URBAN | CROSSROADS

EVERHOME SUITES (CUP22-18)

FOCUSED TRAFFIC ANALYSIS

PREPARED BY: Charlene So | cso@urbanxroads.com
Aric Evatt | aevatt@urbanxroads.com

Reference Number	Agency	Date
15215-05 TA Report	City of San Bernardino	June 13, 2023

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CAMUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CMP	Congestion Management Program
DIF	Development Impact Fee
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
NP	Without Project
OYC	Opening Year Cumulative
PHF	Peak Hour Factor
Project	Everhome Suites
SBCTA	San Bernardino County Transportation Authority
sf	Square Feet
TA	Traffic Analysis
v/c	Volume to Capacity
vphgpl	Vehicles per Hour Green per Lane
WP	With Project

1 INTRODUCTION

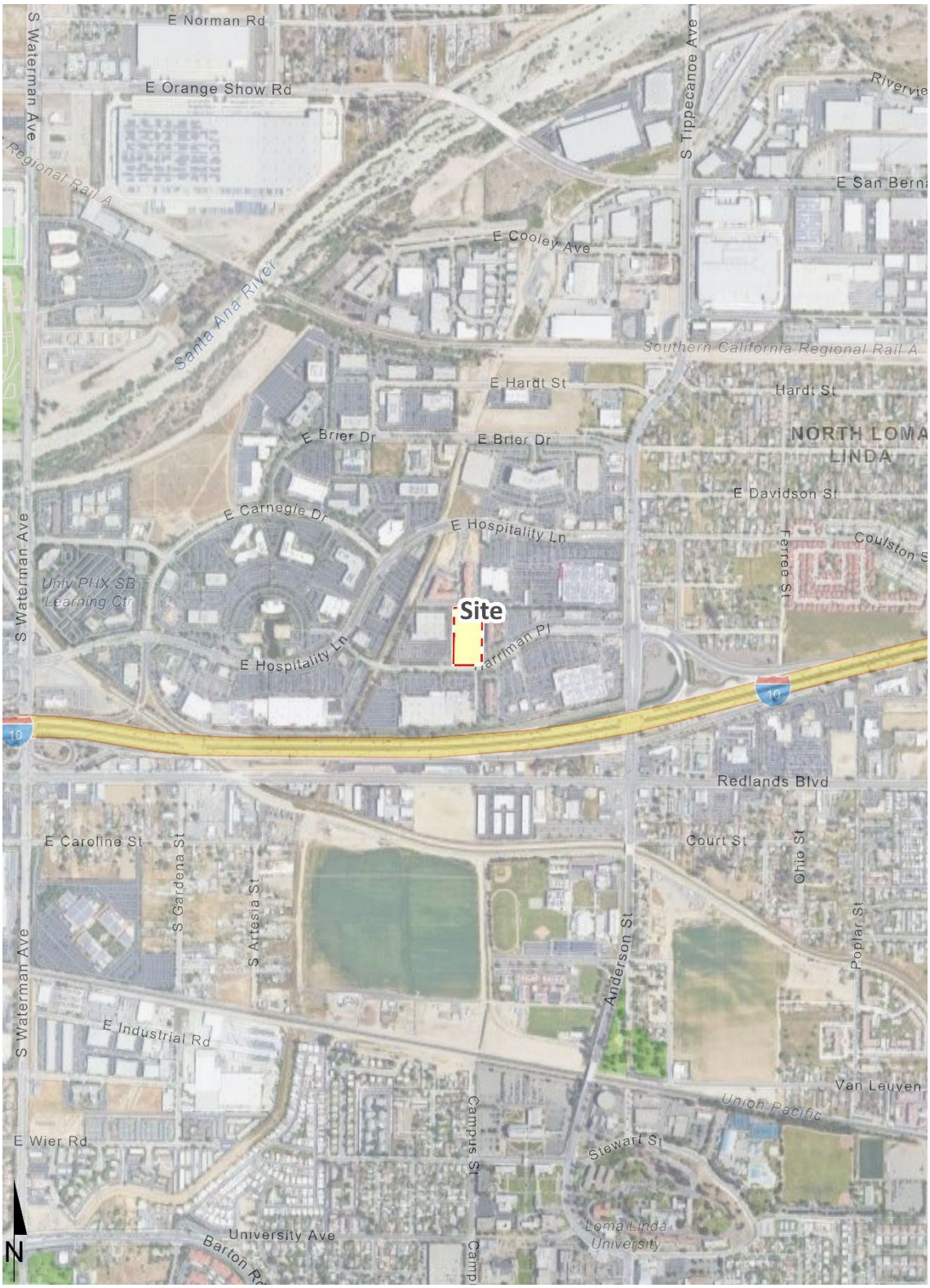
This report presents the results of the Traffic Analysis (TA) for Everhome Suites (Project), which is located at 898 E. Harriman Place in the City of San Bernardino, as shown on Exhibit 1-1. The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and where necessary recommend improvements to achieve acceptable operations consistent with General Plan level of service goals and policies. This traffic study has been prepared in accordance with the City of San Bernardino's Traffic Impact Analysis Guidelines (August 2020), and consultation with City staff during the traffic study scoping process. (1) The City approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TA.

1.1 SUMMARY OF FINDINGS

The Project is being developed on a vacant pad within an existing parcel. As such, there are no site adjacent roadway improvements proposed or access modifications. The existing access to the parcel is shared with the existing Best Buy and Lakeshore Learning Store on Harriman Place. The driveway is signed with a stop control for egress traffic from the parcel and Harriman Place is currently striped with two through lanes in each direction of travel separated by a painted median which serves as a left-turn lane for the Project driveway. There is sufficient storage within the painted median to accommodate the 95th percentile peak hour queues.

Additional details and intersection lane geometrics are provided in Section 1.6 *Recommendations* of this report. The proposed Project is not anticipated to require the construction of any off-site improvements. As such, the Project Applicant's responsibility for the Project's contributions towards deficient off-site intersections is fulfilled through payment into pre-existing fee programs (if applicable) that would be assigned to the future construction of any future local/regional improvement needs. The Project Applicant would be required to pay requisite fees consistent with the City's requirements (see Section 6 *Local and Regional Funding Mechanisms*).

EXHIBIT 1-1: LOCATION MAP



1.2 PROJECT OVERVIEW

The Project is proposed to consist of a 114-room extended stay (all-suite) hotel based on the latest site plan. However, the Project has been evaluated based on a 121-room extended stay hotel for the purposes of this focused traffic analysis and is therefore more conservative than the currently proposed Project. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2025. The latest site plan for the proposed Project is shown on Exhibit 1-2 (reflecting the 114-room hotel). As indicated on Exhibit 1-2, access to the Project site is accommodated via the shared driveway with the existing Best Buy and Lakeshore Learning Store. Regional access to the Project site is available from the I-10 Freeway via the Waterman Avenue/Hospitality Lane and Tippecanoe Avenue interchanges. Exhibit 1-3 depicts the location of the proposed Project in relation to the existing roadway network and the study area intersections.

In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition, 2021) for the All-Suites Hotel land use category (ITE Land Use Code 311). The Project is anticipated to generate a total of 532 actual vehicle trip-ends per day with 41 AM peak hour trips and 43 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2023) Conditions
- Opening Year Cumulative (2025) Without Project Conditions
- Opening Year Cumulative (2025) With Project Conditions

1.3.1 EXISTING (2023) CONDITIONS

Information for Existing (2023) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. For a detailed discussion on the existing traffic counts, see Section 3.6 *Existing Traffic Counts*.

1.3.2 OPENING YEAR CUMULATIVE (2025) WITH PROJECT CONDITIONS

The Opening Year Cumulative (OYC) (2025) Without and With Project traffic conditions analyses determine the potential near-term cumulative circulation system deficiencies based on a comparison of the OYC (2025) With Project to OYC (2025) Without Project traffic conditions. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth factor from Existing conditions of 6.09% is included for OYC (2025) traffic conditions. The ambient growth is consistent with the growth used by other projects in the area (3% per year, compounded annually). A list of cumulative project was also compiled from information provided by the City of San Bernardino.

EXHIBIT 1-2: PRELIMINARY SITE PLAN

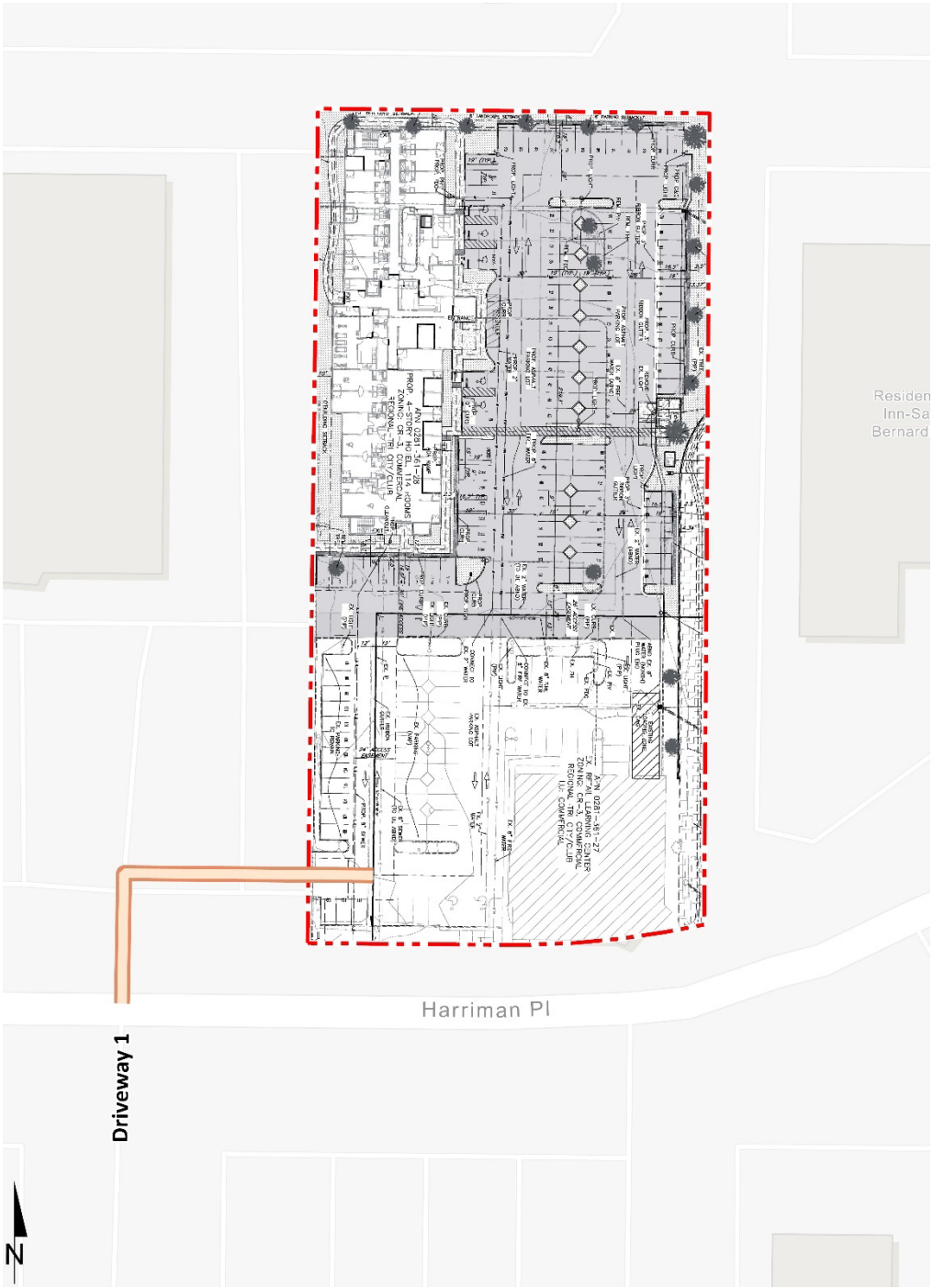


EXHIBIT 1-3: STUDY AREA

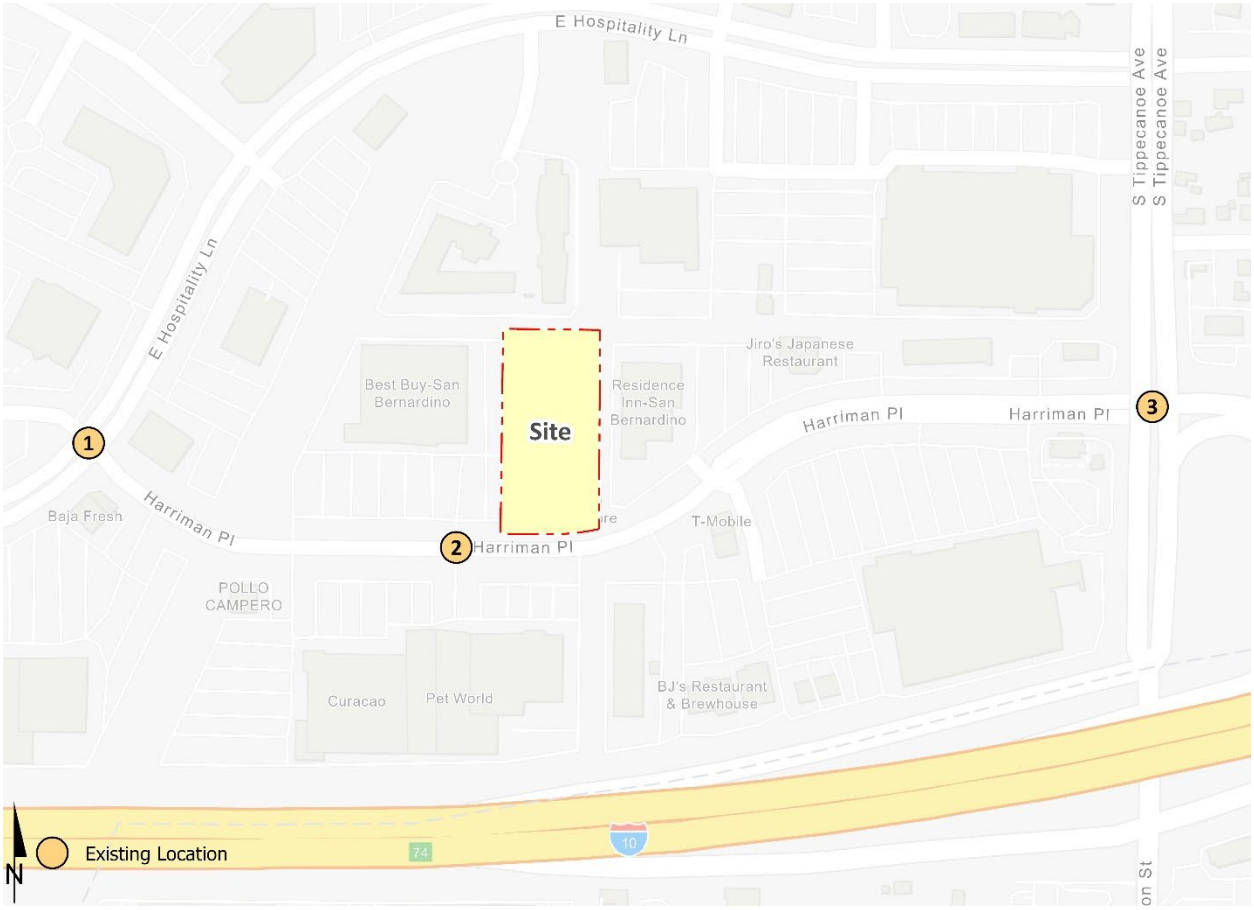


TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	Jurisdiction	CMP?
1	Hospitality Ln. & Harriman Pl.	San Bernardino	No
2	Driveway 1 & Harriman Pl.	San Bernardino	No
3	Tippecanoe Av. & Harriman Pl./I-10 WB Ramps	San Bernardino	No

1.4 STUDY AREA

To ensure that this TA satisfies the City of San Bernardino's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of San Bernardino staff prior to the preparation of this report. This agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The agreement approved by the City is included in Appendix 1.1 of this TA.

The 3 study area intersections shown on Exhibit 1-3 and listed in Table 1-1 were selected for evaluation in this TA based on consultation with City of San Bernardino staff. At a minimum, a study area should include intersections where a project is anticipated to contribute 50 or more peak hour trips per the City's traffic study guidelines. (1) The "50 peak hour trip" criterion represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. The 50 peak hour trip criterion is a traffic engineering rule of thumb that is accepted and widely used within the City of San Bernardino for estimating a potential area of influence (i.e., study area). The proposed Project is anticipated to generate and contribute fewer than 50 peak hour trips to any off-site study area intersection, however, the study area evaluated for this TA has been determined based on discussions with City staff during the scoping process.

The intent of a Congestion Management Program (CMP) is to more link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. The County of San Bernardino CMP became effective with the passage of Proposition 111 in 1990 and last updated in 2016 with an updated Nexus Study completed in 2020. (2) There are no study area intersections identified as a San Bernardino County CMP intersection.

1.5 DEFICIENCIES

This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *Opening Year Cumulative (2025) Traffic Conditions* include the detailed analysis. A summary of LOS results for all analysis scenarios is presented in Table 1-2.

TABLE 1-2: SUMMARY OF LOS

		Existing		2025 NP[1]		2025 WP[1]	
#	Intersection	AM	PM	AM	PM	AM	PM
1	Hospitality Ln. & Harriman Pl.						
2	Driveway 1 & Harriman Pl.						
3	Tippecanoe Av. & Harriman Pl./I-10 WB Ramps						

= A - D = E = F

[1] NP = No (or Without) Project; WP = With Project

1.5.1 EXISTING (2023) CONDITIONS

All of the study area intersections are currently operating at an acceptable LOS during the weekday AM and PM peak hours.

1.5.2 OPENING YEAR CUMULATIVE (2025) CONDITIONS

All of the study area intersections are anticipated to continue to operate at an acceptable LOS under both OYC (2025) Without and With Project traffic conditions. As such, no intersection improvements have been recommended.

1.6 RECOMMENDATIONS

1.6.1 SITE ADJACENT AND SITE ACCESS RECOMMENDATIONS

The Project is being developed on a vacant pad within an existing parcel. As such, there are no site adjacent roadway improvements proposed or access modifications. The existing access to the parcel is shared with the existing Best Buy and Lakeshore Learning Store on Harriman Place. The driveway is signed with a stop control for egress traffic from the parcel and Harriman Place is currently striped with two through lanes in each direction of travel separated by a painted median which serves as a left-turn lane for the Project driveway.

On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the Project site.

1.6.2 OFF-SITE RECOMMENDATIONS

As discussed in Section 1.5 *Deficiencies* of this report, all study area intersections are currently operating and anticipated to continue to operate at an acceptable LOS during the peak hours for all analysis scenarios. As such, no off-site intersection improvements are identified. However, the Project Applicant shall pay requisite fees for the applicable pre-existing fee programs (see Section 6 *Local and Regional Funding Mechanisms*).

1.7 QUEUING ANALYSIS

A queuing analysis was conducted at the Project's driveway on Harriman Place for OYC (2025) With Project traffic conditions to determine the turn pocket lengths and lane geometric necessary to accommodate near-term 95th percentile queues and verify existing left turn pocket storage lengths at the Project driveway (Driveway 1). The analysis was conducted for the weekday AM and weekday PM peak hours using the SimTraffic modeling software. The OYC (2025) With Project queuing results are provided in Table 1-3 and Appendix 1.2 of this TA. There is sufficient storage within the painted median to accommodate the 95th percentile peak hour queues.

SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro (Version 11) to generate random simulations. The 95th percentile queue is not

necessarily ever observed; it is simply based on statistical calculations (or Average Queue plus 1.65 standard deviations). The random simulations generated by SimTraffic have been utilized to determine the 95th percentile queue lengths observed for each turn lane. A SimTraffic simulation has been recorded 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 15-minute periods with 60-minute recording intervals.

TABLE 1-3: QUEUING ANALYSIS SITE ADJACENT INTERSECTIONS

Intersection	Movement	Available Stacking Distance (Feet)	2025 With Project With Improvements 95th % Queue (Feet) AM Peak Hour	PM Peak Hour
Driveway 1 & Harriman Pl.	EBL	50	13	31
	WBL	40	7	24

This page intentionally left blank

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with City of San Bernardino's Traffic Study Guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors, such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 6th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (3) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of San Bernardino requires signalized intersection operations analysis based on the methodology described in the HCM. (3) Intersection LOS operations are based on an intersection's average control delay. Control delays include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1.

The traffic modeling and signal timing optimization software package Synchro (Version 11) has been utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Customary practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g., PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to

analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (3)

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0[1]
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of San Bernardino requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (3) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2). At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection. For all-way stop controlled intersections, LOS is computed for the intersection as a whole (average delay).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0[1]
Little or no delays.	0 to 10.00	A
Short traffic delays.	10.01 to 15.00	B
Average traffic delays.	15.01 to 25.00	C
Long traffic delays.	25.01 to 35.00	D
Very long traffic delays.	35.01 to 50.00	E
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the California Department of Transportation (Caltrans) and other public agencies to quantitatively justify or determine the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (4)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (4) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics. For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection. Urban warrants have been used as posted speed limits on the major roadways with unsignalized intersections are 40 miles per hour or below and rural warrants have been used on roadways with speeds greater than 40 miles per hour. Traffic signal warrant analyses were performed for the following study area intersection shown in Table 2-3.

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *Opening Year Cumulative (2025) Traffic Conditions* of this report. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants

do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

#	Intersection	Jurisdiction
2	Driveway 1 & Harriman Pl.	San Bernardino

2.4 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

Minimum Acceptable LOS and associated definitions of intersection deficiencies have been obtained from each of the applicable surrounding jurisdictions.

2.4.1 CITY OF SAN BERNARDINO

The definition of an intersection deficiency in the City of San Bernardino is based on the City of San Bernardino General Plan Circulation Element. The City of San Bernardino General Plan states that target LOS D be maintained at City intersections wherever possible. (5)

2.4.2 SAN BERNARDINO COUNTY CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. (2)

2.5 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies. The following deficiency criteria has been utilized for the City of San Bernardino. To determine whether the addition of project-related traffic at a study intersection would result in a deficiency, the following will be utilized (based on the City's Guidelines):

LOS Without Project	V/C Difference
C	> 0.0400
D	> 0.0200
E, F	> 0.0100

A traffic deficiency at an intersection when any of the following changes in the volume-to-capacity (v/c) ratios occur between the Without Project and the With Project conditions. Improvement recommendations for Project deficiencies would only reduce the Project's proportional change in delay or v/c ratio to pre-Project conditions or better. Improvement recommendations will be identified for study area intersections that show a cumulative deficiency per the above changes in v/c and operate at LOS E or worse under 2025 traffic conditions. The LOS with improvements must be improved to LOS D or better for intersections.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of San Bernardino General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of San Bernardino staff (Appendix 1.1), the study area includes a total of 3 existing intersections as shown previously on Exhibit 1-3. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and intersection traffic controls.

3.2 CITY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the City of San Bernardino. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of San Bernardino General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of San Bernardino General Plan Circulation Element and Exhibit 3-3 illustrates the City of San Bernardino General Plan roadway cross-sections.

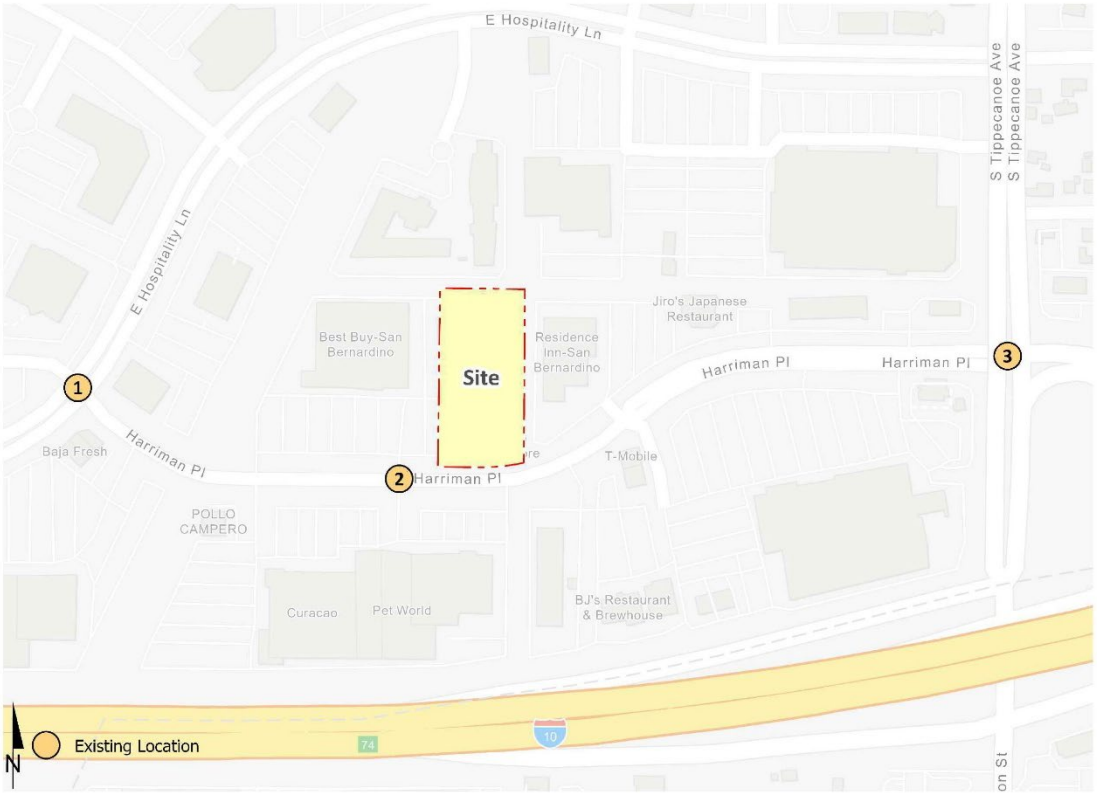
A study area roadway that is classified as a Major Arterial is identified as having a 100-foot right-of-way and 72 to 80-foot curb-to-curb measurement. Major Arterials include two lanes of travel in each direction and a 11 to 12-foot two-way turn pocket in the painted median. The following study area roadways within the City of San Bernardino are classified as a Major Arterial:

- Hospitality Lane
- Tippecanoe Avenue

A study area roadway that is classified as a Secondary Arterial is identified as having an 88-foot right-of-way and 64 to 66-foot curb-to-curb measurement. Secondary Arterials includes two lanes of travel in each direction. The following study area roadway within the City of San Bernardino is classified as a Secondary Arterial:

- Harriman Place

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



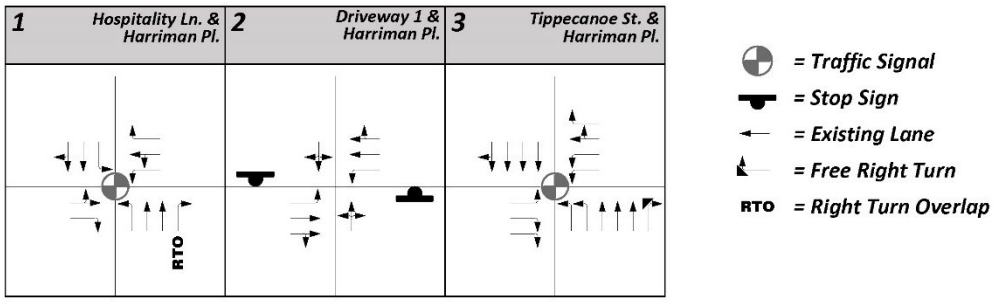


EXHIBIT 3-2: CITY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT

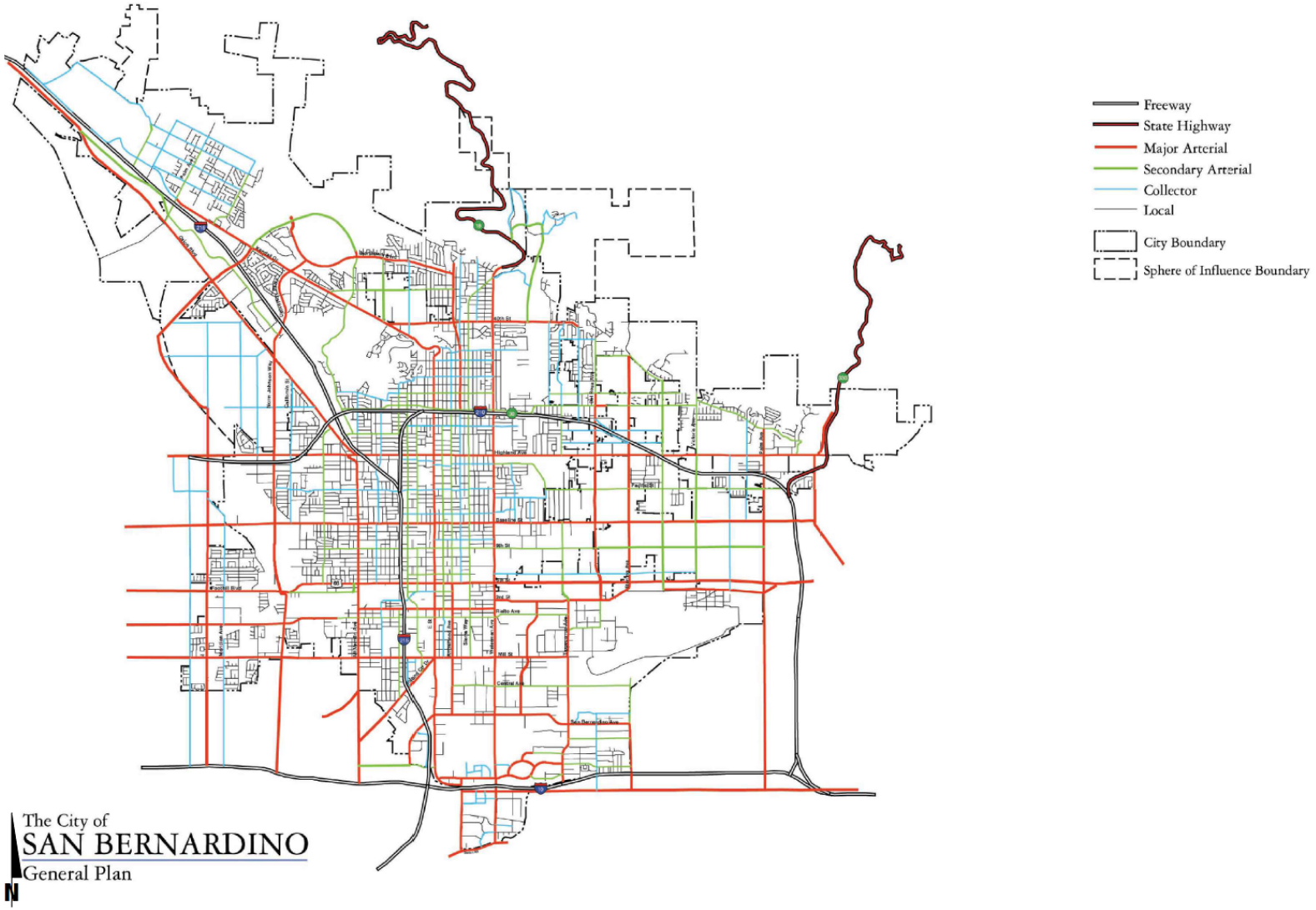
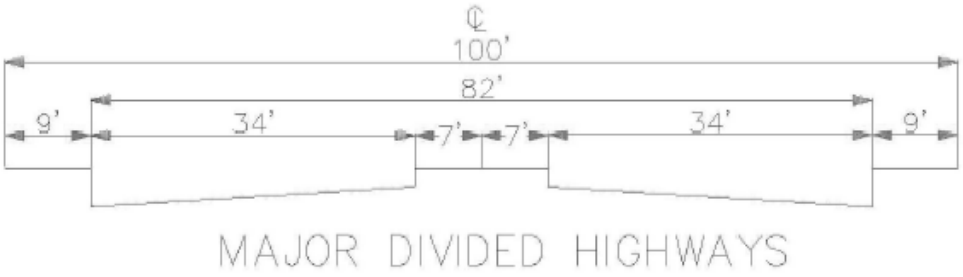
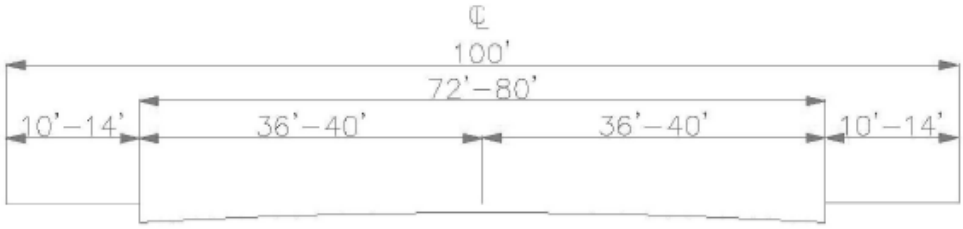


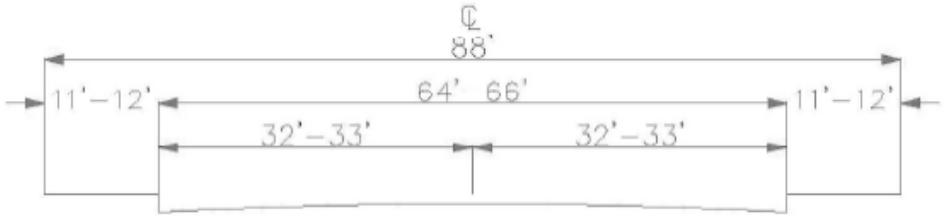
EXHIBIT 3-3: CITY OF SAN BERNARDINO GENERAL PLAN ROADWAY CROSS-SECTIONS



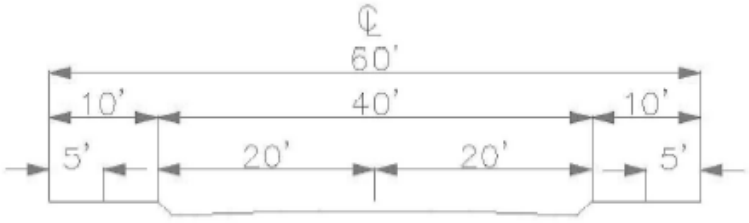
MAJOR DIVIDED HIGHWAYS



MAJOR HIGHWAY



SECONDARY HIGHWAY



COLLECTOR STREET

FOR USE IN QUARTER MILE STREETS,
SCHOOL AND INDUSTRIAL AREAS.

3.3 BICYCLE, EQUESTRIAN, & PEDESTRIAN FACILITIES

Exhibit 3-4 illustrates the City of San Bernardino bicycle facilities. Within the study area, there is a Regional Multipurpose Trail within the San Timoteo Wash and Class II bike lanes are striped along Tippecanoe Avenue per the City's General Plan. Class II bike lanes are striped and signed on-street bike lanes. Existing pedestrian facilities within the study area are shown on Exhibit 3-5. Field observations and traffic counts conducted in March 2023 indicate nominal pedestrian and bicycle activity within the study area.

3.4 TRANSIT SERVICE

The City of San Bernardino is served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County. Existing transit routes that serve the study area are shown on Exhibit 3-6. Based on a review of the transit routes within the vicinity of the Project, Route 2 currently runs along Hospitality Lane and Tippecanoe Avenue within the study area. Route 8 currently runs along Tippecanoe Avenue within the study area. Lastly, the sbX Green Line also runs along Hospitality Lane and Tippecanoe Avenue within the study area. The sbX Green Line (Route 202), also operated by Omnitrans, is a 15.7-mile express bus route serving San Bernardino and Loma Linda and utilizes bus only lanes, has traffic signal prioritization, provides on-board Wi-Fi, power outlets, and bicycle racks. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. As such, it is recommended that the Project Applicant work in conjunction with Omnitrans to potentially provide bus service to the site.

3.5 EXISTING (2023) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in March 2023. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. Existing weekday ADT volumes are shown on Exhibit 3-7. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 12.5 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 8.0 percent. As such, the above equation utilizing a factor of 12.5 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of 8.0 percent (i.e., 1/0.08 = 12.5) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday peak hour intersection volumes are also shown on Exhibit 3-7.

EXHIBIT 3-4: CITY OF SAN BERNARDINO BICYCLE FACILITIES

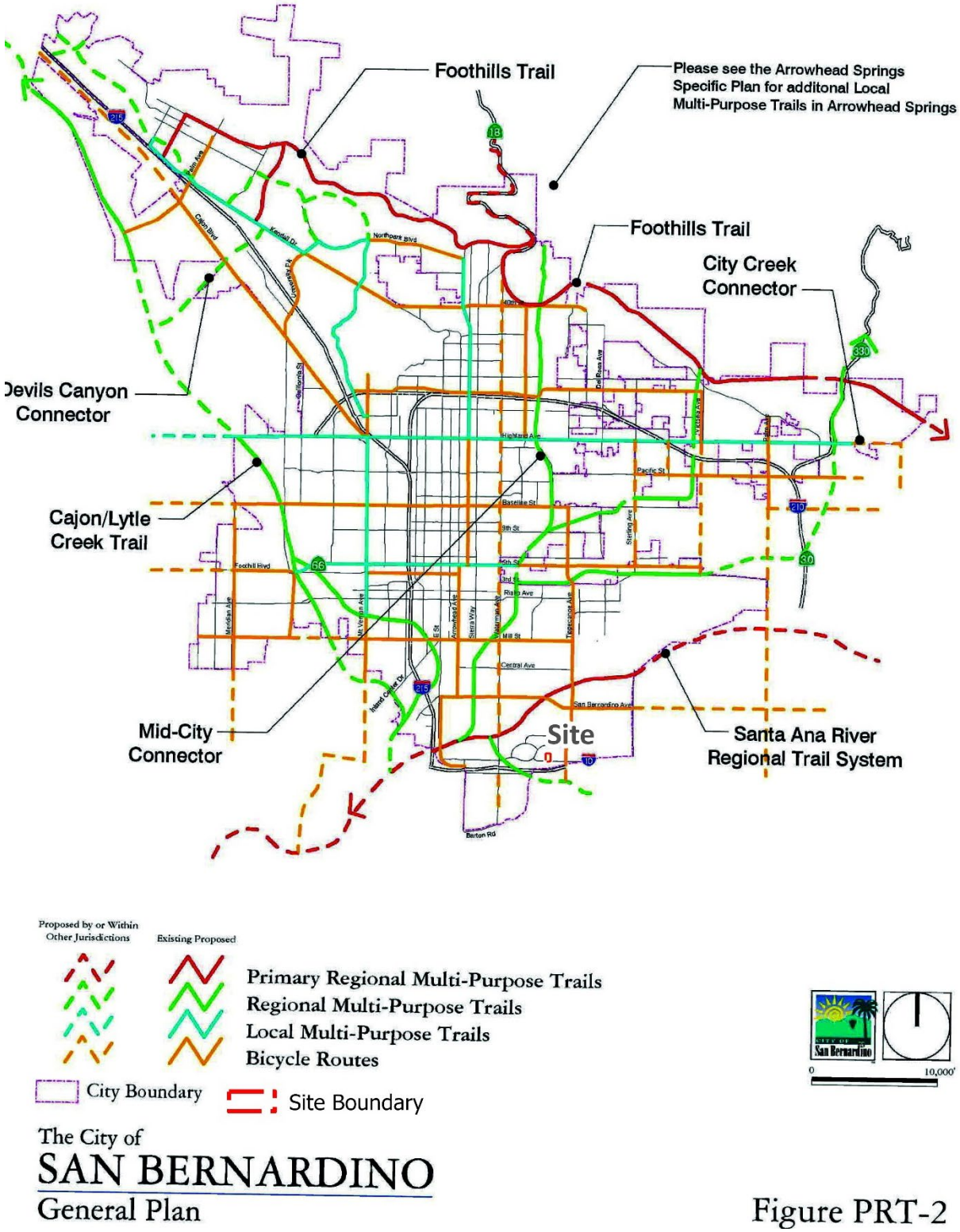


EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES

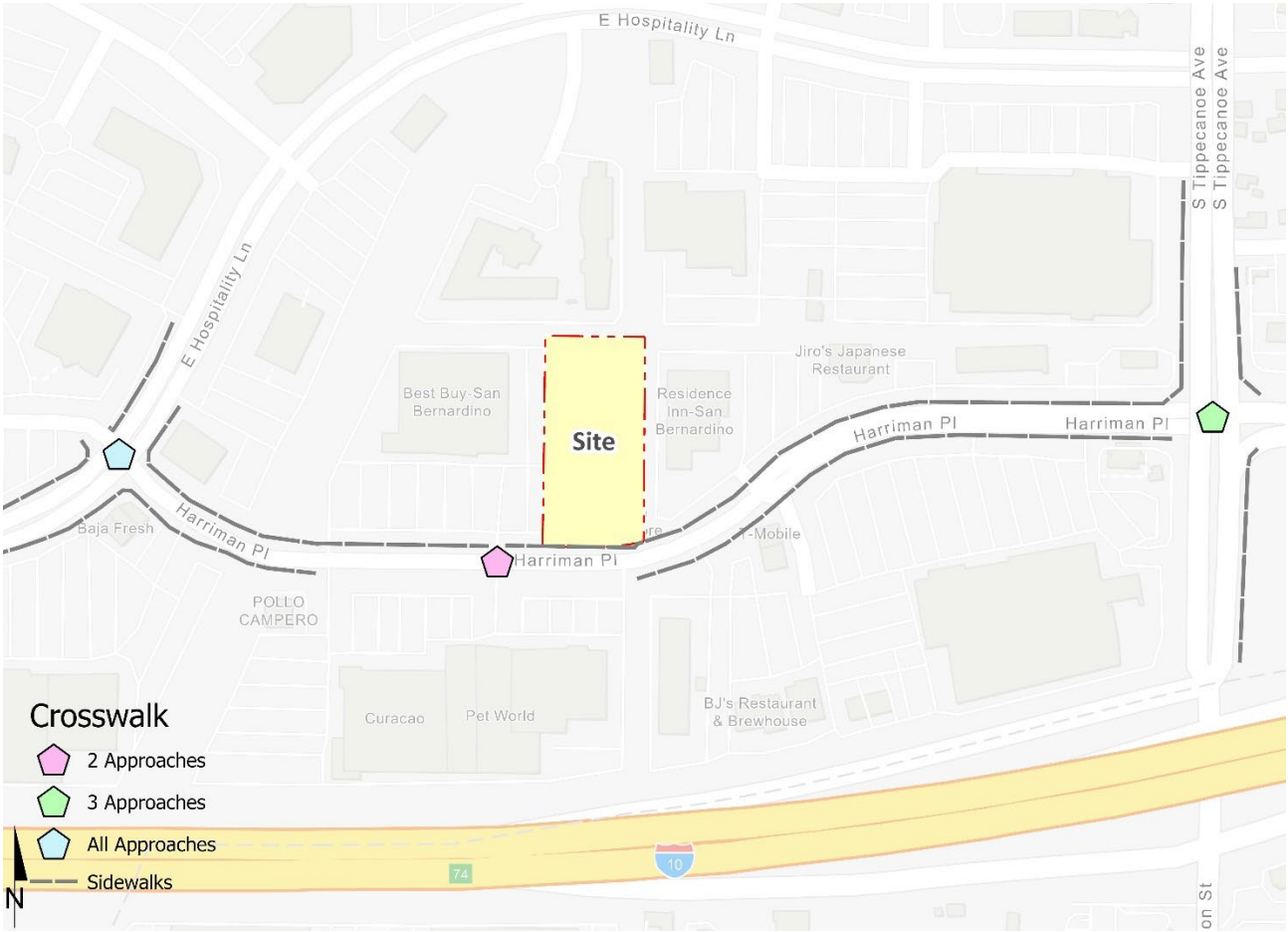


EXHIBIT 3-6: EXISTING TRANSIT ROUTES

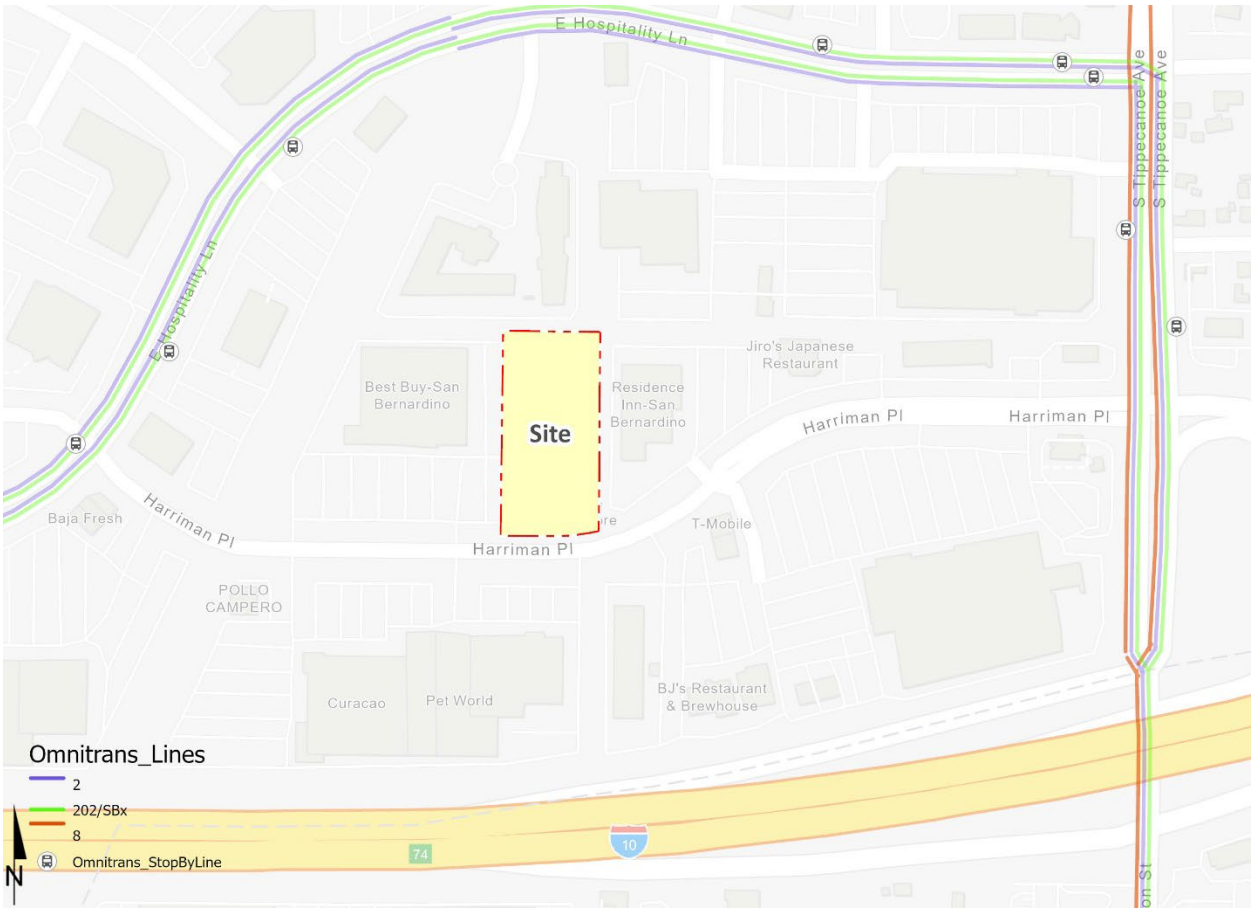
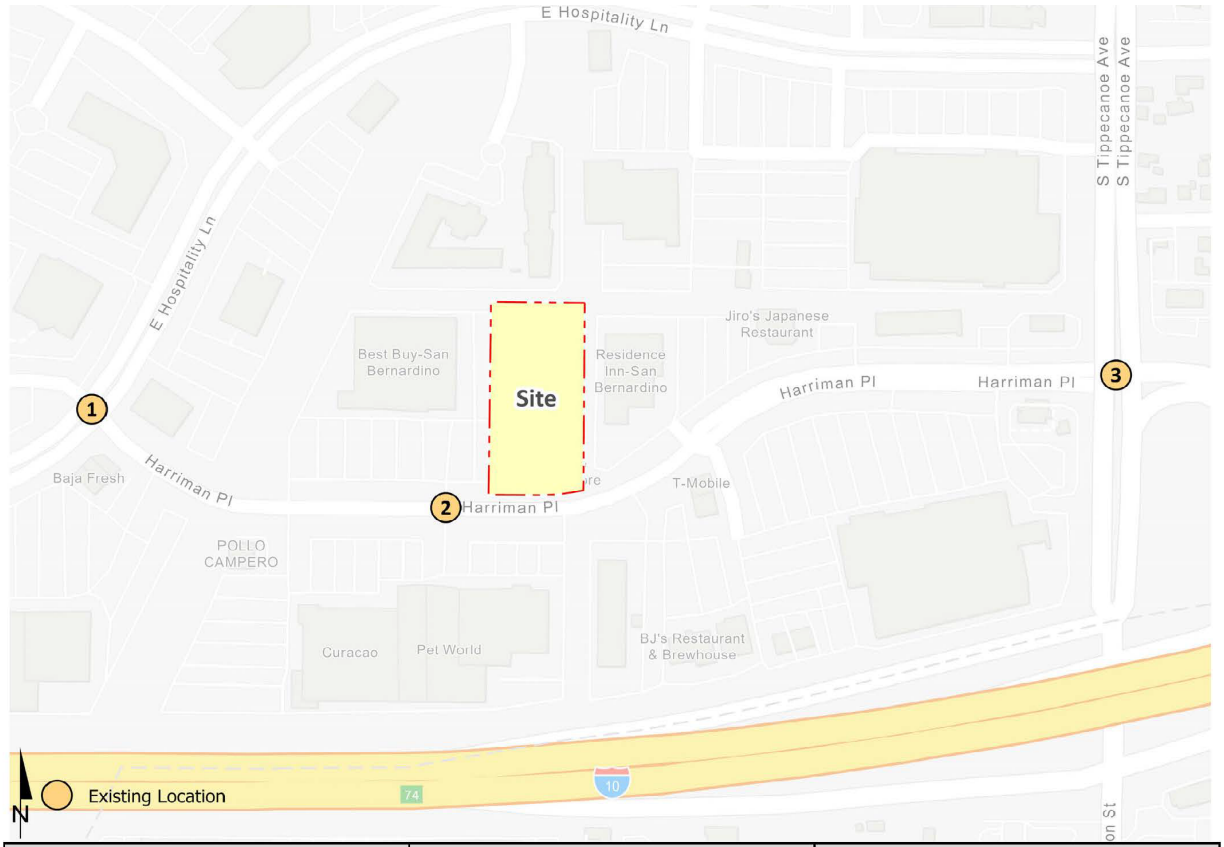


EXHIBIT 3-7: EXISTING (2023) TRAFFIC VOLUMES



1 Hospitality Ln. & Harriman Pl.										2 Driveway 1 & Harriman Pl.										3 Tippecanoe Av. & Harriman Pl.									
10,500									*12,750*	*1,400*									*9,850*	*34,450*									*15,400*
	13(11)	110(233)	39(143)	↱	28(100)						2(33)	0(2)	2(30)	↱	4(26)						80(217)	647(1012)	↱	271(274)					
				←	36(12)									←	152(331)								←	160(214)					
				↰	91(312)									↰	2(13)								↰	357(315)					
	2(10)	↳		↰	↑	↱					4(21)	↳		↰		↱					44(190)	↳	↰	↑	↱				
	7(49)	→		44(42)	127(344)	143(403)					153(513)	→		9(22)		4(15)							220(300)	541(573)	299(428)				
	18(61)	↲									26(45)	↲									263(714)	↲							
2,300									*17,450*	*12,050*									*1,200*	*20,450*									*41,750*

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

3.6 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1, which indicates that all existing study area intersections are currently operating at acceptable LOS during the peak hours. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2023) CONDITIONS

#	Intersection	Traffic Control[2]	Delay[1] (secs.) AM	Delay[1] (secs.) PM	Level of Service AM	Level of Service PM
1	Hospitality Ln. & Harriman Pl.	TS	12.3	19.4	B	B
2	Driveway 1 & Harriman Pl.	CSS	10.1	18.0	B	C
3	Tippecanoe Av. & Harriman Pl./I-10 WB Ramps	TS	16.1	30.8	B	C

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

2 TS = Traffic Signal; CSS = Cross-street Stop

3.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. The Project driveway is the only unsignalized study area intersection and does not currently warrant a traffic signal under Existing traffic conditions. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

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. The Project is proposed to consist of a 114-room extended stay (all-suite) hotel based on the latest site plan. However, the Project has been evaluated based on a 121-room extended stay hotel for the purposes of this focused traffic analysis and is therefore more conservative than the currently proposed Project. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2025. Access to the Project site is accommodated via the shared driveway with the existing Best Buy and Lakeshore Learning Store. Regional access to the Project site is available from the I-10 Freeway via the Waterman Avenue/Hospitality Lane and Tippecanoe Avenue interchanges.

The Project anticipates a total of 6-10 total employees, or approximately 2-5 employees per shift. The hotel is anticipated to operate 24 hours a day, 7 days a week. A parking study conducted for the Project indicates that only 93 parking spaces are needed to support the Project. The Project proposes 111 regular passenger car vehicle parking spaces, 4 regular Americans with Disabilities Act (ADA) spaces, and 1 vanpool ADA space for a total of 116 parking spaces. The Project is located within an existing shopping center and access will be accommodated to Harriman Place via the existing driveway located immediately west of the Lakeshore Learning Store. The existing driveways will provide access to the Project via a shared drive aisle located between the proposed Project and the existing Lakeshore Learning Store. The parking drive aisles will accommodate two-way travel for vehicles.

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. In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published in the ITE Trip Generation Manual (11th Edition, 2021) for the All-Suite Hotel land use category have been utilized (see Table 4-1). (3)

TABLE 4-1: PROJECT TRIP GENERATION SUMMARY

		ITE LU	AM Peak Hour			PM Peak Hour			Daily
Land Use[1]	Units	Code	In	Out	Total	In	Out	Total	
All Suites Hotel	Room	311	0.18	0.16	0.34	0.18	0.18	0.36	4.40

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

			AM Peak Hour			PM Peak Hour			
Land Use	Quantity	Units	In	Out	Total	In	Out	Total	Daily
Everhome Suites	121	Rooms	22	19	41	21	22	43	532

Trip generation is also summarized in Table 4-1. As shown in Table 4-1, the Project would generate 532 two-way trips per day, with 41 trips generated during the AM peak hour and 43 trips generated during the PM peak hour. As noted, the latest site plan indicates the Project currently proposes the

development of a 114-room hotel. The trip generation for a 114-room all-suites hotel is shown in Table 4-2, however, the trip generation used for the operations analyses is based on the higher (more conservative) trip generation summarized in Table 4-1.

TABLE 4-2: PROJECT TRIP GENERATION BASED ON CURRENT SITE PLAN

Land Use[1]	Units	ITE LU Code	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
All Suites Hotel	Room	311	0.18	0.16	0.34	0.18	0.18	0.36	4.40

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

Land Use	Quantity	Units	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
Everhome Suites	114	Rooms	21	18	39	20	21	41	502

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 trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. Exhibit 4-1 illustrates the trip distribution patterns for the Project.

4.3 MODAL SPLIT

The potential for Project trips (non-truck) to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would 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 weekday ADT and weekday peak hour intersection turning movement volumes are shown on Exhibit 4-2.

EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION

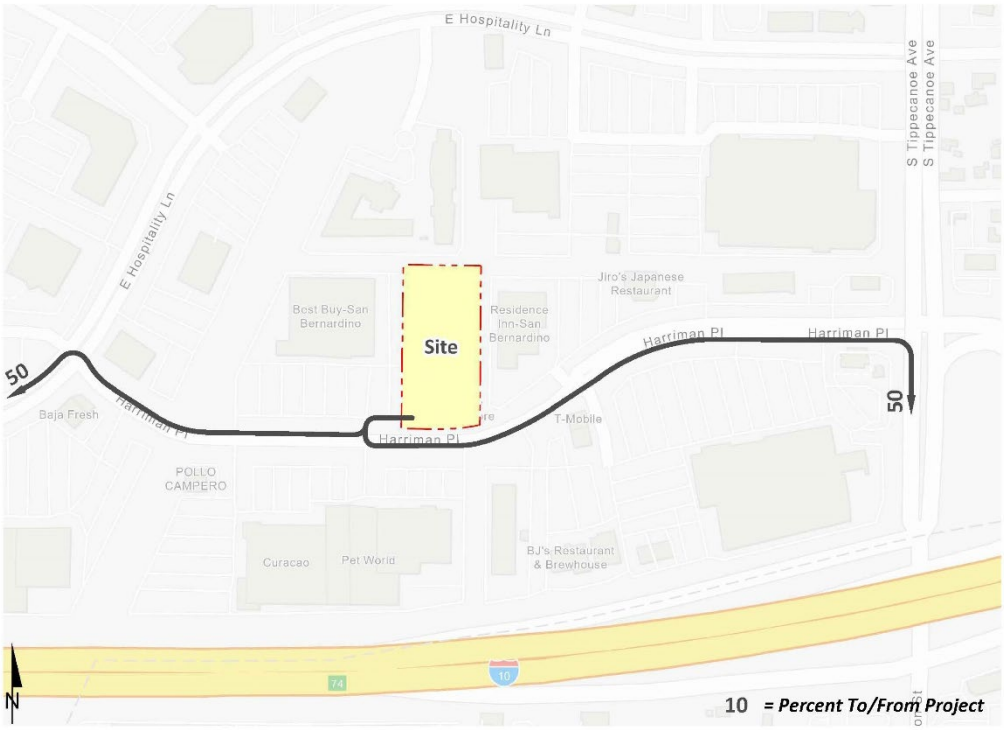
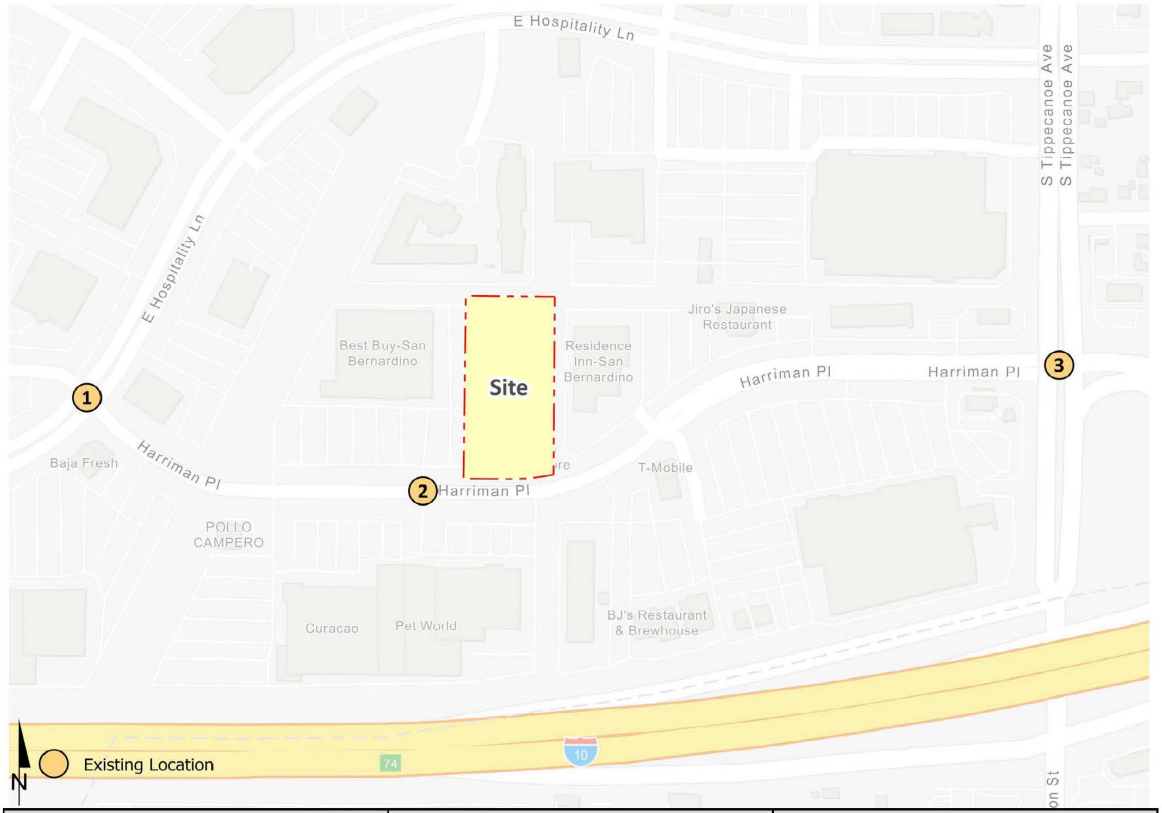


EXHIBIT 4-2: PROJECT ONLY TRAFFIC VOLUMES



1 Hospitality Ln. & Harriman Pl.	2 Driveway 1 & Harriman Pl.	3 Tippecanoe Av. & Harriman Pl.
250	550	250
↰ 10(11)	↲ 10(11)	↰ 11(11)
↱ 11(11)	↳ 10(11)	
250	250	250
	11(11) ↳	
		10(11) ↴
		↰ 11(11)
		250

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 3% per year compounded annually for 2025 traffic conditions or 6.09%. The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in conjunction with traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

The traffic generated by the proposed Project was then manually added to the OYC (2025) Without and With Project forecasts. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- OYC (2025) Without Project
  - Existing (2023) volumes
  - Ambient growth traffic (6.09%)
  - Cumulative Development traffic
- OYC (2025) With Project
  - Existing (2023) volumes
  - Ambient growth traffic (6.09%)
  - Cumulative Development traffic
  - Project Traffic

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of San Bernardino. The cumulative projects listed are those that would generate traffic and would contribute traffic to study area intersections. Exhibit 4-3 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown in Table 4-3. If applicable, the traffic generated by individual cumulative projects was manually added to the OYC forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-3 are reflected as part of the background traffic. In an effort to conduct a conservative analysis, the cumulative projects are added in conjunction with the ambient growth identified in Section 4.5 *Background Traffic*. Cumulative ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-4.

TABLE 4-3: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

No.	Project Name/Case Number	Address/Location	Land Use[1]	Quantity	Units[2]
1	Gateway South 9 (TPM No. 20650)	SEC of Lena & Norman	Warehousing	397.400	TSF
2	Ferree St. Residential (TTM No. 20293)	SE of Ferree & Laurelwood	Single Family Detached	96	DU
3	Hospitality Dutch Bros. (CUP 22-01)	SW of Tippecanoe & Hospitality	Coffee Shop w/ Drive-Thru	0.950	TSF
4	Hardt & Brier Business Park	NW of Tippecanoe & Hardt	Business Park	106.110	TSF
5	TPM No. 20506 (CUP 21-15)	SWC of Hospitality & Waterman	Fast-Food w/ Drive-Thru	3.000	TSF
			Automated Car Wash	1	TUN

Note: SEC = Southeast Corner; SWC = Southwest Corner; NW = Northwest

[1] TSF = Thousand Square Feet; DU = Dwelling Units; TUN = Tunnels

EXHIBIT 4-3: CUMULATIVE DEVELOPMENT LOCATION MAP

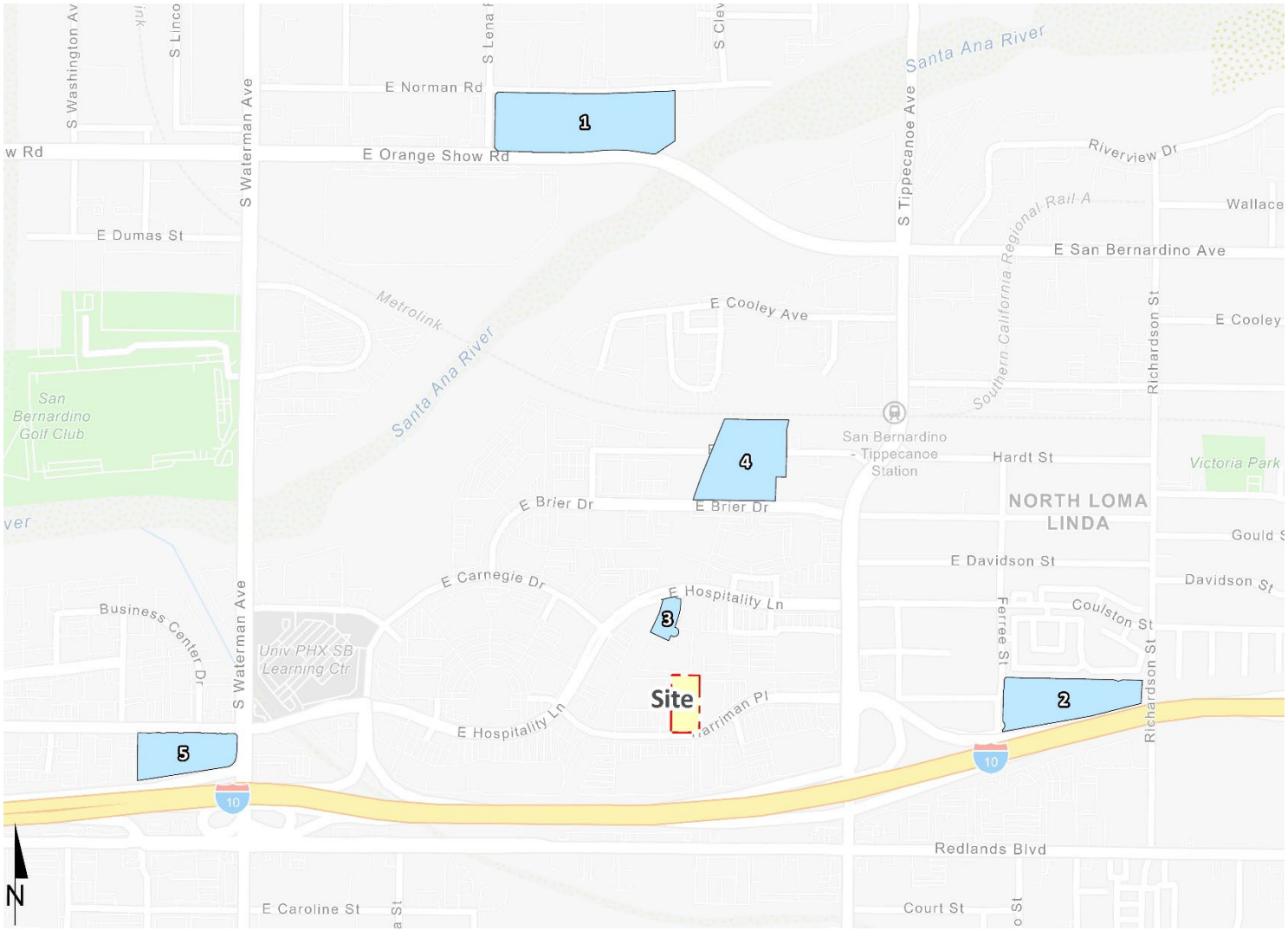
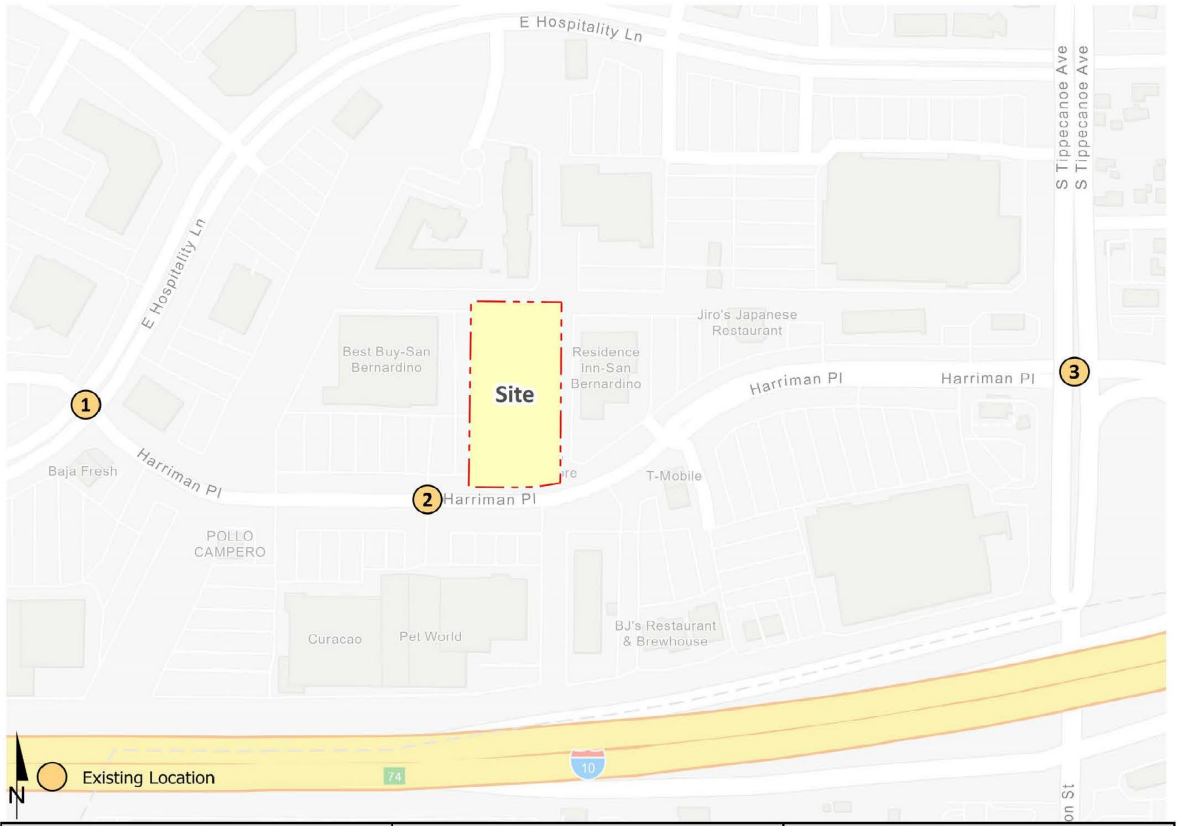


EXHIBIT 4-4: CUMULATIVE ONLY TRAFFIC VOLUMES



1 Hospitality Ln. & Harriman Pl.		2 Driveway 1 & Harriman Pl.		3 Tippecanoe Av. & Harriman Pl.	
250	*100*	*100*	*100*	*1,350*	*200*
↓ 6(7) ↳ 1(3)	↰ 3(2) ↰ 3(2)	← 6(4)		↲ 5(4) ↓ 34(79)	↱ 32(15)
↑ 7(7) ↱ 1(3)		2(6) →		2(6) ↳	↰ 1(0) ↑ 60(31)
250		*100*		*100*	*1,050*

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

5 OPENING YEAR CUMULATIVE (2025) TRAFFIC CONDITIONS

This section discusses the methods used to develop OYC (2025) traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for OYC (2025) conditions are consistent with those shown previously on Exhibit 3-1. There are no new driveways/facilities proposed to be constructed by the Project or other cumulative development project to facilitate site access.

5.2 WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 6.09% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT and weekday peak hour volumes which can be expected for OYC (2025) Without Project traffic conditions are shown on Exhibit 5-1.

5.3 WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes OYC (2025) Without Project traffic in conjunction with the addition of Project traffic. The weekday ADT and weekday/weekend peak hour volumes which can be expected for OYC (2025) With Project traffic conditions are shown on Exhibit 5-2.

5.4 INTERSECTION OPERATIONS ANALYSIS

5.4.1 OYC (2025) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under OYC (2025) Without Project conditions with roadway and intersection geometrics consistent with Section 5.1 *Roadway Improvements*. As shown in Table 5-1, the study area intersections are anticipated to operate at an acceptable LOS under OYC (2025) Without Project traffic conditions. The intersection operations analysis worksheets for OYC (2025) Without Project traffic conditions are included in Appendix 5.1 of this TA.

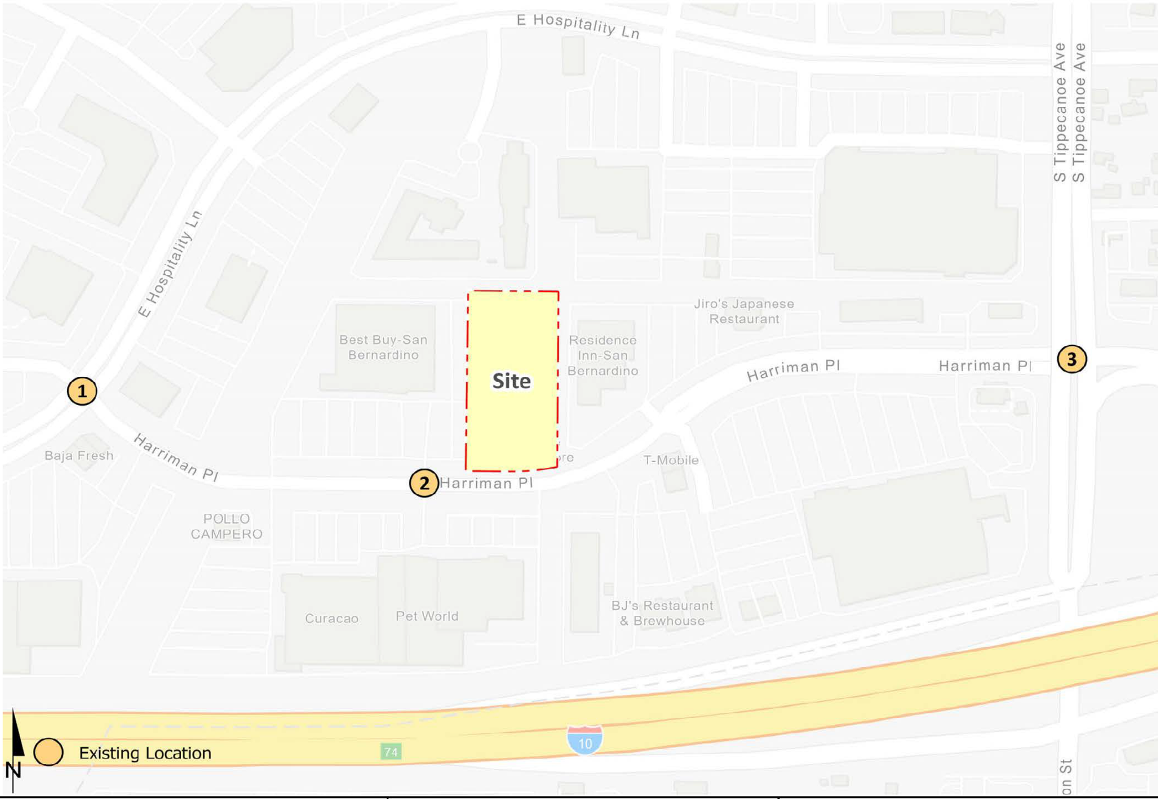
TABLE 5-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2025) CONDITIONS

			2025 Without Project						2025 With Project					
			Delay[1] (secs.)		Volume-to-Capacity (V/C)		Level of Service		Delay[1] (secs.)		Volume-to-Capacity (V/C)		Level of Service	
#	Intersection	Traffic Control[2]	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Hospitality Ln. & Harriman Pl.	TS	12.5	21.2	0.37	0.57	B	C	12.5	21.3	0.37	0.57	B	C
2	Driveway 1 & Harriman Pl.	CSS	10.3	19.6	0.02	0.15	B	C	10.6	20.7	0.02	0.16	B	C
3	Tippecanoe Av. & Harriman Pl./I-10 WB I	TS	16.6	38.8	0.55	0.80	B	D	16.7	40.4	0.55	0.80	C	D

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

[2] TS = Traffic Signal; CSS = Cross-street Stop

EXHIBIT 5-1: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT TRAFFIC VOLUMES



1 Hospitality Ln. & Harriman Pl.

- ADT: *11,400* (north leg), *13,600* (east leg), *2,450* (west leg), *18,750* (south leg)
- Southbound: 14(12) right, 123(254) through, 42(155) left
- Westbound: 33(108) right, 38(13) through, 100(333) left
- Eastbound: 2(11) left, 7(52) through, 19(65) right
- Northbound: 47(45) left, 142(372) through, 153(431) right

2 Driveway 1 & Harriman Pl.

- ADT: *1,500* (north leg), *10,550* (east leg), *12,900* (west leg), *1,300* (south leg)
- Southbound: 2(35) right, 0(2) through, 2(32) left
- Westbound: 4(28) right, 167(355) through, 2(14) left
- Eastbound: 4(22) left, 164(550) through, 28(48) right
- Northbound: 10(23) left, 4(16) right

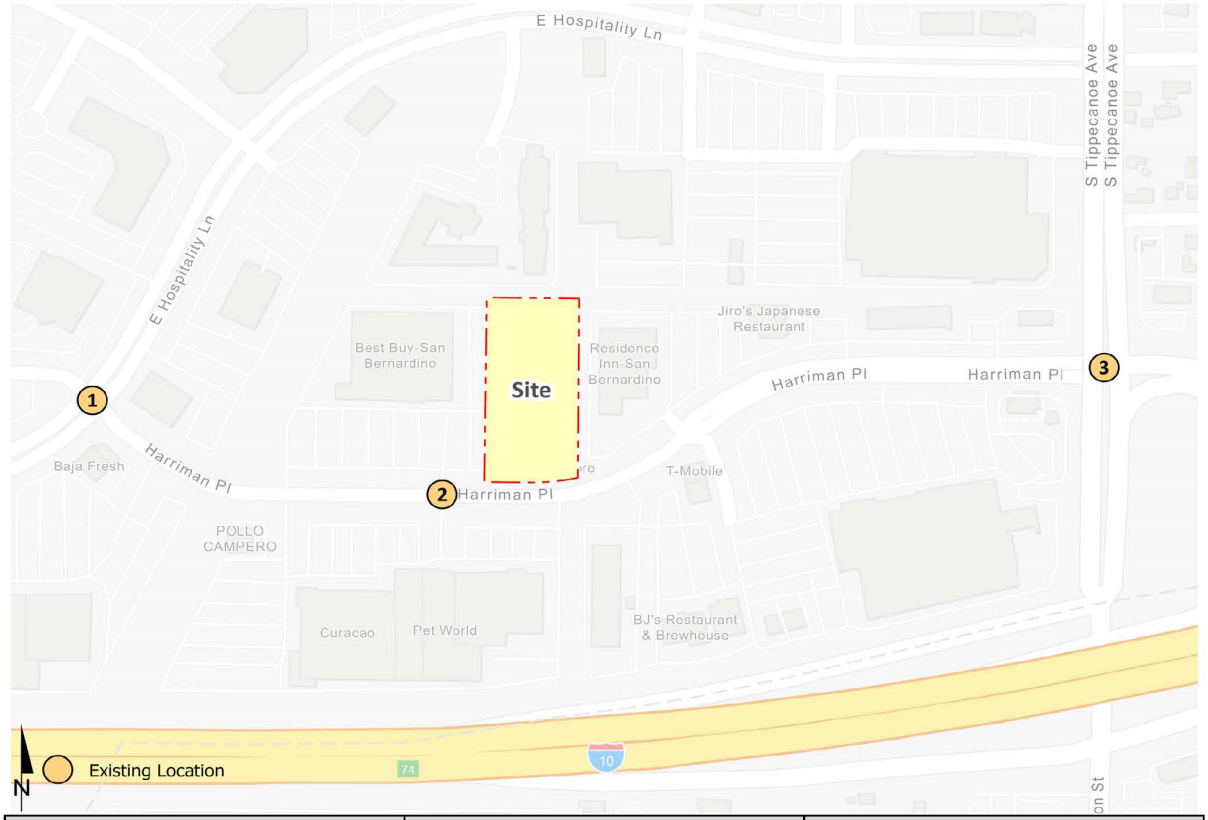
3 Tippecanoe Av. & Harriman Pl.

- ADT: *37,900* (north leg), *16,550* (east leg), *21,750* (west leg), *45,350* (south leg)
- Southbound: 90(234) right, 720(1153) through
- Westbound: 320(306) right, 170(227) through, 379(334) left
- Eastbound: 49(208) left, 279(757) right
- Northbound: 234(318) left, 634(639) through, 317(454) right

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 5-2: OPENING YEAR CUMULATIVE (2025) WITH PROJECT TRAFFIC VOLUMES



1 Hospitality Ln. & Harriman Pl.	2 Driveway 1 & Harriman Pl.	3 Tippecanoe Av. & Harriman Pl.
11,400	***2,000***	***37,900***
13,850	***10,800***	***16,550***
14(12) ↓ 123(254) ↓ 42(155) ↳	12(46) ↓ 0(2) ↓ 12(43) ↳	90(234) ↓ 720(1153) ↓
↱ 33(108)	↱ 15(39)	↱ 320(306)
← 38(13)	← 167(355)	← 170(227)
↰ 110(344)	↰ 2(14)	↰ 379(334)
2(11) → ↳	15(33) → ↳	49(208) → ↳
7(52) → ↑	164(550) → ↑	↰ ↑ ↱
19(65) → ↱	28(48) → ↱	289(768) → ↱
↰ ↑ ↱	↰ ↱	245(329) 634(639) 317(454)
47(45) 142(372) 164(442)	10(23) 4(16)	
19,000	***1,300***	***45,600***
2,450	***13,150***	***22,050***

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

5.4.2 OYC (2025) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 6-1, there are no study area intersections that are anticipated to operate at a deficient LOS during any of the peak hours for OYC (2025) With Project traffic conditions with the addition of Project traffic. The intersection operations analysis worksheets for OYC (2025) With Project traffic conditions are included in Appendix 5.2 of this TA.

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for OYC (2025) traffic conditions are based on the peak hour volume-based traffic signal warrants. The intersection of Driveway 1 on Harriman Place is not anticipated to meet a peak hour volume for OYC (2025) Without or With Project traffic conditions (see Appendix 5.3 and Appendix 5.4).

5.6 DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

The study area intersections are anticipated to operate at an acceptable LOS for OYC (2025) Without and With Project traffic conditions. As such, no additional improvements aside from those that are needed to facilitate site access have been recommended.

6 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of San Bernardino are funded through a combination of project mitigation, development impact fee programs or fair share contributions, such as the City of San Bernardino Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

6.1 CITY OF SAN BERNARDINO DEVELOPMENT IMPACT FEE PROGRAM

The City of San Bernardino has created its own local Development Impact Fee (DIF) program to impose and collect fees from new residential, commercial, and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF includes a Regional Circulation System Fee to comply with Measure "I" and a Local Circulation System Fee to address transportation improvements which are locally significant. The fee schedule was recently updated on February 12, 2022, and is adjusted annually based upon changes in the construction cost index. Under the City's DIF program, the City may grant developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program. The City may grant developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds.

The Project Applicant will be subject to the City's DIF fee program and will pay the requisite City DIF fees at the rates then in effect. The Project Applicant's payment of the requisite DIF fees at the rates then in effect pursuant to the DIF Program will mitigate its impacts to DIF-funded facilities. After the City's DIF fees are collected, they are placed in a separate interest-bearing account pursuant to the requirements of Government Code § 66000 et seq. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department.

6.2 MEASURE "I" FUNDS

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by the San Bernardino County Transportation Authority (SBCTA) and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in 2021. Revenues collected through these programs are used in tandem with the City's DIF funds to deliver projects identified in the Nexus Study. While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past and will continue to fund new transportation facilities in San Bernardino County.

7 REFERENCES

1. **City of San Bernardino.** *Traffic Impact Analysis Guidelines.* San Bernardino : s.n., August 2020.
2. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.
3. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.
4. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014, Updated March 30, 2021 (Revision 6).
5. **Fehr & Peers for City of San Bernardino.** *Traffic Impact Analysis Guidelines.* City of San Bernardino : s.n., August 2020.
6. **Institute of Transportation Engineers.** *Trip Generation Manual.* 11th Edition. 2021.

This page intentionally left blank

APPENDIX 1.1: APPROVED TRAFFIC STUDY SCOPING AGREEMENT

This Page Intentionally Left Blank

City of San Bernardino Public Works / Traffic Engineering Department
Traffic Scope Approval Form

To be completed by applicant consultant and approved by Public Works prior to start of study

Project: CUP22-18
Name: Project: Everhome Suites
Address: Project: 898 E. Harriman Place
Description: 121 Hotel Rooms (All-Suites)
Developer's Name: Paladin Equity Capital - 2600 Mission St. Suite 203, San Marino, CA
Address:
Telephone No. 310-990-7463 (Philip Powers) **Email address:** ppowers@paladinequitycaptial.com

Trip Generation Rates from ITE Latest Edition

Land Use (1) All Suites Hotel (311)	**Land Use (2)**
Development Sq Ft 121 rooms	**Development Sq Ft**
ITE Land Use Code 311	**ITE Land Use Code**
Daily Trips 532	**Daily Trips**
AM Peak Hour Trips	**AM Peak Hour Trips**
Inbound 22	**Inbound**
Outbound 19	**Outbound**
Total 41	**Total**
PM Peak Hour Trips	**PM Peak Hour Trips**
Inbound 21	**Inbound**
Outbound 22	**Outbound**
Total 43	**Total**

(Use Additional Sheet(s), if necessary)

Pass-by Trips (%), if applicable: 0 %

Land Use (1)	**Land Use (2)**
ITE Land Use Code	**ITE Land Use Code**
Daily Trips	**Daily Trips**
AM Peak Hour Trips	**AM Peak Hour Trips**
Inbound	**Inbound**
Outbound	**Outbound**
Total	**Total**
PM Peak Hour Trips:	**PM Peak Hour Trips:**
Inbound	**Inbound**
Outbound	**Outbound**
Total	**Total**

Project Opening Year: 2025 **Build-out Year:**

Study Intersections:
1. Hospitality Ln. & Harriman Pl
2. Driveway & Harriman Pl
3. Tippecanoe Av. & Harriman Pl
4.
5.
6.
7.
8.
9.
10.

(Use Additional Sheet(s) and Maps to show project Boundaries & Attach memo for project Description)

City of San Bernardino Public Works / Traffic Engineering Department
Traffic Scope Approval Form

To be completed by applicant consultant and approved by Public Works prior to start of study

Study Roadway Segments: 1 _____ 2 _____
3 _____ 4 _____
5 _____ 6 _____

Proposed Development Use: ☐ Residential ☐ Commercial ☐ Mixed Use ☒ Other

Software Methodology: ☒ Synchro ☐ HCS

Additional issues to be considered:
☐ Traffic calming measures ☒ Queuing Analysis
☐ Bike/Ped Accommodations ☐ Merge Analysis ☐ Gap Analysis
☐ Actuation/Coordination ☐ Safety Analysis ☐ Sight Distance Analysis

Is the project screened from VMT assessment? ☑ Yes ☐ No

VMT Screening Justification: see attached Memo

Ambient Growth Rate: 3.0% per year

Trip Distribution: East 50 % West 50 % North _____ % South _____ %

Consultant Preparer's Name: Charlene So

Address: 1133 Camelback St. #8329, Newport Beach, CA 92658

Telephone No. 949-861-0177 **PE / TE License #:** TR2414

Email Address: cso@urbanxroads.com

Signature: Charlene So **Date:** March 6, 2023

Approved By (Public Works Department):

Signature: _____ **Date:** 3/15/2023

Name: Azzam Jabsheh **Title:** Traffic Engineer

Submit a Focused Traffic study.

MEMORANDUM

URBAN CROSSROADS

DATE: March 6, 2023
TO: Azzam Jabsheh, City of San Bernardino
FROM: Charlene So, Urban Crossroads, Inc.
JOB NO: 15215-01 TG Memo

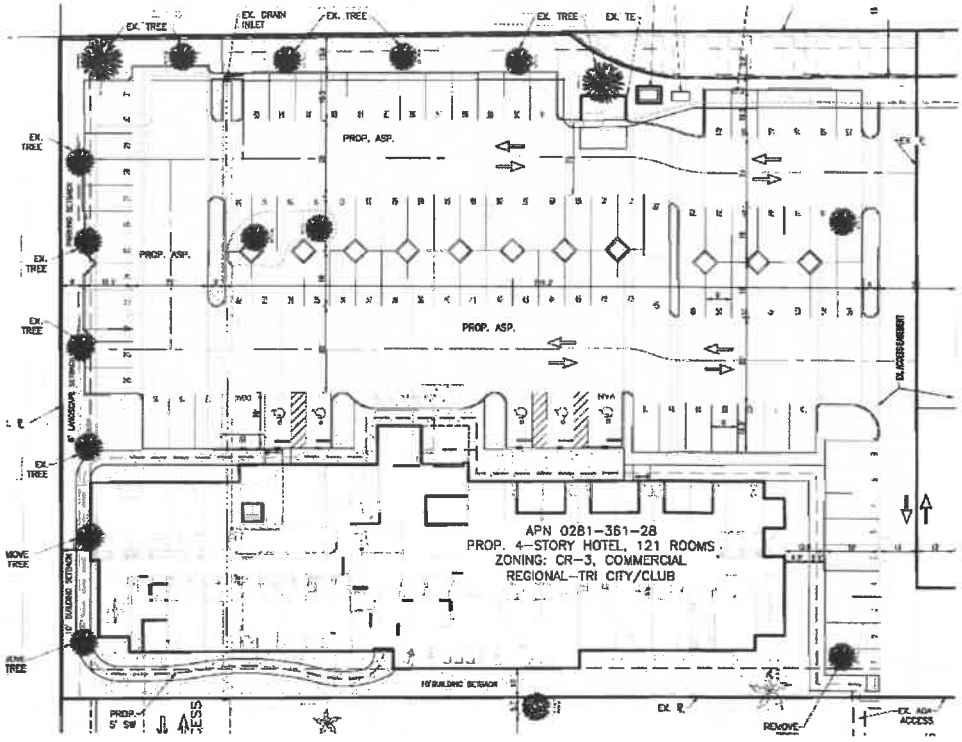
EVERHOME SUITES (CUP22-18) TRAFFIC ANALYSIS SCOPING AGREEEMNT

Urban Crossroads, Inc. is pleased to submit this scoping letter to City of San Bernardino for the proposed Everhome Suites development (**Project**), which is located at 898 E. Harriman Place in the City of San Bernardino (APN 028-136-127). This letter describes the draft proposed Project trip generation, trip distribution, and analysis methodology, which have been used to establish the proposed Project study area and analysis locations. The purpose of this work effort is to determine whether additional traffic analysis is necessary for the proposed Project based on the City of San Bernardino's Traffic Impact Analysis Guidelines (August 2020) (**City Guidelines**).

PROPOSED PROJECT

The Project consistent of the development of a 121-room hotel. A preliminary site plan for the proposed Project is shown on Exhibit 1. This letter describes the proposed Project trip generation. The Project is located on a vacant parcel between an existing Best Buy and Residence Inn, and north of Harriman Place. The Project will take access via an existing driveway on Harriman Place that is shared with other existing uses. The Project is anticipated to have an opening year of 2025.

EXHIBIT 1: PRELIMINARY SITE PLAN



TRIP GENERATION

The Project's trip generation based on the Institute of Transportation Engineers (ITE) Trip Generation Manual trip generation rates (11th Edition, 2021). The hotel is anticipated to be occupied by Everhome Suites. Everhome Suites is an extended stay hotel which offers apartment-style rooms and amenities. The rooms are either studio or one-bedroom suites which also feature fully equipped kitchens and modular furniture. On-site services that are typically offered include 24-hour laundry facility, modern fitness center, multipurpose lobby area, and 24-hour access to snacks/sundries. The ITE Trip Generation Manual includes several lodging land use categories and offers the following descriptions (see Attachment A for ITE land use descriptions):

- **Hotel (ITE Code 310):** A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as a full-service restaurant, cocktail lounge, meeting rooms, banquet room, and convention center facilities. A hotel typically provides a swimming pool or other recreational facility such as a fitness room.
- **All Suites Hotel (ITE Code 311):** An all-suites hotel is a place of lodging that provides sleeping accommodations, a small restaurant and lounge, and small amounts of meeting space. Each suite includes a sitting room and separate bedroom. An in-room kitchen is often provided.
- **Business Hotel (ITE Code 312):** A business hotel is a place of lodging aimed toward the business traveler but also accommodates a growing number of recreational travelers. These hotels provide sleeping accommodations and other limited facilities, such as a breakfast buffet bar and afternoon beverage bar. Some provide a full-service restaurant

geared toward hotel guests. Some provide a swimming pool; most provide fitness facilities.

- **Motel (ITE Code 320):** A motel is a place of lodging that provides sleeping accommodations and provides little or no meeting space and few supporting facilities. Exterior corridors accessing rooms (immediately adjacent to a parking lot) is common for a motel.
- **Resort Hotel (ITE Code 330):** A resort hotel is similar to a hotel (Land Use Code 310) in that it provides sleeping accommodations, full-service restaurants, cocktail lounges, retail shops, and guest services. The primary difference is that a resort hotel caters to the tourist and vacation industry, often providing a wide variety of recreational facilities/programs (e.g., golf courses, tennis courts, beach access, or other amenities) rather than convention and meeting business.

Based on the proposed Project, the All Suites Hotel land use category was selected for the trip generation rates (see Table 1). Table 1 also provides a summary of the proposed Project trip generation. The Project is anticipated to generate 532 trip-ends per day with 41 AM peak hour trips and 43 PM peak hour trips.

TABLE 1: PROJECT TRIP GENERATION SUMMARY

		ITE LU	AM Peak Hour			PM Peak Hour			Daily
Land Use[1]	Units	Code	In	Out	Total	In	Out	Total	
All Suites Hotel	Room	311	0.18	0.16	0.34	0.18	0.18	0.36	4.40

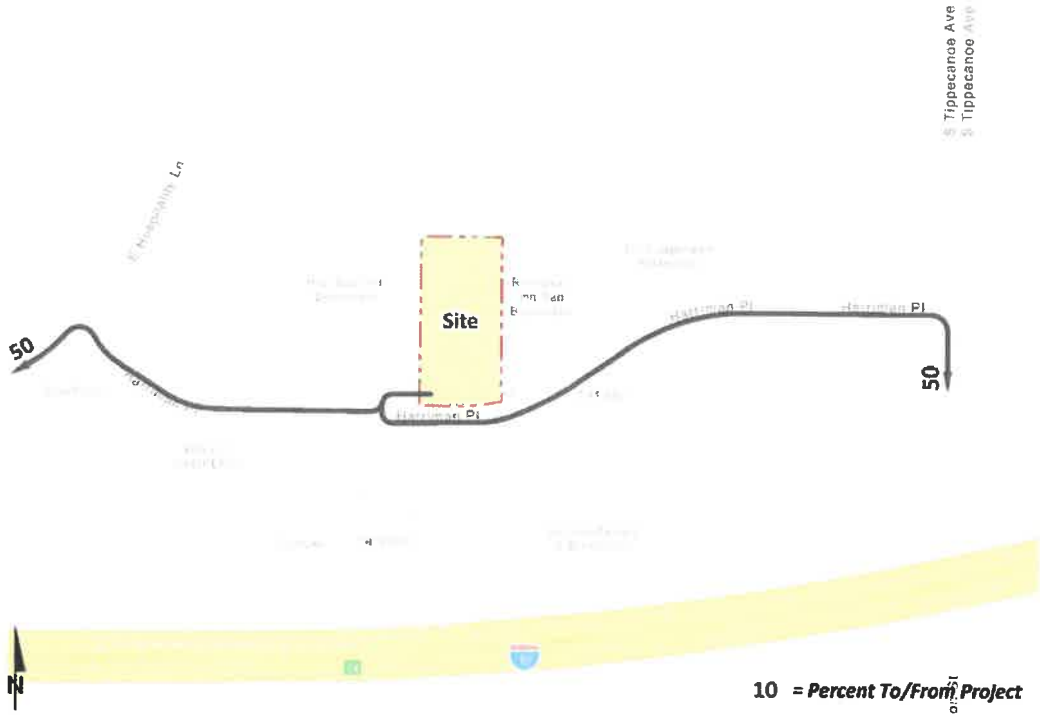
[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

			AM Peak Hour			PM Peak Hour			
Land Use	Quantity	Units	In	Out	Total	In	Out	Total	Daily
Everhome Suites	121	Rooms	22	19	41	21	22	43	532

PROJECT TRIP DISTRIBUITON

Project distribution is shown on Exhibit 2 which indicates 50% would travel to and from the west on Harriman Place and 50% to and from the east on Harriman Place to access the Freeway.

EXHIBIT 2: PROJECT TRIP DISTRIBUTION



ANALYSIS SCENARIOS

Consistent with the City's Guidelines, intersection analysis will be provided for the following analysis scenarios:

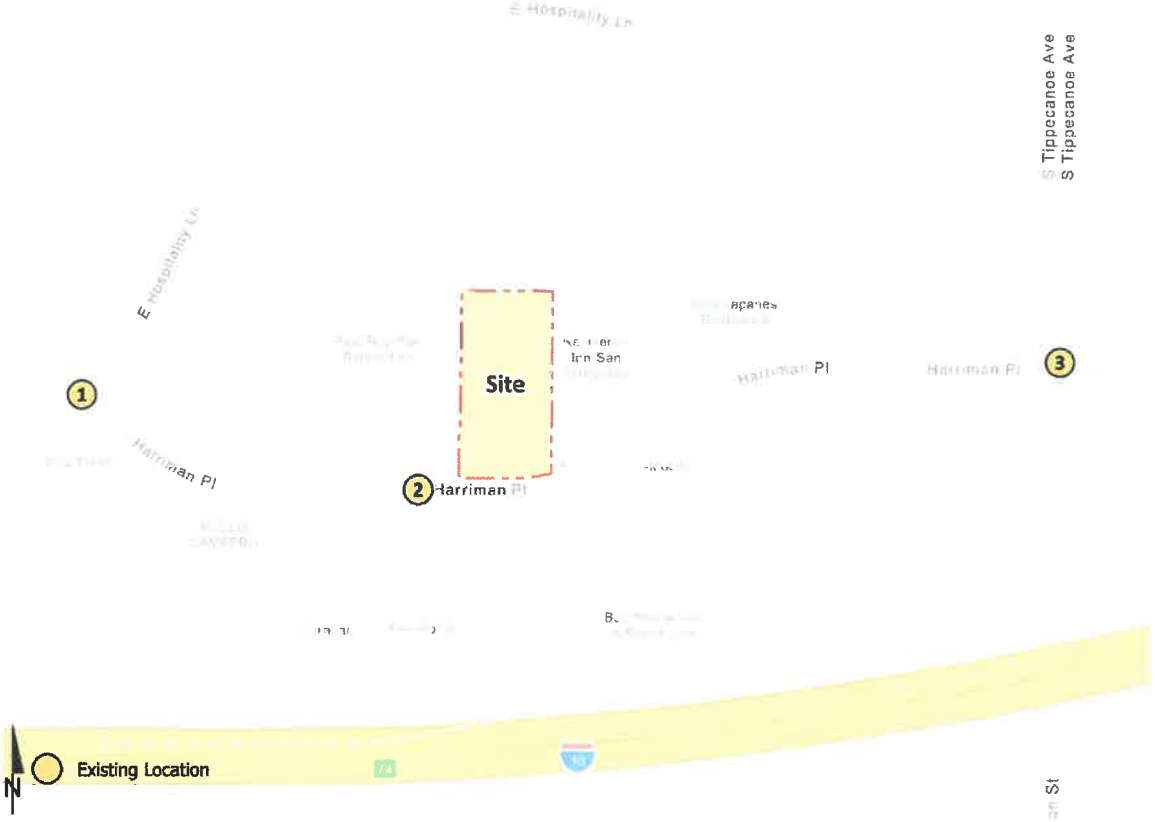
- Existing (2023) Conditions
- Opening Year Cumulative (2025) Without Project Conditions
- Opening Year Cumulative (2025) With Project Conditions

All study area intersections will be analyzed using the HCM (6th Edition) methodology.

STUDY AREA

Based upon the Project trip generation and trip distribution patterns included as part of this letter, the study area intersections are identified on Exhibit 3.

EXHIBIT 3: STUDY AREA



EXISTING COUNT DATA

Traffic counts (classified by vehicle type) will be conducted during a typical Tuesday, Wednesday, or Thursday when local schools are in session and operating on a typical bell schedule. Time periods to be counted will be from 7:00-9:00 AM and 4:00-6:00 PM and will include pedestrian and bicycle counts at each analysis location. No adjustments are proposed to the new traffic counts for the baseline traffic condition as traffic counts will be conducted while local schools are in session.

AMBIENT GROWTH

Pursuant to discussion with City staff and consistent with other studies performed in the area, an ambient growth rate of 3% per year is proposed for the study area intersection to approximate background growth not identified by nearby cumulative development projects. As such, the ambient growth used will be 6.09% (3% per year compounded over 2 years).

CUMULATIVE DEVELOPMENT PROJECTS

It is requested that the City provide a list of cumulative projects that need to be considered for the focused traffic analysis if there are projects that need to be included in conjunction with the ambient growth rate.

SPECIAL ISSUES

The following special issues will also be addressed as part of the focused traffic analysis:

- Traffic Signal Warrant Analysis: Traffic signal warrant analysis will be performed for all full-access unsignalized study area intersections utilizing the California MUTCD peak-hour warrants for existing intersections, and the Caltrans daily (Planning level) warrant for new intersections.
- Site Access Evaluation: The turn pocket lengths will be determined through peak hour traffic simulations developed using Synchro and SimTraffic software in an effort to identify the required storage capacity for turn lanes at the Project driveway on Harriman Place.

If you have any questions or comments, I can be reached at cso@urbanxroads.com.

ATTACHMENT A: ITE LAND USE CODE DESCRIPTIONS

Land Use: 310
Hotel

Description

A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as a full-service restaurant, cocktail lounge, meeting rooms, banquet room, and convention facilities. A hotel typically provides a swimming pool or another recreational facility such as a fitness room. All suites hotel (Land Use 311), business hotel (Land Use 312), motel (Land Use 320), and resort hotel (Land Use 330) are related uses.

Additional Data

Twenty-five studies provided information on occupancy rates at the time the studies were conducted. The average occupancy rate for these studies was approximately 82 percent.

Some properties in this land use provide guest transportation services (e.g., airport shuttle, limousine service, golf course shuttle service) which may have an impact on the overall trip generation rates.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, District of Columbia, Florida, Georgia, Indiana, Minnesota, New York, Ontario (CAN), Pennsylvania, South Dakota, Texas, Vermont, Virginia, and Washington.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Trip generation at a hotel may be related to the presence of supporting facilities such as convention facilities, restaurants, meeting/banquet space, and retail facilities. Future data submissions should specify the presence of these amenities. Reporting the level of activity at the supporting facilities such as full, empty, partially active, number of people attending a meeting/banquet during observation may also be useful in further analysis of this land use.

Source Numbers

170, 260, 262, 277, 280, 301, 306, 357, 422, 507, 577, 728, 867, 872, 925, 951, 1009, 1021, 1026, 1046

Land Use: 311
All Suites Hotel

Description

An all suites hotel is a place of lodging that provides sleeping accommodations, a small restaurant and lounge, and small amounts of meeting space. Each suite includes a sitting room and separate bedroom. An in-room kitchen is often provided. Hotel (Land Use 310), business hotel (Land Use 312), motel (Land Use 320), and resort hotel (Land Use 330) are related uses.

Additional Data

Six studies provided information on occupancy rates at the time the studies were conducted. The average occupancy rate for these studies was approximately 74 percent.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, and the 2010s in Florida, Georgia, Minnesota, Montana, Virginia, and Washington.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Source Numbers

216, 436, 818, 870, 872, 1048

Land Use: 312
Business Hotel

Description

A business hotel is a place of lodging aimed toward the business traveler but also accommodates a growing number of recreational travelers. These hotels provide sleeping accommodations and other limited facilities, such as a breakfast buffet bar and afternoon beverage bar. Some provide a full-service restaurant geared toward hotel guests. Some provide a swimming pool; most provide fitness facilities. Limited space for meeting facilities may be provided. Each unit is a large single room. Hotel (Land Use 310), all suites hotel (Land Use 311), motel (Land Use 320), and resort hotel (Land Use 330) are related uses.

Additional Data

Ten studies provided information on room occupancy at the time of data collection. The average occupancy rate for these sites was approximately 86 percent.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The average numbers of person trips per vehicle trip at the three general urban/suburban sites at which both person trip and vehicle trip data were collected, were as follows:

- 1.3 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.3 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.

The sites were surveyed in the 1980s, the 1990s, and the 2010s in the District of Columbia, Florida, Georgia, Indiana, Minnesota, Texas, Vermont, Washington, and Wisconsin.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Source Numbers

216, 301, 306, 436, 507, 867, 870, 872, 877, 925, 945, 951, 959, 1017

Land Use: 320
Motel

Description

A motel is a place of lodging that provides sleeping accommodations and provides little or no meeting space and few supporting facilities. Exterior corridors accessing rooms (immediately adjacent to a parking lot) is common for a motel. Hotel (Land Use 310), all suites hotel (Land Use 311), business hotel (Land Use 312), and resort hotel (Land Use 330) are related uses.

Additional Data

Sixteen studies provided information on occupancy rates at the time the studies were conducted. The average occupancy rate for these studies was approximately 82 percent.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Florida, Indiana, New Jersey, New York, Oregon, South Dakota, and Texas.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Source Numbers

172, 187, 191, 277, 295, 300, 357, 439, 443, 598, 877, 915, 1046

Land Use: 330
Resort Hotel

Description

A resort hotel is similar to a hotel (Land Use 310) in that it provides sleeping accommodations, full-service restaurants, cocktail lounges, retail shops, and guest services. The primary difference is that a resort hotel caters to the tourist and vacation industry, often providing a wide variety of recreational facilities/programs (e.g., golf courses, tennis courts, beach access, or other amenities) rather than convention and meeting business. Hotel (Land Use 310), all suites hotel (Land Use 311), business hotel (Land Use 312), and motel (Land Use 320) are related uses.

Additional Data

It is recognized that some resort hotels cater to convention business as well as the tourist and vacation industry. The sites in the database do not have convention facilities. A resort hotel with convention facilities is likely to have a different level and pattern of trip generation than is presented in the data plots.

Nine studies provided information on room occupancy at the time of data collection. The average occupancy rate for these sites was approximately 88 percent.

Some properties in this land use provide guest transportation services (e.g., airport shuttle, limousine service, golf course shuttle service) which may have an impact on the overall trip generation rates.

The sites were surveyed in the 1980s and the 1990s in California, Florida, and South Carolina.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Source Numbers

270, 381, 436

APPENDIX 1.2: SITE ADJACENT QUEUES

This Page Intentionally Left Blank

Intersection: 2: Driveway 1/Driveeway 1 & Harriman Pl.

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	19	15	31	37
Average Queue (ft)	2	0	9	15
95th Queue (ft)	13	7	32	40
Link Distance (ft)			148	53
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)	50	50		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Intersection: 2: Driveway 1/Driveeway 1 & Harriman Pl.

Movement	EB	WB	WB	WB	NB	SB
Directions Served	L	L	T	TR	LTR	LTR
Maximum Queue (ft)	41	30	13	21	47	73
Average Queue (ft)	9	5	1	1	25	38
95th Queue (ft)	31	24	10	10	48	64
Link Distance (ft)			370	370	148	53
Upstream Blk Time (%)						2
Queuing Penalty (veh)						0
Storage Bay Dist (ft)	50	50				
Storage Blk Time (%)	0	0	0			
Queuing Penalty (veh)	0	0	0			

Zone Summary

Zone wide Queuing Penalty: 0

APPENDIX 3.1: TRAFFIC COUNTS – MARCH 2023

This Page Intentionally Left Blank

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC3894
Thu, Mar 9, 23	NORTH & SOUTH:	Hospitality	LOCATION #:	1
	EAST & WEST:	Harriman	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

Add U-Turns to Left Turns

		NORTHBOUND Hospitality			SOUTHBOUND Hospitality			EASTBOUND Harriman			WESTBOUND Harriman			
	LANES:	NL 1	NT 2	NR 1	SL 1	ST 2	SR 0	EL 0.5	ET 0.5	ER 1	WL 1.5	WT 0.5	WR 1	TOTAL
AM	7:00 AM	6	26	23	3	14	0	0	0	0	11	2	2	87
	7:15 AM	13	25	19	9	14	0	0	1	1	13	7	8	110
	7:30 AM	19	30	24	9	22	4	1	0	1	19	12	10	151
	7:45 AM	17	37	25	6	19	7	4	1	1	14	10	8	149
	8:00 AM	11	33	39	5	19	6	2	4	5	20	10	6	160
	8:15 AM	19	37	28	13	31	3	0	0	5	18	13	7	174
	8:30 AM	7	29	42	9	30	3	0	1	4	26	5	8	164
	8:45 AM	7	28	34	12	30	1	0	2	4	27	8	7	160
	VOLUMES	99	245	234	66	179	24	7	9	21	148	67	56	1,155
	APPROACH %	17%	42%	40%	25%	67%	9%	19%	24%	57%	55%	25%	21%	
	APP/DEPART	578	/	310	269	/	351	37	/	307	271	/	187	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	44	127	143	39	110	13	2	7	18	91	36	28	658
	APPROACH %	14%	40%	46%	24%	68%	8%	7%	26%	67%	59%	23%	18%	
	PEAK HR FACTOR		0.935			0.862			0.614			0.923		0.945
	APP/DEPART	314	/	159	162	/	220	27	/	187	155	/	92	0
PM	4:00 PM	12	65	89	28	48	2	2	3	7	74	1	23	354
	4:15 PM	8	72	91	25	51	2	0	4	7	81	2	27	370
	4:30 PM	19	62	94	34	53	2	1	6	25	76	5	25	402
	4:45 PM	9	61	90	22	65	2	4	7	14	61	6	20	361
	5:00 PM	8	89	96	51	49	3	6	22	28	65	3	23	443
	5:15 PM	8	91	117	35	51	3	2	7	6	66	2	18	406
	5:30 PM	9	71	91	32	72	2	0	9	11	108	4	29	438
	5:45 PM	17	93	99	25	61	3	2	11	16	73	3	30	433
	VOLUMES	90	604	767	252	450	19	17	69	114	604	26	195	3,207
	APPROACH %	6%	41%	52%	35%	62%	3%	9%	35%	57%	73%	3%	24%	
	APP/DEPART	1,461	/	823	721	/	1,176	200	/	1,081	825	/	127	0
	BEGIN PEAK HR		5:00 PM											
	VOLUMES	42	344	403	143	233	11	10	49	61	312	12	100	1,720
	APPROACH %	5%	44%	51%	37%	60%	3%	8%	41%	51%	74%	3%	24%	
	PEAK HR FACTOR		0.913			0.913			0.536			0.752		0.971
	APP/DEPART	789	/	459	387	/	609	120	/	590	424	/	62	0

U-TURNS

NB 0	SB 0	EB 0	WB 0	TTL
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	1	0	0	1
1	1	0	0	2
3	2	0	0	5
1	1	0	0	2
0	3	0	0	4
2	1	0	0	3
1	0	0	0	1
0	1	0	0	1
1	1	0	0	2
8	7	0	0	15

RTOR

NRR 0	SRR 0	ERR 0	WRR 0
1	0	0	0
4	0	1	3
7	2	0	5
12	1	1	2
11	4	4	4
7	0	5	6
13	1	4	7
13	0	4	4
68	8	19	31
44	5	17	21
31	1	5	12
28	2	6	13
58	1	19	16
56	0	13	14
50	1	21	15
68	0	4	11
50	0	6	12
26	2	12	14
367	7	86	107
194	3	43	52

Hospitality

NORTH SIDE

Harriman WEST SIDE EAST SIDE **Harriman**

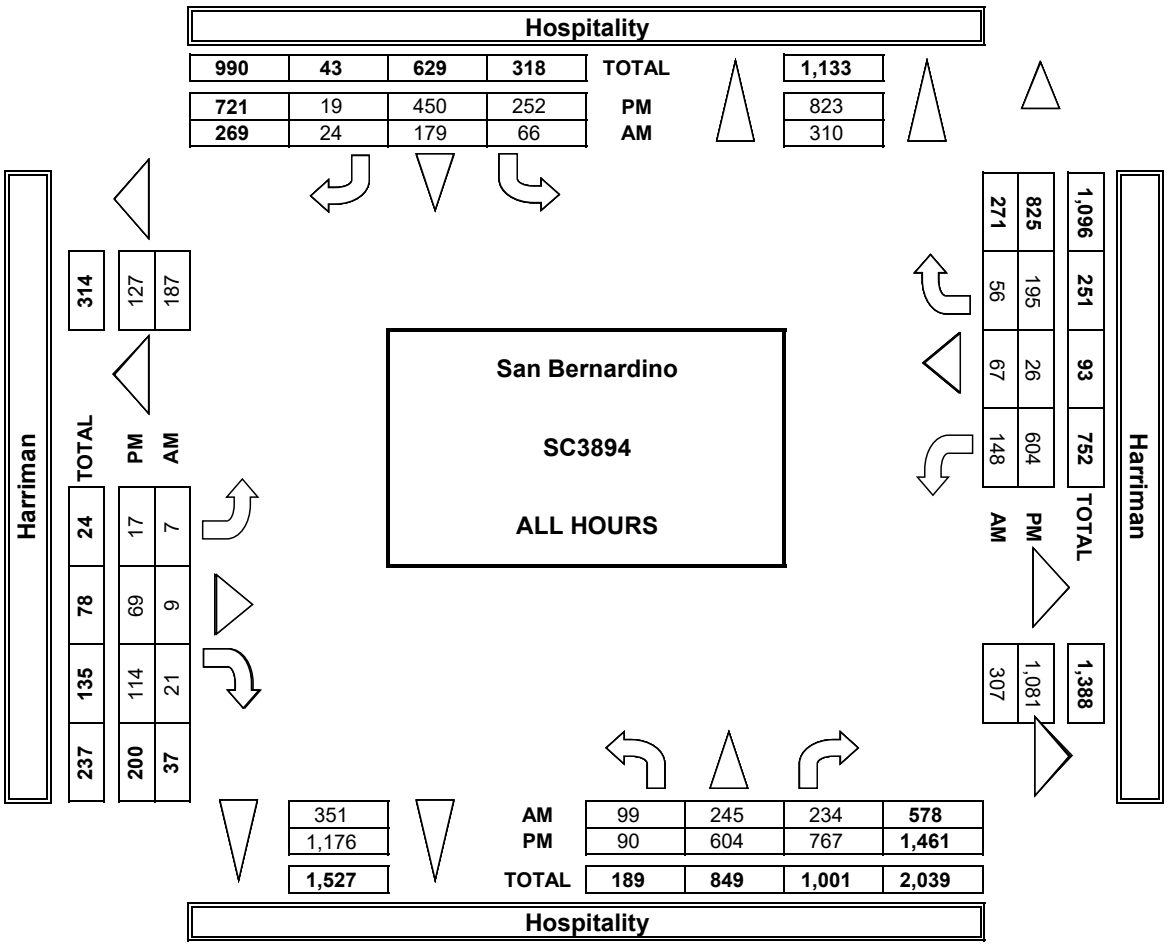
SOUTH SIDE

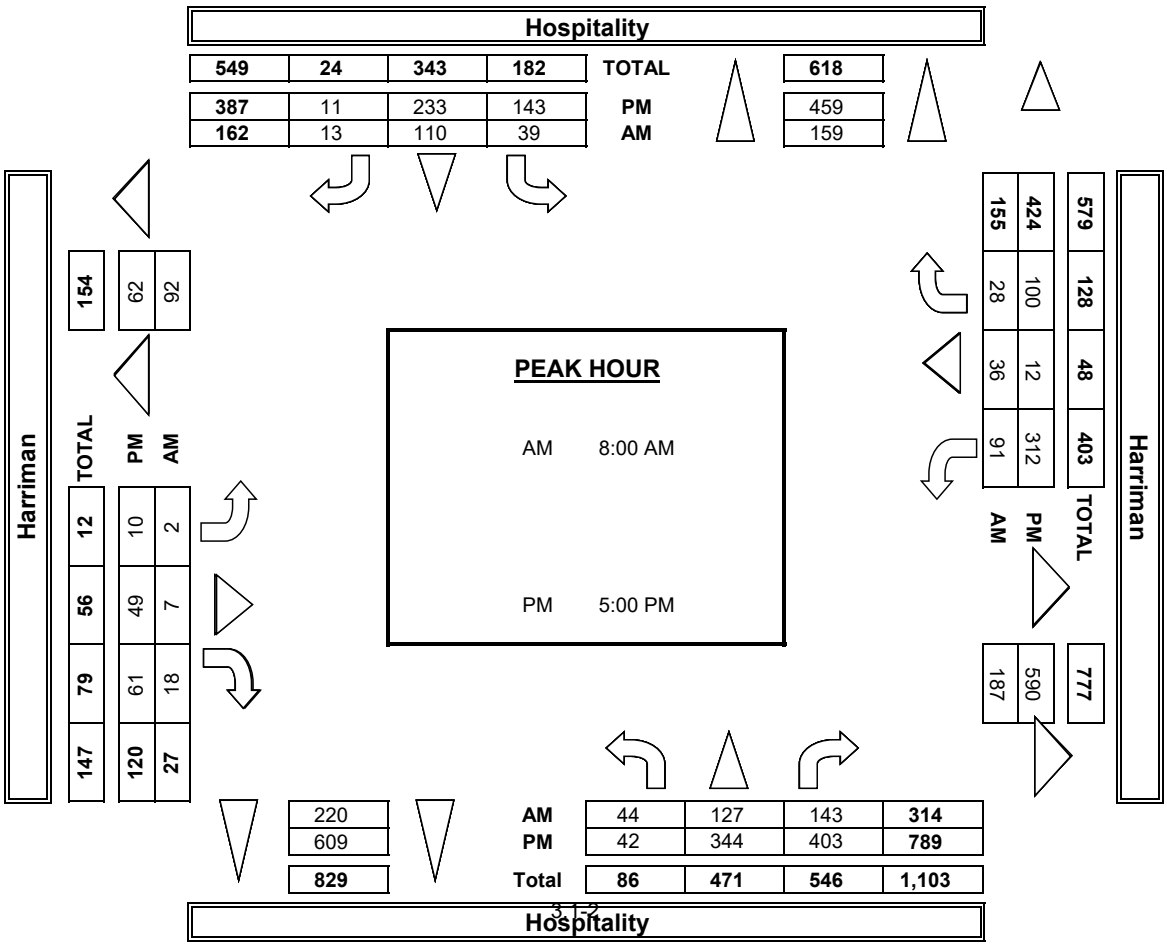
Hospitality

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	1	0	0	1	2	1	0	0	0	1	0	0	0	1	1
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	2	0	0	1	3	2	0	0	0	2	0	0	0	1	1
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	2	1	2	1	6	2	1	2	1	6	0	0	0	0	0
	4:30 PM	1	0	1	1	3	0	0	0	0	0	1	0	1	1	3
	4:45 PM	1	2	0	0	3	0	2	0	0	2	1	0	0	0	1
	5:00 PM	1	1	0	0	2	0	1	0	0	1	1	0	0	0	1
	5:15 PM	0	1	1	0	2	0	1	0	0	1	0	0	1	0	1
	5:30 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1
	5:45 PM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
	TOTAL	5	7	4	2	18	2	6	2	1	11	3	1	2	1	7

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC3894
Thu, Mar 9, 23	NORTH & SOUTH:	Driveway	LOCATION #:	2
	EAST & WEST:	Harriman	CONTROL:	STOP N/S

NOTES:

AM / PM / MD / OTHER / OTHER

▲ N, ◄ W, E ►, S ▼

Add U-Turns to Left Turns

	NORTHBOUND (Driveway)			SOUTHBOUND (Driveway)			EASTBOUND (Harriman)			WESTBOUND (Harriman)			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	1	2	0	0	1	0	
AM 7:00 AM	5	0	2	0	0	0	0	21	5	2	17	0	52
7:15 AM	3	0	1	0	0	0	0	18	2	1	30	3	58
7:30 AM	6	0	2	0	1	0	1	19	8	0	40	0	77
7:45 AM	2	0	0	0	0	0	0	33	2	0	31	3	71
8:00 AM	2	0	0	0	0	1	2	35	9	2	40	1	92
8:15 AM	4	0	2	0	0	0	0	35	3	0	35	0	79
8:30 AM	1	0	2	2	0	0	1	48	7	0	36	0	97
8:45 AM	2	0	0	0	0	1	1	35	7	0	41	3	90
VOLUMES	25	0	9	2	1	2	5	244	43	5	270	10	616
APPROACH %	74%	0%	26%	40%	20%	40%	2%	84%	15%	2%	95%	4%	
APP/DEPART	34	/	15	5	/	49	292	/	255	285	/	297	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	9	0	4	2	0	2	4	153	26	2	152	4	358
APPROACH %	69%	0%	31%	50%	0%	50%	2%	84%	14%	1%	96%	3%	
PEAK HR FACTOR		0.542			0.500			0.817			0.898		0.923
APP/DEPART	13	/	8	4	/	28	183	/	159	158	/	163	0
PM 4:00 PM	4	0	7	8	1	4	5	86	11	5	56	11	198
4:15 PM	6	0	5	6	0	11	10	88	8	4	72	13	223
4:30 PM	6	0	7	9	0	10	8	118	13	3	82	18	274
4:45 PM	4	2	6	18	0	12	3	106	2	1	64	7	225
5:00 PM	5	0	3	10	2	7	4	140	8	2	69	5	255
5:15 PM	5	0	5	8	0	11	7	131	15	3	61	7	253
5:30 PM	9	0	5	6	0	7	5	119	15	3	119	5	293
5:45 PM	3	0	2	6	0	8	5	123	7	5	82	9	250
VOLUMES	42	2	40	71	3	70	47	911	79	26	605	75	1,971
APPROACH %	50%	2%	48%	49%	2%	49%	5%	88%	8%	4%	86%	11%	
APP/DEPART	84	/	124	144	/	108	1,037	/	1,022	706	/	717	0
BEGIN PEAK HR		5:00 PM											
VOLUMES	22	0	15	30	2	33	21	513	45	13	331	26	1,051
APPROACH %	59%	0%	41%	46%	3%	51%	4%	89%	8%	4%	89%	7%	
PEAK HR FACTOR		0.661			0.855			0.946			0.728		0.897
APP/DEPART	37	/	47	65	/	60	579	/	558	370	/	386	0

	U-TURNS					RTOR			
	NB	SB	EB	WB	TTL	NRR	SRR	ERR	WRR
LANES:	0	0	0	0		X	X	X	X
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0
AM PEAK VOLUMES						0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	0	0	0	0	0	0
PM PEAK VOLUMES						0	0	0	0

Driveway

NORTH SIDE

Harriman WEST SIDE | EAST SIDE **Harriman**

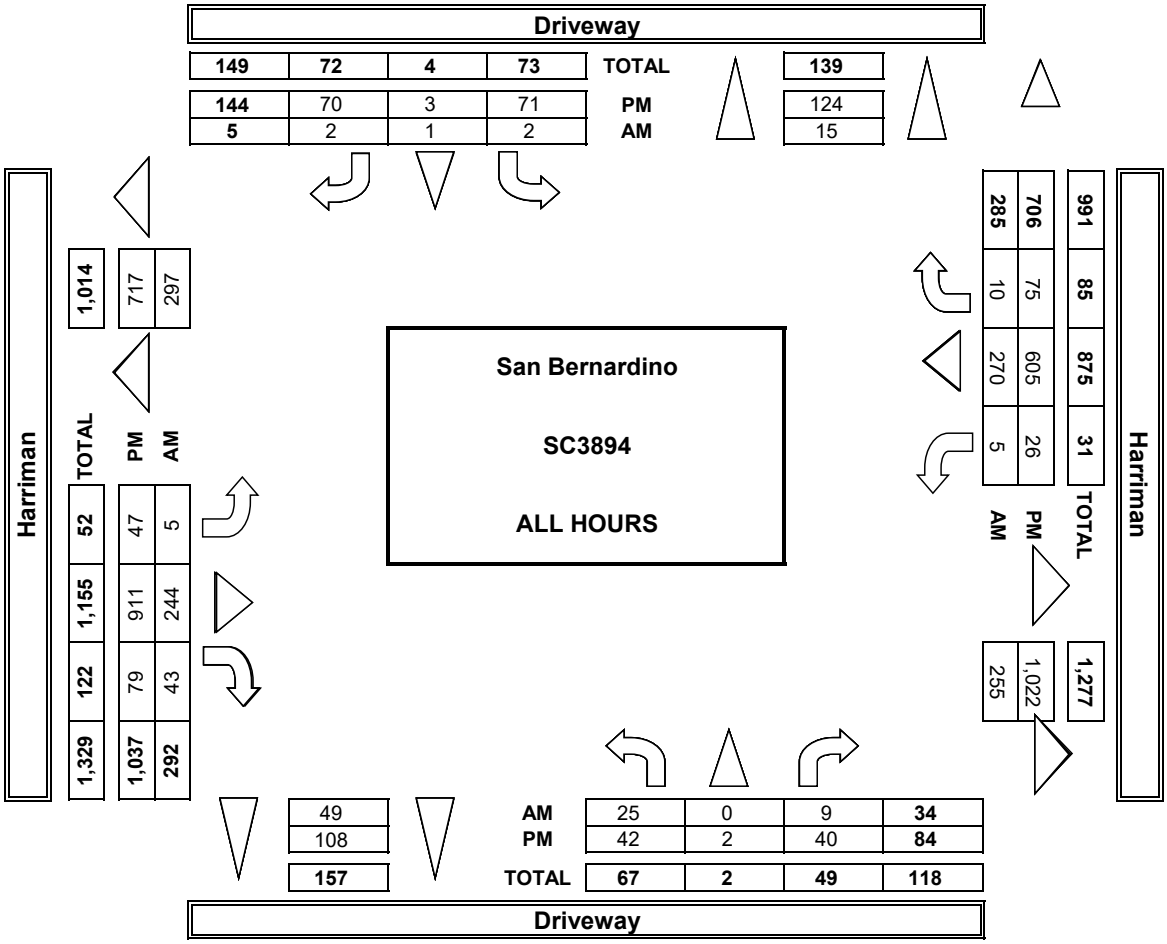
SOUTH SIDE

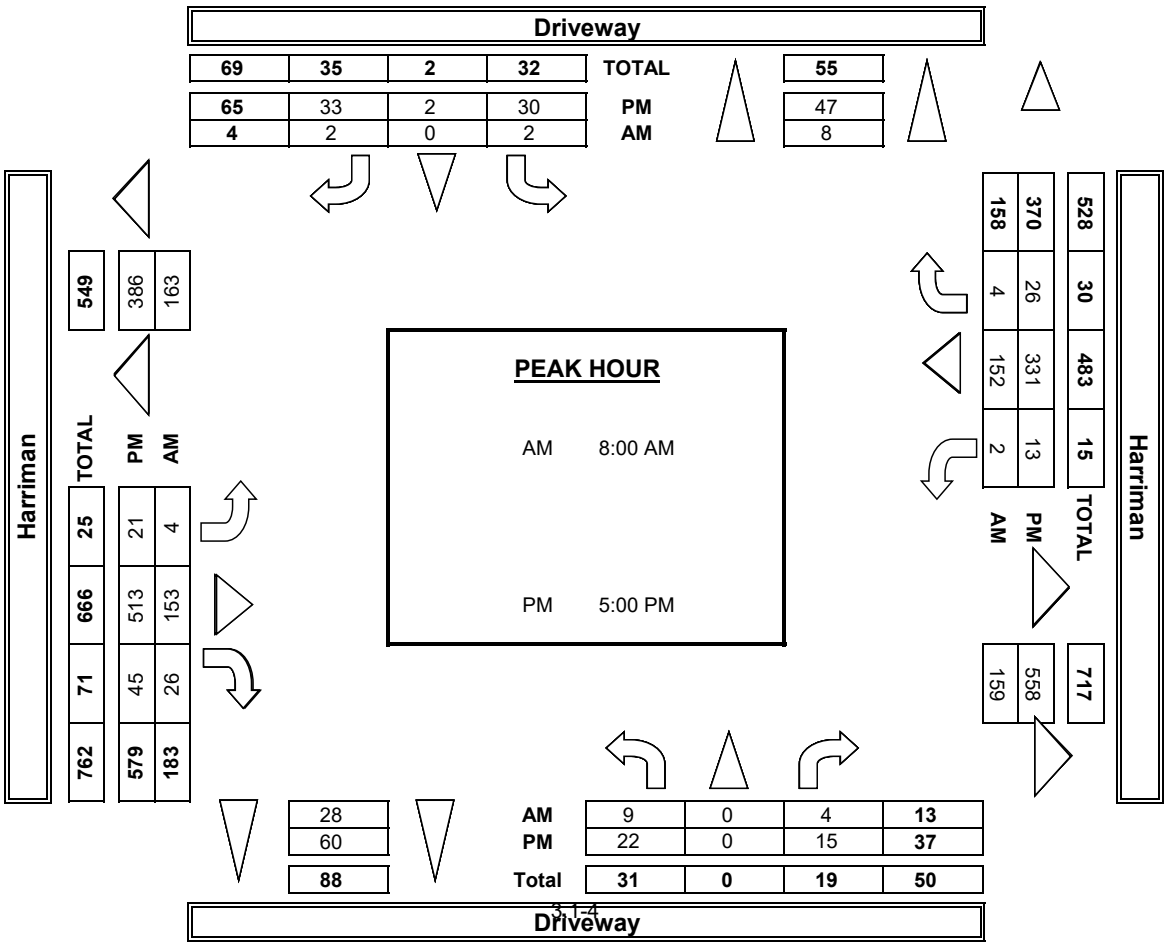
Driveway

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM 7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	2	2	0	0	0	1	1	0	0	0	1	1
7:45 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
TOTAL	0	0	0	4	4	0	0	0	1	1	0	0	0	0	0
PM 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
4:45 PM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
TOTAL	2	0	0	1	3	2	0	0	0	2	0	0	0	0	0

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	San Bernardino	PROJECT #:	SC3894
Thu, Mar 9, 23	NORTH & SOUTH:	Tippecanoe	LOCATION #:	3
	EAST & WEST:	Harriman	CONTROL:	SIGNAL

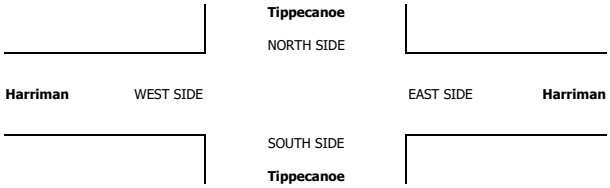
NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

Add U-Turns to Left Turns

		NORTHBOUND (Tippecanoe)			SOUTHBOUND (Tippecanoe)			EASTBOUND (Harriman)			WESTBOUND (Harriman)			
	LANES:	NL 2	NT 3	NR 1	SL X	ST 3.5	SR 0.5	EL 1	ET X	ER 2	WL 2	WT 1	WR 1	TOTAL
AM	7:00 AM	28	163	80	0	152	7	13	0	46	93	23	77	682
	7:15 AM	25	128	89	0	152	10	14	0	34	109	35	89	685
	7:30 AM	36	158	90	0	174	13	9	0	49	112	36	64	741
	7:45 AM	38	139	88	0	118	21	10	0	57	99	33	83	686
	8:00 AM	66	161	108	0	180	21	3	0	47	74	26	64	750
	8:15 AM	44	122	60	0	165	18	11	0	64	76	45	70	675
	8:30 AM	56	130	75	0	154	24	13	0	80	100	42	68	742
	8:45 AM	54	128	56	0	148	17	17	0	72	107	47	69	715
	VOLUMES	347	1,129	646	0	1,243	131	90	0	449	770	287	584	5,676
	APPROACH %	16%	53%	30%	0%	90%	10%	17%	0%	83%	47%	17%	36%	
	APP/DEPART	2,122	/	1,802	1,374	/	2,466	539	/	646	1,641	/	762	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	220	541	299	0	647	80	44	0	263	357	160	271	2,882
	APPROACH %	21%	51%	28%	0%	89%	11%	14%	0%	86%	45%	20%	34%	
	PEAK HR FACTOR		0.791			0.904			0.825			0.883		0.961
	APP/DEPART	1,060	/	856	727	/	1,270	307	/	299	788	/	457	0
PM	4:00 PM	61	139	114	0	302	45	43	0	137	76	64	85	1,066
	4:15 PM	83	161	101	0	264	35	43	0	134	48	57	72	998
	4:30 PM	63	137	132	0	239	46	42	0	175	59	62	67	1,022
	4:45 PM	65	134	131	0	266	46	40	0	158	45	49	55	989
	5:00 PM	71	142	124	0	249	46	53	0	189	53	59	65	1,051
	5:15 PM	81	153	109	0	266	56	43	0	161	78	46	57	1,050
	5:30 PM	66	123	97	0	237	68	52	0	186	111	67	81	1,088
	5:45 PM	82	155	98	0	260	47	42	0	178	73	42	71	1,048
	VOLUMES	572	1,144	906	0	2,083	389	358	0	1,318	543	446	553	8,312
	APPROACH %	22%	44%	35%	0%	84%	16%	21%	0%	79%	35%	29%	36%	
	APP/DEPART	2,622	/	2,040	2,472	/	3,948	1,676	/	906	1,542	/	1,418	0
	BEGIN PEAK HR		5:00 PM											
	VOLUMES	300	573	428	0	1,012	217	190	0	714	315	214	274	4,237
	APPROACH %	23%	44%	33%	0%	82%	18%	21%	0%	79%	39%	27%	34%	
	PEAK HR FACTOR		0.948			0.954			0.934			0.775		0.974
	APP/DEPART	1,301	/	1,027	1,229	/	2,043	904	/	428	803	/	739	0

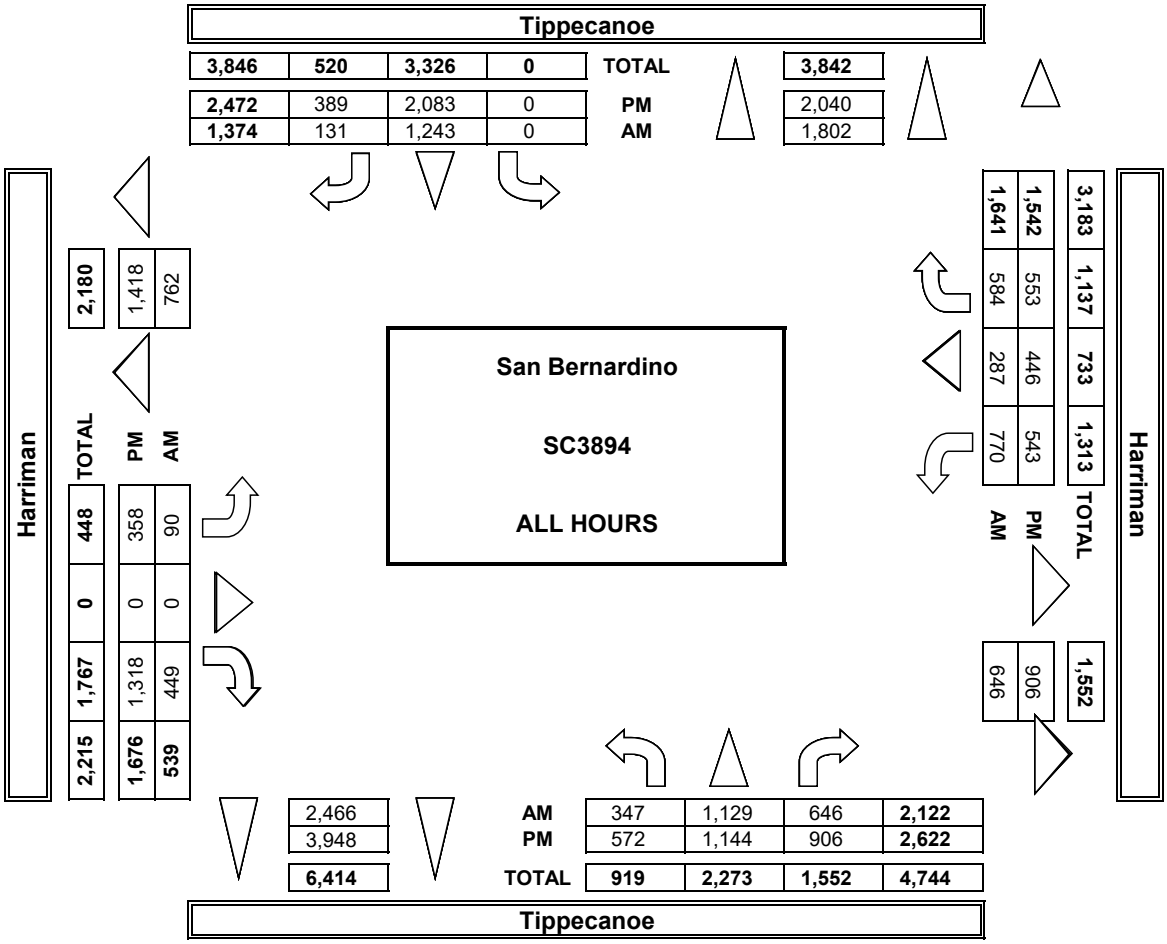
U-TURNS					RTOR			
NB 0	SB 0	EB 0	WB 0	TTL	NRR X	SRR 0	ERR 0	WRR 0
0	0	1	0	1	0	1	19	48
0	0	0	0	0	0	1	8	42
0	0	0	0	0	0	2	37	46
1	0	0	0	1	0	3	35	55
2	0	0	0	2	0	1	32	49
1	0	0	0	1	0	0	26	39
0	0	0	0	0	0	0	41	38
0	0	0	0	0	0	0	31	46
4	0	1	0	5	0	8	229	363
					0	1	130	172
1	0	1	0	2	0	5	48	36
0	0	1	0	1	0	3	46	37
1	0	2	0	3	0	8	69	28
0	0	1	0	1	0	6	51	35
2	0	1	0	3	0	10	69	26
0	0	4	0	4	0	8	70	36
0	0	3	0	3	0	11	59	43
0	0	2	0	2	0	3	87	43
4	0	15	0	19	0	54	499	284
					0	32	285	148

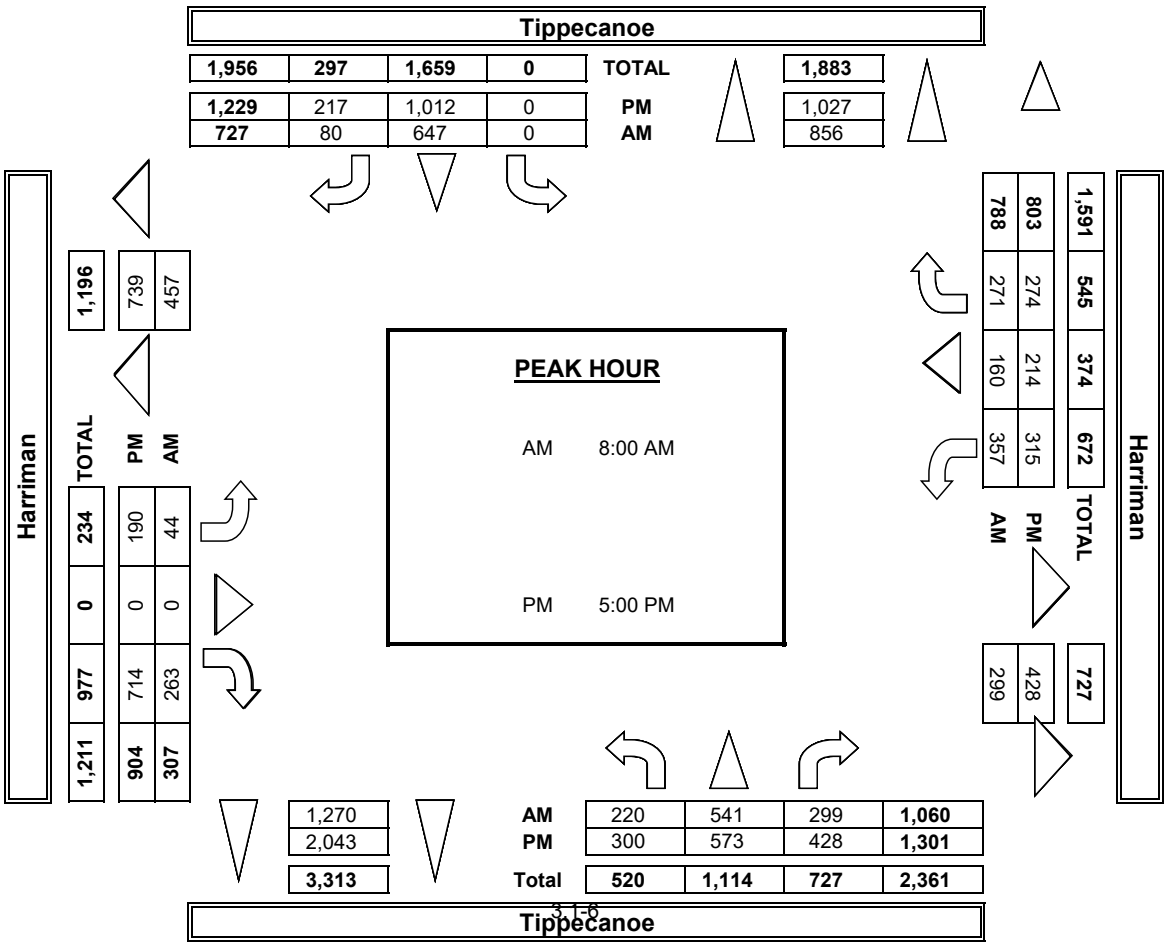


		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM	7:00 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	1	0	0	1	2	1	0	0	1	2	0	0	0	0	0
	8:00 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	8:15 AM	1	0	0	1	2	1	0	0	1	2	0	0	0	0	0
	8:30 AM	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1
	8:45 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	TOTAL	6	0	0	2	8	3	0	0	1	4	1	0	0	0	1
PM	4:00 PM	0	3	1	0	4	0	3	1	0	4	0	0	0	0	0
	4:15 PM	2	4	1	1	8	1	4	1	0	6	1	0	0	1	2
	4:30 PM	2	2	0	0	4	0	2	0	0	2	2	0	0	0	2
	4:45 PM	1	2	0	0	3	1	2	0	0	3	0	0	0	0	0
	5:00 PM	4	3	0	1	8	2	3	0	1	6	2	0	0	0	2
	5:15 PM	3	3	0	0	6	1	2	0	0	3	2	1	0	0	3
	5:30 PM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	13	17	2	2	34	2	11	2	0	15	3	0	0	1	4

AimTD LLC

TURNING MOVEMENT COUNTS





Thursday, March 09, 2023 CITY: San Bernardino PROJECT: SC3894

ADT1 Harriman east of Driveway. Suhsduhg#e|#Dlp WG#DOF#Whd#:47#586#;;;

AM Period	EB		WB			PM Period	EB		WB		
0:00	6		6			12:00	143		107		
0:15	3		9			12:15	143		137		
0:30	2		6			12:30	133		126		
0:45	5	16	6	27	43	12:45	142	561	126	496	1057
1:00	2		3			13:00	133		127		
1:15	2		4			13:15	119		116		
1:30	3		3			13:30	120		92		
1:45	0	7	0	10	17	13:45	97	469	88	423	892
2:00	1		5			14:00	122		84		
2:15	1		0			14:15	106		92		
2:30	0		0			14:30	100		82		
2:45	2	4	0	5	9	14:45	91	419	77	335	754
3:00	2		0			15:00	112		88		
3:15	2		0			15:15	110		79		
3:30	1		3			15:30	106		59		
3:45	5	10	4	7	17	15:45	91	419	80	306	725
4:00	0		1			16:00	101		72		
4:15	2		1			16:15	99		89		
4:30	3		2			16:30	134		103		
4:45	7	12	4	8	20	16:45	130	464	72	336	800
5:00	4		7			17:00	153		76		
5:15	6		4			17:15	144		71		
5:30	9		5			17:30	130		127		
5:45	13	32	4	20	52	17:45	131	558	96	370	928
6:00	9		11			18:00	115		82		
6:15	12		11			18:15	114		82		
6:30	14		20			18:30	88		63		
6:45	17	52	37	79	131	18:45	110	427	69	296	723
7:00	23		19			19:00	83		78		
7:15	19		34			19:15	77		72		
7:30	21		40			19:30	71		58		
7:45	33	96	34	127	223	19:45	73	304	54	262	566
8:00	35		43			20:00	72		45		
8:15	37		35			20:15	61		48		
8:30	52		36			20:30	53		40		
8:45	35	159	44	158	317	20:45	36	222	40	173	395
9:00	45		59			21:00	39		32		
9:15	52		40			21:15	29		16		
9:30	52		45			21:30	31		16		
9:45	64	213	57	201	414	21:45	35	134	19	83	217
10:00	64		63			22:00	28		15		
10:15	72		55			22:15	11		10		
10:30	83		73			22:30	5		3		
10:45	78	297	79	270	567	22:45	11	55	9	37	92
11:00	106		73			23:00	10		6		
11:15	93		109			23:15	9		8		
11:30	121		96			23:30	13		18		
11:45	120	440	91	369	809	23:45	10	42	2	34	76
Total Vol.		1338		1281	**2619**			4074		3151	**7225**

Daily Totals	EB	WB	**Combined**
	5412	4432	**9844**

	AM			**PM**		
Split %	51.1%	48.9%	**26.6%**	56.4%	43.6%	**73.4%**
Peak Hour	11:45	11:45	**11:45**	12:00	12:15	**12:15**
Volume	539	461	**1000**	561	516	**1067**
P.H.F.	0.94	0.84	**0.89**	0.98	0.94	**0.95**

cs@aimtd.com Tell. 714 253 7888

Thursday, March 09, 2023 CITY: San Bernardino PROJECT: SC3894

ADT 2 Tippecanoe north of Harriman.

Suhsduhg#e|#D1p WG#DOF#Whd#:47#586#;;;

AM Period	NB		SB			PM Period	NB		SB		
0:00	45		41			12:00	332		328		
0:15	32		42			12:15	366		359		
0:30	48		74			12:30	307		295		
0:45	44	169	52	209		12:45	276	1281	337	1319	2600
1:00	28		39			13:00	278		305		
1:15	32		34			13:15	262		325		
1:30	37		44			13:30	329		285		
1:45	31	128	26	143		13:45	311	1180	299	1214	2394
2:00	24		36			14:00	259		340		
2:15	25		30			14:15	322		315		
2:30	34		28			14:30	252		300		
2:45	40	123	19	113	236	14:45	287	1120	332	1287	2407
3:00	26		30			15:00	251		319		
3:15	36		36			15:15	284		310		
3:30	47		38			15:30	252		290		
3:45	67	176	35	139	315	15:45	258	1045	302	1221	2266
4:00	47		60			16:00	266		347		
4:15	67		58			16:15	275		299		
4:30	92		79			16:30	244		285		
4:45	131	337	63	260	597	16:45	228	1013	312	1243	2256
5:00	66		77			17:00	259		295		
5:15	115		83			17:15	249		322		
5:30	157		100			17:30	253		305		
5:45	223	561	109	369	930	17:45	266	1027	307	1229	2256
6:00	144		139			18:00	241		266		
6:15	173		130			18:15	285		297		
6:30	227		162			18:30	230		307		
6:45	237	781	137	568	1349	18:45	251	1007	309	1179	2186
7:00	252		159			19:00	256		251		
7:15	231		162			19:15	256		254		
7:30	231		187			19:30	239		233		
7:45	232	946	139	647	1593	19:45	214	965	258	996	1961
8:00	228		201			20:00	185		204		
8:15	203		183			20:15	143		216		
8:30	211		178			20:30	128		205		
8:45	214	856	165	727	1583	20:45	141	597	155	780	1377
9:00	222		187			21:00	111		161		
9:15	205		182			21:15	115		109		
9:30	241		163			21:30	105		104		
9:45	301	969	183	715	1684	21:45	103	434	96	470	904
10:00	302		180			22:00	78		83		
10:15	293		249			22:15	82		66		
10:30	298		253			22:30	61		102		
10:45	284	1177	283	965	2142	22:45	65	286	49	300	586
11:00	279		291			23:00	73		87		
11:15	279		299			23:15	63		64		
11:30	290		265			23:30	70		65		
11:45	311	1159	277	1132	2291	23:45	55	261	52	268	529
Total Vol.	7382		5987		**12720**		10216		11506		**21722**

Daily Totals

NB	SB	Combined
17598	17493	**34442**

	AM			PM		
Split %	58.0%	47.1%	**36.9%**	47.0%	53.0%	**63.1%**
Peak Hour	11:45	11:45	**11:45**	12:00	12:00	**12:00**
Volume	1316	1259	**2575**	1281	1319	**2600**
P.H.F.	0.90	0.88	**0.89**	0.90	0.92	**0.90**

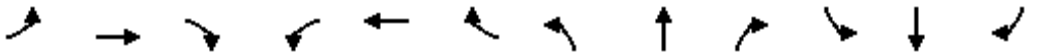
APPENDIX 3.2: EXISTING (2023) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	2	7	18	91	36	28	44	127	143	39	110
Future Volume (vph)	2	7	18	91	36	28	44	127	143	39	110
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases		4		8	8		5	2	8	1	6
Permitted Phases	4		4			8			2		
Detector Phase	4	4	4	8	8	8	5	2	8	1	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.6	35.6	9.6	23.6
Total Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	10.0	23.8	35.6	10.0	23.8
Total Split (%)	33.9%	33.9%	33.9%	33.9%	33.9%	33.9%	9.5%	22.7%	33.9%	9.5%	22.7%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead/Lag							Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		16.5	16.5	16.5	16.5	16.5	7.6	15.5	23.2	7.6	15.5
Actuated g/C Ratio		0.35	0.35	0.35	0.35	0.35	0.16	0.33	0.50	0.16	0.33
v/c Ratio		0.03	0.03	0.11	0.11	0.05	0.16	0.11	0.18	0.14	0.11
Control Delay		21.0	0.1	19.4	19.3	0.1	32.3	21.5	2.1	32.2	20.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		21.0	0.1	19.4	19.3	0.1	32.3	21.5	2.1	32.2	20.2
LOS		C	A	B	B	A	C	C	A	C	C
Approach Delay		6.8			15.9			14.2			23.1
Approach LOS		A			B			B			C

Intersection Summary	
Cycle Length: 105	
Actuated Cycle Length: 46.7	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.18	
Intersection Signal Delay: 16.5	Intersection LOS: B
Intersection Capacity Utilization 36.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Hospitality Ln. & Harriman Pl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	7	18	91	36	28	44	127	143	39	110	13
Future Volume (veh/h)	2	7	18	91	36	28	44	127	143	39	110	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	7	1	67	79	7	46	134	105	41	116	9
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	11	38	42	372	391	331	90	856	713	82	791	61
Arrive On Green	0.03	0.03	0.03	0.21	0.21	0.21	0.05	0.24	0.24	0.05	0.24	0.24
Sat Flow, veh/h	411	1439	1585	1781	1870	1585	1781	3554	1583	1781	3344	257
Grp Volume(v), veh/h	9	0	1	67	79	7	46	134	105	41	61	64
Grp Sat Flow(s),veh/h/ln	1850	0	1585	1781	1870	1585	1781	1777	1583	1781	1777	1824
Q Serve(g_s), s	0.2	0.0	0.0	1.2	1.3	0.1	1.0	1.1	1.5	0.9	1.0	1.1
Cycle Q Clear(g_c), s	0.2	0.0	0.0	1.2	1.3	0.1	1.0	1.1	1.5	0.9	1.0	1.1
Prop In Lane	0.22		1.00	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	49	0	42	372	391	331	90	856	713	82	420	431
V/C Ratio(X)	0.18	0.00	0.02	0.18	0.20	0.02	0.51	0.16	0.15	0.50	0.15	0.15
Avail Cap(c_a), veh/h	1489	0	1275	1433	1505	1275	250	1771	1120	250	886	909
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	18.3	12.5	12.6	12.1	17.8	11.5	6.2	17.9	11.6	11.6
Incr Delay (d2), s/veh	1.8	0.0	0.2	0.2	0.3	0.0	1.7	0.1	0.1	1.7	0.2	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	0.1	0.0	0.0	0.4	0.5	0.0	0.4	0.4	0.6	0.4	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.1	0.0	18.5	12.7	12.8	12.1	19.5	11.6	6.3	19.7	11.8	11.8
LnGrp LOS	C	A	B	B	B	B	B	B	A	B	B	B
Approach Vol, veh/h		10			153			285			166	
Approach Delay, s/veh		20.0			12.8			10.9			13.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	13.9		5.6	6.5	13.7		12.7				
Change Period (Y+Rc), s	4.6	4.6		4.6	4.6	4.6		4.6				
Max Green Setting (Gmax), s	5.4	19.2		31.0	5.4	19.2		31.0				
Max Q Clear Time (g_c+I1), s	2.9	3.5		2.2	3.0	3.1		3.3				
Green Ext Time (p_c), s	0.0	1.0		0.0	0.0	0.5		0.6				

Intersection Summary			
HCM 6th Ctrl Delay		12.3	
HCM 6th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	153	26	2	152	4	9	0	4	2	0	2
Future Vol, veh/h	4	153	26	2	152	4	9	0	4	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	166	28	2	165	4	10	0	4	2	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	170	0	0	194	0	0	275	362	97	263	374	86
Stage 1	-	-	-	-	-	-	188	188	-	172	172	-
Stage 2	-	-	-	-	-	-	87	174	-	91	202	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1405	-	-	1377	-	-	656	564	940	669	555	956
Stage 1	-	-	-	-	-	-	796	743	-	813	755	-
Stage 2	-	-	-	-	-	-	911	754	-	906	733	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1404	-	-	1377	-	-	652	561	940	663	552	955
Mov Cap-2 Maneuver	-	-	-	-	-	-	652	561	-	663	552	-
Stage 1	-	-	-	-	-	-	794	741	-	810	753	-
Stage 2	-	-	-	-	-	-	908	752	-	899	731	-

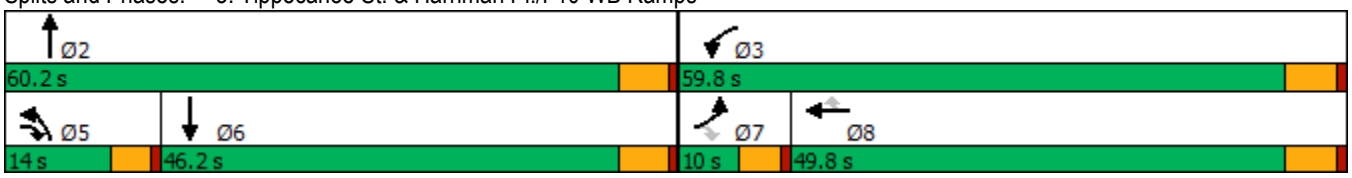
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	10.1	9.6
HCM LOS			B	A

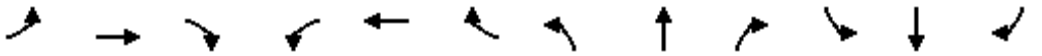
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	720	1404	-	-	1377	-	-	783
HCM Lane V/C Ratio	0.02	0.003	-	-	0.002	-	-	0.006
HCM Control Delay (s)	10.1	7.6	-	-	7.6	-	-	9.6
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	44	263	357	160	271	220	541	299	647
Future Volume (vph)	44	263	357	160	271	220	541	299	647
Turn Type	Prot	pm+ov	Prot	NA	Perm	Prot	NA	Free	NA
Protected Phases	7	5	3	8		5	2		6
Permitted Phases		7			8			Free	
Detector Phase	7	5	3	8	8	5	2		6
Switch Phase									
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	5.0	10.0		10.0
Minimum Split (s)	9.6	9.6	15.8	49.8	49.8	9.6	45.4		45.4
Total Split (s)	10.0	14.0	59.8	49.8	49.8	14.0	60.2		46.2
Total Split (%)	8.3%	11.7%	49.8%	41.5%	41.5%	11.7%	50.2%		38.5%
Yellow Time (s)	3.6	3.6	4.8	4.8	4.8	3.6	4.4		4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.6	4.6	5.8	5.8	5.8	4.6	5.4		5.4
Lead/Lag	Lead	Lead		Lag	Lag	Lead			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes
Recall Mode	None	None	None	None	None	None	Min		Min
Act Effct Green (s)	6.1	12.5	23.1	17.8	17.8	9.7	32.6	68.4	17.7
Actuated g/C Ratio	0.09	0.18	0.34	0.26	0.26	0.14	0.48	1.00	0.26
v/c Ratio	0.29	0.36	0.32	0.53	0.37	0.47	0.23	0.19	0.46
Control Delay	44.6	4.0	17.0	25.8	5.7	36.9	12.6	0.2	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	4.0	17.0	25.8	5.7	36.9	12.6	0.2	22.1
LOS	D	A	B	C	A	D	B	A	C
Approach Delay				16.6			14.2		22.1
Approach LOS				B			B		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 68.4	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 16.4	Intersection LOS: B
Intersection Capacity Utilization 51.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Tippecanoe St. & Harriman Pl./I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	0	263	357	160	271	220	541	299	0	647	80
Future Volume (veh/h)	44	0	263	357	160	271	220	541	299	0	647	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1945	1870	1870	1945	1870	1870	1945	0	1870	1945
Adj Flow Rate, veh/h	46	0	139	372	167	103	229	564	0	0	674	82
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	0	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	84	0	0	705	373	328	354	2242		0	1439	171
Arrive On Green	0.05	0.00	0.00	0.20	0.20	0.20	0.10	0.44	0.00	0.00	0.25	0.25
Sat Flow, veh/h	1781	46		3563	1870	1646	3456	5106	1648	0	6132	699
Grp Volume(v), veh/h	46	28.9		372	167	103	229	564	0	0	551	205
Grp Sat Flow(s),veh/h/ln	1781	C		1781	1870	1646	1728	1702	1648	0	1609	1744
Q Serve(g_s), s	1.3			4.7	3.9	2.7	3.2	3.5	0.0	0.0	4.9	5.0
Cycle Q Clear(g_c), s	1.3			4.7	3.9	2.7	3.2	3.5	0.0	0.0	4.9	5.0
Prop In Lane	1.00			1.00		1.00	1.00		1.00	0.00		0.40
Lane Grp Cap(c), veh/h	84			705	373	328	354	2242		0	1182	427
V/C Ratio(X)	0.55			0.53	0.45	0.31	0.65	0.25		0.00	0.47	0.48
Avail Cap(c_a), veh/h	191			3830	1638	1442	647	5571		0	3920	1417
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	23.4			18.0	17.7	17.2	21.7	8.9	0.0	0.0	16.2	16.2
Incr Delay (d2), s/veh	5.5			0.6	0.8	0.5	0.7	0.1	0.0	0.0	0.3	0.8
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6			1.6	1.5	0.9	1.2	1.0	0.0	0.0	1.5	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.9			18.7	18.5	17.7	22.4	8.9	0.0	0.0	16.4	17.0
LnGrp LOS	C			B	B	B	C	A		A	B	B
Approach Vol, veh/h					642			793			756	
Approach Delay, s/veh					18.5			12.8			16.6	
Approach LOS					B			B			B	

Timer - Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		27.5	15.7		9.7	17.7	7.0	15.8				
Change Period (Y+Rc), s		5.4	5.8		4.6	5.4	4.6	5.8				
Max Green Setting (Gmax), s		54.8	54.0		9.4	40.8	5.4	44.0				
Max Q Clear Time (g_c+I1), s		5.5	6.7		5.2	7.0	3.3	5.9				
Green Ext Time (p_c), s		4.1	1.3		0.2	5.3	0.0	1.2				

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

Notes

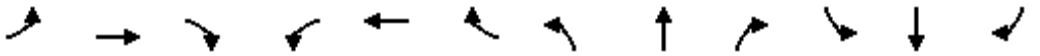
User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	10	49	61	312	12	100	42	344	403	143	233
Future Volume (vph)	10	49	61	312	12	100	42	344	403	143	233
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases		4		8	8		5	2	8	1	6
Permitted Phases	4		4			8			2		
Detector Phase	4	4	4	8	8	8	5	2	8	1	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.6	35.6	9.6	23.6
Total Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.8	35.6	10.0	24.2
Total Split (%)	33.9%	33.9%	33.9%	33.9%	33.9%	33.9%	9.1%	22.7%	33.9%	9.5%	23.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead/Lag							Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		14.0	14.0	17.0	17.0	17.0	5.5	13.2	30.2	6.0	19.2
Actuated g/C Ratio		0.21	0.21	0.26	0.26	0.26	0.08	0.20	0.46	0.09	0.29
v/c Ratio		0.50	0.15	0.38	0.38	0.21	0.29	0.50	0.44	0.92	0.24
Control Delay		41.9	1.7	25.8	25.7	5.9	42.5	29.7	2.5	92.2	25.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		41.9	1.7	25.8	25.7	5.9	42.5	29.7	2.5	92.2	25.3
LOS		D	A	C	C	A	D	C	A	F	C
Approach Delay		21.5			21.1			16.5			50.0
Approach LOS		C			C			B			D

Intersection Summary	
Cycle Length: 105	
Actuated Cycle Length: 65.7	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 25.5	Intersection LOS: C
Intersection Capacity Utilization 54.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Hospitality Ln. & Harriman Pl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	49	61	312	12	100	42	344	403	143	233	11
Future Volume (veh/h)	10	49	61	312	12	100	42	344	403	143	233	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	51	19	331	0	49	43	355	215	147	240	8
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	217	218	704	0	309	80	704	622	187	906	30
Arrive On Green	0.14	0.14	0.14	0.20	0.00	0.20	0.04	0.20	0.20	0.10	0.26	0.26
Sat Flow, veh/h	304	1551	1559	3563	0	1562	1781	3554	1558	1781	3509	117
Grp Volume(v), veh/h	61	0	19	331	0	49	43	355	215	147	121	127
Grp Sat Flow(s),veh/h/ln	1855	0	1559	1781	0	1562	1781	1777	1558	1781	1777	1849
Q Serve(g_s), s	1.5	0.0	0.5	4.2	0.0	1.3	1.2	4.6	4.9	4.1	2.8	2.8
Cycle Q Clear(g_c), s	1.5	0.0	0.5	4.2	0.0	1.3	1.2	4.6	4.9	4.1	2.8	2.8
Prop In Lane	0.16		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	259	0	218	704	0	309	80	704	622	187	459	477
V/C Ratio(X)	0.24	0.00	0.09	0.47	0.00	0.16	0.54	0.50	0.35	0.79	0.26	0.27
Avail Cap(c_a), veh/h	1125	0	946	2160	0	947	174	1334	898	188	681	709
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.6	0.0	19.2	18.1	0.0	17.0	23.9	18.3	10.8	22.3	15.1	15.1
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.5	0.0	0.2	2.1	0.6	0.3	18.0	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.2	1.6	0.0	0.5	0.5	1.8	2.2	2.5	1.1	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.0	0.0	19.3	18.6	0.0	17.2	26.0	18.8	11.2	40.3	15.4	15.4
LnGrp LOS	C	A	B	B	A	B	C	B	B	D	B	B
Approach Vol, veh/h		80			380			613			395	
Approach Delay, s/veh		19.9			18.5			16.6			24.7	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	14.7		11.7	6.9	17.8		14.7				
Change Period (Y+Rc), s	4.6	4.6		4.6	4.6	4.6		4.6				
Max Green Setting (Gmax), s	5.4	19.2		31.0	5.0	19.6		31.0				
Max Q Clear Time (g_c+I1), s	6.1	6.9		3.5	3.2	4.8		6.2				
Green Ext Time (p_c), s	0.0	2.6		0.3	0.0	1.2		1.4				

Intersection Summary			
HCM 6th Ctrl Delay		19.4	
HCM 6th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	21	513	45	13	331	26	22	0	15	30	2	33
Future Vol, veh/h	21	513	45	13	331	26	22	0	15	30	2	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	570	50	14	368	29	24	0	17	33	2	37

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	397	0	0	620	0	0	854	1066	312	744	1077	199
Stage 1	-	-	-	-	-	-	641	641	-	411	411	-
Stage 2	-	-	-	-	-	-	213	425	-	333	666	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1158	-	-	956	-	-	252	221	684	303	218	809
Stage 1	-	-	-	-	-	-	430	468	-	589	593	-
Stage 2	-	-	-	-	-	-	769	585	-	654	456	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1158	-	-	956	-	-	232	213	683	287	210	809
Mov Cap-2 Maneuver	-	-	-	-	-	-	232	213	-	287	210	-
Stage 1	-	-	-	-	-	-	421	459	-	577	584	-
Stage 2	-	-	-	-	-	-	721	576	-	624	447	-

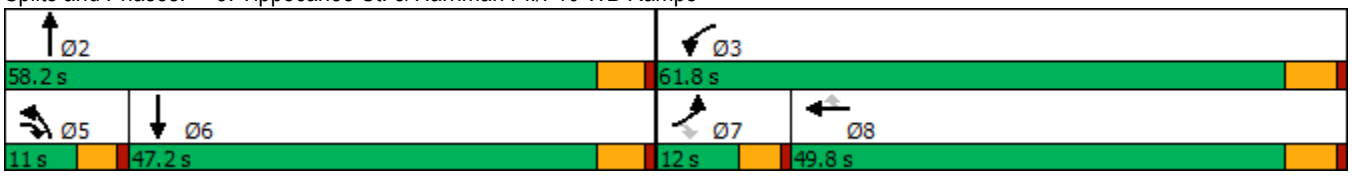
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	18	15.3
HCM LOS			C	C

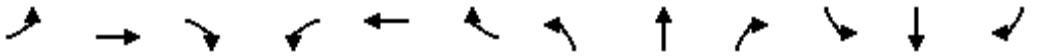
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	317	1158	-	-	956	-	-	420
HCM Lane V/C Ratio	0.13	0.02	-	-	0.015	-	-	0.172
HCM Control Delay (s)	18	8.2	-	-	8.8	-	-	15.3
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.6

Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	190	714	315	214	274	300	573	428	1012
Future Volume (vph)	190	714	315	214	274	300	573	428	1012
Turn Type	Prot	pm+ov	Prot	NA	Perm	Prot	NA	Free	NA
Protected Phases	7	5	3	8		5	2		6
Permitted Phases		7			8			Free	
Detector Phase	7	5	3	8	8	5	2		6
Switch Phase									
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	5.0	10.0		10.0
Minimum Split (s)	9.6	9.6	15.8	49.8	49.8	9.6	45.4		45.4
Total Split (s)	12.0	11.0	61.8	49.8	49.8	11.0	58.2		47.2
Total Split (%)	10.0%	9.2%	51.5%	41.5%	41.5%	9.2%	48.5%		39.3%
Yellow Time (s)	3.6	3.6	4.8	4.8	4.8	3.6	4.4		4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.6	4.6	5.8	5.8	5.8	4.6	5.4		5.4
Lead/Lag	Lead	Lead		Lag	Lag	Lead			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes
Recall Mode	None	None	None	None	None	None	Min		Min
Act Effct Green (s)	7.7	14.4	33.1	20.5	20.5	6.7	38.0	82.8	26.5
Actuated g/C Ratio	0.09	0.17	0.40	0.25	0.25	0.08	0.46	1.00	0.32
v/c Ratio	1.19	0.86	0.24	0.62	0.45	1.12	0.25	0.26	0.63
Control Delay	167.2	21.4	17.1	33.1	11.7	127.7	15.1	0.4	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	167.2	21.4	17.1	33.1	11.7	127.7	15.1	0.4	25.0
LOS	F	C	B	C	B	F	B	A	C
Approach Delay				20.8			36.2		25.0
Approach LOS				C			D		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 82.8	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 33.4	Intersection LOS: C
Intersection Capacity Utilization 75.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Tippecanoe St. & Harriman Pl./I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	0	714	315	214	274	300	573	428	0	1012	217
Future Volume (veh/h)	190	0	714	315	214	274	300	573	428	0	1012	217
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		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1945	1870	1870	1945	1870	1870	1945	0	1870	1945
Adj Flow Rate, veh/h	196	0	463	325	221	129	309	591	0	0	1043	191
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	0	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	189	0	0	511	306	269	318	2570		0	1902	344
Arrive On Green	0.11	0.00	0.00	0.14	0.16	0.16	0.09	0.50	0.00	0.00	0.35	0.35
Sat Flow, veh/h	1781	196		3563	1870	1648	3456	5106	1648	0	5770	997
Grp Volume(v), veh/h	196	106.0		325	221	129	309	591	0	0	912	322
Grp Sat Flow(s),veh/h/ln	1781	F		1781	1870	1648	1728	1702	1648	0	1609	1680
Q Serve(g_s), s	7.4			6.0	7.8	4.9	6.2	4.5	0.0	0.0	10.6	10.8
Cycle Q Clear(g_c), s	7.4			6.0	7.8	4.9	6.2	4.5	0.0	0.0	10.6	10.8
Prop In Lane	1.00			1.00		1.00	1.00		1.00	0.00		0.59
Lane Grp Cap(c), veh/h	189			511	306	269	318	2570		0	1666	580
V/C Ratio(X)	1.04			0.64	0.72	0.48	0.97	0.23		0.00	0.55	0.56
Avail Cap(c_a), veh/h	189			2866	1182	1042	318	3873		0	2898	1009
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	31.1			28.1	27.6	26.4	31.5	9.7	0.0	0.0	18.4	18.5
Incr Delay (d2), s/veh	74.9			1.3	3.2	1.3	42.7	0.0	0.0	0.0	0.3	0.8
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0			2.4	3.4	1.9	4.3	1.4	0.0	0.0	3.5	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.0			29.4	30.9	27.7	74.3	9.8	0.0	0.0	18.7	19.3
LnGrp LOS	F			C	C	C	E	A		A	B	B
Approach Vol, veh/h					675			900			1234	
Approach Delay, s/veh					29.6			31.9			18.8	
Approach LOS					C			C			B	

Timer - Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		40.4	15.8		11.0	29.4	12.0	17.2				
Change Period (Y+Rc), s		5.4	5.8		4.6	5.4	4.6	5.8				
Max Green Setting (Gmax), s		52.8	56.0		6.4	41.8	7.4	44.0				
Max Q Clear Time (g_c+I1), s		6.5	8.0		8.2	12.8	9.4	9.8				
Green Ext Time (p_c), s		4.3	1.1		0.0	9.4	0.0	1.6				

Intersection Summary	
HCM 6th Ctrl Delay	30.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX 3.3: EXISTING (2023) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

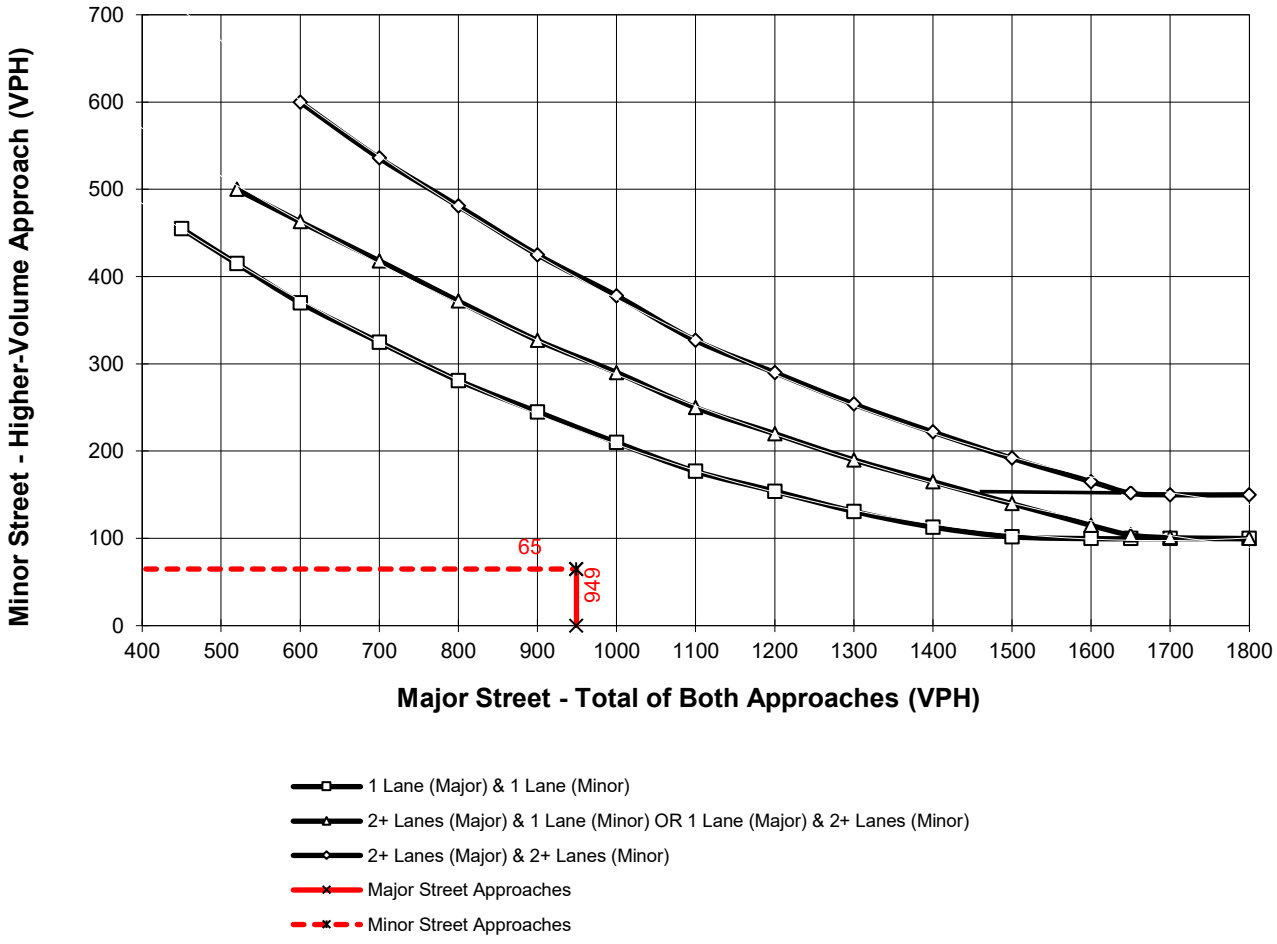
Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **Existing (2023) Conditions - Weekday PM Peak Hour**

Major Street Name = **Harriman Place**
Total of Both Approaches (VPH) = **949**
Number of Approach Lanes on Major Street = **2**

Minor Street Name = **Driveway 1**
High Volume Approach (VPH) = **65**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



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

This Page Intentionally Left Blank

APPENDIX 4.1: CUMULATIVE DEVELOPMEN PROJECT TRIP GENERATION SUMMARY

This Page Intentionally Left Blank

Table 4.1-1

Trip Generation Rates

Land Use	Quantity	Units	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
#1 Gateway South 9	397.4	TSF							
Passenger Cars			21	3	24	9	27	36	469
Trucks (PCE)			311	11	322	8	3	11	239
#2 Feree Street Residential	96	DU	18	54	72	60	35	95	906
#3 Dutch Bros	0.950	TSF	5	3	8	2	1	3	56
#4 Hardt Business Park	106.110	TSF	122	21	143	34	95	129	1,320
#5 FF & Car Wash	3.000	TSF	52	51	103	62	61	123	1,952
	1	TUN							

This Page Intentionally Left Blank

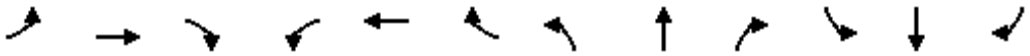
APPENDIX 5.1: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	2	7	19	100	38	33	47	142	153	42	123
Future Volume (vph)	2	7	19	100	38	33	47	142	153	42	123
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases		4		8	8		5	2	8	1	6
Permitted Phases	4		4			8			2		
Detector Phase	4	4	4	8	8	8	5	2	8	1	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.6	35.6	9.6	23.6
Total Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	10.0	23.8	35.6	10.0	23.8
Total Split (%)	33.9%	33.9%	33.9%	33.9%	33.9%	33.9%	9.5%	22.7%	33.9%	9.5%	22.7%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead/Lag							Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		17.3	17.3	17.3	17.3	17.3	8.0	18.7	25.8	7.9	16.2
Actuated g/C Ratio		0.36	0.36	0.36	0.36	0.36	0.17	0.39	0.54	0.16	0.34
v/c Ratio		0.03	0.03	0.12	0.12	0.05	0.17	0.11	0.18	0.15	0.12
Control Delay		21.7	0.1	20.3	20.3	0.2	33.4	21.0	2.0	33.2	21.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		21.7	0.1	20.3	20.3	0.2	33.4	21.0	2.0	33.2	21.3
LOS		C	A	C	C	A	C	C	A	C	C
Approach Delay		6.8			16.4			14.2			24.1
Approach LOS		A			B			B			C

Intersection Summary	
Cycle Length: 105	
Actuated Cycle Length: 48.2	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.18	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 36.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Hospitality Ln. & Harriman Pl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	7	19	100	38	33	47	142	153	42	123	14
Future Volume (veh/h)	2	7	19	100	38	33	47	142	153	42	123	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	7	2	72	85	13	49	149	115	44	129	10
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	12	41	46	382	401	340	94	857	722	86	792	61
Arrive On Green	0.03	0.03	0.03	0.21	0.21	0.21	0.05	0.24	0.24	0.05	0.24	0.24
Sat Flow, veh/h	411	1439	1585	1781	1870	1585	1781	3554	1583	1781	3344	257
Grp Volume(v), veh/h	9	0	2	72	85	13	49	149	115	44	68	71
Grp Sat Flow(s),veh/h/ln	1850	0	1585	1781	1870	1585	1781	1777	1583	1781	1777	1824
Q Serve(g_s), s	0.2	0.0	0.0	1.3	1.5	0.3	1.1	1.3	1.7	0.9	1.2	1.2
Cycle Q Clear(g_c), s	0.2	0.0	0.0	1.3	1.5	0.3	1.1	1.3	1.7	0.9	1.2	1.2
Prop In Lane	0.22		1.00	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	53	0	46	382	401	340	94	857	722	86	421	432
V/C Ratio(X)	0.17	0.00	0.04	0.19	0.21	0.04	0.52	0.17	0.16	0.51	0.16	0.16
Avail Cap(c_a), veh/h	1456	0	1248	1402	1472	1248	244	1732	1112	244	866	889
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	0.0	18.6	12.7	12.7	12.3	18.2	11.8	6.3	18.3	11.9	11.9
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.2	0.3	0.0	1.7	0.1	0.1	1.7	0.2	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	0.1	0.0	0.0	0.5	0.6	0.1	0.4	0.4	0.7	0.4	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.1	0.0	19.0	12.9	13.0	12.3	19.8	11.9	6.4	20.0	12.1	12.1
LnGrp LOS	C	A	B	B	B	B	B	B	A	C	B	B
Approach Vol, veh/h		11			170			313			183	
Approach Delay, s/veh		19.9			12.9			11.1			14.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	14.1		5.7	6.7	13.9		13.0				
Change Period (Y+Rc), s	4.6	4.6		4.6	4.6	4.6		4.6				
Max Green Setting (Gmax), s	5.4	19.2		31.0	5.4	19.2		31.0				
Max Q Clear Time (g_c+I1), s	2.9	3.7		2.2	3.1	3.2		3.5				
Green Ext Time (p_c), s	0.0	1.1		0.0	0.0	0.6		0.7				

Intersection Summary			
HCM 6th Ctrl Delay		12.5	
HCM 6th LOS		B	

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	164	28	2	167	4	10	0	4	2	0	2
Future Vol, veh/h	4	164	28	2	167	4	10	0	4	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	178	30	2	182	4	11	0	4	2	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	187	0	0	208	0	0	296	392	104	286	405	94
Stage 1	-	-	-	-	-	-	201	201	-	189	189	-
Stage 2	-	-	-	-	-	-	95	191	-	97	216	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1385	-	-	1360	-	-	634	542	931	644	533	944
Stage 1	-	-	-	-	-	-	782	734	-	795	743	-
Stage 2	-	-	-	-	-	-	901	741	-	899	723	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1384	-	-	1360	-	-	630	539	931	638	530	943
Mov Cap-2 Maneuver	-	-	-	-	-	-	630	539	-	638	530	-
Stage 1	-	-	-	-	-	-	780	732	-	792	742	-
Stage 2	-	-	-	-	-	-	898	740	-	892	721	-

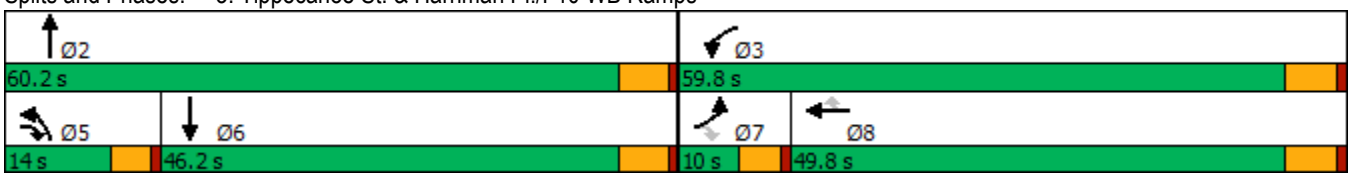
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	10.3	9.8
HCM LOS			B	A

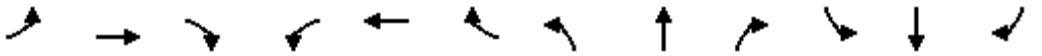
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	694	1384	-	-	1360	-	-	761
HCM Lane V/C Ratio	0.022	0.003	-	-	0.002	-	-	0.006
HCM Control Delay (s)	10.3	7.6	-	-	7.7	-	-	9.8
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	49	279	379	170	320	234	634	317	720
Future Volume (vph)	49	279	379	170	320	234	634	317	720
Turn Type	Prot	pm+ov	Prot	NA	Perm	Prot	NA	Free	NA
Protected Phases	7	5	3	8		5	2		6
Permitted Phases		7			8			Free	
Detector Phase	7	5	3	8	8	5	2		6
Switch Phase									
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	5.0	10.0		10.0
Minimum Split (s)	9.6	9.6	15.8	49.8	49.8	9.6	45.4		45.4
Total Split (s)	10.0	14.0	59.8	49.8	49.8	14.0	60.2		46.2
Total Split (%)	8.3%	11.7%	49.8%	41.5%	41.5%	11.7%	50.2%		38.5%
Yellow Time (s)	3.6	3.6	4.8	4.8	4.8	3.6	4.4		4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.6	4.6	5.8	5.8	5.8	4.6	5.4		5.4
Lead/Lag	Lead	Lead		Lag	Lag	Lead			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes
Recall Mode	None	None	None	None	None	None	Min		Min
Act Effct Green (s)	6.0	14.1	26.7	19.0	19.0	9.9	34.1	73.2	19.1
Actuated g/C Ratio	0.08	0.19	0.36	0.26	0.26	0.14	0.47	1.00	0.26
v/c Ratio	0.35	0.36	0.31	0.59	0.45	0.53	0.28	0.20	0.51
Control Delay	48.0	3.9	17.0	28.3	11.2	39.9	13.9	0.3	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.0	3.9	17.0	28.3	11.2	39.9	13.9	0.3	23.9
LOS	D	A	B	C	B	D	B	A	C
Approach Delay				18.8			15.4		23.9
Approach LOS				B			B		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 73.2	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 54.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Tippecanoe St. & Harriman Pl./I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	0	279	379	170	320	234	634	317	0	720	90
Future Volume (veh/h)	49	0	279	379	170	320	234	634	317	0	720	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1945	1870	1870	1945	1870	1870	1945	0	1870	1945
Adj Flow Rate, veh/h	51	0	156	395	177	154	244	660	0	0	750	93
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	0	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	89	0	0	676	362	318	366	2328		0	1537	187
Arrive On Green	0.05	0.00	0.00	0.19	0.19	0.19	0.11	0.46	0.00	0.00	0.26	0.26
Sat Flow, veh/h	1781	51		3563	1870	1646	3456	5106	1648	0	6117	713
Grp Volume(v), veh/h	51	30.1		395	177	154	244	660	0	0	616	227
Grp Sat Flow(s),veh/h/ln	1781	C		1781	1870	1646	1728	1702	1648	0	1609	1742
Q Serve(g_s), s	1.5			5.3	4.4	4.4	3.6	4.2	0.0	0.0	5.7	5.8
Cycle Q Clear(g_c), s	1.5			5.3	4.4	4.4	3.6	4.2	0.0	0.0	5.7	5.8
Prop In Lane	1.00			1.00		1.00	1.00		1.00	0.00		0.41
Lane Grp Cap(c), veh/h	89			676	362	318	366	2328		0	1267	457
V/C Ratio(X)	0.57			0.58	0.49	0.48	0.67	0.28		0.00	0.49	0.50
Avail Cap(c_a), veh/h	183			3659	1565	1377	618	5322		0	3745	1352
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	24.4			19.4	18.9	18.9	22.6	8.9	0.0	0.0	16.4	16.4
Incr Delay (d2), s/veh	5.7			0.8	1.0	1.1	0.8	0.1	0.0	0.0	0.3	0.8
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7			1.9	1.7	1.5	1.3	1.2	0.0	0.0	1.8	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.1			20.2	19.9	20.0	23.4	9.0	0.0	0.0	16.7	17.3
LnGrp LOS	C			C	B	C	C	A		A	B	B
Approach Vol, veh/h					726			904			843	
Approach Delay, s/veh					20.1			12.9			16.8	
Approach LOS					C			B			B	

Timer - Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		29.4	15.8		10.2	19.2	7.2	16.0				
Change Period (Y+Rc), s		5.4	5.8		4.6	5.4	4.6	5.8				
Max Green Setting (Gmax), s		54.8	54.0		9.4	40.8	5.4	44.0				
Max Q Clear Time (g_c+I1), s		6.2	7.3		5.6	7.8	3.5	6.4				
Green Ext Time (p_c), s		4.9	1.4		0.2	6.0	0.0	1.4				

Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

Notes

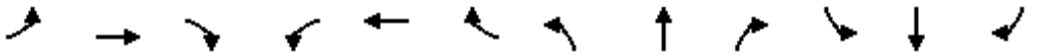
User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	11	52	65	333	13	108	45	372	431	155	254
Future Volume (vph)	11	52	65	333	13	108	45	372	431	155	254
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases		4		8	8		5	2	8	1	6
Permitted Phases	4		4			8			2		
Detector Phase	4	4	4	8	8	8	5	2	8	1	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.6	35.6	9.6	23.6
Total Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.8	35.6	10.0	24.2
Total Split (%)	33.9%	33.9%	33.9%	33.9%	33.9%	33.9%	9.1%	22.7%	33.9%	9.5%	23.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead/Lag							Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		14.3	14.3	17.8	17.8	17.8	5.5	13.9	31.7	6.0	19.9
Actuated g/C Ratio		0.21	0.21	0.26	0.26	0.26	0.08	0.21	0.47	0.09	0.30
v/c Ratio		0.56	0.16	0.40	0.40	0.22	0.32	0.52	0.46	1.02	0.26
Control Delay		47.3	2.1	26.3	26.2	6.6	44.5	30.3	2.5	118.5	25.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		47.3	2.1	26.3	26.2	6.6	44.5	30.3	2.5	118.5	25.6
LOS		D	A	C	C	A	D	C	A	F	C
Approach Delay		24.4			21.6			16.9			59.9
Approach LOS		C			C			B			E

Intersection Summary	
Cycle Length: 105	
Actuated Cycle Length: 67.4	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 28.4	Intersection LOS: C
Intersection Capacity Utilization 56.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Hospitality Ln. & Harriman Pl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	52	65	333	13	108	45	372	431	155	254	12
Future Volume (veh/h)	11	52	65	333	13	108	45	372	431	155	254	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	54	23	352	0	57	46	384	244	160	262	9
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	223	226	692	0	303	83	728	627	184	917	31
Arrive On Green	0.14	0.14	0.14	0.19	0.00	0.19	0.05	0.20	0.20	0.10	0.26	0.26
Sat Flow, veh/h	314	1541	1559	3563	0	1562	1781	3554	1558	1781	3505	120
Grp Volume(v), veh/h	65	0	23	352	0	57	46	384	244	160	132	139
Grp Sat Flow(s),veh/h/ln	1855	0	1559	1781	0	1562	1781	1777	1558	1781	1777	1848
Q Serve(g_s), s	1.6	0.0	0.7	4.6	0.0	1.6	1.3	5.0	5.8	4.6	3.1	3.1
Cycle Q Clear(g_c), s	1.6	0.0	0.7	4.6	0.0	1.6	1.3	5.0	5.8	4.6	3.1	3.1
Prop In Lane	0.17		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	269	0	226	692	0	303	83	728	627	184	465	484
V/C Ratio(X)	0.24	0.00	0.10	0.51	0.00	0.19	0.55	0.53	0.39	0.87	0.28	0.29
Avail Cap(c_a), veh/h	1102	0	927	2117	0	928	171	1308	881	184	668	694
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	19.4	18.8	0.0	17.6	24.3	18.5	11.2	23.0	15.4	15.4
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.6	0.0	0.3	2.1	0.6	0.4	31.6	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	1.8	0.0	0.6	0.6	2.0	2.6	3.4	1.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	0.0	19.6	19.4	0.0	17.9	26.5	19.1	11.6	54.7	15.7	15.7
LnGrp LOS	C	A	B	B	A	B	C	B	B	D	B	B
Approach Vol, veh/h		88			409			674			431	
Approach Delay, s/veh		20.1			19.2			16.9			30.2	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	15.3		12.2	7.0	18.3		14.7				
Change Period (Y+Rc), s	4.6	4.6		4.6	4.6	4.6		4.6				
Max Green Setting (Gmax), s	5.4	19.2		31.0	5.0	19.6		31.0				
Max Q Clear Time (g_c+I1), s	6.6	7.8		3.6	3.3	5.1		6.6				
Green Ext Time (p_c), s	0.0	2.7		0.4	0.0	1.3		1.5				

Intersection Summary			
HCM 6th Ctrl Delay		21.2	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	550	48	14	355	28	23	0	16	32	2	35
Future Vol, veh/h	22	550	48	14	355	28	23	0	16	32	2	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	611	53	16	394	31	26	0	18	36	2	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	425	0	0	664	0	0	916	1143	334	798	1154	213
Stage 1	-	-	-	-	-	-	686	686	-	442	442	-
Stage 2	-	-	-	-	-	-	230	457	-	356	712	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1131	-	-	921	-	-	227	199	662	277	196	792
Stage 1	-	-	-	-	-	-	404	446	-	564	575	-
Stage 2	-	-	-	-	-	-	752	566	-	634	434	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1131	-	-	921	-	-	208	191	661	261	189	792
Mov Cap-2 Maneuver	-	-	-	-	-	-	208	191	-	261	189	-
Stage 1	-	-	-	-	-	-	396	437	-	552	565	-
Stage 2	-	-	-	-	-	-	700	556	-	603	425	-

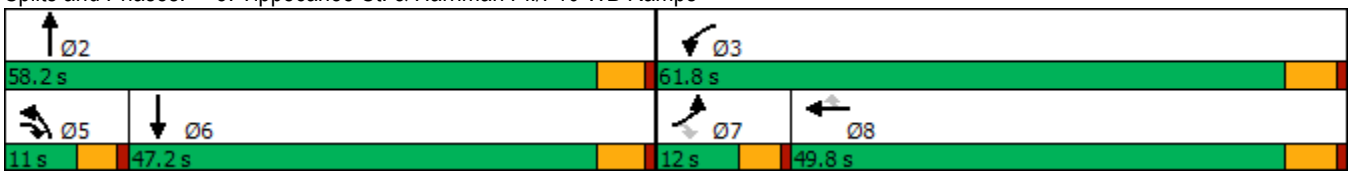
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3	19.6	16.5
HCM LOS			C	C

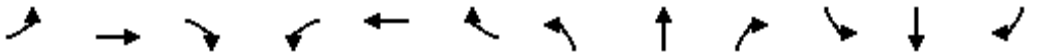
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	289	1131	-	-	921	-	-	389
HCM Lane V/C Ratio	0.15	0.022	-	-	0.017	-	-	0.197
HCM Control Delay (s)	19.6	8.3	-	-	9	-	-	16.5
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	0.7

Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	208	757	334	227	306	318	639	454	1153
Future Volume (vph)	208	757	334	227	306	318	639	454	1153
Turn Type	Prot	pm+ov	Prot	NA	Perm	Prot	NA	Free	NA
Protected Phases	7	5	3	8		5	2		6
Permitted Phases		7			8			Free	
Detector Phase	7	5	3	8	8	5	2		6
Switch Phase									
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	5.0	10.0		10.0
Minimum Split (s)	9.6	9.6	15.8	49.8	49.8	9.6	45.4		45.4
Total Split (s)	12.0	11.0	61.8	49.8	49.8	11.0	58.2		47.2
Total Split (%)	10.0%	9.2%	51.5%	41.5%	41.5%	9.2%	48.5%		39.3%
Yellow Time (s)	3.6	3.6	4.8	4.8	4.8	3.6	4.4		4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.6	4.6	5.8	5.8	5.8	4.6	5.4		5.4
Lead/Lag	Lead	Lead		Lag	Lag	Lead			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes
Recall Mode	None	None	None	None	None	None	Min		Min
Act Effct Green (s)	7.7	14.3	34.7	22.2	22.2	6.6	41.9	88.2	30.4
Actuated g/C Ratio	0.09	0.16	0.39	0.25	0.25	0.07	0.48	1.00	0.34
v/c Ratio	1.39	0.97	0.25	0.66	0.51	1.27	0.27	0.28	0.66
Control Delay	245.1	39.5	18.7	35.9	17.5	184.2	15.4	0.4	25.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	245.1	39.5	18.7	35.9	17.5	184.2	15.4	0.4	25.8
LOS	F	D	B	D	B	F	B	A	C
Approach Delay				23.9			48.6		25.8
Approach LOS				C			D		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 88.2	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.39	
Intersection Signal Delay: 44.5	Intersection LOS: D
Intersection Capacity Utilization 80.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Tippecanoe St. & Harriman Pl./I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	208	0	757	334	227	306	318	639	454	0	1153	234
Future Volume (veh/h)	208	0	757	334	227	306	318	639	454	0	1153	234
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		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1945	1870	1870	1945	1870	1870	1945	0	1870	1945
Adj Flow Rate, veh/h	214	0	507	344	234	162	328	659	0	0	1189	208
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	0	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	178	0	0	483	318	280	299	2635		0	2037	354
Arrive On Green	0.10	0.00	0.00	0.14	0.17	0.17	0.09	0.52	0.00	0.00	0.37	0.37
Sat Flow, veh/h	1781	214		3563	1870	1648	3456	5106	1648	0	5810	964
Grp Volume(v), veh/h	214	164.3		344	234	162	328	659	0	0	1033	364
Grp Sat Flow(s),veh/h/ln	1781	F		1781	1870	1648	1728	1702	1648	0	1609	1687
Q Serve(g_s), s	7.4			6.8	8.8	6.7	6.4	5.3	0.0	0.0	12.7	12.9
Cycle Q Clear(g_c), s	7.4			6.8	8.8	6.7	6.4	5.3	0.0	0.0	12.7	12.9
Prop In Lane	1.00			1.00		1.00	1.00		1.00	0.00		0.57
Lane Grp Cap(c), veh/h	178			483	318	280	299	2635		0	1772	619
V/C Ratio(X)	1.20			0.71	0.74	0.58	1.10	0.25		0.00	0.58	0.59
Avail Cap(c_a), veh/h	178			2701	1114	982	299	3650		0	2731	954
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.2			30.5	29.1	28.2	33.7	9.9	0.0	0.0	18.8	18.9
Incr Delay (d2), s/veh	131.1			2.0	3.3	1.9	80.0	0.0	0.0	0.0	0.3	0.9
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6			2.8	3.9	2.6	5.8	1.7	0.0	0.0	4.3	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	164.3			32.5	32.4	30.1	113.7	10.0	0.0	0.0	19.1	19.7
LnGrp LOS	F			C	C	C	F	A		A	B	B
Approach Vol, veh/h					740			987			1397	
Approach Delay, s/veh					32.0			44.5			19.3	
Approach LOS					C			D			B	

Timer - Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		43.5	15.8		11.0	32.5	12.0	18.3				
Change Period (Y+Rc), s		5.4	5.8		4.6	5.4	4.6	5.8				
Max Green Setting (Gmax), s		52.8	56.0		6.4	41.8	7.4	44.0				
Max Q Clear Time (g_c+I1), s		7.3	8.8		8.4	14.9	9.4	10.8				
Green Ext Time (p_c), s		4.8	1.2		0.0	10.7	0.0	1.8				

Intersection Summary	
HCM 6th Ctrl Delay	38.8
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

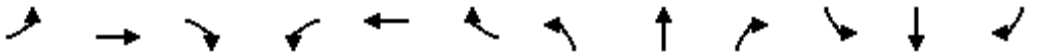
APPENDIX 5.2: OPENING YEAR CUMULATIVE (2025) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	2	7	19	110	38	33	47	142	164	42	123
Future Volume (vph)	2	7	19	110	38	33	47	142	164	42	123
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases		4		8	8		5	2	8	1	6
Permitted Phases	4		4			8			2		
Detector Phase	4	4	4	8	8	8	5	2	8	1	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.6	35.6	9.6	23.6
Total Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	10.0	23.8	35.6	10.0	23.8
Total Split (%)	33.9%	33.9%	33.9%	33.9%	33.9%	33.9%	9.5%	22.7%	33.9%	9.5%	22.7%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead/Lag							Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		17.7	17.7	17.7	17.7	17.7	8.2	19.0	26.1	8.1	16.6
Actuated g/C Ratio		0.37	0.37	0.37	0.37	0.37	0.17	0.40	0.54	0.17	0.35
v/c Ratio		0.02	0.03	0.12	0.12	0.05	0.16	0.11	0.18	0.15	0.12
Control Delay		21.7	0.1	20.4	20.3	0.2	33.3	21.0	2.0	33.2	21.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		21.7	0.1	20.4	20.3	0.2	33.3	21.0	2.0	33.2	21.3
LOS		C	A	C	C	A	C	C	A	C	C
Approach Delay		6.8			16.6			13.8			24.1
Approach LOS		A			B			B			C

Intersection Summary	
Cycle Length: 105	
Actuated Cycle Length: 48	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.18	
Intersection Signal Delay: 16.7	Intersection LOS: B
Intersection Capacity Utilization 36.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Hospitality Ln. & Harriman Pl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	7	19	110	38	33	47	142	164	42	123	14
Future Volume (veh/h)	2	7	19	110	38	33	47	142	164	42	123	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	7	2	78	93	13	49	149	127	44	129	10
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	12	41	46	389	409	347	94	857	728	86	792	61
Arrive On Green	0.03	0.03	0.03	0.22	0.22	0.22	0.05	0.24	0.24	0.05	0.24	0.24
Sat Flow, veh/h	411	1439	1585	1781	1870	1585	1781	3554	1583	1781	3344	257
Grp Volume(v), veh/h	9	0	2	78	93	13	49	149	127	44	68	71
Grp Sat Flow(s),veh/h/ln	1850	0	1585	1781	1870	1585	1781	1777	1583	1781	1777	1824
Q Serve(g_s), s	0.2	0.0	0.0	1.4	1.6	0.3	1.1	1.3	1.9	1.0	1.2	1.2
Cycle Q Clear(g_c), s	0.2	0.0	0.0	1.4	1.6	0.3	1.1	1.3	1.9	1.0	1.2	1.2
Prop In Lane	0.22		1.00	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	53	0	46	389	409	347	94	857	728	86	421	432
V/C Ratio(X)	0.17	0.00	0.04	0.20	0.23	0.04	0.52	0.17	0.17	0.51	0.16	0.16
Avail Cap(c_a), veh/h	1443	0	1237	1390	1459	1237	242	1717	1112	242	859	881
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.8	0.0	18.8	12.7	12.8	12.2	18.3	11.9	6.3	18.4	12.0	12.0
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.2	0.3	0.0	1.7	0.1	0.1	1.7	0.2	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	0.1	0.0	0.0	0.5	0.6	0.1	0.4	0.5	0.8	0.4	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	0.0	19.2	12.9	13.0	12.3	20.0	12.0	6.4	20.2	12.2	12.2
LnGrp LOS	C	A	B	B	B	B	C	B	A	C	B	B
Approach Vol, veh/h		11			184			325			183	
Approach Delay, s/veh		20.1			12.9			11.0			14.1	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	14.2		5.7	6.7	14.0		13.3				
Change Period (Y+Rc), s	4.6	4.6		4.6	4.6	4.6		4.6				
Max Green Setting (Gmax), s	5.4	19.2		31.0	5.4	19.2		31.0				
Max Q Clear Time (g_c+I1), s	3.0	3.9		2.2	3.1	3.2		3.6				
Green Ext Time (p_c), s	0.0	1.2		0.0	0.0	0.6		0.8				

Intersection Summary		
HCM 6th Ctrl Delay		12.5
HCM 6th LOS		B

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	164	28	2	167	15	10	0	4	12	0	12
Future Vol, veh/h	15	164	28	2	167	15	10	0	4	12	0	12
Conflicting Peds, #/hr	0	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	178	30	2	182	16	11	0	4	13	0	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	199	0	0	208	0	0	320	428	104	316	435	100
Stage 1	-	-	-	-	-	-	225	225	-	195	195	-
Stage 2	-	-	-	-	-	-	95	203	-	121	240	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1371	-	-	1360	-	-	609	518	931	613	513	936
Stage 1	-	-	-	-	-	-	757	716	-	788	738	-
Stage 2	-	-	-	-	-	-	901	732	-	870	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1370	-	-	1360	-	-	594	511	931	603	506	935
Mov Cap-2 Maneuver	-	-	-	-	-	-	594	511	-	603	506	-
Stage 1	-	-	-	-	-	-	748	707	-	778	737	-
Stage 2	-	-	-	-	-	-	887	731	-	856	698	-

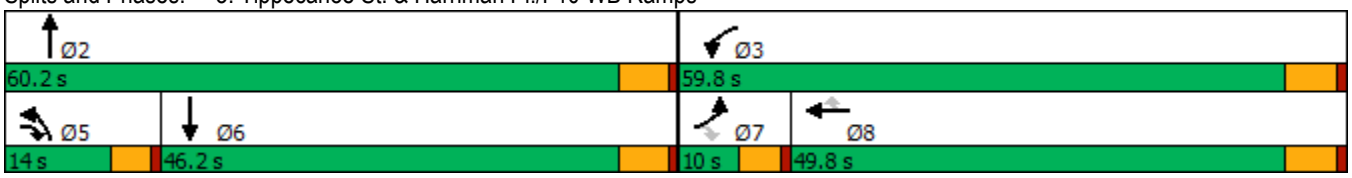
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.1	10.6	10.1
HCM LOS			B	B

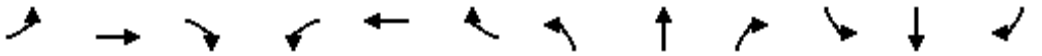
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	663	1370	-	-	1360	-	-	733
HCM Lane V/C Ratio	0.023	0.012	-	-	0.002	-	-	0.036
HCM Control Delay (s)	10.6	7.7	-	-	7.7	-	-	10.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	49	289	379	170	320	245	634	317	720
Future Volume (vph)	49	289	379	170	320	245	634	317	720
Turn Type	Prot	pm+ov	Prot	NA	Perm	Prot	NA	Free	NA
Protected Phases	7	5	3	8		5	2		6
Permitted Phases		7			8			Free	
Detector Phase	7	5	3	8	8	5	2		6
Switch Phase									
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	5.0	10.0		10.0
Minimum Split (s)	9.6	9.6	15.8	49.8	49.8	9.6	45.4		45.4
Total Split (s)	10.0	14.0	59.8	49.8	49.8	14.0	60.2		46.2
Total Split (%)	8.3%	11.7%	49.8%	41.5%	41.5%	11.7%	50.2%		38.5%
Yellow Time (s)	3.6	3.6	4.8	4.8	4.8	3.6	4.4		4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.6	4.6	5.8	5.8	5.8	4.6	5.4		5.4
Lead/Lag	Lead	Lead		Lag	Lag	Lead			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes
Recall Mode	None	None	None	None	None	None	Min		Min
Act Effct Green (s)	6.0	14.3	26.7	18.9	18.9	10.1	34.2	73.3	19.1
Actuated g/C Ratio	0.08	0.20	0.36	0.26	0.26	0.14	0.47	1.00	0.26
v/c Ratio	0.36	0.37	0.32	0.59	0.46	0.54	0.28	0.20	0.51
Control Delay	48.1	3.9	17.1	28.4	11.2	39.9	13.9	0.3	24.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.1	3.9	17.1	28.4	11.2	39.9	13.9	0.3	24.0
LOS	D	A	B	C	B	D	B	A	C
Approach Delay				18.8			15.6		24.0
Approach LOS				B			B		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 73.3	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 55.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Tippecanoe St. & Harriman Pl./I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	0	289	379	170	320	245	634	317	0	720	90
Future Volume (veh/h)	49	0	289	379	170	320	245	634	317	0	720	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1945	1870	1870	1945	1870	1870	1945	0	1870	1945
Adj Flow Rate, veh/h	51	0	166	395	177	154	255	660	0	0	750	93
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	0	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	89	0	0	672	360	317	378	2340		0	1533	187
Arrive On Green	0.05	0.00	0.00	0.19	0.19	0.19	0.11	0.46	0.00	0.00	0.26	0.26
Sat Flow, veh/h	1781	51		3563	1870	1646	3456	5106	1648	0	6117	713
Grp Volume(v), veh/h	51	30.3		395	177	154	255	660	0	0	616	227
Grp Sat Flow(s),veh/h/ln	1781	C		1781	1870	1646	1728	1702	1648	0	1609	1742
Q Serve(g_s), s	1.5			5.3	4.5	4.4	3.7	4.2	0.0	0.0	5.7	5.8
Cycle Q Clear(g_c), s	1.5			5.3	4.5	4.4	3.7	4.2	0.0	0.0	5.7	5.8
Prop In Lane	1.00			1.00		1.00	1.00		1.00	0.00		0.41
Lane Grp Cap(c), veh/h	89			672	360	317	378	2340		0	1264	456
V/C Ratio(X)	0.57			0.59	0.49	0.49	0.67	0.28		0.00	0.49	0.50
Avail Cap(c_a), veh/h	182			3642	1558	1371	615	5298		0	3727	1346
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	24.5			19.5	19.0	19.0	22.6	8.9	0.0	0.0	16.5	16.5
Incr Delay (d2), s/veh	5.7			0.8	1.0	1.2	0.8	0.1	0.0	0.0	0.3	0.8
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7			1.9	1.7	1.5	1.4	1.2	0.0	0.0	1.8	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.3			20.4	20.1	20.1	23.4	9.0	0.0	0.0	16.8	17.4
LnGrp LOS	C			C	C	C	C	A		A	B	B
Approach Vol, veh/h					726			915			843	
Approach Delay, s/veh					20.2			13.0			16.9	
Approach LOS					C			B			B	

Timer - Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		29.6	15.8		10.4	19.2	7.2	16.0				
Change Period (Y+Rc), s		5.4	5.8		4.6	5.4	4.6	5.8				
Max Green Setting (Gmax), s		54.8	54.0		9.4	40.8	5.4	44.0				
Max Q Clear Time (g_c+I1), s		6.2	7.3		5.7	7.8	3.5	6.5				
Green Ext Time (p_c), s		4.9	1.4		0.2	6.0	0.0	1.4				

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

Notes

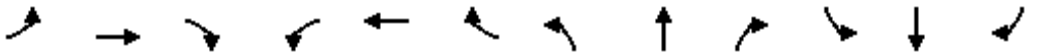
User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	11	52	65	344	13	108	45	372	442	155	254
Future Volume (vph)	11	52	65	344	13	108	45	372	442	155	254
Turn Type	Perm	NA	Perm	Split	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases		4		8	8		5	2	8	1	6
Permitted Phases	4		4			8			2		
Detector Phase	4	4	4	8	8	8	5	2	8	1	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.6	35.6	9.6	23.6
Total Split (s)	35.6	35.6	35.6	35.6	35.6	35.6	9.6	23.8	35.6	10.0	24.2
Total Split (%)	33.9%	33.9%	33.9%	33.9%	33.9%	33.9%	9.1%	22.7%	33.9%	9.5%	23.0%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead/Lag							Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)		14.3	14.3	18.2	18.2	18.2	5.5	14.0	32.2	6.0	20.0
Actuated g/C Ratio		0.21	0.21	0.27	0.27	0.27	0.08	0.21	0.47	0.09	0.29
v/c Ratio		0.55	0.16	0.41	0.40	0.22	0.32	0.53	0.46	1.03	0.26
Control Delay		47.1	2.1	26.4	26.2	6.6	44.8	30.6	2.5	121.0	25.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		47.1	2.1	26.4	26.2	6.6	44.8	30.6	2.5	121.0	25.9
LOS		D	A	C	C	A	D	C	A	F	C
Approach Delay		24.3			21.7			16.9			60.9
Approach LOS		C			C			B			E

Intersection Summary	
Cycle Length: 105	
Actuated Cycle Length: 67.8	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 28.5	Intersection LOS: C
Intersection Capacity Utilization 57.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Hospitality Ln. & Harriman Pl.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	52	65	344	13	108	45	372	442	155	254	12
Future Volume (veh/h)	11	52	65	344	13	108	45	372	442	155	254	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	54	23	364	0	57	46	384	256	160	262	9
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	45	222	225	687	0	301	83	746	633	183	932	32
Arrive On Green	0.14	0.14	0.14	0.19	0.00	0.19	0.05	0.21	0.21	0.10	0.27	0.27
Sat Flow, veh/h	314	1541	1559	3563	0	1562	1781	3554	1558	1781	3505	120
Grp Volume(v), veh/h	65	0	23	364	0	57	46	384	256	160	132	139
Grp Sat Flow(s),veh/h/ln	1855	0	1559	1781	0	1562	1781	1777	1558	1781	1777	1848
Q Serve(g_s), s	1.6	0.0	0.7	4.8	0.0	1.6	1.3	5.0	6.2	4.7	3.1	3.1
Cycle Q Clear(g_c), s	1.6	0.0	0.7	4.8	0.0	1.6	1.3	5.0	6.2	4.7	3.1	3.1
Prop In Lane	0.17		1.00	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	268	0	225	687	0	301	83	746	633	183	473	492
V/C Ratio(X)	0.24	0.00	0.10	0.53	0.00	0.19	0.55	0.52	0.40	0.87	0.28	0.28
Avail Cap(c_a), veh/h	1094	0	920	2102	0	922	170	1299	875	183	663	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	19.5	19.1	0.0	17.8	24.5	18.4	11.2	23.2	15.3	15.3
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.6	0.0	0.3	2.1	0.6	0.4	33.1	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.2	1.9	0.0	0.6	0.6	2.0	2.8	3.5	1.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	0.0	19.7	19.7	0.0	18.1	26.7	18.9	11.6	56.3	15.6	15.6
LnGrp LOS	C	A	B	B	A	B	C	B	B	E	B	B
Approach Vol, veh/h		88			421			686			431	
Approach Delay, s/veh		20.2			19.5			16.7			30.7	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	15.6		12.2	7.0	18.6		14.7				
Change Period (Y+Rc), s	4.6	4.6		4.6	4.6	4.6		4.6				
Max Green Setting (Gmax), s	5.4	19.2		31.0	5.0	19.6		31.0				
Max Q Clear Time (g_c+I1), s	6.7	8.2		3.6	3.3	5.1		6.8				
Green Ext Time (p_c), s	0.0	2.7		0.4	0.0	1.3		1.5				

Intersection Summary			
HCM 6th Ctrl Delay		21.3	
HCM 6th LOS		C	

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	33	550	48	14	355	39	23	0	16	43	2	46
Future Vol, veh/h	33	550	48	14	355	39	23	0	16	43	2	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	2	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	611	53	16	394	43	26	0	18	48	2	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	437	0	0	664	0	0	942	1181	334	830	1186	219
Stage 1	-	-	-	-	-	-	712	712	-	448	448	-
Stage 2	-	-	-	-	-	-	230	469	-	382	738	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1119	-	-	921	-	-	218	189	662	263	187	785
Stage 1	-	-	-	-	-	-	389	434	-	560	571	-
Stage 2	-	-	-	-	-	-	752	559	-	612	422	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1119	-	-	921	-	-	194	180	661	246	178	785
Mov Cap-2 Maneuver	-	-	-	-	-	-	194	180	-	246	178	-
Stage 1	-	-	-	-	-	-	376	420	-	542	561	-
Stage 2	-	-	-	-	-	-	688	549	-	575	408	-

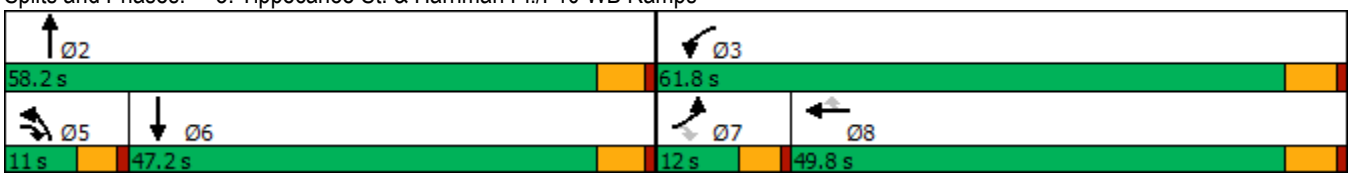
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.3	20.7	18.3
HCM LOS			C	C

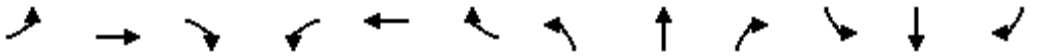
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	273	1119	-	-	921	-	-	372
HCM Lane V/C Ratio	0.159	0.033	-	-	0.017	-	-	0.272
HCM Control Delay (s)	20.7	8.3	-	-	9	-	-	18.3
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	1.1

Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Configurations									
Traffic Volume (vph)	208	768	334	227	306	329	639	454	1153
Future Volume (vph)	208	768	334	227	306	329	639	454	1153
Turn Type	Prot	pm+ov	Prot	NA	Perm	Prot	NA	Free	NA
Protected Phases	7	5	3	8		5	2		6
Permitted Phases		7			8			Free	
Detector Phase	7	5	3	8	8	5	2		6
Switch Phase									
Minimum Initial (s)	5.0	5.0	10.0	10.0	10.0	5.0	10.0		10.0
Minimum Split (s)	9.6	9.6	15.8	49.8	49.8	9.6	45.4		45.4
Total Split (s)	12.0	11.0	61.8	49.8	49.8	11.0	58.2		47.2
Total Split (%)	10.0%	9.2%	51.5%	41.5%	41.5%	9.2%	48.5%		39.3%
Yellow Time (s)	3.6	3.6	4.8	4.8	4.8	3.6	4.4		4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.6	4.6	5.8	5.8	5.8	4.6	5.4		5.4
Lead/Lag	Lead	Lead		Lag	Lag	Lead			Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes
Recall Mode	None	None	None	None	None	None	Min		Min
Act Effct Green (s)	7.7	14.3	34.7	22.2	22.2	6.6	41.9	88.2	30.4
Actuated g/C Ratio	0.09	0.16	0.39	0.25	0.25	0.07	0.48	1.00	0.34
v/c Ratio	1.39	0.99	0.25	0.66	0.51	1.31	0.27	0.28	0.66
Control Delay	245.1	43.0	18.7	35.9	17.5	200.3	15.4	0.4	25.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	245.1	43.0	18.7	35.9	17.5	200.3	15.4	0.4	25.8
LOS	F	D	B	D	B	F	B	A	C
Approach Delay				23.9			53.4		25.8
Approach LOS				C			D		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 88.2	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.39	
Intersection Signal Delay: 46.5	Intersection LOS: D
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Tippecanoe St. & Harriman Pl./I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	208	0	768	334	227	306	329	639	454	0	1153	234
Future Volume (veh/h)	208	0	768	334	227	306	329	639	454	0	1153	234
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		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	0	1945	1870	1870	1945	1870	1870	1945	0	1870	1945
Adj Flow Rate, veh/h	214	0	519	344	234	162	339	659	0	0	1189	208
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	0	2	2	2	2	2	2	2	0	2	2
Cap, veh/h	178	0	0	483	318	280	299	2635		0	2037	354
Arrive On Green	0.10	0.00	0.00	0.14	0.17	0.17	0.09	0.52	0.00	0.00	0.37	0.37
Sat Flow, veh/h	1781	214		3563	1870	1648	3456	5106	1648	0	5810	964
Grp Volume(v), veh/h	214	164.3		344	234	162	339	659	0	0	1033	364
Grp Sat Flow(s),veh/h/ln	1781	F		1781	1870	1648	1728	1702	1648	0	1609	1687
Q Serve(g_s), s	7.4			6.8	8.8	6.7	6.4	5.3	0.0	0.0	12.7	12.9
Cycle Q Clear(g_c), s	7.4			6.8	8.8	6.7	6.4	5.3	0.0	0.0	12.7	12.9
Prop In Lane	1.00			1.00		1.00	1.00		1.00	0.00		0.57
Lane Grp Cap(c), veh/h	178			483	318	280	299	2635		0	1772	619
V/C Ratio(X)	1.20			0.71	0.74	0.58	1.13	0.25		0.00	0.58	0.59
Avail Cap(c_a), veh/h	178			2701	1114	982	299	3650		0	2731	954
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	33.2			30.5	29.1	28.2	33.7	9.9	0.0	0.0	18.8	18.9
Incr Delay (d2), s/veh	131.1			2.0	3.3	1.9	92.6	0.0	0.0	0.0	0.3	0.9
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6			2.8	3.9	2.6	6.4	1.7	0.0	0.0	4.3	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	164.3			32.5	32.4	30.1	126.3	10.0	0.0	0.0	19.1	19.7
LnGrp LOS	F			C	C	C	F	A		A	B	B
Approach Vol, veh/h					740			998			1397	
Approach Delay, s/veh					32.0			49.5			19.3	
Approach LOS					C			D			B	

Timer - Assigned Phs		2	3		5	6	7	8				
Phs Duration (G+Y+Rc), s		43.5	15.8		11.0	32.5	12.0	18.3				
Change Period (Y+Rc), s		5.4	5.8		4.6	5.4	4.6	5.8				
Max Green Setting (Gmax), s		52.8	56.0		6.4	41.8	7.4	44.0				
Max Q Clear Time (g_c+I1), s		7.3	8.8		8.4	14.9	9.4	10.8				
Green Ext Time (p_c), s		4.8	1.2		0.0	10.7	0.0	1.8				

Intersection Summary	
HCM 6th Ctrl Delay	40.4
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX 5.3: OPENING YEAR CUMULATIVE (2025) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

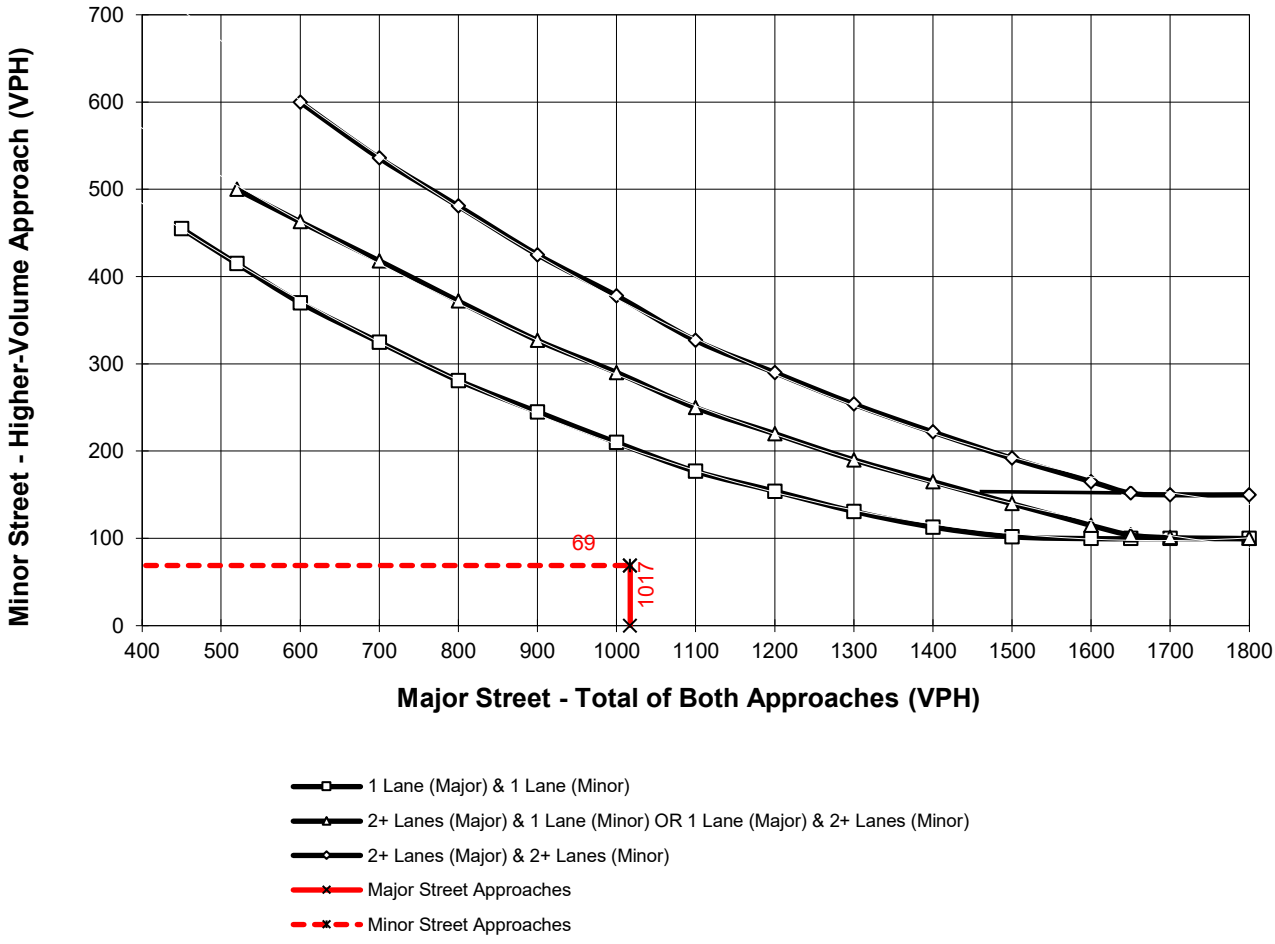
Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2025 Without Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Harriman Place**
Total of Both Approaches (VPH) = **1017**
Number of Approach Lanes on Major Street = **2**

Minor Street Name = **Driveway 1**
High Volume Approach (VPH) = **69**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



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

This Page Intentionally Left Blank

APPENDIX 5.4: OPENING YEAR CUMULATIVE (2025) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

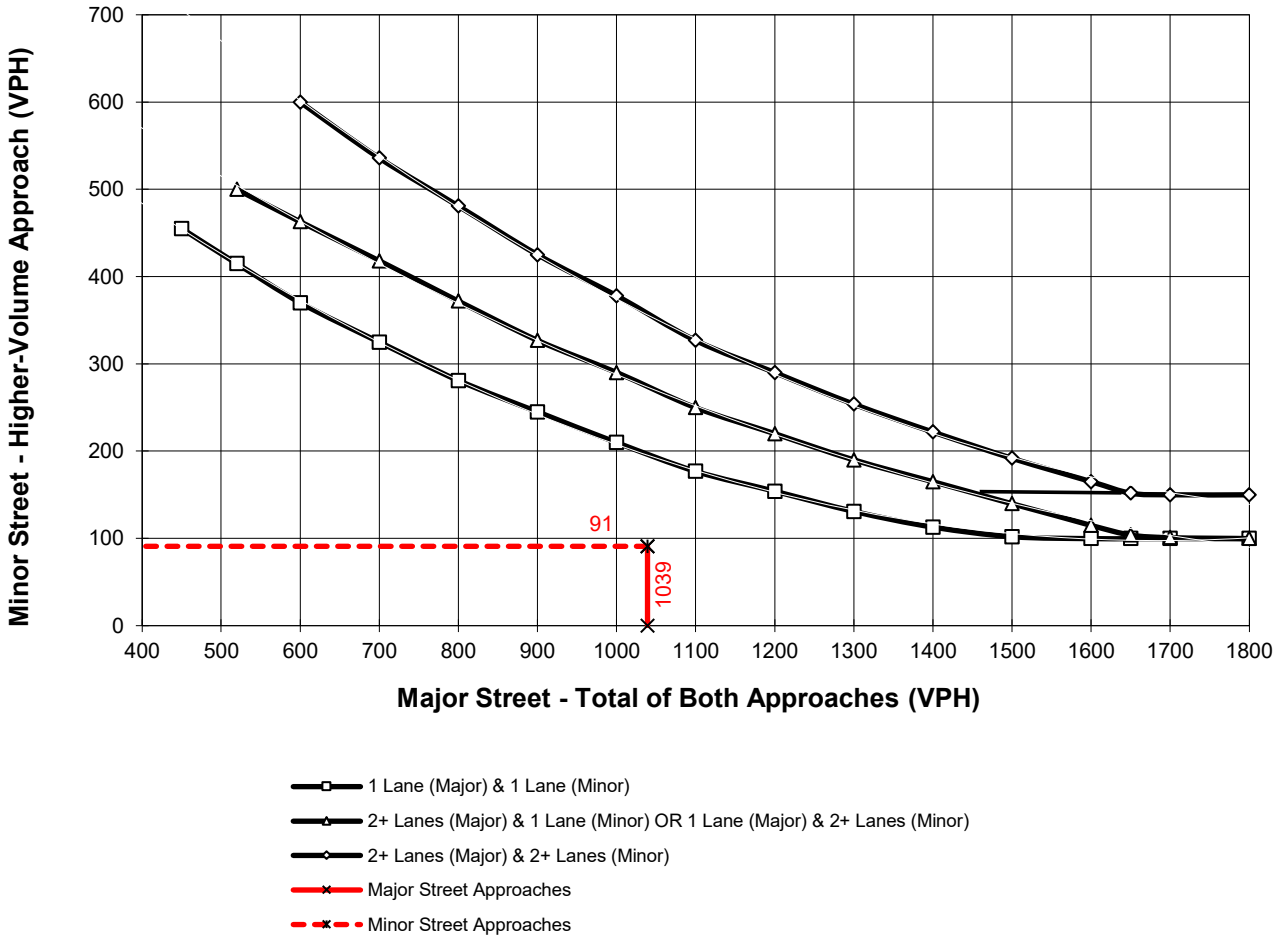
Figure 4C-3. Warrant 3, Peak Hour

Traffic Conditions = **2025 With Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Harriman Place**
Total of Both Approaches (VPH) = **1039**
Number of Approach Lanes on Major Street = **2**

Minor Street Name = **Driveway 1**
High Volume Approach (VPH) = **91**
Number of Approach Lanes On Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



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

This Page Intentionally Left Blank