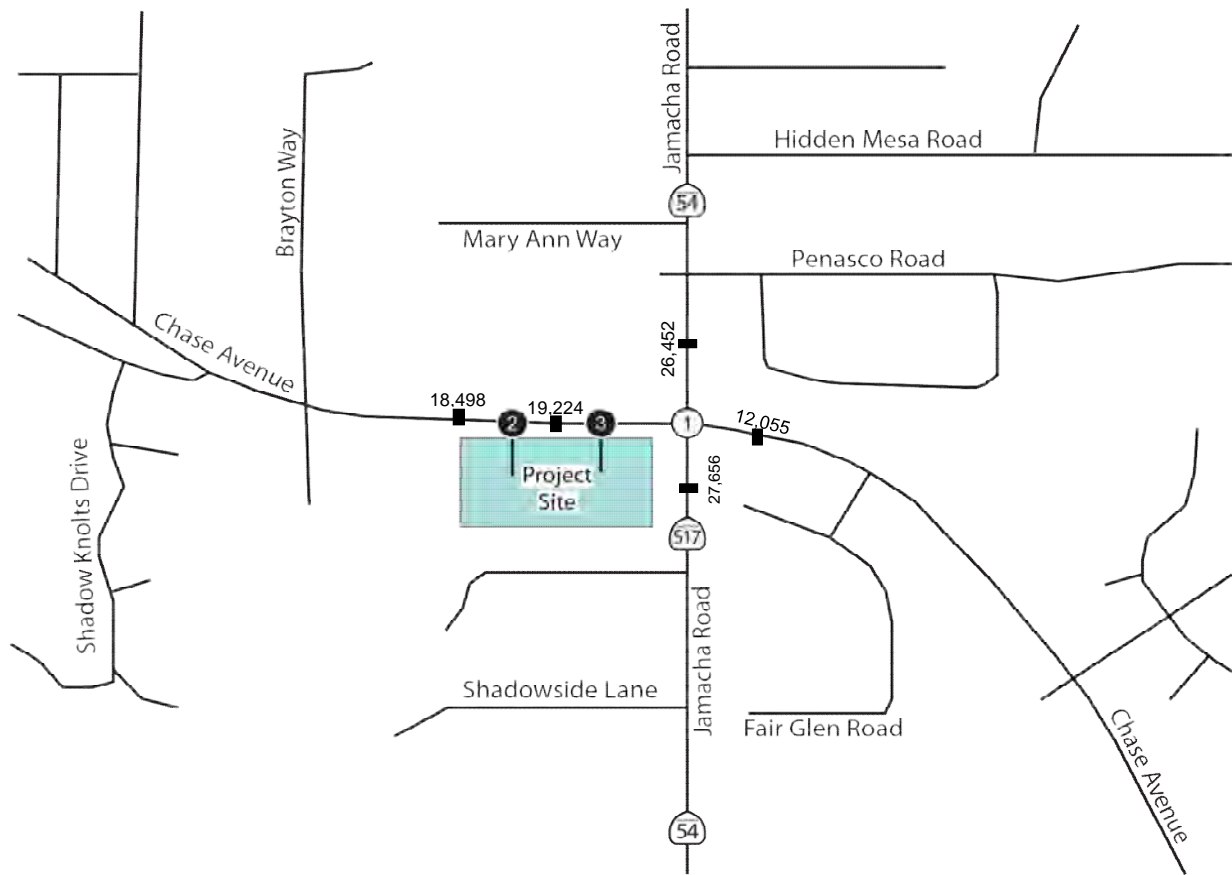


## APPENDIX B

---

### EXISTING WITH PROJECT TRAFFIC VOLUMES

1			2			3			4		
<div><div>↖ 211 ↗ 682 ↘ 137</div><div>Jamacha Road</div><div>↖ 200 ↗ 431 ↘ 21</div></div> <div>Chase Avenue</div>			<div><div>↖ 834 ↗ 148</div><div>Chase Avenue</div></div>			<div><div>↖ 982</div><div>Chase Avenue</div></div>			<div><div>↖ 1035 ↗ 112</div><div>Jamacha Road</div><div>↖ 87 ↗ 242</div></div> <div>Hillsdale Rd</div>		
<div><div>105 226 336</div><div>↖ ↗ ↘</div></div> <div><div>340 664 12</div><div>↖ ↗ ↘</div></div>			<div><div>632 26</div><div>↖ ↗ ↘ Project Driveway 1</div></div> <div></div>			<div><div>632</div><div>↖ ↗ ↘ Project Driveway 2</div></div> <div><div>35</div><div></div></div>			<div><div></div><div></div></div> <div><div>940 198</div><div></div></div>		



## APPENDIX C

---























### SYNCHRO PEAK-HOUR INTERSECTION ANALYSIS SHEETS

## Existing with Project Conditions (Observed TG)

AM Peak

## 1: Jamacha Road &amp; Chase Avenue

Timing Plan: Default

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	226	336	21	431	200	340	664	12	137	682	211
Future Volume (veh/h)	105	226	336	21	431	200	340	664	12	137	682	211
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.96	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	131	282	420	27	560	260	347	678	12	156	775	240
Adj No. of Lanes	1	1	1	1	2	0	2	2	0	1	2	1
Peak Hour Factor	0.80	0.80	0.80	0.77	0.77	0.77	0.98	0.98	0.98	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	147	519	431	159	688	319	378	1193	21	176	1149	483
Arrive On Green	0.08	0.28	0.28	0.09	0.30	0.30	0.11	0.34	0.34	0.10	0.32	0.32
Sat Flow, veh/h	1774	1863	1546	1774	2332	1080	3442	3555	63	1774	3539	1486
Grp Volume(v), veh/h	131	282	420	27	425	395	347	337	353	156	775	240
Grp Sat Flow(s),veh/h/ln	1774	1863	1546	1774	1770	1643	1721	1770	1849	1774	1770	1486
Q Serve(g_s), s	8.2	14.4	21.7	1.6	24.9	25.0	11.2	17.5	17.6	9.7	21.2	14.6
Cycle Q Clear(g_c), s	8.2	14.4	21.7	1.6	24.9	25.0	11.2	17.5	17.6	9.7	21.2	14.6
Prop In Lane	1.00		1.00	1.00		0.66	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	147	519	431	159	522	485	378	594	620	176	1149	483
V/C Ratio(X)	0.89	0.54	0.98	0.17	0.81	0.82	0.92	0.57	0.57	0.89	0.67	0.50
Avail Cap(c_a), veh/h	147	653	542	159	568	528	378	594	620	176	1149	483
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.9	34.4	20.6	47.2	36.6	36.7	49.4	30.6	30.6	49.9	32.7	30.5
Incr Delay (d2), s/veh	43.5	0.9	29.3	0.5	8.2	9.0	27.0	3.9	3.8	38.1	3.2	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	7.6	12.7	0.8	13.3	12.5	6.7	9.2	9.6	6.6	10.8	6.5
LnGrp Delay(d),s/veh	94.4	35.3	50.0	47.7	44.9	45.7	76.4	34.5	34.3	88.0	35.9	34.1
LnGrp LOS	F	D	D	D	D	D	E	C	C	F	D	C
Approach Vol, veh/h		833			847			1037			1171	
Approach Delay, s/veh		52.0			45.3			48.5			42.5	
Approach LOS		D			D			D			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.8	43.4	15.8	37.0	17.0	42.2	14.0	38.9				
Change Period (Y+Rc), s	* 4.7	5.8	5.8	* 5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 11	37.6	6.0	* 39	* 12	36.4	* 9.3	36.0				
Max Q Clear Time (g_c+I1), s	11.7	19.6	3.6	23.7	13.2	23.2	10.2	27.0				
Green Ext Time (p_c), s	0.0	9.4	1.2	2.7	0.0	7.7	0.0	3.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay			46.7									
HCM 2010 LOS			D									
<b>Notes</b>												

Existing with Project Conditions (Observed TG)  
2: School Driveway 1 & Chase Avenue

AM Peak  
Timing Plan: Default

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	632	26	148	834	0	0
Future Vol, veh/h	632	26	148	834	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	250	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	687	28	161	907	0	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	715	0	1929	701
Stage 1	-	-	-	-	701	-
Stage 2	-	-	-	-	1228	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	885	-	73	439
Stage 1	-	-	-	-	492	-
Stage 2	-	-	-	-	277	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	885	-	60	439
Mov Cap-2 Maneuver	-	-	-	-	60	-
Stage 1	-	-	-	-	492	-
Stage 2	-	-	-	-	227	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.5		0	
HCM LOS					A	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	-	-	-	885	-	
HCM Lane V/C Ratio	-	-	-	0.182	-	
HCM Control Delay (s)	0	-	-	10	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	-	-	-	0.7	-	

Existing with Project Conditions (Observed TG)  
3: School Driveway 2 & Chase Avenue

AM Peak  
Timing Plan: Default

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Vol, veh/h	632	0	0	982	0	35
Future Vol, veh/h	632	0	0	982	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	687	0	0	1067	0	38
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	687	0	1754	343
Stage 1	-	-	-	-	687	-
Stage 2	-	-	-	-	1067	-
Critical Hdwy	-	-	4.14	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.22	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	903	-	85	654
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	330	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	903	-	85	654
Mov Cap-2 Maneuver	-	-	-	-	85	-
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	330	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		10.8	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	654	-	-	903	-	
HCM Lane V/C Ratio	0.058	-	-	-	-	
HCM Control Delay (s)	10.8	-	-	0	-	
HCM Lane LOS	B	-	-	A	-	
HCM 95th %tile Q(veh)	0.2	-	-	0	-	














## Existing with Project Conditions (Observed TG)

AM Peak

## 4: Jamacha Road &amp; Hillsdale Rd

Timing Plan: Default

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	242	87	940	198	112	1035		
Future Volume (veh/h)	242	87	940	198	112	1035		
Number	3	18	2	12	1	6		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.98	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863		
Adj Flow Rate, veh/h	263	95	1022	215	122	1125		
Adj No. of Lanes	1	1	2	0	2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	2	2	2	2	2	2		
Cap, veh/h	291	259	1899	398	224	2668		
Arrive On Green	0.16	0.16	0.65	0.65	0.06	0.75		
Sat Flow, veh/h	1774	1583	2994	608	3442	3632		
Grp Volume(v), veh/h	263	95	622	615	122	1125		
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1739	1721	1770		
Q Serve(g_s), s	22.3	8.2	28.6	28.9	5.3	17.6		
Cycle Q Clear(g_c), s	22.3	8.2	28.6	28.9	5.3	17.6		
Prop In Lane	1.00	1.00		0.35	1.00			
Lane Grp Cap(c), veh/h	291	259	1159	1139	224	2668		
V/C Ratio(X)	0.90	0.37	0.54	0.54	0.55	0.42		
Avail Cap(c_a), veh/h	394	352	1159	1139	562	2668		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.75	0.75		
Uniform Delay (d), s/veh	62.8	56.9	14.1	14.1	69.3	6.8		
Incr Delay (d2), s/veh	19.4	0.9	1.8	1.8	1.5	0.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	12.5	3.6	14.6	14.4	2.6	8.6		
LnGrp Delay(d),s/veh	82.2	57.8	15.8	15.9	70.9	7.2		
LnGrp LOS	F	E	B	B	E	A		
Approach Vol, veh/h	358		1237			1247		
Approach Delay, s/veh	75.7		15.9			13.4		
Approach LOS	E		B			B		
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.1	106.9				122.0		31.0
Change Period (Y+Rc), s	* 5.2	6.7				6.7		5.9
Max Green Setting (Gmax), s	* 25	76.0				76.0		34.0
Max Q Clear Time (g_c+I1), s	7.3	30.9				19.6		24.3
Green Ext Time (p_c), s	0.3	26.9				30.3		0.8
Intersection Summary								
HCM 2010 Ctrl Delay			22.3					
HCM 2010 LOS			C					
Notes								

## APPENDIX D

---

### GAP STUDY OBSERVATIONS

Gap Study - Case Avenue at Future School  
Driveway (7:45 AM to 8:15 AM)

	7:45 - 8:00		8:00 - 8:15		8:15 - 8:30		8:30 - 8:45	
Gap Size (sec)	Number of Gaps Observed	Number of Vehicles Processed	Number of Gaps Observed	Number of Vehicles Processed	Number of Gaps Observed	Number of Vehicles Processed	Number of Gaps Observed	Number of Vehicles Processed
4		0	2	2		0		0
5	7	7	2	2	4	4	8	8
6	8	16	2	4	1	2	5	10
7	4	8	2	4	2	4	11	22
8	6	18	5	15		0	3	9
9	4	12	1	3	1	3	2	6
10	3	12	1	4	1	4	3	12
11	2	8		0	1	4	4	16
12	2	10		0	1	5		0
13	2	10		0	3	15	1	5
14		0		0		0	3	18
15	1	6	2	12	2	12		0
16	1	7		0		0	3	21
17		0		0		0	1	7
18		0		0		0	2	16
19		0		0	1	8	1	8
20	1	9		0	1	9	1	9
21		0		0	1	9		0
22		0		0		0		0
23		0		0	1	10		0
24		0		0		0		0
25	1	11		0	1	11	1	11
26		0		0		0		0
27		0		0	1	12		0
28	1	13		0		0		0
29		0		0	1	13	1	13
30		0		0		0		0
31		0		0		0		0
32		0		0		0	1	15
33		0		0		0	1	15
34		0		0	1	16		0
35	1	16		0		0		0
36		0		0		0		0
37		0		0		0		0
38		0		0		0		0
39		0		0		0		0
40		0		0		0		0
41		0		0		0	1	19
42		0		0		0		0
43		0		0		0		0
44		0		0		0		0
45		0		0	1	21		0
<b>Total</b>	<b>43</b>	<b>147</b>	<b>15</b>	<b>44</b>	<b>23</b>	<b>125</b>	<b>50</b>	<b>191</b>

Notes

Start up lost time = 2 sec

Saturation flow rate = 1800 veh/hour = 0.5 veh/sec

**Total Gaps 131**

**Total Vehicles 507**

## APPENDIX E

---

### TRANSIT SERVICE INFORMATION

# 816

**El Cajon T.C. – Cuyamaca College**  
via Washington Ave. / Jamacha Rd.

## DESTINATIONS

- Rancho SD Towne Center



El Cajon



01/18



## CASH FARES / Tarifas en efectivo

Exact fare, please / Favor de pagar la cantidad exacta

<b>Day Pass (Regional) / Pase diario (Regional)</b> Compass Card required (\$2) / Se requiere un Compass Card (\$2)	<b>\$5.00</b>
<b>One-Way Fare / Tarifa de una dirección</b>	<b>\$2.25</b>
<b>Senior (60+)/Disabled/Medicare</b> Mayores de 60 años/Discapacitados/Medicare	<b>\$1.10*</b>

**Children 5 & under / Niños de 5 años o menos** FREE / GRATIS  
Up to two children ride free per paying adult / Máximo dos niños viajan gratis por cada adulto

## MONTHLY PASSES / Pases mensual

<b>Adult / Adulto</b>	<b>\$72.00</b>
<b>Senior (60+)/Disabled/Medicare</b> Mayores de 60 años/Discapacitados/Medicare	<b>\$18.00*</b>
<b>Youths (18 and under)</b> Jóvenes (18 años o menos)	<b>\$36.00*</b>

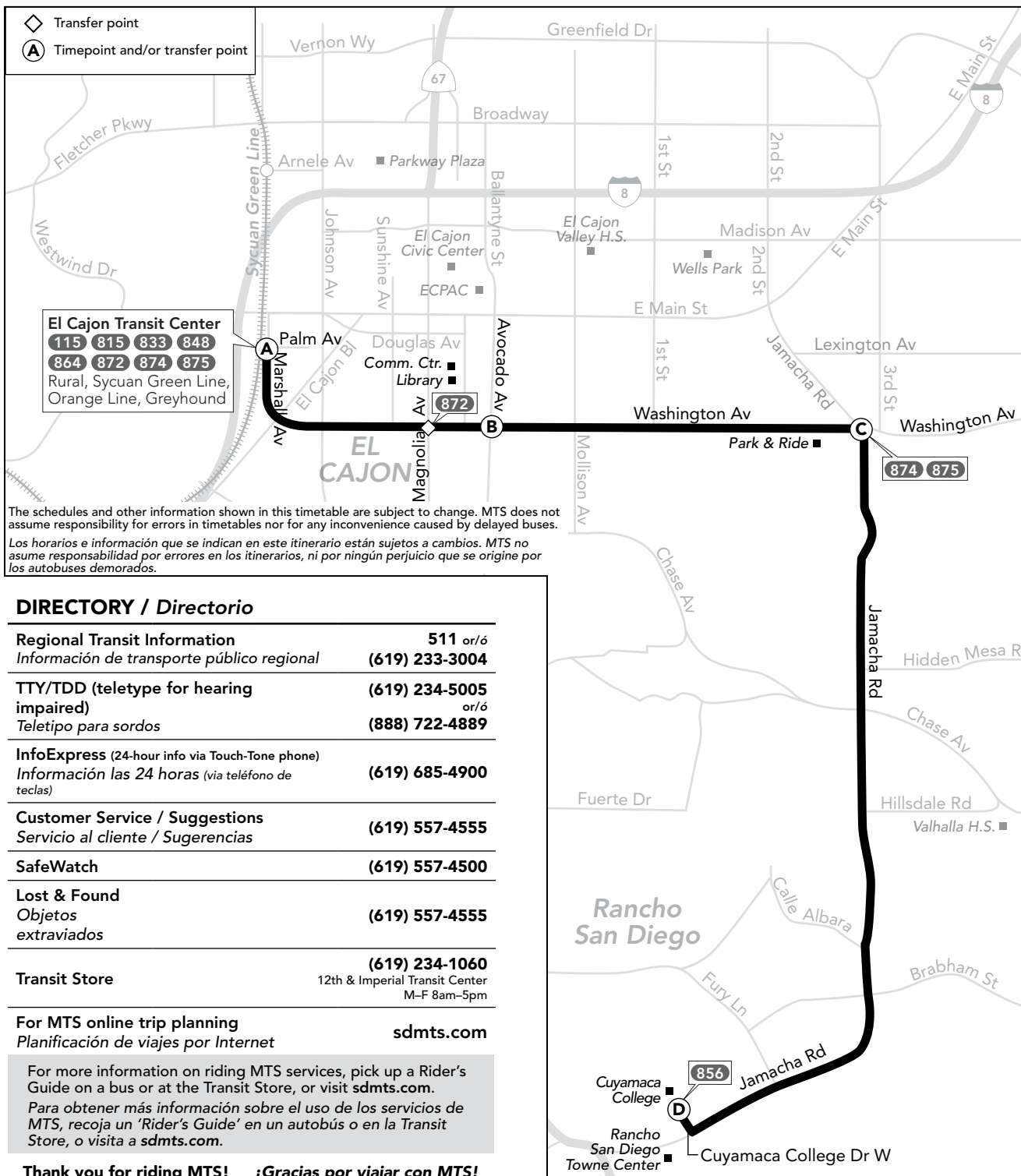
\*I.D. required for discount fare or pass.

\*Se requiere identificación para tarifas o pases de descuento.

## DAY PASS (REGIONAL) / Pase diario (Regional)

All passes are sold on Compass Card, which can be reloaded and reused for up to five years. Compass Cards are available for \$2 at select outlets. A \$5 Day Pass requires a Compass Card. A paper Day Pass can be purchased on board buses for an additional \$2 fee.

Todos los pases se venden en el Compass Card, el cual puede ser recargado y reutilizado por hasta cinco años. Compass Cards están disponibles por \$2 en selectas sucursales. Un pase de un día por \$5 requiere un Compass Card. Un pase de un día de papel se puede obtener a bordo los autobuses por un costo adicional de \$2.



Alternative formats available upon request. Please call: (619) 557-4555  
 Formato alternativo disponible al preguntar. Favor de llamar: (619) 557-4555

# Route 816 – Monday through Friday / lunes a viernes

## El Cajon Transit Center ➡ Cuyamaca College

(A) El Cajon Transit Center DEPART	(B) Wahington Av. & Avocado Av.	(C) Wahington Av. & Jamacha Rd.	(D) Cuyamaca College ARRIVE
5:56a	6:01a	6:08a	6:19a
6:26	6:31	6:38	6:49
6:56	7:02	7:09	7:21
7:26	7:32	7:39	7:51
7:56	8:02	8:09	8:21
8:26	8:32	8:39	8:51
8:56	9:02	9:09	9:21
9:26	9:32	9:39	9:51
9:56	10:02	10:09	10:21
10:26	10:32	10:39	10:51
10:56	11:02	11:09	11:21
11:26	11:32	11:39	11:51
11:56	12:02p	12:10p	12:23p
12:26p	12:32	12:40	12:53
12:56	1:02	1:10	1:23
1:26	1:32	1:40	1:53
1:56	2:02	2:10	2:23
2:26	2:33	2:41	2:54
2:56	3:03	3:11	3:24
3:26	3:33	3:41	3:54
3:56	4:03	4:11	4:24
4:26	4:33	4:41	4:54
4:56	5:03	5:11	5:24
5:26	5:33	5:41	5:54
5:56	6:03	6:11	6:24
6:26	6:32	6:39	6:51

## Cuyamaca College ➡ El Cajon Transit Center

(D) Cuyamaca College DEPART	(C) Wahington Av. & Jamacha Rd.	(B) Wahington Av. & Avocado Av.	(A) El Cajon Transit Center ARRIVE
5:45a	5:57a	6:03a	6:09a
6:15	6:27	6:33	6:39
6:43	6:56	7:02	7:09
7:13	7:26	7:32	7:39
7:41	7:55	8:02	8:09
8:11	8:25	8:32	8:39
8:41	8:55	9:02	9:09
9:11	9:25	9:32	9:39
9:41	9:55	10:02	10:09
10:11	10:25	10:32	10:39
10:41	10:55	11:02	11:09
11:10	11:25	11:32	11:39
11:40	11:55	12:02p	12:09p
12:10p	12:25p	12:32	12:39
12:40	12:55	1:02	1:09
1:10	1:25	1:32	1:39
1:40	1:55	2:02	2:09
2:07	2:24	2:32	2:39
2:37	2:54	3:02	3:09
3:07	3:24	3:32	3:39
3:37	3:54	4:02	4:09
4:07	4:24	4:32	4:39
4:37	4:54	5:02	5:09
5:10	5:25	5:32	5:39
5:40	5:55	6:02	6:09
6:12	6:26	6:33	6:39
6:42	6:56	7:03	7:09

Route 816 does not operate on weekends or on the observation of the following holidays  
 La ruta 816 no ofrece servicio durante el fin de semana ó durante los siguientes días festivos

>>>

New Year's Day, Presidents' Day,  
 Memorial Day, Independence Day,  
 Labor Day, Thanksgiving, Christmas

# COMPASS CASH

Load money onto your Compass  
 Card for a new, convenient way  
 to pay.

Great for One-Ways.

Follow prompts on  
 machine to load value.

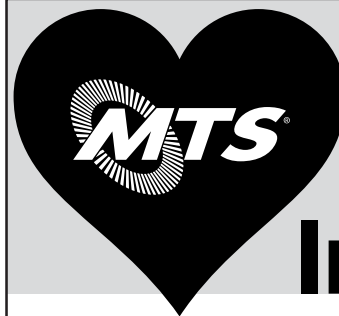
Just tap and ride!



Compass Service Center  
 (619) 595-5636  
 sdmts.com



CHANGING THE WAY  
 SAN DIEGO MOVES



# Rider Insider

Freebies ♥ Contests  
 Events ♥ News ♥ Fun

We LOVE our riders and as part of giving back,  
 we're starting a new program for YOU! Just by  
 staying in touch with us via email you'll get exclusive  
 sweepstakes, news, events, plus transit lifestyle tips.

Join Today!

[sdmts.com/RiderInsider](http://sdmts.com/RiderInsider)

Sponsored by