Base Line Retail Center – Smart & Final
Traffic Impact Analysis
City of Highland, California

Prepared for:
KZ DevCo, L.P.
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June 22, 2016
Revised: September 27, 2016

September 27, 2016

Mr. Patrick Cowan
KZ DevCo., L.P.
18818 Teller Avenue, Suite 100
Irvine, CA 92612

Subject: Traffic Impact Analysis: Smart & Final, City of Highland

Dear Mr. Cowan:

TJW ENGINEERING, INC. (TJW) is pleased to present you with this revised traffic impact analysis for the proposed **Smart & Final** project in the City of Highland. The proposed project is located north of Base Line Street between Church Avenue and Buckeye Street and would consist of a 27,524 square foot Smart & Final supermarket.

This traffic study has been revised based on comments provided by City of Highland staff on August 9, 2016. This report is being submitted to you for review and forwarding to the City of Highland.

Please contact us at (949) 878-3509 if you have any questions regarding this analysis.

Sincerely,

Thomas Wheat, PE, TE
President

Jeff Weckstein
Transportation Planner

Registered Civil Engineer *#69467*
Registered Traffic Engineer *#2565*

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1.0 EXECUTIVE SUMMARY

This report presents the results of the traffic impact analysis (TIA) prepared for the proposed **Smart & Final** project in the City of Highland. The proposed project is located north of Base Line Street between Church Avenue and Buckeye Street and would consist of a 27,524 square foot grocery store. The project site is currently vacant. Site access for the proposed project is planned at two full access ingress/egress locations on Church Avenue and two full access ingress/egress locations on Buckeye Street. For the purpose of this TIA, it is assumed that the proposed project will be built and generating trips in 2018.

The purpose of this TIA is to evaluate the proposed impacts to traffic and circulation associated with the development of the proposed project and recommended improvements to mitigate impacts considered significant in comparison to established regulatory thresholds. This TIA has been prepared in accordance with Appendix C of the *Guidelines for CMP Traffic Impact Analysis Reports in San Bernardino County (San Bernardino County CMP Update, 2005)* as well as input from City staff.

Institute of Transportation Engineers (ITE) Trip Generation (9th Edition, 2012) rates were used to determine trip generation of the proposed project. The proposed project is forecast to generate 94 AM peak hour trips, 261 PM peak hour trips and 2,814 daily trips at the project driveways. After accounting for pass-by trips, the proposed project is forecast to generate 94 AM peak hour trips, 196 PM peak hour trips, and 2,112 daily trips on the surrounding roadway system.

Consistent with the City and County's traffic study guidelines, potential impacts to traffic and circulation were assessed for the following scenarios:

- Existing Conditions;
- Existing Plus Project Conditions;
- Project Opening Year (2018) Without Project Conditions;
- Project Opening Year (2018) With Project Conditions;
- General Plan Buildout (2030) Without Project Conditions; and
- General Plan Buildout (2030) With Project Conditions.

The following two (2) intersections in the vicinity of the project site have been included in the intersection level of service (LOS) analysis:

- Church Avenue/Base Line Street; and
- Buckeye Street/Base Line Street;

Additionally the project's main driveways on Church Avenue and Buckeye Street have been analyzed for with project conditions.

1.1 SUMMARY OF ANALYSIS RESULTS

The study intersections are currently operating at an acceptable LOS (LOS D or better) during the AM and PM peak hours.

The study intersections are projected to continue to operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours for *existing plus project* conditions.

The study intersections are projected to operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours for *project opening year without and with project* conditions.

The study intersections are projected to operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours for *General Plan buildout without and with project* conditions.

The southbound left-turn queue at the Church Avenue/Base Line Street intersection is projected to exceed the existing 75 foot storage capacity for existing plus project conditions and all future with project scenarios.

1.2 SUMMARY OF IMPACTS AND RECOMMENDED IMPROVEMENTS

Based on the City's thresholds of significance, the addition of project generated trips is not projected to have any significant impacts at the study intersections since they are projected to operate at an acceptable level of service for all analysis scenarios.

However, the following improvement is recommended at the Church Avenue/Base Line Street intersection to address potential queueing issues on the southbound approach*:*

- Increase the length of the southbound left-turn pocket at the Church Avenue/Base Line Street intersection up to the first project driveway, a distance of approximately 177 feet,

Transportation improvements throughout the City of Highland are funded through a combination of direct project mitigation, fair share contributions or development impact fee programs such as the City's Development Impact Fee (DIF) program. It is anticipated that the proposed project will be subject to the City's DIF. The City's DIF includes both a local circulation and a regional circulation element. Identification and timing of needed improvements are generally determined through local jurisdictions based upon a variety of factors.

DIF fees are imposed on new residential, industrial and commercial development through application of the DIF fee ordinance and fees are collected at the building or occupancy permit phase.

1.3 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

Wherever necessary, roadways adjacent to the proposed project site and site access points will be constructed in compliance with recommended roadway classifications and respective cross-sections in the Highland General Plan Circulation Element.

The recommended site access improvements at the project driveways are described below.

Church Avenue/Commercial Driveway(s) – Install a stop control on the westbound approach at both project driveways on Church Avenue and construct each driveway intersection with the following geometrics:

- Northbound Approach: One shared through/right-turn lane.
- Southbound Approach: One shared left turn/through lane.
- Westbound Approach: One shared left-turn/right-turn lane.

Buckeye Street/Commercial Driveway(s) – Install a stop control on the eastbound approach at both project driveways on Buckeye Street and construct each driveway intersection with the following geometrics:

- Northbound Approach: One shared left-turn/through lane.
- Southbound Approach: One shared through/right-turn lane.
- Eastbound Approach: One shared left-turn/right-turn lane.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City sight distance standards at the time of final grading, landscaping and street improvement plans.

2.0 INTRODUCTION

This traffic study analyzes the forecast traffic operations associated with the proposed **Smart & Final** project in the City of Highland. The proposed project is located north of Base Line Street between Church Avenue and Buckeye Street and would consist of a 27,524 square foot grocery store. The proposed project is expected to be built and generating trips in 2018. The project site is currently vacant.

Site access for the proposed project is planned at two full access ingress/egress locations on Church Avenue and two full access ingress/egress locations on Buckeye Street. The project site is bounded by vacant land to the north, Buckeye Street to the east, Base Line Street to the south and Church Avenue to the west. ***Figure 1*** shows the project site location.

Figure 1– *Project Location*

Source: Google Earth Pro, 2016

2.1 STUDY AREA

The following two (2) intersections in the vicinity of the project site have been included in the intersection level of service (LOS) analysis at the request of City staff:

- Church Avenue/Base Line Street; and
- Buckeye Street/Base Line Street.

The study intersections are all located within the City of Highland.

This traffic analysis follows the guidelines for traffic impact analysis contained in Appendix B of the San Bernardino Association of Governments (SANBAG) Congestion Management Program (CMP).

Exhibit 1 shows the location of the study intersections, which are analyzed for the following study scenarios:

- Existing Conditions;
- Existing Plus Project Conditions;
- Project Opening Year (2018) Without Project Conditions;
- Project Opening Year (2018) With Project Conditions;
- General Plan Buildout (2030) Without Project Conditions; and
- General Plan Buildout (2030) With Project Conditions.

Traffic operations are evaluated for the following time periods:

- Weekday AM Peak Hour occurring within 7:00 AM to 9:00 AM; and
- Weekday PM Peak Hour occurring within 4:00 PM to 6:00 PM.

2.2 ANALYSIS METHODOLOGY

Level of Service (LOS) is commonly used to describe the quality of flow on roadways and at intersections using a range of LOS from LOS A (free flow with little congestion) to LOS F (severely congested conditions). The definitions for LOS for interruption of traffic flow differ depending on the type of traffic control (traffic signal, unsignalized intersection with side street stops, unsignalized intersection with all-way stops). The Highway Capacity Manual (HCM) 2010 (Transportation Research Board, 2010) methodology expresses the LOS of an intersection in terms of delay time for the intersection approaches. The HCM methodology utilizes different procedures for different types of intersection control.

The SANBAG CMP traffic study guidelines require signalized intersection operations be analyzed utilizing the HCM 2010 methodology. Intersection LOS for signalized intersections is based on the intersections average control delay for all movements at the intersection during the peak hour. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

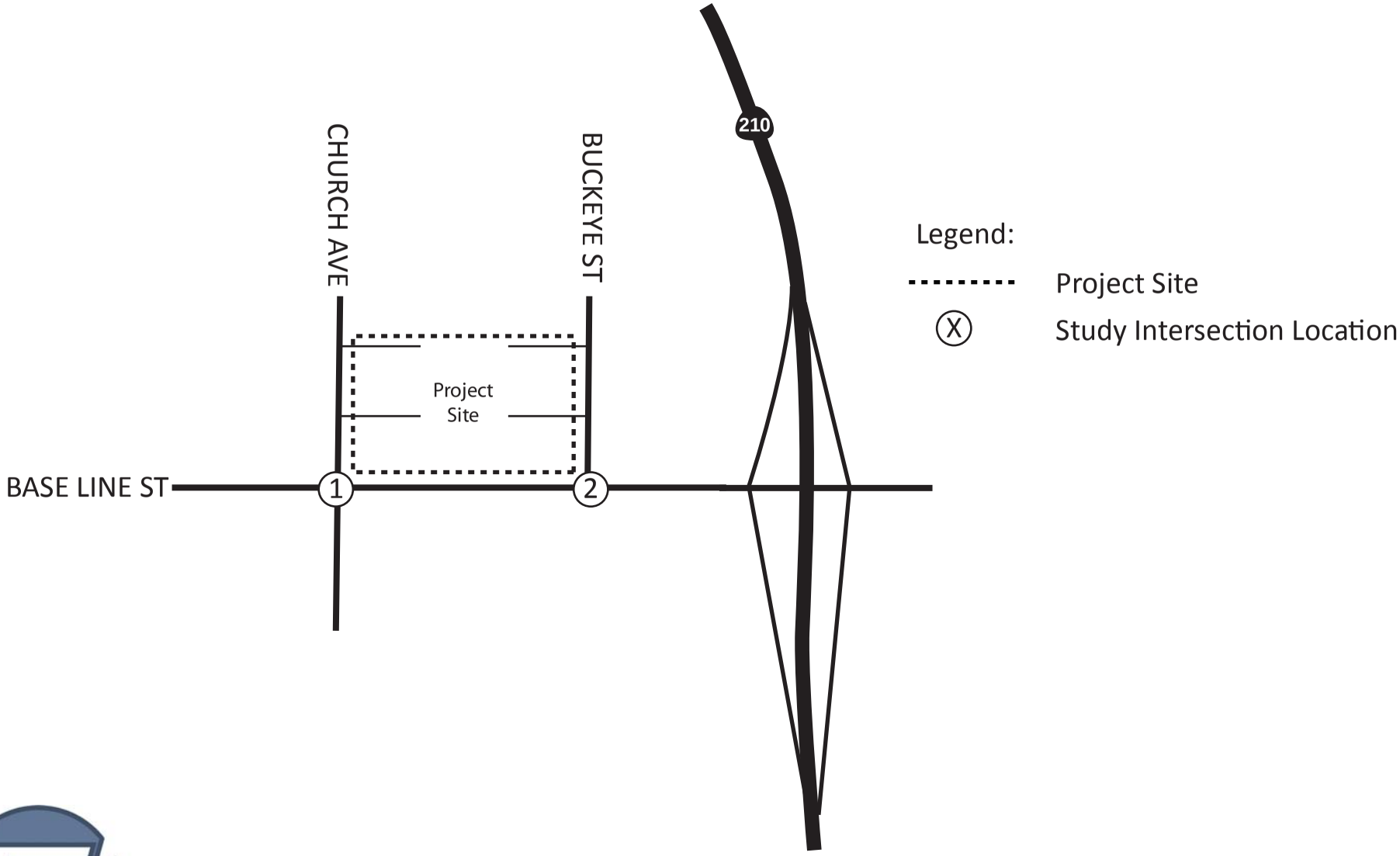

Exhibit 1: Project Location & Study Area

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Not to Scale

Table 1 describes the general characteristics of traffic flow and accompanying delay ranges at signalized intersections.

Table 1
HCM – LOS & Delay Ranges – Signalized Intersections

LEVEL OF SERVICE	DESCRIPTION	DELAY (in seconds)
A	Very favorable progression; most vehicles arrive during green signal and do not stop. Short cycle lengths.	0 – 10.00
B	Good progression, short cycle lengths. More vehicles stop than for LOS A.	10.01 – 20.00
C	Fair progression; longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant, though many vehicles still pass through without stopping.	20.01 – 35.00
D	Progression less favorable, longer cycle length and high flow/capacity ratio. The proportion of vehicles that pass through without stopping diminishes. Individual cycle failures are obvious.	35.01 – 55.00
E	Severe congestion with some long standing queues on critical approaches. Poor progression, long cycle lengths and high flow/capacity ratio. Individual cycle failures are frequent.	55.01 – 80.00
F	Very poor progression, long cycle lengths and many individual cycle failures. Arrival flow rates exceed capacity of intersection.	> 80.01

Source: Transportation Research Board, *Highway Capacity Manual*, HCM2010 Edition (Washington D.C., 2010).

Collected peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. It is a common practice in LOS analysis to conservatively use a peak 15-minute flow rate applied to the entire hour to derive flow rates in vehicles per hour that are used in the LOS analysis. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume. PHF = [Hourly Volume]/ [4 * Peak 15-Minute Volume]. The use of a 15-minute PHF produces a more detailed and conservative analysis compared to analyzing vehicles per hour. Existing PHFs, obtained from the existing traffic counts have been used for Existing and Opening Year scenarios. SANBAG CMP traffic impact study guidelines recommended PHF have been used for General Plan Buildout analysis scenarios.

The SANBAG CMP traffic study guidelines also require unsignalized intersection operations be analyzed utilizing the HCM 2010 methodology. At a two-way or side-street stop-controlled intersection, LOS is calculated for each stop-controlled minor street movement and for the left-turn movement(s) from the major street to the minor street. For approaches consisting of a single lane, the delay is calculated as the average of all movements in that lane.

Table 2 describes the general characteristics of traffic flow and accompanying delay ranges at unsignalized intersections.

Table 2
HCM – LOS & Delay Ranges – Unsignalized Intersections

LEVEL OF SERVICE	DESCRIPTION	DELAY (in seconds)
A	Little or no delays.	0 – 10.00
B	Short traffic delays.	10.01 – 15.00
C	Average traffic delays.	15.01 – 25.00
D	Long traffic delays. Multiple vehicles in queue.	25.01 – 35.00
E	Very long delays. Demand approaching capacity of intersection	35.01 – 50.00
F	Very constrained flow with extreme delays and intersection capacity exceeded.	> 50.01

Source: Transportation Research Board, *Highway Capacity Manual*, HCM2010 Edition (Washington D.C., 2010).

The traffic impact analysis utilizes the level of service analysis procedures and assumptions contained in the SANBAG CMP traffic impact analysis guidelines. Additionally, minimum green times for through movements have been calculated based on pedestrian crossing times, assuming a pedestrian call occurs each cycle, which provides a 'worst-case' analysis since this methodology inflates the amount of green time given to minor-street through movements.

This analysis utilizes the Synchro 9 analysis software for all signalized and unsignalized intersections.

2.3 PERFORMANCE CRITERIA

The City of Highland's target for peak hour intersection operation is LOS D or better at all City intersections. The City also has a policy that a turning movement with a volume-to-capacity (V/C) ratio higher than 1.0 means that the intersection is operating at a deficient level of service even if the overall intersection LOS is LOS D or better.

2.4 THRESHOLDS OF SIGNIFICANCE

According to California Environmental Quality Act (CEQA) guidelines, a project is considered to cause a significant impact to a transportation system if it:

- Conflicts with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel.
- Conflicts with an applicable congestion management program (CMP), including, but not limited to level of service standards, travel demand measures, or other standards established by the County Congestion Management Agency for roadways or highways.
- Conflicts with adopted policies or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decreases the performance or safety of such facilities.

The City of Highland target for peak hour intersection operation is LOS D or better. Intersections operating at LOS E or F or with turning movements with a V/C ratio greater than 1.0 must be

mitigated to LOS D or better.

A significant direct impact occurs if the addition of project trips causes an intersection operating acceptably to operate at a deficient level of service.

A significant cumulative impact is identified when a facility is projected to operate at an unacceptable LOS (E or F) due to cumulative future traffic and project related traffic. Cumulative traffic impacts are the result of a combination of the proposed project and other future developments contributing to the overall traffic impact at an intersection. The proposed project's fair share contribution toward a cumulatively impacted facility not found to be covered by a pre-existing fee program should be considered sufficient to address the project's fair share toward mitigation measures designed to alleviate the cumulative impact.

3.0 Existing Conditions

3.1 EXISTING CIRCULATION NETWORK/STUDY AREA CONDITIONS

The characteristics of the roadway system in the vicinity of the proposed project site are described below:

Church Avenue is a north-south roadway on the western border of the proposed project site. Church Avenue is classified as a Collector Street in the City of Highland General Plan Circulation element. Church Avenue is a two-lane undivided roadway with a posted speed limit of 25 miles per hour. On-street parking is generally not permitted on Church Avenue in the vicinity of the Church Avenue/Base Line Street intersection.

Buckeye Street is a north-south roadway on the eastern border of the proposed project site that terminates to the south at Base Line Street. Buckeye Street is a residential street. Buckeye Street is a two-lane undivided roadway with a prima facie speed limit of 25 miles per hour. On-street parking is generally not permitted on Buckeye Street in the vicinity of the Buckeye Street/Base Line Street intersection.

Interstate 210 (I-210) is an east-west state highway in the Los Angeles area that originates at Interstate 5 in Glendora and terminates at Interstate 10 in Redlands, just south of Highland. Through the City of Highland, I-210 is oriented north-south and is a four-lane freeway facility with two general purpose lanes in each direction. I-210 is approximately 1/8 of a mile east of the project site.

Base Line Street is an east-west roadway generally classified as a Major Highway in the City of Highland General Plan Circulation element. Between Church Avenue and Boulder Avenue, Base Line Street is classified as a Primary Arterial. In the study area, Base Line Street is a four-lane divided roadway with a raised, landscaped median and bicycle lanes in both directions. The posted speed limit on Base Line Street is 45 miles per hour between Palm Avenue and the I-210 Southbound Ramps, west of Palm Avenue and east of the I-210 Southbound Ramps; the posted speed limit is 40 miles per hour. On-street parking is prohibited on Base Line Street.

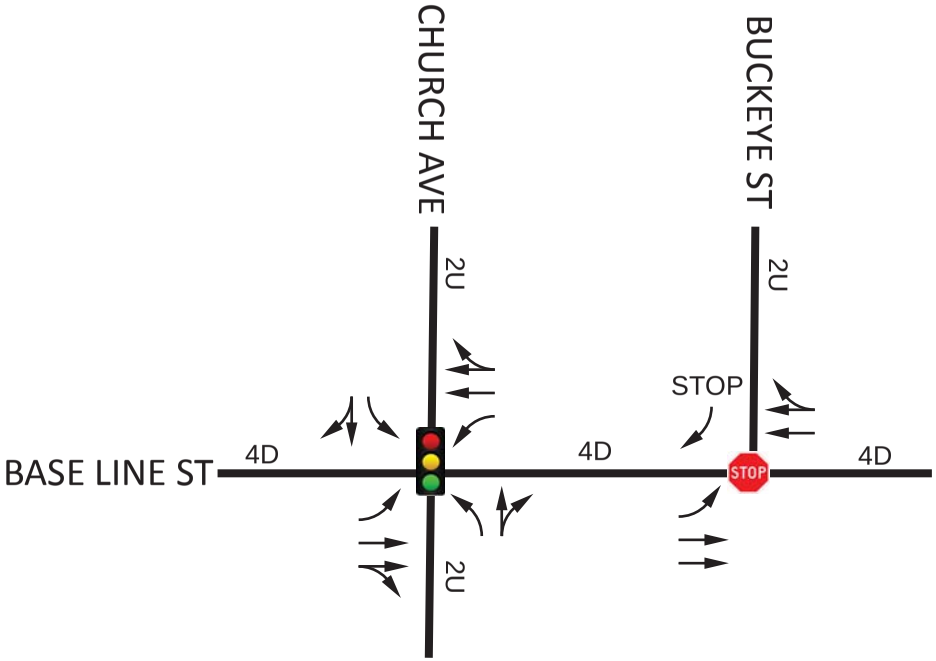
Exhibit 2 shows existing conditions study area intersection and roadway geometry.

3.2 CITY OF HIGHLAND GENERAL PLAN CIRCULATION ELEMENT

Appendix A contains the City of Highland General Plan Circulation Element roadway classifications and roadway cross sections.

3.3 EXISTING BICYCLE AND PEDESTRIAN FACILITIES

There is a striped Class II bicycle lane on both sides of Base Line Street throughout the study area. Sidewalks along roadways and curb ramps at intersections are present at all locations within the study area. Pedestrian crossing of Base Line Street is not permitted at the I-210 Ramp intersections and at the Buckeye Street/Base Line Street intersection.



Legend:

←	Existing Lane
	Signal-Controlled Intersection
	Unsignalized Intersection
STOP	Stop Controlled Approach
2U	2-lane Undivided Roadway
4D	4-lane Divided Roadway

Exhibit 2: Existing Lane Geometry & Intersection Control

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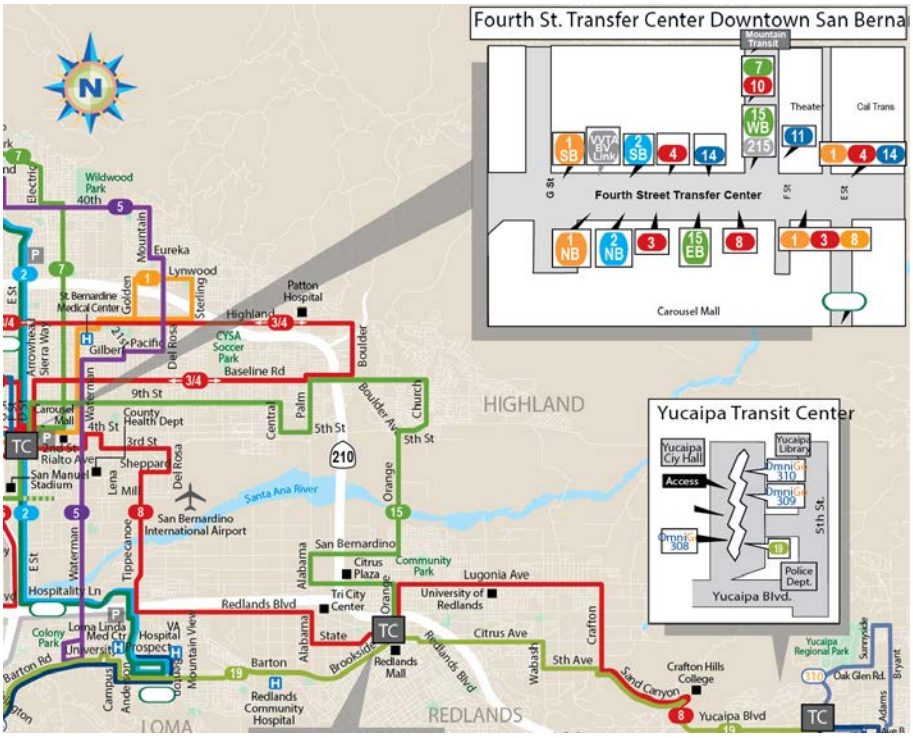
3.4 EXISTING PUBLIC TRANSIT SERVICES

The City of Highland is served by the OmniTrans Transit Agency which provides 27 bus routes throughout the San Bernardino Valley. ***Figure 2*** shows the OmniTrans routes in the vicinity of the City of Highland.

Figure 2– *OmniTrans Routes*



There are two bus routes currently providing stops within convenient walking distance (adjacent to) the proposed project site operated by OmniTrans. The bus lines serving the project site directly are described below. ***Appendix B*** contains additional information on the transit routes serving the study area.

OmniTrans Route 3/4 provides local-stop service in a loop between Highland and San Bernardino. Notable destinations include stops at San Bernardino Community Hospital and the 4th Street Transit Center in San Bernardino. In the project vicinity Route 3/4 runs along Base Line Street with stops for both the westbound and eastbound direction at the Church Avenue/Base Line Street intersection. Route 3/4 provides weekday service with headways of approximately 15 minutes throughout the day. Weekend and holiday service are also available, with 20 minute headways throughout the day.

OmniTrans Route 15 provides local-stop service between the Cities of Fontana, Rialto, San Bernardino, Highland and Redlands. Notable destinations include stops at Redlands Mall, the 4th

Street Transit Center in San Bernardino, and stops near the Rialto and Fontana Metrolink stations. In the project vicinity Route 15 runs along Base Line Street with stops for both the westbound and eastbound direction at the Church Avenue/Base Line Street intersection. Route 15 provides weekday service with headways of approximately 30 minutes throughout the day. Weekend and holiday service are also available, with 60 minute headways throughout the day.

3.5 EXISTING TRAFFIC VOLUMES

To determine the existing operation of the study intersections, AM and PM peak period traffic counts were collected on a typical weekday (Tuesday, Wednesday or Thursday) in November 2014. The traffic volumes used in this analysis are from the highest value in an hour within the peak period counted. Since traffic counts were collected in 2014, the counts have been increased by the short-term ambient growth rate of 1% per year, for two years, to derive existing (2016) AM/PM peak hour traffic volumes. Detailed traffic count data is provided in ***Appendix C***.

Exhibit 3 shows existing AM and PM peak hour volumes at the study intersections.

3.6 EXISTING CONDITIONS INTERSECTION LEVEL OF SERVICE ANALYSIS

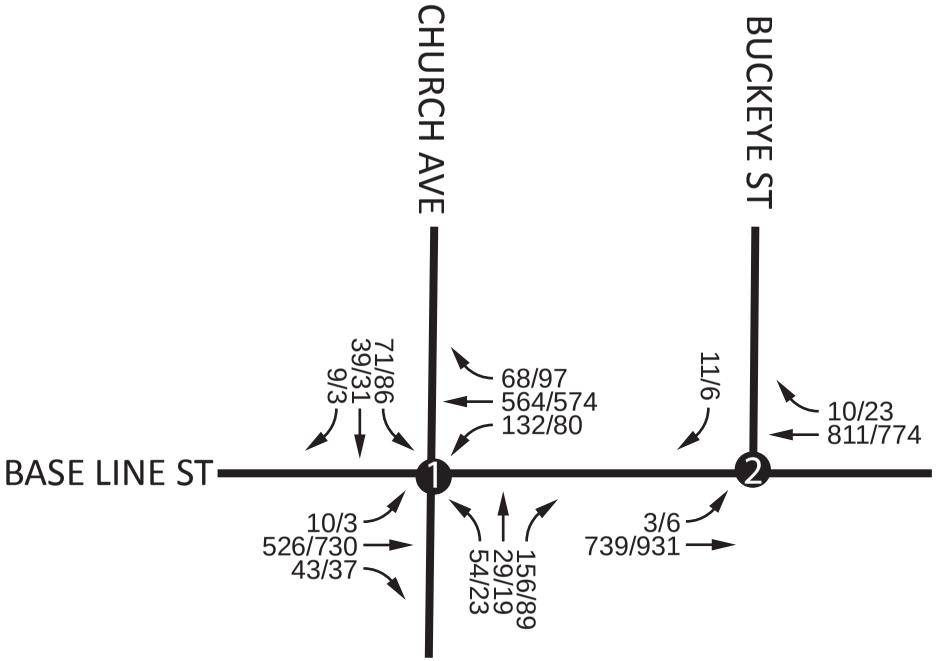
Existing conditions AM and PM peak hour intersection analysis is shown in ***Table 3***. Calculations are based on the existing geometrics at the study area intersections as shown in ***Exhibit 2.*** HCM analysis sheets are provided in ***Appendix D***.

Table 3
Intersection Analysis – Existing Conditions

Intersection	Control Type	AM Peak Hour	PM Peak Hour
		Delay - LOS	Delay - LOS
Church Ave/Base Line St	Signal	40.5 – D	35.8 – D
Buckeye St/Base Line St			
Eastbound Left-Turn	TWSC	10.0 – A	10.0 – A
Southbound Right-turn		11.9 – B	11.8 – B

Note: TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle

As shown in ***Table 3***, the study intersections are currently operating at an acceptable LOS (LOS D or better) during the AM and PM peak hours.



Legend:

XX/XX AM/PM Peak Hour Volume

Exhibit 3: Existing (2016) AM/PM Peak Hour Intersection Volumes

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4.0 Proposed Project

4.1 Project Description

This traffic study analyzes the forecast traffic operations associated with the proposed **Smart & Final** project in the City of Highland. The proposed project is located north of Base Line Street between Church Avenue and Buckeye Street and would consist of a 27,524 square foot grocery store. The proposed project would be built and generating trips by 2018. The project site is currently vacant.

Site access for the proposed project is planned at two full access ingress/egress locations on Church Avenue and two full access ingress/egress locations on Buckeye Street. The project site is bounded by vacant land to the north, Buckeye Street to the east, Base Line Street to the south and Church Avenue to the west.

Exhibit 4 shows the proposed project site plan.

4.2 Project Trip Generation

In order to determine the project's anticipated trip generation, *Institute of Transportation Engineers (ITE) 9th Edition* trip generation rates were utilized. The analysis calculates the AM peak hour trips, PM peak hour trips and average daily trips (ADT) forecast to be generated by the proposed project land use.

Pass-by Trip Adjustment

As documented in ITE's Trip Generation Handbook (Institute of Transportation Engineers, 3rd Edition, 2014), a pass-by trip adjustment is applicable to land uses located along busy arterial roadways attracting vehicle trips already on the roadway; particularly when the roadway is experiencing peak operating conditions. For example, during the AM or PM peak hour, a motorist traveling along Base Line Street between work and home may stop at the proposed Smart & Final supermarket to pick up groceries for dinner. A pass-by adjustment under this example would reduce/eliminate both the inbound trip and the outbound trip from the surrounding roadway circulation system since the vehicle was already traveling on the roadway. While ITE recommends pass-by percentages for the supermarket land use, based on discussion with City of Highland staff a pass-by percentage of 0% in the AM Peak Hour and 25% in the PM and for daily trips. The project's full ITE trip generation will still be accounted for at the project access points in the traffic analysis.

Table 4 shows the *ITE* rates used to calculate trip generation of the proposed project. The traffic generation of the proposed project, based on these rates is also shown in ***Table 4***.

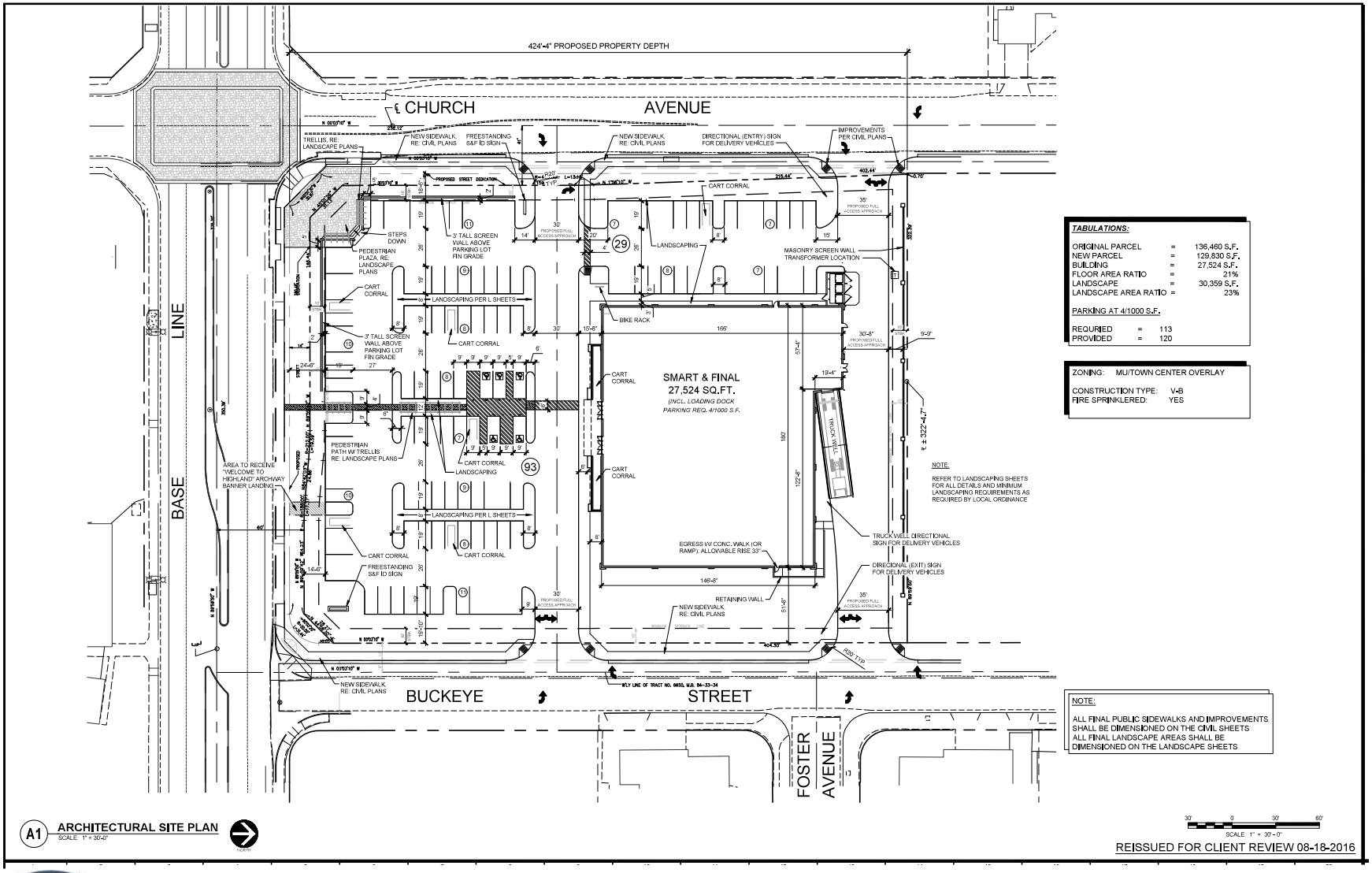

Exhibit 4: Proposed Project Site Plan

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Table 4
Proposed Project Trip Generation

Land Use (ITE Code)	Unit	AM Peak Hour			PM Peak Hour			Daily Trips
		In	Out	Total	In	Out	Total	
Trip Generation Rates (ITE 9th Edition)								
Supermarket (850)	TSF	2.11	1.29	3.40	4.83	4.65	9.48	102.24
Supermarket Pass-By Adjustment		0%			25%			25%
Project Vehicle Trips								
Supermarket	**27.524**	58	36	94	133	128	261	2,814
Pass-By Adjustment	**TSF**	-0	-0	-0	-33	-32	-65	-704
Net Trips		58	36	94	100	96	196	2,110
Total Gross Trip Generation		58	36	94	133	128	261	2,814
Total Net Trip Generation		58	36	94	100	96	196	2,110

Note: TSF = Thousand Square Feet
Source: ITE Trip Generation, 9th Edition (2012)

As shown in Table 4, the proposed project is forecast to generate 94 AM peak hour trips, 261 PM peak hour trips and 2,814 daily trips at the project driveways. After accounting for pass-by trips, the proposed project is forecast to generate 94 AM peak hour trips, 196 PM peak hour trips, and 2,112 daily trips on the surrounding roadway system.

4.3 Project Trip Distribution

The proposed forecast trip distribution for this project is based on the existing traffic patterns of the surrounding streets and intersections as well as potential interactions between the proposed project land uses and surrounding land uses. **Exhibit 5** shows the proposed forecast trip distribution of proposed project trips.

4.4 Modal Split

While the OmniTrans bus routes have stops at the Church Avenue/Base Line Street intersection, and sidewalks and a bicycle lane exist along Base Line Street, the traffic reducing potential of public transit, walking, and bicycling have not been considered in this analysis since they are expected to capture only a small percentage of the proposed project's trips.

4.5 Project Trip Assignment

Exhibit 6 shows the corresponding projected AM/PM peak hour trip assignment of project trips, and takes into account pass-by trips at the Church Avenue/Base Line Street and Buckeye Street/Base Line Street intersections. This analysis assumes that all AM/PM peak hour traffic utilizes the southernmost project driveways on Church Avenue and Buckeye Street. The northern driveways serve back of house operations such as loading/receiving.

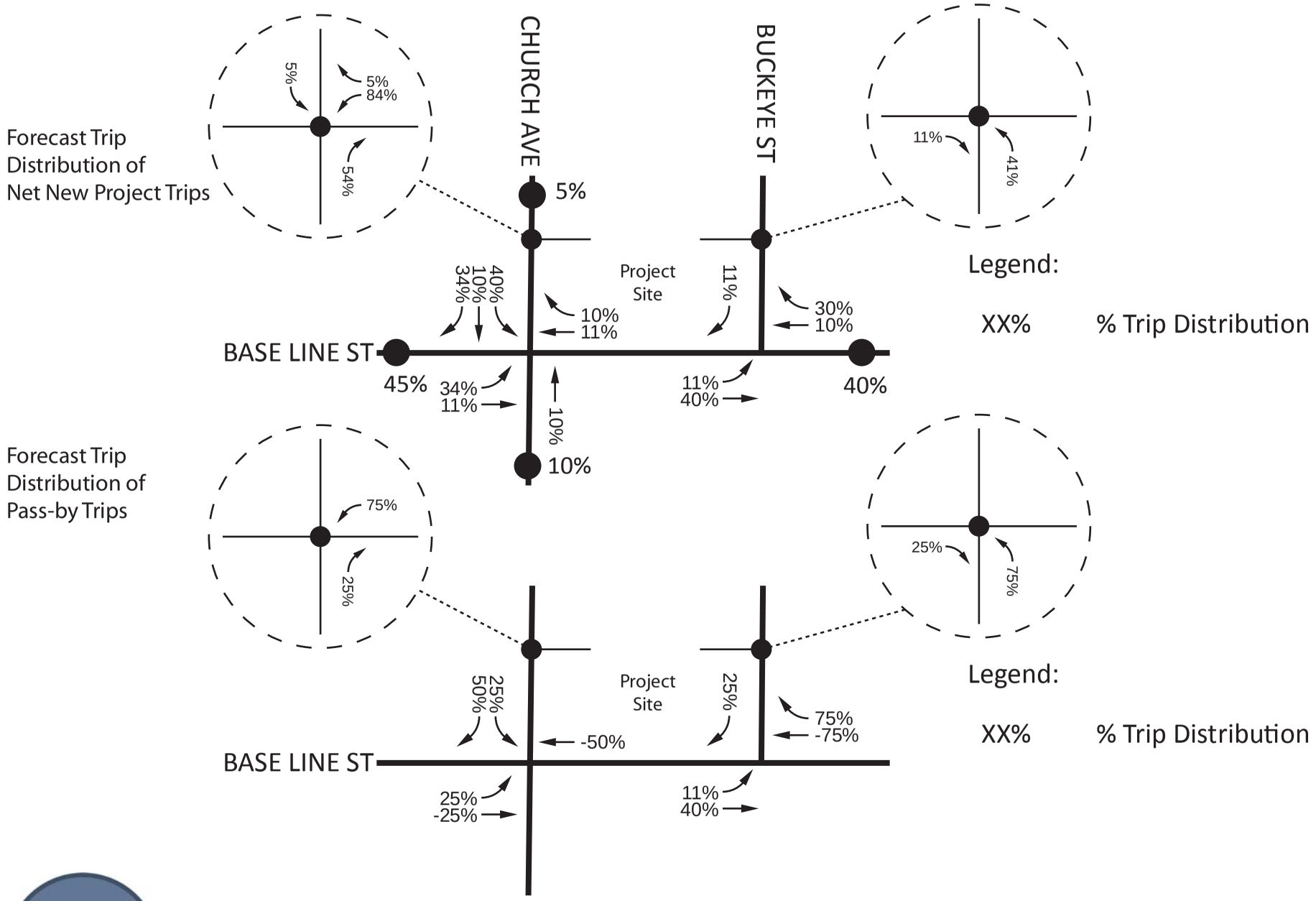

Exhibit 5: Forecast Trip Distribution of Proposed Project Trips

KZD-14-001 Baseline Smart & Final Traffic Impact Analysis

Not to Scale

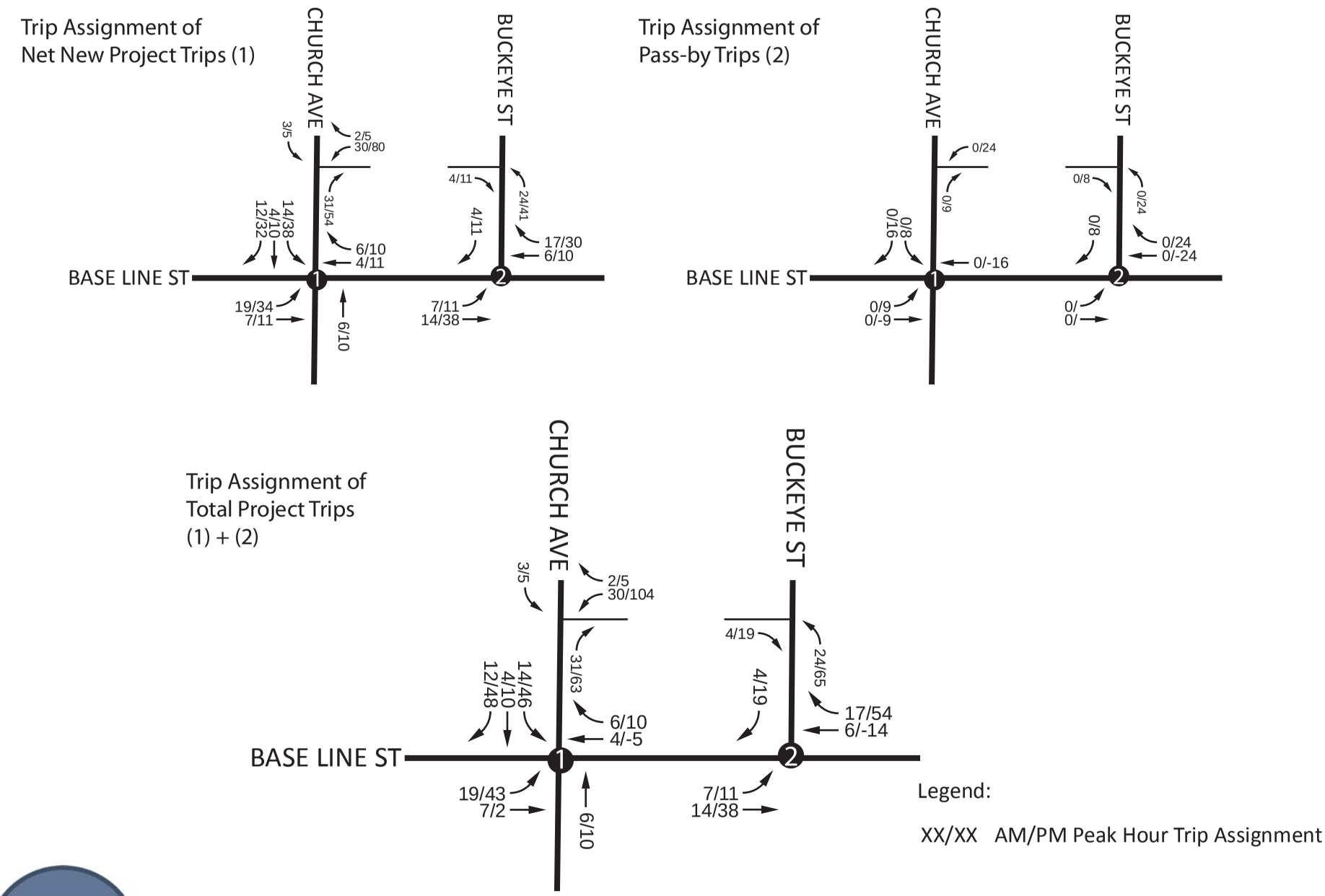

Exhibit 6: Forecast Proposed Project AM/PM Peak Hour Trip Assignment

KZD-14-001 Baseline Smart & Final Traffic Impact Analysis

Not to Scale

4.6 Cumulative Projects Traffic

CEQA guidelines require that other reasonably foreseeable development projects which are either approved or are currently being processed in the study area also be included as part of a cumulative analysis scenario. A list of cumulative projects was developed for this analysis and provided by City of Highland staff. Of the 36 developments provided by the City, 17 are small in size and assumed to be covered by the ambient growth rate assumed for project opening year conditions. ***Exhibit 7*** shows the location of the 19 larger cumulative developments whose trip generation and assignment was added to the study area network based on information provided by the City of Highland. A summary of the cumulative projects land uses and trip generation is shown in ***Table 5****.* The detailed cumulative projects information provided by City staff is contained in ***Appendix E.***

Based on the trip generation and trip distribution patterns for the cumulative development projects on arterials throughout the study area, cumulative projects AM and PM peak intersection turning movement volumes are shown on ***Exhibit 8.***

Legend:

- Project Site
- 1 Santa Ana River Wash
- 2 Blossom Trails
- 3 Richmond American
- 4 San Manuel Village
- 5 Highland Crossroads
- 6 Retail SWC Boulder/Greenspot
- 7 Centerstone
- 8 Greenspot Village & Marketplace
- 9 Harmony Specific Plan
- 10 Base Line Commercial
- 11 Orange New Jersey Pro
- 12 Diversified Pacific
- 13 Alta Vista & Santa Ana
- 14 Bank
- 15 TTP18935
- 16 Mediterra Specific Plan
- 17 Arco Car Wash/Restaurant
- 18 Highland Park
- 19 Real Journey Academy

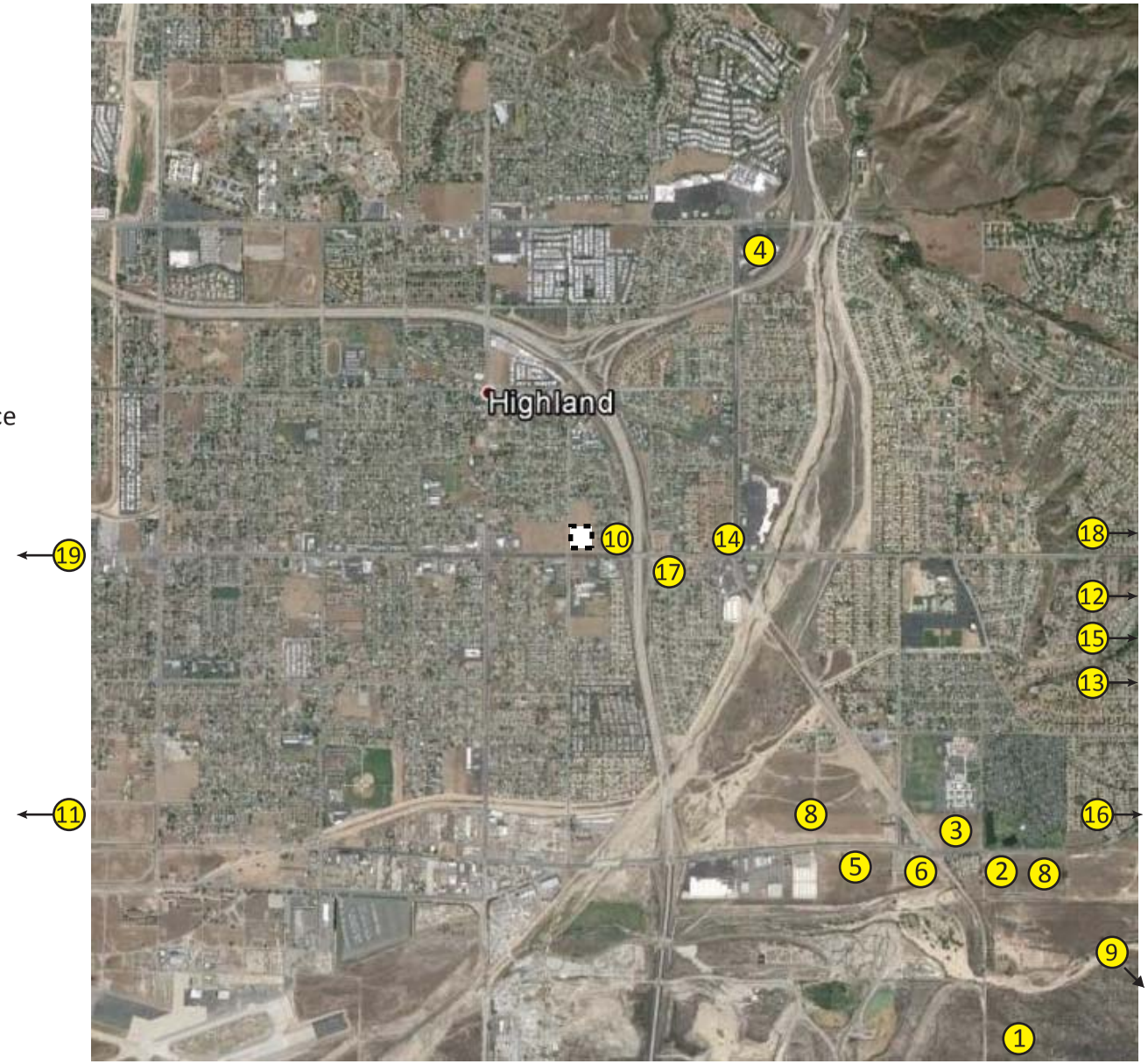

Exhibit 7: Cumulative Projects Location Map

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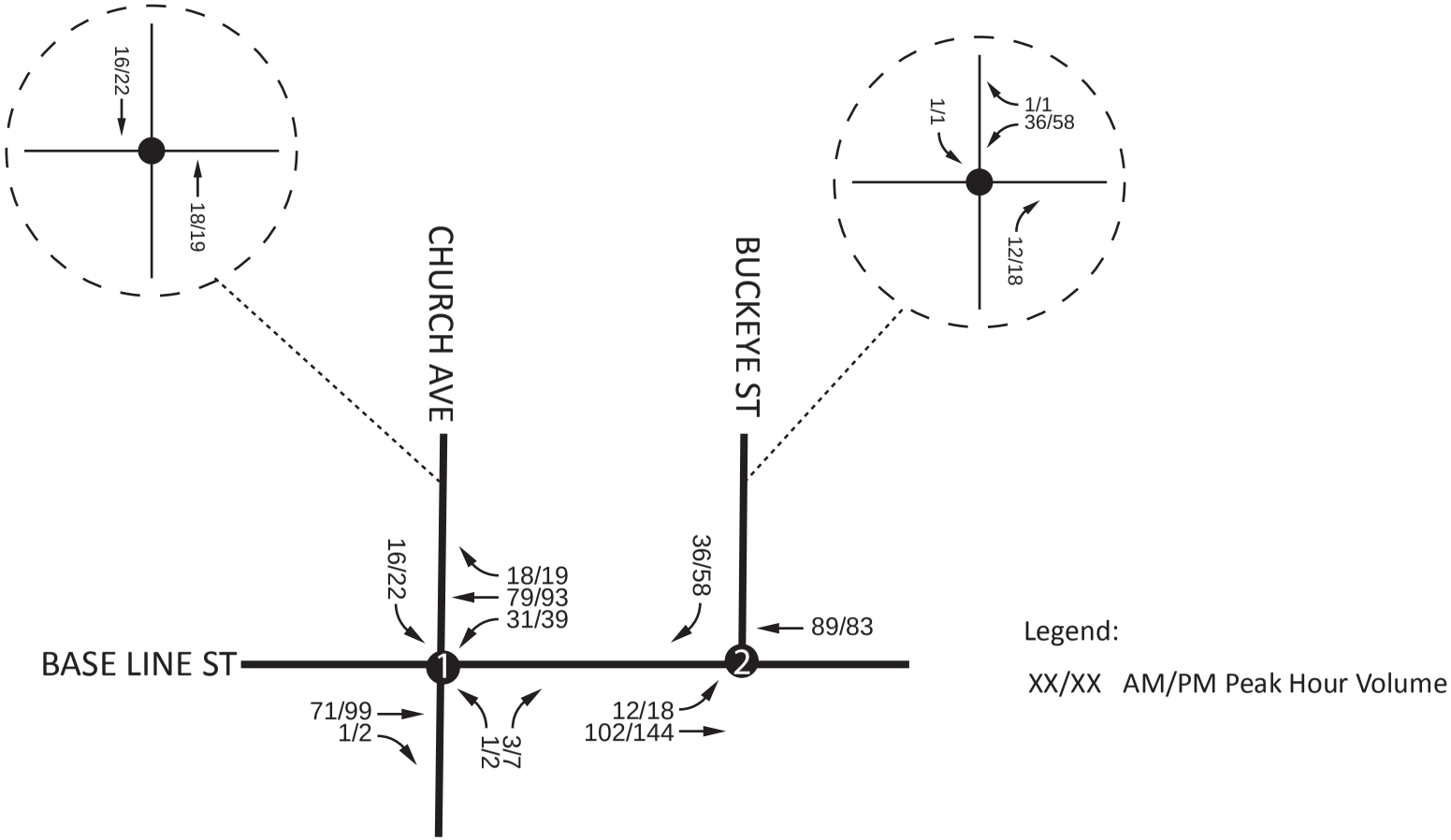
Not to Scale



Legend:

XX/XX AM/PM Peak Hour Volume

Exhibit 8: Cumulative Projects AM/PM Peak Hour Intersection Volumes

KZD-14-001 Baseline Smart & Final Traffic Impact Analysis

Not to Scale

Table 5
Summary of Cumulative Projects

No.	Title	Land Use	Quantity	Unit	Trip Generation		
					AM	PM	Daily
1	Santa Ana River Wash	Cement Plant			39	9	1,212
2	Blossom Trails	SFR	14	DU	11	14	134
		Condo	306	DU	134	159	1793
3	Richmond American	SFR	121	DU	91	122	1158
4	San Manuel Village	Restaurants	9.30	TSF	253	185	2473
5	Highland Crossroads	Retail Retail w/ Drive Through	42.84 5	TSF TSF	79	293	2304
6	Center at Boulder Avenue / Greenspot Road CUP-007-008	Fast Food Retail	14.38 16.33	TSF TSF	420	289	3,674
7	Centerstone	SFR	125	DU	100	134	1,273
8	Greenspot Village & Marketplace	Residential / Retail - see attachment for Land Use			1527	2939	31,754
9	Harmony Development	Residential / Retail - see attachment for Land Use			2350	3496	33,749
10	Base Line Commercial	Fast Food w/ Drive Through High Turnover Restaurant	86 80	Seats Seats	75	111	1,838
11	Orange New Jersey Pro	Industrial Park	126.9	TSF	104	108	867
12	Diversified Pacific	SFR	69	DU	52	69	657
13	Alta Vista and Santa Ana	SFR	56	DU	42	56	533
14	NWC Base Line and Boulder	Bank	5.2	TSF	63	126	770
15	TTP 18935 & Adjacent Tract	SFR	80	DU	60	80	762
16	Mediterra Specific Plan	Residential	300.0	DU	208	277	2,637
17	Arco Addition	Restaurant, Carwash	4.0	TSF	182	131	1984
18	Highland Park	Residential	80	DU	35	46	438
19	Real Journey Academy Charter School	School - Junior High	450.0	Students	120	69	378

Note: SFR = Single Family Residential. DU = Dwelling Unit, TSF = Thousand Square Feet

5.0 Existing Plus Project Conditions

Existing plus project conditions analysis is intended to identify the project-related impacts on the existing circulation system.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the *existing plus project* scenario are consistent with those previously shown in **Exhibit 2**, with the exception of project driveways assumed to be constructed by the proposed project to provide site access.

5.2 EXISTING PLUS PROJECT TRAFFIC VOLUMES

Existing plus project volumes include existing traffic volumes plus the addition of the traffic projected to be generated by the proposed project. ***Exhibit 9*** shows *existing plus project* AM and PM peak hour volumes at the study intersections and project driveways.

5.3 EXISTING PLUS PROJECT CONDITIONS INTERSECTION LEVEL OF SERVICE ANALYSIS

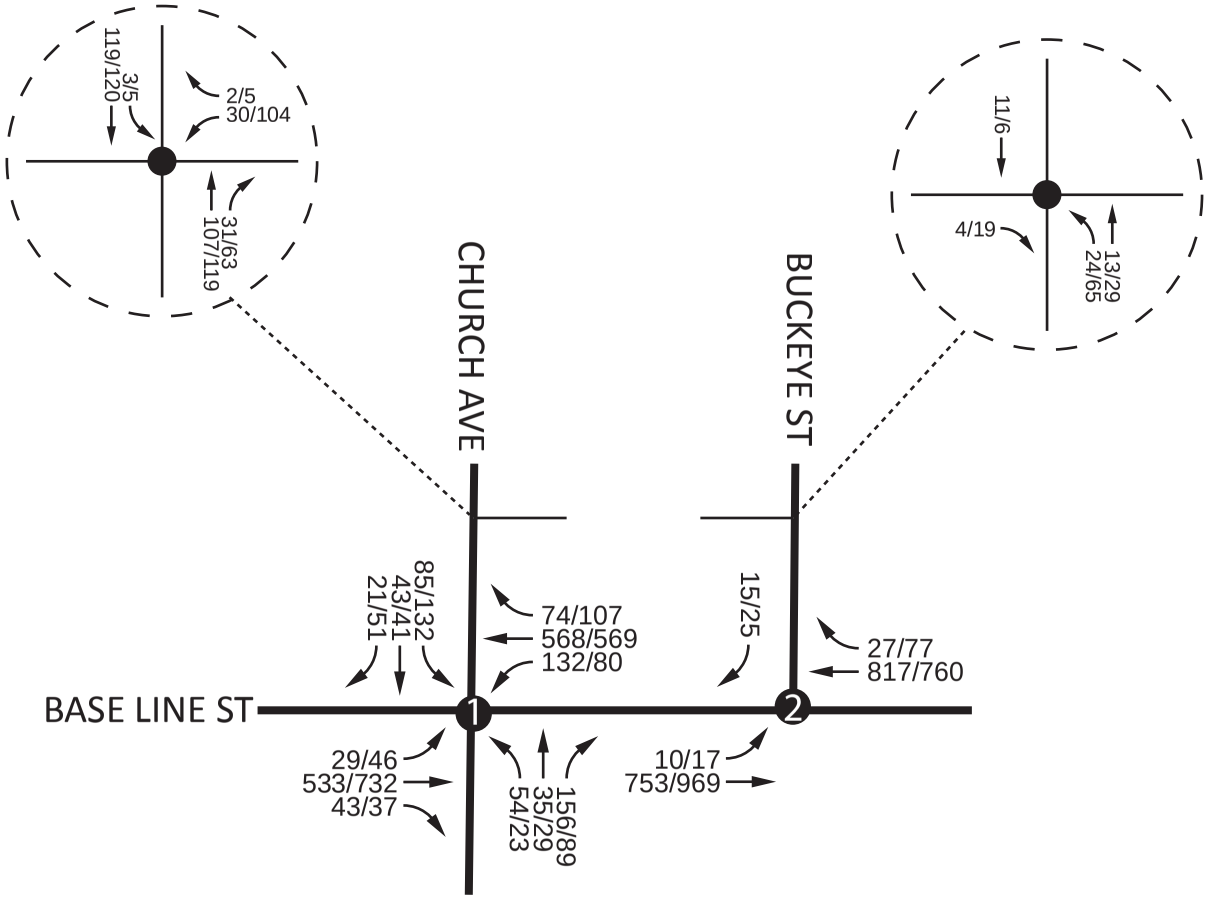
Existing plus project conditions AM and PM peak hour intersection analysis is shown in ***Table 6.*** Calculations are based on the existing geometrics at the study area intersections as shown in ***Exhibit 2.*** HCM analysis sheets are provided in ***Appendix D***.

Table 6
Intersection Analysis – Existing Plus Project Conditions

		Existing				Existing Plus Project			
Intersection	Control Type	Delay[1]		LOS		Delay[1]		LOS	
		AM	PM	AM	PM	AM	PM	AM	PM
Church Ave/Base Line St	Signal	40.5	35.8	D	D	41.9	34.4	D	C
Buckeye St/Base Line St	TWSC	11.9	11.8	B	B	12.1	12.3	B	B
Church Ave/Main Drwy	TWSC	Not Applicable				10.2	11.3	B	B
Buckeye St/Main Drwy	TWSC	Not Applicable				8.4	8.4	A	A

Note: TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle
1 = Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

As shown in ***Table 6***, the intersections are projected to continue to operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours for *existing plus project* conditions. While it may appear counterintuitive that average intersection delay declines with the addition of proposed project trips, this is a not uncommon occurrence when utilizing the HCM methodology for signalized intersections. The HCM methodology for signalized intersections reports the average delay experienced by all vehicles on all approaches; if a project adds trips to approaches experiencing delay below the intersection's average as whole, average delay may decline.



Legend:

XX/XX AM/PM Peak Hour Volume

Exhibit 9: Existing Plus Project AM/PM Peak Hour Intersection Volumes

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Not to Scale

Based on the thresholds of significance for previously discussed in S*ection 2.4*, the addition of project generated trips does not result in a significant impact at any of the study intersections for *existing plus project conditions.*

6.0 Project Opening Year Without Project Conditions

Project opening year without project conditions is intended to set the baseline for identifying cumulative project-related impacts on the planned near-term circulation system. The proposed project is expected to be built and generating trips in 2018.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the *project opening year without project* scenario are consistent with those previously shown in **Exhibit 2.**

6.2 PROJECT OPENING YEAR WITHOUT PROJECT TRAFFIC VOLUMES

Project opening year without project volumes include background traffic plus the addition of the traffic projected to be generated by cumulative developments in the vicinity of the proposed project which are in various stages of planning, entitlement and construction. Since the proposed project is expected to be built and generating trips in 2018, *project opening year without project* volumes include an ambient growth rate of 1% per year for two years, applied to existing (2016) volumes.

Project Opening Year Without Project Volumes = (Existing (2016) Counts * 1.01^2) + Cumulative Projects Traffic

The cumulative projects were previously discussed in *Section 4.6 Cumulative Projects Traffic.* ***Exhibit 10*** shows *project opening year without project* AM and PM peak hour volumes at the study intersections.

6.3 PROJECT OPENING YEAR WITHOUT PROJECT INTERSECTION LEVEL OF SERVICE ANALYSIS

Project opening year without project conditions AM and PM peak hour intersection analysis is shown in ***Table 7***. HCM analysis sheets are provided in ***Appendix D.***

Table 7
Intersection Analysis – Project Opening Year Without Project Conditions

Intersection	Control Type	AM Peak Hour	PM Peak Hour
		Delay - LOS	Delay - LOS
Church Ave/Base Line St	Signal	41.6 – D	35.9 – D
Buckeye St/Base Line St	TWSC	13.5 – B	14.8 – B

Note: TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle
1 = Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

As shown in ***Table 7***, the intersections are projected to operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours for *project opening year without project* conditions.

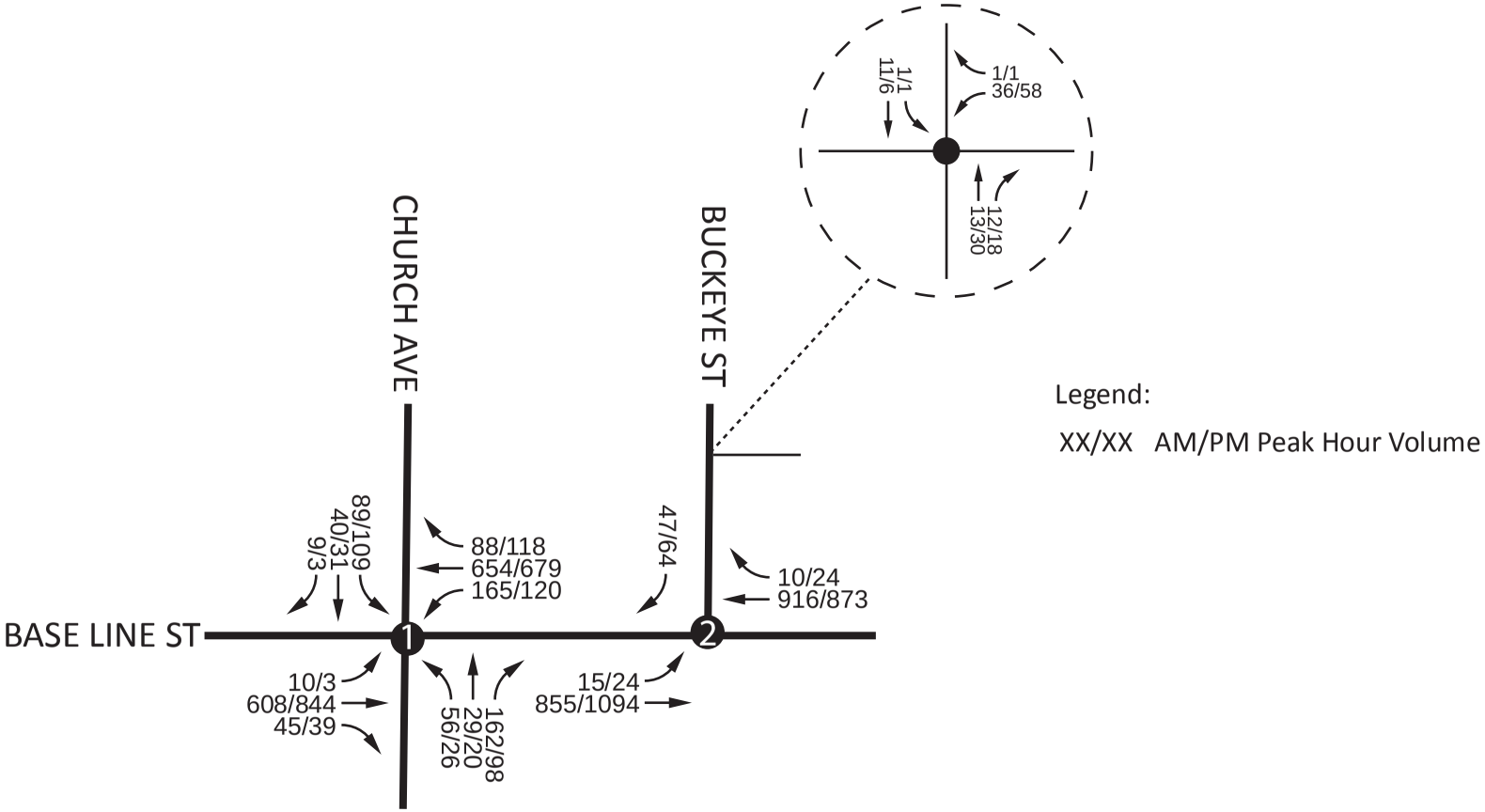


Exhibit 10: Project Opening Year Without Project AM/PM Peak Hour Intersection Volumes

KZD-14-001 Baseline Smart & Final Traffic Impact Analysis

Not to Scale

7.0 Project Opening Year With Project Conditions

Project opening year with project conditions analysis is intended to identify cumulative project-related impacts on the planned near-term circulation system. The project is expected to be built and generating trips in 2018.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the *project opening year with project* scenario are consistent with those previously shown in **Exhibit 2**, with the exception of project driveways and other facilities assumed to be constructed by the proposed project to provide site access.

7.2 PROJECT OPENING YEAR WITH PROJECT TRAFFIC VOLUMES

Project opening year with project volumes include background traffic plus the addition of the traffic projected to be generated by the proposed project and traffic projected to be generated by cumulative developments in the vicinity of the proposed project which are in various stages of planning, entitlement and construction. Since the proposed project is expected to be built and generating trips in 2018, *project opening year with project* volumes include an ambient growth rate of 1% per year for two years, applied to existing (2016) volumes.

Project Opening Year With Project Volumes = (Existing (2016) Volumes * 1.01^2) + Cumulative Projects Traffic + Project Traffic

The cumulative projects were previously discussed in *Section 4.6 Cumulative Projects Traffic.*

Exhibit 11 shows *project opening year with project* AM and PM peak hour volumes at the study intersections.

7.3 PROJECT OPENING YEAR WITH PROJECT INTERSECTION LEVEL OF SERVICE ANALYSIS

Project opening year with project conditions AM and PM peak hour intersection analysis is shown in ***Table*** 8. HCM analysis sheets are provided in ***Appendix D***.

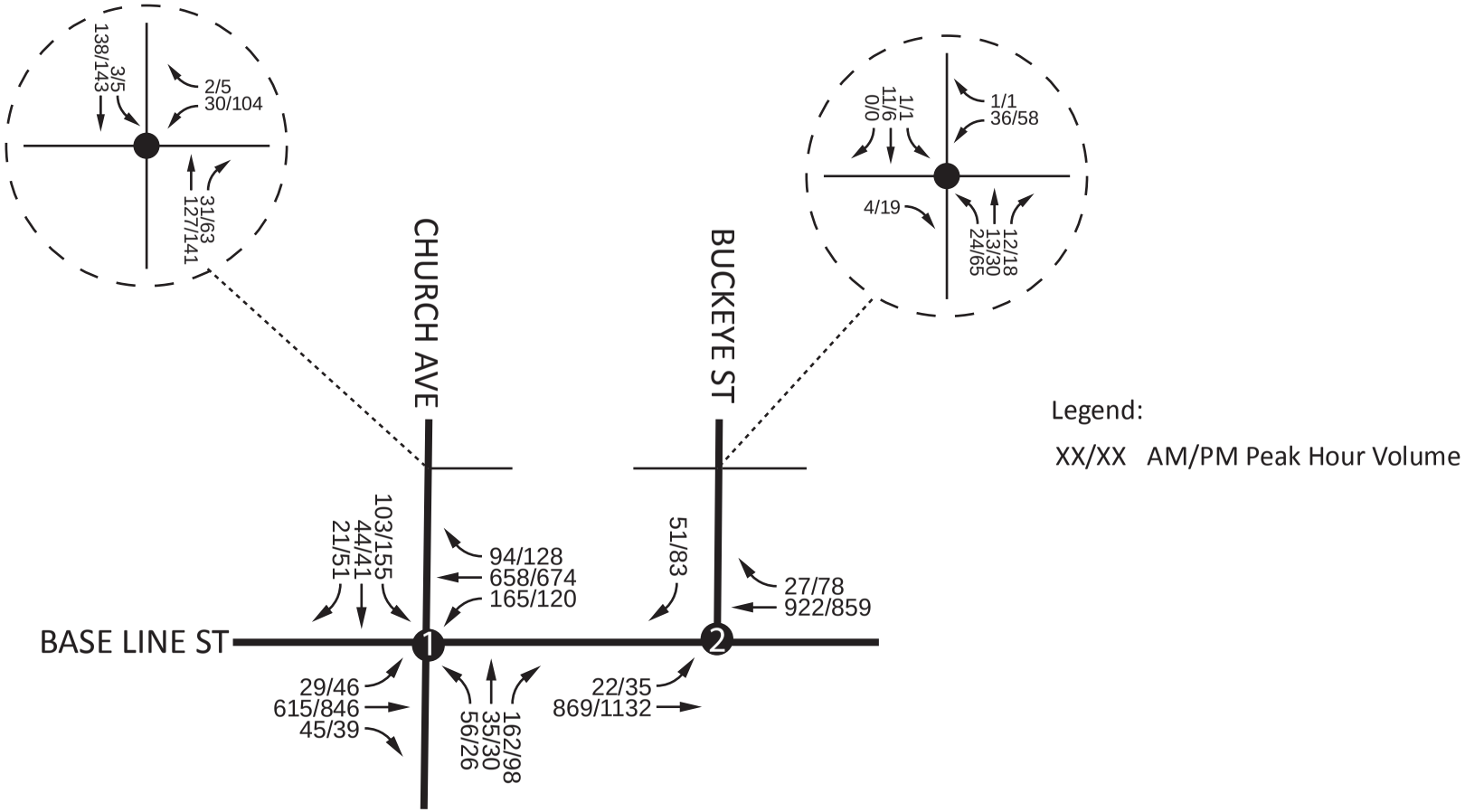


Exhibit 11: Project Opening Year With Project AM/PM Peak Hour Intersection Volumes

KZD-14-001 Baseline Smart & Final Traffic Impact Analysis

Not to Scale

Table 8
Intersection Analysis – Project Opening Year With Project

Intersection	Control Type	Project Opening Year Without Project				Project Opening Year With Project			
		Delay[1]		LOS		Delay[1]		LOS	
		AM	PM	AM	PM	AM	PM	AM	PM
Church Ave/Base Line St	Signal	41.6	35.9	D	D	45.5	39.1	D	D
Buckeye St/Base Line St	TWSC	13.5	14.8	B	B	13.8	16.5	B	C
Church Ave/Main Drwy	TWSC	Not Applicable				10.4	11.6	B	B
Buckeye St/Main Drwy	TWSC	Not Applicable				9.2	10.4	A	B

Note: TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle
1 = Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown

As shown in Table 8, the intersections are projected to continue to operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours for *project opening year with project* conditions.

Based on the thresholds of significance for *project opening year with project* conditions previously discussed in *Section 2.4*, the addition of project generated trips does not result in a significant impact at any of the study intersections for *project opening year with project conditions*.

8.0 General Plan Buildout (2030) Without Project Conditions

Assessment of *General Plan Buildout (2030)* conditions with and without the proposed project will determine if the City of Highland Circulation Element is adequate to accommodate future traffic at the target LOS or if additional mitigation is necessary.

8.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the *General Plan Buildout (2030) without and with project* scenarios are consistent with the City of Highland General Plan Circulation Element roadway classifications for the roadways within the study area. Additionally, the San Bernardino Association of Governments (SANBAG) Congestion Management Program Nexus Study Project List was consulted to determine improvements planned for Base Line Street in the study area, which is anticipated to be widened from 4 to 6 lanes. ***Exhibit 12*** shows the assumed lane configurations and traffic controls in the study area for General Plan Buildout (2030) conditions.

8.2 GENERAL PLAN BUILDOUT (2030) WITHOUT PROJECT TRAFFIC VOLUMES

General Plan buildout (2030) without project volumes are based on analysis of existing and General Plan Buildout (2030) volumes contained in the traffic impact analyses included in two recent Environmental Impact Reports (EIRs) prepared for large projects in the City of Highland, the *Greenspot Village Focused Traffic Analysis (Urban Crossroads, April 25, 2013)* and the *Harmony Specific Plan Traffic Impact Analysis (LSA, March 17, 2014)*. The implied growth in traffic volumes between existing conditions and General Plan Buildout (2030) conditions over the planning horizon in each report was analyzed to determine an appropriate average annual growth rate to apply to the study intersections in this report. Based on our analysis of these volumes, an average annual growth rate of 2% per year is appropriate to grow existing (2016) traffic volumes to *General Plan buildout (2030) without project* traffic volumes. The following additional assumptions were utilized to fine tune General Plan buildout (2030) traffic volumes:

- Volumes were checked, and increased as necessary, to ensure that General Plan buildout (2030) volumes were at least equal to or greater than the project opening year without project volumes discussed in section 6 of this report.
- Volumes were balanced along Base Line Street.

Exhibit 13 shows *General Plan buildout (2030) without project* AM and PM peak hour volumes at the study intersections.

8.3 GENERAL PLAN BUILDOUT (2030) WITHOUT PROJECT INTERSECTION LEVEL OF SERVICE ANALYSIS

General plan buildout (2030) without project conditions AM and PM peak hour intersection analysis is shown in ***Table 9***. HCM analysis sheets are provided in ***Appendix D***.

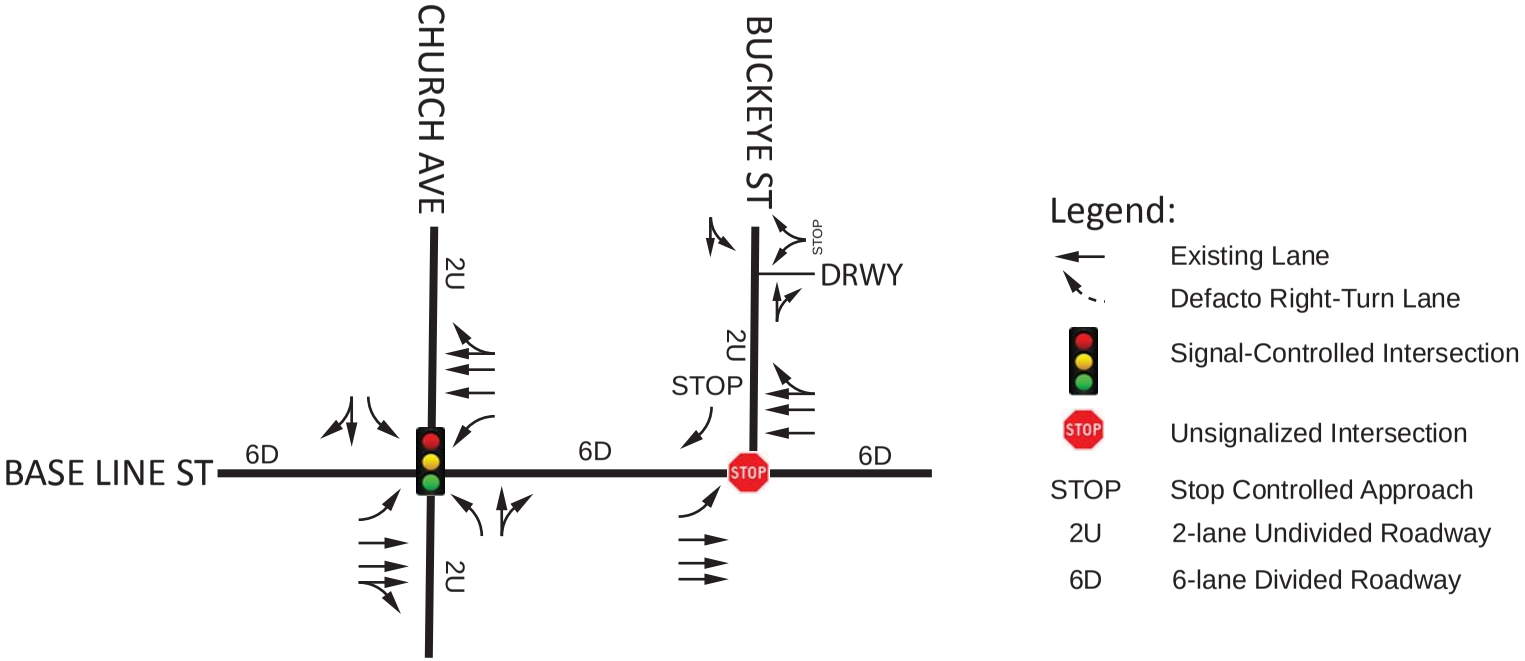


Exhibit 12:

Assumed General Plan Buildout Lane Geometry & Intersection Control

KZD-14-001 Baseline Smart & Final Traffic Impact Analysis

Not to Scale

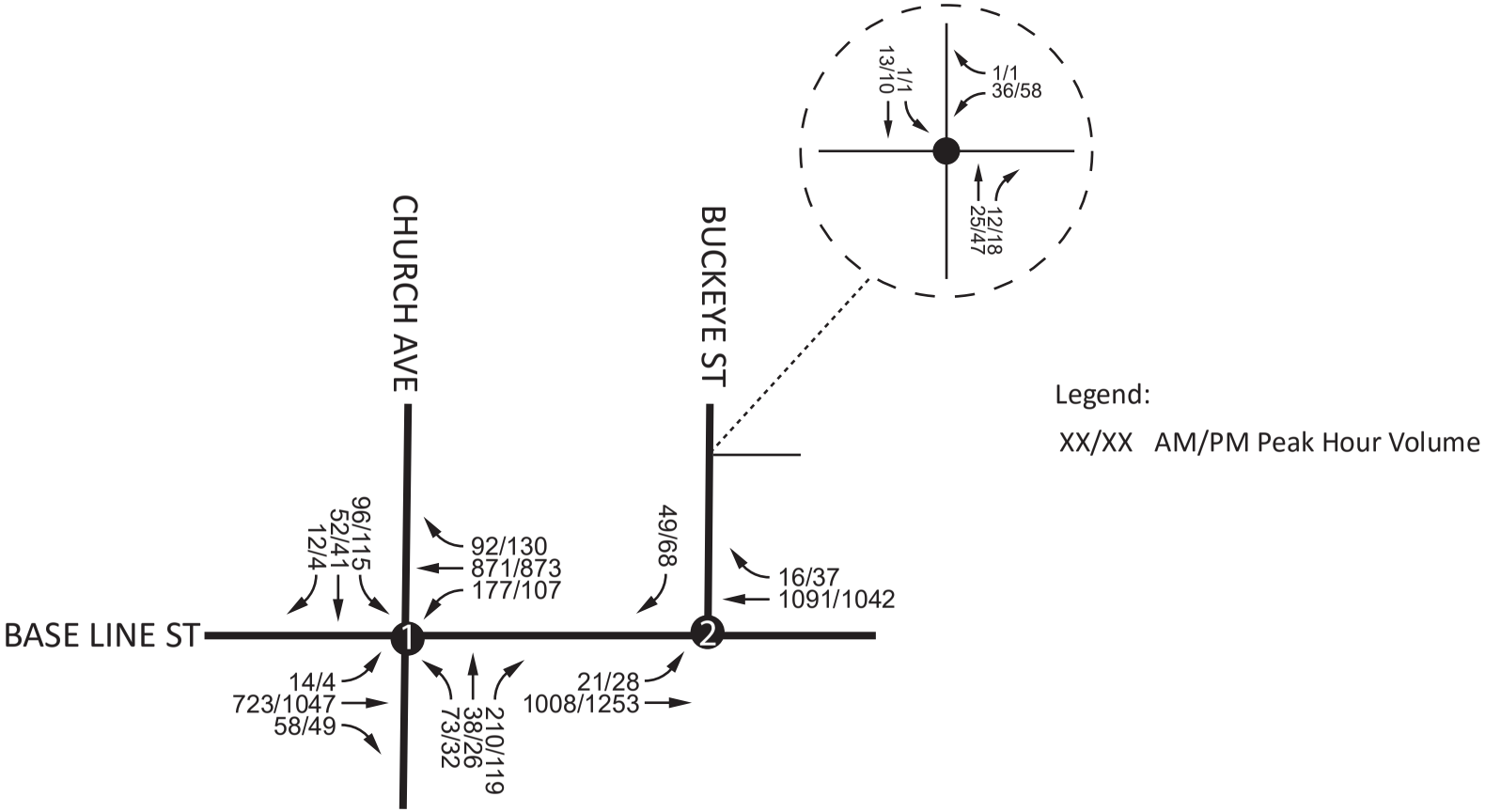


Exhibit 13: General Plan Buildout Without Project AM/PM Peak Hour Intersection Volumes

KZD-14-001 Baseline Smart & Final Traffic Impact Analysis

Not to Scale

Table 9
Intersection Analysis – General Plan Buildout (2030) Without Project

Intersection	Control Type	AM Peak Hour	PM Peak Hour
		Delay - LOS	Delay - LOS
Church Ave/Base Line St	Signal	33.1 – C	27.5 – C
Buckeye St/Base Line St	TWSC	16.8 – C	16.7 – C

Note: TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle
1 = Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

As shown in ***Table 9***, the study intersections are projected to operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours for *General Plan buildout (2030) without project* conditions.

9.0 General Plan Buildout (2030) With Project Conditions

Assessment of *General Plan Buildout (2030)* conditions with and without the proposed project will determine if the City of Highland Circulation Element is adequate to accommodate future traffic at the target LOS or if additional mitigation is necessary.

9.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for the *General Plan Buildout (2030) without and with project* scenarios are consistent with the City of Highland General Plan Circulation Element roadway classifications for the roadways within the study area. Additionally, the San Bernardino Association of Governments (SANBAG) Congestion Management Program Nexus Study Project List was consulted to determine improvements planned for Base Line Street in the study area, which is anticipated to be widened from 4 to 6 lanes. ***Exhibit 12*** previously showed the assumed lane configurations and traffic controls in the study area for General Plan Buildout (2030) conditions.

9.2 GENERAL PLAN BUILDOUT (2030) WITH PROJECT TRAFFIC VOLUMES

General Plan buildout (2030) with project volumes include *General Plan buildout (2030) without project* traffic volumes plus the addition of the traffic projected to be generated by the proposed project.

Exhibit 14 shows *General Plan buildout (2030) with project* AM and PM peak hour volumes at the study intersections.

9.3 GENERAL PLAN BUILDOUT (2030) WITH PROJECT INTERSECTION LEVEL OF SERVICE ANALYSIS

General Plan buildout (2030) with project conditions AM and PM peak hour intersection analysis is shown in ***Table 10***. HCM analysis sheets are provided in ***Appendix D***.

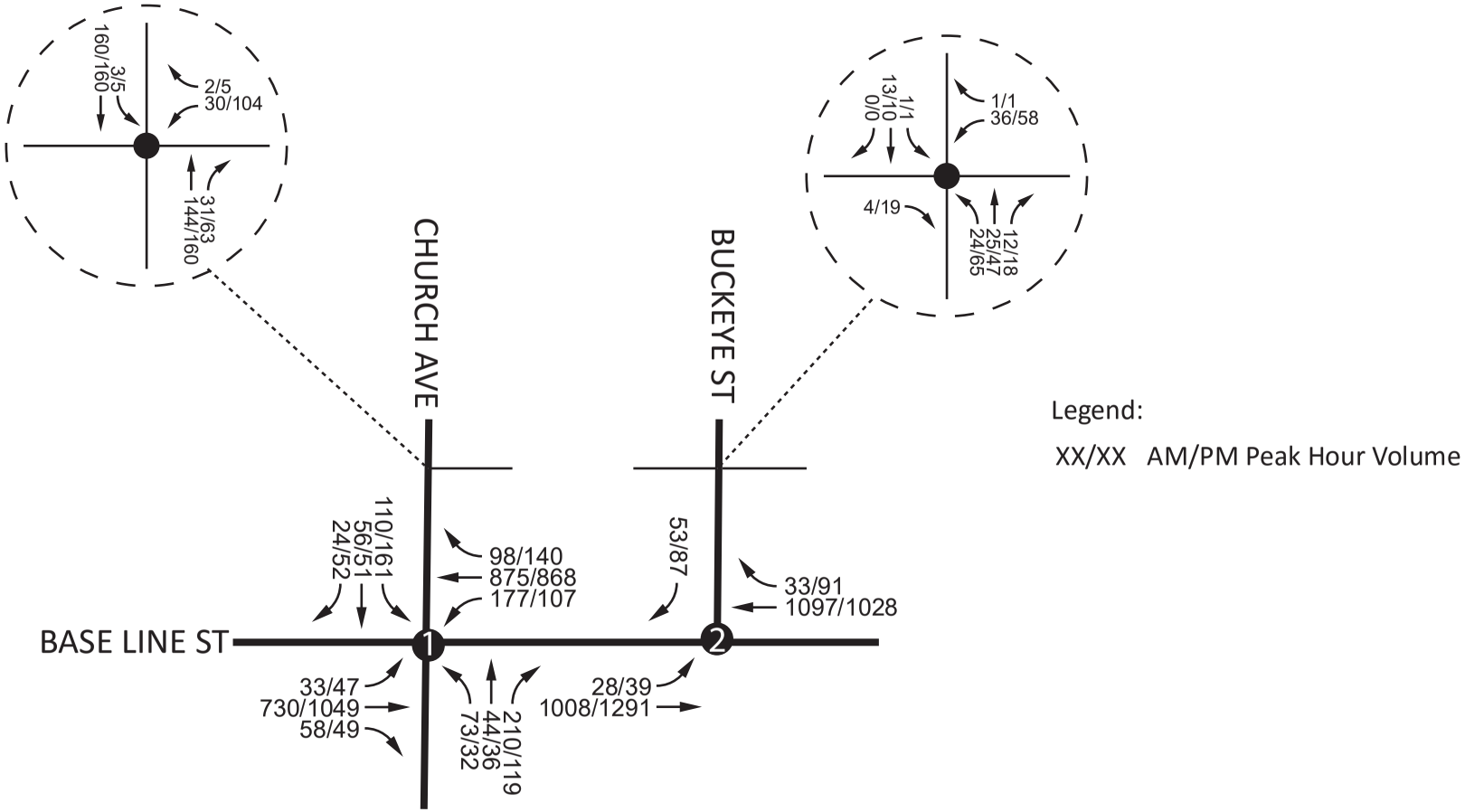


Exhibit 14: General Plan Buildout With Project AM/PM Peak Hour Intersection Volumes

KZD-14-001 Baseline Smart & Final Traffic Impact Analysis

Not to Scale

Table 10
Intersection Analysis – General Plan Buildout (2030) With Project

Intersection	Control Type	General Plan Buildout (2030) Without Project				General Plan Buildout (2030) With Project			
		Delay[1]		LOS		Delay[1]		LOS	
		AM	PM	AM	PM	AM	PM	AM	PM
Church Ave/Base Line St	Signal	33.1	27.5	C	C	32.9	29.5	C	C
Buckeye St/Base Line St	TWSC	16.8	16.7	C	C	17.5	17.9	C	C
Church Ave/Main Drwy	TWSC	Not Applicable				10.7	12.0	B	B
Buckeye St/Main Drwy	TWSC	Not Applicable				9.3	10.6	A	B

Note: TWSC = One-or-Two-Way Stop-Control, Delay shown in seconds per vehicle
1 = Per the 2010 Highway Capacity Manual, overall average delay and LOS are shown for signalized and all-way stop-controlled intersections. For intersections with one-or-two-way stop-control, the delay and LOS for the worst individual movement is shown.

As shown in ***Table 10***, the study intersections are projected to continue to operate at an acceptable LOS (LOS D or better) during the AM and PM peak hours for *General Plan buildout (2030) with project* conditions.

Based on the thresholds of significance for previously discussed in *Section 2.4*, the addition of project generated trips does not result in a significant impact at any of the study intersections for *General Plan buildout (2030) with conditions.*

10.0 Local Circulation and Site Access

This section summarizes proposed site access and on-site circulation recommendations.

10.1 ON-SITE ROADWAY IMPROVEMENTS

The recommended site-adjacent roadway improvements are described below and shown in ***Exhibit 15***.

Wherever necessary, roadways adjacent to the proposed project site and site access points will be constructed in compliance with recommended roadway classifications and respective cross-sections in the City of Highland General Plan Circulation Element.

10.2 SITE ACCESS RECOMMENDATIONS

The recommended site access improvements are described below.

Church Avenue/Commercial Driveway(s) – Install a stop control on the westbound approach at both project driveways on Church Avenue and construct each driveway intersection with the following geometrics:

- Northbound Approach: One shared through/right-turn lane.
- Southbound Approach: One shared left turn/through lane.
- Westbound Approach: One shared left-turn/right-turn lane.

Buckeye Street/Commercial Driveway(s) – Install a stop control on the eastbound approach at both project driveways on Buckeye Street and construct each driveway intersection with the following geometrics:

- Northbound Approach: One shared left-turn/through lane.
- Southbound Approach: One shared through/right-turn lane.
- Eastbound Approach: One shared left-turn/right-turn lane.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City sight distance standards at the time of final grading, landscaping and street improvement plans.

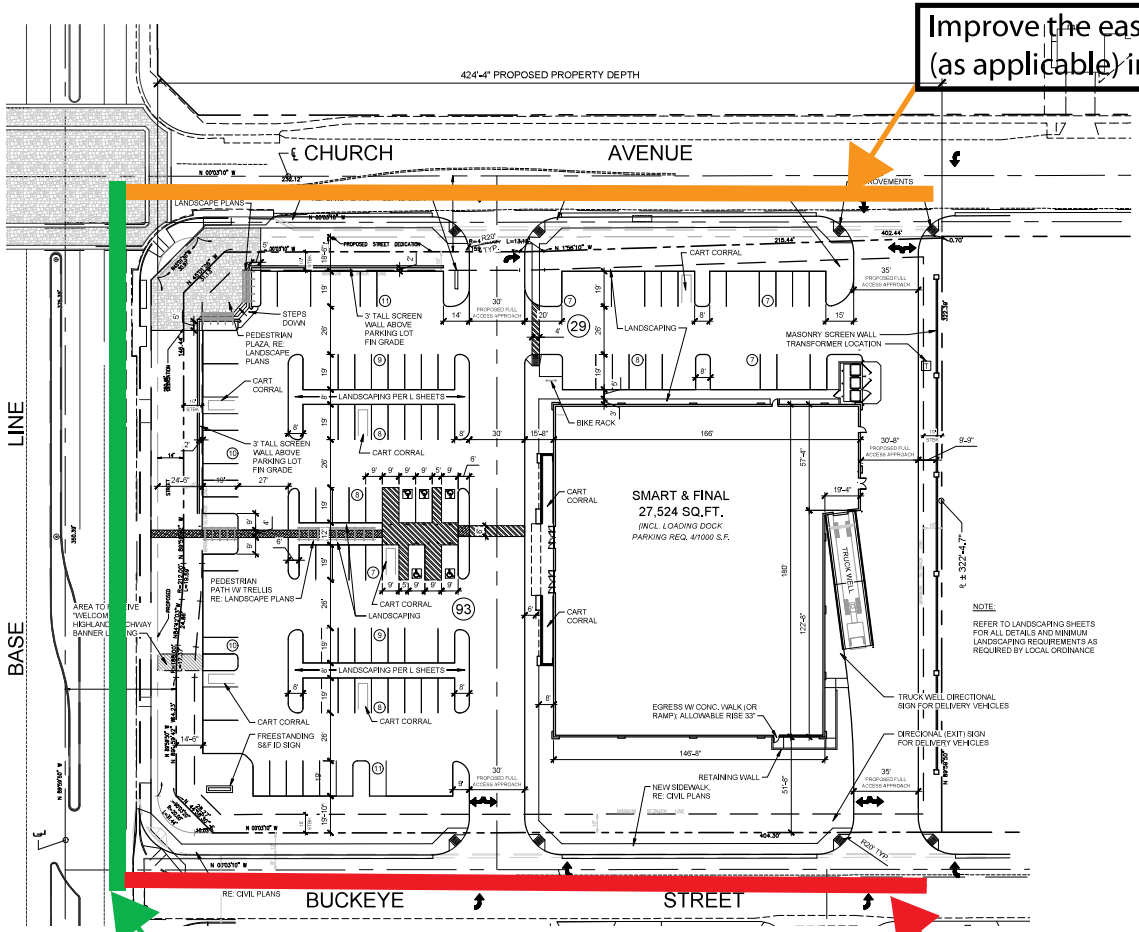


Exhibit 15: Site Adjacent Roadway Improvements

KZD-14-001 Baseline Smart & Final TIA

Not to Scale

11.0 Local and Regional Funding Mechanisms

Transportation improvements throughout the City of Highland are funded through a combination of direct project mitigation, fair share contributions or development impact fee programs such as the City's Development Impact Fee (DIF) program. It is anticipated that the proposed project will be subject to the City's DIF. Identification and timing of needed improvements are generally determined through local jurisdictions based upon a variety of factors.

The project's contribution to one of the aforementioned transportation impact fee programs or as a fair share contribution towards a cumulatively impacted facility not found to be covered by a pre-existing fee program should be considered sufficient to address the project's fair share towards mitigation measure(s) designed to alleviate the cumulative impact. Discussion of the relevant pre-existing transportation impact fee programs is provided below.

11.1 CITY OF HIGHALND DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The proposed project is located within the City of Highland and will therefore be subject to the City's Development Impact Fees (DIF). The City of Highland DIF program includes both a local circulation system component and a regional circulation system component. ***Table 11*** summarizes the current fee schedule for the City's DIF program.

Table 11
Estimated DIF Fees

Fee Reference	Commercial/Office Per Square Foot
City of Highland DIF – Local Circulation System	$2.921
City of Highland DIF – Regional Circulation System	$7.739

Source: http://economicdevelopment.cityofhighland.org/Fees/

11.2 FAIR SHARE CONTRIBUTION

Project mitigation may include a combination of fee payments to established programs and/or payment of a fair share contribution towards future improvements, or a combination of the two, as directed by the City. When off-site improvements are identified that are not covered by a pre-existing traffic impact fee for which a proposed project has a minor share of the responsibility, the approving jurisdiction may elect to collect a fair share contribution.

12.0 Truck Turning Templates

The City requested that truck turning radius analysis for delivery trucks be prepared at the following two locations:

- Westbound U-turns at Church Avenue/Base Line Street; and
- Eastbound left-turns at Buckeye Street/Base Line Street.

Based on the truck turning template analysis, while passenger vehicles can negotiate westbound U-turns, delivery trucks cannot negotiate westbound U-turns at the Church Avenue/Base Line Street intersection. Any delivery trucks exiting the project site and traveling east on Base Line Street could instead utilize the driveway on Church Avenue instead of the driveway on Buckeye Street and make a southbound left-turn onto eastbound Base Line Street.

Truck turning template exhibits are provided in ***Appendix F***.

13.0 Church/Base Line Southbound Queue Analysis

The City of Highland requested that southbound leg queueing at the Church Avenue/Base Line Street intersection be analyzed to determine whether queueing at the intersection will block the proposed project driveways on Church Avenue.

The distance between the Church Avenue/Base Line Street intersection and the proposed Smart & Final driveways on Church Avenue are approximately 177 feet and 372 feet respectively. Currently, the southbound Church Avenue approach at the Church Avenue/Base Line Street intersection consists of one through/right-turn land and one 75-foot left-turn pocket.

Table 12 summarizes the results of the queue analysis for the southbound approach at the Church Avenue/Base Line Street intersection. Queue analysis sheets are provided in ***Appendix G***.

Table 12
Southbound Queues at Church/Base Line

Scenario/Time Period	Queue (in feet)			
	Southbound Through/Right-Turn		Southbound Left-Turn	
	50th	95th	50th	95th
Existing Plus Project				
- AM Peak Hour	25	48	51	87
- PM Peak Hour	20	38	76	104
Opening Year (2018) With Project				
- AM Peak Hour	19	56	82	169
- PM Peak Hour	16	51	90	179
General Plan Buildout (2030) With Project				
- AM Peak Hour	18	50	39	90
- PM Peak Hour	30	77	83	166

Note: 50th = 50th percentile, 95th = 95th percentile. Projected queues shown in feet.

As shown in ***Table 12,*** projected southbound through/right-turn queues are not projected to block left-turns into and out of the proposed project driveway on Church Avenue for all analysis scenarios. However, the southbound left-turn volume at the Church Avenue/Base Line Street intersection is typically 1.5 to 2 times greater than the southbound through and right-turn movement combined. For existing plus project conditions, the southbound left-turn queue is projected to exceed the turn pocket storage capacity, and this condition is projected to continue to worsen in future with project scenarios.

It is recommended that the proposed project increase the length of the southbound left-turn pocket at the Church Avenue/Base Line Street intersection up to the first project driveway, a distance of approximately 177 feet.

Appendices

APPENDIX A

CITY OF HIGHLAND GENERAL PLAN ROADWAY CLASSICIATIONS

Roadway Classifications

Based upon existing and projected traffic demands generated by buildout of the General Plan, each major roadway has been assigned a specific design classification. The need for and appropriateness of each classification has been based upon modeled future traffic volumes and overall community design goals set forth in the General Plan. Each of the classifications corresponds with the typical street cross-sections illustrated in Figure 3.1, Roadway Cross-Sections. While the cross-sections represent typical street widths, refinements may be required at intersections or entrances to development projects, which could include the need for additional travel or turn lanes, as well as provisions for transit improvements.

There are seven categories in the City roadway hierarchy, ranging from higher capacity primary arterials to lower capacity collector streets. These categories are described below:

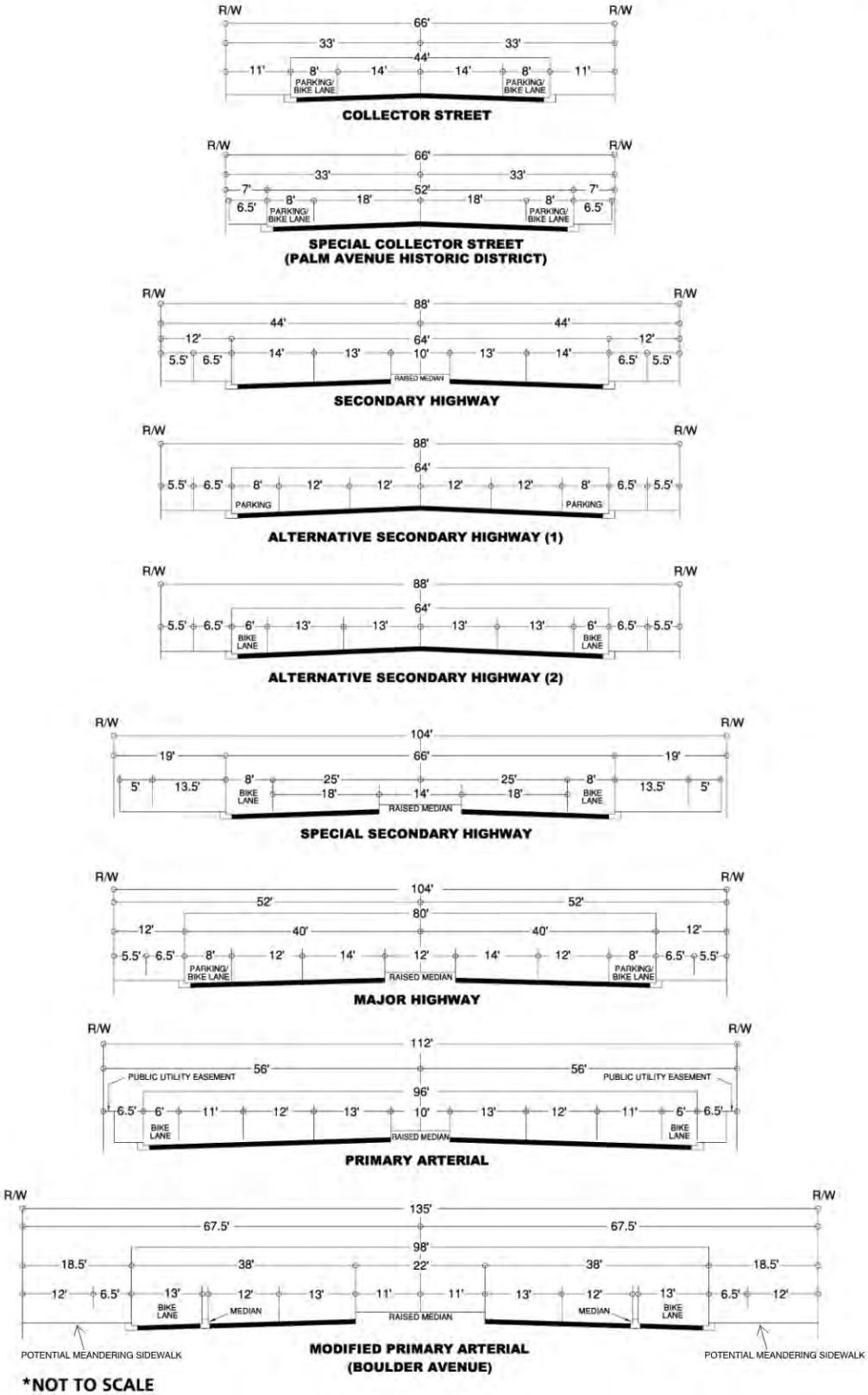
- **Collector Street.** This category of roadway is intended to carry traffic between residential neighborhoods and the larger street network. They are, generally, two-lane roadways which have a mixture of residential and commercial land uses along them. Collector streets are 44 feet, curb-to-curb, within 66-foot rights-of-way. Examples of collector streets are Church Avenue and Weaver Street. Cunningham Street is wider (more than 50 feet) than the typical cross-section for most of its segments.

Looking north on Palm Avenue, a Special Collector Street, in Highland's Historic Village District.

- **Special Collector Street.** Palm Avenue is designated as a special collector street in the area between the Base Line and Pacific Street. This section of Palm Avenue serves as the primary connection between the Town Center and Historic Village District and, in some areas, is constrained by existing historic structures in the area. This is a two-lane roadway with a 52-foot roadway, curb-to-curb, within a 66-foot right-of-way. Restrictions on the amount and design of on-street parking within the Historic Village Area are anticipated. It is also expected that the increase in pedestrian movement in the area may necessitate the installation of pedestrian crossings or signals, which will reduce the efficiency in this section of the roadway system.

  If on-street parking is eliminated, a narrower curb-to-curb cross-section could be utilized, allowing the available right-of-way to be used to augment pedestrian amenities (e.g., wider sidewalks with room available for street furniture and other enhancements).

Figure 3-1 Roadway Cross-Sections



Source: Urban Crossroads

NOT TO SCALE

Because of the location of the intersection of Palm Avenue and Pacific Street and right-of-way constraints within the Historic Village District, consideration may be given to alternatives to traffic signals as a method to achieve acceptable levels of service (LOS). Alternatively, the City may accept a reduced LOS to retain the historic character of the District.

- **Special Secondary Highway.** The portion of Base Line between Church Street and Greenspot Road is identified as requiring special secondary highway status. This section of roadway is designated as containing a 66-foot roadway, curb-to-curb, within a 104-foot right-of-way. This section provides more space for pedestrian and landscape improvements.

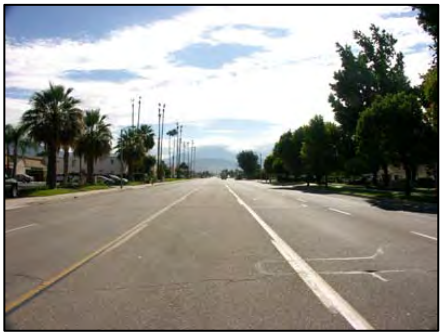
- **Secondary Highway.** Secondary highways provide more local access than major arterials, but also provide some nonlocal through-traffic service. This classification includes a four-lane roadway with a raised median and has a typical right-of-way width of 88 feet and a curb-to-curb pavement width of approximately 64 feet. Del Rosa Drive, Tippecanoe Avenue, Pacific Street, 9th Street and Church Street are examples of secondary highways.

  The alternative secondary highway cross-section does not include a raised median but enhances the opportunity to provide bike paths and/or parking lanes. Table 3.1 summarizes the different cross-section configurations for all secondary highways in the City of Highland.

Looking east on Base Line, identified as a Special Secondary Highway, at its intersection with Church Street.

Table 3.1: Secondary Highway Configuration

Roadway	Median	Bike Path	Parking Lane
Pacific Street	No	Class II	No
9th Street	No	Class III	Yes
Tippecanoe Avenue	No	Class II	No
Del Rosa Drive	Yes	No	No
Highland Avenue	Yes	Class II	No
Church Street	No	Class II	No
Orange Street	No	Class II	No



Looking east on Base Line at Central Avenue. This portion of Base Line is identified as a major highway.

- **Major Highway.** Major highways provide service to nonlocal through trips, as well as providing limited local access. Ideally, curb cuts are minimized on major arterials, although historically such access control has been difficult to achieve. Major highways are designated as four-lane, 80-foot roadways (including a 12-foot median) curb-to-curb, within 104-foot rights-of-way.

Base Line (west of Church Avenue and between Boulder Avenue and Church Street) and most of Greenspot Road are examples of major highways. Base Line, from the western City limit to Palm Avenue, will retain a 72-foot curb-to-curb cross-section. The median on Base Line from Browning Road to Church Street will have a reduced width due to local topography.

This portion of 5th Street is identified as a Primary Arterial.

- **Primary Arterial.** Primary arterials are limited access facilities which provide service to nonlocal through trips with a minimal level of direct access to adjacent land uses. They are designated as 96-foot roadways, curb-to-curb, within a minimum of 112-foot rights-of-way, and carry up to three lanes of through traffic in each direction. An example of a primary arterial is 5th Street between Palm Avenue and Boulder Avenue.

- **Modified Primary Arterial.** Boulder Avenue north of Greenspot Road is designated as a modified primary arterial. The modified primary arterial is designated as a four-lane divided roadway plus a Class I bike lane, with a typical right-of-way width of 135 feet and a curb-to-curb pavement width of approximately 98 feet with a raised median.

Typical cross-sections for roadway classifications are provided in Figure 3.1, Roadway Cross-Sections. Actual cross-sections may vary somewhat from the indicated measurement standards, but in order to provide maximum capacity, as well as right-of-way protection for landscaping, bike lanes and future roadway improvements, the typical roadway cross-sections are recommended as future minimums.

Regional Roadways

State Route 30 (SR-30) represents the backbone of Highland's circulation system and must be considered in any significant changes to land use or design.

The process to add SR-30 to Interstate 210 (I-210) began in 1998, when the designation of SR-30 was legislatively changed to California 210 (AB 2388, 1998). In 1999, the state of California submitted California 210 for inclusion in the Interstate Highway System. The American Association of State Highway and Transportation Officials (AASHTO) rejected this proposal because the freeway segments were not complete; however, the freeway will be resubmitted for approval once it is complete. The City of Highland and surrounding jurisdictions may also seek funding and approval for the freeway's expansion from four to six or more lanes to accommodate the expected increase in future traffic.

The connection of I-210 with SR-30 construction will be completed by the end of 2007. The regional long-range projections indicate that SR-30 through Highland will need to be widened to six lanes. Measure I, the

Figure 3-2 Roadway Network

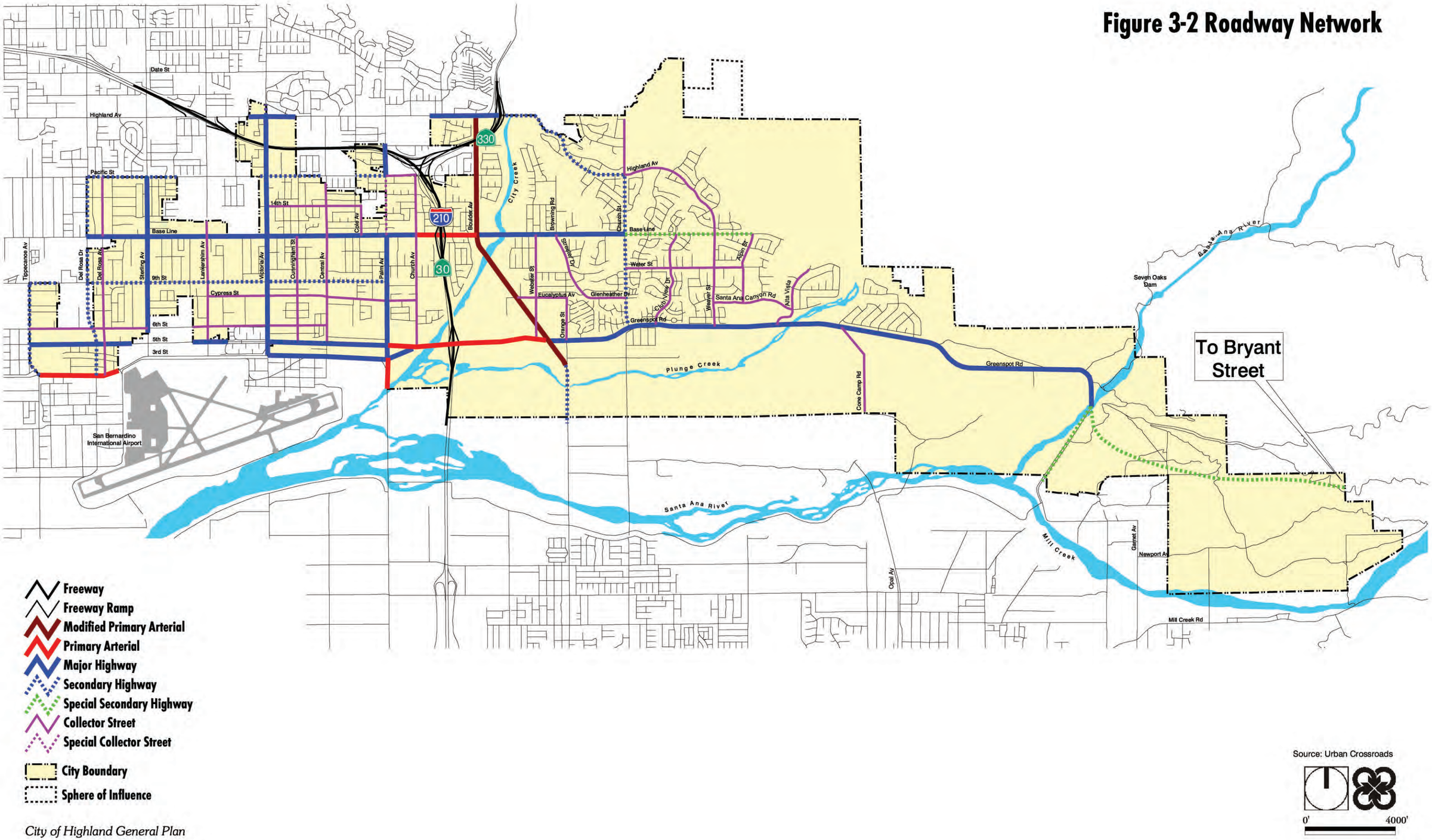
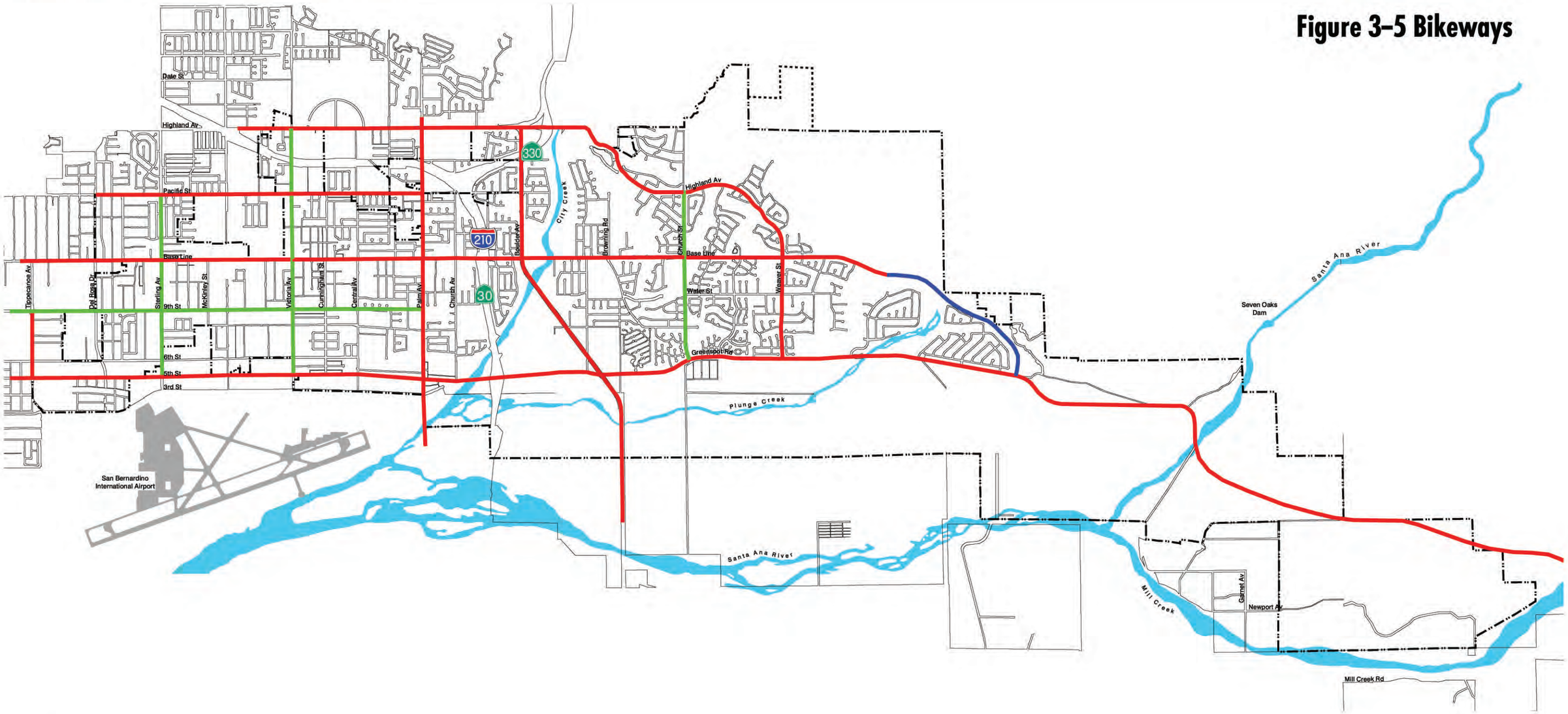


Figure 3–5 Bikeways



Class I Bike Path

Class II Bike Lane (On Street)

Class III Bike Route (Signage)

City Boundary

Sphere of Influence

Source: Urban Crossroads

0' 4000'

Attachment 1

Arterial Projects

($ in thousands)

HIGHLAND

Arterial Description	Lane-Miles	2013 Cost Estimate	2015 Cost Estimate	Status (C, D, or F)*	If C, year of completion	2015 Notes
Widen 3rd St from Palm Ave to 5th St from 2 to 3 lanes	0.27	$2,165	$2,165	D		
Widen 3rd St from Tippecanoe Ave to 200' e/o Shirley Ave from 2 to 6 lanes	0.69	$3,024	$3,024	D		
Widen 3rd St from Victoria Ave to Palm Ave (no additional lanes)	1.00	$5,401	$5,401	D		
Widen 5th St from Tippecanoe Ave to Del Rosa Dr from 2 to 4 lanes	0.56	$5,413	$5,413	D		
Widen 5th St from Del Rosa Dr to Palm Ave from 2 to 4 lanes and from Church Ave to SR 210 from 4 to 6 lanes (including fwy undercrossing)	3.04	$14,961	$14,961	D		
Widen 9th St from Victoria Ave to Cunningham from 2 to 4 lanes	0.25	$294	$294	D		
Widen 9th St from 160' e/o of Drummond Ave to Palm Ave from 2 to 4 lanes	0.06	$387	$387	D		
Widen 9th St from Lillian Ln to 160' e/o Drummond Ave from 2 to 4 lanes	0.19	$227	$227	D		
Widen 9th St from Central Ave to Lillian Ln from 2 to 4 lanes	0.25	$345	$345	D		
Widen 9th St from Cunningham St to Hillview St from 2 to 4 lanes	0.07	$123	$123	D		
Widen 9th St from Del Rosa Dr to Victoria Ave from 2 to 4 lanes	1.52	$4,269	$4,269	D		
Widen 9th St from Hillview St to Central Ave from 2 to 4 lanes	0.18	$549	$549	D		
Widen 9th St from Tippecanoe Ave to 145' e/o Fairfax Ln from 2 to 4 lanes	0.25	$265	$265	F		
Extend Arden Ave to connect to Lankershim Ave from 0 lanes to 2 lanes	0.68	$2,015	$2,015	F		
Widen Base Line from Palm Ave to Boulder Ave from 4 to 6 lanes (excluding freeway bridge)	1.28	$3,100	$3,100	D		
Widen Base Line from Boulder Ave to Church St (including bridge at City Creek) (no additional lanes)	1.25	$2,800	$2,800	D		
Widen Base Line from W. City Limit to Palm Ave (no additional lanes)	1.99	$7,003	$7,003	F		
Widen Base Line from 510' e/o Fairwood Ln to Brookwood Ln from 2 to 4 lanes	0.39	$1,114	$1,114	F		
Widen Boulder Ave from Highland Ave to 5th St from 2 lanes to 4 lanes (including bridge)	2.10	$4,154	$4,154	D		
Widen Boulder Ave/Orange St from 5th St to S. City Limits from 2 to 4 lanes (including 2 bridges)	0.68	$12,000	$12,000	F		
Extend Cone Camp Rd from Greenspot Rd to S. City Limits from 0 to 2 lanes	0.75	$2,774	$2,774	F		
Widen Del Rosa Dr from 3rd St to 5th St (no additional lanes)	0.26	$568	$568	D		
Widen Del Rosa Dr from 5th St to Base Line (no additional lanes)	0.38	$673	$673	F		
Widen Greenspot Rd from SR-210 to Boulder Ave from 2 to 6 lanes	0.86	$4,252	$4,252	D		
Widen Greenspot Rd from Boulder Ave to Valencia Ct from 2 to 4 or 6 lanes	0.54	$1,798	$1,798	D		
Widen Greenspot Rd from Valencia Ct to 145' w/o Weaver St (no additional lanes)	0.63	$324	$324	F		
Widen Greenspot Rd from 145' w/o Weaver St to 1250' e/o Weaver Street St (no additional lanes)	0.39	$817	$817	F		
Widen Greenspot Rd from 1250' e/o Weaver Street St to 560' e/o Santa Paula St (no additional lanes)	1.70	$4,115	$4,115	F		
Extend Greenspot Rd from 560' e/o Santa Paula St to East City Limit (including bridge at Santa Ana River)	4.95	$15,919	$15,919	D		
Widen Highland Ave from Olive St to 800' w/o Victoria Ave (no additional lanes)	0.40	$888	$888	D		
Widen Highland Ave from Boulder Ave to 200' w/o Denair Ave (no additional lanes)	0.39	$711	$711	F		
Widen Highland Ave from Church St to Boulder Ave from 2 to 4 lanes	1.34	$3,030	$3,030	F		
Widen Palm Ave/Alabama St from S. City Limit to Base Line from 2 to 4 lanes	1.31	$4,244	$4,244	F		
Widen Palm Ave from Pacific St to Atlantic Ave from 2 to 4 lanes	0.20	$407	$407	D		
Widen Sterling Ave from S. City Limits to Pacific Ave (no additional lanes)	1.35	$4,391	$4,391	F		
Widen Tippecanoe Ave from 3rd St to 9th St (no additional lanes)	0.80	$3,280	$3,280	F		
Widen Victoria Ave from 6th St to 660' n/o 6th St (no additional lanes)	0.13	$432	$432	F		
Widen Victoria Ave from n/o 6th St to N. City Limits (no additional lanes)	1.70	$4,699	$4,699	F		
Widen Victoria Ave from 3rd St to 6th St (no additional lanes)	0.25	$3,195	$3,195	D		
Widen Lankershim Ave from 5th St to 1200' north of 9th St (no additional lanes)	0.76	$651	$651	D		
Widen Greenspot Rd from Santa Ana River to south city limits	0.60	$1,333	$1,333	F		
Widen Palm Ave from Base Line to Pacific St (no additional lanes)	0.50	$1,660	$1,660	F		
Widen 5th St from Victoria Ave to Palm Ave from 2 to 4 lanes						Removed in 2011
Widen 5th St from Tippecanoe Ave to 845' e/o Shirley from 2 to 4 lanes						Removed in 2011
Widen 5th St from Sterling Ave to Victoria Ave from 2 to 4 lanes						Removed in 2011
Widen 5th St from Church Ave to SR-210 from 2 to 6 lanes						Removed in 2011
Widen Del Rosa Dr from 3rd St to Base Line from 2 to 4 lanes						Removed in 2011
Widen Base Line from Church St to Weaver St (no additional lanes)	0.75			C	10/22/2002	Completed prior to Nexus Study Adoption
Highland Total	**36.89**	**$129,766**	**$129,766**			

*C = Completed, D = In Development, F = Future

APPENDIX B

TRANSIT INFORMATION

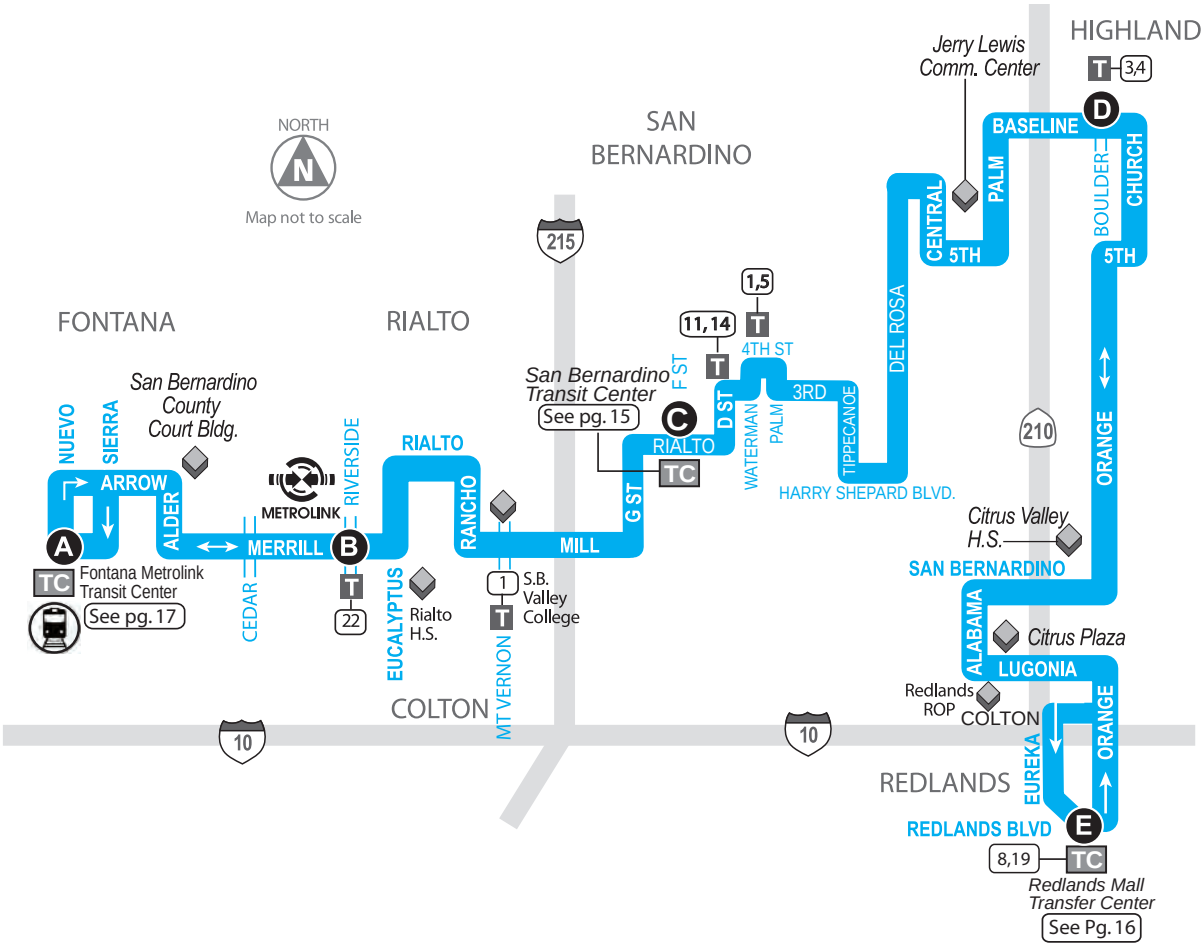
15 FONTANA - SAN BDNO/HIGHLAND - REDLANDS

Bus Route | Tripper Service | Timepoint - Look for the matching symbol in the timetable section. | Metrolink Station | Park-and-Ride | Point of interest | Medical Center | Transfer Point | Connection Route(s) | Transit/Transfer Center

FREQUENCY

WKDY	SAT	SUN
30	60	60

This route connects with sbX!



Transit Tip

Help keep us on time! Be ready with exact change, or have your bus pass ready, BEFORE you board. If paying with discounted fare, show the required ID to the driver.

ROUTE 15: MONDAY – FRIDAY

A Fontana Metrolink	B Merrill & Riverside	C San Bernardino Transit Center	D Baseline & Boulder	E Redlands Mall	D Baseline & Boulder	C San Bernardino Transit Center	B Merrill & Riverside	A Fontana Metrolink
EASTBOUND					**WESTBOUND**			
						5:12	5:36	5:51
						5:41	6:05	6:20
					5:05	5:30	6:02	6:04	6:26	6:44
					6:10	6:30	7:02	7:04	7:28	7:46
			5:25	5:54	6:18	6:35	7:05	7:42	8:07	8:25
			5:56	6:27	6:57	7:05	7:35	8:12	8:14	8:38	8:56
			6:17	6:48	7:18	7:35	8:05	8:42	8:44	9:08	9:26
6:09	6:27	6:52	6:57	7:30	8:00	8:05	8:35	9:12	9:14	9:38	9:56
6:39	6:57	7:22	7:27	8:00	8:30	8:35	9:05	9:42	9:44	10:08	10:26
7:09	7:27	7:52	7:57	8:30	9:00	9:05	9:35	10:12	10:14	10:38	10:56
7:39	7:57	8:22	8:27	9:00	9:30	9:35	10:05	10:42	10:44	11:08	11:26
8:09	8:27	8:52	8:57	9:30	10:00	10:05	10:35	11:12	11:14	11:38	11:56
8:39	8:57	9:22	9:27	10:00	10:30	10:35	11:05	11:42	11:44	**12:08**	**12:26**
9:09	9:27	9:52	9:57	10:30	11:00	11:02	11:32	**12:09**	**12:11**	**12:35**	**12:53**
9:39	9:57	10:22	10:27	11:00	11:30	11:35	**12:05**	**12:42**	**12:44**	**1:08**	**1:26**
10:09	10:27	10:52	10:57	11:30	**12:00**	**12:05**	**12:35**	**1:12**	**1:14**	**1:38**	**1:56**
10:39	10:57	11:22	11:27	**12:00**	**12:30**	**12:35**	**1:05**	**1:42**	**1:44**	**2:08**	**2:26**
11:11	11:29	11:54	11:59	**12:32**	**1:02**	**1:05**	**1:35**	**2:12**	**2:14**	**2:38**	**2:56**
11:43	**12:01**	**12:26**	**12:31**	**1:04**	**1:34**	**1:35**	**2:05**	**2:42**	**2:44**	**3:08**	**3:26**
12:10	**12:28**	**12:53**	**12:58**	**1:31**	**2:01**	**2:05**	**2:35**	**3:12**	**3:14**	**3:38**	**3:56**
12:41	**12:59**	**1:24**	**1:29**	**2:02**	**2:32**	**2:32**	**3:02**	**3:39**	**3:41**	**4:05**	**4:23**
1:09	**1:27**	**1:52**	**1:57**	**2:30**	**3:00**	**3:05**	**3:35**	**4:12**	**4:14**	**4:38**	**4:56**
1:39	**1:57**	**2:22**	**2:27**	**3:00**	**3:30**	**3:35**	**4:05**	**4:42**	**4:44**	**5:08**	**5:26**
2:09	**2:27**	**2:52**	**2:57**	**3:30**	**4:00**	**4:05**	**4:35**	**5:12**	**5:14**	**5:38**	**5:56**
2:39	**2:57**	**3:22**	**3:27**	**4:00**	**4:30**	**4:35**	**5:05**	**5:42**	**5:44**	**6:08**	**6:26**
3:09	**3:27**	**3:52**	**3:57**	**4:30**	**5:00**	**5:05**	**5:35**	**6:12**	**6:14**	**6:38**	**6:56**
3:39	**3:57**	**4:22**	**4:27**	**5:00**	**5:30**	**5:35**	**6:05**	**6:42**	**6:44**	**7:08**	**7:23**
4:09	**4:27**	**4:52**	**4:57**	**5:30**	**6:00**	**6:05**	**6:35**	**7:12**	**7:14**	**7:38**	**7:53**
4:39	**4:57**	**5:22**	**5:27**	**6:00**	**6:30**	**6:32**	**6:58**	**7:35**			
5:09	**5:27**	**5:52**	**5:57**	**6:30**	**7:00**	**7:07**	**7:33**	**8:05**			
5:39	**5:57**	**6:22**	**6:27**	**7:00**	**7:30**	**7:35**	**8:01**	**8:28**			
6:09	**6:27**	**6:52**	**6:57**	**7:28**	**7:56**	**8:07**	**8:33**	**9:00**			
6:39	**6:57**	**7:22**	**7:27**	**7:58**	**8:26**	**8:35**	**9:01**	**9:28**			
7:09	**7:27**	**7:52**	**7:57**	**8:28**	**8:56**						
			8:36	**9:05**	**9:33**	**9:45**	**10:11**	**10:43**			
			9:41	**10:10**	**10:38**						

ROUTE 15: SATURDAY

A Fontana Metrolink	B Merrill & Riverside	C San Bernardino Transit Center	D Baseline & Boulder	E Redlands Mall	D Baseline & Boulder	C San Bernardino Transit Center	B Merrill & Riverside	A Fontana Metrolink
EASTBOUND					**WESTBOUND**			
						7:17	7:41	7:59
					7:37	8:07	8:44	8:47	9:11	9:29
			7:26	7:57	8:23	8:37	9:07	9:44	9:47	10:11	10:29
7:43	8:01	8:26	8:31	9:02	9:32	9:37	10:07	10:44	10:47	11:11	11:29
8:43	9:01	9:26	9:31	10:02	10:32	10:37	11:07	11:44	11:47	**12:11**	**12:29**
9:43	10:01	10:26	10:31	11:02	11:32	11:37	**12:07**	**12:44**	**12:47**	**1:11**	**1:29**
10:43	11:01	11:26	11:31	**12:02**	**12:32**	**12:37**	**1:07**	**1:44**	**1:47**	**2:11**	**2:29**
11:43	**12:01**	**12:26**	**12:31**	**1:02**	**1:32**	**1:37**	**2:07**	**2:44**	**2:47**	**3:11**	**3:29**
12:43	**1:01**	**1:26**	**1:31**	**2:02**	**2:32**	**2:37**	**3:07**	**3:44**	**3:47**	**4:11**	**4:29**
1:43	**2:01**	**2:26**	**2:31**	**3:02**	**3:32**	**3:37**	**4:07**	**4:44**	**4:47**	**5:11**	**5:29**
2:43	**3:01**	**3:26**	**3:31**	**4:02**	**4:32**	**4:37**	**5:07**	**5:44**	**5:47**	**6:11**	**6:29**
3:43	**4:01**	**4:26**	**4:31**	**5:02**	**5:32**	**5:35**	**6:01**	**6:38**			
4:43	**5:01**	**5:26**	**5:31**	**6:02**	**6:32**						
5:43	**6:01**	**6:26**	**6:31**	**7:02**	**7:32**						
6:43	**7:01**	**7:21**									

ROUTE 15: SUNDAY

EASTBOUND

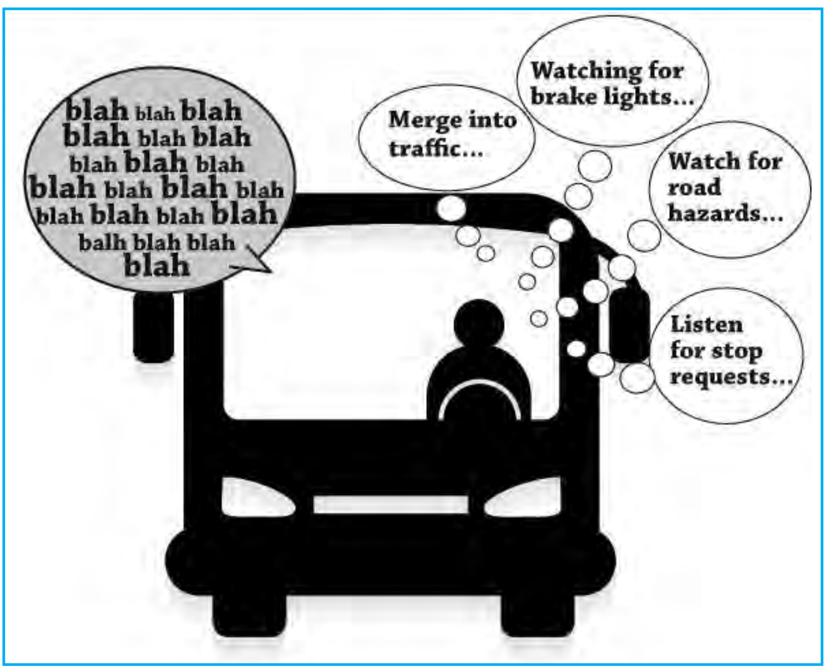
A Fontana Metrolink	B Merrill & Riverside	C San Bernardino Transit Center		D Baseline & Boulder	E Redlands Mall
			7:26	7:57	8:23
7:44	8:01	8:25	8:30	9:01	9:30
8:44	9:01	9:25	9:30	10:01	10:30
9:44	10:01	10:25	10:30	11:01	11:30
10:44	**11:01**	**11:25**	**11:30**	**12:01**	**12:30**
11:44	**12:01**	**12:25**	**12:30**	**1:01**	**1:30**
12:44	**1:01**	**1:25**	**1:30**	**2:01**	**2:30**
1:44	**2:01**	**2:25**	**2:30**	**3:01**	**3:30**
2:44	**3:01**	**3:25**	**3:30**	**4:01**	**4:30**
3:44	**4:01**	**4:25**	**4:30**	**5:01**	**5:30**
4:44	**5:01**	**5:25**	**5:30**	**6:01**	**6:30**
5:44	**6:01**	**6:25**	**6:30**	**7:01**	**7:30**

WESTBOUND

	D Baseline & Boulder	C San Bernardino Transit Center		B Merrill & Riverside	A Fontana Metrolink
6:37	7:07	7:44	7:47	8:11	8:28
7:37	8:07	8:44	8:47	9:11	9:28
8:37	9:07	9:44	9:47	10:11	10:28
9:37	10:07	10:44	10:47	11:11	11:28
10:37	11:07	11:44	11:47	**12:11**	**12:28**
11:37	**12:07**	**12:44**	**12:47**	**1:11**	**1:28**
12:37	**1:07**	**1:44**	**1:47**	**2:11**	**2:28**
1:37	**2:07**	**2:44**	**2:47**	**3:11**	**3:28**
2:37	**3:07**	**3:44**	**3:47**	**4:11**	**4:28**
3:37	**4:07**	**4:44**	**4:47**	**5:11**	**5:28**
4:35	**5:01**	**5:28**			
5:35	**6:01**	**6:28**			

Transit Tip

We love catching up with our drivers! However, they must stay focused. Please don't try to have a long conversation with your driver while the bus is in motion. Thank you!



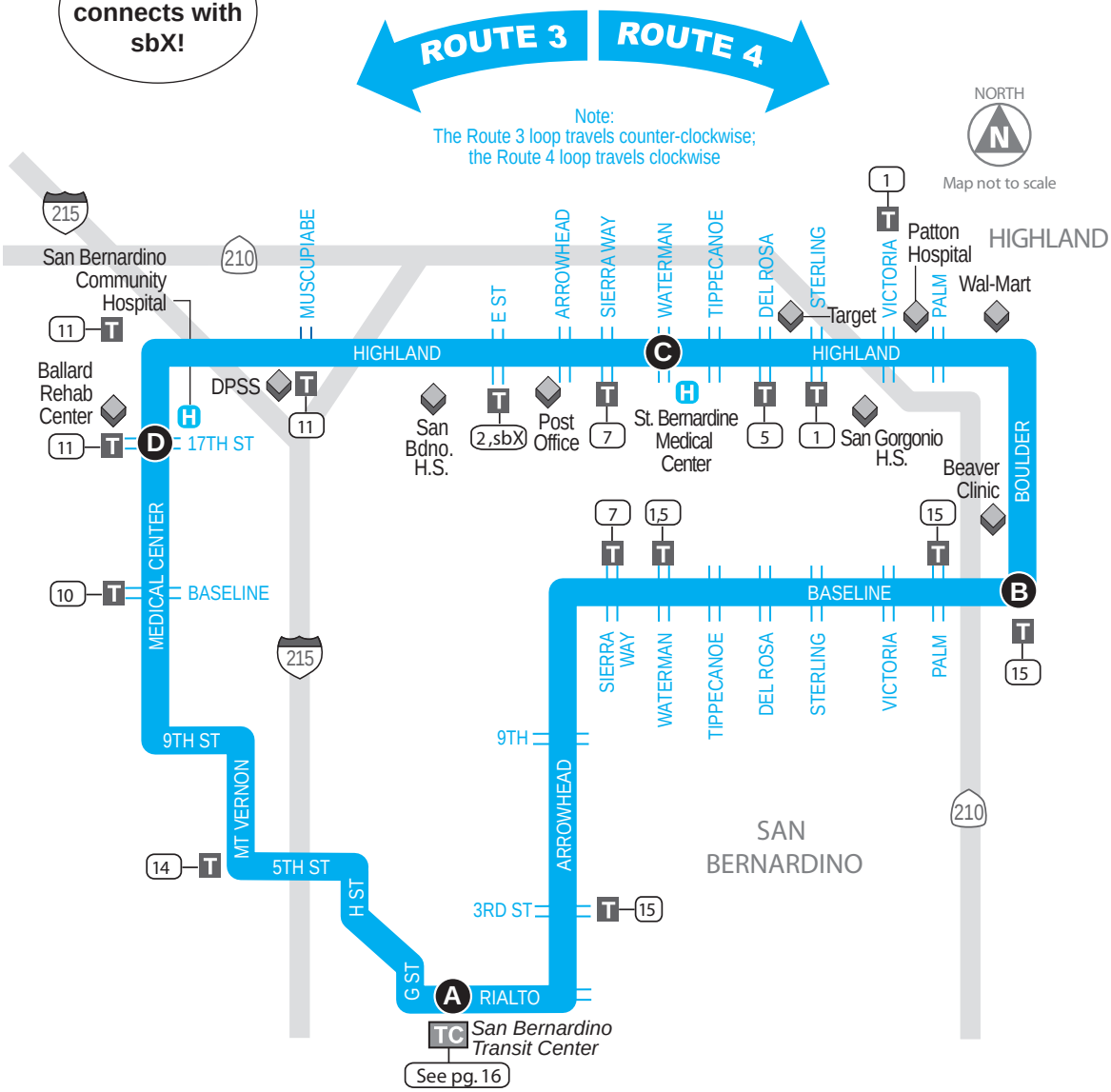
3/4 BASELINE - HIGHLAND - SAN BERNARDINO

Bus Route
Tripper Service
Timepoint - Look for the matching symbol in the timetable section.
Metrolink Station
Park-and-Ride
Point of interest
Medical Center
Transfer Point
Connection Route(s)
Transit/Transfer Center

FREQUENCY

WKDY	SAT	SUN
15	20	20

This route connects with sbX!



ROUTE 3/4: MONDAY – FRIDAY

3: COUNTERCLOCKWISE

A San Bernardino Transit Center	B Boulder & Baseline	C Highland & Waterman	D 17th & Medical Center	A San Bernardino Transit Center
	4:40	5:00	5:12	5:23
	5:34	5:54	6:06	6:17
	5:59	6:19	6:31	6:48
5:43	6:11	6:31	6:43	7:00
6:13	6:41	7:01	7:13	7:30
6:43	7:11	7:31	7:43	8:00
7:03	7:31	7:51	8:03	8:20
7:23	7:51	8:14	8:27	8:44
7:43	8:11	8:34	8:47	9:04
7:58	8:29	8:52	9:05	9:22
8:13	8:44	9:07	9:20	9:37
8:28	8:59	9:22	9:35	9:52
8:43	9:14	9:37	9:50	10:07
8:58	9:29	9:52	10:05	10:22
9:13	9:44	10:07	10:20	10:37
9:28	9:59	10:22	10:35	10:52
9:43	10:14	10:37	10:50	11:07
9:58	10:29	10:54	11:07	11:24
10:13	10:44	11:09	11:22	11:39
10:28	10:59	11:24	11:37	11:54
10:43	11:14	11:39	11:52	12:09
10:58	11:31	11:56	12:10	12:27
11:13	11:46	12:11	12:25	12:42
11:28	12:01	12:26	12:40	12:57
11:43	12:16	12:41	12:55	1:12
11:58	12:31	12:56	1:10	1:26
12:13	12:46	1:11	1:25	1:41
12:28	1:01	1:26	1:40	1:56
12:43	1:16	1:41	1:55	2:11
12:58	1:31	1:56	2:10	2:26
1:13	1:46	2:11	2:25	2:41
1:28	2:01	2:26	2:40	2:56
1:43	2:16	2:41	2:55	3:11
1:58	2:31	2:56	3:10	3:26
2:13	2:46	3:11	3:25	3:41
2:28	3:01	3:26	3:40	3:56
2:43	3:16	3:41	3:55	4:11
2:58	3:31	3:56	4:10	4:26
3:13	3:46	4:11	4:25	4:41
3:28	4:01	4:26	4:40	4:56
3:43	4:16	4:41	4:55	5:11
3:58	4:31	4:56	5:10	5:26
4:13	4:46	5:11	5:25	5:41
4:28	5:01	5:24	5:38	5:54
4:43	5:16	5:39	5:53	6:09
4:58	5:31	5:54	6:06	6:22
5:13	5:44	6:07	6:19	6:35
5:28	5:59	6:22	6:34	6:50
5:43	6:14	6:37	6:49	7:05
5:58	6:29	6:51	7:03	7:19
6:13	6:44	7:06	7:18	7:34
6:28	6:59	7:21	7:33	7:49
6:43	7:14	7:36	7:48	8:04
6:58	7:29	7:51	8:03	8:19
7:28	7:59	8:21	8:33	8:49
8:03	8:34	8:56	9:08	9:24
8:28	8:56	9:16	9:26	9:39
9:03	9:31	9:51	10:01	10:14
9:33	10:01	10:21	10:31	10:44
10:20	10:48	11:08	11:18	11:31

4: CLOCKWISE

A San Bernardino Transit Center	D 17th & Medical Center	C Highland & Waterman	B Boulder & Baseline	A San Bernardino Transit Center
			4:28	4:56
			5:28	5:56
5:00	5:12	5:24	5:42	6:10
			6:27	6:55
6:00	6:12	6:24	6:45	7:13
6:30	6:42	6:54	7:15	7:43
6:59	7:13	7:27	7:48	8:16
7:29	7:43	7:57	8:18	8:46
7:44	7:58	8:12	8:33	9:01
7:59	8:13	8:27	8:48	9:19
8:14	8:28	8:42	9:03	9:34
8:29	8:43	8:57	9:18	9:49
8:44	8:58	9:12	9:33	10:06
8:59	9:13	9:27	9:51	10:24
9:14	9:28	9:42	10:06	10:39
9:29	9:43	9:59	10:24	10:57
9:44	9:58	10:14	10:39	11:12
9:59	10:13	10:29	10:54	11:27
10:14	10:28	10:44	11:09	11:42
10:28	10:42	10:58	11:23	11:56
10:43	10:57	11:13	11:38	12:11
10:58	11:12	11:28	11:53	12:26
11:13	11:27	11:43	12:08	12:41
11:28	11:42	11:58	12:23	12:56
11:43	11:57	12:13	12:38	1:11
11:58	12:12	12:28	12:53	1:26
12:13	12:27	12:43	1:08	1:41
12:28	12:42	12:58	1:23	1:56
12:43	12:57	1:13	1:38	2:11
12:58	1:13	1:29	1:54	2:27
1:13	1:28	1:44	2:09	2:42
1:28	1:43	1:59	2:24	2:57
1:43	1:58	2:14	2:39	3:12
1:58	2:13	2:29	2:54	3:27
2:13	2:28	2:44	3:09	3:42
2:28	2:43	2:59	3:24	3:57
2:43	2:58	3:14	3:39	4:12
2:58	3:13	3:29	3:54	4:27
3:13	3:28	3:44	4:09	4:42
3:28	3:43	3:59	4:24	4:57
3:43	3:58	4:14	4:39	5:12
3:58	4:13	4:29	4:54	5:27
4:13	4:28	4:42	5:07	5:40
4:28	4:43	4:57	5:22	5:55
4:43	4:58	5:12	5:37	6:10
4:58	5:13	5:27	5:52	6:25
5:14	5:28	5:42	6:06	6:39
5:29	5:43	5:57	6:21	6:54
5:44	5:58	6:12	6:34	7:05
5:49	6:03	6:17	6:39	7:10
6:14	6:28	6:42	7:04	7:35
6:29	6:43	6:55	7:17	7:48
6:44	6:57	7:09	7:31	8:02
6:59	7:12	7:24	7:44	8:15
7:29	7:42	7:54	8:14	8:45
7:59	8:12	8:24	8:42	9:10
8:29	8:42	8:54	9:12	9:40
8:59	9:12	9:24	9:42	10:10
10:00	10:13	10:25	10:43	

ROUTE 3/4: SATURDAY

3: COUNTERCLOCKWISE					4: CLOCKWISE				
A	B	C	D	A	A	D	C	B	A
San Bernardino Transit Center	Boulder & Baseline	Highland & Waterman	17th & Medical Center	San Bernardino Transit Center	San Bernardino Transit Center	17th & Medical Center	Highland & Waterman	Boulder & Baseline	San Bernardino Transit Center
	6:04	6:24	6:36	6:55				6:13	6:50
	7:04	7:24	7:36	7:55				6:53	7:30
	7:24	7:44	7:56	8:15				7:13	7:50
7:19	7:49	8:09	8:21	8:40	7:10	7:23	7:37	7:58	8:35
7:39	8:09	8:29	8:41	9:00	7:30	7:43	7:57	8:18	8:55
7:59	8:29	8:49	9:01	9:20	7:50	8:03	8:17	8:38	9:15
8:19	8:49	9:09	9:21	9:40	8:10	8:23	8:37	8:58	9:35
8:39	9:09	9:29	9:41	10:00	8:30	8:43	8:57	9:18	9:55
8:59	9:29	9:49	10:01	10:20	8:50	9:03	9:17	9:38	10:15
9:19	9:49	10:09	10:21	10:40	9:10	9:23	9:37	9:58	10:35
9:39	10:09	10:29	10:41	11:00	9:30	9:43	9:57	10:18	10:55
9:59	10:29	10:49	11:01	11:20	9:50	10:03	10:17	10:38	11:15
10:19	10:49	11:09	11:21	11:40	10:10	10:23	10:37	10:58	11:35
10:39	11:09	11:30	11:42	12:01	10:30	10:43	10:57	11:18	11:55
10:59	11:29	11:50	12:02	12:21	10:50	11:03	11:17	11:38	12:15
11:19	11:49	12:10	12:22	12:41	11:10	11:23	11:37	11:58	12:35
11:39	12:09	12:30	12:42	1:01	11:30	11:43	11:57	12:18	12:55
11:59	12:29	12:50	1:02	1:21	11:50	12:03	12:17	12:38	1:15
12:19	12:49	1:10	1:22	1:41	12:10	12:23	12:37	12:58	1:35
12:39	1:09	1:30	1:42	2:01	12:30	12:43	12:57	1:18	1:55
12:54	1:29	1:50	2:02	2:21	12:50	1:03	1:17	1:38	2:15
1:14	1:49	2:10	2:22	2:41	1:10	1:23	1:37	1:58	2:35
1:34	2:09	2:30	2:42	3:01	1:30	1:43	1:57	2:18	2:55
1:54	2:29	2:50	3:02	3:21	1:50	2:03	2:17	2:38	3:15
2:14	2:49	3:10	3:22	3:41	2:10	2:23	2:37	2:58	3:35
2:34	3:09	3:30	3:42	4:01	2:30	2:43	2:57	3:18	3:55
2:54	3:29	3:50	4:02	4:21	2:50	3:03	3:17	3:38	4:15
3:14	3:49	4:10	4:22	4:41	3:10	3:23	3:37	3:58	4:35
3:34	4:09	4:30	4:42	5:01	3:30	3:43	3:57	4:18	4:55
3:54	4:29	4:50	5:02	5:21	3:50	4:03	4:17	4:38	5:15
4:14	4:49	5:10	5:22	5:41	4:10	4:23	4:37	4:58	5:35
4:34	5:09	5:29	5:41	5:57	4:30	4:43	4:57	5:18	5:55
4:54	5:29	5:49	6:01	6:17	4:50	5:03	5:17	5:38	6:15
5:14	5:49	6:09	6:21	6:37	5:12	5:25	5:39	6:00	6:37
5:32	6:07	6:27	6:39	6:55	5:30	5:43	5:57	6:18	6:55
5:57	6:27	6:47	6:59	7:15	5:49	6:02	6:16	6:37	7:14
6:17	6:47	7:07	7:19	7:35	6:07	6:20	6:32	6:53	7:30
6:37	7:07	7:27	7:39	7:55	6:27	6:40	6:52	7:13	7:50
7:10	7:40				6:47	7:00	7:12	7:33	8:10
7:37	8:07	8:27	8:39	8:55	7:07	7:20	7:32	7:53	8:30
					7:27	7:40	7:52	8:13	
					7:47	8:00	8:12	8:33	
					8:07	8:20	8:32	8:53	

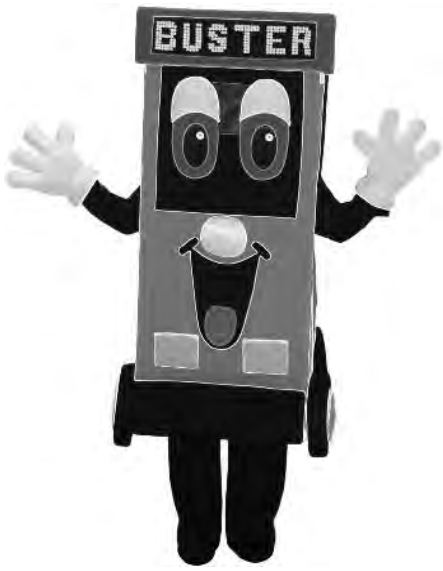
Transit Tip

Service animals are allowed to accompany persons with disabilities. That person is responsible for the actions of the animal while aboard the bus.

ROUTE 3/4: SUNDAY

3: COUNTERCLOCKWISE					4: CLOCKWISE				
A	B	C	D	A	A	D	C	B	A
San Bernardino Transit Center	Boulder & Baseline	Highland & Waterman	17th & Medical Center	San Bernardino Transit Center	San Bernardino Transit Center	17th & Medical Center	Highland & Waterman	Boulder & Baseline	San Bernardino Transit Center
	6:08	6:28	6:39	6:55				6:13	6:50
	7:08	7:28	7:39	7:55				6:43	7:20
	7:28	7:48	7:59	8:15				7:13	7:50
7:20	7:53	8:13	8:24	8:40				7:33	8:10
7:40	8:13	8:33	8:44	9:00	7:05	7:18	7:32	7:53	8:30
8:00	8:33	8:53	9:04	9:20				8:13	8:50
8:20	8:53	9:13	9:24	9:40	7:50	8:03	8:17	8:38	9:15
8:40	9:13	9:33	9:44	10:00	8:10	8:23	8:37	8:58	9:35
9:00	9:33	9:53	10:04	10:20	8:30	8:43	8:57	9:18	9:55
9:20	9:53	10:13	10:24	10:40	8:50	9:03	9:17	9:38	10:15
9:40	10:13	10:33	10:44	11:00	9:10	9:23	9:37	9:58	10:35
10:00	10:33	10:53	11:04	11:20	9:30	9:43	9:57	10:18	10:55
10:20	10:53	11:13	11:24	11:40	9:50	10:03	10:17	10:38	11:15
10:40	11:13	11:33	11:44	**12:00**	10:10	10:23	10:37	10:58	11:35
11:00	11:33	11:53	**12:04**	**12:20**	10:30	10:43	10:57	11:18	11:55
11:20	11:53	**12:13**	**12:24**	**12:40**	10:50	11:03	11:17	11:38	**12:15**
11:40	**12:13**	**12:33**	**12:44**	**1:00**	11:10	11:23	11:37	11:58	**12:35**
11:58	**12:31**	**12:53**	**1:04**	**1:20**	11:30	11:43	11:57	**12:18**	**12:55**
12:18	**12:51**	**1:13**	**1:24**	**1:40**	11:50	**12:03**	**12:17**	**12:38**	**1:15**
12:38	**1:11**	**1:33**	**1:44**	**2:00**	**12:10**	**12:23**	**12:37**	**12:58**	**1:35**
12:58	**1:31**	**1:53**	**2:04**	**2:20**	**12:30**	**12:43**	**12:57**	**1:18**	**1:55**
1:18	**1:51**	**2:13**	**2:24**	**2:40**	**12:50**	**1:03**	**1:17**	**1:38**	**2:15**
1:38	**2:11**	**2:33**	**2:44**	**3:00**	**1:10**	**1:23**	**1:37**	**1:58**	**2:35**
1:58	**2:31**	**2:53**	**3:04**	**3:20**	**1:30**	**1:43**	**1:57**	**2:18**	**2:55**
2:18	**2:51**	**3:13**	**3:24**	**3:40**	**1:50**	**2:03**	**2:17**	**2:38**	**3:15**
2:38	**3:11**	**3:33**	**3:44**	**4:00**	**2:10**	**2:23**	**2:37**	**2:58**	**3:35**
2:58	**3:31**	**3:53**	**4:04**	**4:20**	**2:30**	**2:43**	**2:57**	**3:18**	**3:55**
3:18	**3:51**	**4:13**	**4:24**	**4:40**	**2:50**	**3:03**	**3:17**	**3:38**	**4:15**
3:38	**4:11**	**4:33**	**4:44**	**5:00**	**3:10**	**3:23**	**3:37**	**3:58**	**4:35**
3:58	**4:33**	**4:53**	**5:04**	**5:20**	**3:30**	**3:43**	**3:57**	**4:18**	**4:55**
4:18	**4:53**	**5:13**	**5:24**	**5:40**	**3:50**	**4:03**	**4:17**	**4:38**	**5:15**
4:38	**5:13**	**5:33**	**5:44**	**6:00**	**4:10**	**4:23**	**4:37**	**4:58**	**5:35**
5:00	**5:33**	**5:53**	**6:04**	**6:20**	**4:38**	**4:51**	**5:05**	**5:26**	**5:50**
5:20	**5:53**	**6:13**	**6:24**	**6:40**	**4:58**	**5:11**	**5:25**	**5:46**	**6:10**
5:35	**6:08**				**5:15**	**5:28**	**5:42**	**6:03**	**6:27**
5:56	**6:29**	**6:49**	**7:00**	**7:16**	**5:35**	**5:48**	**6:02**	**6:23**	
6:19	**6:52**				**5:55**	**6:08**	**6:22**	**6:43**	**7:07**
6:39	**7:12**				**6:35**	**6:48**	**7:02**	**7:23**	

It takes a lot of concentration to drive a bus. Please keep your voices down, and your music low. It's for everyone's safety!



APPENDIX C

EXISTING TRAFFIC COUNTS

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

DATE:				
Thu, Oct 16, 14	LOCATION:	Highland	PROJECT #:	SC0455
	NORTH & SOUTH:	Church	LOCATION #:	2
	EAST & WEST:	Base Line	CONTROL:	SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

N
W
E
S

		NORTHBOUND Church			SOUTHBOUND Church			EASTBOUND Base Line			WESTBOUND Base Line				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	1	2	0	1	2	0	1	2	0	1	2	1		X	X	X	X	
AM	7:00 AM	3	7	29	25	3	2	0	143	4	10	112	13	350	0	0	1	0	1
	7:15 AM	1	8	20	29	5	2	1	94	6	18	135	11	329	0	0	2	1	3
	7:30 AM	7	1	31	31	11	2	4	127	4	17	178	29	440	0	0	0	2	2
	7:45 AM	8	5	35	19	5	3	5	131	10	28	179	17	444	5	0	2	1	8
	8:00 AM	5	5	18	12	4	3	3	133	4	18	125	18	348	0	0	6	1	7
	8:15 AM	7	4	40	19	9	1	1	110	9	26	132	14	372	0	0	0	0	0
	8:30 AM	33	14	60	20	20	2	1	142	19	57	117	18	502	0	0	0	0	0
	8:45 AM	23	13	60	14	3	0	2	142	9	31	91	14	402	0	0	1	0	1
	VOLUMES	87	57	293	169	60	15	17	1,022	65	205	1,069	134	3,209	5	0	12	5	22
	APPROACH %	20%	13%	67%	69%	25%	6%	2%	93%	6%	14%	76%	10%						
	APP/DEPART	442	/	208	244	/	329	1,116	/	1,489	1,407	/	1,183	0					
	BEGIN PEAK HR		7:45 AM																
	VOLUMES	53	28	153	70	38	9	10	516	42	129	553	67	1,666					
	APPROACH %	23%	12%	65%	60%	32%	8%	2%	91%	7%	17%	74%	9%						
	PEAK HR FACTOR		0.547			0.696			0.877			0.837		0.830					
	APP/DEPART	234	/	105	117	/	207	568	/	739	747	/	615	0					
PM	4:00 PM	2	3	19	29	5	4	2	187	5	15	149	25	445	0	0	1	1	2
	4:15 PM	5	7	13	17	4	0	0	152	8	19	141	17	383	0	0	2	2	4
	4:30 PM	6	8	36	39	6	0	3	159	5	20	142	20	444	0	0	0	3	3
	4:45 PM	8	5	25	22	4	4	2	161	7	17	133	20	408	0	0	0	0	0
	5:00 PM	6	6	16	15	7	0	1	180	7	14	109	18	379	0	0	0	0	0
	5:15 PM	3	2	20	21	10	1	0	191	9	17	151	26	451	0	0	0	1	1
	5:30 PM	10	6	23	24	6	2	2	188	8	22	138	23	452	0	0	0	1	1
	5:45 PM	4	5	28	24	7	0	0	157	12	25	165	28	455	0	0	0	2	2
	VOLUMES	44	42	180	191	49	11	10	1,375	61	149	1,128	177	3,430	0	0	3	10	13
	APPROACH %	17%	16%	68%	76%	20%	4%	1%	95%	4%	10%	78%	12%						
	APP/DEPART	266	/	229	251	/	259	1,449	/	1,756	1,464	/	1,186	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	23	19	87	84	30	3	3	716	36	78	563	95	1,737					
	APPROACH %	18%	15%	67%	72%	26%	3%	0%	95%	5%	11%	76%	13%						
	PEAK HR FACTOR		0.827			0.914			0.944			0.844		0.954					
	APP/DEPART	129	/	117	117	/	144	755	/	887	736	/	589	0					

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 951 249 3226 pacific@aimtd.com

DATE:				
Thu, Oct 16, 14	LOCATION:	Highland	PROJECT #:	SC0455
	NORTH & SOUTH:	Buckeye	LOCATION #:	3
	EAST & WEST:	Base Line	CONTROL:	Stop S way

NOTES:

AM
PM
MD
OTHER
OTHER

N ▲
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E ►
S ▼

		NORTHBOUND Buckeye			SOUTHBOUND Buckeye			EASTBOUND Base Line			WESTBOUND Base Line				U-TURNS				
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL
	LANES:	X	X	X	0	X	0	1	2	X	X	2	0		X	X	X	X	
AM	7:00 AM	0	0	0	0	0	2	1	208	0	0	141	5	357	0	0	0	0	0
	7:15 AM	0	0	0	0	0	4	1	152	0	0	167	0	324	0	0	0	0	0
	7:30 AM	0	0	0	0	0	4	1	198	0	0	231	1	435	0	0	0	0	0
	7:45 AM	0	0	0	0	0	4	0	188	0	0	225	4	421	0	0	0	0	0
	8:00 AM	0	0	0	0	0	2	1	164	0	0	163	3	333	0	0	0	0	0
	8:15 AM	0	0	0	0	0	1	1	174	0	0	176	2	354	0	0	0	0	0
	8:30 AM	0	0	0	0	0	3	1	221	0	0	196	4	425	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	1	220	0	0	143	3	367	0	0	1	0	1
	VOLUMES	0	0	0	0	0	20	7	1,525	0	0	1,442	22	3,017	0	0	1	0	1
	APPROACH %	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%	98%	2%						
	APP/DEPART	0	/	29	20	/	0	1,533	/	1,531	1,464	/	1,457	0					
	BEGIN PEAK HR		7:30 AM																
	VOLUMES	0	0	0	0	0	11	3	724	0	0	795	10	1,543					
	APPROACH %	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%	99%	1%						
	PEAK HR FACTOR		0.000			0.688			0.913			0.867		0.887					
	APP/DEPART	0	/	13	11	/	0	727	/	727	805	/	803	0					
PM	4:00 PM	0	0	0	0	0	5	1	243	0	0	191	7	447	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	1	190	0	0	188	3	382	0	0	0	0	0
	4:30 PM	0	0	0	0	0	4	0	242	0	0	190	10	446	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	1	212	0	0	173	4	390	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	2	217	0	0	147	8	374	0	0	0	0	0
	5:15 PM	0	0	0	0	0	2	1	239	0	0	199	5	446	0	0	0	0	0
	5:30 PM	0	0	0	0	0	1	2	241	0	0	188	4	436	0	0	0	0	0
	5:45 PM	0	0	0	0	0	3	1	216	0	0	225	6	451	0	0	0	0	0
	VOLUMES	0	0	0	0	0	15	9	1,800	0	0	1,501	47	3,372	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%	97%	3%						
	APP/DEPART	0	/	56	15	/	0	1,809	/	1,801	1,548	/	1,515	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	0	0	0	0	0	6	6	913	0	0	759	23	1,707					
	APPROACH %	0%	0%	0%	0%	0%	100%	1%	99%	0%	0%	97%	3%						
	PEAK HR FACTOR		0.000			0.500			0.945			0.846		0.946					
	APP/DEPART	0	/	29	6	/	0	919	/	913	782	/	765	0					

APPENDIX D

HCM ANALYSIS WORKSHEETS

EXISTING CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	526	43	132	564	68	54	29	156	71	39	9
Future Volume (veh/h)	10	526	43	132	564	68	54	29	156	71	39	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1667	1765	1800	1667	1765	1800	1667	1765	1800	1667	1765	1800
Adj Flow Rate, veh/h	11	598	49	157	671	81	98	53	284	101	56	13
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.55	0.55	0.55	0.70	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	113	708	58	185	816	98	733	134	717	483	767	178
Arrive On Green	0.07	0.23	0.23	0.08	0.18	0.18	0.55	0.55	0.55	0.55	0.55	0.55
Sat Flow, veh/h	1587	3139	257	1587	3014	363	1253	242	1295	981	1386	322
Grp Volume(v), veh/h	11	319	328	157	373	379	98	0	337	101	0	69
Grp Sat Flow(s),veh/h/ln	1587	1676	1719	1587	1676	1701	1253	0	1536	981	0	1708
Q Serve(g_s), s	0.7	20.9	21.0	11.2	24.6	24.7	4.5	0.0	14.4	7.5	0.0	2.2
Cycle Q Clear(g_c), s	0.7	20.9	21.0	11.2	24.6	24.7	6.7	0.0	14.4	22.0	0.0	2.2
Prop In Lane	1.00		0.15	1.00		0.21	1.00		0.84	1.00		0.19
Lane Grp Cap(c), veh/h	113	378	388	185	454	461	733	0	850	483	0	945
V/C Ratio(X)	0.10	0.84	0.85	0.85	0.82	0.82	0.13	0.00	0.40	0.21	0.00	0.07
Avail Cap(c_a), veh/h	113	525	538	331	787	799	733	0	850	483	0	945
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.68	0.68	0.68	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.0	42.6	42.6	52.0	44.4	44.4	13.5	0.0	14.7	21.0	0.0	11.9
Incr Delay (d2), s/veh	0.3	6.2	6.2	10.2	3.8	3.7	0.4	0.0	1.4	1.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	10.3	10.6	5.5	11.9	12.1	1.6	0.0	6.4	2.2	0.0	1.1
LnGrp Delay(d),s/veh	50.2	48.8	48.8	62.2	48.1	48.1	13.9	0.0	16.1	21.9	0.0	12.1
LnGrp LOS	D	D	D	E	D	D	B		B	C		B
Approach Vol, veh/h		658			909			435			170	
Approach Delay, s/veh		48.8			50.6			15.6			17.9	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		67.7	17.4	29.9		67.7	12.2	35.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		43.0	24.0	36.0		43.0	6.0	54.0
Max Q Clear Time (g_c+I1), s		16.4	13.2	23.0		24.0	2.7	26.7
Green Ext Time (p_c), s		3.9	0.3	2.9		3.5	1.1	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	40.5
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	739	811	10	0	11
Future Vol, veh/h	3	739	811	10	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	87	87	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	812	932	11	0	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	944	0	-	0	-	472
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	722	-	-	-	0	538
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	722	-	-	-	-	538
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	722	-	-	-	538
HCM Lane V/C Ratio	0.005	-	-	-	0.03
HCM Control Delay (s)	10	-	-	-	11.9
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	730	37	80	574	97	23	19	89	86	31	3
Future Volume (veh/h)	3	730	37	80	574	97	23	19	89	86	31	3
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1667	1765	1800	1667	1765	1800	1667	1765	1800	1667	1765	1800
Adj Flow Rate, veh/h	3	777	39	95	683	115	28	23	107	95	34	3
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.84	0.84	0.84	0.83	0.83	0.83	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	922	46	119	861	145	721	139	644	629	812	72
Arrive On Green	0.06	0.28	0.28	0.02	0.10	0.10	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1587	3249	163	1587	2873	483	1289	273	1268	1185	1599	141
Grp Volume(v), veh/h	3	401	415	95	398	400	28	0	130	95	0	37
Grp Sat Flow(s),veh/h/ln	1587	1676	1736	1587	1676	1679	1289	0	1541	1185	0	1740
Q Serve(g_s), s	0.2	20.3	20.3	5.4	20.9	20.9	1.0	0.0	4.1	4.2	0.0	1.0
Cycle Q Clear(g_c), s	0.2	20.3	20.3	5.4	20.9	20.9	2.0	0.0	4.1	8.3	0.0	1.0
Prop In Lane	1.00		0.09	1.00		0.29	1.00		0.82	1.00		0.08
Lane Grp Cap(c), veh/h	93	476	492	119	502	503	721	0	783	629	0	884
V/C Ratio(X)	0.03	0.84	0.84	0.80	0.79	0.79	0.04	0.00	0.17	0.15	0.00	0.04
Avail Cap(c_a), veh/h	106	596	617	212	708	709	721	0	783	629	0	884
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.60	0.60	0.60	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.9	30.3	30.4	43.2	37.8	37.8	11.6	0.0	11.9	14.1	0.0	11.1
Incr Delay (d2), s/veh	0.1	5.5	5.3	11.6	4.1	4.2	0.1	0.0	0.5	0.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	10.1	10.4	2.7	10.3	10.3	0.4	0.0	1.8	1.5	0.0	0.5
LnGrp Delay(d),s/veh	40.0	35.8	35.7	54.8	41.9	42.0	11.7	0.0	12.3	14.6	0.0	11.2
LnGrp LOS	D	D	D	D	D	D	B		B	B		B
Approach Vol, veh/h		819			893			158			132	
Approach Delay, s/veh		35.8			43.3			12.2			13.7	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		49.7	10.7	29.5		49.7	9.3	31.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		34.0	12.0	32.0		34.0	6.0	38.0
Max Q Clear Time (g_c+I1), s		6.1	7.4	22.3		10.3	2.2	22.9
Green Ext Time (p_c), s		1.5	0.1	3.3		1.5	1.7	4.0

Intersection Summary	
HCM 2010 Ctrl Delay	35.8
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	931	774	23	0	6
Future Vol, veh/h	6	931	774	23	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	85	85	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	990	911	27	0	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	938	0	-	0	-	469
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	726	-	-	-	0	541
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	726	-	-	-	-	541
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	726	-	-	-	541
HCM Lane V/C Ratio	0.009	-	-	-	0.022
HCM Control Delay (s)	10	-	-	-	11.8
HCM Lane LOS	B	-	-	-	B

EXISTING PLUS PROJECT CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	533	43	132	568	74	54	35	156	85	43	21
Future Volume (veh/h)	29	533	43	132	568	74	54	35	156	85	43	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1667	1765	1800	1667	1765	1800	1667	1765	1800	1667	1765	1800
Adj Flow Rate, veh/h	33	606	49	157	676	88	98	64	284	121	61	30
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.55	0.55	0.55	0.70	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	104	716	58	186	834	108	707	156	693	470	615	303
Arrive On Green	0.07	0.23	0.23	0.04	0.09	0.09	0.55	0.55	0.55	0.55	0.55	0.55
Sat Flow, veh/h	1587	3143	254	1587	2985	388	1228	284	1259	971	1118	550
Grp Volume(v), veh/h	33	323	332	157	379	385	98	0	348	121	0	91
Grp Sat Flow(s),veh/h/ln	1587	1676	1720	1587	1676	1696	1228	0	1543	971	0	1668
Q Serve(g_s), s	2.3	21.2	21.3	11.3	25.5	25.6	4.7	0.0	15.1	9.5	0.0	3.0
Cycle Q Clear(g_c), s	2.3	21.2	21.3	11.3	25.5	25.6	7.7	0.0	15.1	24.6	0.0	3.0
Prop In Lane	1.00		0.15	1.00		0.23	1.00		0.82	1.00		0.33
Lane Grp Cap(c), veh/h	104	382	392	186	469	474	707	0	849	470	0	918
V/C Ratio(X)	0.32	0.85	0.85	0.84	0.81	0.81	0.14	0.00	0.41	0.26	0.00	0.10
Avail Cap(c_a), veh/h	104	525	538	331	787	796	707	0	849	470	0	918
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.67	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.3	42.5	42.5	54.2	49.2	49.2	14.1	0.0	15.0	22.1	0.0	12.3
Incr Delay (d2), s/veh	1.2	6.3	6.2	9.9	3.4	3.4	0.4	0.0	1.5	1.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	10.4	10.7	5.5	12.3	12.5	1.7	0.0	6.7	2.7	0.0	1.4
LnGrp Delay(d),s/veh	52.4	48.7	48.7	64.1	52.6	52.6	14.5	0.0	16.5	23.4	0.0	12.5
LnGrp LOS	D	D	D	E	D	D	B		B	C		B
Approach Vol, veh/h		688			921			446			212	
Approach Delay, s/veh		48.9			54.6			16.0			18.7	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		67.3	17.5	30.2		67.3	11.5	36.1
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		43.0	24.0	36.0		43.0	6.0	54.0
Max Q Clear Time (g_c+I1), s		17.1	13.3	23.3		26.6	4.3	27.6
Green Ext Time (p_c), s		4.3	0.3	3.0		3.7	0.7	4.6

Intersection Summary	
HCM 2010 Ctrl Delay	41.9
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	753	817	27	0	15
Future Vol, veh/h	10	753	817	27	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	87	87	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	827	939	31	0	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	970	0	-	0	-	485
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	706	-	-	-	0	528
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	706	-	-	-	-	528
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	706	-	-	-	528
HCM Lane V/C Ratio	0.016	-	-	-	0.041
HCM Control Delay (s)	10.2	-	-	-	12.1
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	2	107	31	3	119
Future Vol, veh/h	30	2	107	31	3	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	2	116	34	3	129

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	269	133	0	0	150	0
Stage 1	133	-	-	-	-	-
Stage 2	136	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	720	916	-	-	1431	-
Stage 1	893	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	719	916	-	-	1431	-
Mov Cap-2 Maneuver	719	-	-	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	888	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	729	1431	-
HCM Lane V/C Ratio	-	-	0.048	0.002	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	24	13	11	0
Future Vol, veh/h	0	4	24	13	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	26	14	12	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	78	12	12	0	-	0
Stage 1	12	-	-	-	-	-
Stage 2	66	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	925	1069	1607	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	957	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	910	1069	1607	-	-	-
Mov Cap-2 Maneuver	910	-	-	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	942	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	4.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1607	-	1069	-	-
HCM Lane V/C Ratio	0.016	-	0.004	-	-
HCM Control Delay (s)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	732	37	80	569	107	23	29	89	132	41	51
Future Volume (veh/h)	46	732	37	80	569	107	23	29	89	132	41	51
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1667	1765	1800	1667	1765	1800	1667	1765	1800	1667	1765	1800
Adj Flow Rate, veh/h	52	832	42	95	677	127	42	53	162	189	59	73
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.55	0.55	0.55	0.70	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	116	970	49	119	846	159	610	189	579	532	354	439
Arrive On Green	0.07	0.30	0.30	0.02	0.10	0.10	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1587	3248	164	1587	2820	528	1183	384	1174	1097	719	889
Grp Volume(v), veh/h	52	429	445	95	402	402	42	0	215	189	0	132
Grp Sat Flow(s),veh/h/ln	1587	1676	1736	1587	1676	1671	1183	0	1558	1097	0	1608
Q Serve(g_s), s	2.8	21.7	21.7	5.4	21.1	21.2	1.8	0.0	7.3	11.0	0.0	4.1
Cycle Q Clear(g_c), s	2.8	21.7	21.7	5.4	21.1	21.2	5.9	0.0	7.3	18.3	0.0	4.1
Prop In Lane	1.00		0.09	1.00		0.32	1.00		0.75	1.00		0.55
Lane Grp Cap(c), veh/h	116	501	518	119	503	502	610	0	768	532	0	793
V/C Ratio(X)	0.45	0.86	0.86	0.80	0.80	0.80	0.07	0.00	0.28	0.36	0.00	0.17
Avail Cap(c_a), veh/h	116	587	608	205	680	678	610	0	768	532	0	793
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.57	0.57	0.57	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.0	29.8	29.8	43.2	37.9	37.9	14.2	0.0	13.4	18.8	0.0	12.6
Incr Delay (d2), s/veh	1.5	6.5	6.3	11.6	4.9	4.9	0.2	0.0	0.9	1.9	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	10.9	11.3	2.7	10.5	10.5	0.6	0.0	3.3	3.6	0.0	1.9
LnGrp Delay(d),s/veh	41.5	36.3	36.1	54.8	42.8	42.8	14.4	0.0	14.3	20.6	0.0	13.0
LnGrp LOS	D	D	D	D	D	D	B		B	C		B
Approach Vol, veh/h		926			899			257			321	
Approach Delay, s/veh		36.5			44.1			14.3			17.5	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		48.4	10.7	30.9		48.4	10.6	31.0
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		34.9	11.6	31.5		34.9	6.6	36.5
Max Q Clear Time (g_c+I1), s		9.3	7.4	23.7		20.3	4.8	23.2
Green Ext Time (p_c), s		3.4	0.1	3.1		2.9	0.9	3.9

Intersection Summary	
HCM 2010 Ctrl Delay	34.4
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	969	760	77	0	25
Future Vol, veh/h	17	969	760	77	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	87	87	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	1065	874	89	0	36

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	962	0	-	0	-	481
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	711	-	-	-	0	531
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	711	-	-	-	-	531
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	711	-	-	-	531
HCM Lane V/C Ratio	0.026	-	-	-	0.068
HCM Control Delay (s)	10.2	-	-	-	12.3
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	104	5	119	63	5	120
Future Vol, veh/h	104	5	119	63	5	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	113	5	129	68	5	130

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	305	164	0	0	198	0
Stage 1	164	-	-	-	-	-
Stage 2	141	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	687	881	-	-	1375	-
Stage 1	865	-	-	-	-	-
Stage 2	886	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	684	881	-	-	1375	-
Mov Cap-2 Maneuver	684	-	-	-	-	-
Stage 1	865	-	-	-	-	-
Stage 2	882	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	691	1375	-
HCM Lane V/C Ratio	-	-	0.171	0.004	-
HCM Control Delay (s)	-	-	11.3	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	19	65	29	6	0
Future Vol, veh/h	0	19	65	29	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	21	71	32	7	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	180	7	7	0	-	0
Stage 1	7	-	-	-	-	-
Stage 2	173	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	810	1075	1614	-	-	-
Stage 1	1016	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	774	1075	1614	-	-	-
Mov Cap-2 Maneuver	774	-	-	-	-	-
Stage 1	1016	-	-	-	-	-
Stage 2	818	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.4	5.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1614	-	1075	-	-
HCM Lane V/C Ratio	0.044	-	0.019	-	-
HCM Control Delay (s)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

PROJECT OPENING YEAR WITHOUT PROJECT CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	608	45	165	654	88	56	29	162	89	40	9
Future Volume (veh/h)	10	608	45	165	654	88	56	29	162	89	40	9
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1863	1900	1765	1863	1900	1765	1863	1900	1765	1863	1900
Adj Flow Rate, veh/h	11	691	51	196	779	105	102	53	295	127	57	13
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.55	0.55	0.55	0.70	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	138	814	60	224	925	125	731	130	724	467	774	177
Arrive On Green	0.08	0.24	0.24	0.13	0.30	0.30	0.53	0.53	0.53	0.53	0.53	0.53
Sat Flow, veh/h	1681	3342	247	1681	3135	423	1325	247	1374	1029	1469	335
Grp Volume(v), veh/h	11	366	376	196	440	444	102	0	348	127	0	70
Grp Sat Flow(s),veh/h/ln	1681	1770	1819	1681	1770	1788	1325	0	1620	1029	0	1804
Q Serve(g_s), s	0.8	24.6	24.7	14.3	29.1	29.1	5.1	0.0	16.2	10.6	0.0	2.4
Cycle Q Clear(g_c), s	0.8	24.6	24.7	14.3	29.1	29.1	7.5	0.0	16.2	26.8	0.0	2.4
Prop In Lane	1.00		0.14	1.00		0.24	1.00		0.85	1.00		0.19
Lane Grp Cap(c), veh/h	138	431	443	224	522	528	731	0	854	467	0	951
V/C Ratio(X)	0.08	0.85	0.85	0.87	0.84	0.84	0.14	0.00	0.41	0.27	0.00	0.07
Avail Cap(c_a), veh/h	138	609	626	390	920	930	731	0	854	467	0	951
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.64	0.64	0.64	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.0	45.1	45.1	53.1	41.3	41.3	16.4	0.0	17.8	25.9	0.0	14.5
Incr Delay (d2), s/veh	0.2	5.2	5.2	10.4	3.8	3.7	0.4	0.0	1.4	1.4	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	12.6	13.1	7.3	14.8	15.0	2.0	0.0	7.6	3.2	0.0	1.2
LnGrp Delay(d),s/veh	53.2	50.3	50.3	63.5	45.1	45.1	16.8	0.0	19.2	27.3	0.0	14.7
LnGrp LOS	D	D	D	E	D	D	B		B	C		B
Approach Vol, veh/h		753			1080			450			197	
Approach Delay, s/veh		50.3			48.4			18.7			22.8	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		69.9	20.7	34.4		69.9	14.2	40.9
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		41.0	29.0	43.0		41.0	7.0	65.0
Max Q Clear Time (g_c+I1), s		18.2	16.3	26.7		28.8	2.8	31.1
Green Ext Time (p_c), s		3.9	0.4	3.8		3.1	1.7	5.7

Intersection Summary	
HCM 2010 Ctrl Delay	41.6
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	855	916	10	0	47
Future Vol, veh/h	15	855	916	10	0	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	87	87	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	940	1053	11	0	68

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1064	0	-	0	-	532
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	651	-	-	-	0	492
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	651	-	-	-	-	492
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	651	-	-	-	492
HCM Lane V/C Ratio	0.025	-	-	-	0.138
HCM Control Delay (s)	10.7	-	-	-	13.5
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	844	39	120	679	118	26	20	98	109	31	3
Future Volume (veh/h)	3	844	39	120	679	118	26	20	98	109	31	3
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1863	1900	1765	1863	1900	1765	1863	1900	1765	1863	1900
Adj Flow Rate, veh/h	3	898	41	143	808	140	31	24	118	120	34	3
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.84	0.84	0.84	0.83	0.83	0.83	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	176	1050	48	167	903	156	727	137	675	619	844	74
Arrive On Green	0.10	0.30	0.30	0.20	0.60	0.60	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	1681	3447	157	1681	3017	523	1365	275	1350	1241	1688	149
Grp Volume(v), veh/h	3	461	478	143	474	474	31	0	142	120	0	37
Grp Sat Flow(s),veh/h/ln	1681	1770	1835	1681	1770	1770	1365	0	1625	1241	0	1836
Q Serve(g_s), s	0.2	30.6	30.6	10.3	28.9	28.9	1.5	0.0	6.0	7.3	0.0	1.3
Cycle Q Clear(g_c), s	0.2	30.6	30.6	10.3	28.9	28.9	2.8	0.0	6.0	13.3	0.0	1.3
Prop In Lane	1.00		0.09	1.00		0.30	1.00		0.83	1.00		0.08
Lane Grp Cap(c), veh/h	176	539	559	167	529	530	727	0	813	619	0	919
V/C Ratio(X)	0.02	0.86	0.86	0.86	0.90	0.90	0.04	0.00	0.17	0.19	0.00	0.04
Avail Cap(c_a), veh/h	176	750	778	296	977	977	727	0	813	619	0	919
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.58	0.58	0.58	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.2	40.9	40.9	49.2	23.4	23.4	16.6	0.0	17.1	20.8	0.0	15.9
Incr Delay (d2), s/veh	0.0	4.2	4.1	11.8	5.6	5.6	0.1	0.0	0.5	0.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	15.6	16.2	5.3	14.6	14.6	0.6	0.0	2.8	2.6	0.0	0.7
LnGrp Delay(d),s/veh	50.2	45.1	45.0	61.0	29.0	29.0	16.7	0.0	17.6	21.4	0.0	16.0
LnGrp LOS	D	D	D	E	C	C	B		B	C		B
Approach Vol, veh/h		942			1091			173			157	
Approach Delay, s/veh		45.1			33.2			17.4			20.2	
Approach LOS		D			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		66.5	16.4	42.1		66.5	17.1	41.4
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		38.0	22.0	53.0		38.0	6.0	69.0
Max Q Clear Time (g_c+I1), s		8.0	12.3	32.6		15.3	2.2	30.9
Green Ext Time (p_c), s		1.7	0.2	5.4		1.6	1.9	6.5

Intersection Summary	
HCM 2010 Ctrl Delay	35.9
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	24	1094	873	24	0	64
Future Vol, veh/h	24	1094	873	24	0	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	85	85	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	1152	1027	28	0	128

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1055	0	-	0	-	528
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	656	-	-	-	0	495
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	656	-	-	-	-	495
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	656	-	-	-	495
HCM Lane V/C Ratio	0.039	-	-	-	0.259
HCM Control Delay (s)	10.7	-	-	-	14.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1

PROJECT OPENING YEAR WITH PROJECT CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	615	45	165	658	94	56	35	162	103	44	21
Future Volume (veh/h)	29	615	45	165	658	94	56	35	162	103	44	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1863	1900	1765	1863	1900	1765	1863	1900	1765	1863	1900
Adj Flow Rate, veh/h	33	699	51	196	783	112	102	64	295	147	63	30
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.55	0.55	0.55	0.70	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	121	823	60	227	961	137	702	152	699	453	625	297
Arrive On Green	0.07	0.25	0.25	0.04	0.10	0.10	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1681	3345	244	1681	3109	445	1298	290	1337	1018	1194	569
Grp Volume(v), veh/h	33	370	380	196	446	449	102	0	359	147	0	93
Grp Sat Flow(s),veh/h/ln	1681	1770	1820	1681	1770	1784	1298	0	1627	1018	0	1762
Q Serve(g_s), s	2.3	24.9	24.9	14.5	30.8	30.8	5.4	0.0	16.9	12.9	0.0	3.3
Cycle Q Clear(g_c), s	2.3	24.9	24.9	14.5	30.8	30.8	8.7	0.0	16.9	29.8	0.0	3.3
Prop In Lane	1.00		0.13	1.00		0.25	1.00		0.82	1.00		0.32
Lane Grp Cap(c), veh/h	121	435	447	227	547	552	702	0	851	453	0	922
V/C Ratio(X)	0.27	0.85	0.85	0.86	0.81	0.81	0.15	0.00	0.42	0.32	0.00	0.10
Avail Cap(c_a), veh/h	121	609	626	390	920	928	702	0	851	453	0	922
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.64	0.64	0.64	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.9	44.9	44.9	58.6	52.6	52.6	17.2	0.0	18.2	27.3	0.0	15.0
Incr Delay (d2), s/veh	0.8	5.3	5.2	9.6	3.0	3.0	0.4	0.0	1.5	1.9	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	12.8	13.1	7.4	15.6	15.7	2.0	0.0	7.9	3.9	0.0	1.7
LnGrp Delay(d),s/veh	55.7	50.2	50.1	68.2	55.6	55.6	17.6	0.0	19.8	29.2	0.0	15.2
LnGrp LOS	E	D	D	E	E	E	B		B	C		B
Approach Vol, veh/h		783			1091			461			240	
Approach Delay, s/veh		50.4			57.9			19.3			23.8	
Approach LOS		D			E			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		69.4	20.9	34.7		69.4	13.0	42.6
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		41.0	29.0	43.0		41.0	7.0	65.0
Max Q Clear Time (g_c+I1), s		18.9	16.5	26.9		31.8	4.3	32.8
Green Ext Time (p_c), s		4.3	0.4	3.8		2.9	1.2	5.8

Intersection Summary	
HCM 2010 Ctrl Delay	45.5
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	869	922	27	0	51
Future Vol, veh/h	22	869	922	27	0	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	87	87	69	69
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	955	1060	31	0	74

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1091	0	-	0	-	545
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	635	-	-	-	0	482
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	635	-	-	-	-	482
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	635	-	-	-	482
HCM Lane V/C Ratio	0.038	-	-	-	0.153
HCM Control Delay (s)	10.9	-	-	-	13.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	2	127	31	3	138
Future Vol, veh/h	30	2	127	31	3	138
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	2	134	33	3	145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	302	150	0	0	166	0
Stage 1	150	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	690	896	-	-	1412	-
Stage 1	878	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	689	896	-	-	1412	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	878	-	-	-	-	-
Stage 2	874	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	699	1412	-
HCM Lane V/C Ratio	-	-	0.048	0.002	-
HCM Control Delay (s)	-	-	10.4	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	4	36	0	1	24	13	12	1	11	0
Future Vol, veh/h	0	0	4	36	0	1	24	13	12	1	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	4	38	0	1	25	14	13	1	12	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	85	91	12	87	85	20	12	0	0	26	0	0
Stage 1	14	14	-	71	71	-	-	-	-	-	-	-
Stage 2	71	77	-	16	14	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	901	799	1069	899	805	1058	1607	-	-	1588	-	-
Stage 1	1006	884	-	939	836	-	-	-	-	-	-	-
Stage 2	939	831	-	1004	884	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	888	785	1069	884	791	1058	1607	-	-	1588	-	-
Mov Cap-2 Maneuver	888	785	-	884	791	-	-	-	-	-	-	-
Stage 1	990	883	-	924	823	-	-	-	-	-	-	-
Stage 2	923	818	-	999	883	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.4	9.2	3.6	0.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1607	-	-	1069	888	1588	-	-
HCM Lane V/C Ratio	0.016	-	-	0.004	0.044	0.001	-	-
HCM Control Delay (s)	7.3	0	-	8.4	9.2	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	846	39	120	674	128	26	30	98	155	41	51
Future Volume (veh/h)	46	846	39	120	674	128	26	30	98	155	41	51
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1863	1900	1765	1863	1900	1765	1863	1900	1765	1863	1900
Adj Flow Rate, veh/h	49	900	41	143	802	152	31	36	118	170	45	56
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.84	0.84	0.84	0.83	0.83	0.83	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	153	1050	48	168	931	176	660	192	628	607	377	470
Arrive On Green	0.09	0.30	0.30	0.13	0.42	0.42	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	1681	3448	157	1681	2970	563	1288	384	1257	1228	756	941
Grp Volume(v), veh/h	49	462	479	143	478	476	31	0	154	170	0	101
Grp Sat Flow(s),veh/h/ln	1681	1770	1835	1681	1770	1763	1288	0	1641	1228	0	1697
Q Serve(g_s), s	3.4	30.7	30.7	10.4	30.7	30.7	1.6	0.0	6.5	11.1	0.0	4.0
Cycle Q Clear(g_c), s	3.4	30.7	30.7	10.4	30.7	30.7	5.6	0.0	6.5	17.6	0.0	4.0
Prop In Lane	1.00		0.09	1.00		0.32	1.00		0.77	1.00		0.55
Lane Grp Cap(c), veh/h	153	539	559	168	555	553	660	0	819	607	0	847
V/C Ratio(X)	0.32	0.86	0.86	0.85	0.86	0.86	0.05	0.00	0.19	0.28	0.00	0.12
Avail Cap(c_a), veh/h	153	750	778	296	977	973	660	0	819	607	0	847
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.57	0.57	0.57	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	53.2	40.9	40.9	53.2	34.0	34.0	18.2	0.0	17.3	22.1	0.0	16.7
Incr Delay (d2), s/veh	0.7	4.2	4.1	11.1	4.1	4.1	0.1	0.0	0.5	1.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	15.6	16.2	5.3	15.6	15.6	0.6	0.0	3.0	4.0	0.0	1.9
LnGrp Delay(d),s/veh	53.8	45.2	45.0	64.4	38.0	38.1	18.3	0.0	17.8	23.3	0.0	16.9
LnGrp LOS	D	D	D	E	D	D	B		B	C		B
Approach Vol, veh/h		990			1097			185			271	
Approach Delay, s/veh		45.5			41.5			17.9			20.9	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		66.4	16.5	42.1		66.4	15.4	43.2
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		38.0	22.0	53.0		38.0	6.0	69.0
Max Q Clear Time (g_c+I1), s		8.5	12.4	32.7		19.6	5.4	32.7
Green Ext Time (p_c), s		2.5	0.2	5.3		2.2	0.3	6.5

Intersection Summary	
HCM 2010 Ctrl Delay	39.1
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	1132	859	78	0	83
Future Vol, veh/h	35	1132	859	78	0	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	85	85	50	50
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	1192	1011	92	0	166

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1102	0	-	0	-	551
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	3.32
Pot Cap-1 Maneuver	629	-	-	-	0	478
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	629	-	-	-	-	478
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	16.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	629	-	-	-	478
HCM Lane V/C Ratio	0.059	-	-	-	0.347
HCM Control Delay (s)	11.1	-	-	-	16.5
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.5

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	104	5	141	63	5	143
Future Vol, veh/h	104	5	141	63	5	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	5	148	66	5	151

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	343	182	0	0	215	0
Stage 1	182	-	-	-	-	-
Stage 2	161	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	653	861	-	-	1355	-
Stage 1	849	-	-	-	-	-
Stage 2	868	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	650	861	-	-	1355	-
Mov Cap-2 Maneuver	650	-	-	-	-	-
Stage 1	849	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	657	1355	-
HCM Lane V/C Ratio	-	-	0.175	0.004	-
HCM Control Delay (s)	-	-	11.6	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	19	58	0	1	65	30	18	1	6	0
Future Vol, veh/h	0	0	19	58	0	1	65	30	18	1	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	20	61	0	1	68	32	19	1	6	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	186	195	6	196	186	41	6	0	0	51	0	0
Stage 1	8	8	-	178	178	-	-	-	-	-	-	-
Stage 2	178	187	-	18	8	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	775	700	1077	763	708	1030	1615	-	-	1555	-	-
Stage 1	1013	889	-	824	752	-	-	-	-	-	-	-
Stage 2	824	745	-	1001	889	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	748	669	1077	724	677	1030	1615	-	-	1555	-	-
Mov Cap-2 Maneuver	748	669	-	724	677	-	-	-	-	-	-	-
Stage 1	969	888	-	789	720	-	-	-	-	-	-	-
Stage 2	788	713	-	981	888	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.4	10.4	4.2	1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1615	-	-	1077	728	1555	-	-
HCM Lane V/C Ratio	0.042	-	-	0.019	0.085	0.001	-	-
HCM Control Delay (s)	7.3	0	-	8.4	10.4	7.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.3	0	-	-

GENERAL PLAN BUILDOUT WITHOUT PROJECT CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	723	58	177	871	92	73	38	210	96	52	12
Future Volume (veh/h)	14	723	58	177	871	92	73	38	210	96	52	12
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1863	1900	1765	1863	1900	1765	1863	1900	1765	1863	1900
Adj Flow Rate, veh/h	15	761	61	186	917	97	77	40	221	101	55	13
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	1040	83	224	1323	139	741	128	710	553	754	178
Arrive On Green	0.07	0.22	0.22	0.04	0.09	0.09	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1681	4802	383	1681	4673	493	1328	248	1372	1114	1457	344
Grp Volume(v), veh/h	15	536	286	186	664	350	77	0	261	101	0	68
Grp Sat Flow(s),veh/h/ln	1681	1695	1795	1681	1695	1776	1328	0	1621	1114	0	1802
Q Serve(g_s), s	0.8	13.2	13.4	9.9	17.1	17.2	2.8	0.0	8.3	5.2	0.0	1.7
Cycle Q Clear(g_c), s	0.8	13.2	13.4	9.9	17.1	17.2	4.5	0.0	8.3	13.5	0.0	1.7
Prop In Lane	1.00		0.21	1.00		0.28	1.00		0.85	1.00		0.19
Lane Grp Cap(c), veh/h	112	734	389	224	960	503	741	0	838	553	0	932
V/C Ratio(X)	0.13	0.73	0.74	0.83	0.69	0.70	0.10	0.00	0.31	0.18	0.00	0.07
Avail Cap(c_a), veh/h	112	1092	578	317	1526	799	741	0	838	553	0	932
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.50	0.50	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.6	32.8	32.9	42.0	37.0	37.0	12.0	0.0	12.5	16.4	0.0	10.9
Incr Delay (d2), s/veh	0.3	0.7	1.4	12.0	0.9	1.7	0.3	0.0	1.0	0.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	6.3	6.7	5.4	8.2	8.7	1.1	0.0	3.9	1.7	0.0	0.9
LnGrp Delay(d),s/veh	39.8	33.5	34.2	54.1	37.9	38.8	12.3	0.0	13.5	17.1	0.0	11.1
LnGrp LOS	D	C	C	D	D	D	B		B	B		B
Approach Vol, veh/h		837			1200			338			169	
Approach Delay, s/veh		33.9			40.7			13.2			14.7	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		50.5	16.0	23.5		50.5	10.0	29.5
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		32.0	17.0	29.0		32.0	5.5	40.5
Max Q Clear Time (g_c+I1), s		10.3	11.9	15.4		15.5	2.8	19.2
Green Ext Time (p_c), s		2.9	0.2	4.1		2.6	1.3	6.3

Intersection Summary	
HCM 2010 Ctrl Delay	33.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	21	1008	1091	16	0	49
Future Vol, veh/h	21	1008	1091	16	0	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	1061	1148	17	0	52

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1165	0	-	0	-	583
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	-	-	3.92
Pot Cap-1 Maneuver	326	-	-	-	0	390
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	326	-	-	-	-	390
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	326	-	-	-	390
HCM Lane V/C Ratio	0.068	-	-	-	0.132
HCM Control Delay (s)	16.8	-	-	-	15.6
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	36	0	1	0	25	12	1	13	0
Future Vol, veh/h	0	0	0	36	0	1	0	25	12	1	13	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	38	0	1	0	26	13	1	14	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	49	55	14	49	49	33	14	0	0	39	0	0
Stage 1	16	16	-	33	33	-	-	-	-	-	-	-
Stage 2	33	39	-	16	16	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	951	836	1066	951	843	1041	1604	-	-	1571	-	-
Stage 1	1004	882	-	983	868	-	-	-	-	-	-	-
Stage 2	983	862	-	1004	882	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	949	835	1066	950	842	1041	1604	-	-	1571	-	-
Mov Cap-2 Maneuver	949	835	-	950	842	-	-	-	-	-	-	-
Stage 1	1004	881	-	983	868	-	-	-	-	-	-	-
Stage 2	982	862	-	1003	881	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.9	0	0.5
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1604	-	-	-	952	1571	-	-
HCM Lane V/C Ratio	-	-	-	-	0.041	0.001	-	-
HCM Control Delay (s)	0	-	-	0	8.9	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1047	49	107	873	130	32	29	119	115	41	4
Future Volume (veh/h)	4	1047	49	107	873	130	32	29	119	115	41	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1863	1900	1765	1863	1900	1765	1863	1900	1765	1863	1900
Adj Flow Rate, veh/h	4	1102	52	113	919	137	34	31	125	121	43	4
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	1412	67	189	1749	260	730	166	669	619	859	80
Arrive On Green	0.01	0.28	0.28	0.23	0.78	0.78	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1681	4977	235	1681	4472	664	1353	324	1308	1226	1679	156
Grp Volume(v), veh/h	4	750	404	113	696	360	34	0	156	121	0	47
Grp Sat Flow(s),veh/h/ln	1681	1695	1821	1681	1695	1746	1353	0	1632	1226	0	1835
Q Serve(g_s), s	0.3	26.5	26.5	7.8	9.9	9.9	1.7	0.0	6.7	7.7	0.0	1.7
Cycle Q Clear(g_c), s	0.3	26.5	26.5	7.8	9.9	9.9	3.3	0.0	6.7	14.4	0.0	1.7
Prop In Lane	1.00		0.13	1.00		0.38	1.00		0.80	1.00		0.09
Lane Grp Cap(c), veh/h	9	962	517	189	1326	683	730	0	835	619	0	939
V/C Ratio(X)	0.46	0.78	0.78	0.60	0.52	0.53	0.05	0.00	0.19	0.20	0.00	0.05
Avail Cap(c_a), veh/h	71	1617	869	271	2021	1041	730	0	835	619	0	939
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.42	0.42	0.42	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	64.5	42.8	42.8	47.7	9.7	9.7	16.8	0.0	17.2	21.0	0.0	15.9
Incr Delay (d2), s/veh	15.2	0.6	1.1	3.0	0.3	0.6	0.1	0.0	0.5	0.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	12.5	13.5	3.8	4.5	4.7	0.6	0.0	3.1	2.7	0.0	0.9
LnGrp Delay(d),s/veh	79.6	43.4	44.0	50.7	10.0	10.3	16.9	0.0	17.6	21.8	0.0	16.0
LnGrp LOS	E	D	D	D	B	B	B		B	C		B
Approach Vol, veh/h		1158			1169			190			168	
Approach Delay, s/veh		43.8			14.1			17.5			20.1	
Approach LOS		D			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		70.5	18.6	40.9		70.5	4.7	54.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		35.0	21.0	62.0		35.0	5.5	77.5
Max Q Clear Time (g_c+I1), s		8.7	9.8	28.5		16.4	2.3	11.9
Green Ext Time (p_c), s		1.9	5.1	8.4		1.7	0.0	8.5

Intersection Summary	
HCM 2010 Ctrl Delay	27.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	1253	1042	37	0	68
Future Vol, veh/h	28	1253	1042	37	0	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	1319	1097	39	0	72

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1136	0	-	0	-	568
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	-	-	3.92
Pot Cap-1 Maneuver	336	-	-	-	0	399
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	336	-	-	-	-	399
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	16
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	336	-	-	-	399
HCM Lane V/C Ratio	0.088	-	-	-	0.179
HCM Control Delay (s)	16.7	-	-	-	16
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	0.6

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	58	0	1	0	47	18	1	10	0
Future Vol, veh/h	0	0	0	58	0	1	0	47	18	1	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	61	0	1	0	49	19	1	11	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	72	81	11	72	72	59	11	0	0	68	0	0
Stage 1	13	13	-	59	59	-	-	-	-	-	-	-
Stage 2	59	68	-	13	13	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	919	809	1070	919	818	1007	1608	-	-	1533	-	-
Stage 1	1007	885	-	953	846	-	-	-	-	-	-	-
Stage 2	953	838	-	1007	885	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	917	808	1070	918	817	1007	1608	-	-	1533	-	-
Mov Cap-2 Maneuver	917	808	-	918	817	-	-	-	-	-	-	-
Stage 1	1007	884	-	953	846	-	-	-	-	-	-	-
Stage 2	952	838	-	1006	884	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	9.2	0	0.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1608	-	-	-	919	1533	-	-
HCM Lane V/C Ratio	-	-	-	-	0.068	0.001	-	-
HCM Control Delay (s)	0	-	-	0	9.2	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0	-	-

GENERAL PLAN BUILDOUT WITH PROJECT CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	730	58	177	875	98	73	44	210	110	56	24
Future Volume (veh/h)	33	730	58	177	875	98	73	44	210	110	56	24
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1863	1900	1765	1863	1900	1765	1863	1900	1765	1863	1900
Adj Flow Rate, veh/h	35	768	61	186	921	103	77	46	221	116	59	25
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	1049	83	224	1327	148	723	144	693	545	641	271
Arrive On Green	0.07	0.22	0.22	0.04	0.09	0.09	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1681	4806	380	1681	4644	518	1308	280	1345	1108	1243	527
Grp Volume(v), veh/h	35	541	288	186	672	352	77	0	267	116	0	84
Grp Sat Flow(s),veh/h/ln	1681	1695	1796	1681	1695	1771	1308	0	1625	1108	0	1770
Q Serve(g_s), s	1.8	13.3	13.5	9.9	17.3	17.4	2.9	0.0	8.6	6.1	0.0	2.2
Cycle Q Clear(g_c), s	1.8	13.3	13.5	9.9	17.3	17.4	5.0	0.0	8.6	14.7	0.0	2.2
Prop In Lane	1.00		0.21	1.00		0.29	1.00		0.83	1.00		0.30
Lane Grp Cap(c), veh/h	110	740	392	224	969	506	723	0	838	545	0	912
V/C Ratio(X)	0.32	0.73	0.74	0.83	0.69	0.70	0.11	0.00	0.32	0.21	0.00	0.09
Avail Cap(c_a), veh/h	110	1092	579	317	1526	797	723	0	838	545	0	912
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	0.48	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.1	32.7	32.8	42.0	36.9	37.0	12.4	0.0	12.6	16.9	0.0	11.1
Incr Delay (d2), s/veh	0.8	0.7	1.3	12.0	0.9	1.7	0.3	0.0	1.0	0.9	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	6.3	6.8	5.4	8.2	8.8	1.1	0.0	4.1	2.0	0.0	1.1
LnGrp Delay(d),s/veh	40.9	33.4	34.1	54.1	37.8	38.7	12.7	0.0	13.7	17.8	0.0	11.3
LnGrp LOS	D	C	C	D	D	D	B		B	B		B
Approach Vol, veh/h		864			1210			344			200	
Approach Delay, s/veh		33.9			40.6			13.4			15.1	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		50.4	16.0	23.6		50.4	9.9	29.7
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		32.0	17.0	29.0		32.0	5.5	40.5
Max Q Clear Time (g_c+I1), s		10.6	11.9	15.5		16.7	3.8	19.4
Green Ext Time (p_c), s		3.1	0.2	4.2		2.7	0.9	6.4

Intersection Summary	
HCM 2010 Ctrl Delay	32.9
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	1008	1097	33	0	53
Future Vol, veh/h	28	1008	1097	33	0	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	1061	1155	35	0	56

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1189	0	-	0	-	595
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	-	-	3.92
Pot Cap-1 Maneuver	317	-	-	-	0	383
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	317	-	-	-	-	383
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	16
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	317	-	-	-	383
HCM Lane V/C Ratio	0.093	-	-	-	0.146
HCM Control Delay (s)	17.5	-	-	-	16
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	0.5

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	2	144	31	3	160
Future Vol, veh/h	30	2	144	31	3	160
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	2	152	33	3	168

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	343	168	0	0	184	0
Stage 1	168	-	-	-	-	-
Stage 2	175	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	653	876	-	-	1391	-
Stage 1	862	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	652	876	-	-	1391	-
Mov Cap-2 Maneuver	652	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	853	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	663	1391	-
HCM Lane V/C Ratio	-	-	0.051	0.002	-
HCM Control Delay (s)	-	-	10.7	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	4	36	0	1	24	25	12	1	13	0
Future Vol, veh/h	0	0	4	36	0	1	24	25	12	1	13	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	4	38	0	1	25	26	13	1	14	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	100	105	14	101	99	33	14	0	0	39	0	0
Stage 1	16	16	-	83	83	-	-	-	-	-	-	-
Stage 2	84	89	-	18	16	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	881	785	1066	880	791	1041	1604	-	-	1571	-	-
Stage 1	1004	882	-	925	826	-	-	-	-	-	-	-
Stage 2	924	821	-	1001	882	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	869	772	1066	865	778	1041	1604	-	-	1571	-	-
Mov Cap-2 Maneuver	869	772	-	865	778	-	-	-	-	-	-	-
Stage 1	988	881	-	910	813	-	-	-	-	-	-	-
Stage 2	908	808	-	996	881	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.4	9.3	2.9	0.5
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1604	-	-	1066	869	1571	-	-
HCM Lane V/C Ratio	0.016	-	-	0.004	0.045	0.001	-	-
HCM Control Delay (s)	7.3	0	-	8.4	9.3	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	1049	49	107	868	140	32	36	119	161	51	52
Future Volume (veh/h)	47	1049	49	107	868	140	32	36	119	161	51	52
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1765	1863	1900	1765	1863	1900	1765	1863	1900	1765	1863	1900
Adj Flow Rate, veh/h	49	1104	52	113	914	147	34	38	125	169	54	55
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	1414	67	190	1592	255	666	195	643	612	433	441
Arrive On Green	0.04	0.28	0.28	0.23	0.72	0.72	0.51	0.51	0.51	0.51	0.51	0.51
Sat Flow, veh/h	1681	4977	234	1681	4420	708	1279	382	1258	1218	847	863
Grp Volume(v), veh/h	49	752	404	113	700	361	34	0	163	169	0	109
Grp Sat Flow(s),veh/h/ln	1681	1695	1821	1681	1695	1738	1279	0	1641	1218	0	1710
Q Serve(g_s), s	3.8	26.5	26.5	7.8	12.8	12.9	1.9	0.0	7.0	11.4	0.0	4.3
Cycle Q Clear(g_c), s	3.8	26.5	26.5	7.8	12.8	12.9	6.2	0.0	7.0	18.4	0.0	4.3
Prop In Lane	1.00		0.13	1.00		0.41	1.00		0.77	1.00		0.50
Lane Grp Cap(c), veh/h	62	963	517	190	1221	626	666	0	838	612	0	874
V/C Ratio(X)	0.79	0.78	0.78	0.60	0.57	0.58	0.05	0.00	0.19	0.28	0.00	0.12
Avail Cap(c_a), veh/h	71	1617	869	271	2021	1036	666	0	838	612	0	874
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.41	0.41	0.41	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.1	42.8	42.8	47.7	13.4	13.4	18.2	0.0	17.3	22.3	0.0	16.6
Incr Delay (d2), s/veh	19.3	0.6	1.1	3.0	0.4	0.8	0.1	0.0	0.5	1.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	12.5	13.5	3.8	5.9	6.2	0.7	0.0	3.3	4.0	0.0	2.1
LnGrp Delay(d),s/veh	81.4	43.4	43.9	50.7	13.9	14.3	18.4	0.0	17.8	23.4	0.0	16.9
LnGrp LOS	F	D	D	D	B	B	B		B	C		B
Approach Vol, veh/h		1205			1174			197			278	
Approach Delay, s/veh		45.1			17.5			17.9			20.8	
Approach LOS		D			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		70.4	18.7	40.9		70.4	8.8	50.8
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		35.0	21.0	62.0		35.0	5.5	77.5
Max Q Clear Time (g_c+I1), s		9.0	9.8	28.5		20.4	5.8	14.9
Green Ext Time (p_c), s		2.6	5.1	8.4		2.2	0.0	8.5

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	1291	1028	91	0	87
Future Vol, veh/h	39	1291	1028	91	0	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	85	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	1359	1082	96	0	92

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1178	0	-	0	-	589
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	5.34	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	3.12	-	-	-	-	3.92
Pot Cap-1 Maneuver	321	-	-	-	0	387
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	321	-	-	-	-	387
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	17.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	321	-	-	-	387
HCM Lane V/C Ratio	0.128	-	-	-	0.237
HCM Control Delay (s)	17.9	-	-	-	17.2
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	0.9

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	104	5	160	63	5	160
Future Vol, veh/h	104	5	160	63	5	160
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	5	168	66	5	168

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	381	202	0	0	235	0
Stage 1	202	-	-	-	-	-
Stage 2	179	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	621	839	-	-	1332	-
Stage 1	832	-	-	-	-	-
Stage 2	852	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	619	839	-	-	1332	-
Mov Cap-2 Maneuver	619	-	-	-	-	-
Stage 1	832	-	-	-	-	-
Stage 2	849	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	627	1332	-
HCM Lane V/C Ratio	-	-	0.183	0.004	-
HCM Control Delay (s)	-	-	12	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0	-

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	19	58	0	1	65	47	18	1	10	0
Future Vol, veh/h	0	0	19	58	0	1	65	47	18	1	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	20	61	0	1	68	49	19	1	11	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	209	218	11	219	209	59	11	0	0	68	0	0
Stage 1	13	13	-	196	196	-	-	-	-	-	-	-
Stage 2	196	205	-	23	13	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	748	680	1070	737	688	1007	1608	-	-	1533	-	-
Stage 1	1007	885	-	806	739	-	-	-	-	-	-	-
Stage 2	806	732	-	995	885	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	722	649	1070	698	657	1007	1608	-	-	1533	-	-
Mov Cap-2 Maneuver	722	649	-	698	657	-	-	-	-	-	-	-
Stage 1	963	884	-	771	706	-	-	-	-	-	-	-
Stage 2	770	700	-	975	884	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.4	10.6	3.7	0.7
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1608	-	-	1070	702	1533	-	-
HCM Lane V/C Ratio	0.043	-	-	0.019	0.088	0.001	-	-
HCM Control Delay (s)	7.3	0	-	8.4	10.6	7.3	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.3	0	-	-

APPENDIX E

CUMULATIVE PROJECTS INFORMATION

No.	Title	Land Use	No. of Units	Unit
1	Santa Ana River Wash	Cement Plant		
2	Blossom Trails	Single Family Residential Residential Condominium	14 306	DU DU
3	Richmond American 121 SFD Gated Community	Single Family Residential	121	DU
4	San Manuel Village Partially Built	Restaurant with Drive Through Restaurant	3.5 5.8	TSF TSF
5	Highland Crossroads (Formerly Regency Center) Partially Occupied - items remaining	Retail Retail w/ Drive Through	42.84 5	TSF TSF
6	30,000 SF Retail Center at Boulder Avenue / Greenspot Road CUP-007-008	Fast Food Retail	14.38 16.33	TSF TSF
7	Centerstone Single Family Homes	Residential	125	DU
8	Greenspot Village & Marketplace	Residential / Retail - see attachment for Land Use		
9	Harmony Development	Residential / Retail - see attachment for Land Use		
10	Base Line Commercial	Fast Food w/ Drive Through High Turnover Restaurant	86 80	Seats Seats
11	Orange New Jersey Pro (Office/Professional/Warehouse)	Industrial Park	126.9	TSF
12	Diversified Pacific	Single Family-Detached	69	DU
13	Alta Vista and Santa Ana	Single Family-Detached	56	DU
14	Keven Chong - Northwest Corner of Base Line and Boulder	Bank	5.2	TSF
15	TTP 18935 & Adjacent Tract South of Waters, Along Aplin	Single Family Detached	80	DU
16	Mediterra Specific Plan - North of Greenspot Road, East of Santa Paula	Residential	300.0	DU
17	Arco Addition of Car Wash and QSR SWC of Base Line / Seine		4.0	TSF
18	Highland Park - Mastercraft Homes North of Base Line, West of Weaver	Residential	46.0	DU
19	Real Journey (New Vision) Academy Charter School, North of Base Line, West of Victoria	School - Junior High	450.0	Students

CUMULATIVE PROJECT 1

TRAFFIC STUDY

UPPER SANTA ANA RIVER WASH

SAN BERNARDINO COUNTY, CALIFORNIA

This Traffic Study
has been prepared under the supervision of
Leslie E. Card, P.E.

Signed _____

REGISTERED PROFESSIONAL ENGINEER
LESLIE ERIC CARD
No. 34410
Exp. 9/30/07
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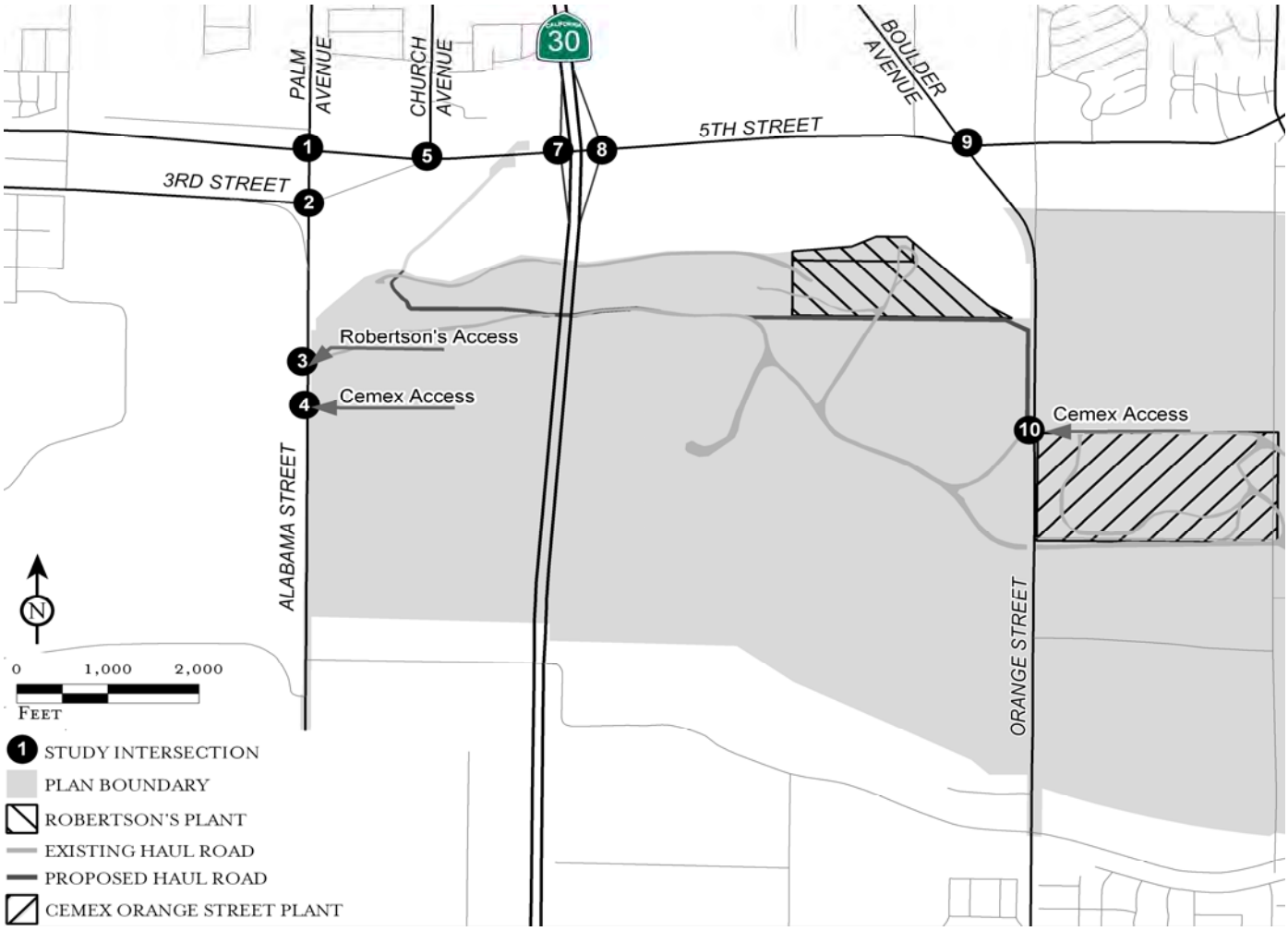
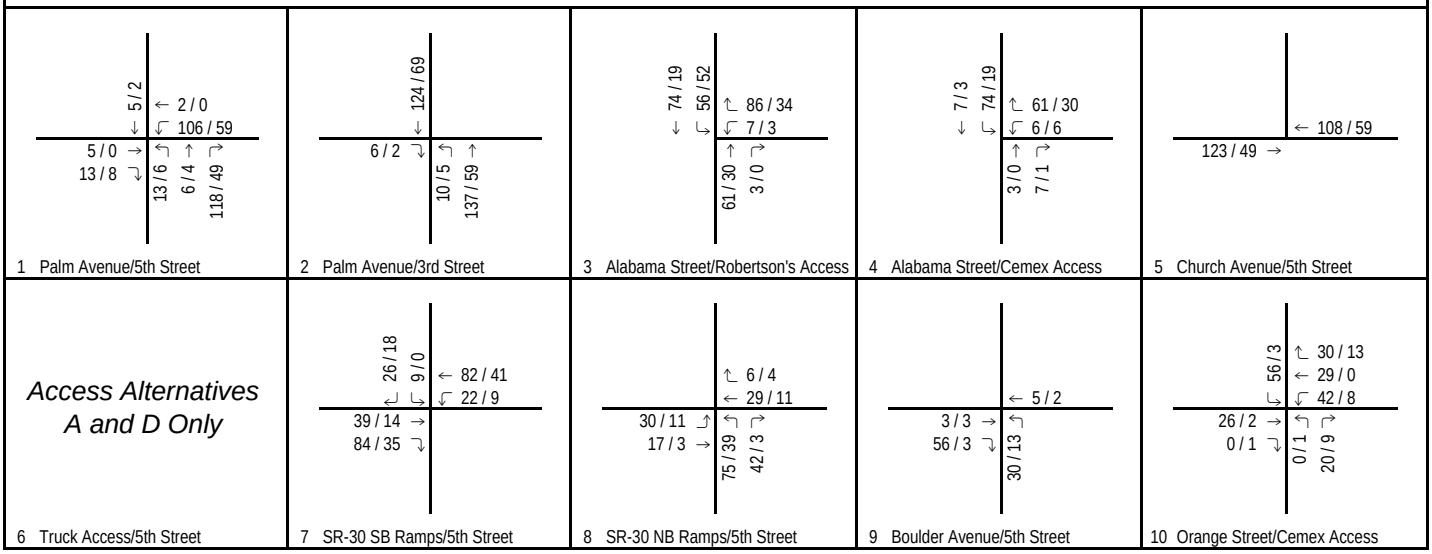
STATE OF CALIFORNIA

LSA

January 26, 2007





LSA

FIGURE 5

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Total Plant Traffic (in PCEs)

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_05_Existing Plant Trips (1/25/2007)

Table E - Project New Trip Generation - Aggregate Trucks

Land Use Alternative 1

Land Use	A.M. Peak Hour			P.M. Peak Hour			Daily[5]
	In	Out	Total	In	Out	Total	
Robertson Plunge Creek [1]							
Existing Trucks At 1.81 MPTY Baseline	11	10	21	6	6	12	384
Proposed Trucks at 3.00 MTPY [2]	11	10	21	6	6	12	640
Net New Trucks	0	0	0	0	0	0	256
Net New PCE Trips [3]	0	0	0	0	0	0	768
Cemex Orange Street Plant [4]							
Existing Trucks At 2.53 MPTY Baseline	38	39	77	10	7	17	762
Proposed Trucks at 3.00 MTPY	44	46	90	12	8	20	910
Net New Trucks	6	7	13	2	1	3	148
Net New PCE Trips [3]	18	21	39	6	3	9	444
Total New PCE Trips	**18**	**21**	**39**	**6**	**3**	**9**	**1,212**

Note:

These are ship numbers that reflect waste and stock piling

MTPY=Million Tons Per Year.

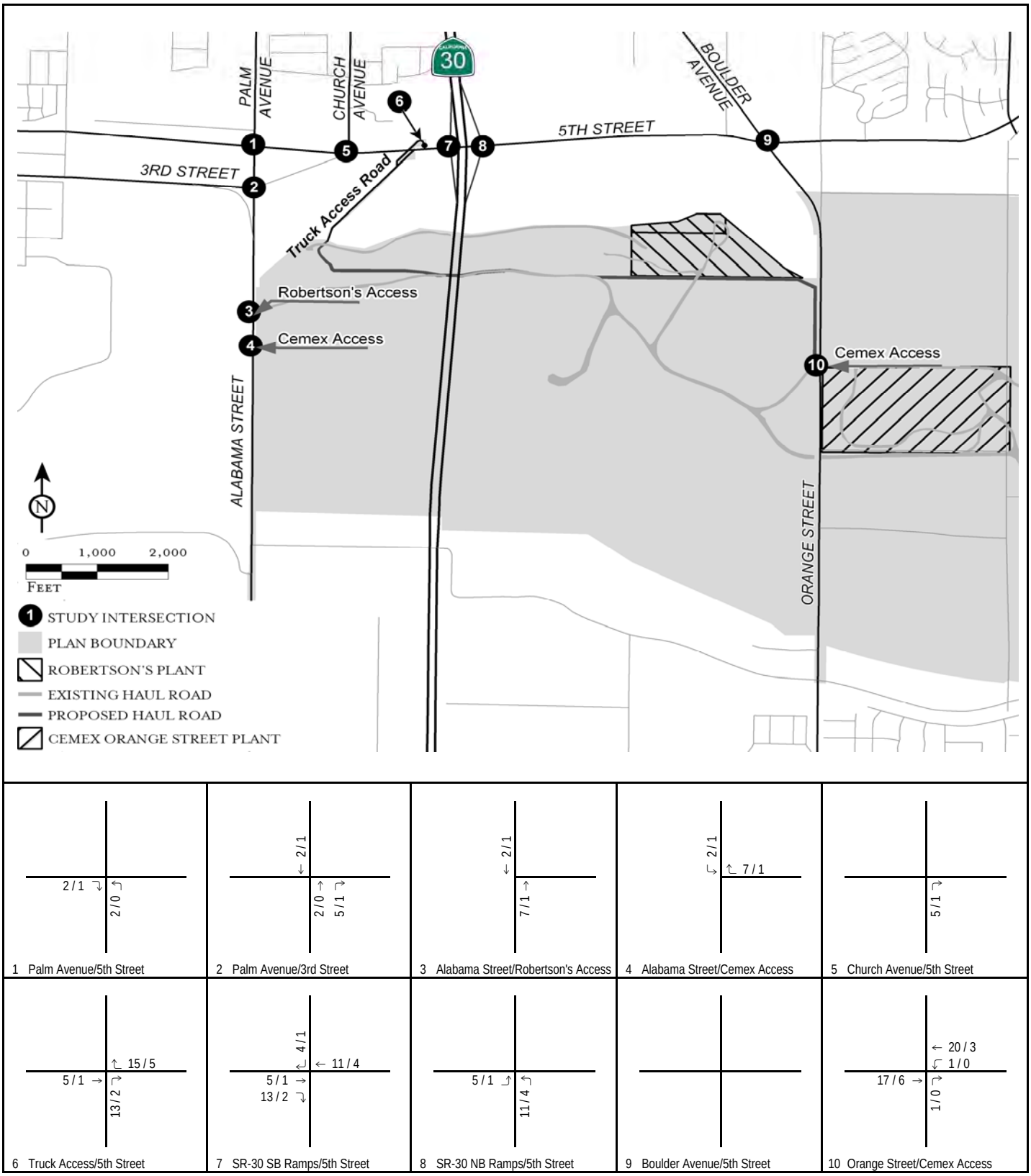
[1] Based on Robertson's memo updated February 24, 2006 (3 years of truck data from 2003 to 2005)

[2] Robertson's has the ability to limit shipments during local peak traffic hours, so that NO net change from baseline conditions would occur during these hours.

[3] All values given are in Passenger Car Equivalency (PCE). PCE of 3 has been used for all aggregate trucks

[4] Based on Lilburn Corporation and Cemex memo updated June 16, 2006 (3 years of truck data from 2003 to 2005)

[5] Based on Robertson's memo updated February 24, 2006 and Cemex memo updated June 16, 2006



LSA

FIGURE 17

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative D

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_17_New Cemex Trips Alt 1D (1/25/2007)

CUMULATIVE PROJECT 2

URBAN
CROSSROADS

41 Corporate Park, Suite 300
Irvine, CA 92606

Prepared by:

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BLOSSOM TRAILS
SITE ACCESS EVALUATION
CITY OF HIGHLAND, CALIFORNIA

January 27, 2006

JN: 03524-02
CW:RA:DM:mg

TABLE 2

TRIP GENERATION SUMMARY

BLOSSOM TRAILS

LAND USE	QUANTITY	UNITS[1]	PEAK HOUR						DAILY
			AM			PM			
			IN	OUT	TOTAL	IN	OUT	TOTAL	
Single Family Detached	14	DU	3	8	11	9	5	14	134
Residential Condo/Townhouse	306	DU	21	113	134	107	52	159	1,793
Total			**24**	**121**	**145**	**116**	**57**	**173**	**1,927**

ADJACENT PARCEL

LAND USE	QUANTITY	UNITS[1]	PEAK HOUR						DAILY
			AM			PM			
			IN	OUT	TOTAL	IN	OUT	TOTAL	
Residential Condo/Townhouse	252 [2]	DU	18	93	111	88	43	131	1,477
Total			**18**	**93**	**111**	**88**	**43**	**131**	**1,477**

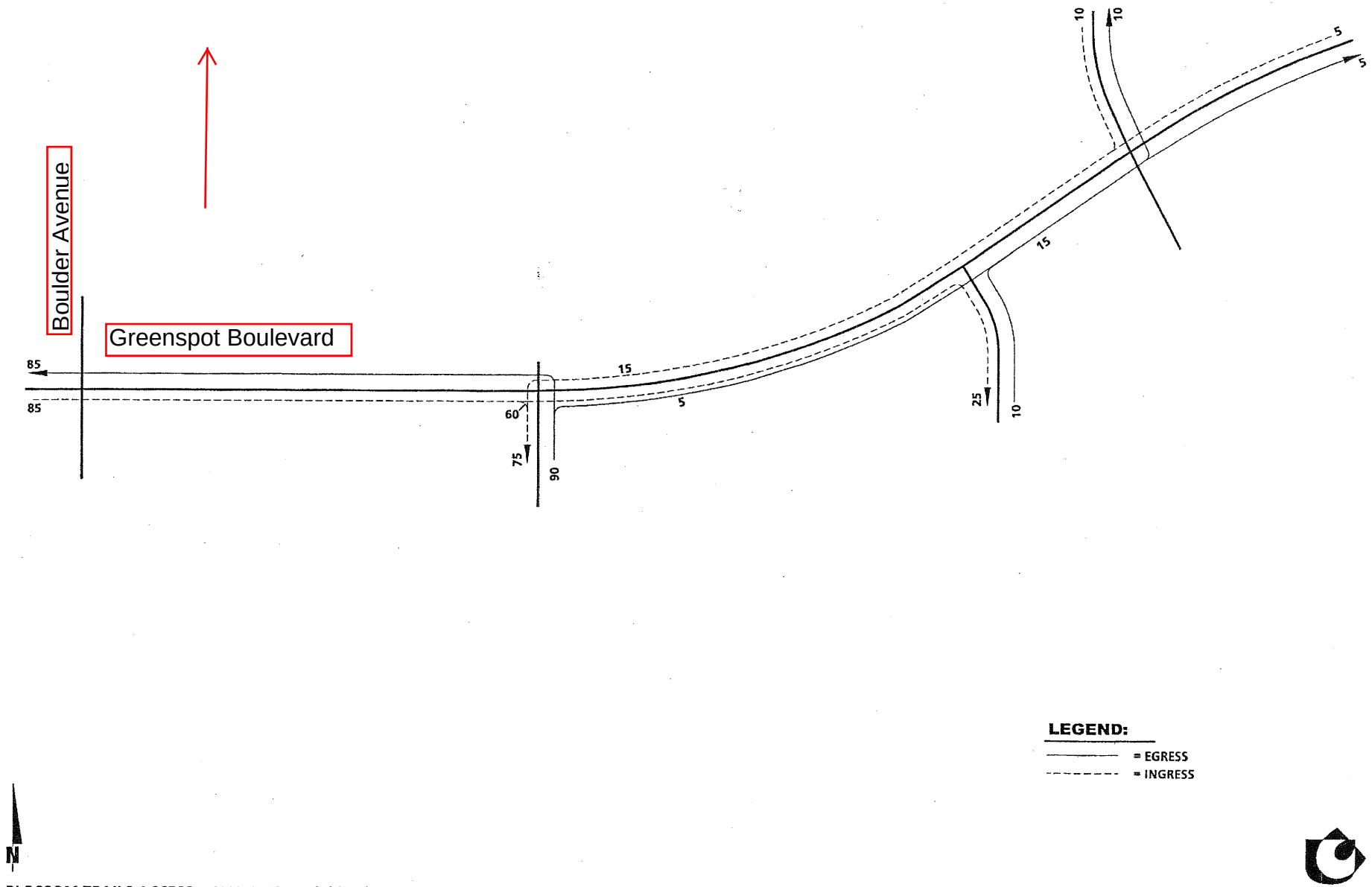
[1] DU = Dwelling Units

[2] Property is zoned for 12 units/acre and is approximately 21 acres

U:\UcJobs_03500\03524\Excel\[03524-02.xls]T 2

EXHIBIT C

BLOSSOM TRAILS SOUTH TRIP DISTRIBUTION WITHOUT ADJACENT PROJECT (FULL ACCESS)



BLOSSOM TRAILS ACCESS EVALUATION, Highland, California - 03524: 05.dwg

URBAN CROSSROADS

CUMULATIVE PROJECT 3

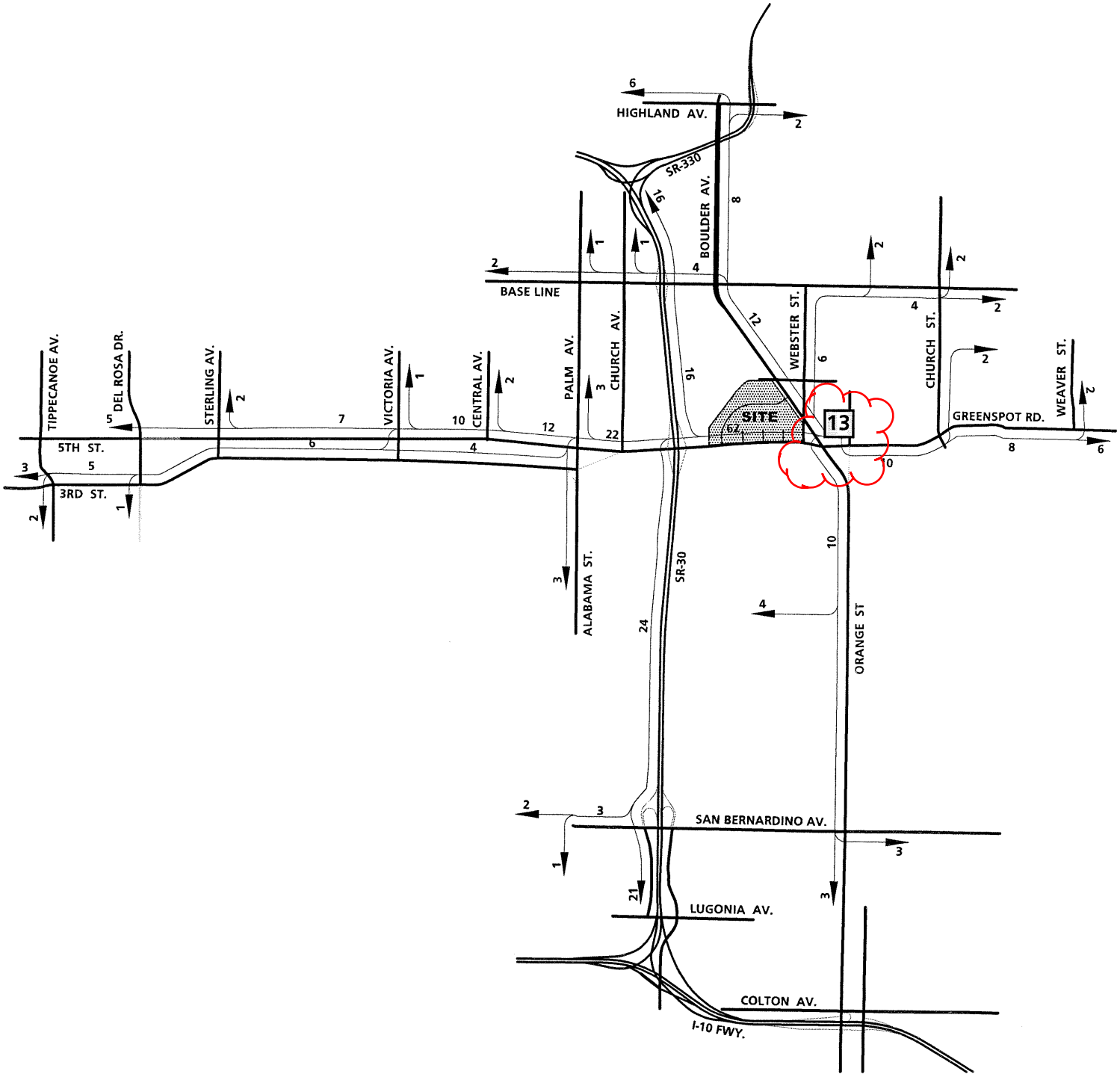
121 DU
2/2/09

7th Ed ITE - Weekday rates

Page No.	Category	Unit	Ave Trip Rate per Unit	Total Trips	In %	In Trips	Out %	Out Trips
	210 - SFH	121						
269	ADT		9.57	1158.0	50	579	50	579
270	AM Peak Hour of Adjacent Traffic		0.75	90.8	25	23	75	68
271	PM Peak Hour of Adjacent Traffic		1.01	122.2	63	77	37	45

EXHIBIT D-3

121 DU SFD GATED COMMUNITY TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

13 = 121 DU SINGLE FAMILY DETACHED HOUSING GATED COMMUNITY

N

SOURCE: RECENT SUBMITTED DEVELOPMENT

URBAN CROSSROADS

CUMULATIVE PROJECT 4

San Manuel

San Manuel Village
Traffic Impact Analysis
(TIA)

Final

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June 1, 2006

Table 1
San Manuel Village TIA (February 2006)
Site Land-Use Assumptions for Trip Generation Estimation

ITE	Site Plan Land Use	ITE Use	Quantity (trip generation parameter)
934	Pad 1: restaurant with drive-through	Fast food restaurant with a drive-through window	3500 SF
814	Pad 2: retail	Specialty retail center	6000 SF
932	Pad 3: restaurant	High turnover (sit down) restaurant	5800 SF
912	Pad 4: commercial	Drive-in bank	5200 SF
934	Pad 5: restaurant with drive-through	Fast food restaurant with drive-through	5000 SF
932	Pad 6: restaurant and retail	High turnover (sit down) restaurant and specialty retail center	13,000 SF
710	Office	General office building	68,500 SF
310	Hotel	All suites hotel	110 rooms

FIGURE 6

SAN MANUEL VILLAGE TIA

PROJECT AM AND PM PEAK HOUR TURNING MOVEMENTS

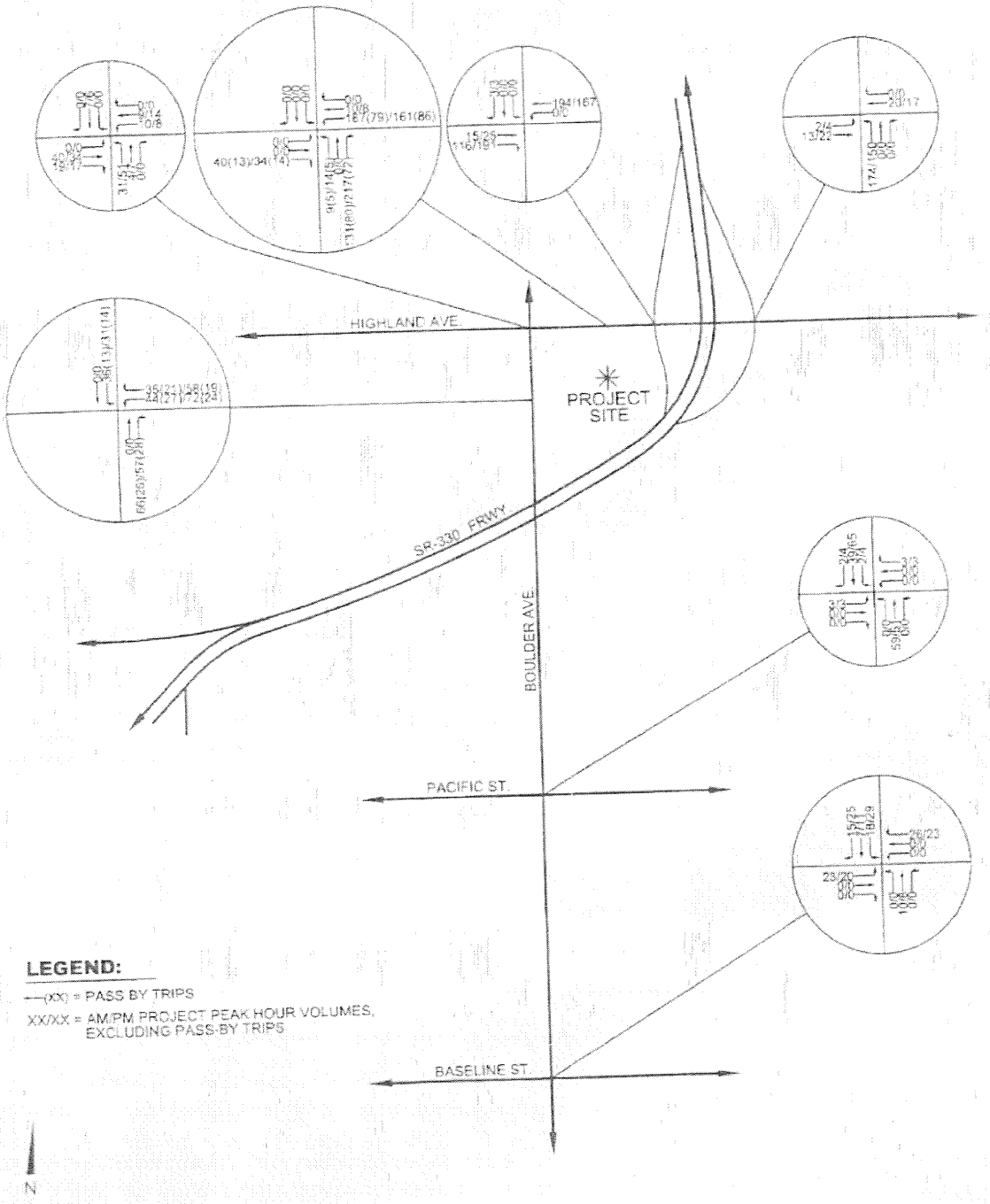
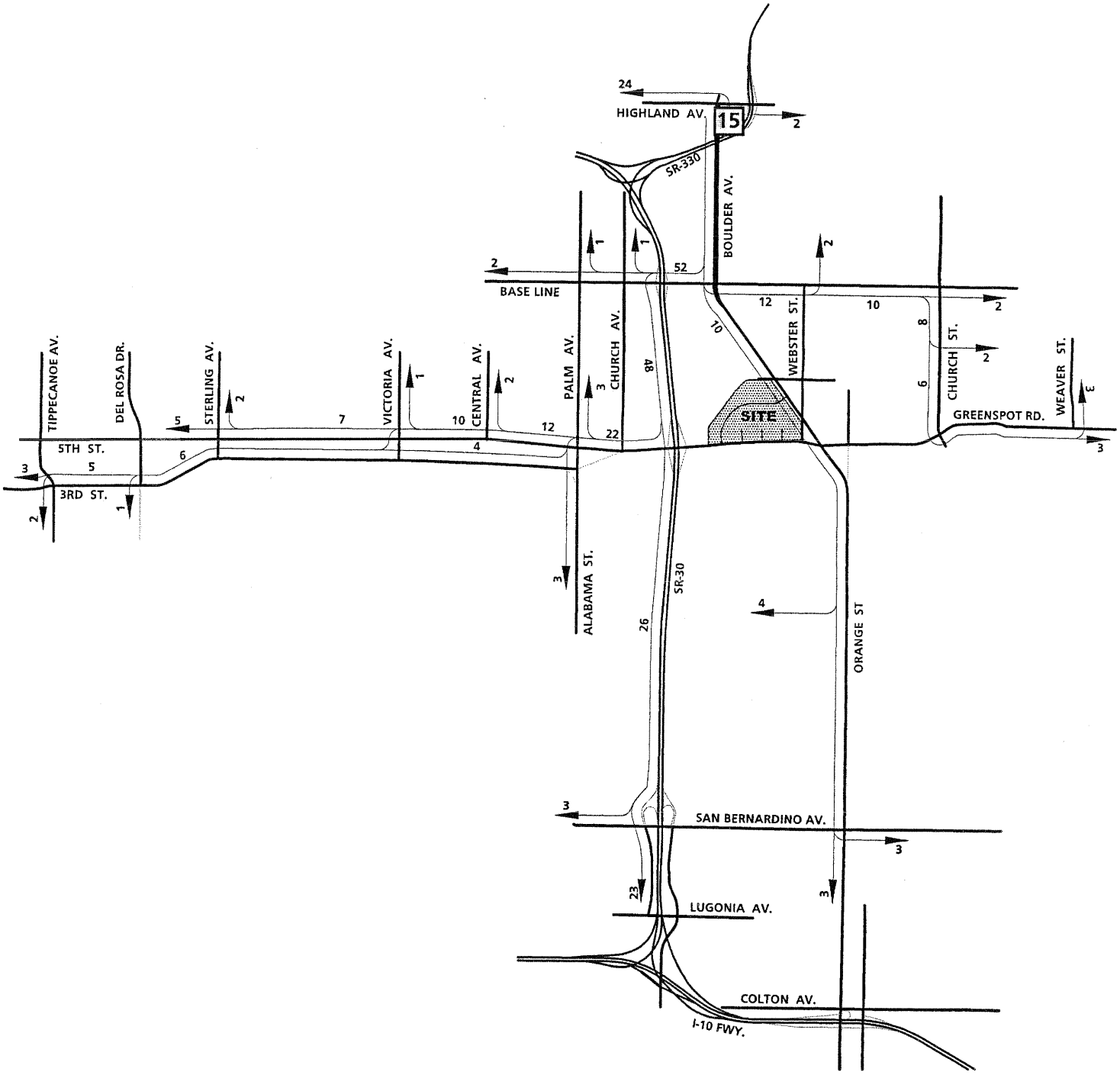


EXHIBIT D-5

SAN MANUEL VILLAGE (RETAIL CENTER & HOTEL/CONVENTION) TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

15 = SAN MANUEL VILLAGE (RETAIL CENTER & HOTEL/CONVENTION)

N

SOURCE: RECENT SUBMITTED DEVELOPMENT

URBAN CROSSROADS

TABLE 1

SAN MANUEL TRIP GENERATION RATES[1]

PAD	LAND USE	ITE CODE	QUANTITY	UNITS[2]	PEAK HOUR AM IN	PEAK HOUR AM OUT	PEAK HOUR AM TOTAL	PEAK HOUR PM IN	PEAK HOUR PM OUT	PEAK HOUR PM TOTAL	DAILY
1	Restaurant W/Drive Thru	934	3.5	TSF	27.09	26.02	53.11	18.01	16.63	34.64	496.12
2	Specialty Retail	814	6.0	TSF	NOM	NOM	NOM	1.19	1.52	2.71	44.32
3	Restaurant (High Turnover)	932	5.8	TSF	5.99	5.53	11.52	6.66	4.26	10.92	127.15
4	Bank w/ Drive Thru	912	5.2	TSF	11.24	8.14	19.38	25.54	25.54	51.08	411.17
5	Restaurant W/Drive Thru	934	5.0	TSF	27.09	26.02	53.11	18.01	16.63	34.64	496.12
6	Restaurant (High Turnover) W/Specialty Retail[3]	932	13.0	TSF	5.99	5.53	11.52	6.66	4.26	10.92	127.15
7	Office	710	68.5	TSF	1.78	0.24	2.02	0.39	1.88	2.27	14.55
8	Hotel	310	110	RM	0.34	0.22	0.56	0.31	0.27	0.58	8.17

SAN MANUEL TRIP GENERATION SUMMARY

PAD	LAND USE	QUANTITY	UNITS	PEAK HOUR AM IN	PEAK HOUR AM OUT	PEAK HOUR AM TOTAL	PEAK HOUR PM IN	PEAK HOUR PM OUT	PEAK HOUR PM TOTAL	DAILY
1	Restaurant W/Drive Thru	3.5	TSF	95	91	186	63	58	121	1,736
2	Specialty Retail	6.0	TSF	NOM	NOM	NOM	7	9	16	266
3	Restaurant (High Turnover)	5.8	TSF	35	32	67	39	25	64	737
4	Bank w/ Drive Thru	5.2	TSF	58	42	100	133	133	266	2,138
5	Restaurant W/Drive Thru	5.0	TSF	135	130	265	90	83	173	2,481
6	Restaurant (High Turnover) W/Specialty Retail[3]	13.0	TSF	78	72	150	87	55	142	1,653
	Subtotal			401	367	768	419	363	782	9,011
	-Commercial 25% Pass By Reduction [4]			*-100*	*-92*	*-192*	*-105*	*-91*	*-196*	*-2,253*
	Net Commercial Trips			**301**	**275**	**576**	**314**	**272**	**586**	**6,758**
7	Office	68.5	TSF	122	16	138	27	129	156	997
8	Hotel	110.0	RM	37	24	61	34	30	64	899
	Net Trips			**460**	**315**	**775**	**375**	**431**	**806**	**8,654**

[1] Source: ITE (Institute of Transportation Engineers) Trip Generation Manual, 7th Edition, 2003.

[2] TSF = thousand square feet, DU = dwelling units, RM = rooms

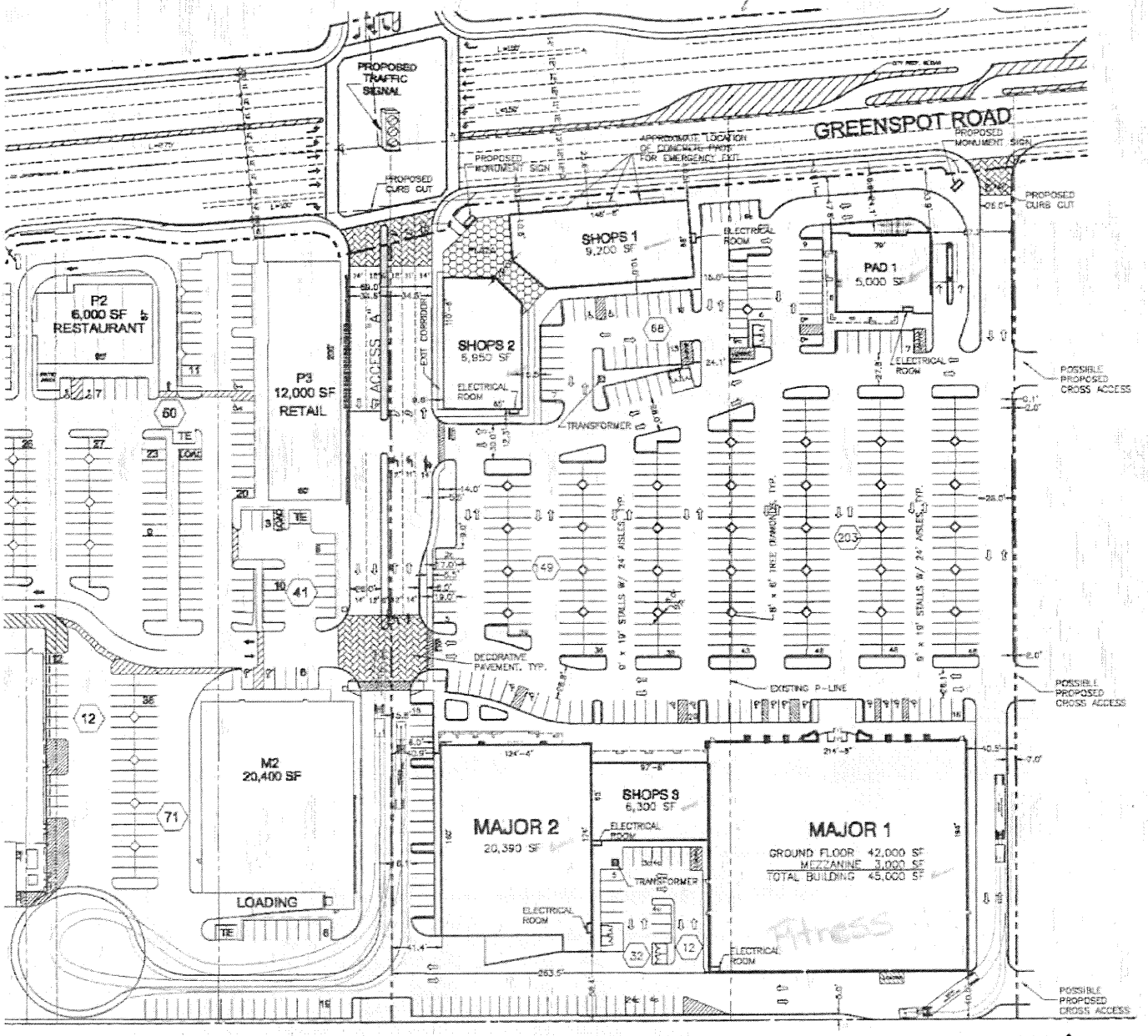
[3] ITE Code 932 has been used for this cumulative project to be more conservative

[4] Not all of the trips generated by this project are 'NEW' trips. A 25% Pass-By reduction has been considered for trip generation purposes.

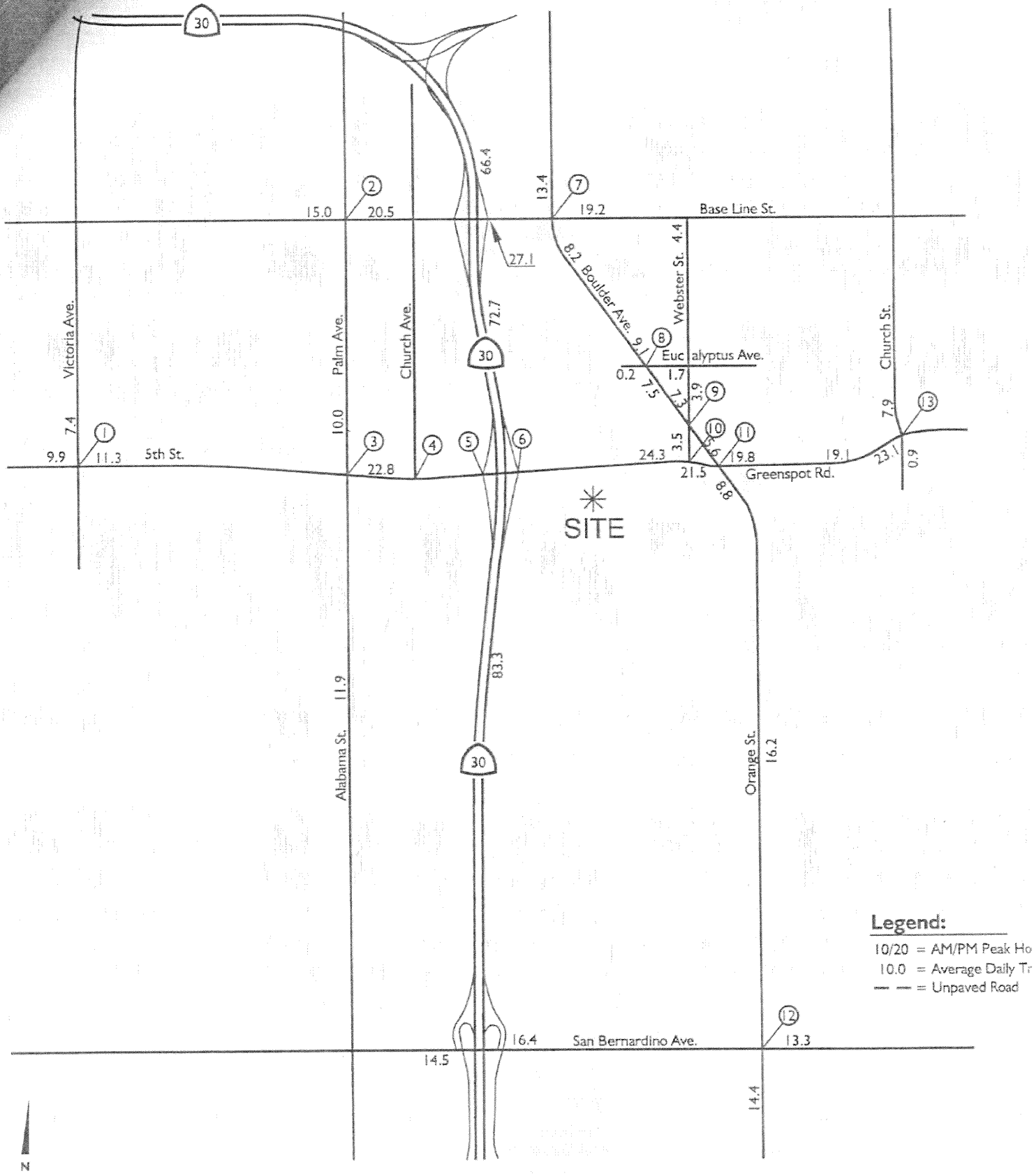
NO NAME:[San Manuel Village TG.xls]TGinputarea

CUMULATIVE PROJECT 5

#21 2nd Submittal 07-1032



42,840 Retail
45000 Fitness



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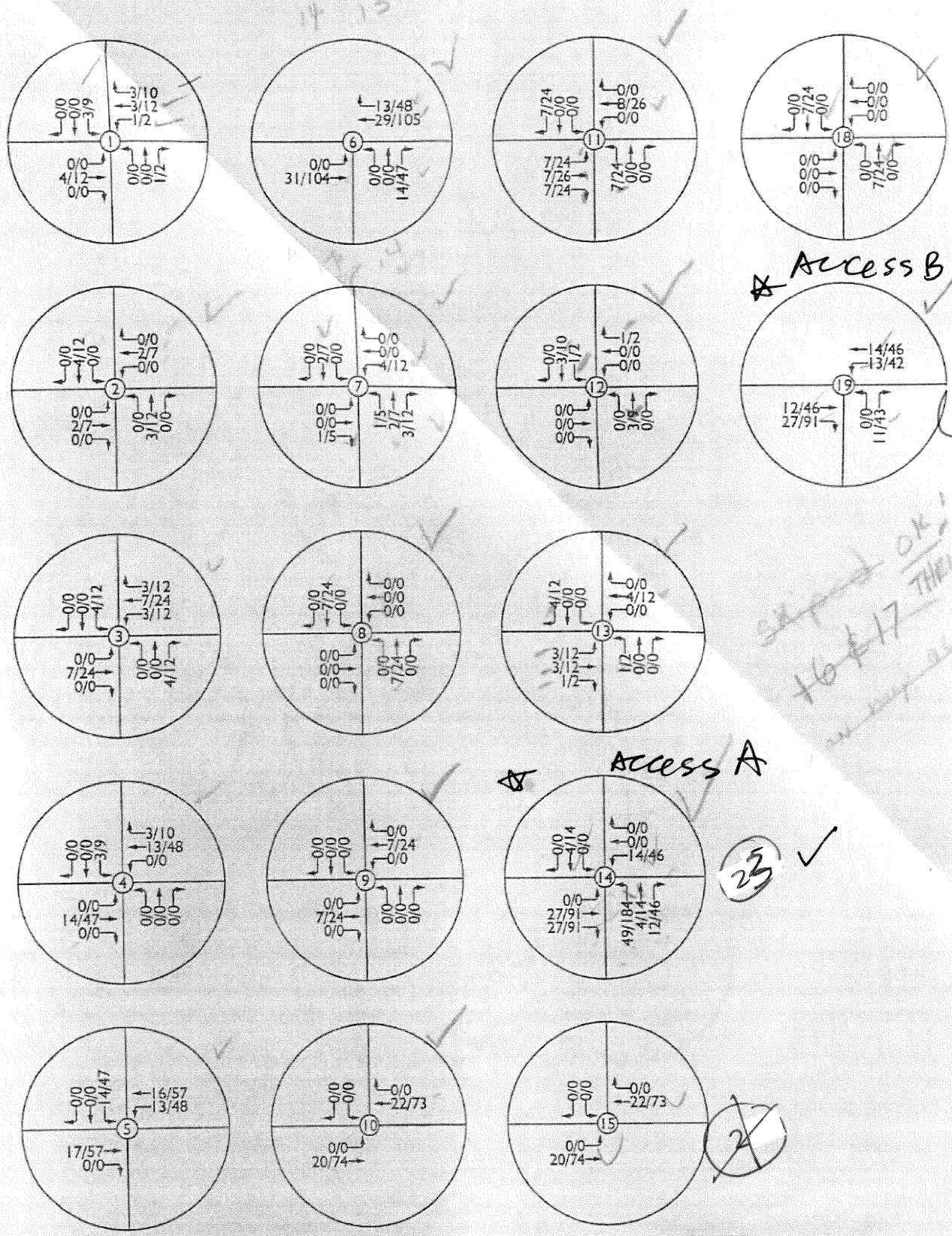
REGENCY CENTERS TRAFFIC IMPACT STUDY, City of Highland, California

Exhibit H

Project Peak Hour Intersection Volumes



Access B

24

Access A

23

2

ur Volumes
afic

RK engineering group, inc.

1958-07-01 (ExH)
REGENCY CENTERS TRAFFIC IMPACT STUDY, City of Highland, California

TABLE 3

Trip Generation[1]

Land Use	ITE Code	Quantity	Units[2]	Peak Hour AM In	Peak Hour AM Out	Peak Hour AM Total	Peak Hour PM In	Peak Hour PM Out	Peak Hour PM Total	Daily
Bank w/ Drive-Thru	912	5.000	TSF	35	27	62	114	114	229	1,232
Less Pass-by Trips (25%)				-9	-7	-16	-29	-29	-57	-308
Net Trip Generation (Bank)				26	20	46	86	86	172	924
Retail	820	42.840	TSF	27	17	44	77	84	161	1,840
Less Pass-by Trips (25%)				-7	-4	-11	-19	-21	-40	-460
Net Trip Generation (Retail)				20	13	33	58	63	121	1,380
Health / Fitness Club	492	45.000	TSF	23	32	54	93	89	182	1,482
Gross Total Trip Generation				85	76	160	284	287	572	4,554
Net Total Trip Generation				70	65	133	236	238	475	3,786

[1] TSF = Thousand Square Feet

[2] Full Trip Generation Without Pass-by Trips; Utilized for Analysis at Project Access Points

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CUMULATIVE PROJECT 6

Retail Center -
SWC Boulder - Greenspot Road

Traffic Study for a Retail Project in the City of Highland

February 17, 2009

Prepared for:

Boulder Holdings, LLC
Thatcher Engineering & Associates
345 5th Street, Suite B
Redlands, California 92374
(909) 748-7777

Prepared by:

KOA CORPORATION
PLANNING & ENGINEERING
3190 C Shelby Street
Ontario, CA 91764
(909) 890-9693

Job No: JA84062

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PLANNING & ENGINEERING

3190 C Shelby Street
Ontario, CA 91764
t: 909.890.9693 f: 909.890.9694
www.koacorporation.com

February 17, 2009

Boulder Holdings, LLC
c/o Thatcher Engineering & Associates
345 5th Street, Suite B
Redlands, California 92374
Attn: Vicky Valenzuela-Gilliland

SUBJECT: Traffic Study for a Retail Project in the City of Highland

Dear Ms. Gilliland:

KOA Corporation is pleased to present the attached traffic study for a Retail Project in the City of Highland. The project consists of 6,019 square feet of fast food restaurants with drive thru windows, 8,356 square feet of fast food restaurants without drive thru window and 16,332 square foot retail building located on the southwest corner of Boulder Avenue at Greenspot Road. The traffic study has been prepared to meet the traffic study requirements of the City of Highland and revised per their request.

The report is being submitted to you for review and processing. Please contact our office if you have any questions about the report, or if you need additional information to complete your submittal. If there are any comments that require response or revisions, please notify our office as soon as possible for prompt revision.

It has been a pleasure to prepare this study for you and the City of Highland.

Sincerely,

Mujib Ahmed, P.E.
Vice President

REGISTERED PROFESSIONAL ENGINEER
MUJIB AHMED
No.C68467
Exp.09/30/09
CIVIL
STATE OF CALIFORNIA

6. Project Trips

Project-related traffic consists of trips on any portion of the street system that will begin or end on the project site as a result of the development of the proposed project. Project-related traffic is a function of the extent and type of development proposed for the site. This information is used to establish traffic generation for the site.

The proposed project will consist of 6,019 square feet of fast food restaurants with drive thru windows, 8,356 square feet of fast food restaurants without drive thru windows, and 16,332 square feet of retail buildings.

Existing Land Use Traffic

The project site is currently vacant. No traffic is currently generated from the site; therefore, the current trip generation for the project site is zero.

Project Trip Generation

Trip generation is a measure or forecast of the number of trips that will be made to or from the project. It is generally equal to the traffic volume expected at the project entrance.

Trip generation characteristics for projects are normally estimated based on rates published in *Trip Generation, Seventh Edition*, published by the Institute of Transportation Engineers (ITE). This document is widely used in Southern California and indicates the probable traffic generation rates for various land uses based upon studies of existing developments in comparable settings. The *Trip Generation Manual* indicates a daily and a PM peak hour for Specialty Retail; however, it does not indicate an AM peak hour rate. For the purpose of this traffic study report we used a rate that is 25% of the PM peak hour rate since the stores will be closed during the AM peak generally. The report includes trip generation information for the project uses, as shown in Table 6.

Table 6
Trip Generation Rates

Land Use	Units		AM Peak Hour			PM Peak Hour		
		Daily	Total	In	Out	Total	In	Out
Fast Food w/ Drive Thru ITE (934)	KSF	496.12	53.11	27.09	26.02	34.64	18.01	16.63
Fast Food w/o Drive Thru ITE (933)	KSF	260.0*	43.87	26.32	17.55	26.15	13.34	12.81
Specialty Retail** ITE (814)	KSF	44.32	0.68	0.30	0.38	2.71	1.19	1.52

Note: KSF = 1000 square feet. * 10 times the PM rate ** AM peak hour is 25% of the PM rate

Table 7 summarizes the traffic generation expected from project, based on the generation rates shown in Table 6.

Due to the retail nature of the project, it will attract "passby" trips. According to the *ITE Trip Generation Handbook* the retail uses will normally attract passby trips of 20% and the fast food uses will attract a passby of 40%.

Table 7
Project Traffic Generation

Land Use	Daily	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
6,019 sq.ft. Fast Food w/ Drive Thru	2,986	320	163	157	208	108	100
8,356 sq.ft. Fast Food w/o Drive Thru	2,173	367	220	147	219	112	107
Subtotal Fast food	5,159	687	383	304	427	220	207
-40% passby trips	*-2,064*	*-276*	*-138*	*-138*	*-172*	*-86*	*-86*
Total Fast Food	***3,095***	***411***	***245***	***166***	***255***	***134***	***121***
16,332 sq.ft. Retail	724	11	5	6	44	19	25
-20% passby trips	*-145*	*-2*	*-1*	*-1*	*-10*	*-5*	*-5*
Total Retail	***579***	***9***	***4***	***5***	***34***	***14***	***20***
Total Project Trips	**3,674**	**420**	**249**	**171**	**289**	**148**	**141**

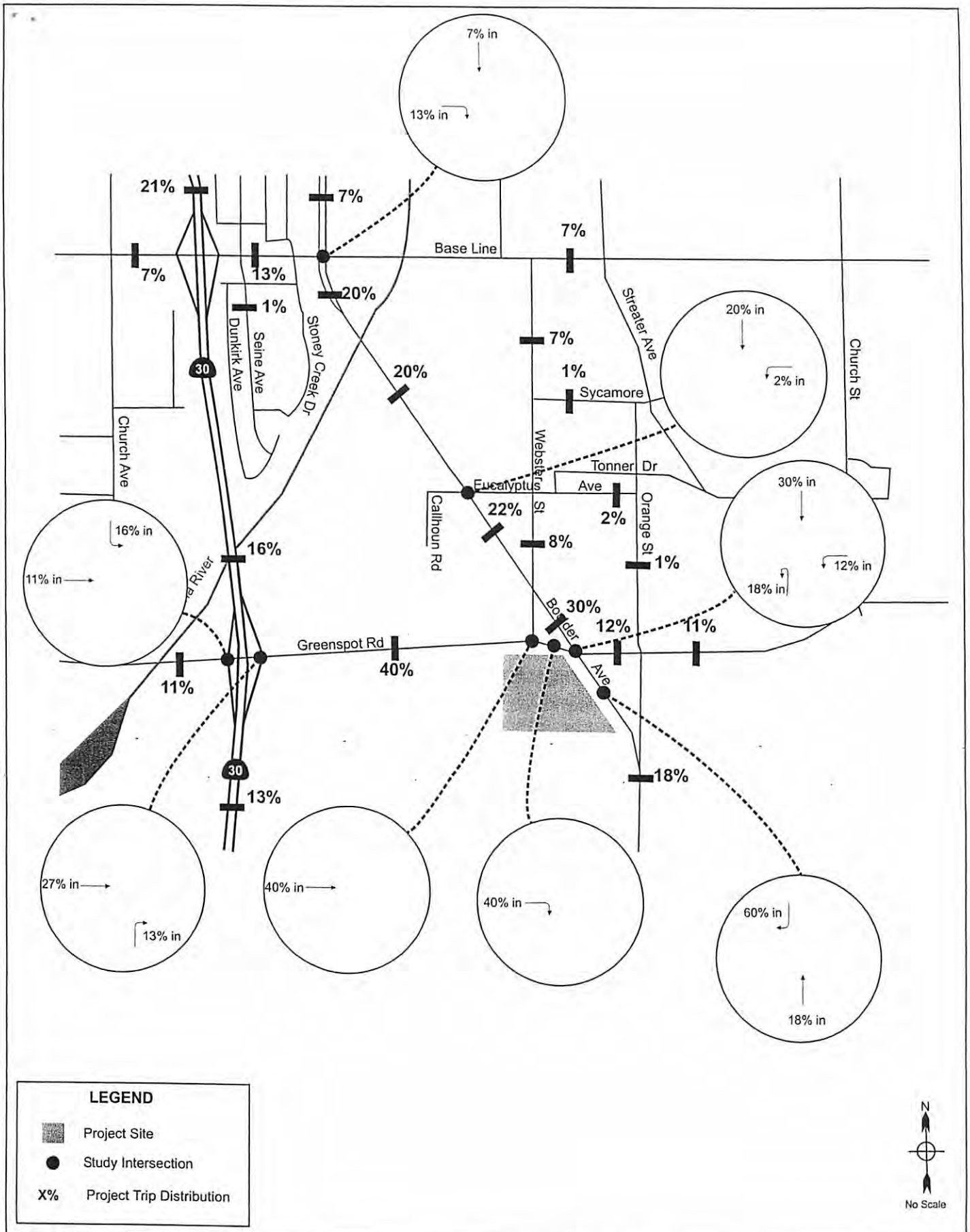
The project will generate a total 3,674 daily trips including, 420 trips during the AM peak hour and 289 trips during the PM peak hour.

Project Trip Distribution

Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by project traffic. The potential interaction between the proposed land use and surrounding regional access routes are considered to identify the route where the project traffic will distribute.

The Traffic Model was used to develop this trip distribution for this project. For SANBAG CMP level traffic studies, model "runs" are used to develop the project distribution, as prepared by City of San Bernardino and furnished to KOA Corporation for further analysis. The City furnished a traffic model select zone analysis with project traffic only. The select zone run shows the total volume assigned to all roadways from project traffic analysis zones. The total volume on each roadway is divided by the total site traffic generation to indicate the percentage of project traffic that will use each component of the regional roadway system in each relevant direction.

The anticipated trip distribution for the proposed development is presented on Figures 11A, 11B, 11C, and 11D. This figure indicates the proportion of project traffic that will use the street segments and turning movements indicated. Also, the project trip distribution assumes U-turns at the intersection of Greenspot Road at Boulder Avenue, as the City has indicated that they will be allowed at all movements at this intersection and current signage will be replaced with standard U-turn allowed signs.



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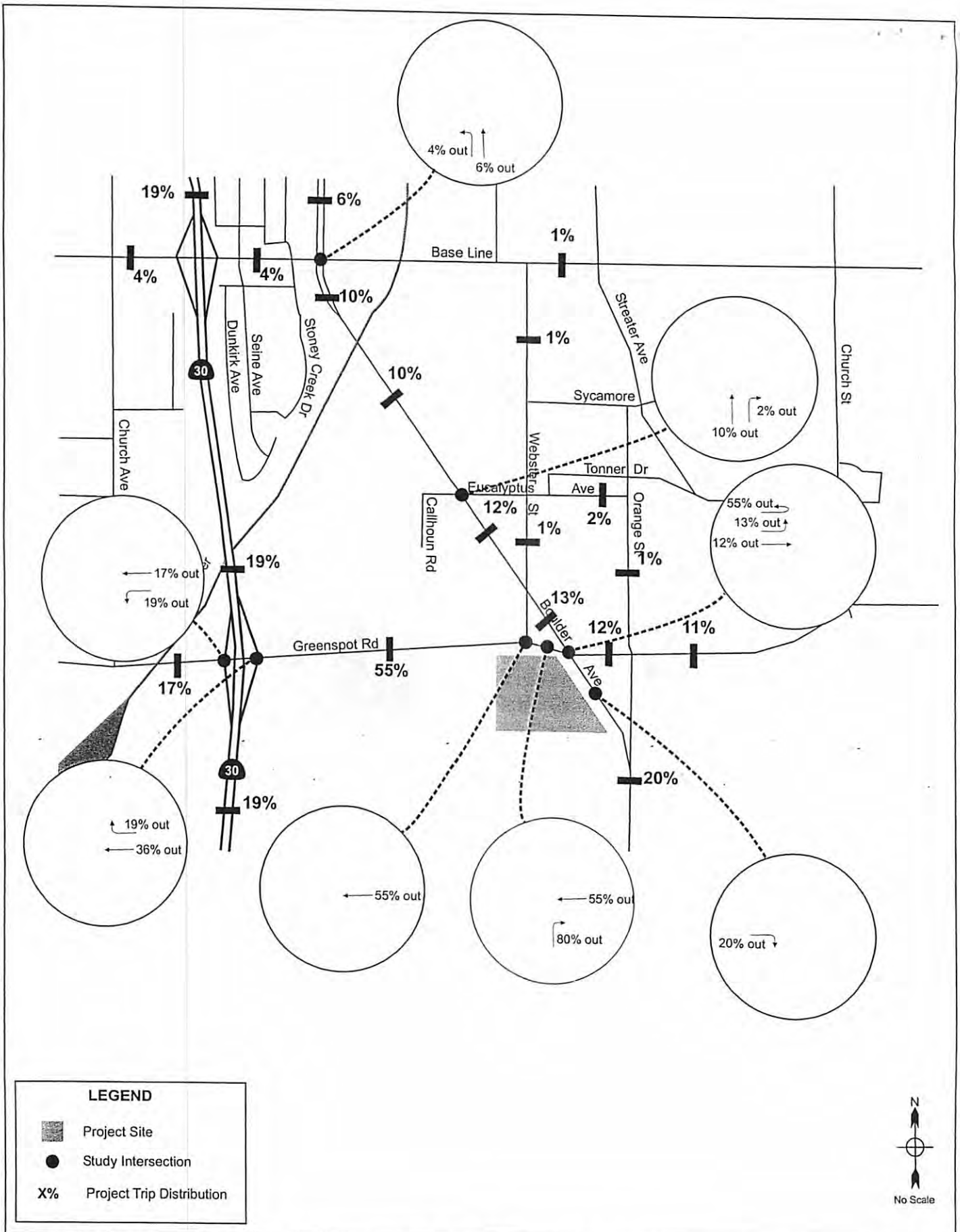
Highland Retail - Traffic Impact Study

Figure 11A

Project Trip Distribution - AM Peak Hour (Inbound)



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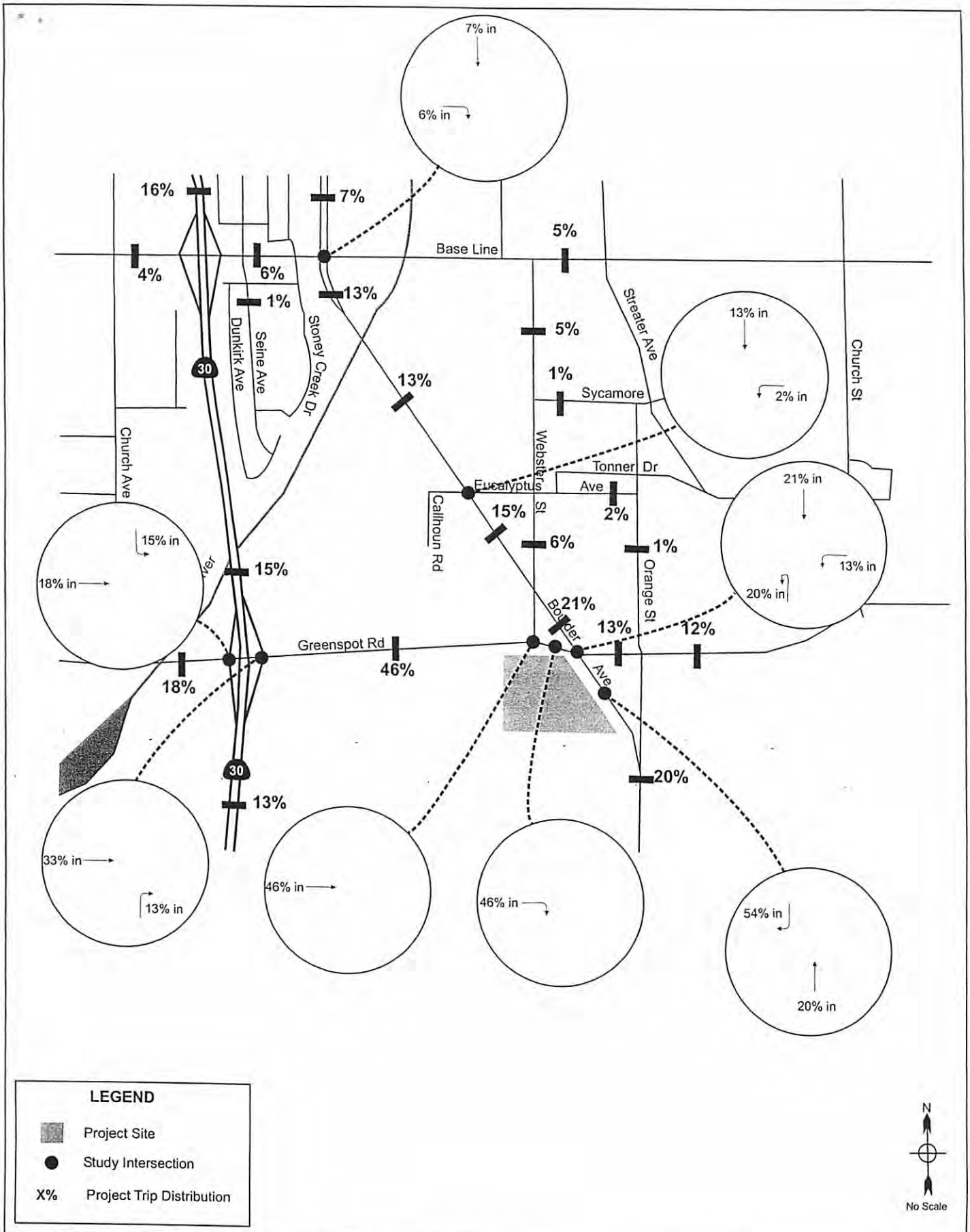
Highland Retail - Traffic Impact Study

Figure 11B

Project Trip Distribution - AM Peak Hour (Outbound)



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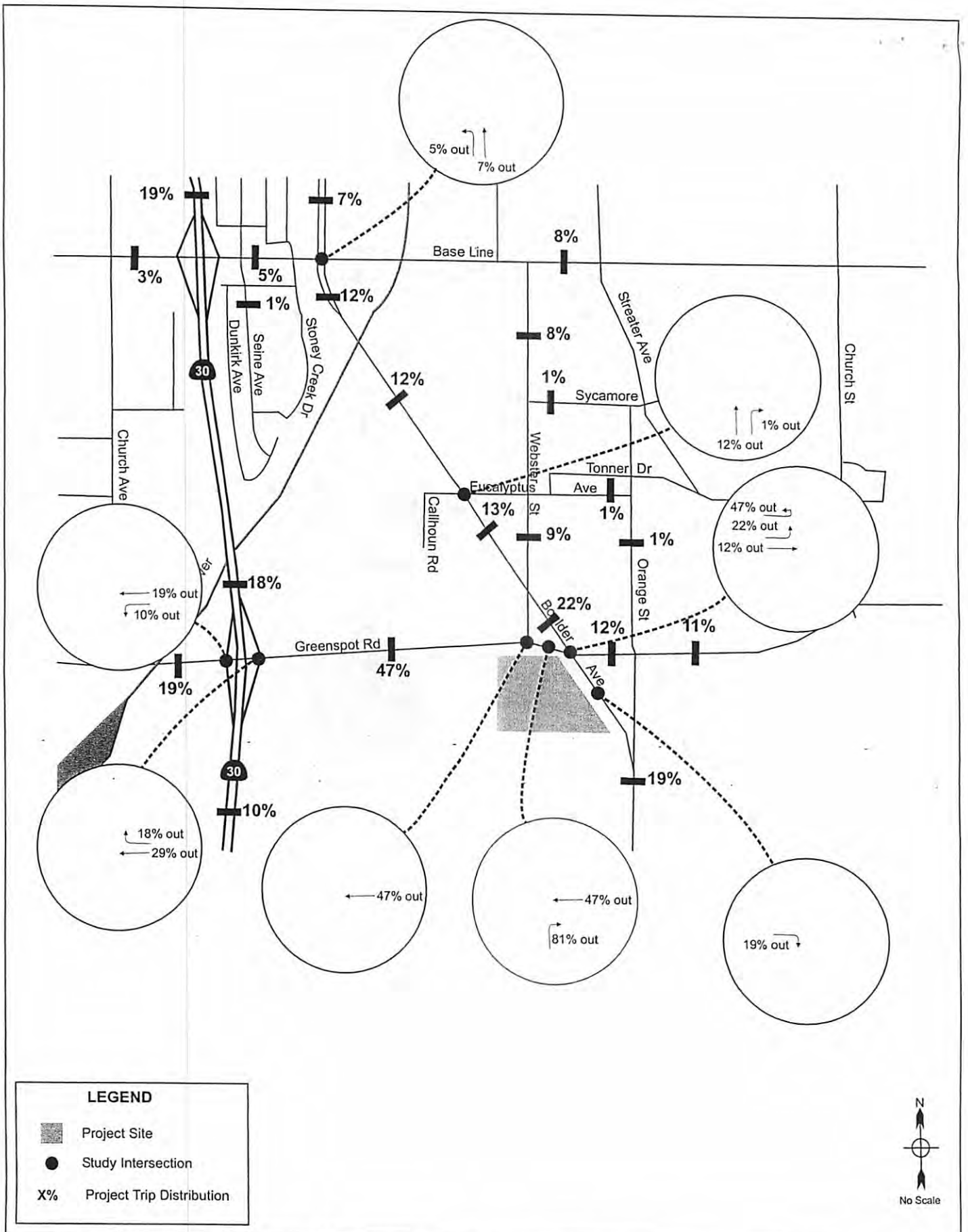
Highland Retail - Traffic Impact Study

Figure 11C

Project Trip Distribution - PM Peak Hour (Inbound)



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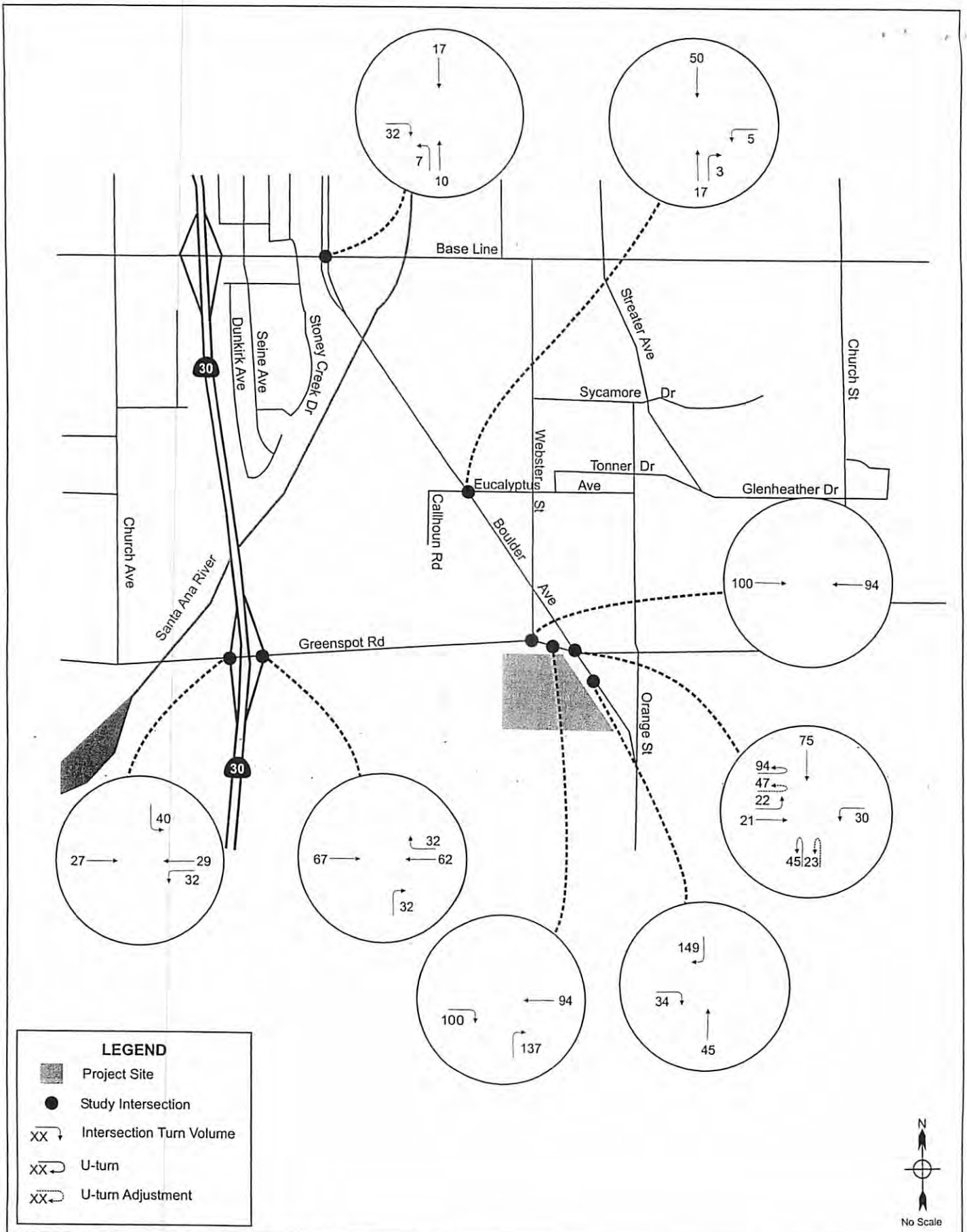
Highland Retail - Traffic Impact Study

Figure 11D

Project Trip Distribution - PM Peak Hour (Outbound)

Figures 12 and 13 indicate the near-term volume of project related traffic increases. Figures 14 and 15 show the future diverted trips at the driveways and nearby intersections for pass-by trips. Figures 16 and 17 indicate the total volume of future project related traffic increases. Future traffic levels in the project vicinity are expected to be changed by the amounts shown on these figures.



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Highland Retail - Traffic Impact Study

Figure 12

Added Traffic Volumes - AM Peak Hour

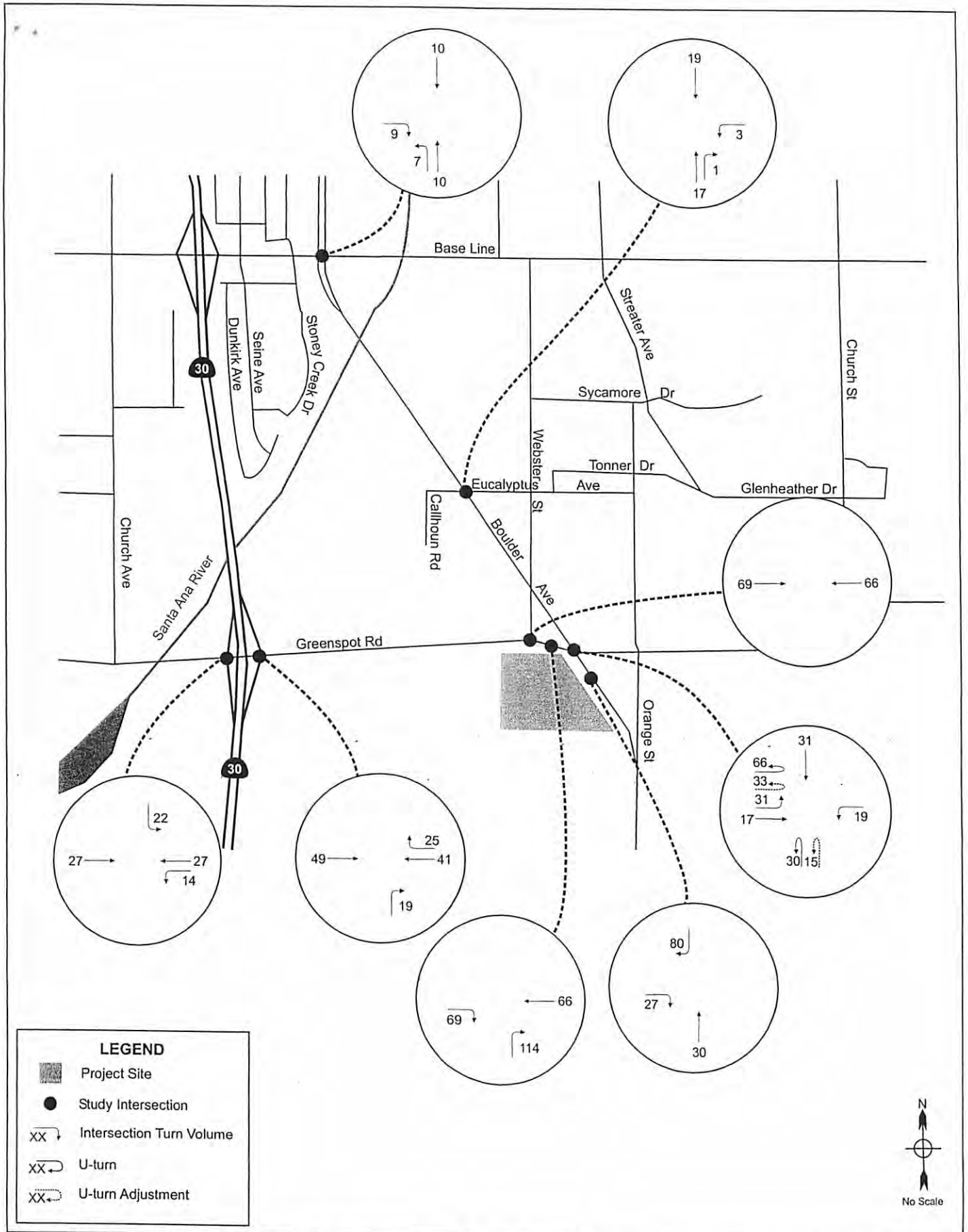

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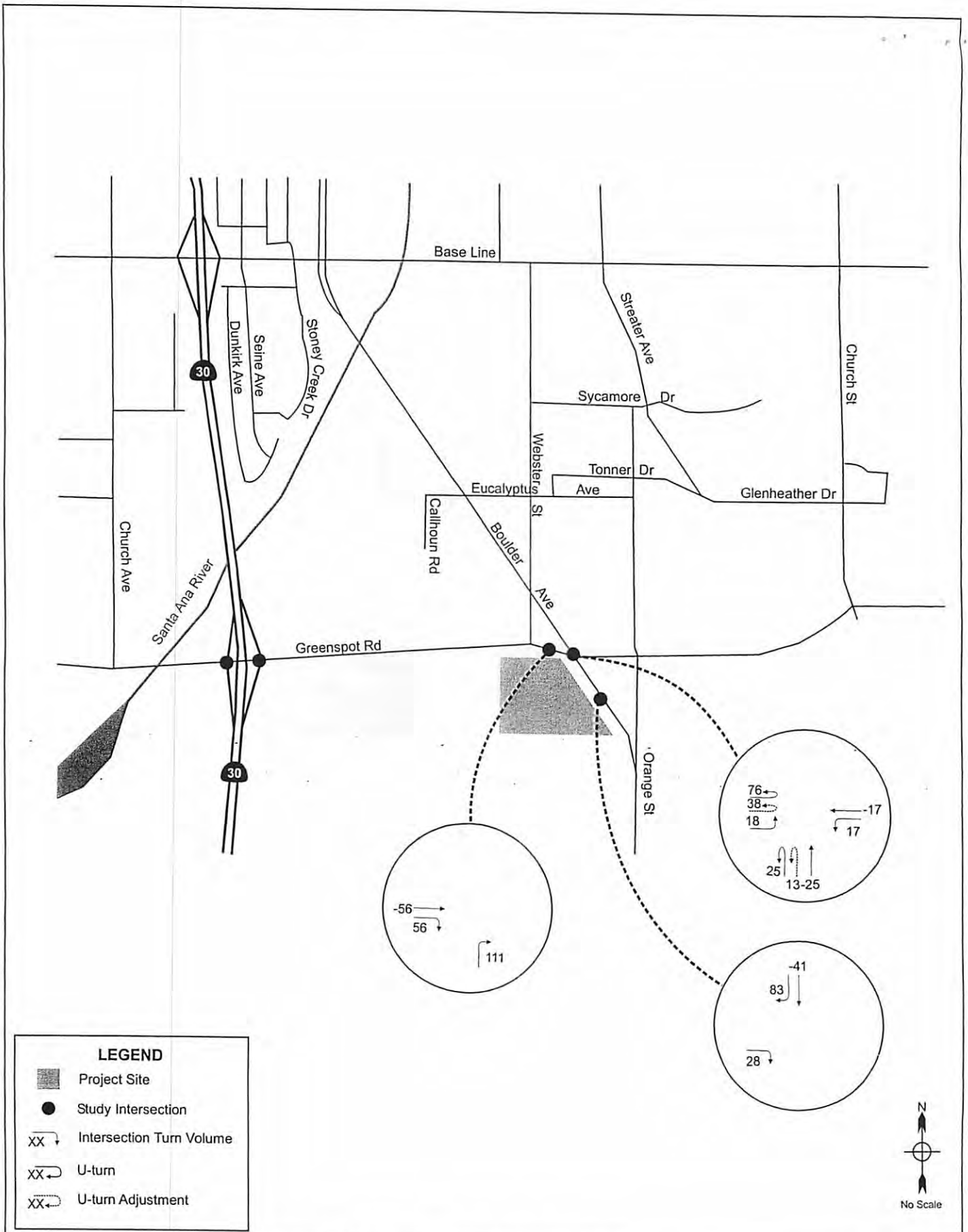
Figure 13

Added Traffic Volumes - PM Peak Hour



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Highland Retail - Traffic Impact Study

Figure 14

Passby Traffic Volumes - AM Peak Hour

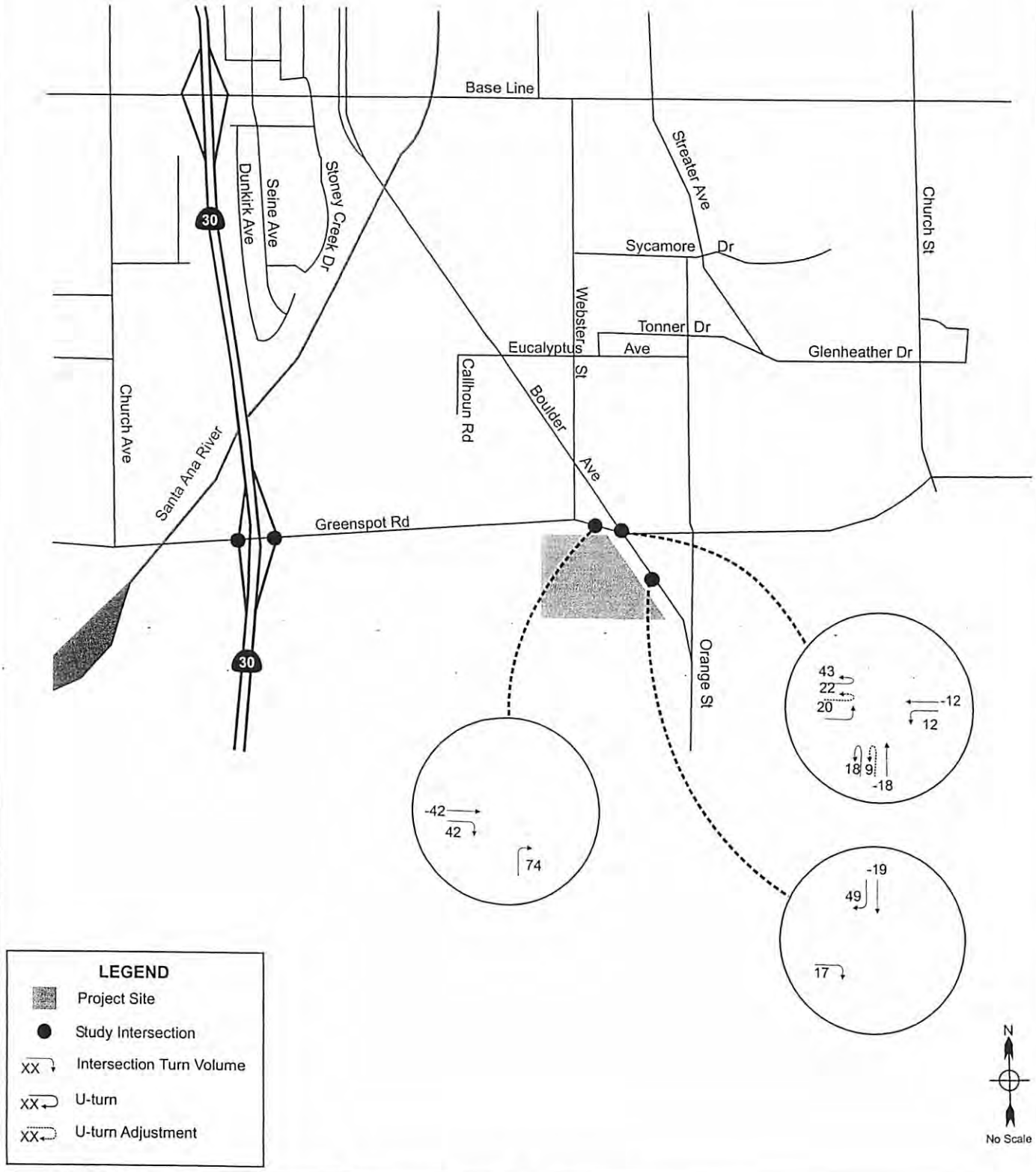

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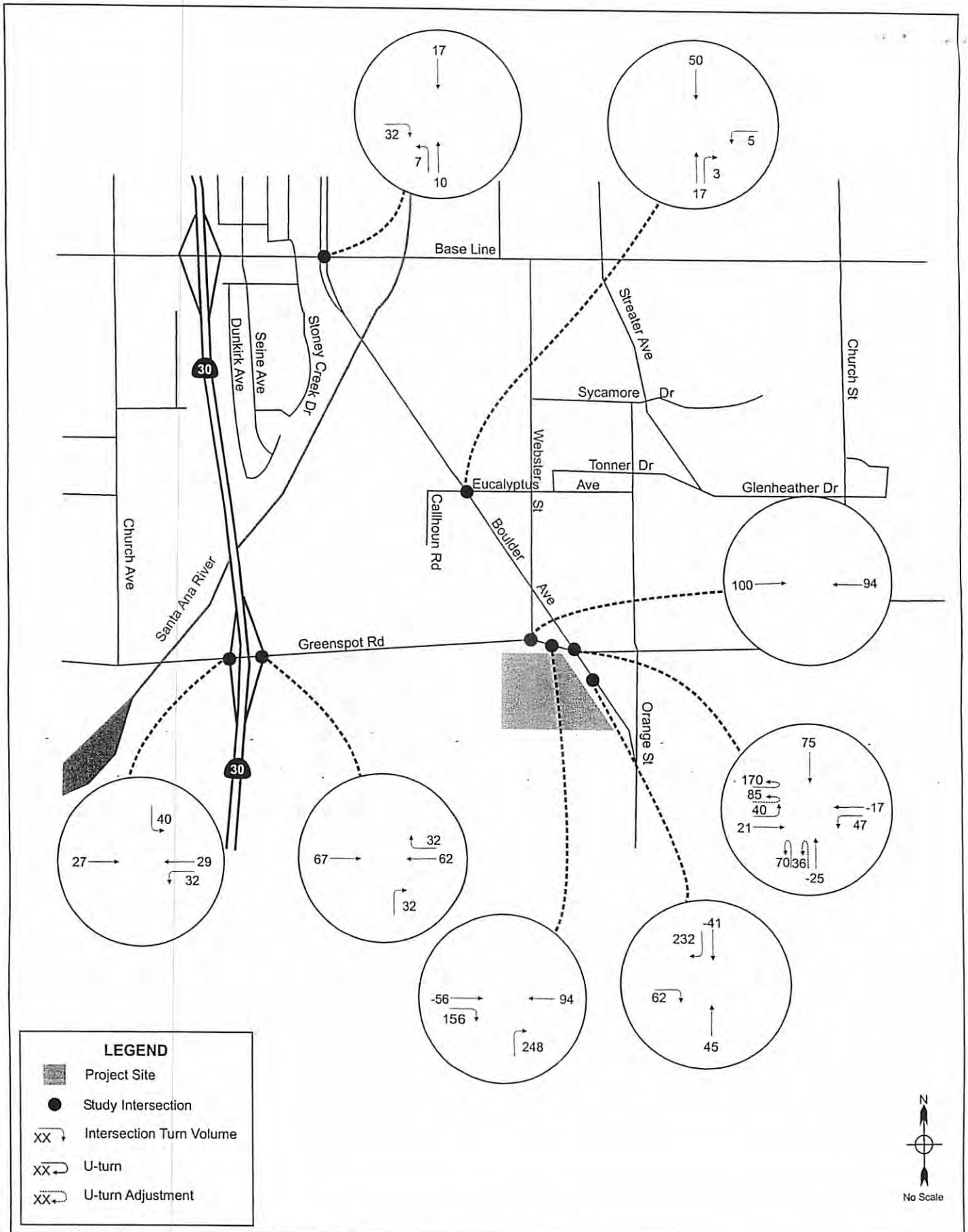
Figure 15

Passby Traffic Volumes - PM Peak Hour



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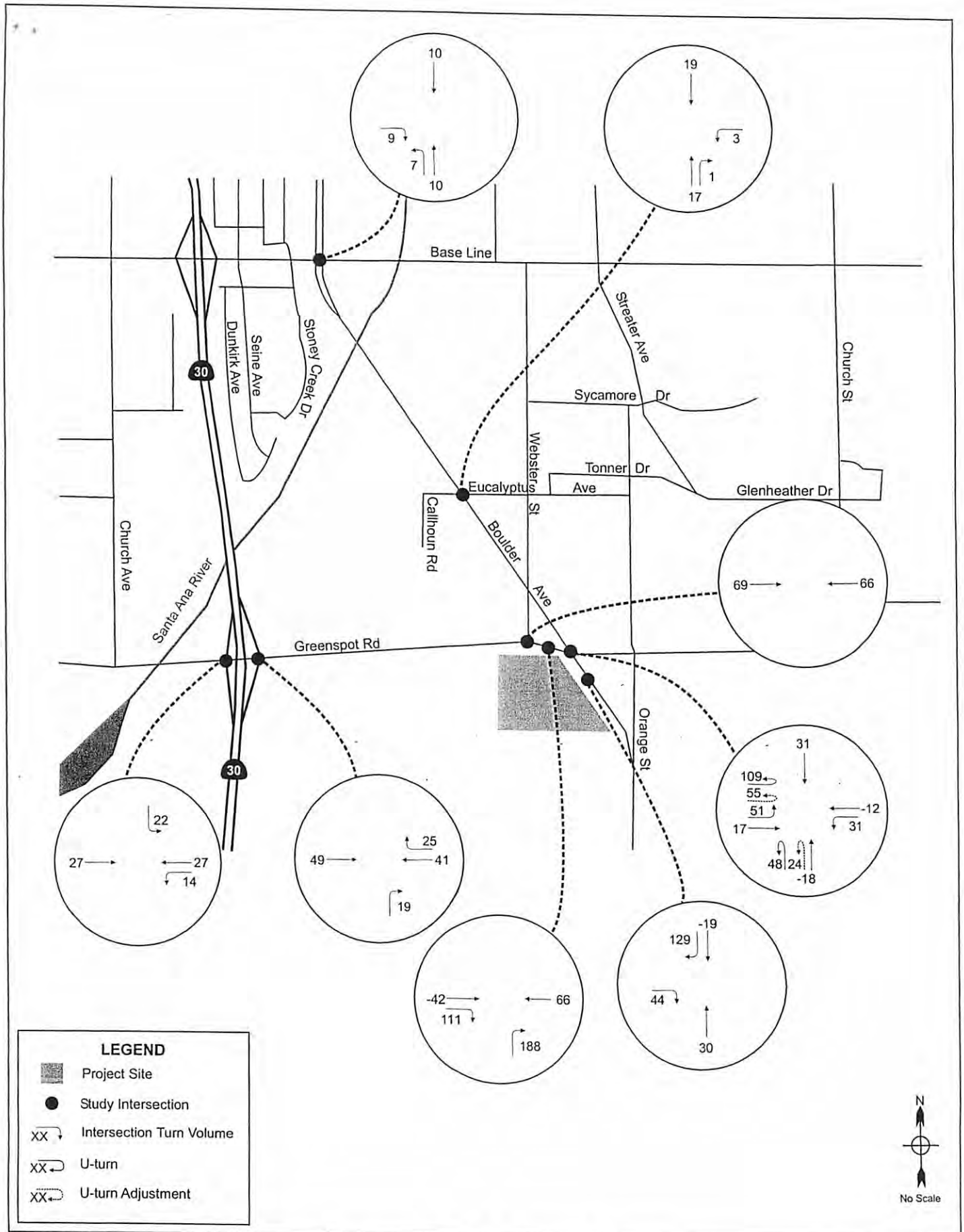
Highland Retail - Traffic Impact Study

Figure 16

Total Project Related Traffic Volumes - AM Peak Hour



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Highland Retail - Traffic Impact Study

Figure 17

Total Project - Related Traffic Volumes - PM Peak Hour

8. Near Term WITH Project Conditions (Year 2012)

This section documents the near term (Year 2012) traffic conditions with the addition of total project-related traffic to the surrounding street system.

Near Term Peak Hour Intersection Level of Service

The near term "WITH Project" traffic volumes were derived by adding the total project trips shown in Figures 16 and 17 to the future traffic volumes for the year 2012. Table 9 summarizes the results of the level of service analysis for the future "WITH Project" conditions.

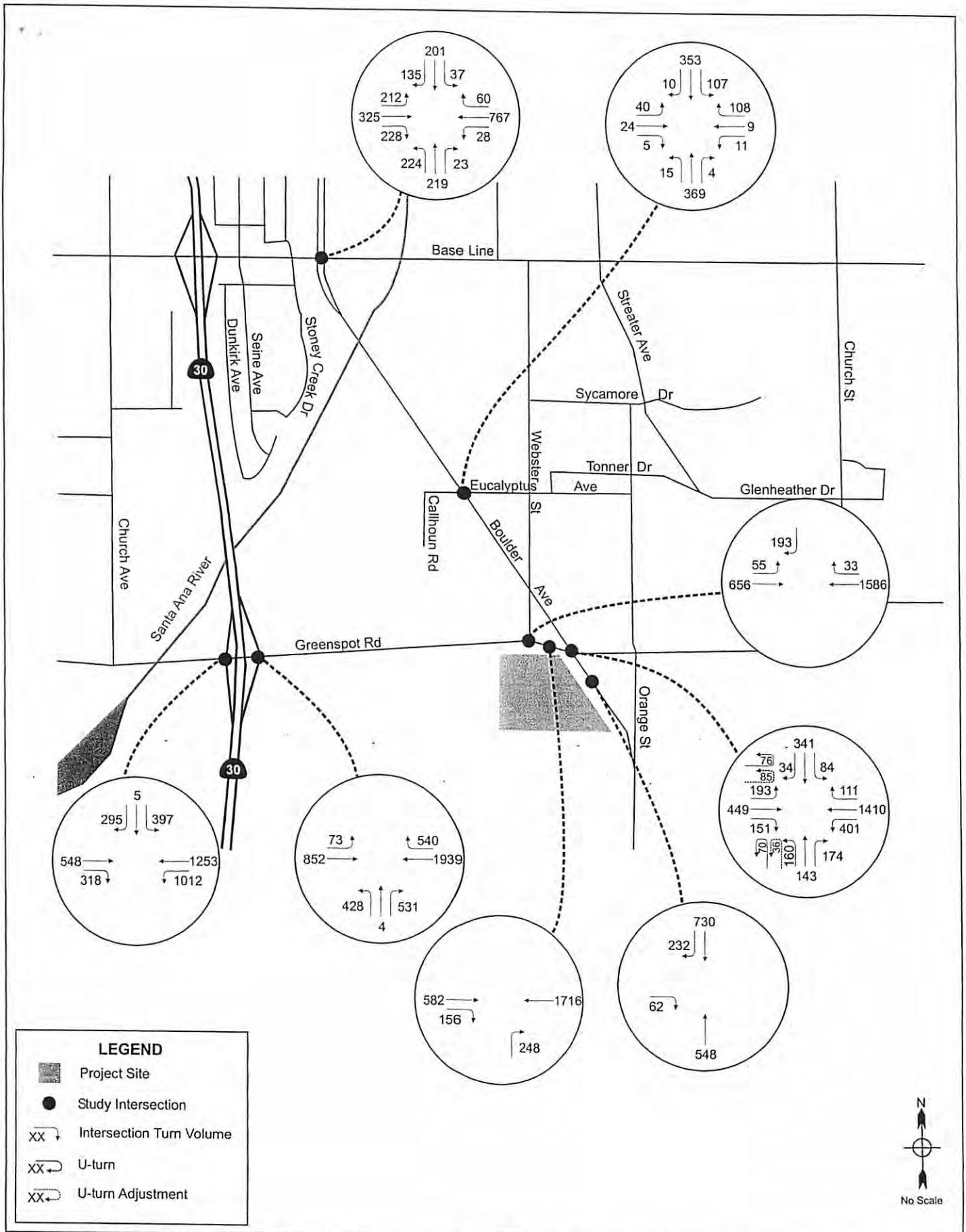
Table 9
AM/PM Peak Hour Intersection Performance
Near Term WITH Project Conditions (Year 2012)

Intersection	AM Peak Hour				PM Peak Hour			
	Delay (sec)		Level of Service		Delay (sec)		Level of Service	
	Average	Poorest Movement	Average	Poorest Movement	Average	Poorest Movement	Average	Poorest Movement
Unsignalized Intersections								
Project Driveway at Greenspot Rd.	1.2	12.9	A	B	1.3	22.9	A	C
Project Driveway at Boulder Ave.	0.5	11.5	A	B	0.5	9.3	A	A
Greenspot Rd. at Webster Ave.	5.1	63.6	A	F	2.7	20.0	A	C
Eucalyptus Ave. at Boulder Ave.	10.4	84.1	B	F	>120.0	>120.0	F	F
Signalized Intersections								
	Delay (sec)		Level of Service		Delay (sec)		Level of Service	
	Average		LOS		Average		LOS	
Greenspot Rd. at Boulder Ave.	99.5		F		72.6		E	
Greenspot Rd. at SR-30 NB Ramps	43.4		D		>120.0		F	
Greenspot Rd. at SR-30 SB Ramps	31.4		C		>120.0		F	
Base Line St. at Boulder Ave.	33.2		C		40.1		D	

Note: Delay based on seconds per vehicle average. LOS = Level of Service.

As shown in Table 9, the intersections are forecast to operate at Level of Service D or better during the AM or PM peak hour except the following:

- Greenspot Road at Webster Street for the poorest movement (AM peak hour)
- Eucalyptus Avenue at Boulder Avenue (AM and PM peak hours)
- Greenspot Road at Boulder Avenue (AM and PM peak hours)
- Greenspot Road at SR-30 Northbound Ramp (PM peak hour)
- Greenspot Road at SR-30 Southbound Ramp (PM peak hour)



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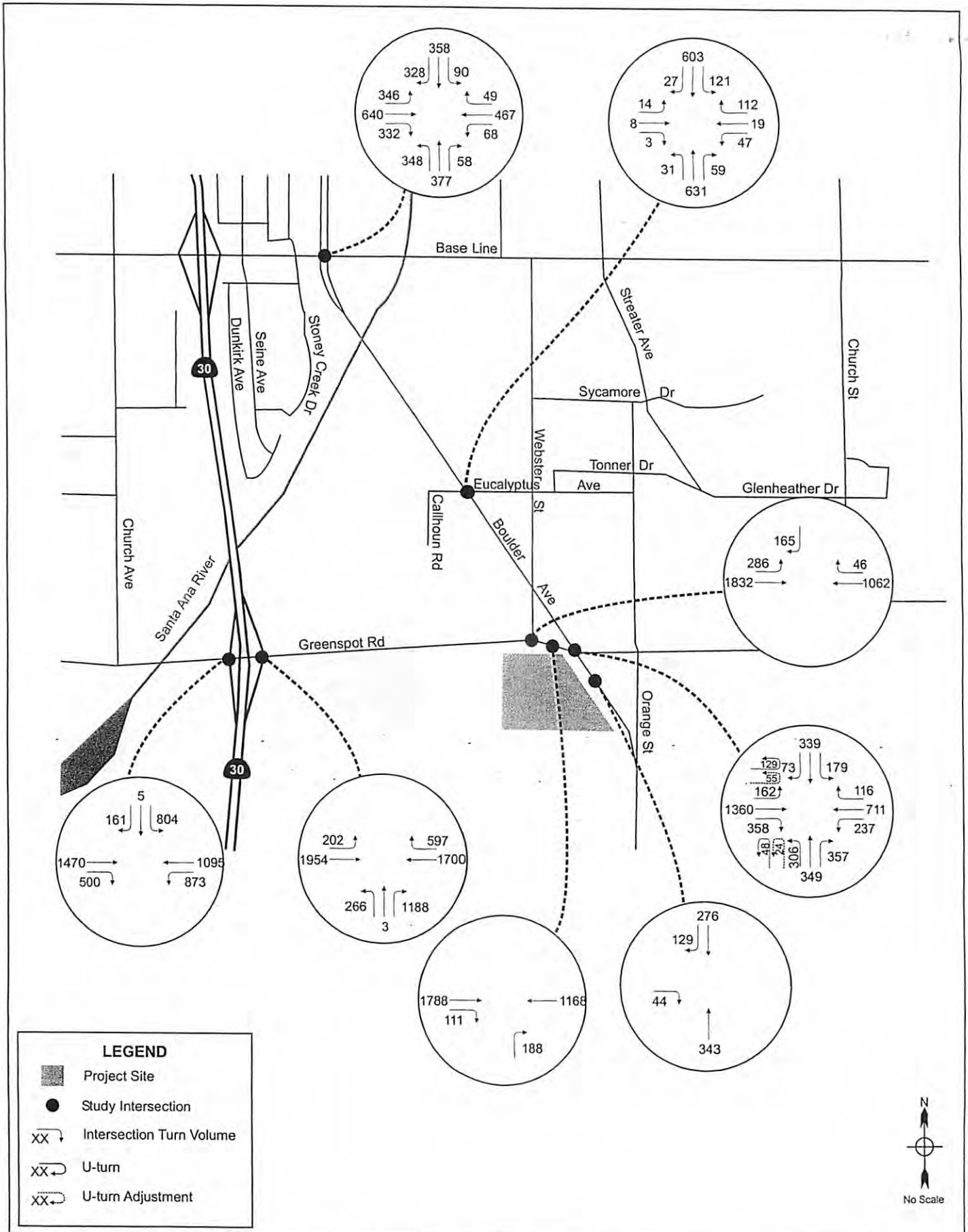
Highland Retail - Traffic Impact Study

Figure 18

Near Term (Year 2012) Traffic Volumes with Project Traffic - AM Peak Hour



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Highland Retail - Traffic Impact Study

Figure 19

Near Term (Year 2012)Traffic Volumes with Project Traffic - PM Peak Hour

CUMULATIVE PROJECT 7

TRAFFIC IMPACT STUDY

Centerstone Subdivision

City of Highland, California

Prepared for:

City of Highland
27215 Base Line
Highland, CA 92346
(909) 864-8732

Prepared by:

Hernandez, Kroone & Associates
234 East Drake Drive
San Bernardino, CA 92408
(909) 884-3222

September 2009

INTRODUCTION

This analysis was prepared to determine the potential traffic impacts of the Centerstone Subdivision, a housing development proposed at the southeast corner of the Greenspot Road / Orange Street intersection. The project will provide 133 units of single family detached housing. The 21 acre site is located approximately 800 feet east of the intersection of Boulder Avenue / Greenspot Road in the City of Highland, California. (See Vicinity Map)

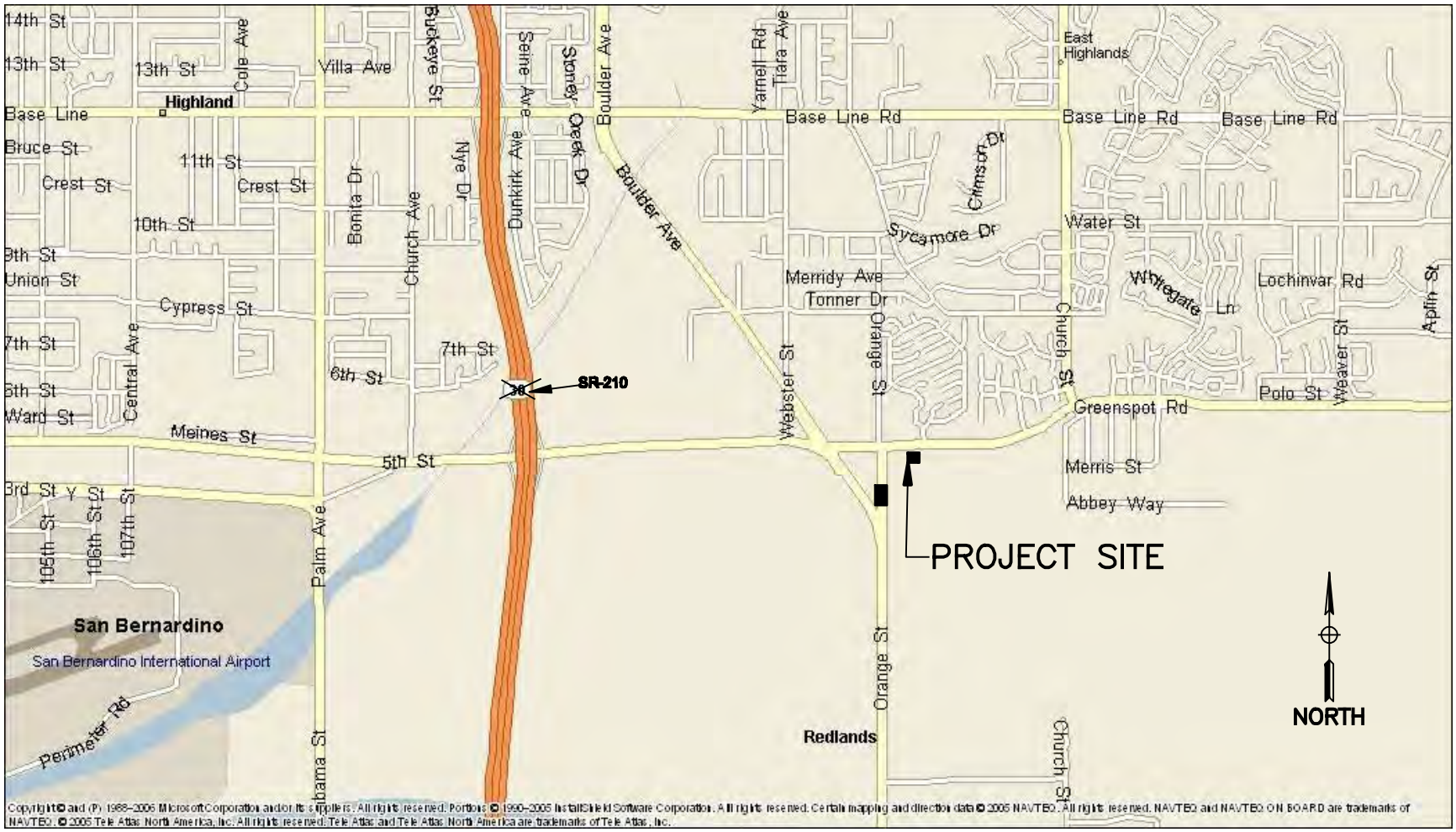
The site is currently undeveloped land. There is a mobile home park west of the project at the southwest corner of the Greenspot Road / Orange Street intersection. The property directly north of the site is developed as single family homes, with two operating schools and a post office under construction nearby. The property south of the project includes the easement for the Metropolitan Water District of Southern California Inland Feeder Pipeline, the Santa Ana River Wash and two land leases to gravel mining companies.

The land immediately to the east of the project is vacant. The site is proposed to be developed as Blossom Trails Subdivision consisting of 14 single family homes and 306 condos / town homes. The 14 single family homes will be north of Greenspot Road and the 306 condos / town homes will be south of Greenspot Road. Urban Crossroads completed a traffic study for the Blossom Trails project on January 27, 2006.

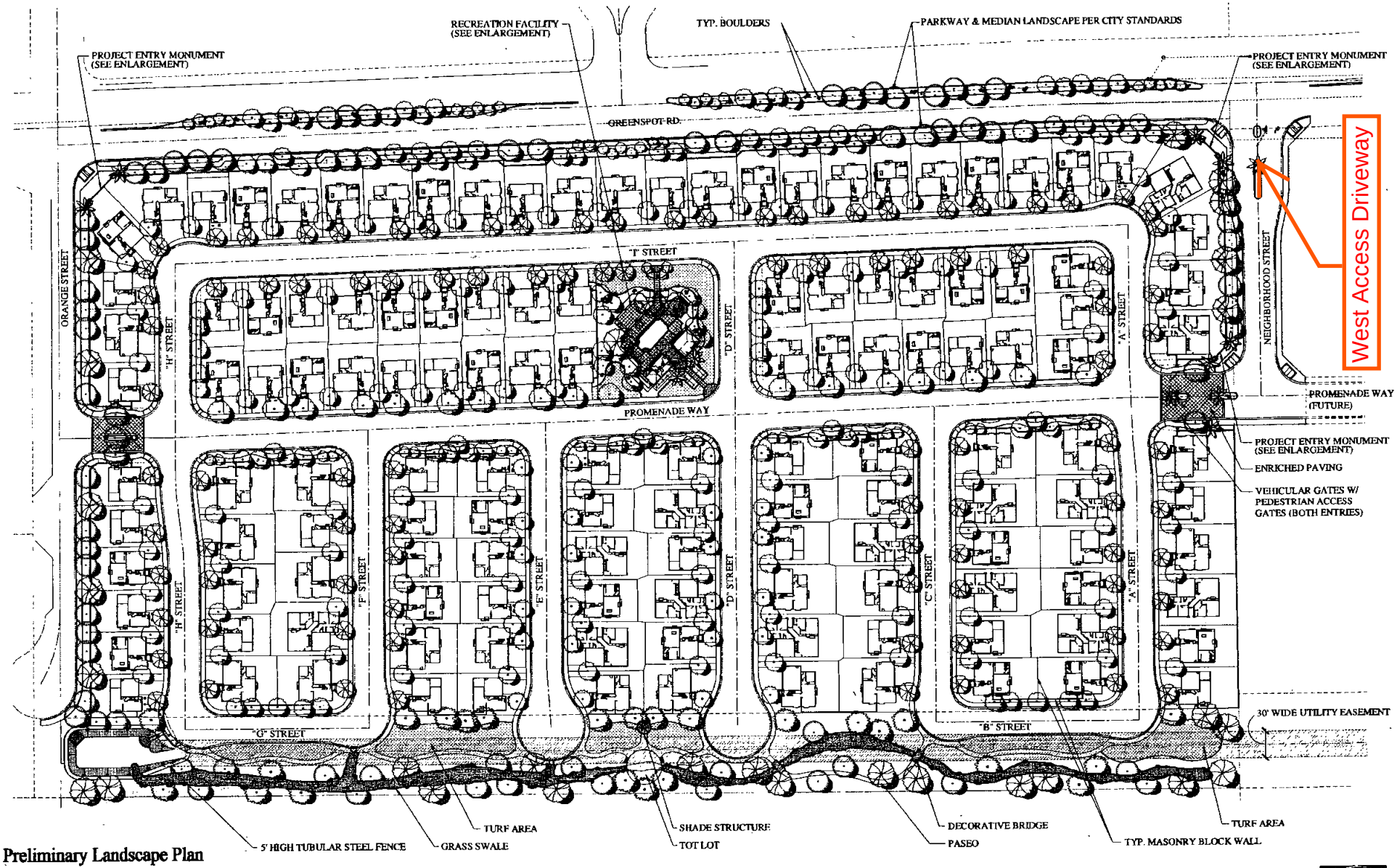
In the January 2006 traffic study the Blossom Trails Subdivision and the Centerstone Subdivision were anticipated to share an access to Greenspot Road about 1,320 feet east of Orange Street. Since that access was on the west side of the Blossom Trails project, it was called the “West Access Driveway”. This access will be called the “West Access Driveway” in this traffic study as well even though it is on the east side of the development. (See Site Plan)

Centerstone Subdivision’s other access will be at Orange Street / Greenspot Road. The main thrust of the study will be to analyze the West Access Driveway in the absence of the Blossom Trails development. This traffic study is a revision of the one completed December 2008. The number of dwelling units was changed from 120 to 133. This is an increase of 13 trips during the PM Peak Period. The exhibits, tables, analysis and conclusions have been revised to reflect this change.

This traffic study was completed with generally accepted procedures and reflects the opinions of Hernandez, Kroone & Associates.



Hernandez, Kroone & Associates, Inc — CONSULTING ENGINEERS — PLANNING - DESIGN - SURVEYING 234 EAST DRAKE DRIVE SAN BERNARDINO, CA 92408 (909) 884-3222 FAX (909) 383-1577 E-MAIL	OWNER CENTERSTONE SUBDIVISION	08–1030
	DESCRIPTION VICINITY MAP	DATE 12/08/08



Preliminary Landscape Plan

Centerstone @ Woodbridge Trails

Highland, California

Centerstone Communities, Inc.

SCALE: 1" = 40'-0"

NUVIS
LANDSCAPE ARCHITECTURE
AND PLANNING
CA 1226 NV 396

SHT 1 OF 3

The Single Family-Detached Housing category was used to approximate the number of AM and PM Peak Period trips in and out of the proposed 133 units housing development. These trips are summarized in Table 2 below. The detailed calculations can be found in Appendix C.

Table 2: Project Trip Summary Table

Development Type	**AM Peak Period**			**PM Peak Period**			**ADT[1]**
	Total	**In**	**Out**	**Total**	**In**	**Out**	
Single Family-Detached Housing	100	25	75	134	84	50	1,273

[1]*ADT (Average Daily Trips) is the average number of vehicles expected to enter or leave the site during one day.*

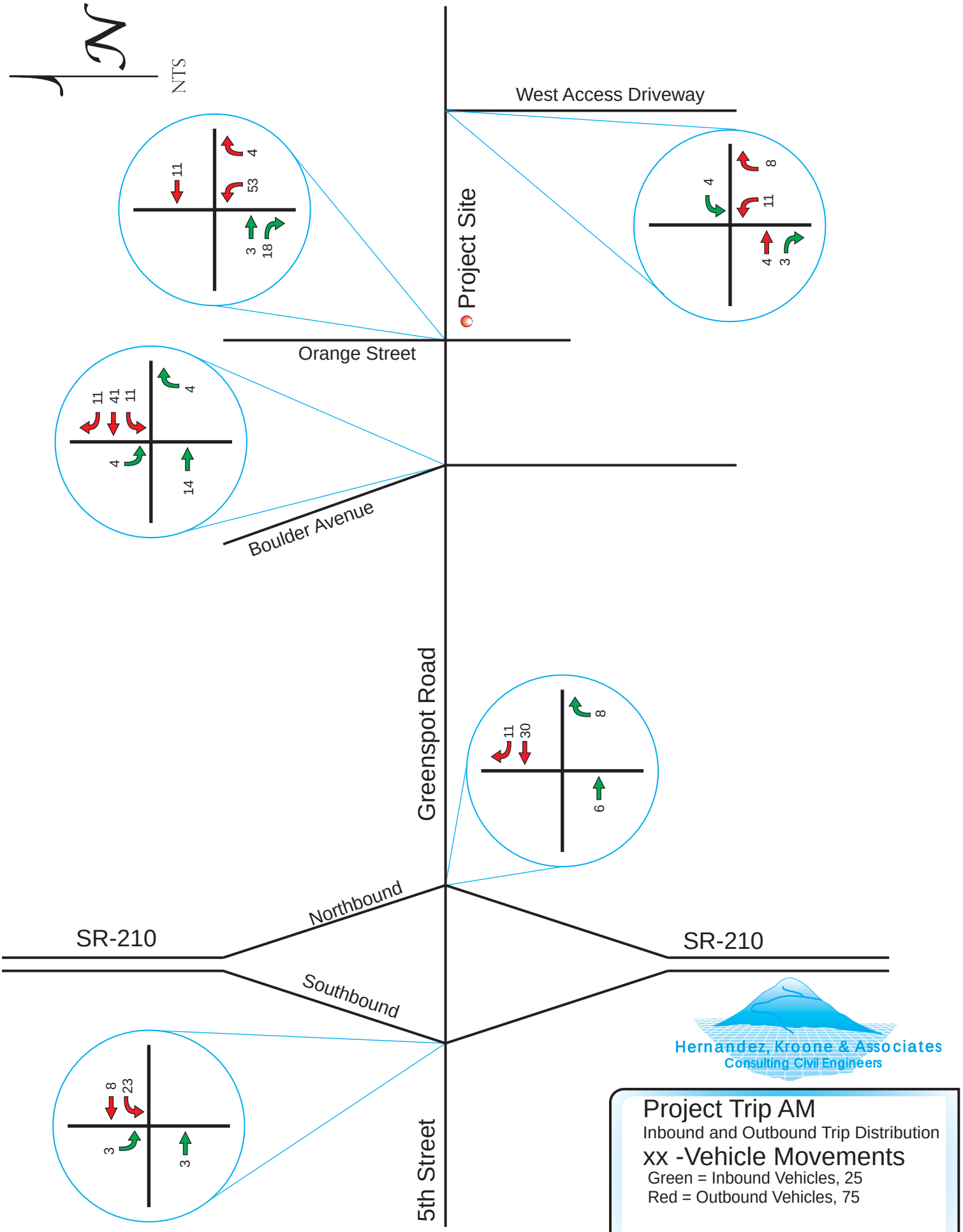
PROJECT TRIP DISTRIBUTION

To the west of the Centerstone Subdivision is access to the Cities of Highland, San Bernardino, Redlands, schools, post office, or shopping via Boulder Avenue and SR-210 to Interstate 10 (I-10) or Interstate 215 (I-215). The Golden Triangle area west of Centerstone will be developing in the next few years and will provide a major attraction for shopping, entertainment, work and dining. To the east of the site are smaller shopping centers, subdivisions and indirect rural access to the unincorporated area of Mentone and the mountains. The Urban Crossroads study anticipated that 85% of the project traffic would leave to the west or arrive from the west. This distribution will be used for this analysis of the Centerstone development. The project's trip distribution is shown in Appendix C.

BACKGROUND TRAFFIC GROWTH

Growth Rate

In order to accurately model the traffic conditions for future scenarios, it is necessary to increase the background (existing) traffic in addition to adding in the cumulative project trips. A 2% growth rate per year will be assumed to the Opening Year for this analysis. Opening Year is assumed to be 2011. This will result in an overall increase of 6% to the existing counts at the study intersections.


NTS
West Access Driveway
Project Site
Orange Street
Boulder Avenue
Greenspot Road
Northbound
Southbound
SR-210
SR-210
5th Street
11
4
53
3
18
4
8
11
4
3
11
41
11
4
4
14
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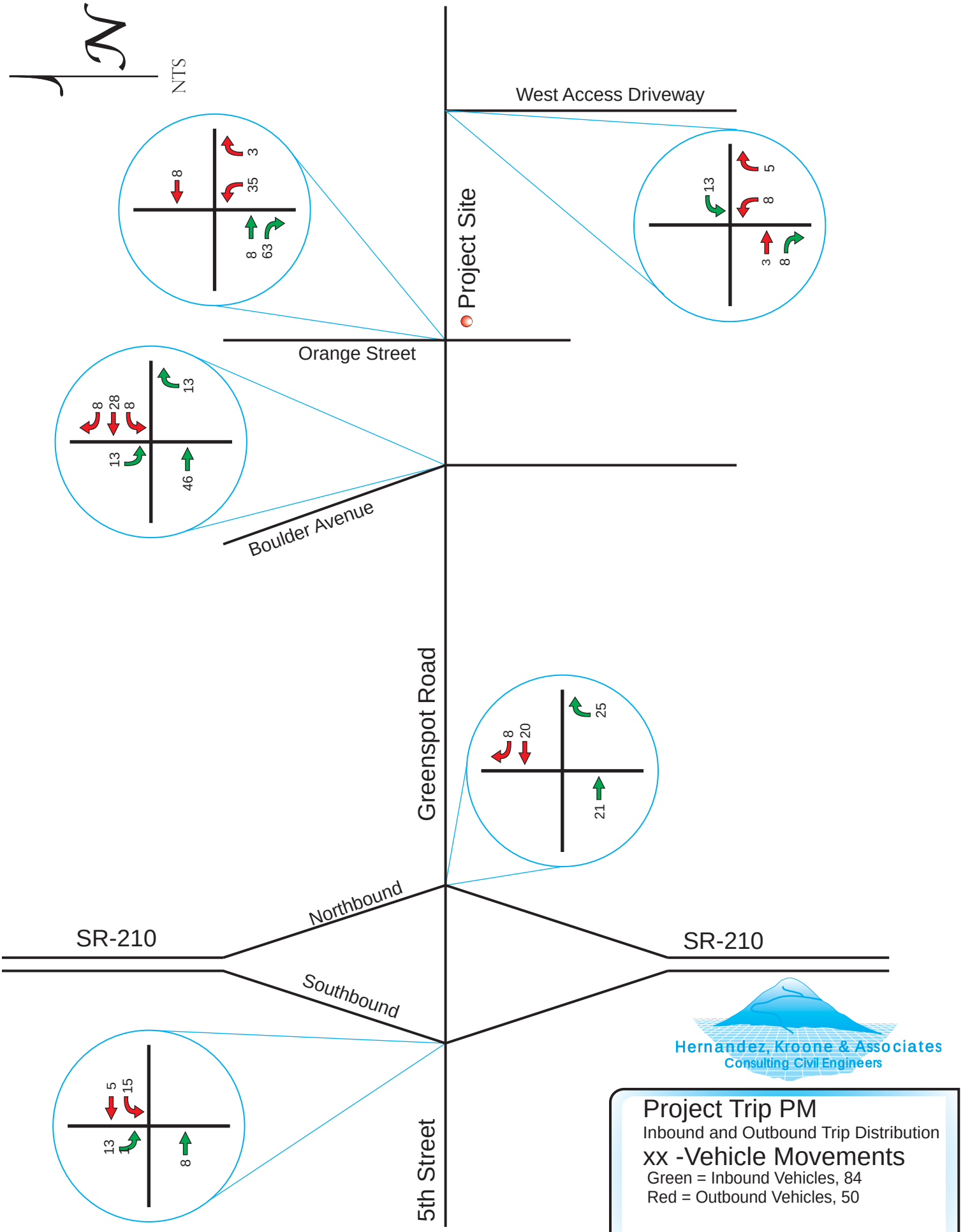
30
8
6
8
23
3
3
Hernandez, Kroone & Associates
Consulting Civil Engineers
Project Trip AM
Inbound and Outbound Trip Distribution
xx -Vehicle Movements
Green = Inbound Vehicles, 25
Red = Outbound Vehicles, 75


NTS
West Access Driveway
Project Site
Orange Street
Boulder Avenue
Greenspot Road
Northbound
Southbound
SR-210
SR-210
5th Street
3
35
8
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5
8
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3
8
8
28
8
13
13
46
8
20
25
21
5
15
13
1
8
Hernandez, Kroone & Associates
Consulting Civil Engineers
Project Trip PM
Inbound and Outbound Trip Distribution
xx -Vehicle Movements
Green = Inbound Vehicles, 84
Red = Outbound Vehicles, 50

CUMULATIVE PROJECT 8

TABLE 1

PROJECT TRIP GENERATION RATES[1]

Land Use[1]	ITE LU Code	Quantity	Units[2]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
PLANNING AREA 1 (COMMERCIAL)										
Phase 1:										
Shopping Center	820	588	TSF	0.45	0.29	0.74	1.74	1.81	3.55	36.53
Phase 2:										
Fast Food w/ Drive Thru	934	4	TSF	25.17	24.18	49.35	17.60	16.24	33.84	496.12
Gasoline/Service Station w/Conven. Mkt.[3]	945	3.6	TSF	40.44	38.86	79.30	48.54	48.54	97.08	1064.40
PLANNING AREA 2 (RESIDENTIAL):										
Apartment	220	546	Occupied DU	0.10	0.41	0.51	0.40	0.22	0.62	6.65
PLANNING AREA 3 (VILLAGE CENTER - MIXED USE):										
Shopping Center	820	91	TSF	0.98	0.62	1.60	3.22	3.35	6.57	70.19
Fast Food w/ Drive Thru	934	7.2	TSF	25.17	24.18	49.35	17.60	16.24	33.84	496.12
Drive-in Bank	912	10	TSF	6.92	5.43	12.35	12.91	12.91	25.82	148.15
Apartment	220	150	DU	0.10	0.41	0.51	0.40	0.22	0.62	6.65
Senior Adult Housing - Attached	252	104	Occupied DU	0.05	0.08	0.13	0.10	0.06	0.16	3.48
Hotel	310	240	Occupied RM	0.39	0.28	0.67	0.34	0.36	0.70	8.92

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eighth Edition (2008).

[2] TSF = Thousand Square Feet; DU = Dwelling Unit; RM = Room

[3] The daily trip rate is based on PM Peak Hour to Daily Trip Ratio for ITE Code 946 (Service Station with Conv. Market and Car Wash)

TABLE 2 (PAGE 1 OF 2)

PROJECT TRIP GENERATION SUMMARY

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
TAZ 1 (COMMERCIAL)									
Phase 1									
Shopping Center	588	TSF	265	171	436	1,023	1,064	2,087	21,480
Phase 1 Subtotal			265	171	436	1,023	1,064	2,087	21,480
"Pass-By" Trips (25% Commercial Only) [2]			*-55*	*-55*	*-109*	*-261*	*-261*	*-522*	*-5,370*
Phase 1 Subtotal (less "Pass-By")			210	116	326	762	803	1,565	16,110
Phase 2									
Fast Food w/ Drive Thru	4	TSF	101	97	198	70	65	135	1,984
Gasoline/Service Station w/Conven. Mkt.	3.6	TSF	146	140	286	175	175	350	3,832
Phase 2 Subtotal			247	237	484	245	240	485	5,816
"Pass-By" Trips (25% Commercial Only) [2]			*-61*	*-61*	*-121*	*-61*	*-61*	*-121*	*-1,454*
Phase 2 Subtotal (less "Pass-By")			186	176	362	184	179	363	4,362
TOTAL PLANNING AREA 1 (without "pass-by" reduction)			512	408	920	1,268	1,304	2,572	27,296
TOTAL PLANNING AREA 1 (less "pass-by")			396	292	688	946	982	1,928	20,472
TAZ 2 (RESIDENTIAL)									
Apartment	546	DU	55	224	279	218	120	338	3,631
TOTAL PLANNING AREA 2			55	224	279	218	120	338	3,631
TAZ 3 (MIXED USE)									
Shopping Center	91	TSF	89	56	145	293	305	598	6,387
Fast Food w/ Drive Thru	7.2	TSF	181	174	355	127	117	244	3,572
Drive-in Bank	10	TSF	69	54	123	129	129	258	1,482
Subtotal for Commercial Uses			339	284	623	549	551	1,100	11,441
Apartment	150	DU	15	62	77	60	33	93	998
Senior Adult Housing - Attached	104	Occupied DU	5	8	13	10	6	16	362
Hotel	240	Occupied RM	94	67	161	82	86	168	2,141
Subtotal for Residential Uses			114	137	251	152	125	277	3,501
TOTAL PLANNING AREA 3			453	421	874	701	676	1,377	14,942

STUDY AREA PROJECT TRIP GENERATION							
Gross Total Commercial	*851*	*692*	*1,543*	*1,817*	*1,855*	*3,672*	*38,737*
Internal Capture with residential Uses [3]	*-43*	*-48*	*-91*	*-130*	*-115*	*-245*	*-2,532*
TOTAL COMMERCIAL *(with Internal Capture)*	808	644	1,452	1,687	1,740	3,427	36,205
Gross Total Residential	*169*	*361*	*530*	*370*	*245*	*615*	*7,132*
Internal Capture with Commercial Uses [3]	*-48*	*-43*	*-91*	*-115*	*-130*	*-245*	*-2,532*
TOTAL RESIDENTIAL *(with Internal Capture)*	121	318	439	255	115	370	4,600
TOTAL PROJECT TRIPS *(with Intenal Capture)*	929	962	1,891	1,942	1,855	3,797	40,805

TABLE 2 (PAGE 2 OF 2)

PROJECT TRIP GENERATION SUMMARY

EXTERNAL TRIPS PROJECT TRIP GENERATION							
	AM Peak Hour			PM Peak Hour			
	In	Out	Total	In	Out	Total	Daily
Total Commercial (with Internal Capture) [4]	*808*	*644*	*1,452*	*1,687*	*1,740*	*3,427*	*36,205*
"Pass-By" Trips Total (25% Commercial Only) [2]	*-182*	*-182*	*-363*	*-429*	*-429*	*-857*	*-9,051*
TOTAL PROJECT COMMERCIAL *(less internal capture, less "pass-by")*	626	462	1,088	1,258	1,311	2,569	27,154
TOTAL RESIDENTIAL *(less internal capture)*	121	318	439	255	115	370	4,600
NET PROJECT EXTERNAL TRIPS	747	780	1,527	1,513	1,426	2,939	31,754
USED IN SUBSEQUENT ANALYSIS	793	838	1,631	1,524	1,427	2,951	32,765
DIFFERENCE	46	58	104	11	1	12	1,011
% DIFFERENCE	6.2%	7.4%	6.8%	0.7%	0.1%	0.4%	3.2%

[1] TSF = Thousand Square Feet; DU = Dwelling Unit; RM = Room

[2] Pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination without route diversion. It should be noted that the pass-by reductions are applied after the internal capture reductions are taken. Pass-By reduction will not be applied to the project driveways and the intersections adjacent to the project site.

[3] Internal capture reductions include interactions between commercial, office, and residential uses. The internal capture rates are based upon data collected by the Institute of Transportation Engineers (ITE) and included in the Trip Generation Handbook, Chapter 7, Multi-Use Development.

[4] As mentioned previously, Pass-By trips are not applied at the project driveways and intersections adjacent to the site. Therefore, the following trip generation is utilized at the following intersections only: 1.) All Project Access points 2.) SR-210 NB Ramps/Greenspot Rd. 3.)Webster St./Greenspot Rd. 4.) Webster St./Boulder Ave.

PROJECT ONLY PEAK HOUR INTERSECTION VOLUMES

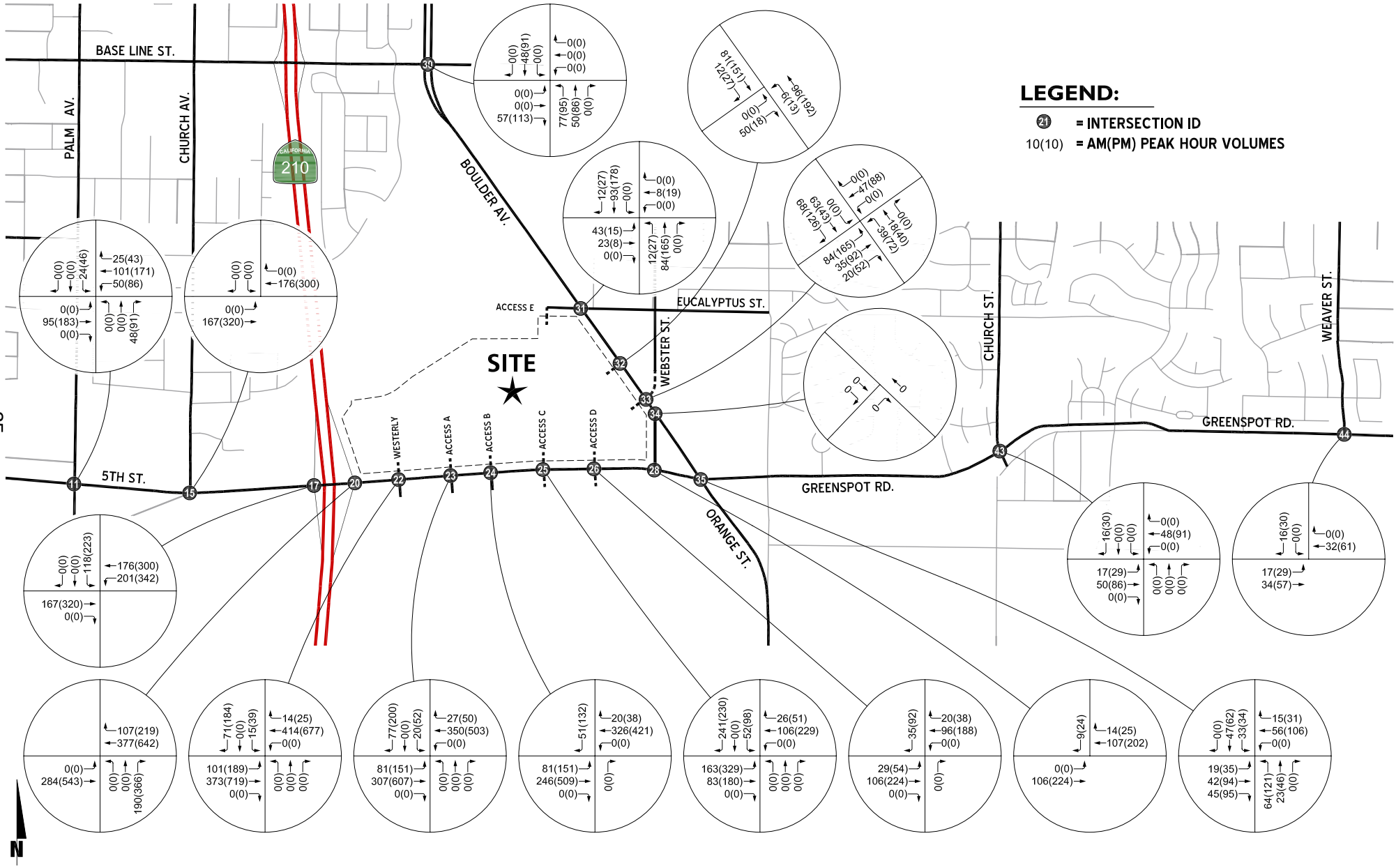
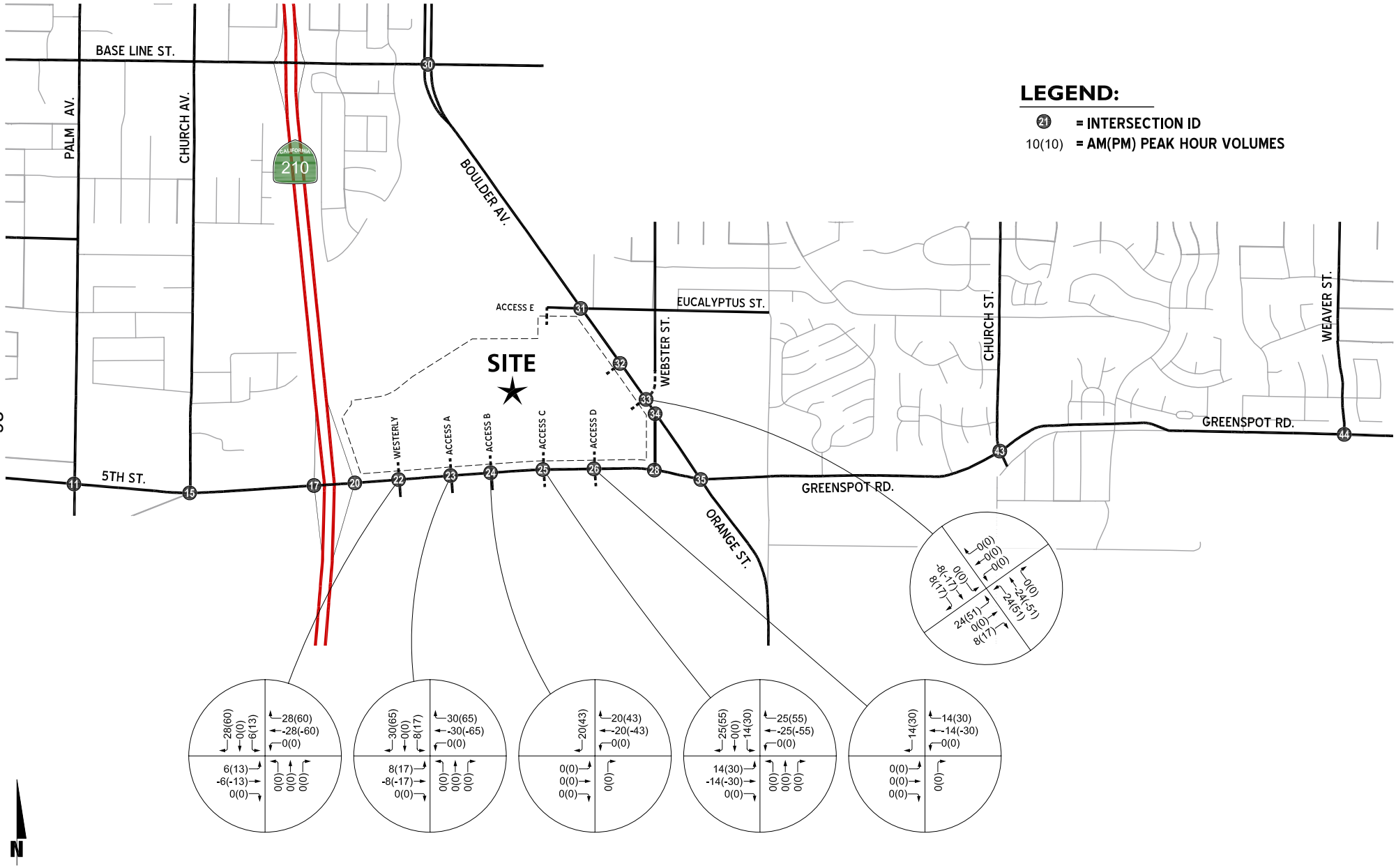


EXHIBIT E

PROJECT PASS-BY ONLY PEAK HOUR INTERSECTION VOLUMES

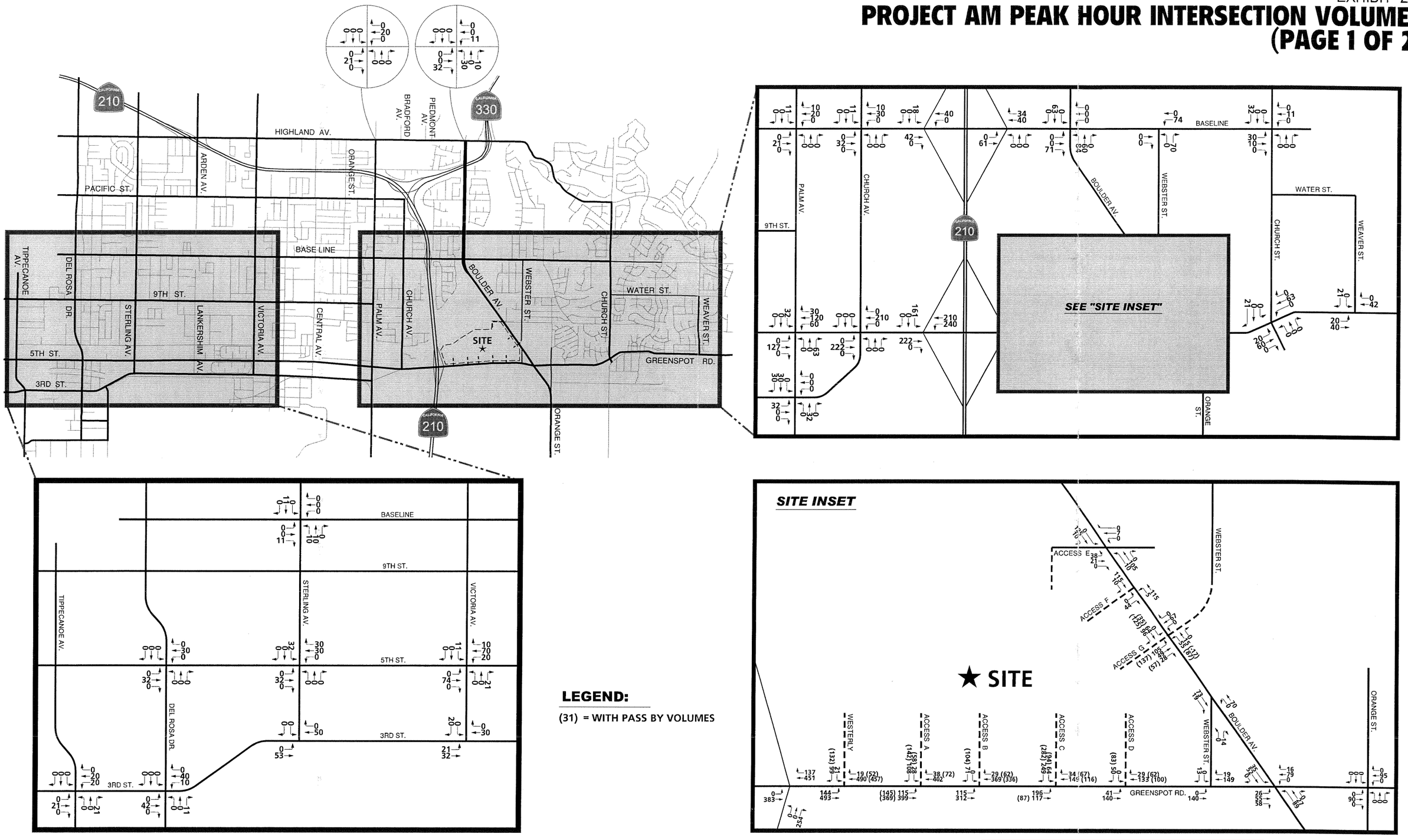


Greenspot Village & Marketplace Traffic Study Update
City of Highland, CA (JN - 08186:301)

URBAN CROSSROADS

EXHIBIT 2-D

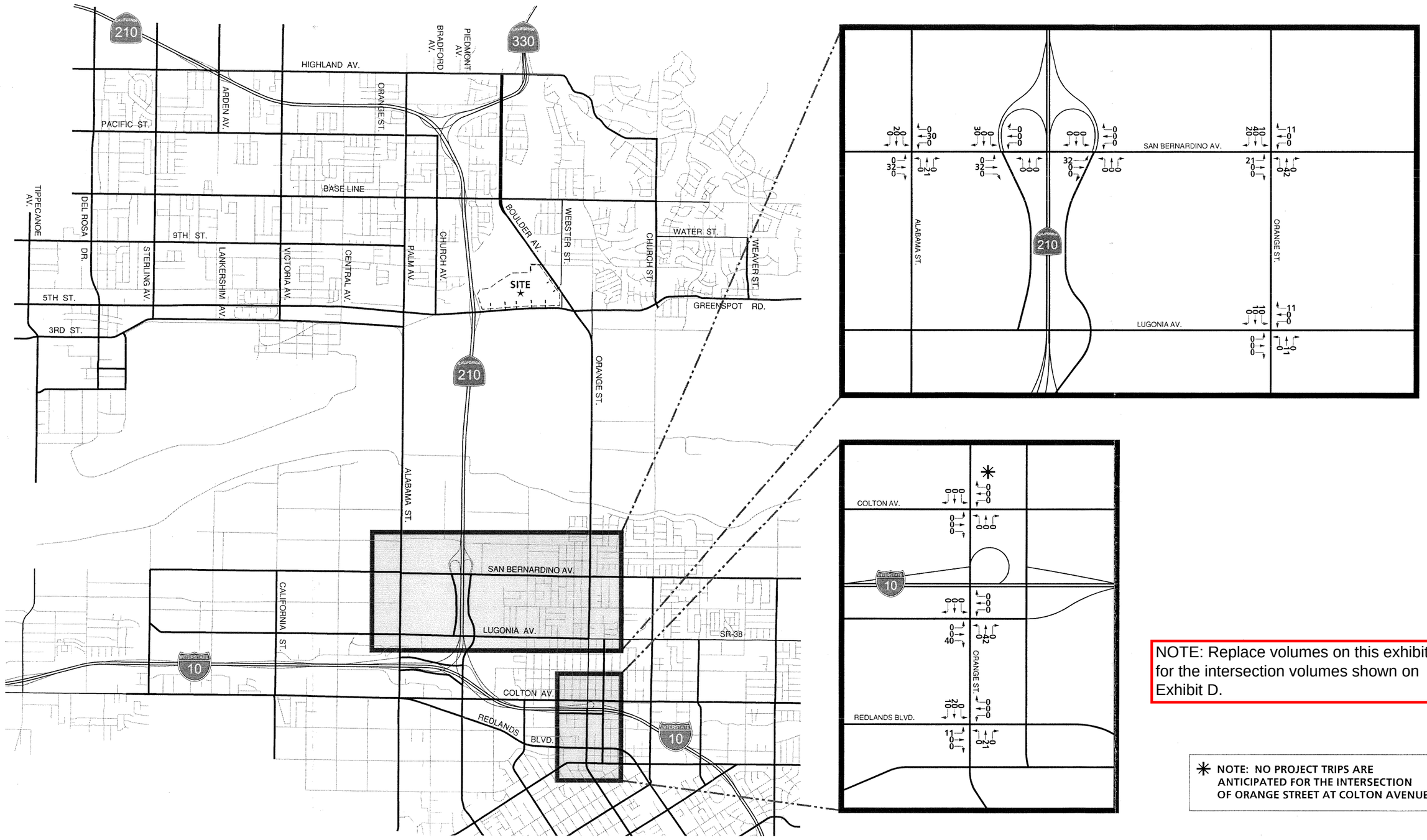
PROJECT AM PEAK HOUR INTERSECTION VOLUMES (PAGE 1 OF 2)



NOTE: Replace volumes on this exhibit for the intersection volumes shown on Exhibit D.

EXHIBIT 2-D

PROJECT AM PEAK HOUR INTERSECTION VOLUMES (PAGE 2 OF 2)

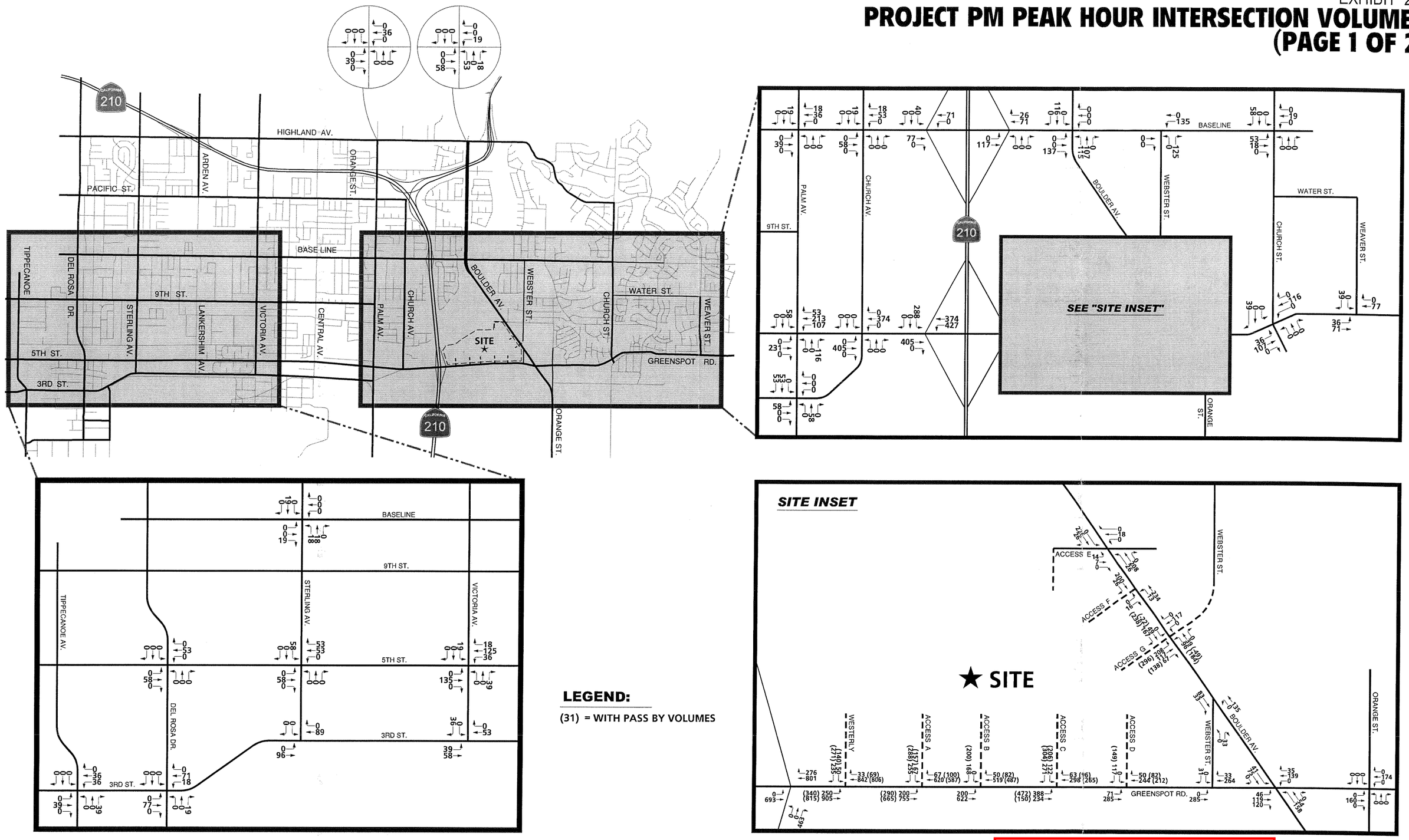


NOTE: Replace volumes on this exhibit for the intersection volumes shown on Exhibit D.

✳ NOTE: NO PROJECT TRIPS ARE ANTICIPATED FOR THE INTERSECTION OF ORANGE STREET AT COLTON AVENUE

EXHIBIT 2-E

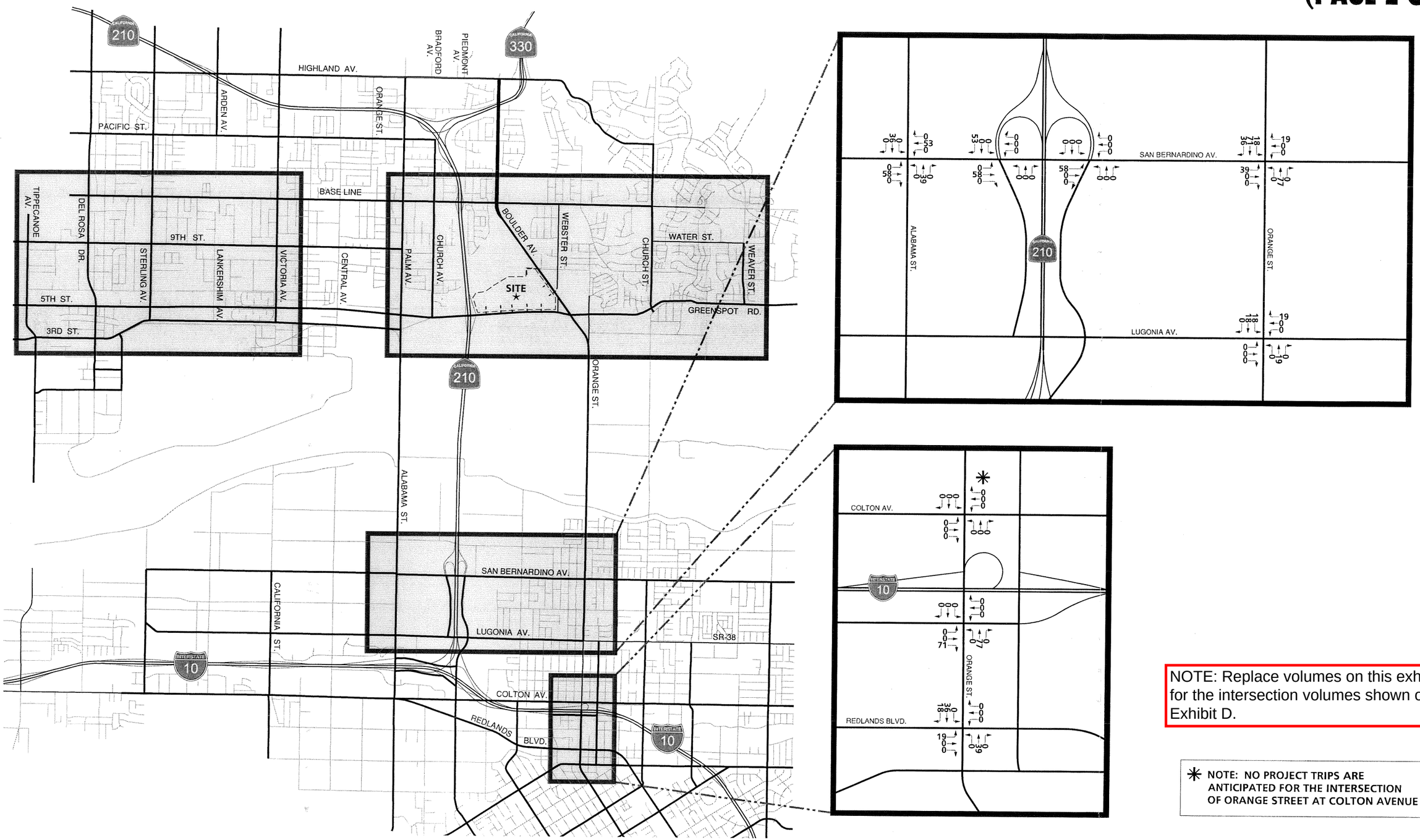
PROJECT PM PEAK HOUR INTERSECTION VOLUMES (PAGE 1 OF 2)



NOTE: Replace volumes on this exhibit for the intersection volumes shown on Exhibit D.

EXHIBIT 2-E

PROJECT PM PEAK HOUR INTERSECTION VOLUMES (PAGE 2 OF 2)



NOTE: Replace volumes on this exhibit for the intersection volumes shown on Exhibit D.

✳ NOTE: NO PROJECT TRIPS ARE ANTICIPATED FOR THE INTERSECTION OF ORANGE STREET AT COLTON AVENUE

CUMULATIVE PROJECT 9

David Chong
5 Lot SFD, North of Highland

The eastern site boundary abuts a new single-family residential development in the City of Highland. Building pads of the adjacent development are elevated above the project site. The southern site boundary is adjacent to two single-family residences in the City of Highland located off of Applewood Street, one single-family residence off of Orange Blossom Drive, one single-family residence located at the intersection of Summit Avenue and Live Oak Road, and the Sycamore Heights Hydro-Pneumatic Pump Plant, operated by the East Valley Water District (EVWD). The single-family residential homes surrounding the site vary from one to two stories with most being two stories in height. Two single-family homes on the southeastern border of the site, east of Applewood Street, are separated from the project site by a block masonry wall.

RECEIVED
SEP 21 2011

1.3 PROJECT DESCRIPTION

1.3.1 LAFCO Process

The project proposes a municipal reorganization of the City of San Bernardino and the City of Highland for annexation of the 3.62-acre site into the City of Highland due to the physical location of the project adjacent to the City of Highland and separated from the City of San Bernardino by Cook Canyon. The Local Agency Formation Commission (LAFCO) is the authority for local boundary changes and municipal reorganizations. Municipal reorganization for the project would include detachment of the 3.62-acre parcel from the City of San Bernardino, annexation of the parcel into the City of Highland Sphere of Influence (SOI) area, pre-zoning (ZC 006-002) of the parcel by the City of Highland to Low Density Residential (LDR), and annexation of the parcel into the City of Highland. The project would also be annexed into the Consolidated Landscape and Lighting District 96-1 and zoned within the Fire Safety Overlay District (FR 1).These actions would require a General Plan amendment (GPA 006-002) for both the City of Highland and the City of San Bernardino. Detachment of the parcel from the City of San Bernardino requires a Resolution from the City of San Bernardino City Council accepting the proposed action.

1.3.2 Proposed Land Use

24,700

Upon annexation into the City of Highland, the project applicant proposes to develop the 3.62-acre site for a five-lot residential subdivision as Tentative Tract Map No. 16636. Lot sizes would range from approximately 24,000 square feet to 42,700 square feet. Proposed structures would range in height from one to two stories. Figure 6, *Conceptual Site Plan*, shows the proposed layout of the five residential lots on the 3.62-acre site.

The project involves modifications to the existing landform and topography and removal of the irrigation canals (zanjas) along the northern and western property line. To create level residential pads, elevations in the northern portions of the site would be lowered while elevations in the southwestern portion of the site would be raised. As a result of the landform modifications, Lot 1 would be situated at an elevation of 1,880 feet, Lots 2 and 3 would be situated at an elevation of 1,885 feet, Lot 4 would be situated at an elevation of 1,850 feet, and Lot 5 at an elevation of 1,838 feet. Because of the difference in elevations on the southwestern end of the site, as a result of the existing 20-foot utility easement, a retaining wall with a height of approximately four feet would be required along the southern side of the proposed driveway to the Lot 5 pad. A retaining wall, measuring approximately five feet in height, would also be required between Lots 3 and 4 as a result of the difference in elevations.

The northerly end of Applewood Street, within the project site, would be a cul-de-sac with a curb radius of 40 feet for adequate space for maneuvering emergency vehicles. To accommodate the grade difference between the residential pads and the existing street elevation of Applewood Street, driveways to Lots 1, 2, and 3 would have a slope of 18 percent from the end cul-de-sac of Applewood Street leading up toward the residential pads, while the driveway to Lot 4 would have a slope of 14 percent downward towards the residential pad.

The project would be connected to existing utility connections in the right-of-way of Applewood Street. Electricity to the project site would be provided by Southern California Edison, gas service would be provided by the Southern California Gas Company (Sempra Utilities), and water and sewer service would be provided by EVWD. The EVWD also maintains an easement immediately north of the southwestern property line, near the Sycamore Heights Hydro-Pneumatic Pump Plant.

1.3.3 Project Phasing

The project would be completed in two phases. The first phase encompasses the three-part municipal reorganization for the parcel, which includes: (1) detachment of the 3.62-acre site from the City of San Bernardino, (2) sphere of influence (SOI) change for the parcel from the City of San Bernardino to the City of Highland by LAFCO, the City of San Bernardino, and the City of Highland, and (3) subsequent annexation of this parcel into the City of Highland. The second phase includes development and operation of the 3.62-acre site for the five single-family residential lots.

Tentative Construction Schedule

Construction is estimated to begin in 2007 and includes grading for development of individual building pads on the five single-family residential lots. Construction of the single-family residential homes would occur later as individual lots may be sold separately. Site grading is estimated to take approximately one and a half months. Site grading would require 5,398 cubic yards (cy) of cut and 1,614 cy of fill, resulting in the export of 3,784 cy of soil exported offsite.

1.4 EXISTING ZONING AND GENERAL PLAN

The project site is located in an area of the City of San Bernardino currently designated by the General Plan as Residential Low (RL), which permits 3.1 single-family detached dwelling units per acre and a 10,800-square-foot minimum lot size. The City of San Bernardino General Plan also designates the project site as within the Highlands Specific Plan area.

1.5 CITY/AGENCY ACTION REQUESTED

- LAFCO-sponsored application for detachment of the parcel from the City of San Bernardino, inclusion of the parcel into the City of Highland SOI, and annexation to the City of Highland.
- City of San Bernardino Resolution accepting the detachment of the parcel from the City
- General Plan Amendment, SOI area exchange, annexation and prezone application to designate the parcel as Low Density Residential (LDR) within the Fire Safety Overlay District (FR 1) and Consolidated Landscape and Lighting District 96-1 in the City of Highland.
- Development Plan Review, Approval of Tentative Tract Map No. 16636, and approval of the Initial Study/Mitigated Negative Declaration by Planning Commission and City Council.
- Review and approval of the project development plans and fuel management zone by the California Department of Forestry and Fire (CDF).
- Approval of a variance for driveways that exceed 12 percent slope required by the City engineer.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

No Impact. The project would not construct any recreational facilities on the project site. No impact would occur and no mitigation measures are required.

3.15 TRANSPORTATION/TRAFFIC

a) Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

Less Than Significant Impact. The project site is accessed at the north terminus of Applewood Street in the City of Highland. Urban Crossroads prepared the traffic analysis for the proposed project (dated August 2006), which is included in Appendix H.

Project trip generation has been calculated in accordance with the Institute of Transportation Engineers' (ITE) manual, *Trip Generation* (2003). As shown in Table 15, the project is anticipated to generate 48 average daily trips, with four trips during the morning peak hour and five trips during the evening peak hour.

Table 15
Project-Generated Traffic

Time Period	*Trip Generation Rate (trips per dwelling unit)*	*Generated Traffic Volume*
AM Peak Hour (7:00-8:00 a.m.)		
In	0.19	1
Out	0.56	3
Total	**0.75**	**4**
PM Peak Hour (3:00-4:00 p.m.)		
In	0.64	3
Out	0.37	2
Total	**1.01**	**5**
Total Daily Traffic	**9.57**	**48**

Project traffic was distributed over local roadways. It was assumed that project traffic would utilize Highland Avenue and Base Line via Church Street to reach destinations within the City and outlying areas. The regional plan for the area was examined for purposes of assessing project plus cumulative project growth within the vicinity of the project. As shown in the subregional Comprehensive Transportation Plan (CTP) Traffic Analysis Zone (TAZ) map, the project is located within TAZ 290800. The 2020 forecast for TAZ 290800 includes significant increases of single-family housing, multifamily housing, and retail and service uses. Consequently, the regional model has accounted for the amount of trips that the project would generate.

Roadways within the vicinity of the project have sufficient capacity to accommodate the 48 additional daily trips generated by the project. Intersections along the primary project access route were analyzed in the context of the recent City of Highland General Plan Update. Level of Service (LOS) is a measure of traffic operating conditions that based on prevailing traffic volumes (Average Daily Traffic [ADT]) in relation to the roadway capacity. The City of Highland has established an LOS D as the lowest acceptable level of service for peak hour intersection volumes. All streets within the vicinity of the project currently operate at LOS C or better during both the morning and evening peak hours and would continue to do so with implementation of

the proposed project. The addition of four morning and five evening peak-hour trips would not adversely affect the level of service on the roadway system that would serve project-related traffic.

b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

No Impact. The 2003 update to the Congestion Management Program (CMP) for San Bernardino County, defines a network of state highways and arterials in addition to level of service standards for roadways and intersections within the CMP network. The project site is not located adjacent to nor would it impact a roadway or intersection that is a part of the San Bernardino County CMP. Therefore, no impact to roadways or intersections within the County of San Bernardino CMP network would occur.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

No Impact. The project involves annexation and subsequent development of a 3.62-acre site for residential development. The project would not result in changes of air traffic patterns, as the project would not result in increases in safety risks or air traffic levels. No impact would occur.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. A cul-de-sac with a minimum 40-foot diameter would be constructed at the north terminus of Applewood Street. Each of the five lots would have access to Applewood Street by means of a private driveway. The project would not create any design hazards (e.g., sharp curves or dangerous intersections) or incompatible uses. No impact would occur. No mitigation measures are required.

e) Result in inadequate emergency access?

No Impact. The project would have one access point located at current north terminus of Applewood Street. The cul-de-sac would be designed with a minimum 40-foot-diameter turnaround for emergency vehicle access and to allow for sufficient turnaround radius by emergency vehicles. Furthermore, emergency access for the project would be review by the City of Engineer to ensure adequate access for emergency vehicles; therefore, no impact would occur.

f) Result in inadequate parking capacity?

No Impact. The City of Highland requires two spaces per single-family unit (Municipal Code Section 16.52.030) within an enclosed garage area. Single-family residential homes would be required to show that homes include two-car garages on building plans. New construction on the residential lots would be required to adhere to the parking requirements of the City of Highland Municipal code; therefore, no impact would occur.

g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

No Impact. The project is located adjacent to single-family residential neighborhoods within the City of Highland. The project is not located within close proximity to designated bus routes or bicycle routes. Development of the project would not conflict with policies, plans, or programs of the City of Highland which support alternative transportation. No impact would occur.

CUMULATIVE PROJECT 10

Two Trip Assignments given as a decision has not yet been reached between the two. Use the one that impacts your study intersections more.
HKA June 2014

Table D - Harmony Trip Generation (with Commercial Overlay)

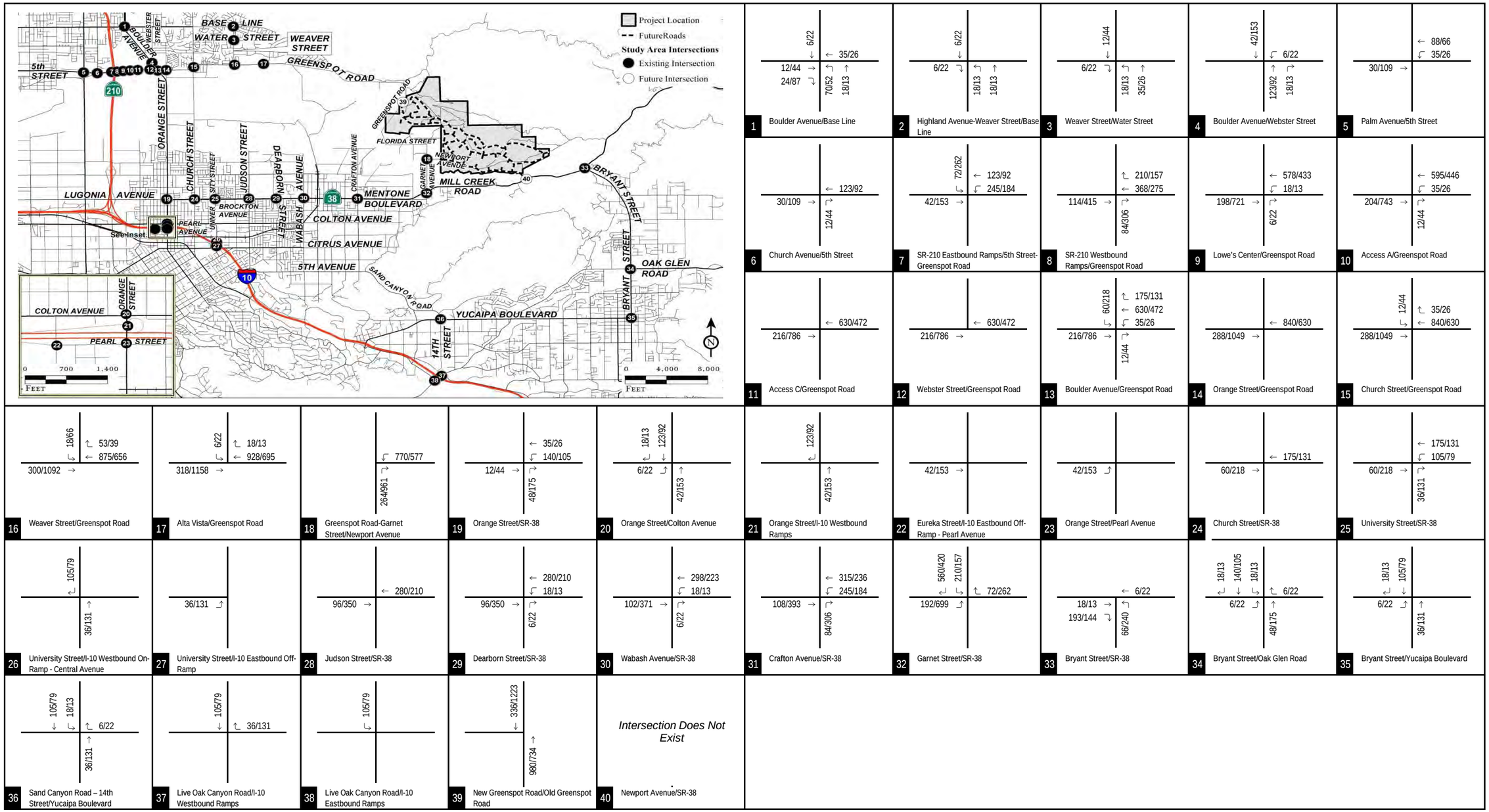
Land Use		Units	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily
PA 1	Single Family Residential	46 DU	9	26	35	29	17	46	438
PA 2	Single Family Residential	104 DU	20	58	78	66	38	104	990
PA 3	Single Family Residential	141 DU	27	79	106	89	52	141	1342
PA 4	Single Family Residential	51 DU	10	28	38	32	19	51	486
PA 5	Single Family Residential	36 DU	7	20	27	23	13	36	343
PA 6	Single Family Residential	36 DU	7	20	27	23	13	36	343
PA 7	Single Family Residential	133 DU	25	75	100	84	49	133	1266
PA 8	Single Family Residential	47 DU	9	26	35	30	17	47	447
PA 9	Single Family Residential	13 DU	2	8	10	8	5	13	124
PA 10	Single Family Residential	84 DU	16	47	63	53	31	84	800
PA 11	Single Family Residential	19 DU	4	10	14	12	7	19	181
PA 12	Single Family Residential	27 DU	5	15	20	17	10	27	257
PA 13	Single Family Residential	63 DU	12	35	47	40	23	63	600
PA 14	Single Family Residential	94 DU	18	53	71	59	35	94	895
PA 18	Recreation Center	16.0 TSF	22	11	33	22	22	44	541
PA 45	Single Family Residential	15 DU	3	8	11	9	6	15	143
PA 48	City Park	2.9 Acres	0	0	0	0	0	0	5
PA 49	City Park	4.3 Acres	0	0	0	0	0	0	8
PA 15	Single Family Residential	208 DU	40	116	156	131	77	208	1980
PA 16	Single Family Residential	39 DU	7	22	29	25	14	39	371
PA 19A	Elementary School	832 Students	209	165	374	59	67	126	1072
PA 19B	City Park	5.3 Acres	0	0	0	0	0	0	10

Table D - Harmony Trip Generation (with Commercial Overlay)

Land Use			Units	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily
PA	**20D**	Single Family Residential	53 DU	10	30	40	33	20	53	505
PA	**21**	Single Family Residential	115 DU	22	64	86	72	43	115	1095
PA	**22**	Single Family Residential	47 DU	9	26	35	30	17	47	447
PA	**26**	Condominium/Townhomes	173 DU	12	64	76	61	29	90	1005
PA	**27**	Single Family Residential	62 DU	12	35	47	39	23	62	590
PA	**29A**	Single Family Residential	45 DU	9	25	34	28	17	45	428
PA	**29B**	Single Family Residential	52 DU	10	29	39	33	19	52	495
PA	**44**	Sports Complex	4.0 Fields	3	1	4	47	24	71	285
PA	**46**	Single Family Residential	15 DU	3	8	11	9	6	15	143
PA	**50**	City Park	0.7 Acres	0	0	0	0	0	0	1
PA	**51**	City Park	0.8 Acres	0	0	0	0	0	0	2
PA	**52**	City Park	0.7 Acres	0	0	0	0	0	0	1
PA	**17**	Single Family Residential	157 DU	30	88	118	99	58	157	1,495
PA	**20A/C**	Commercial (NC Overlay)	141.6 TSF	85	51	136	252	273	525	6,045
PA	**20B**	Commercial	62.1 TSF	37	23	60	110	120	230	2,651
PA	**23**	Single Family Residential	77 DU	15	43	58	49	28	77	733
PA	**24**	Single Family Residential	56 DU	11	31	42	35	21	56	533
PA	**25**	Single Family Residential	110 DU	21	62	83	69	41	110	1047
PA	**28**	Single Family Residential	31 DU	6	17	23	20	11	31	295
PA	**30**	Single Family Residential	31 DU	6	17	23	20	11	31	295
PA	**31A**	Single Family Residential	52 DU	10	29	39	33	19	52	495
PA	**31B**	Single Family Residential	63 DU	12	35	47	40	23	63	600
PA	**32A**	Single Family Residential	63 DU	12	35	47	40	23	63	600
PA	**32B**	Single Family Residential	54 DU	10	31	41	34	20	54	514
PA	**43A**	Single Family Residential	130 DU	25	73	98	82	48	130	1238
PA	**43B**	Single Family Residential	99 DU	19	55	74	62	37	99	942

Table D - Harmony Trip Generation (with Commercial Overlay)

Land Use		Units	A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily
PA 53	City Park	0.9 Acres	0	0	0	0	0	0	2
PA 54	City Park	0.8 Acres	0	0	0	0	0	0	2
PA 55	City Park	0.6 Acres	0	0	0	0	0	0	1
PA 56	City Park	1.0 Acres	0	0	0	0	0	0	2
PA 57	City Park	0.8 Acres	0	0	0	0	0	0	2
PA 33	Single Family Residential	105 DU	20	59	79	66	39	105	1000
PA 34	Single Family Residential	52 DU	10	29	39	33	19	52	495
PA 35	Single Family Residential	25 DU	5	14	19	16	9	25	238
	Commercial (NC Overlay)	10.9 TSF	7	3	10	19	21	40	465
PA 36	Single Family Residential	45 DU	9	25	34	28	17	45	428
PA 37	Single Family Residential	28 DU	5	16	21	18	10	28	267
PA 38	Single Family Residential	23 DU	4	13	17	14	9	23	219
PA 58	City Park	1.0 Acres	0	0	0	0	0	0	2
PA 59	City Park	0.8 Acres	0	0	0	0	0	0	2
PA 39	Single Family Residential	119 DU	23	66	89	75	44	119	1133
PA 40	Single Family Residential	195 DU	37	109	146	123	72	195	1856
	Commercial (NC Overlay)	10.9 TSF	7	3	10	19	21	40	465
PA 41	Single Family Residential	81 DU	15	46	61	51	30	81	771
PA 42	Single Family Residential	152 DU	29	85	114	96	56	152	1447
PA 47	City Park	6.5 Acres	0	0	0	0	0	0	12
Phase V Completion Trip Generation Summary									
	Gross Trip Generation		**1,012**	**2,162**	**3,174**	**2,666**	**1,793**	**4,459**	**43,931**
	Internal Trips:								
	Residential		**(175)**	**(237)**	**(412)**	**(197)**	**(181)**	**(378)**	**(4107)**
	City Park		**0**	**0**	**0**	**0**	**0**	**0**	**(52)**
	Recreation Center		**(22)**	**(11)**	**(33)**	**(22)**	**(22)**	**(44)**	**(541)**
	Elementary School		**(178)**	**(142)**	**(320)**	**(51)**	**(57)**	**(108)**	**(914)**
	Commercial		**(37)**	**(22)**	**(59)**	**(108)**	**(118)**	**(226)**	**(2600)**
	Pass By Trips		**0**	**0**	**0**	**(104)**	**(104)**	**(207)**	**(1968)**
	Net Trip Generation		**600**	**1,750**	**2,350**	**2,185**	**1,312**	**3,496**	**33,749**



LSA

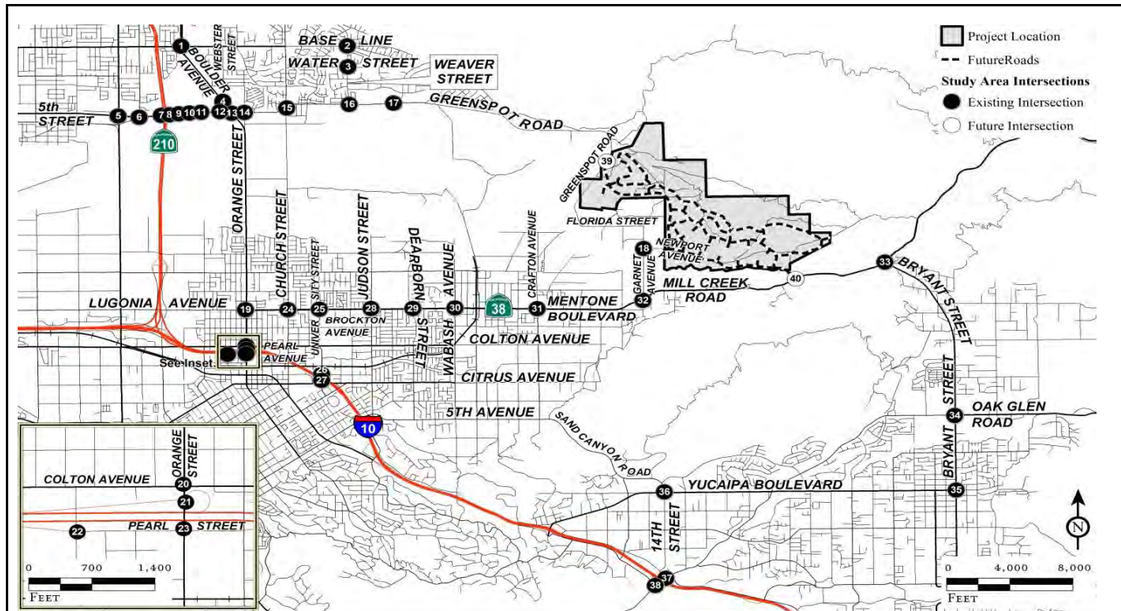
FIGURE 13

Harmony Specific Plan
Traffic Impact Analysis

XXX/YYY AM/PM Peak Hour Trips

Phase V Project Trip Assignment
(without Newport Avenue/SR-38 Connection)

R:\LEW1003\Traffic\09_2013\z60-Assn_Phase V (9/26/2013)



1 Boulder Avenue/Base Line
↓ 6/22 ← 35/26
12/44 → 24/87 ↲ 70/52 ↳ 18/13

2 Highland Avenue-Weaver Street/Base Line
↓ 6/22
6/22 ↲ 18/13 ↳ 18/13

3 Weaver Street/Water Street
↓ 12/44
6/22 ↲ 18/13 ↳ 35/26

4 Boulder Avenue/Webster Street
↓ 42/153 ↳ 6/22
123/92 → 18/13 ↱

5 Palm Avenue/5th Street
← 88/66 ↳ 35/26
30/109 →

6 Church Avenue/5th Street
← 123/92
30/109 → ↱ 12/44

7 SR-210 Eastbound Ramps/5th Street-Greenspot Road
72/262 ↳ ← 123/92 ↳ 140/105
42/153 →

8 SR-210 Westbound Ramps/Greenspot Road
↱ 210/157 ← 263/197
114/415 → ↱ 48/175

9 Lowe's Center/Greenspot Road
← 473/354 ↳ 18/13
162/590 → ↱ 6/22

10 Access A/Greenspot Road
← 490/367 ↳ 35/26
168/612 → ↱ 12/44

11 Access C/Greenspot Road
← 525/393
180/655 →

12 Webster Street/Greenspot Road
← 525/393
180/655 →

13 Boulder Avenue/Greenspot Road
60/218 ↱ 175/131 ← 525/393 ↳ 35/26
180/655 → ↱ 12/44

14 Orange Street/Greenspot Road
← 735/551
252/917 →

15 Church Street/Greenspot Road
12/44 ↳ ↱ 35/26 ← 735/551
252/917 →

16 Weaver Street/Greenspot Road
18/66 ↳ ↱ 53/39 ← 770/577
264/961 →

17 Alta Vista/Greenspot Road
6/22 ↳ ↱ 18/13 ← 823/616
282/1027 →

18 Greenspot Road-Garnet Street/Newport Avenue
↳ 717/538
246/896 ↱

19 Orange Street/SR-38
← 53/39 ↳ 175/131
18/66 → ↱ 60/218

20 Orange Street/Colton Avenue
18/13 ↲ 158/118 ↓
6/22 ↳ ↑ 54/197

21 Orange Street/I-10 Westbound Ramps
158/118 ↲
↑ 54/197

22 Eureka Street/I-10 Eastbound Off-Ramp - Pearl Avenue
54/197 →

23 Orange Street/Pearl Avenue
54/197 ↳

24 Church Street/SR-38
← 228/170
78/284 →

25 University Street/SR-38
← 228/170 ↳ 123/92
78/284 → ↱ 42/153

26 University Street/I-10 Westbound On-Ramp - Central Avenue
123/92 ↲
↑ 42/153

27 University Street/I-10 Eastbound Off-Ramp
42/153 ↳

28 Judson Street/SR-38
← 350/262
120/437 →

29 Dearbor Street/SR-38
← 350/262 ↳ 18/13
120/437 → ↱ 6/22

30 Wabash Avenue/SR-38
← 368/275 ↳ 18/13
126/459 → ↱ 6/22

31 Crafton Avenue/SR-38
← 385/289 ↳ 210/157
132/481 → ↱ 72/262

32 Garnet Street/SR-38
560/420 ↲ 158/118 ↳ ↳ 54/197 ← 35/26
192/699 ↳ 12/44 →

33 Bryant Street/SR-38
← 6/22
18/13 → ↰ 263/197 ↳ 90/328

34 Bryant Street/Oak Glen Road
35/26 ↲ 158/118 ↓ 18/13 ↳ ↱ 6/22
12/44 ↳ ↑ 54/197

35 Bryant Street/Yucaipa Boulevard
18/13 ↲ 140/105 ↓
6/22 ↳ ↑ 48/175

36 Sand Canyon Road – 14th Street/Yucaipa Boulevard
70/52 ↓ 18/13 ↳ ↱ 6/22
↑ 24/87

37 Live Oak Canyon Road/I-10 Westbound Ramps
70/52 ↓ ↰ 24/87

38 Live Oak Canyon Road/I-10 Eastbound Ramps
70/52 ↳

39 New Greenspot Road/Old Greenspot Road
300/1092 ↓
↑ 875/656

40 Newport Avenue/SR-38
35/26 ↲ 123/92 ↳ ↱ 42/153 ← 54/197
12/44 ↳
158/118 →

LSA

FIGURE 15

Harmony Specific Plan
Traffic Impact Analysis

XXX/YYY AM/PM Peak Hour Trips

Phase V Project Trip Assignment
(with Newport Avenue/SR-38 Connection)

R:\LEW1003\Traffic\09_2013\z60-Assn_Phase V_Alt (9/27/2013)

CUMULATIVE PROJECT 11

ASSOCIATED TRANSPORTATION ENGINEERS
100 N. Hope Avenue, Suite 4, Santa Barbara, CA 93110 • (805) 687-4418 • FAX (805) 682-8509
Since 1978

Richard L. Pool, P.E.
Scott A. Schell, AICP, PTP

March 3, 2014 14007L03.wpd

Ms. Nancy Holland
Hernandez, Kroone & Associates
234 East Drake Drive
San Bernardino, CA 92408

REVISED ASSUMPTIONS FOR THE TRAFFIC AND CIRCULATION STUDY FOR THE BASE LINE COMMERCIAL CENTER, CITY OF HIGHLAND, CALIFORNIA

The following letter list the revised trip generation and trip distribution assumptions, also the traffic scenarios for the traffic and circulation study for the Base Line Commercial Center located in the northwest quadrant of the State Route 210/Base Line Interchange. Please review and comment on these assumptions so we can proceed with the traffic and circulation study.

PROJECT TRIP GENERATION

Trip generation estimates were calculated for the Base Line Commercial Center are based on the rates presented in the Institute of Transportation Engineers (ITE), Trip Generation, 9th Edition for High-Turnover Restaurant (Land-Use Code #932) and Fast-Food Restaurant with Drive-Through Window(Land-Use Code #934).[1] The indoor and outdoor seating area is used for the purpose of trip generation. Table 1 summarizes the average daily trips (ADT), A.M. and P.M. peak hour trip generation estimates for the proposed project.

[1] Trip Generation, Institute of Transportation Engineers, 9th Edition, 2013.

Table 1
Project Trip Generation

Land Use	Size	ADT		A.M. Peak Hour		P.M. Peak Hour	
		Rate	Trips	Rate	Trips	Rate	Trips
High-Turnover Restaurant	120 seats	4.83	580	0.47	56 (31/25)	0.41	49 (29/20)
Fast-Food Rest w/Drive-Thru Less 25% Pass-By Trips: Primary Trips:	20 seats	19.52	390 -98 292	1.27	25 (13/12) - 6 (-3/-3) 19 (10/9)	0.95	19 (10/9) -4 (-2/-2) 15 (8/7)
Fast-Food Rest w/Drive-Thru Less 25% Pass-By Trips; Primary Trips:	66 seats	19.52	1,288 -322 966	N/A	0 0 0	0.95	63 (33/30) -16 (-8/-8) 47 (25/22)
Total Trip Site Generation: **Total Pass-by Trip Generation:** **Total Primary Trip Generation:**			**2,258** **-420** **1,838**		**81 (44/37)** **-6 (-3/-3)** **75 (41/34)**		**131 (72/59)** **-20 (-10/-10)** **111 (62/49)**

The data presented in Table 1 show that the proposed project would generate a total of 2,258 average daily trips, 81 A.M. peak hour trips, and 131 P.M. peak hour trips. Of the total trip generation 420 average daily trips, 6 A.M. peak hour trips, and 20 P.M. peak hour trips would be 'pass-by" in nature. The remaining 1,838 average daily trips, 75 A.M. peak hour trips, and 111 P.M. peak hour trips would be primary in nature.

PROJECT TRIP DISTRIBUTION

Project trip distribution percentages are presented in Table 2 and shown on Figure A (attached).

Table 2
Project Trip Distribution

Origin/Destination	Direction	Percent
State Route 210 North of Base Line Avenue	North	20%
State Route 210 South of Base Line Avenue	South	20%
Base Line Avenue West of Church Avenue	West	25%
Base Line Avenue East of Seine Avenue	East	25%
Church Avenue North of Base Line Avenue	North	2%
Church Avenue South of Base Line Avenue	South	2%
Buckeye Street North of Base Line Avenue	North	2%
Seine Avenue North of Base Line Avenue	North	2%
Seine Avenue South of Base Line Avenue	South	2%
Total		**100%**

TRAFFIC SCENARIOS

The traffic study will include the following evaluation scenarios:

- Existing Conditions
- Opening Year (including Cumulative Projects) without the Project Conditions
- Opening Year (including Cumulative Projects) with the Project Conditions

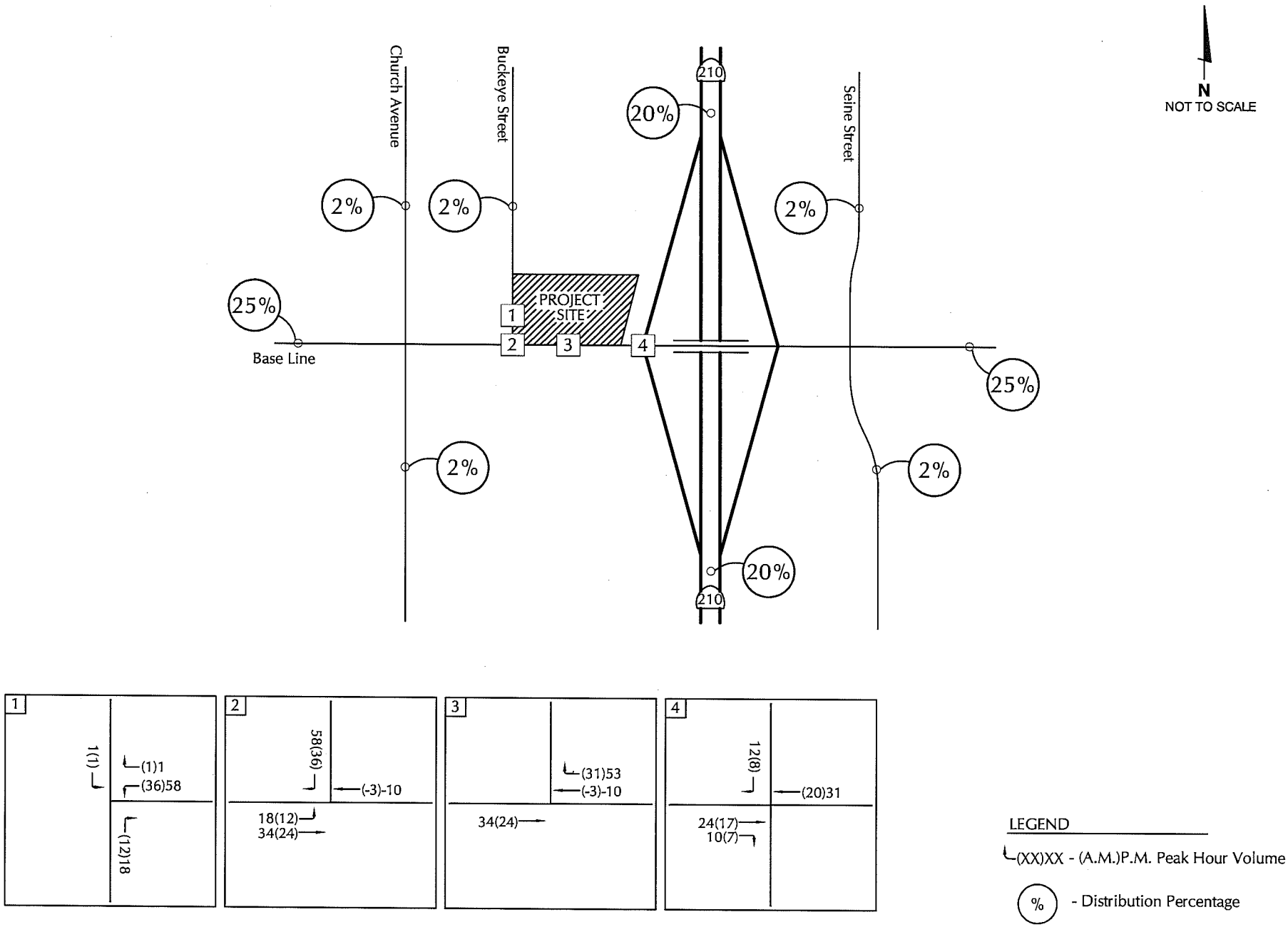
SITE ACCE SS AND ON-SITE CIRCULATION

The traffic and circulation study being prepared by ATE will address site access and on-site circulation.

Associated Transportation Engineers,

Darryl F. Nelson, PTP
Senior Transportation Planner

attachments: Project Trip Distribution



ASSOCIATED
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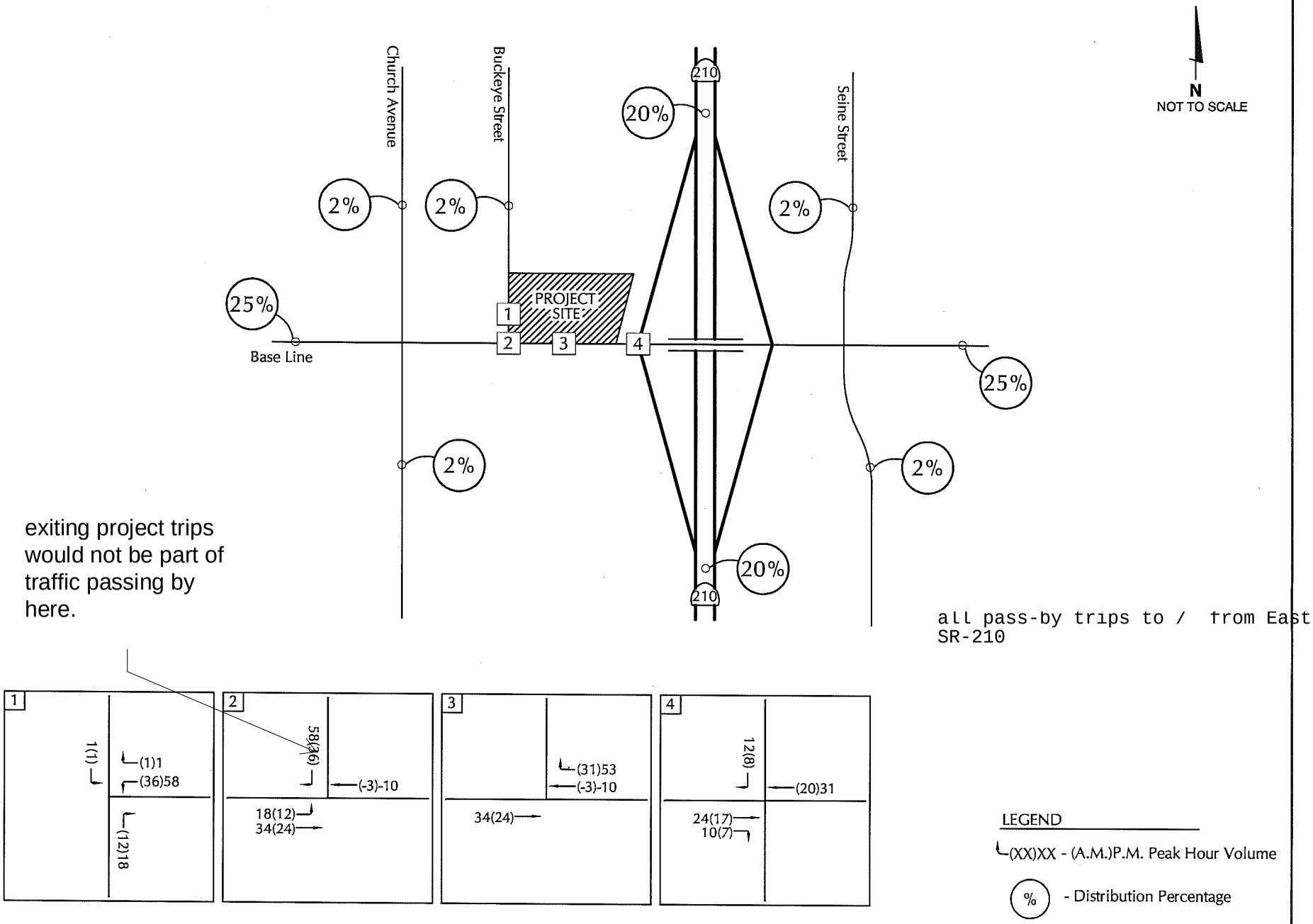
ENGINEERS

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

FIGURE 1

MMF - #14007



ASSOCIATED
TRANSPORTATION
ENGINEERS

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

FIGURE 1

MMF - #14007

CUMULATIVE PROJECT 12

CITY OF HIGHLAND

27215 Base Line, Highland, CA 92346
Telephone (909) 864-8732 FAX: (909) 862-3180

NOTICE OF DETERMINATION

CLERK OF THE BOARD
JAN 17 2008
COUNTY OF
SAN BERNARDINO

TO: ___ Office of Planning & Research
1400 Tenth St., Room 121
Sacramento, CA 95814

_X_ Clerk of the Board
385 N. Arrowhead Ave., Second Floor
San Bernardino, CA 92411

FROM: City of Highland
Community Development Dept.
27215 Base Line
Highland, CA 92346

Documentary Handling Fee ($35.00)
Receipt Number 371546

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

PROJECT TITLE: Design Review Application (DRB-007-020)

STATE CLEARINGHOUSE NUMBER: NA

CONTACT PERSON AND TELEPHONE: Pat Meyer (909) 798-4446

LEAD AGENCY CONTACT PERSON AND TELEPHONE: Sean Kelleher, Assistant Planner (909) 864-8732, ext. 210

PROJECT LOCATION: An approximate 8.01 acre parcel of land located at the northeast corner of the intersection of Del Rosa Drive and Fifth Street (APN: 0279-211-25 and 26)

PROJECT DESCRIPTION: Design Review Application (DRB 007-020) which proposes the construction eight (8) Business Park Buildings each with attached associated business offices. The Buildings will range in size from 10,550 square feet to 23,620 square feet for a total of 126,913 square feet of business park space.

APPLICANT: Orange-New Jersey Property
731 Wimbleton Drive
Redlands, CA 92373

DATE FILED & POSTED

This is to advise that the City of Highland (Lead Agency) has approved the above described project on September 6, 2005 and has made the following determinations regarding the above described project:

1. The project ___ will, _X_ will not, have a significant effect on the environment.
2. ___ An Environmental Impact Report was prepared for this pursuant to the provisions of CEQA.

   _X_ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures _X_ were, ___ were not, made a condition of the approval of the project by reference to umbrella approved projects.
4. This project ___ has, _X_ has no, potential (*de minimis*) impact for any adverse effect, either individually or cumulatively on wildlife resources or wildlife habitat.
5. A statement of Overriding Considerations ___ was, _X_ was not, adopted for this project.
6. Findings _X_ were, ___ were not made pursuant to the provisions of CEQA.

This is to certify that the Mitigated Negative Declaration with comments and responses and record of project approval is available to the General Public at City of Highland, Community Development Department, 27215 Base Line, Highland, CA 92346.

Sabah Jaguess 1/16/08 Community Development Director
Signature (Public Agency) Date Title

Date received for filing at OPR: _____

CLERK OF THE BOARD
DEC 03 2007
COUNTY OF
SAN BERNARDINO

CITY OF HIGHLAND

27215 Base Line, Highland, CA 92346
Telephone (909) 864-8732 FAX: (909) 862-3180

DATE FILED & POSTED

NOTICE OF INTENT TO ADOPT A NEGATIVE DECLARATION

PUBLICATION OF THIS NOTICE DOES NOT IMPLY THE REVIEWING AUTHORITY (CITY OF HIGHLAND) HAS MADE A FINAL DECISION TO ADOPT THE NEGATIVE DECLARATION

Lead Agency:
City of Highland
Planning Division
27215 Base Line
Highland, CA 92346

Contact:
Sean Kelleher
Assistant Planner
(909) 864-8732, Ext. 210

The City of Highland, in its capacity as the Lead Agency for this project, evaluated the potential environmental impacts of the project in accordance with the California Environmental Quality Act (CEQA). The City has determined through the preparation of an Initial Study the project will not result in any significant environmental impacts, and therefore will prepare a Mitigated Negative Declaration for the project identified below. The Initial Study meets the requirements of CEQA, and the City of Highland Guidelines for the implementation of CEQA.

We need to know your views as to the scope and contents of the environmental information, which has been included in the Initial Study. If you represent a responsible or trustee agency, we are particularly interested in information germane to your statutory responsibilities. If you are a public agency, you will need to use the Initial Study prepared by our Agency when considering your permit or other approval for the project.

Due to the time limits mandated by State Law, your response must be sent at the earliest possible date, but no later than the ending date specified below.

Project Title: Design Review Board Application (DRB-007-020)
Del Rosa Drive Business Park

Project Location: The northeast corner of the intersection of Del Rosa Drive and Fifth Street (APN: 0279-211-25 and 26)

City: Highland County: San Bernardino

Project Description: The Applicant is proposing the Construction of eight (8) Business Park Buildings each with attached associated business offices.

The Buildings will range in size from 10,550 square feet to 23,620 square feet. A total of 126,913 square feet of building is proposed for the eight (8) acre parcel of Land. The Applicant has also proposed as part of the project a Parcel Map to allow each of the building to be located on its own lot, separated from the Parking Lot.

The Site has a total of 299 parking stalls proposed, which is consistent with the Highland Municipal Code

The Highland Municipal Code requires a development of this nature to be processed as a Major Design Review Application subject to a Public Meeting before the Design Review Board.

Public Review: Design Review Board (DRB-007-020) Initial Study/Mitigated Negative Declaration, and related documents are available for public review daily during normal business hours. Members of the public may view these documents at City Hall Planning Division, located at 27215 Base Line, Highland and submit comment at or prior to the Design Review Board Public Meeting.

An opportunity will be given at said hearing for all interested persons to be heard.

Public Review Period: Begins: December 3, 2007 Ends: December 24, 2007

Public Hearing(s): Tentative Date: January 15, 2008

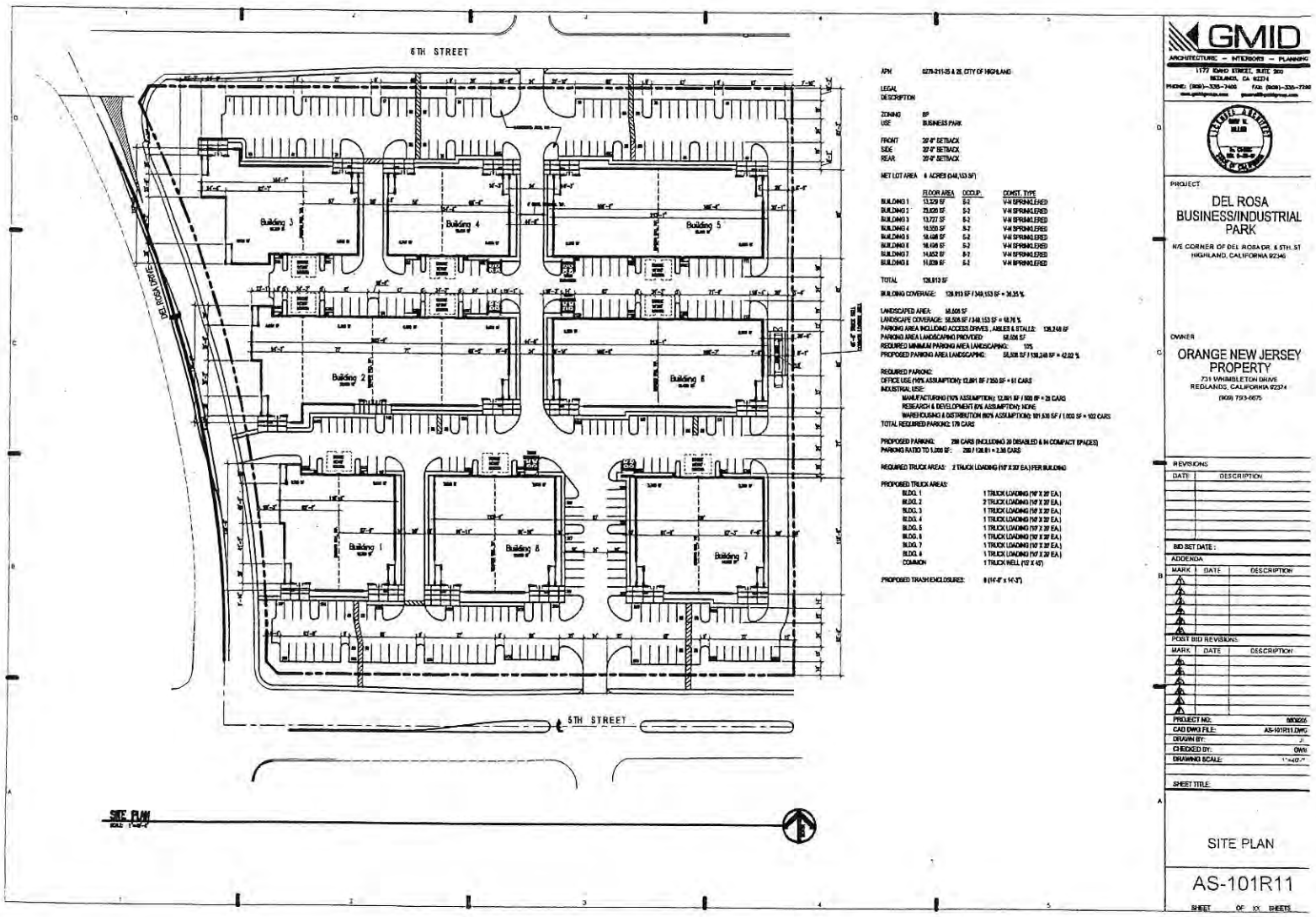
Time: 5:00 p.m. or soon thereafter
Location: Leo Donahue Council Chambers
27215 Base Line

Comments: All comments and questions should be in writing and directed to:

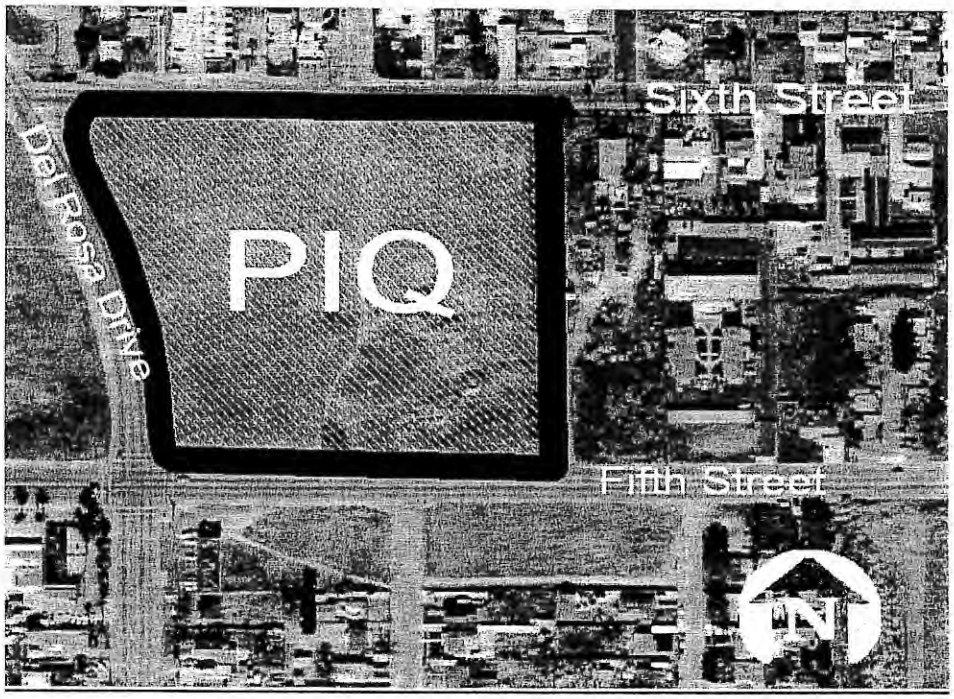
City of Highland
Attention: Sean Kelleher, Assistant Planner
27215 Base Line
Highland, CA 92346

C:\environmental\notice of intent

Site Plan (Exhibit 1)



Aerial Photo (Exhibit 2)



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

Explanation:

14ab <u>No Impact:</u> The proposed use as a Business Park Center. The proposed Project will not result in the direct addition of new residents to the City of Highland. Therefore there is no additional service is generated by this Project, no mitigation measures are required.

Mitigation Measures: Not Required

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
15. TRANSPORTATION/TRAFFIC -- Would the project:				
a) Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	☑
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☑
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☑
e) Result in inadequate emergency access?	☐	☐	☐	☑
f) Result in inadequate parking capacity?	☐	☐	☐	☑
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☑

Explanation:

15a <u>No Impact</u>: The Proposed Project is anticipated to generate 851 Passenger car equivalent (PCE) trips on a daily basis. Pursuant to the Traffic Study prepared by Alan Kashefi, T.E.; Michael Lloyd, P.E.; and Jason Stack; the project will not substantially increase the existing volume of traffic in the studied intersections. No mitigation measures are required.

15b. <u>No Impact</u>: Based on the Traffic Study mentioned in 15a the proposed Project will not substantial increase peak traffic causing the Level of Service standard to be exceeded. Therefore, impacts to roadway segments are not considered significant. No mitigation is required.

15c <u>No Impact</u>: The proposed Project would not result in a change in air traffic patterns although the San Bernardino International Airport and the Redlands Municipal Airport are located approximately .5 miles and approximately 6 miles

respectively from the project site. No mitigation measures are required.

15d No Impact: The proposed Project will be required to install street improvements Along Sixth Street, Del Rosa Drive, and Fifth Street. The Street improvements proposed will not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections). No incompatible uses (i.e. farm equipment is anticipated to utilize the roadways around the site. Therefore, no mitigation measures are required.

15e No Impact: The proposed Project utilizes Sixth Street, Del Rosa Drive, and Fifth Street as the primary points of access. No mitigation measures are required.

15f No Impact: The proposed Project provides two hundred and ninety-nine (299) parking stalls to be utilized by both employees and patrons to the site. The Parking count is consistent with the requirements of the Highland Municipal Code. Therefore, no mitigation measures are required.

15g No Impact: The Project site is bounded by Sixth Street (classified as a Collector Street), Del Rosa Drive (classified as a Secondary Highway), and Fifth Street (classified as a Major Highway). No bus turnouts are proposed for the Project; however, it will comply with the City's Municipal Code Chapter 16.40.470, Transportation Control Measures. Therefore, no mitigation measures are required.

Mitigation Measures: Not Required

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
16. UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☑	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☑	☐
e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☑	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☑	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☑	☐

Explanation:

16a Less Than Significant Impact: The proposed Project would construct 126,913 square feet of Business Park buildings with 299 associated parking stalls, drive lanes, and landscaping. According to EVWD, the sewerage system has adequate capacity to serve the development. Therefore, operation of the site as a Business Park development would not result in an accedence of wastewater treatment requirements of the SARWQCB. No mitigation measures are required.

16b Less Than Significant Impact: The proposed Project would construct 126,913 square feet of Business Park buildings with 299 associated parking stalls, drive lanes, and landscaping. According to EVWD, the wastewater service provider has adequate capacity to serve the development. No additional facilities would

CUMULATIVE PROJECT 32

EXHIBIT 1-2: LOCATION MAP

LEGEND:

- = EXISTING INTERSECTION ANALYSIS LOCATION
- = FUTURE INTERSECTION ANALYSIS LOCATION

N

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. .

Exhibit 1-1 illustrates the preliminary site plan. The Project is proposed to consist of 277 single family detached residential dwelling units, and is located north of Greenspot Road. For the purposes of this analysis, the Project opening year (i.e., the year when the Project is expected to be built out and occupied) is assumed to be 2018.

Vehicular access to and from the Project site is assumed to be provided via Driveway 1 and Driveway 2 on Greenspot Road. Both Driveway 1 and Driveway 2 are proposed to allow for full access.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

The ITE Trip Generation manual is a nationally recognized source for estimating site specific trip generation. ITE recently released an updated edition of the Trip Generation manual (9th Edition) in 2012. (4) Trip generation rates used to estimate Project traffic are shown in Table 4-1 and a summary of the Project's trip generation is shown in Table 4-2. The trip generation rates are based upon data collected by the Institute of Transportation Engineers (ITE) for Single-Family Detached Residential (ITE Land Use Code 210). The Project is anticipated to generate 2,637 trip-ends per day, with 208 vehicles per hour (VPH) during the AM peak hour and 277 VPH in the PM peak hour.

TABLE 4-1: PROJECT TRIP GENERATION RATES

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			Inbound	Outbound	Total	Inbound	Outbound	Total	
Single Family Detached Res.	DU	210	0.19	0.56	0.75	0.63	0.37	1.00	9.52

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Ninth Edition (2012).
[2] DU = Dwelling Units

TABLE 4-2: PROJECT TRIP GENERATION SUMMARY

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			Inbound	Outbound	Total	Inbound	Outbound	Total	
Single Family Detached Res.	277	DU	53	155	208	175	102	277	2,637

[1] DU = Dwelling Units

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the routes where Project traffic would distribute. The Project trip distribution was developed based on anticipated travel patterns to and from the Project site.

The trip distribution pattern of passenger cars is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. Surrounding uses considered in developing the Project trip distribution include shopping opportunities, employment opportunities, and the location of local schools.

Exhibit 4-1 illustrates the Project trip distribution for outbound trips during the AM peak hour. Exhibit 4-2 illustrates the Project trip distribution for inbound trips during the AM peak hour and both outbound and inbound trips during the PM peak hour. The trip distribution is primarily based on the existing roadway system. The Project trip distribution patterns are also greatly affected by existing / near-term development patterns in the vicinity of the Project site, and have been reviewed by City staff as part of the scoping process.

4.3 MODAL SPLIT

The traffic reducing potential of public transit, walking or bicycling have not been considered in this TIA. Essentially, the traffic projections are "conservative" in that these alternative travel modes might be able to reduce the forecasted traffic volumes.

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project average daily traffic (ADT), AM and PM peak hour intersection turning movement volumes are shown on Exhibit 4-3.

EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION (AM PEAK-OUTBOUND)

LEGEND:

10 = PERCENT FROM PROJECT

N

URBAN CROSSROADS

EXHIBIT 4-2: PROJECT TRIP DISTRIBUTION (AM PEAK INBOUND, PM PEAK)

LEGEND:

10 = PERCENT TO/FROM PROJECT

N

URBAN CROSSROADS

EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES

1 SR-210 EB Ramps & 5th St.	2 SR-210 WB Ramps & Greenspot Rd.	3 Boulder Av. & Greenspot Rd.	4 Orange St. & Pioneer Av.
0(0) 0(0) 8(26) ←23(15) ←23(26)	←23(15) ←47(41)	0(0) 0(0) 8(26) ←23(15) ←70(56) ←39(15)	16(0) 23(15) 0(0) ←0(0) ←0(0) ←0(0)
8(26)→ 0(0)→	0(0)→ 16(53)→ 0(0) 0(0) 13(44)	0(0)→ 29(96)→ 0(0)→ 0(0) 0(0) 8(26)	0(0)→ 0(0)→ 0(0)→ 0(0) 8(26) 0(0)
5 Church St. & Greenspot Rd.	**6 Weaver St. & Greenspot Rd.**	**7 Driveway 1 & Greenspot Rd.**	**8 Driveway 2 & Greenspot Rd.**
0(0) 0(0) 3(9) ←8(5) ←132(87) ←0(0)	0(0) 3(9) ←8(5) ←140(92)	74(48) 4(2) ←1(4) ←74(49)	74(49) 4(3) ←2(5) ←1(4)
0(0)→ 45(149)→ 0(0)→ 0(0) 0(0) 0(0)	0(0)→ 48(158)→	25(83)→ 25(84)→	25(84)→ 4(2)→

LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

10(10) = AM(PM) PEAK HOUR VOLUMES

N

CUMULATIVE PROJECT 36

Hernandez, Kroone & Associates
Engineers & Land Surveyors

October 15, 2015

Mr. Ernest Wong, PE
Public Works Director / City Engineer
City of Highland
27215 Base Line
Highland, CA 92346

RE: New Vision Academy — Project No.: 15-1017
Traffic Study Scope of Work Specifications

Dear Mr. Wong:

Thank you for the opportunity to review the subject scope of work. HKA welcomes the chance to work with the City of Highland (City) to rapidly prepare a complete, accurate and defendable traffic study. To that end, HKA has prepared this scope of work for the traffic study required for the project.

General Requirements - The City of Highland uses the San Bernardino Associated Governments Congestion Management Program (CMP) for the traffic impact study guidelines. If the project will add more than 250 project trips during the peak periods, a Traffic Impact Analysis (TIA) will be needed. All intersections that are listed in the latest CMP which will receive 50 or more peak hour project trips (two-way) within a 5 miles radius should be evaluated. Additionally the City can request the evaluation of other key intersections.

All freeway segments receiving 50 or more peak hour project trips (two-way) within a 5 miles radius should be evaluated. City of Highland will forward the traffic study to Caltrans if this trigger is met.

Generally traffic counts should be less than 12 months old.

Saturation rates, lost time, V/C and other details should follow those listed in CMP Appendix C, Section titled Level of Service Analysis Procedures and Assumptions. The City has a policy that a movement with a V/C ratio higher than 1 means the intersection needs mitigation even if the intersection LOS meets the City's minimum acceptable LOS of D.

234 East Drake Drive ▲ San Bernardino, California 92408
Phone: (909) 884-3222 ▲ Fax: (909) 383-1577 ▲ www.hkagroup.com

For wide street crossings (over 50 feet) where pedestrian traffic is expected, please calculate the minimum green time based on pedestrian crossing times. Please use that time as the minimum green on the through movements.

To expedite the review process, printouts of any models used in the study should be included in the appendices so reviewers and readers can check the model, inputs into the model adjustment program, or the distribution pattern of the traffic. Intermediate calculations need to be included in the appendices so that readers can easily follow the development of the volumes used in the LOS analysis.

The above requirements are modified as follows to be specific to this project.

Project Description –
Project is to be built at 26200 Base Line in the City of Highland. The current plans call for a school serving up to 450 6th, 7th and 8th grade students. Part of the students will transfer from an existing school about 1 mile to the northwest.

The school building will open about 8 am. Classes are held from 9 am – 3 pm. There are no before or after school activities on-site. There is no day care provided on-site. There are no intermural activities or events where other schools would come to the site.

The site will not be used by the community for soccer or other types of organized events.

The plans attached show a gross square footage of 27,433 square feet (SF). See attached plans.

Any changes to this description or site plan may impact the trip rate, trip distribution and the scope of the traffic study

Project Trips Generation – HKA generated the project trips based on the square footage proposed using trip rates shown in the *Institute of Transportation Engineers Trip Generation Manual, 9th Edition* (Table 1). The time when the AM trips rate generated by a school is highest is the same as for the AM peak period for adjacent street traffic volumes. The trip rate during the school's PM peak trip period is higher than the rate observed during the PM peak period for adjacent street traffic volumes. The PM rate used for project trips generated was the PM Hour of generator.

Table 1: Project Trip Generation

522-Middle/Junior High School		**AM Peak Hour, Trips**			**PM Peak Hour of Generator, Trips**			**Daily, Trips**
		In	**Out**	**AM**	**In**	**Out**	**PM**	**ADT**
Rates	27.443 trips / TSF	2.39	1.96	4.35	1.13	1.39	2.52	13.78
Trips		66	54	120	31	38	69	378

Project Trip Distribution – HKA has prepared the trip distribution and attached the diagram to this letter. The school's west driveway will primarily be used by staff members and persons parking for meetings or business with school staff. The east driveway is almost exclusively used by vehicles dropping off or picking up students. The majority of the entering traffic was assigned to the east driveway. Both driveways can be used by vehicles exiting the school after dropping off or picking up student, so the exiting traffic was balanced between the east and west driveways (Changes to the site plan may change the trip distribution proposed).

The intersections to be studied are:

- Sterling Avenue / Base Line
- West Driveway / Base Line
- East Driveway / Base Line
- Victoria Avenue / Base Line

The intersections of Sterling Avenue and Victoria Avenue with Base Line are CMP intersections and will receive more than 50 peak hour project trips during the AM Peak period.

Scenarios to analyze – The time periods to be analyzed will be based on the school's schedule and are as follows:

- 7:00 AM to 9:00 AM
- 2:00 PM to 4:00 PM

Counts should be taken at these times at the two existing intersections and the peak hours (4 highest consecutive 15-minute periods) during those periods should be used as the existing background traffic AM and PM peak hours respectively.

Level of Services analysis for the following scenarios should be completed for both the AM and PM hours:

- Existing Year (intersections only)
- Opening Year (assume 2016) without Project Trips (intersections only)

- Opening Year (assume 2016) with Project Trips (intersections and driveways)
- Future Year (assume 2036) without Project Trips (intersections only)
- Future Year (assume 2036) with Project Trips (intersections and driveways)

Volumes –
Existing Year volumes will be based on current counts at the two existing intersections. Classified counts and conversion to passenger car equivalents (PCEs), and balancing is not required. The existing traffic moving between the two intersections will be used as through traffic at the proposed driveways.

Opening Year without Project Trips volumes will be based on a 1% annual growth rate of the existing volumes. Based on information from the City staff, there are no anticipated cumulative project trips to consider.

Future Year without Project Trips volumes will be based on a 1% annual growth rate of the existing volumes. Based on information from the City staff, there are no anticipated cumulative project trips to consider.

Configurations - Please use the existing intersection configurations for the LOS analysis. Base Line has two through lanes in each direction and one two-way left turn lane in this location.

Table 2: Existing Intersection Configurations

Approaches -	**NB**			**SB**			**EB**			**WB**		
Intersections -	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**
Sterling Avenue / Base Line	1	2	S	1	2	S	1	2	S	1	2	S
Victoria Avenue / Base Line	1	2	S	1	2	S	1	2	S	1	2	S

S – Right turn movement is shared with the outside through movement.

Both intersections are signalized and have left turn arrow light heads on all approaches.

Please analyze the driveways assuming full access. If left turns (either in or out) must be prohibited due to long queues or low LOS results, please contact City staff.

LOS analysis – Please follow procedures in the latest Highway Capacity Manual. Please use the saturation rates, lost time minimums, etc., from the CMP Appendix C, Section titled *Level of Service Analysis Procedures and Assumptions.*

Mitigation and Fair Share – If mitigation is needed, please show the mitigation proposed and the LOS analysis documenting that it meets the City's LOS standards of at least D.

Please show the cost estimate for the mitigation per Appendix G of the CMP. Please show the project's fair share of the mitigation proposed.

Additional Analysis –
Beside on-site and off-site queuing issues at the school's driveways, there is concern that queues at the driveways will impact the school's neighbors' access to Base Line. There is a private drive west of the school and Seeley Court east of the school that may need to be addressed.

Besides the operational analysis (LOS) at the school driveways, please provide tables showing the queuing distances and the available storage for the following movements:

- SB, WB and EB traffic at Driveways

Discuss or document in an exhibit any queues that will cause delays in accessing Base Line by the residents using the private driveway of Seeley Court.

Other Comments:

a. City of Highland is not requesting an analysis of the construction impacts as they will be temporary. The City will expect the construction traffic to use a route approved by the City and will expect compensation for the repair of that route as required by the City.

b. Please follow the outline for a TIA Report content in Appendix C of the SANBAG CMP, starting on page C-4, except for the sections on non-vehicular methods, Transit and TDM considerations.

c. Please include all exhibits and tables as listed in Appendix C of the SANBAG CMP, starting on page C-12. Exhibits and tables can be combined.

d. Modeling is not required or recommended.

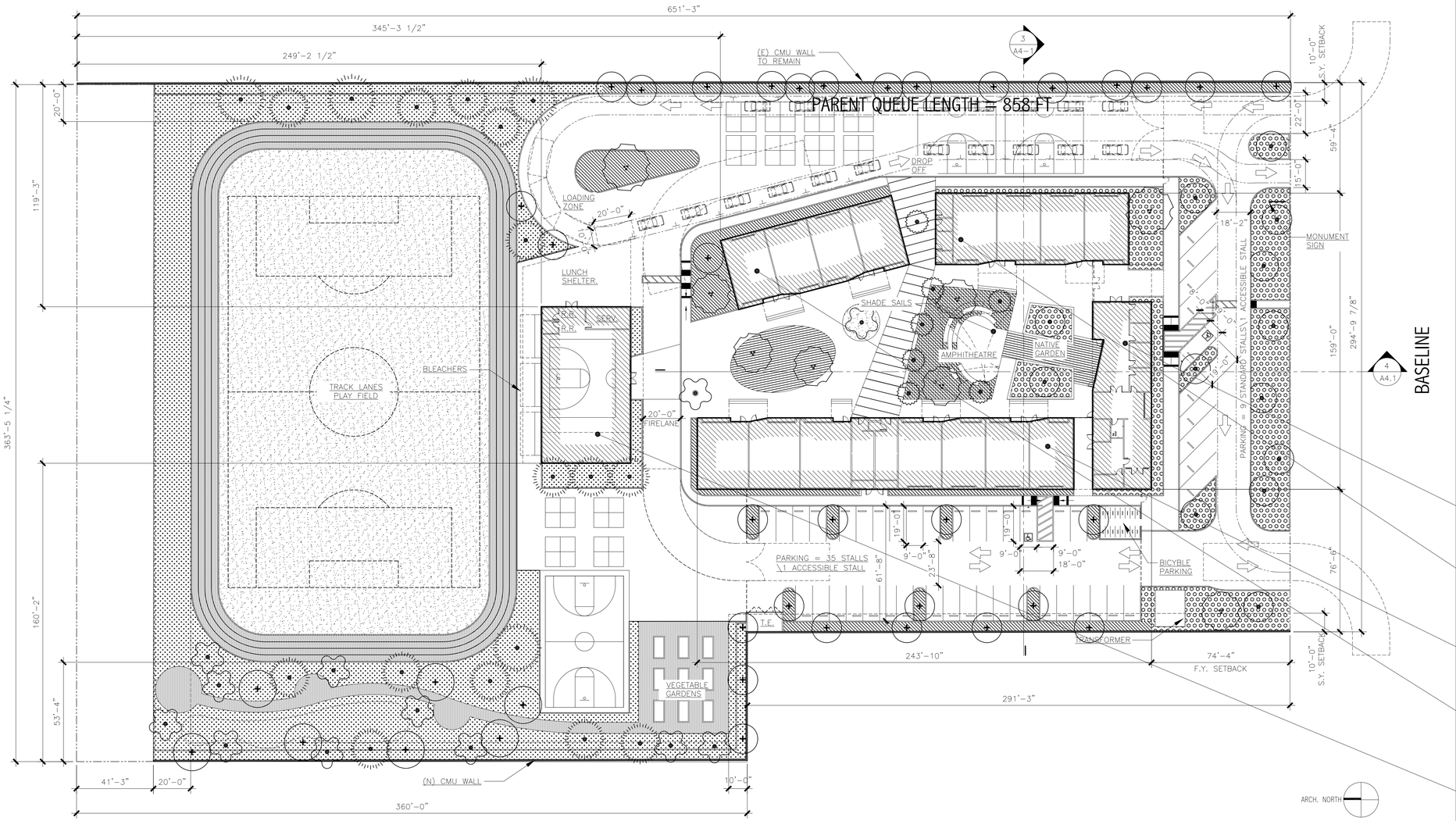
We will be glad to discuss or help clarify anything now or as the project and study develops. Please call or email if you have any questions or concerns.

Sincerely,

Anne M. Hernandez

Anne M. Hernandez, P.E.
Principal

Attachments: Site
Distribution and Assignment Exhibits



SITE PLAN NOTES:

1. ACCESSIBLE PATH OF TRAVEL AS INDICATED ON PLAN IS A BARRIER–FREE ACCESS ROUTE WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING 1/2" IF BEVELED AT 1:2 MAX SLOPE, OR VERTICAL LEVEL CHANGES NOT EXCEEDING 1/4" MAX, AND AT LEAST 48" IN WIDTH. SURFACE IS STABLE, FIRM, AND SLIP RESISTANT. CROSS SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5%, UNLESS OTHERWISE INDICATED. ACCESSIBLE PATH OF TRAVEL SHALL BE MAINTAINED FREE OF OVERHANGING OBSTRUCTIONS TO 80" MINIMUM, AND PROTRUDING OBJECTS GREATER THAN 4" PROJECTION FROM WALL AND ABOVE 27" AND LESS THAN 80".

LEGEND:

- PROPERTY LINE
- SETBACK LINE
- (N) CHAIN LINK FENCE
- (N) 6'–0" IRON FENCE, TYP.
- (N) 6'–0" CONCRETE MASONRY UNIT WALL
- CONCRETE, SEE CIVIL DRAWINGS
- ASPHALT, SEE CIVIL DRAWINGS
- LANDSCAPE AREA, SEE LANDSCAPE DRAWINGS
- TURF, SEE LANDSCAPE DRAWINGS
- CONCRETE PAVERS, SEE LANDSCAPE DRAWINGS

ADMIN #1
NO. STORIES: ONE
FLOOR AREA (GROSS): 3,060 SF
F.F. ELEVATION: 1125.20'

CLASSROOM (TYP) #2
NO. STORIES: ONE
FLOOR AREA (GROSS): 3,916 SF
F.F. ELEVATION: 1125.20'

BUILDING #3
NO. STORIES: ONE
FLOOR AREA (GROSS): 7,650 SF
F.F. ELEVATION: 1125.20'

BUILDING #4
NO. STORIES: ONE
FLOOR AREA (GROSS): 3,575 SF
F.F. ELEVATION: 1125.20'

MULTI–PURPOSE #5
PRE–ENGINEERED METAL BUILDING
NO. STORIES: ONE
FLOOR AREA (GROSS): 4,032 SF
F.F. ELEVATION: 1125.20'

SITE PLAN

SCALE: 1" = 30'-0" | 8

NOTES

SCALE: N.T.S. | 3

GENERAL SUMMARY:

GENERAL PLAN:	CITY OF HIGHLAND GENERAL PLAN	
ZONING DESIGNATIONS:	R–2C CORRIDOR RESIDENTIAL	
SIZE OF PROPERTY:	GROSS:	216,702 SF (4.97 ACRES)
	NET:	216,702 SF (4.97 ACRES)
TOTAL FLOOR AREA:	ADMIN #1:	3,060 SF
	CLASSROOM(TYP) #2:	3,916 SF
	BUILDING #3:	7,650 SF
	BUILDING #4:	3,575 SF
	MULTI–PURPOSE #5:	4,032 SF
	TOTAL:	22,233 SF
TOTAL BUILDING AREA: (FLOOR AREA, BALCONIES AND COVERED LUNCH CANOPY)	27,443 SF	
SITE COVERAGE DETAILS:		
BUILDING COVERAGE:	22,333 SF	
IMPERVIOUS SURFACE:	105,861 SF	
LANDSCAPING:	53,104 SF	
PARKING, DRIVEWAY, AND MISC.	22,615 SF	
OPEN AREA:	49,427 SF	

PARKING SUMMARY:

PARKING REQUIRED			# SPACES REQ'D
USE	BASIS	FACTOR	
GRADES 6–8	12 CLASSROOMS	1 PER CLASSROOM	12
OFFICE	3,060 SF	1 PER 250 SF	13
LEARNING LABS	3 CLASSROOMS	1 PER CLASSROOM	3
		TOTAL # SPACES REQUIRED:	28

PARKING PROVIDED		# SPACES PROVIDED
ONSITE	STANDARD	44
	COMPACT	–
	ADA (2 SPACES REQ.)	2
	TOTAL # SPACES PROVIDED:	46

NOTES

SCALE: N.T.S. | 4

SLO SWIFTLEEOFFICE

ARCHITECT:
SWIFTLEEOFFICE
543A S. Raymond Ave.
Pasadena, CA 91105
T. 323.257.8200 F. 323.257.8276
www.swiftleeoffice.com

CONSULTANT:

PROJECT NAME:
NEW VISION ACADEMY
26200 BASELINE ST.
HIGHLAND, CA, 92346

DATE: 07.16.15
REVISED:
C.U.P SUBMITTAL

APPROVAL:

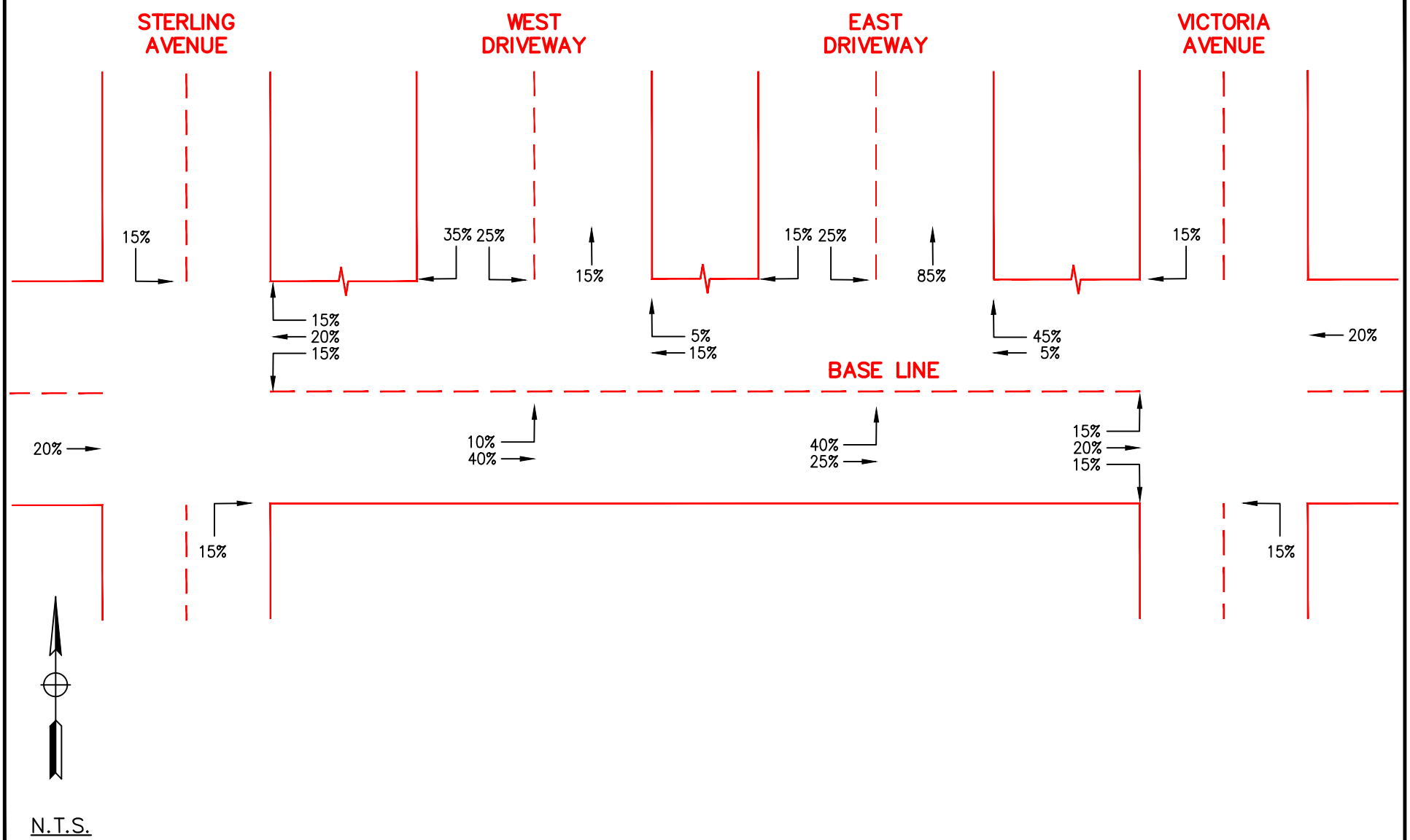
STAMP/SEAL:

SHEET TITLE:
SITE PLAN

PROJ. NO: 2015-14

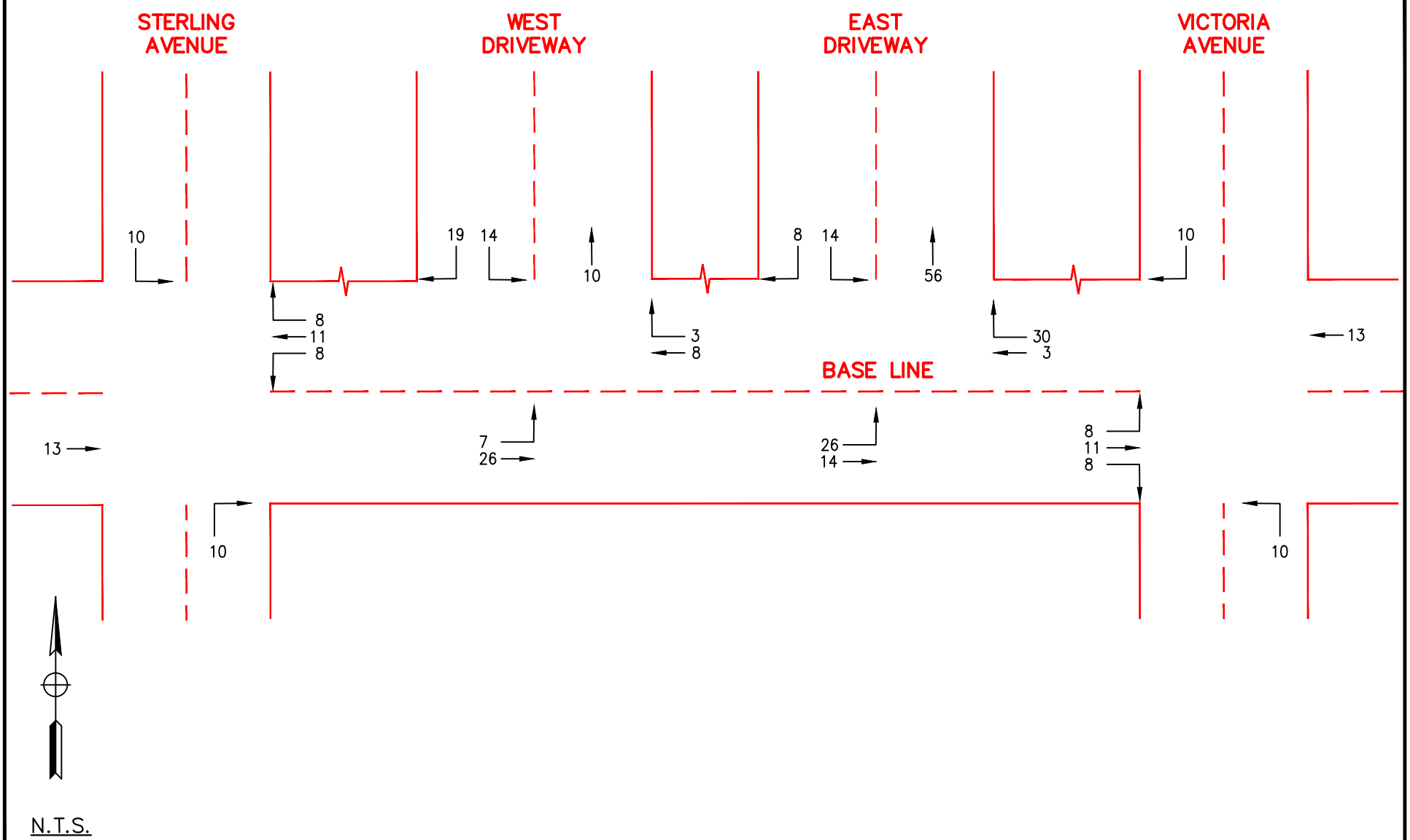
SHEET NO:
A1.1

© 2015 SWIFTLEEOFFICE



Hernandez, Kroone & Associates, Inc
— CONSULTING ENGINEERS —
PLANNING - DESIGN - SURVEYING
234 EAST DRAKE DRIVE
SAN BERNARDINO, CA 92408
(909) 884-3222 FAX (909) 383-1577
E-MAIL richardh@hkagroup.com

PROJECT SITE NEW VISION ACADEMY	EXHIBIT 2	
DESCRIPTION PEAK HOUR PROJECT TRIP DISTRIBUTION	DATE 10/20/15	PAGE 1 OF 1



Hernandez, Kroone & Associates, Inc
— CONSULTING ENGINEERS —
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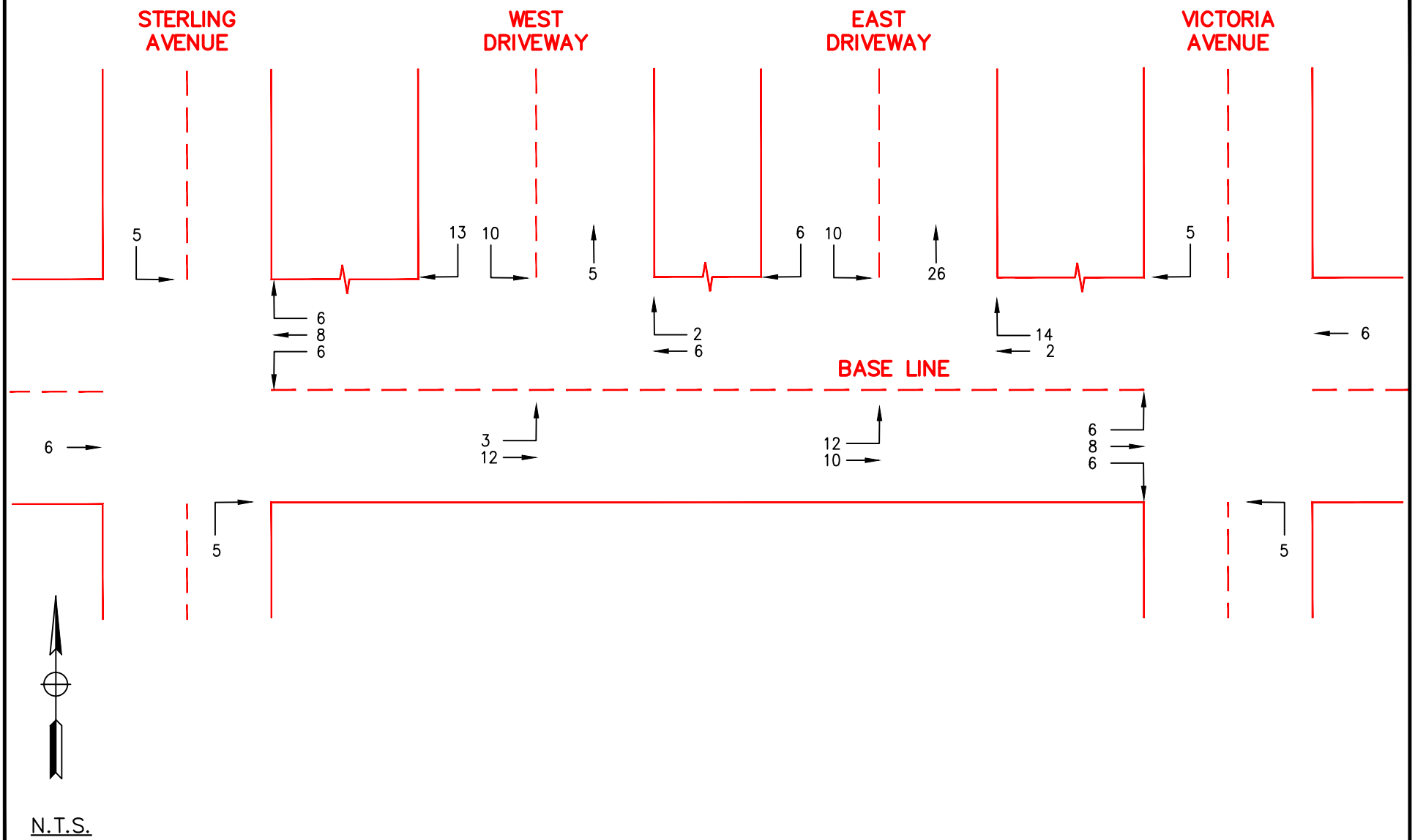
234 EAST DRAKE DRIVE
SAN BERNARDINO, CA 92408
(909) 884-3222 FAX (909) 383-1577
E-MAIL richardh@hkagroup.com

PROJECT SITE NEW VISION ACADEMY	EXHIBIT 3	
DESCRIPTION AM PROJECT TRIPS ASSIGNMENT	DATE 10/20/15	PAGE 1 OF 1



Hernandez, Kroone & Associates, Inc
— CONSULTING ENGINEERS —
PLANNING - DESIGN - SURVEYING
234 EAST DRAKE DRIVE
SAN BERNARDINO, CA 92408
(909) 884-3222 FAX (909) 383-1577
E-MAIL richardh@hkagroup.com

PROJECT SITE NEW VISION ACADEMY	EXHIBIT 4	
DESCRIPTION PM PROJECT TRIPS ASSIGNMENT	DATE 10/20/15	PAGE 1 OF 1

CUMULATIVE PROJECT 37

SEP 21 2011

STATE OF CALIFORNIA - THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
ENVIRONMENTAL FILING FEE CASH RECI
DFG 753.5a (8-03)

2 8030

Lead Agency: City of Highland Date: 9/12/06

County / State Agency of Filing: Co. San Bernardino Document No.:

Project Title: DR13 006-014

Project Applicant Name: City of Highland Phone Number: 9096648732

Project Applicant Address: 27215 Baseline Highland, CA 92346

Project Applicant *(check appropriate box)*: Local Public Agency [X] School District [ ] Other Special District [ ]
State Agency [ ] Private Entity [ ]

CHECK APPLICABLE FEES:

CASH

( ) Environmental Impact Report	$850.00	$
( ) Negative Declaration	$1,250.00	$
( ) Application Fee Water Diversion *(State Water Resources Control Board Only)*	$850.00	$
( ) Projects Subject to Certified Regulatory Programs	$850.00	$
(X) County Administrative Fee	$25.00	$ 25.00 —
( ) Project that is exempt from fees		
	TOTAL RECEIVED	$ 25.00 —

Signature and title of person receiving payment: Jemina Ramos, Deputy Clerk

WHITE-PROJECT APPLICANT YELLOW-DFG/FASB PINK-LEAD AGENCY GOLDENROD-STATE AGENCY OF FILING

STATE OF CALIFORNIA - THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
ENVIRONMENTAL FILING FEE CASH RECE
DFG 753.5a (8-03)

27 3030

Lead Agency: City of Highland Date: 9/12/06

County / State Agency of Filing: Co. San Bernardino Document No.:

Project Title: DR13 006-014

Project Applicant Name: City of Highland Phone Number: 9096648732

Project Applicant Address: 27215 Baseline Highland, CA 92346

Project Applicant *(check appropriate box)*: Local Public Agency [X] School District [ ] Other Special District [ ]
State Agency [ ] Private Entity [ ]

CHECK APPLICABLE FEES:

CASH

( ) Environmental Impact Report	$850.00	$
( ) Negative Declaration	$1,250.00	$
( ) Application Fee Water Diversion *(State Water Resources Control Board Only)*	$850.00	$
( ) Projects Subject to Certified Regulatory Programs	$850.00	$
(X) County Administrative Fee	$25.00	$ 25.00 —
( ) Project that is exempt from fees		
	TOTAL RECEIVED	$ 25.00 —

Signature and title of person receiving payment: Jemina Ramos, Deputy Clerk

WHITE-PROJECT APPLICANT YELLOW-DFG/FASB PINK-LEAD AGENCY GOLDENROD-STATE AGENCY OF FILING

DATE FILED & POSTED

CITY OF HIGHLAND

Ref # 278030

27215 Base Line, Highland, CA 92346
Telephone (909) 864-8732 FAX: (909) 862-3180

CLERK OF THE BOARD
SEP 12 2006
COUNTY OF
SAN BERNARDINO

NOTICE OF EXEMPTION

TO: Clerk of the Board
385 N. Arrowhead Ave.
Second Floor
San Bernardino, CA 92411

FROM: City of Highland
Community Development Department
27215 Base Line
Highland, CA 92346

PROJECT TITLE: DRB 006-014

PROJECT LOCATION - SPECIFIC: The 1.43 acre Site is located at the north-west corner of Palm Avenue and Fifth Street. Assessor Parcel Number: 1192-621-01-0-000

PROJECT LOCATION - CITY: Highland

PROJECT LOCATION - COUNTY: San Bernardino

DESCRIPTION OF THE NATURE, PURPOSES, AND BENEFICIARIES OF THE PROJECT:

An Application, for a Farmer Boys Restaurant drive-thru facility and associate speculative retail building with drive-thru restaurant building attached consisting of two (2) buildings totaling 7,160 square feet.

NAME OF PUBLIC AGENCIES INVOLVED: Planning Division, City of Highland

NAME OF PERSON OF AGENCY CARRYING OUT PROJECT: City of Highland

REASON WHY PROJECT IS EXEMPT: City Staff has undertaken and completed a preliminary review of this project. In accordance with the California Environmental Quality Act, as amended, this project is exempt from CEQA.

EXEMPT STATUS: (Check One)

___Ministerial (Section 21080 (b)(1) ; 15268)
___Declared Emergency (Section 21080 (b)(3);15269(a))
___Emergency Protection (Section 21080 (b)(4); 15269 (b), (c))
_X_Categorical Exemptions. Article XIX, Section 15332

CONTACT PERSON: Sean Kelleher

TELEPHONE NUMBER: (909)864-8732 ext. 210

IF FILED BY APPLICANT

1. Attach certified document of exemption findings.
2. Has a Notice of Exemption been filed by the public agency approving the project? Yes __ No__.

Responsible Official Signature | Assistant Planner Title | 9/12/06 Date

c:\Myfiles\Seankelleher\Ceqa Projects\drb006014.wpd

CUMULATIVE PROJECT 38

KUNZMAN ASSOCIATES, INC.

TENTATIVE TRACT MAP NO. 18935

TRAFFIC IMPACT ANALYSIS (REVISED)

April 2, 2015

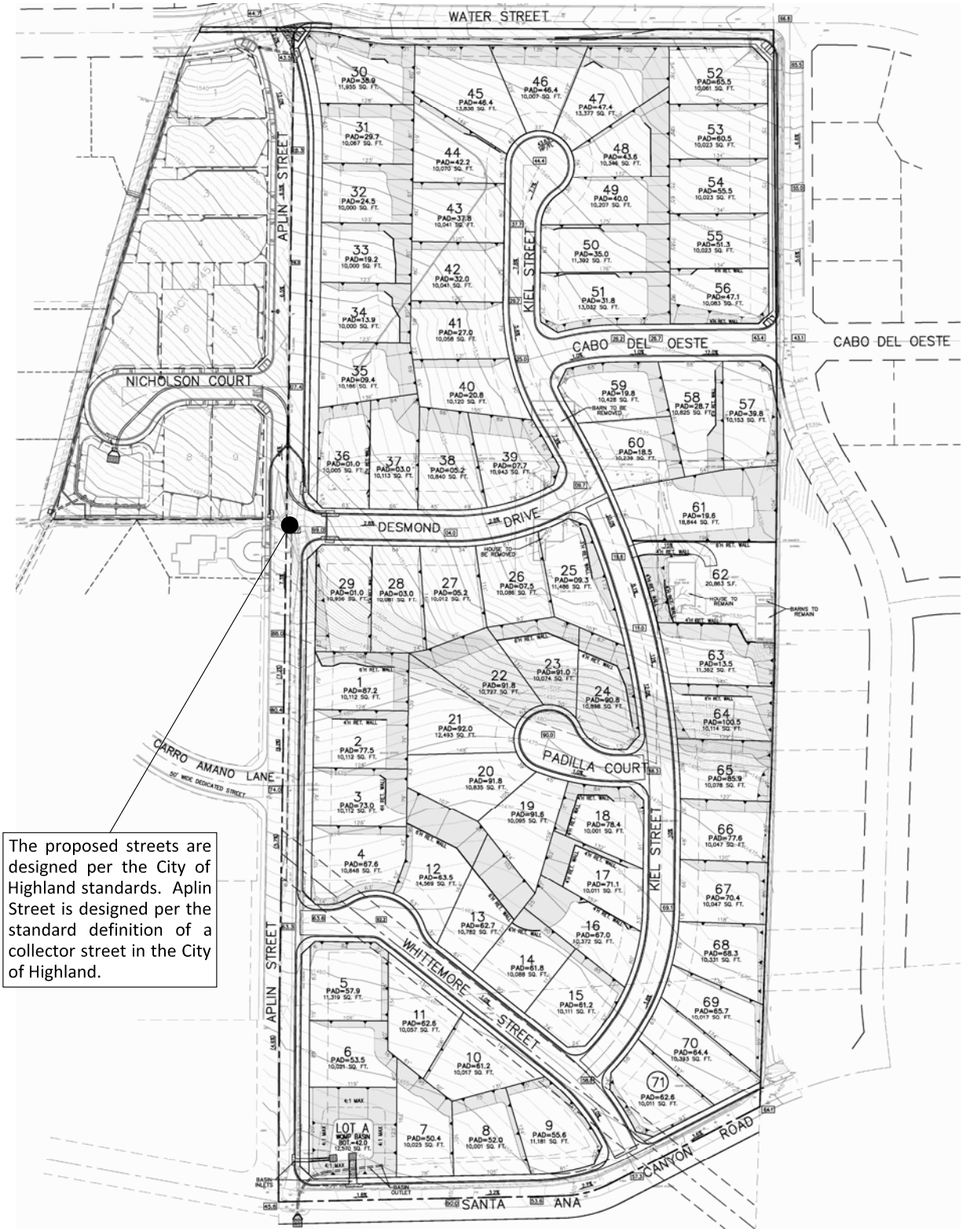
Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

Figure 1
Project Location Map

KUNZMAN ASSOCIATES, INC.
OVER 35 YEARS OF EXCELLENT SERVICE

5799/1

Figure 2
Site Plan



The proposed streets are designed per the City of Highland standards. Aplin Street is designed per the standard definition of a collector street in the City of Highland.

5799/2

KUNZMAN ASSOCIATES, INC.

OVER 35 YEARS OF EXCELLENT SERVICE

Table 2

Project Trip Generation[1]

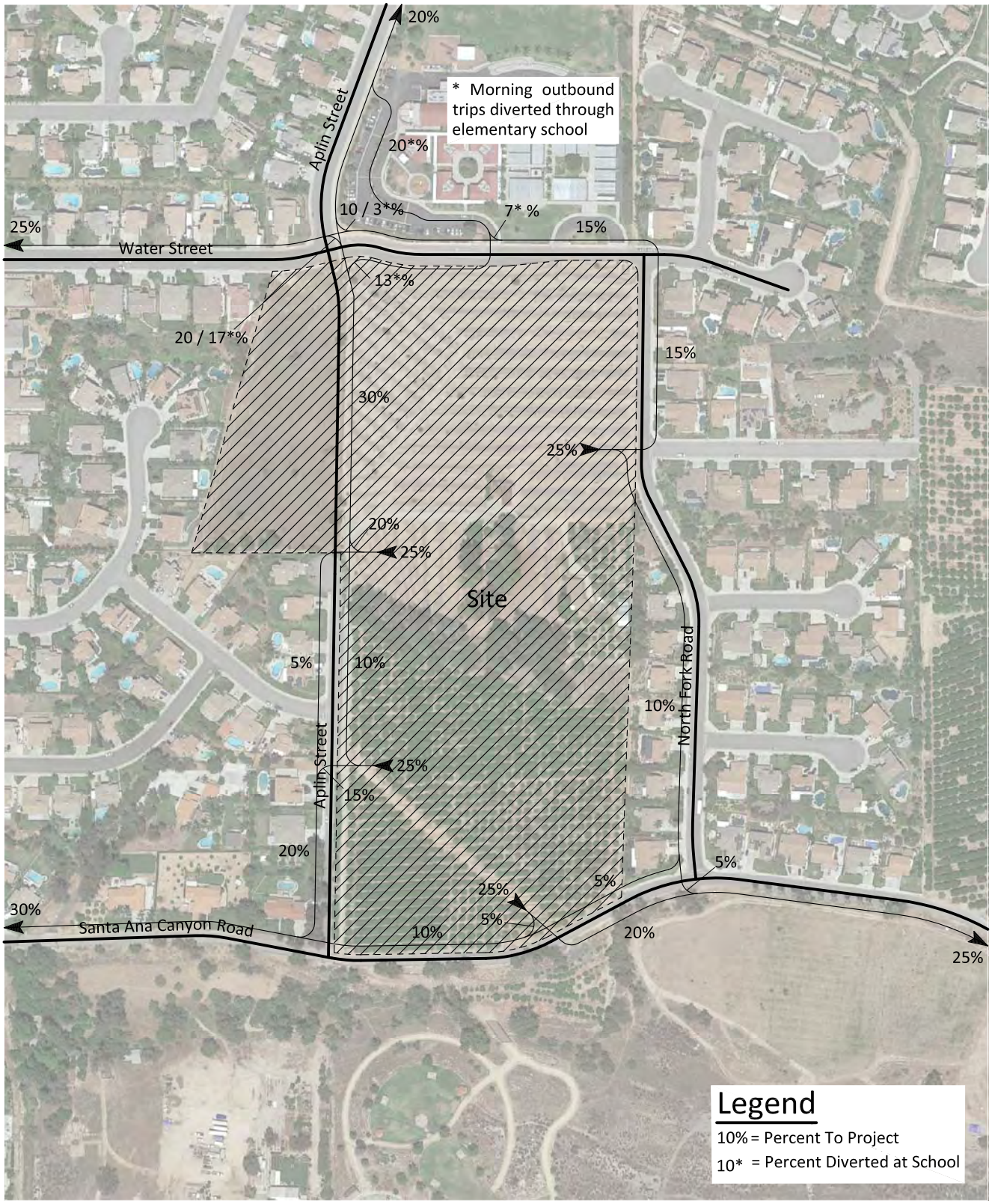
Land Use	Quantity	Units[3]	Peak Hour						Daily
			Morning			Afternoon[2]			
			Inbound	Outbound	Total	Inbound	Outbound	Total	
Trip Generation Rates									
Single-Family Detached Residential		DU	0.19	0.56	0.75	0.63	0.37	1.00	9.52
Trips Generated									
Single-Family Detached Residential	80	DU	15	45	60	50	30	80	762

[1] Source: Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012, Land Use Category 210.

[2] Because of the proximity to the adjacent school the morning and afternoon peak periods counted were to capture the morning arrival and afternoon dismissal period of the school. In order to provide a "conservative" analysis, the evening peak hour trip generation was used for the afternoon peak hour.

[3] DU = Dwelling Units

Figure 9
Project Outbound Trip Distribution



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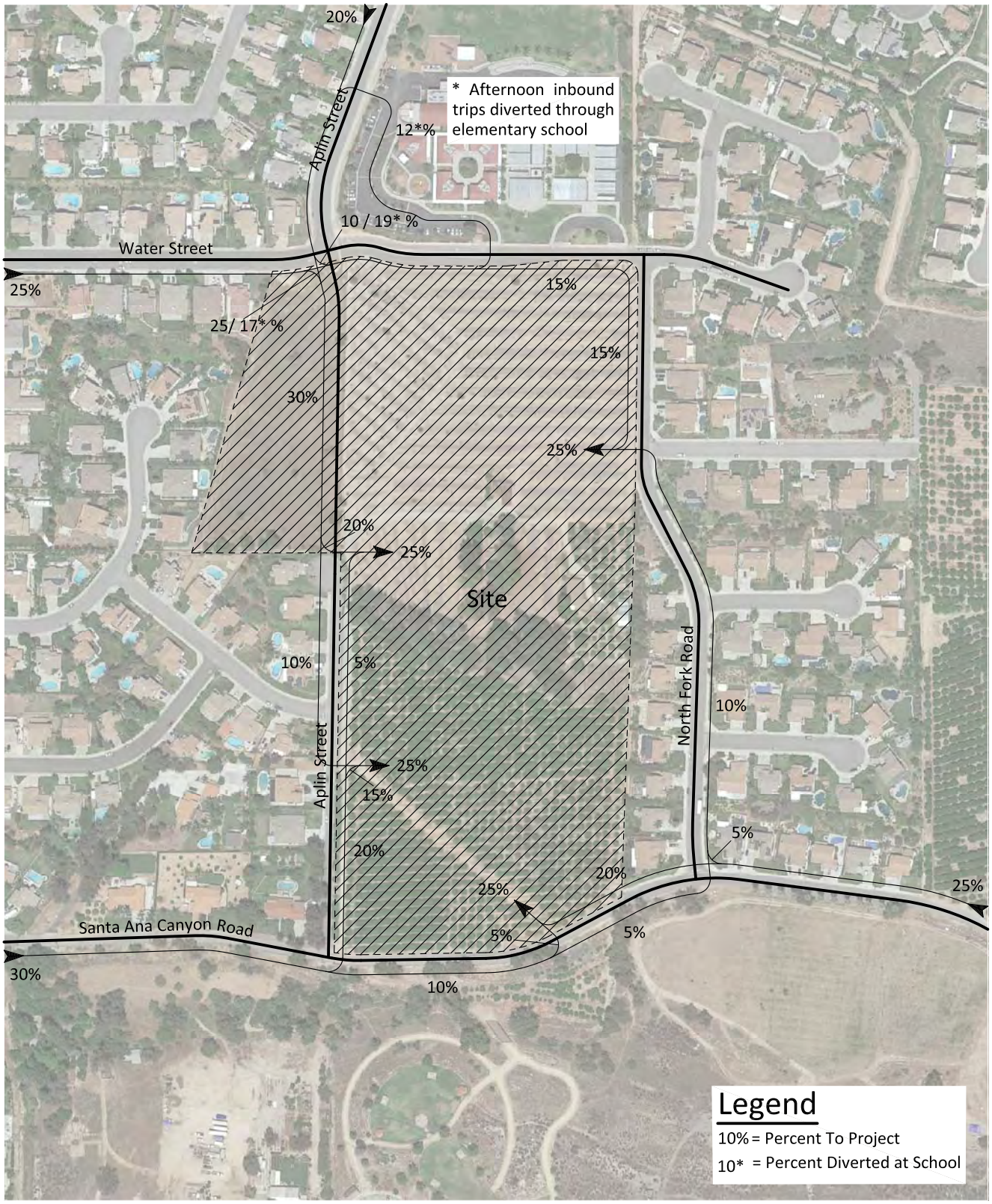
KUNZMAN ASSOCIATES, INC.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 10
Project Inbound Trip Distribution

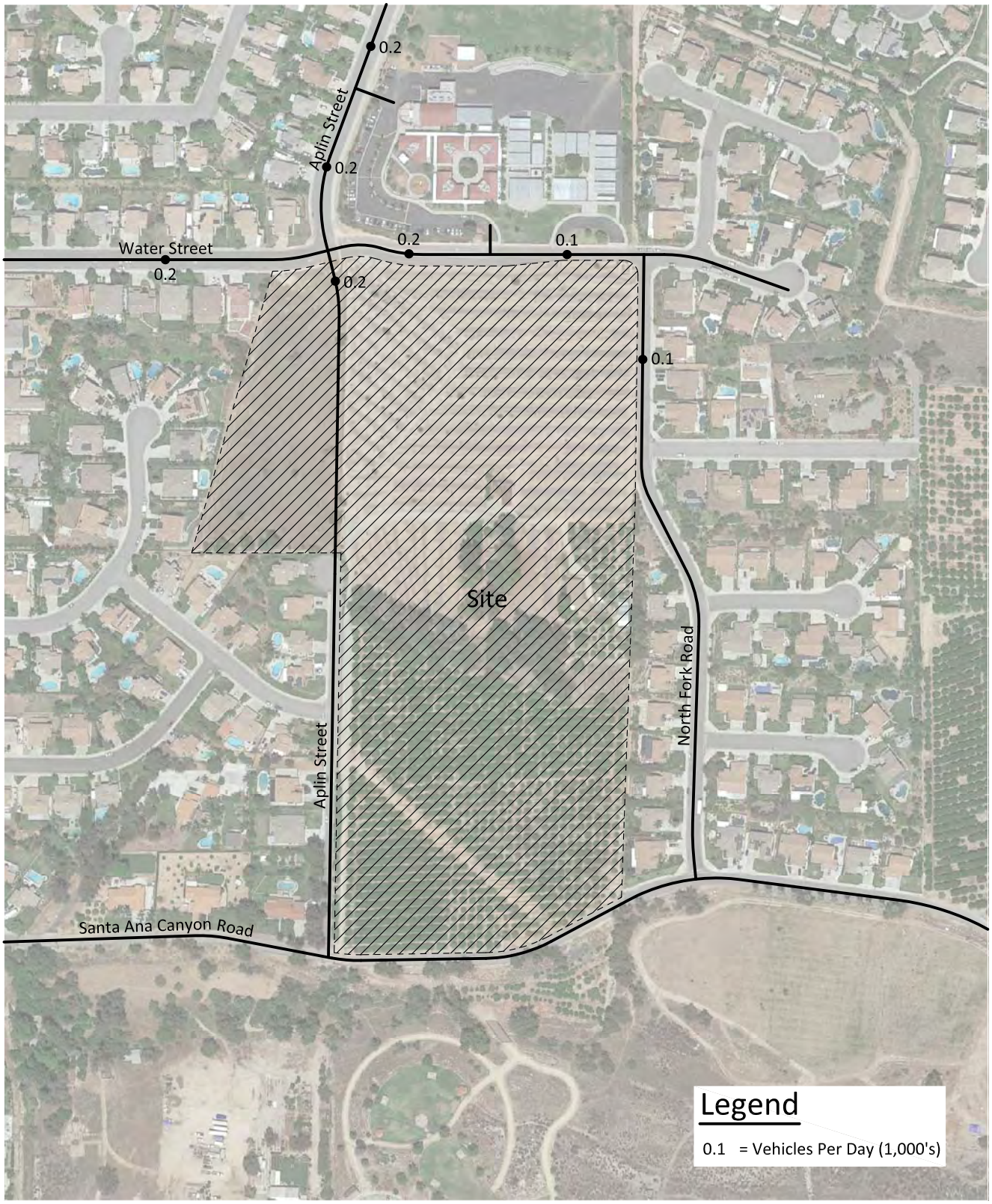


5799/10

KUNZMAN ASSOCIATES, INC.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 11
Project Average Daily Traffic Volumes

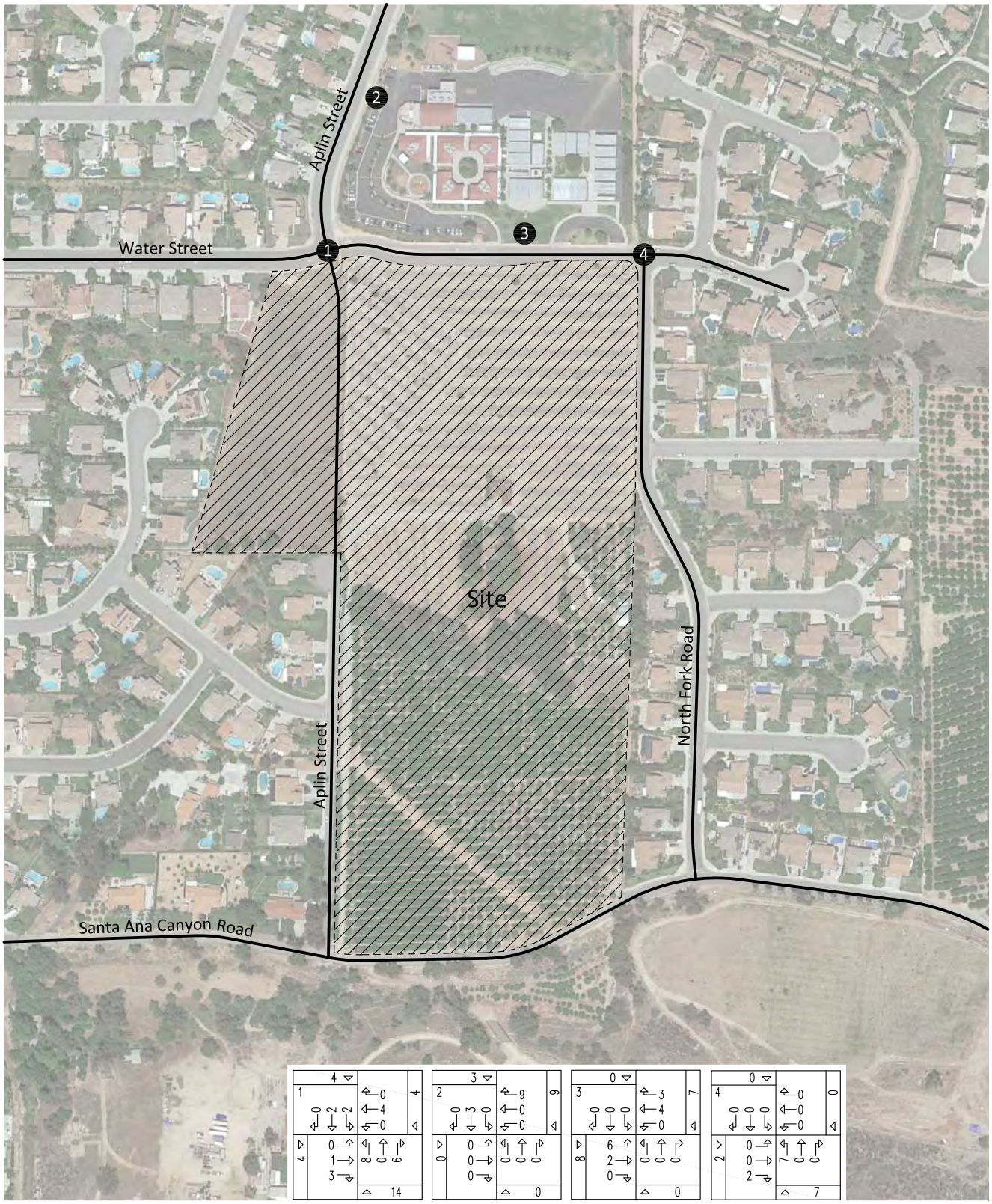


5799/11

KUNZMAN ASSOCIATES, INC.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 12
Project Morning Peak Hour Intersection Turning Movement Volumes

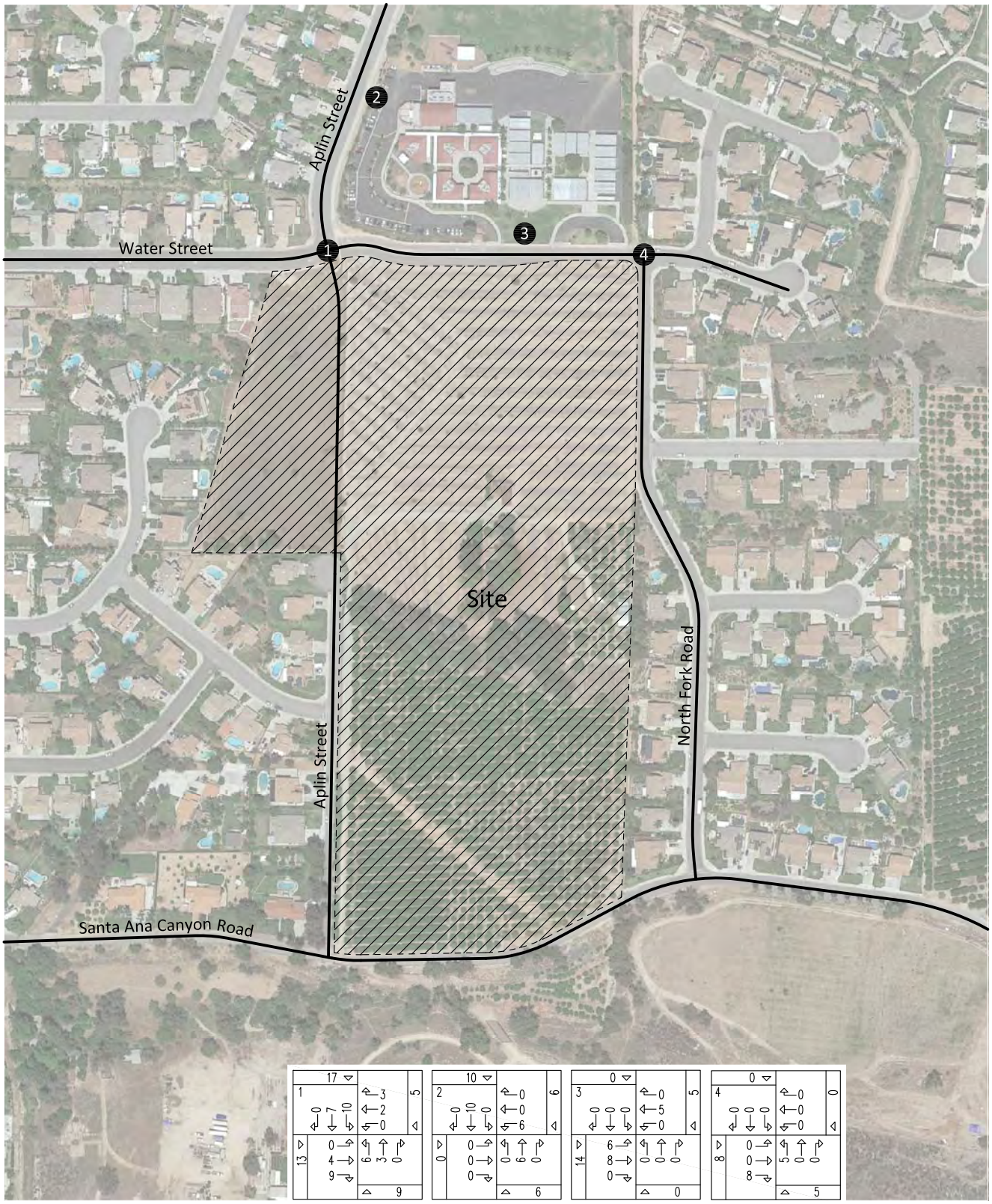


5799/12

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 13
Project Afternoon Peak Hour Intersection Turning Movement Volumes



5799/13

KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

APPENDIX F

TRUCK TURNING EXHIBITS

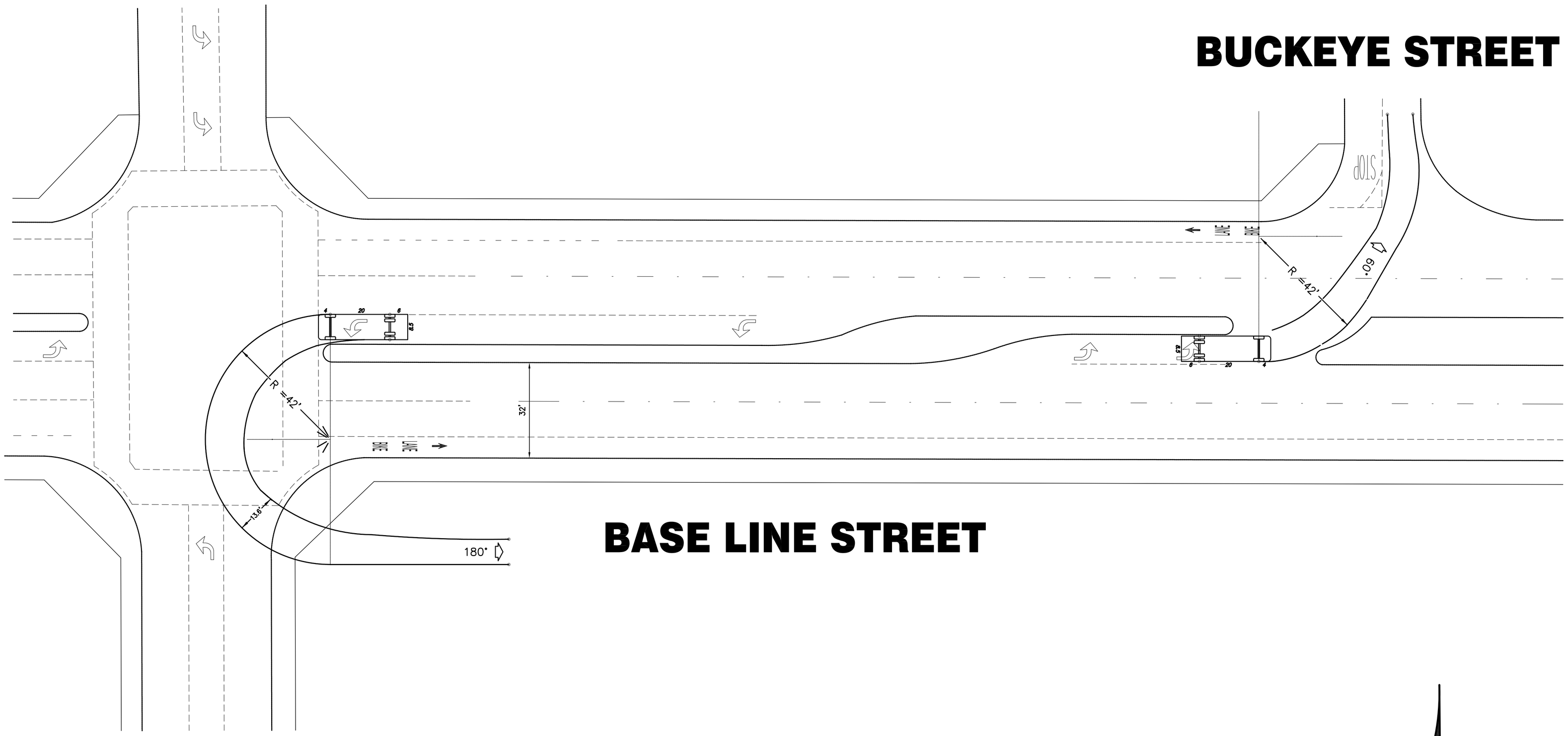


EXHIBIT A: Baseline Smart & Final
Delivery Truck Turning Template Exhibit

Date: 08/15/16

SCALE: 1" = 40'

20 0 20 40 60

24"x36" PLOT

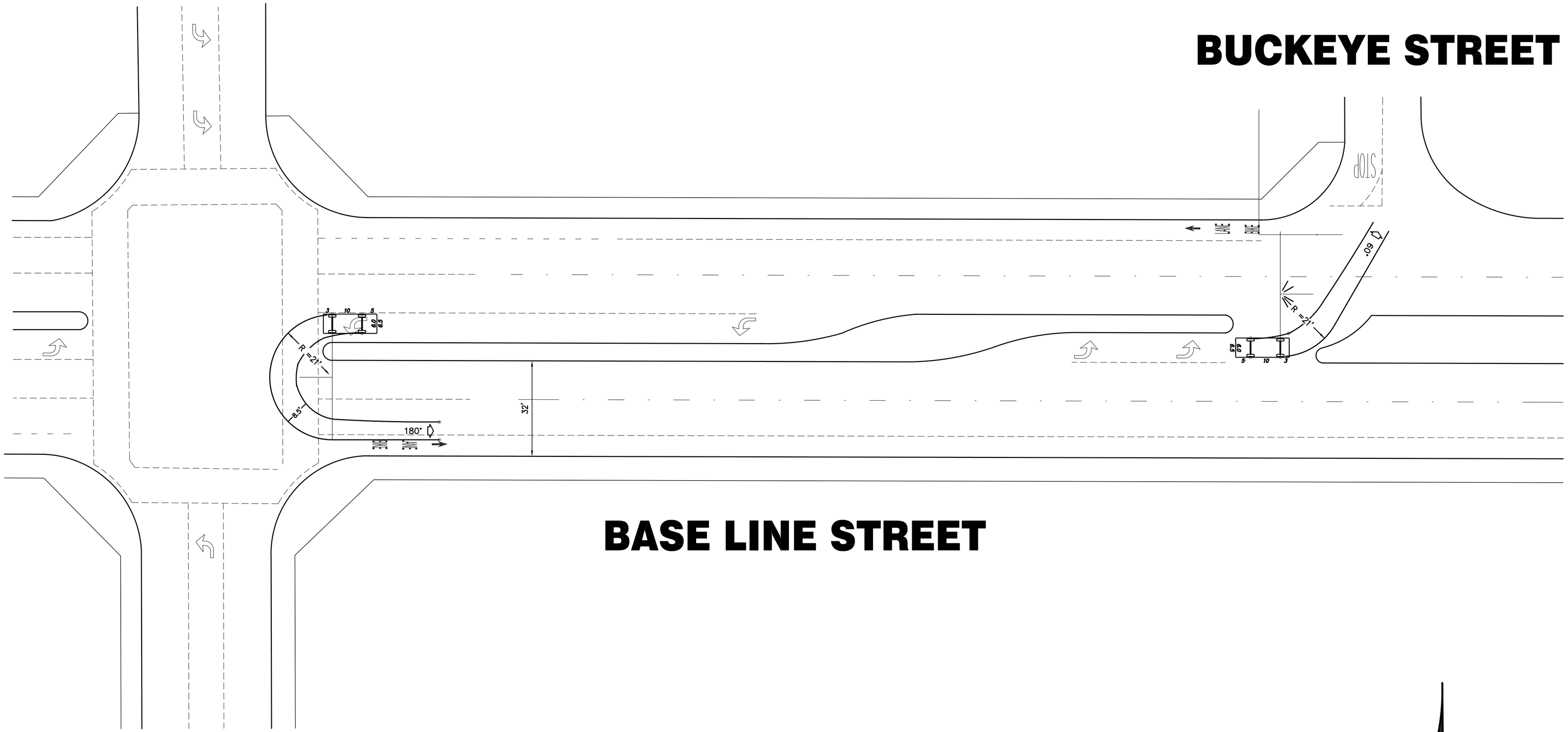


EXHIBIT B: Baseline Smart & Final
Car Turning Template Exhibit

Date: 08/15/16

SCALE: 1" = 40'

20 0 20 40 60

24"x36" PLOT

APPENDIX G

QUEUE ANALYSIS OUTPUT SHEETS

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	33	655	157	764	98	348	121	91
v/c Ratio	0.23	0.79	0.69	0.68	0.17	0.39	0.32	0.11
Control Delay	29.2	25.9	53.9	26.1	19.5	9.0	23.2	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	25.9	53.9	26.1	19.5	9.0	23.2	14.0
Queue Length 50th (ft)	14	102	76	246	38	49	51	25
Queue Length 95th (ft)	m42	117	106	242	51	30	87	48
Internal Link Dist (ft)		1229		288		1398		277
Turn Bay Length (ft)	110		165		125		70	
Base Capacity (vph)	144	1043	330	1556	585	889	379	856
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.63	0.48	0.49	0.17	0.39	0.32	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	52	874	95	804	42	215	189	132
v/c Ratio	0.33	0.82	0.55	0.69	0.08	0.27	0.42	0.17
Control Delay	27.4	21.9	40.4	23.0	17.6	6.4	22.9	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	21.9	40.4	23.0	17.6	6.4	22.9	9.3
Queue Length 50th (ft)	15	78	46	227	14	18	76	20
Queue Length 95th (ft)	m41	130	87	251	22	14	104	38
Internal Link Dist (ft)		1229		288		1398		277
Turn Bay Length (ft)	110		165		125		70	
Base Capacity (vph)	161	1169	204	1373	517	809	445	785
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.75	0.47	0.59	0.08	0.27	0.42	0.17

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	676	172	802	59	206	179	76
v/c Ratio	0.31	0.79	0.71	0.73	0.09	0.22	0.33	0.08
Control Delay	29.4	21.8	55.2	27.6	19.3	5.5	22.6	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	21.8	55.2	27.6	19.3	5.5	22.6	13.3
Queue Length 50th (ft)	26	115	81	233	23	14	82	19
Queue Length 95th (ft)	65	136	124	276	59	66	169	56
Internal Link Dist (ft)		1229		288		1398		277
Turn Bay Length (ft)	110		165		125		70	
Base Capacity (vph)	154	1209	388	1812	645	925	538	920
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.56	0.44	0.44	0.09	0.22	0.33	0.08

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	29	929	126	862	27	129	177	57
v/c Ratio	0.17	0.80	0.64	0.66	0.05	0.16	0.33	0.07
Control Delay	29.3	18.9	77.0	20.9	23.6	7.7	26.8	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	18.9	77.0	20.9	23.6	7.7	26.8	16.7
Queue Length 50th (ft)	15	156	89	158	12	11	90	16
Queue Length 95th (ft)	m30	181	132	164	36	57	179	51
Internal Link Dist (ft)		1229		288		1398		277
Turn Bay Length (ft)	110		165		125		70	
Base Capacity (vph)	176	1492	294	1917	583	807	532	819
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.62	0.43	0.45	0.05	0.16	0.33	0.07

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	829	186	1024	77	267	116	84
v/c Ratio	0.21	0.68	0.70	0.59	0.13	0.30	0.27	0.10
Control Delay	26.4	25.2	41.3	22.7	16.8	5.2	19.0	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	25.2	41.3	22.7	16.8	5.2	19.0	12.2
Queue Length 50th (ft)	11	79	91	188	24	14	39	18
Queue Length 95th (ft)	m17	m86	m155	216	59	66	90	50
Internal Link Dist (ft)		1229		288		1398		277
Turn Bay Length (ft)	110		165		125		70	
Base Capacity (vph)	168	1630	316	2269	581	883	437	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.51	0.59	0.45	0.13	0.30	0.27	0.10

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	49	1156	113	1061	34	163	169	109
v/c Ratio	0.70	0.75	0.62	0.55	0.06	0.19	0.31	0.13
Control Delay	104.4	41.5	54.0	22.0	21.2	7.1	24.2	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	104.4	41.5	54.0	22.0	21.2	7.1	24.2	14.0
Queue Length 50th (ft)	41	243	83	157	15	16	83	30
Queue Length 95th (ft)	m54	243	m133	117	41	66	166	77
Internal Link Dist (ft)		1229		288		1398		277
Turn Bay Length (ft)	110		165		125		70	
Base Capacity (vph)	70	2412	270	2985	596	878	547	870
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.48	0.42	0.36	0.06	0.19	0.31	0.13

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.