Appendix 16
Traffic Impact Analysis

VANTAGEPOINT CHURCH

Project No. PLN15-1174

INITIAL STUDY

Vantage Point Church

FOCUSED TRAFFIC IMPACT ANALYSIS

CITY OF EASTVALE

REGISTERED PROFESSIONAL ENGINEER
CHARLENE HWANG SO
No. TR2414
Exp. 6/30/2017
TRAFFIC
STATE OF CALIFORNIA

PREPARED BY:

Aric Evatt, PTP
aevatt@urbanxroads.com
(949) 660-1994 x204

Charlene So, PE
cso@urbanxroads.com
(949) 660-1994 x222

Brandon Booth
bbooth@urbanxroads.com
(949) 660-1994 x234

APRIL 29, 2016

TABLE OF CONTENTS

TABLE OF CONTENTS ..... **III**
APPENDICES ..... **V**
LIST OF EXHIBITS ..... **VII**
LIST OF TABLES ..... **IX**
LIST OF ABBREVIATED TERMS ..... **XI**
1 INTRODUCTION **1**
1.1 Project Overview 1
1.2 Analysis Scenarios 1
1.3 Study Area 3
1.4 Project Impacts 5
1.5 Local and Regional Funding Mechanisms 5
1.6 On-Site Roadway and Site Access Improvements 7
1.7 Pedestrian and Bicycle Accommodations 10
2 METHODOLOGIES **11**
2.1 Level of Service 11
2.2 Intersection Capacity Analysis 11
2.3 Traffic Signal Warrant Analysis Methodology 13
2.4 Minimum Level of Service (LOS) 14
2.5 Deficiency Criteria 14
3 AREA CONDITIONS **17**
3.1 Existing Circulation Network 17
3.2 City of Eastvale General Plan Circulation Element 17
3.3 Transit Service 22
3.4 Bicycle & Pedestrian Facilities 22
3.5 Existing (2016) Traffic Counts 26
3.6 Existing (2016) Conditions Intersection Operations Analysis 26
3.7 Existing (2016) Conditions Traffic Signal Warrants Analysis 26
3.8 Recommended Improvements 26
4 PROJECTED FUTURE TRAFFIC **31**
4.1 Project Trip Generation 31
4.2 Project Trip Distribution 31
4.3 Modal Split 31
4.4 Project Trip Assignment 34
5 E+P TRAFFIC CONDITIONS **37**
5.1 Roadway Improvements 37
5.2 Traffic Volume Forecasts 37
5.3 Intersection Operations Analysis 37
5.5 Traffic Signal Warrants Analysis 37
5.6 Recommended Improvements 37
6 REFERENCES **41**

This Page Intentionally Left Blank

APPENDICES

APPENDIX 1.1: SITE ADJACENT QUEUING ANALYSIS WORKSHEETS
APPENDIX 3.1: EXISTING TRAFFIC COUNTS – APRIL 2016
APPENDIX 3.2: EXISTING (2016) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 3.3: EXISTING (2016) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 5.1: E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 5.2: E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

LIST OF EXHIBITS

EXHIBIT 1-1: PRELIMINARY SITE PLAN 2
EXHIBIT 1-2: LOCATION MAP 4
EXHIBIT 1-3: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS 8
EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS 18
EXHIBIT 3-2: CITY OF EASTVALE GENERAL PLAN CIRCULATION ELEMENT 19
EXHIBIT 3-3: CITY OF EASTVALE GENERAL PLAN ROADWAY CROSS-SECTIONS 20
EXHIBIT 3-4: EXISTING TRANSIT ROUTES 23
EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES 24
EXHIBIT 3-6: EASTVALE AREA TRAILS AND BIKEWAYS SYSTEM 25
EXHIBIT 3-7: EXISTING (2016) SUNDAY TRAFFIC VOLUMES 27
EXHIBIT 3-8: EXISTING (2016) SUMMARY OF LOS 28
EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION 33
EXHIBIT 4-2: PROJECT ONLY SUNDAY TRAFFIC VOLUMES 35
EXHIBIT 5-1: E+P SUNDAY TRAFFIC VOLUMES 38
EXHIBIT 5-2: E+P SUMMARY OF LOS 39

This Page Intentionally Left Blank

LIST OF TABLES

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS 3
TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS 11
TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS 13
TABLE 2-4: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS 14
TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2016) CONDITIONS 29
TABLE 4-1: PROJECT TRIP GENERATION SUMMARY 32
TABLE 5-1: INTERSECTION ANALYSIS FOR E+P CONDITIONS 40

This Page Intentionally Left Blank

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
DIF	Development Impact Fee
E+P	Existing Plus Project
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
PHF	Peak Hour Factor
Project	Vantage Point Church
RBBD	Road and Bridge Benefit District
RTA	Riverside Transit Authority
TIA	Traffic Impact Analysis
TUMF	Transportation Uniform Mitigation Fee
WRCOG	Western Riverside Council of Governments

This Page Intentionally Left Blank

1 INTRODUCTION

This report presents the results of the focused traffic impact analysis (TIA) for the proposed Vantage Point Church development ("Project") located at the northeast corner of Archibald Avenue and Prado Basin Park Road in the City of Eastvale as shown on Exhibit 1-1.

The purpose of this traffic impact analysis is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to achieve acceptable circulation system operational conditions.

1.1 PROJECT OVERVIEW

The Project is proposed to consist of the development of a 1,200 seat church. The Project is proposed to have access on Archibald Avenue via Driveway 1, Driveway 2, and the existing signalized intersection at Prado Basin Park Road. Prado Basin Park Road is assumed to continue to allow for full-access via the existing signalized intersection and both Driveway 1 and Driveway 2 are proposed for right-in/right-out access only. Approximately 60 percent of the membership would be from the Eastvale/Mira Loma area, with the remaining 40 percent coming from the Norco/Corona, Chino/Chino Hills, and Ontario areas. For the purposes of this analysis, it is assumed that the Project will be constructed within a single phase of development, and is anticipated to be fully built and reach maximum capacity by Year 2025.

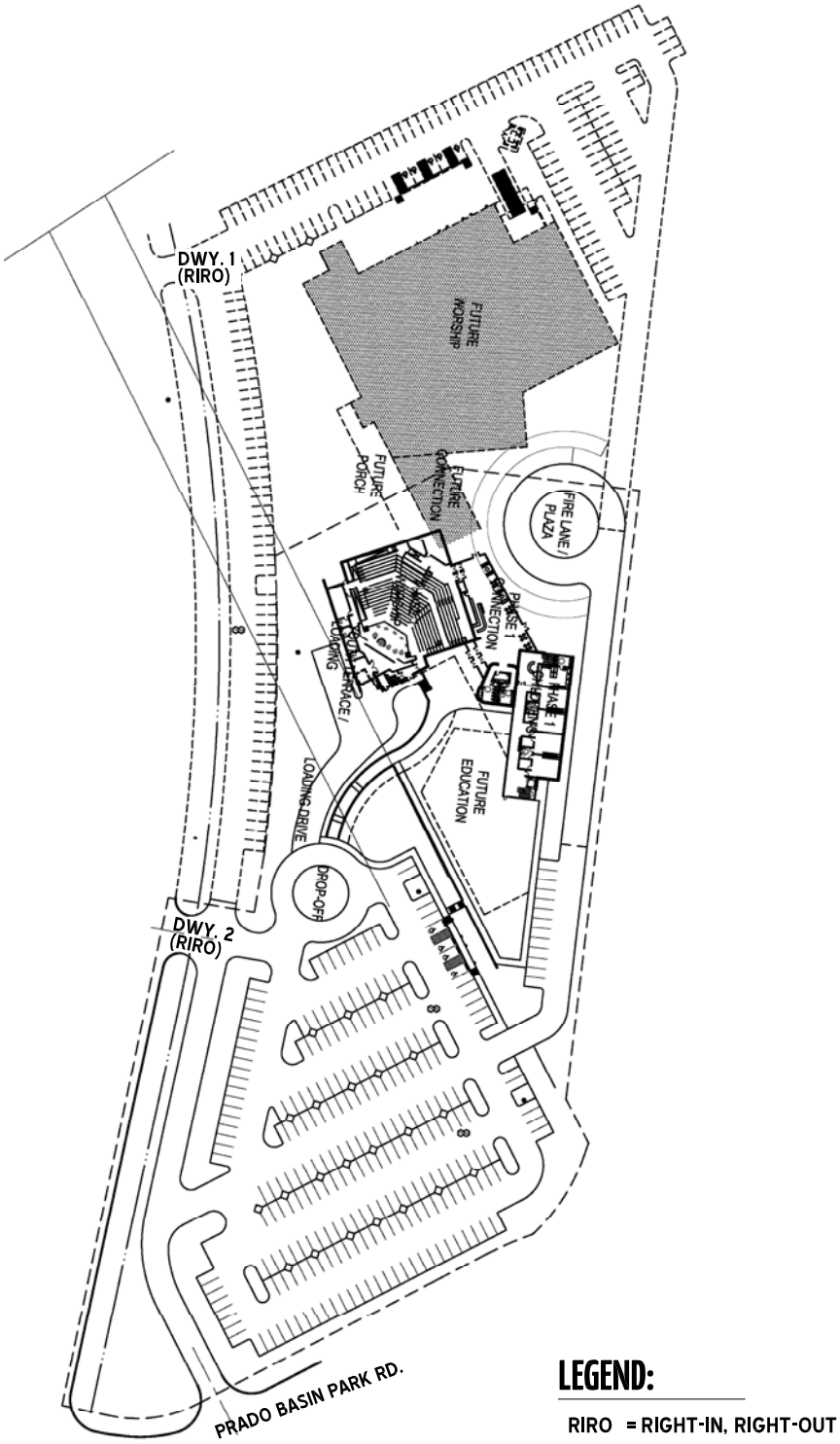
Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition, 2012. (1) The Project is estimated to generate a net total of 2,200 trip-ends per day on a typical Sunday with approximately 732 trips during the morning peak hour. 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.

1.2 ANALYSIS SCENARIOS

Based on discussions with City staff, potential impacts to traffic and circulation have been assessed for each of the following conditions during the Sunday morning peak hour for the purposes of this traffic study:

- Existing (2016) (1 scenario)
- Existing plus Project (E+P) (1 scenario)

EXHIBIT 1-1: PRELIMINARY SITE PLAN



1.2.1 EXISTING (2016) CONDITIONS

Information for Existing (2016) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.2.2 EXISTING PLUS PROJECT CONDITIONS

The Existing Plus Project (E+P) analysis determines circulation system deficiencies that would occur on the existing roadway system in the scenario of the Project being placed upon Existing conditions.

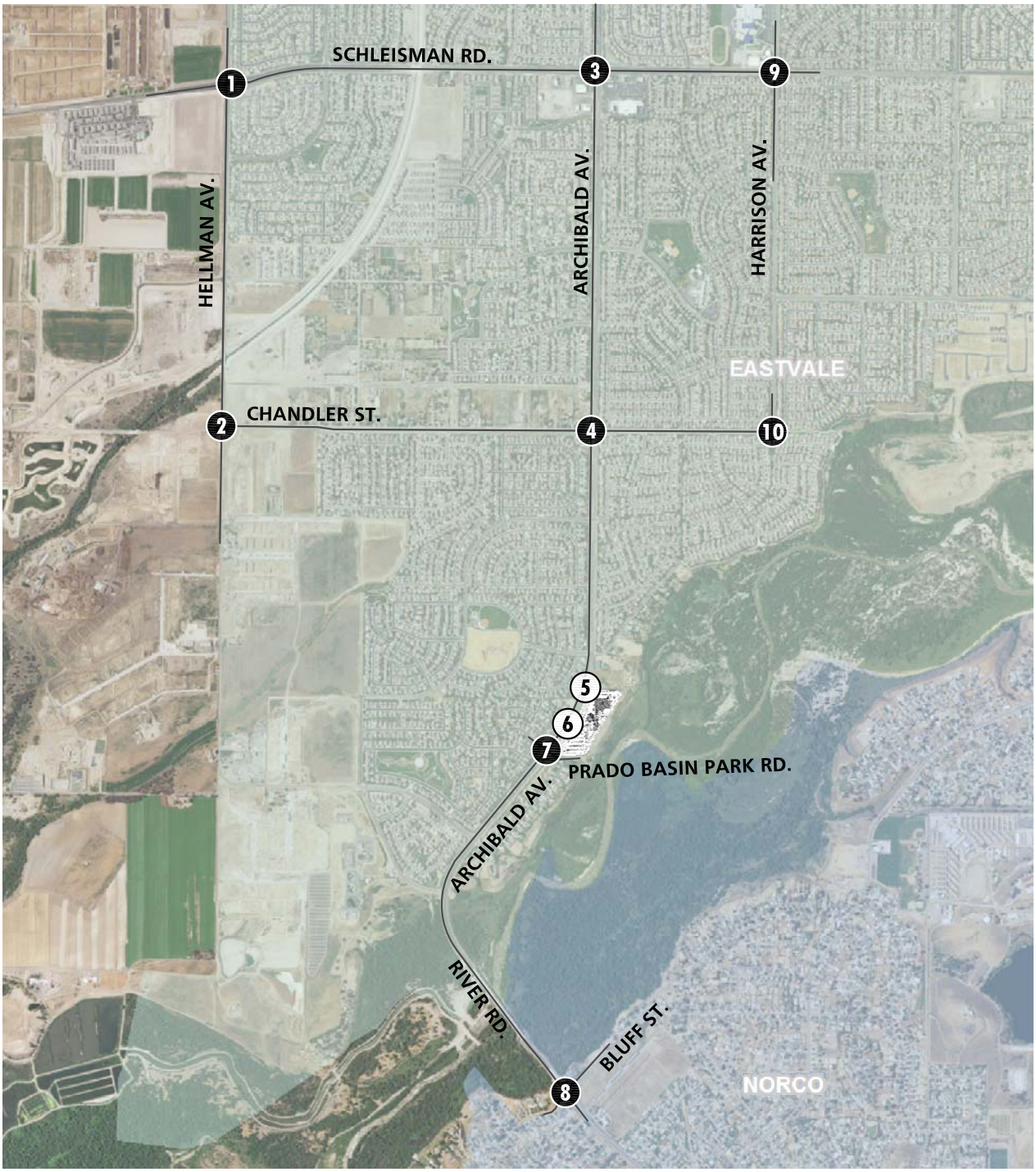
1.3 STUDY AREA

To ensure that this TIA satisfies the City of Eastvale's traffic study requirements, Urban Crossroads, Inc. coordinated with City staff prior to the preparation of this report. The following 10 study area intersections shown on Exhibit 1-2 and listed in Table 1-1 were selected for this TIA based on consultation with City of Eastvale staff.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
1	Hellman Avenue & Pine Avenue/Schleisman Road	Eastvale, Chino
2	Hellman Avenue & Chino Corona Road/Chandler Street	Eastvale, Chino
3	Archibald Avenue & Schleisman Road	Eastvale
4	Archibald Avenue & Chandler Street	Eastvale
5	Archibald Avenue & Driveway 1 – Future Intersection	Eastvale
6	Archibald Avenue & Driveway 2 – Future Intersection	Eastvale
7	Archibald Avenue & Corbin Drive/Prado Basin Park Road	Eastvale
8	River Road & Bluff Street	Norco
9	Harrison Avenue & Schleisman Road	Eastvale
10	Harrison Avenue & Chandler Street	Eastvale

EXHIBIT 1-2: LOCATION MAP



LEGEND:

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

N

1.4 PROJECT IMPACTS

There were no deficiencies under E+P conditions. As such, the Project's impact to off-site study area intersections is less than significant.

1.5 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Eastvale are funded through a combination of direct project mitigation, fair share contributions or development impact fee programs, such as the County's Transportation Uniform Mitigation Fee (TUMF) program, Mira Loma Road and Bridge Benefit District (RBBD) fee program and the City of Eastvale Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

1.5.1 CITY OF EASTVALE DEVELOPMENT IMPACT FEE PROGRAM

The Project will also be subject to City of Eastvale Development Impact Fees (DIF). The City of Eastvale has prepared a Nexus Study to establish fees which has been adopted by the City as of July 1, 2012. The DIF program consists of three separate components: Transportation Component, Fire Component and General Government Component. It is our understanding that the DIF program includes widening of the Hellman Avenue bridge over Cucamonga Creek and the signalization of up to 23 intersections. In addition, an annual inflation adjustment is considered each year in March. Fee credits and reimbursements will be available as part of the Fee Program and will only be given to projects that are identified as a Fee Program facility. The Project's Conditions of Approval will establish and clarify eligibility.

1.5.2 TRANSPORTATION UNIFORM MITIGATION FEE (TUMF) PROGRAM

The TUMF program is administered by Western Riverside Council of Governments (WRCOG) based upon a regional Nexus Study completed in early 2003 and updated in 2009 to address major changes in right of way acquisition and improvement cost factors. (2) TUMF identifies a network of backbone and local roadways that are needed to accommodate growth through 2035. This regional program was put into place to ensure that development pays its fair share and that funding is in place for construction of facilities needed to maintain the requisite level of service and critical to mobility in the region. A draft TUMF Nexus study was completed in August 2015, but has not yet been approved.

TUMF is an ambitious regional program created to address cumulative impacts of growth throughout Western Riverside County. Program guidelines are being handled on an iterative basis. Exemptions, credits, reimbursements and local administration are being deferred to primary agencies. The County of Riverside serves this function for the proposed Project. Fees submitted to the County are passed on to the WRCOG as the ultimate program administrator.

TUMF fees are imposed on new residential, industrial, and commercial development through application of the TUMF fee ordinance and fees are collected at the building or occupancy permit stage. In addition, an annual inflation adjustment is considered each year in January. In

this way, TUMF fees are adjusted upwards on a regular basis to ensure that the development impact fees collected keep pace with construction and labor costs, etc.

The Project applicant will be subject to the TUMF fee program and will pay the requisite TUMF fees at the rates then in effect pursuant to the TUMF Ordinance. WRCOG has a successful track record funding and overseeing the construction of improvements funded through the TUMF program. In total, the TUMF program is anticipated to generate nearly $5 billion in transportation projects for Western Riverside County.

1.5.3 MIRA LOMA ROAD AND BRIDGE BENEFIT DISTRICT (RBBD)

Similar to other regions within Riverside County, the City of Eastvale is anticipated to experience substantial growth. Extensive improvements are necessitated by new development within the region. In particular, Riverside County recognized the impact of this growth on the vicinity of the study area when it formed the Mira Loma RBBD. The proposed Project lies within Zone D of the Mira Loma RBBD. Zone D is generally bounded by Bellegrave Avenue to the north, Hellman Avenue to the west, Hamner Avenue to the east and the Santa Ana River to the south. As discussed above, the facilities improvements that will be ultimately constructed as a result of the collection of these fees and assessments are significant. They include:

Mira Loma Road and Bridge Benefits District (Zone D):

- Interchange improvements at I-15 Freeway at Limonite Avenue
- Overcrossing improvements to Bellegrave Avenue at the I-15 Freeway
- Widening of Archibald Avenue to six-lanes between River Road and the San Bernardino County/Riverside County line
- Landscaped median improvements to Archibald Avenue between River Road and the San Bernardino County/Riverside County line (where landscaped median improvements include curb, gutter, landscaping and irrigation)
- Widening of Limonite Avenue to six lanes between Hamner Avenue and Archibald Avenue
- Landscaped median improvements to Limonite Avenue between Hamner Avenue and Archibald Avenue (where landscaped median improvements include curb, gutter, landscaping and irrigation)
- Widening of Schleisman Road between Hamner Avenue to the San Bernardino County/Riverside County line
- Landscaped median improvements to Schleisman Road between Hamner Avenue to the San Bernardino County/Riverside County line (where landscaped median improvements include curb, gutter, landscaping and irrigation)
- Landscaped median improvements to Hamner Avenue between Bellegrave Avenue and the Santa Ana River (where landscaped median improvements include curb, gutter, landscaping and irrigation)

1.5.4 FAIR SHARE CONTRIBUTION

Project mitigation may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the City's discretion).

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Improvements included in a defined program and constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate.

1.6 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

The Project is proposed to have access on Archibald Avenue via Driveway 1, Driveway 2 and the existing signalized intersection at Prado Basin Park Road. Prado Basin Park Road is assumed to continue to allow for full-access via the existing signalized intersection and both Driveway 1 and Driveway 2 are proposed for right-in/right-out access only. Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements should be in place prior to occupancy.

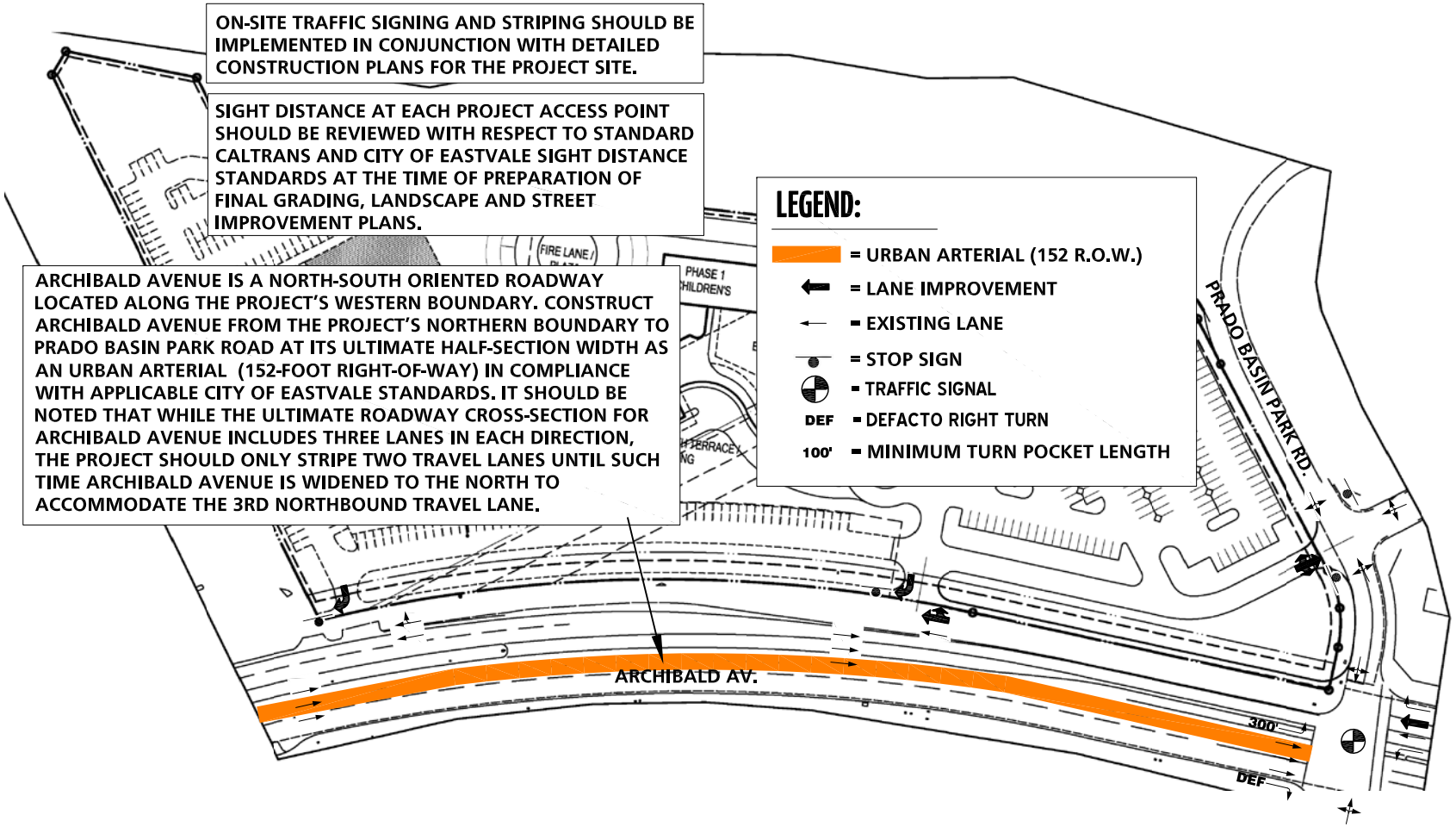
1.6.1 SITE ADJACENT ROADWAY IMPROVEMENTS

The recommended site-adjacent roadway improvements for the Project are described below. These improvements need to be incorporated into the project description prior to Project approval or imposed as conditions of approval as part of the Project approval. Exhibit 1-3 illustrates the site-adjacent roadway improvement recommendations.

Archibald Avenue – Archibald Avenue is a north-south oriented roadway located along the Project's western boundary. Construct Archibald Avenue from the Project's northern boundary to Prado Basin Park Road at its ultimate half-section width as an Urban Arterial Highway (152-foot right-of-way) in compliance with applicable City of Eastvale standards. It should be noted that while the ultimate roadway cross-section for Archibald Avenue includes three travel lanes in each direction, the Project should only stripe two travel lanes until such time Archibald Avenue is widened to the north to accommodate the 3rd northbound travel lane.

Wherever necessary, roadways adjacent to the Project, site access points and site-adjacent intersections will be constructed to be consistent with the identified roadway classifications and respective cross-sections in the City of Eastvale General Plan Circulation Element.

EXHIBIT 1-3: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS



1.6.2 SITE ACCESS IMPROVEMENTS

The recommended site access driveway improvements for the Project are described below. Exhibit 1-3 also illustrates the on-site and site adjacent recommended roadway lane improvements. Construction of on-site and site adjacent improvements are recommended to occur in conjunction with adjacent Project development activity or as needed for Project access purposes. It should be noted that the improvement shown on Exhibit 1-3 are consistent with the recommended near-term improvements.

Archibald Avenue at Driveway 1 – Install a stop control on the westbound approach and construct the intersection with the following geometrics:

Northbound Approach: One through lane and one shared through-right turn lane. Although the Project would construct the ultimate half-section, the roadway should be striped with two lanes until such time in the future when Archibald Avenue is widened to the north to accommodate the 3rd northbound travel lane.
Southbound Approach: Three through lanes.
Eastbound Approach: Not applicable (N/A)
Westbound Approach: One right turn lane.

Archibald Avenue at Driveway 2 – Install a stop control on the westbound approach and construct the intersection with the following geometrics:

Northbound Approach: One through lane and one shared through-right turn lane. Although the Project would construct the ultimate half-section, the roadway should be striped with two lanes until such time in the future when Archibald Avenue is widened to the north to accommodate the 3rd northbound travel lane.
Southbound Approach: Three through lanes.
Eastbound Approach: N/A
Westbound Approach: One right turn lane.

Archibald Avenue at Corbin Drive/Prado Basin Park Road – Maintain the existing traffic signal and construct the intersection with the following geometrics:

Northbound Approach: One left turn lane with 180-feet of storage, two through lanes, and one right turn lane.
Southbound Approach: One left turn lane with a minimum of 300-feet of storage, three through lanes, and a defacto right turn lane. The existing southbound left turn lane currently provides approximately 200-feet of storage. As such, the striping will need to be modified to accommodate an additional 100-feet of storage.
Eastbound Approach: One shared left-through-right turn lane.
Westbound Approach: One shared left-through-right turn lane.

1.6.3 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS

A queuing analysis was conducted along the site adjacent roadway of Archibald Avenue for E+P traffic conditions to determine the turn pocket lengths necessary to accommodate near term 95th percentile queues. The analysis was conducted for the Sunday peak hour.

The traffic modeling and signal timing optimization software package Synchro (Version 9 Build 904) has been utilized to assess queues at the Project access points. Synchro is a macroscopic traffic software program that is based on the signalized and unsignalized intersection capacity analyses 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 in Synchro. The level of service (LOS) and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

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 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). However, the average queue is the average of all the two-minute maximum queues observed by SimTraffic. The maximum back of queue observed for every two-minute period is recorded by SimTraffic.

SimTraffic has been utilized to assess peak hour queuing at the site access driveways for Opening Year Cumulative With Project and Long Range With Project traffic conditions. The random simulations generated by SimTraffic have been utilized to determine the 50th and 95th percentile queue lengths observed for each turn lane. A SimTraffic simulation has been recorded five (5) times, during the weekday AM and weekday PM peak hours, and has been seeded for 15-minute periods with 60-minute recording intervals.

A vehicle is considered queued whenever it is traveling at less than 10 feet/second. A vehicle will only become queued when it is either at the stop bar or behind another queued vehicle. Although only the 95th percentile queue has been utilized for purposes of determining the necessary turn pocket storage lengths, the 50th percentile queues are also reported. The 50th percentile queue is the maximum back of queue on a typical cycle during the peak hour, while the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be the queue experienced with the 95th busiest cycle (or 5% of the time).

The storage length recommendations for the turning movements at the Project are shown previously on Exhibit 1-3. The queuing results are provided in Appendix 1.1 of this report.

1.7 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

Exhibit 3-5 illustrates pedestrian and bicycle accommodations adjacent to and within the proposed Project. The Project will construct its ultimate half-section of Limonite Avenue and Archibald Avenue including curb and gutter and sidewalk improvements. Crosswalks will be provided at the two proposed stop-controlled driveways (both on Archibald Avenue).

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with City of Eastvale 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 *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

City of Eastvale, City of Chino, City of Norco

The City of Eastvale, City of Chino, and City of Norco require signalized intersection operations analysis based on the methodology described in the HCM 2010. (3) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
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	F
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	F
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	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths	80.01 and up	F	F

Source: HCM 2010, Chapter 18

Study area intersections have been analyzed using the software package Synchro (Version 9). The LOS analysis for signalized intersections has been performed using optimized signal timing for existing traffic conditions. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time for pedestrian crossings has also been considered in the signalized intersection analysis.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15 minute volumes. Common 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 Chapter 4 of the HCM 2010, 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) In an effort to conduct a conservative analysis, existing PHF have been utilized for both Existing and E+P traffic conditions.

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Eastvale, City of Chino, and City of Norco require the operations of unsignalized intersections be evaluated using the methodology described in the HCM 2010. (3) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

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

Source: HCM 2010, Chapter 19 and Chapter 20

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. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*, as amended by *the MUTCD 2012 California Supplement*, for all study area intersections. (4)

The signal warrant criteria for Existing conditions are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. Both the FHWA's *MUTCD* and the *MUTCD 2012 California Supplement* indicate that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (4) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 criteria are basically identical for both the FHWA's *MUTCD* and the *MUTCD 2012 California Supplement*. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). 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.

Future unsignalized intersections have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the California Department of Transportation (Caltrans) planning level ADT-based signal warrant analysis worksheets.

As shown on Table 2-4, a traffic signal warrant analysis was performed for the following unsignalized study area intersection:

TABLE 2-4: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
10	Harrison Avenue & Chandler Street	Eastvale

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analysis for future conditions is presented in Section 5 *E+P Traffic Analysis* 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.

2.4 MINIMUM LEVEL OF SERVICE (LOS)

The definition of an intersection deficiency has been obtained from each of the applicable surrounding jurisdictions.

2.4.1 CITY OF EASTVALE

Per Policy C-10 of the City of Eastvale General Plan, the following LOS will be utilized for study area intersections located within the City: Seek to maintain the following target levels of service: C along all City-maintained roads. A peak hour level of service of D may be allowed in commercial and employment areas, and at intersections of any combination of Major Highways, Urban Arterials, Secondary Highways, or freeway ramp intersections.

For each of the off-site study area intersections within the City of Eastvale the intersecting roadways were found to be Secondary Highway or higher on the City's General Plan Circulation Element. As such, the minimum level of service applicable to the study area intersections is LOS D. Therefore, any intersection operating at LOS E or worse will be considered deficient for the purposes of this analysis.

2.4.2 CITY OF CHINO AND CITY OF NORCO

For the study intersections located in the City of Chino and City of Norco, LOS D is also the minimum acceptable condition that should be maintained during the peak commute hours.

2.5 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies.

2.5.1 INTERSECTIONS

To determine whether the addition of project traffic at a study intersection would result in a deficiency, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (i.e., acceptable LOS), and project-generated traffic causes deterioration below LOS D (i.e., unacceptable LOS), a deficiency is deemed to occur.

This Page Intentionally Left Blank

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Eastvale General Plan Circulation Network, and a review of existing peak hour intersection operations, roadway segment capacities, freeway mainline operations, and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

The study area includes a total of 10 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF EASTVALE GENERAL PLAN CIRCULATION ELEMENT

3.2.1 CITY OF EASTVALE

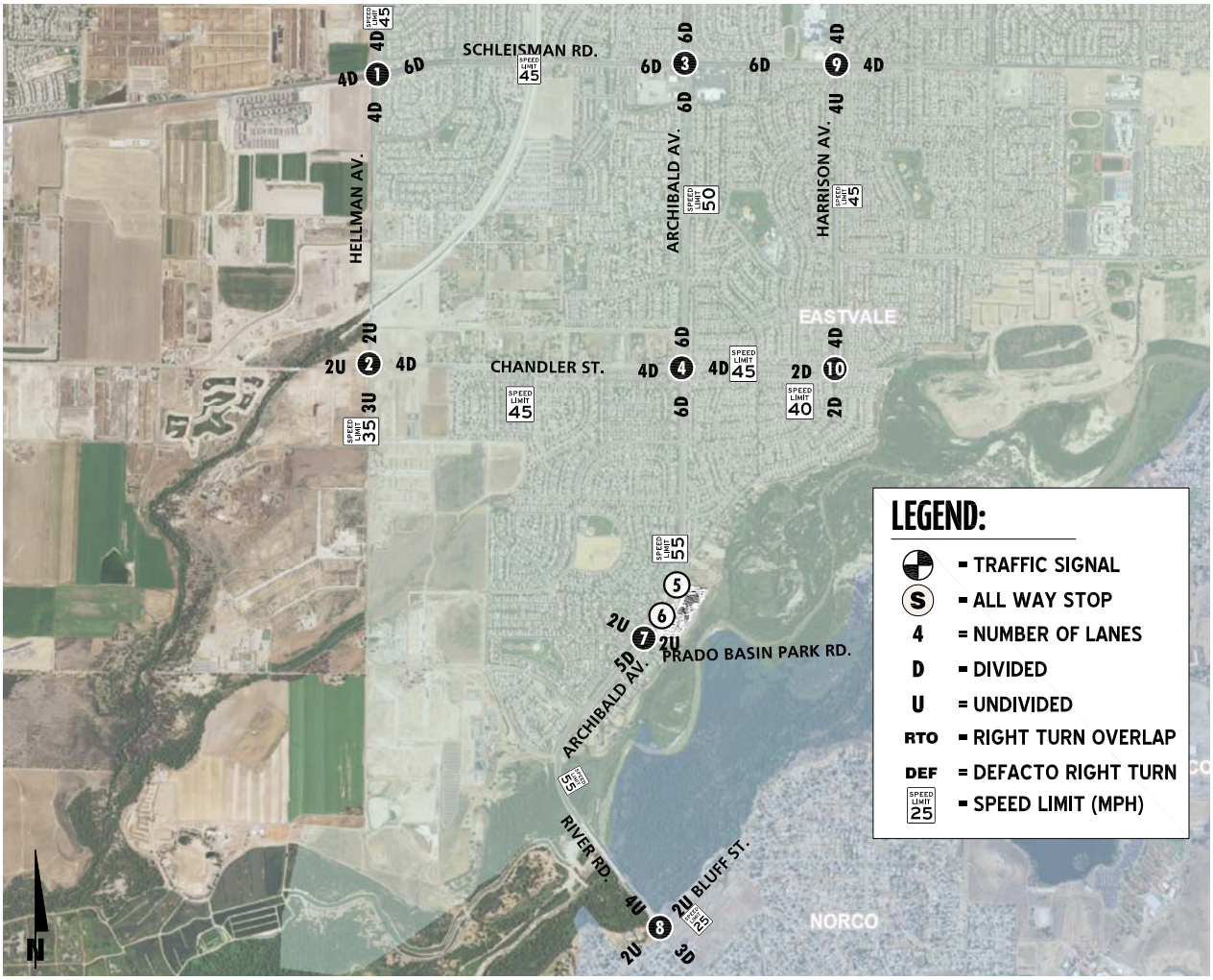
As previously noted, the Project site is located within the City of Eastvale. Exhibit 3-2 shows the City of Eastvale General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Eastvale General Plan roadway cross-sections. The City of Eastvale adopted their General Plan in June 2012.

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the City of Eastvale as identified on their General Plan Circulation Elements are described subsequently.

Urban Arterial Highways are high-speed/high-capacity roads that provide access to regional transportation facilities. Urban Arterial Highways are primarily for through traffic where anticipated traffic volumes exceed four-lane capacities and access from other streets/highways should be limited to approximately one-quarter mile intervals. The study area roadways that are classified as Urban Arterial Highways are identified as having a 152-foot right-of-way and 110-foot curb-to-curb measurement. Urban Arterials Highways include three lanes of travel in each direction and a 14-foot curbed and/or landscaped median. The following study area roadways within the City of Eastvale are classified as Urban Arterial Highways:

- Archibald Avenue
- Schleisman Road

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



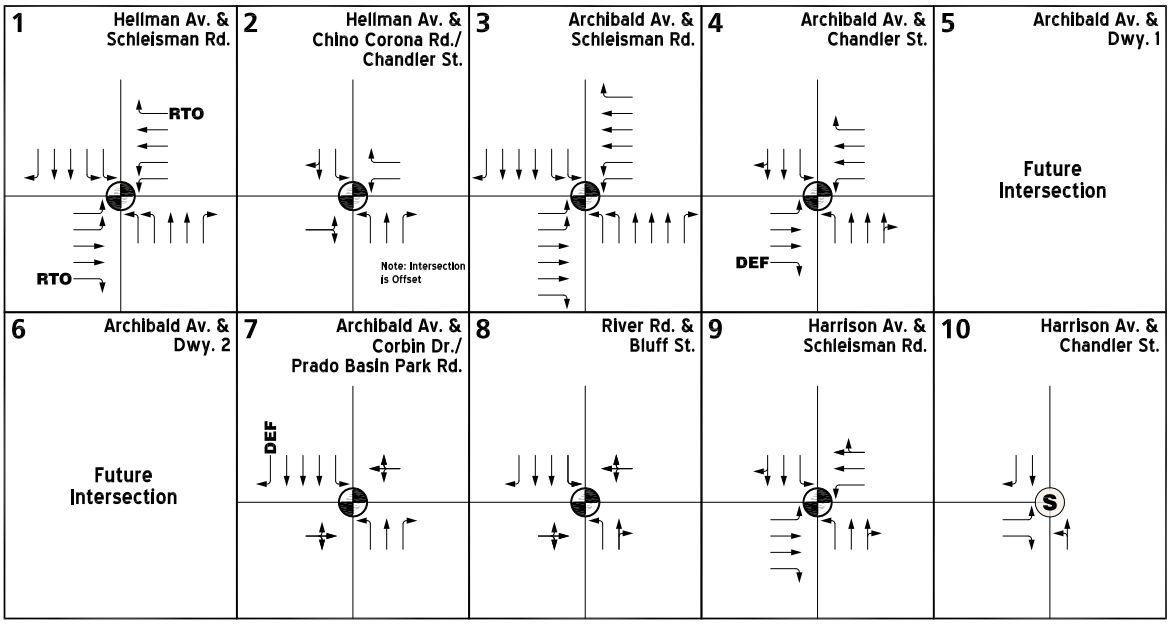
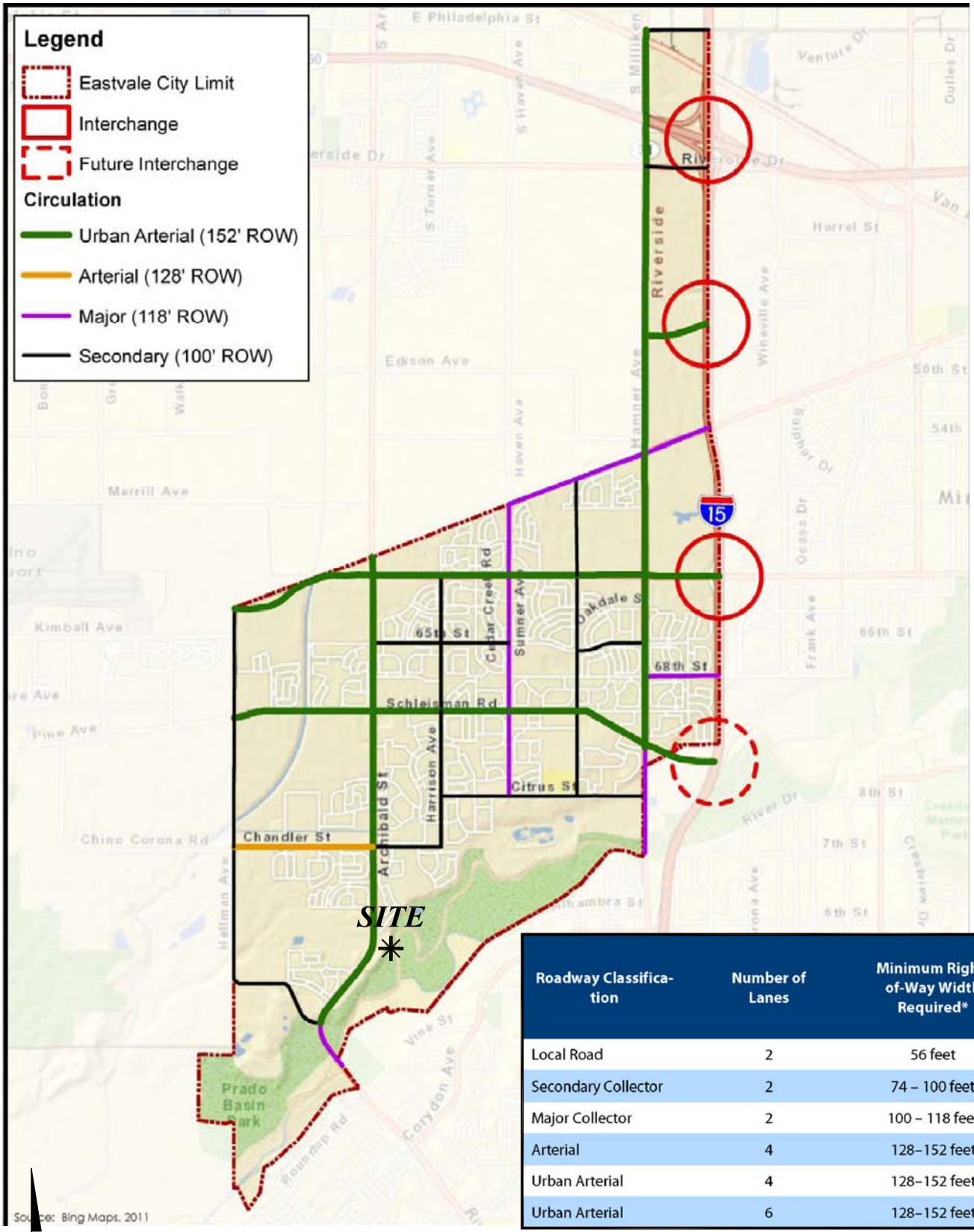


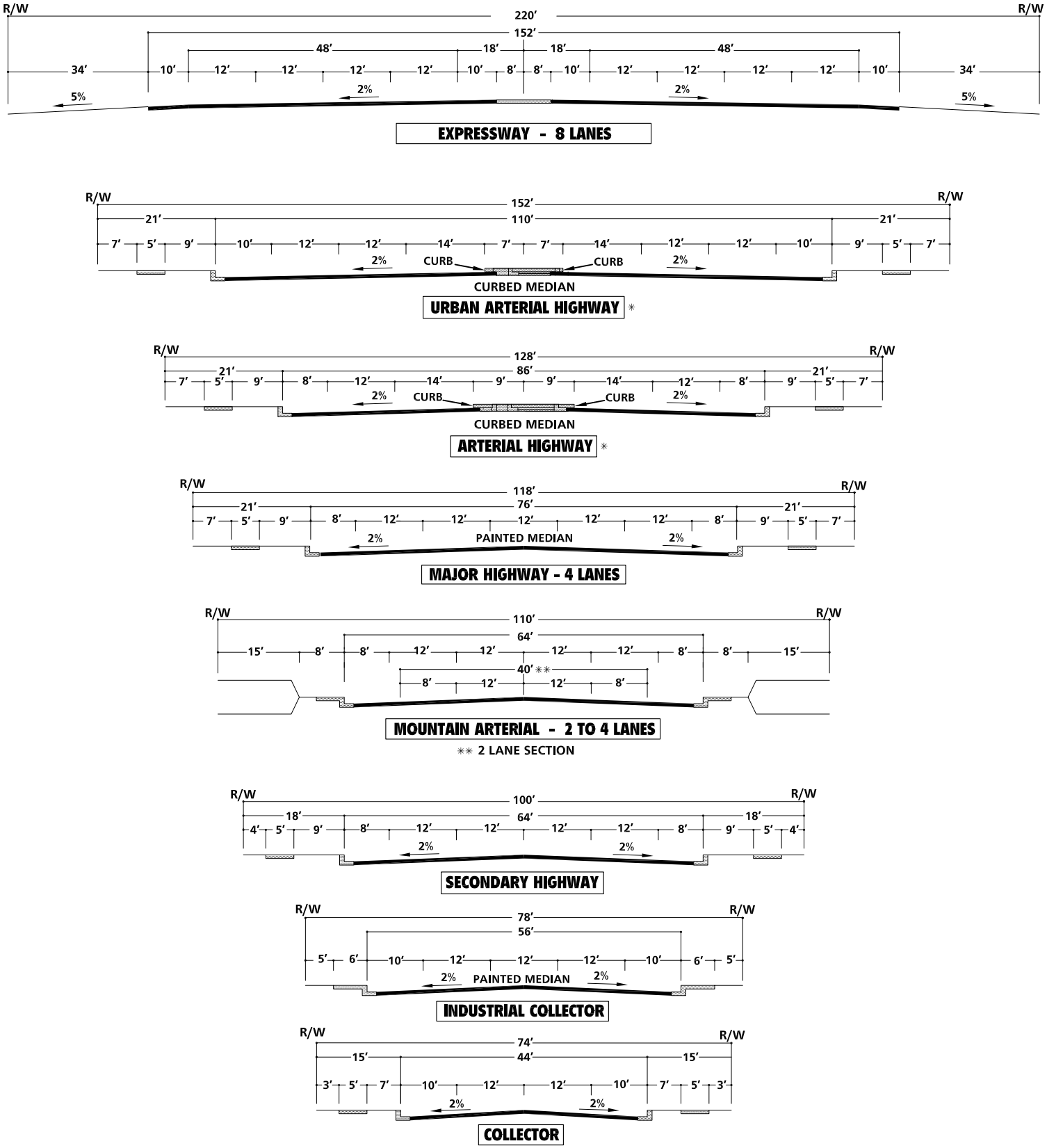
EXHIBIT 3-2: CITY OF EASTVALE GENERAL PLAN CIRCULATION ELEMENT



Roadway Classification	Number of Lanes	Minimum Right-of-Way Width Required*
Local Road	2	56 feet
Secondary Collector	2	74 – 100 feet
Major Collector	2	100 – 118 feet
Arterial	4	128–152 feet
Urban Arterial	4	128–152 feet
Urban Arterial	6	128–152 feet

SOURCE: CITY OF EASTVALE GENERAL PLAN
ADOPTED: JUNE 13, 2012

EXHIBIT 3-3: CITY OF EASTVALE GENERAL PLAN ROADWAY CROSS-SECTIONS



✳ *IMPROVEMENTS MAY BE RECONFIGURED TO ACCOMMODATE EXCLUSIVE TRANSIT LANES OR ALTERNATIVE LANE ARRANGEMENTS ADDITIONAL RIGHT OF WAY MAY BE REQUIRED AT INTERSECTIONS TO ACCOMMODATE ULTIMATE IMPROVEMENTS FOR STATE HIGHWAYS SHALL CONFORM TO CALTRANS DESIGN STANDARDS.*

NOT TO SCALE

10202 - gprcs.dwg

URBAN CROSSROADS

Arterial Highways are divided highways for through traffic to which access from abutting property shall be kept at a minimum and access from other streets/highways should be limited to approximately one-quarter mile intervals. The study area roadways that are classified as Arterial Highways are identified as having a 128-foot right-of-way and 86-foot curb-to-curb measurement. Arterial Highways include two lanes of travel in each direction and an 18-foot curbed and/or landscaped median. The following study area roadway within the City of Eastvale is classified as an Arterial Highway:

- Chandler Street, west of Archibald Avenue

Secondary Highways are intended to through traffic along longer routes between major traffic generating areas or to serve property zoned for multiple residential, secondary industrial or commercial uses. Access from other streets/highways should be limited to approximately 330-foot intervals. The study area roadways that are classified as Secondary Highways are identified as having 100-foot right-of-way and 64-foot curb-to-curb measurement. Secondary Highways include two lanes of travel in each direction. The following study area roadways within the City of Eastvale and City of Jurupa Valley are classified as Secondary Highways:

- Hellman Avenue
- Chandler, east of Archibald Avenue
- Harrison Avenue

3.2.2 CITY OF CHINO

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the City of Chino as identified on the City of Chino General Plan Circulation Element are described subsequently.

The study area roadways that are classified as Major Arterials are identified as having a 120-foot right-of-way and 100-foot curb-to-curb measurement. Major Arterials include three lanes of travel in each direction and a 14-foot curbed and/or landscaped median. The following study area roadway within the City of Chino is classified as a Major Arterial:

- Pine Avenue, between Euclid Avenue (SR-83) and Hellman Avenue

The study area roadways that are classified as Primary Arterials are identified as having a 98-foot right-of-way and 74-foot curb-to-curb measurement. Primary Arterials include two lanes of travel in each direction and a 14-foot curbed and/or landscaped median. The following study area roadway within the City of Chino is classified as a Primary Arterial:

- Hellman Avenue

The study area roadways that are classified as Urban Residential Collectors are identified as having a 60-foot right-of-way and 40-foot curb-to-curb measurement. Urban Residential Collectors include one lane of travel in each direction and allow for on-street parking. The following study area roadway within the City of Chino is classified as an Urban Residential Collector:

- Chino Corona Road

3.2.3 CITY OF NORCO

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the City of Norco as identified on the City of Norco General Plan Circulation Element are described subsequently.

Major Arterials are four-lane divided roadways (divided by a 12-foot raised median) with a 100-foot right-of-way and 80-foot curb-to-curb measurement. The following study area roadway within the City of Norco is classified as Major Arterials:

- River Road (Archibald Avenue)

Local Streets are two-lane undivided roadways with a 60-foot right-of-way and 36-foot curb-to-curb measurement, which includes a 12-foot equestrian trail. The following study area roadway within the City of Norco is classified as Local Streets:

- Bluff Street

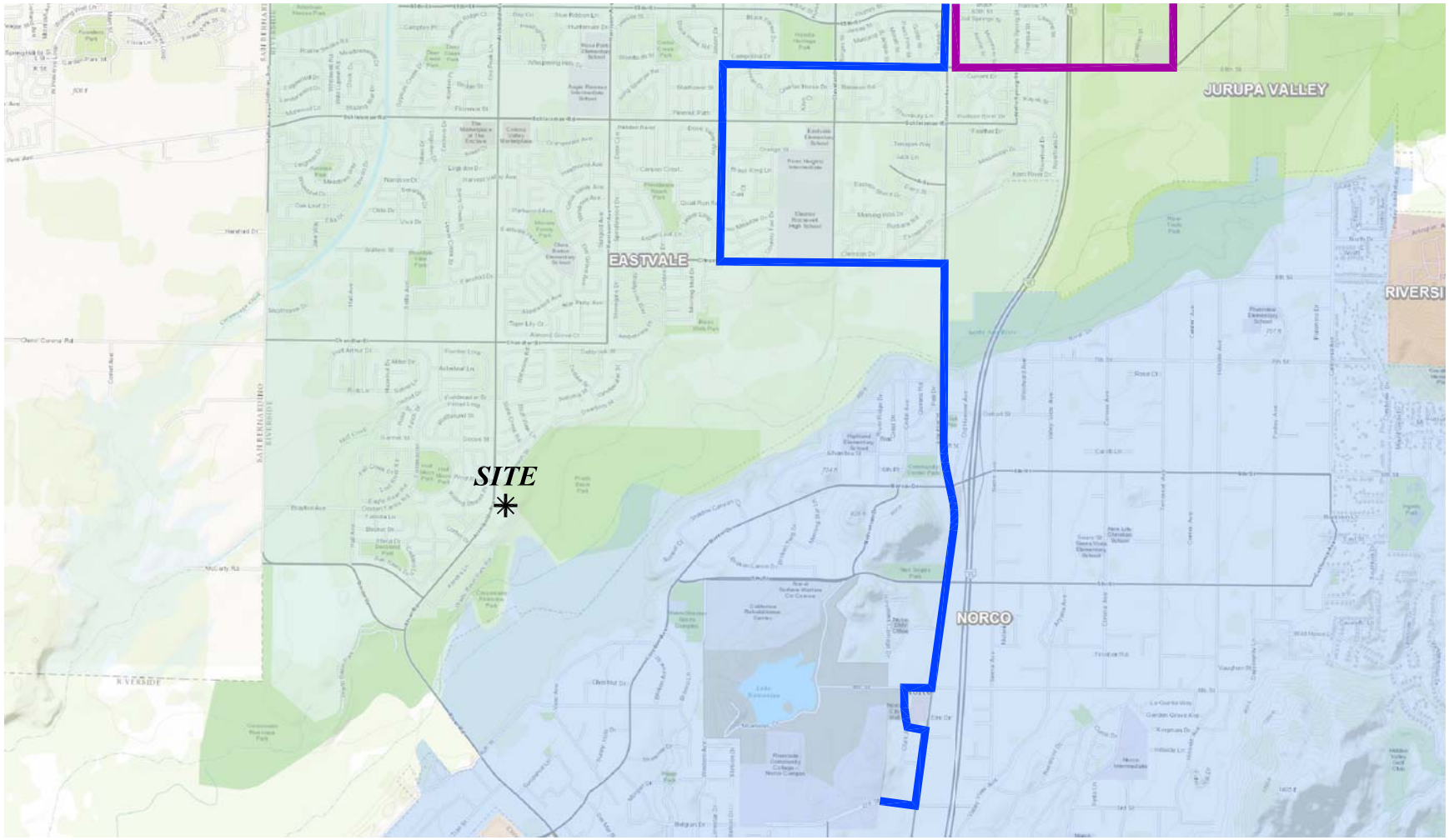
3.3 TRANSIT SERVICE

The study area is currently served by the Riverside Transit Authority (RTA), a public transit agency serving the unincorporated Riverside County region near the City of Eastvale, with bus service along Hamner Avenue, 68th Street, and Citrus Street via two existing routes. Based on a review of the existing transit routes within the vicinity of the proposed Project, there does not appear to be one existing line that could feasibly serve the Project. Transit service is reviewed and updated by RTA 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 applicant work in conjunction with RTA to potentially provide bus service to the site.

3.4 BICYCLE & PEDESTRIAN FACILITIES

Field observations conducted in April 2016 indicate nominal pedestrian and bicycle activity within the study area. Existing pedestrian facilities within the study area are shown on Exhibit 3-5. Exhibit 3-6 illustrates the Eastvale Area Trails and Bikeway System as planned by the Jurupa Community Services District. The study area currently includes Class II bikeways and also a Class I horse trail in Corona/Norco. Class II bikeways, also referred to as "bike lanes," are intended to delineate the right-of-way assigned to bicyclists and motorists, and to provide for more predictable movements of each. Bike lane signs and pavement marking help define the bikeway. A more important reason for bike lanes is to better accommodate bicyclists through corridors where insufficient room exists for safe bicycling on existing streets. Exhibit 3-6 illustrates proposed Class II bike lanes along Archibald Avenue.

EXHIBIT 3-4: EXISTING TRANSIT ROUTES



N

LEGEND:

= RTA ROUTE 3

= RTA ROUTE 29

EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES

EXHIBIT 3-6: EASTVALE AREA TRAILS AND BIKEWAYS SYSTEM

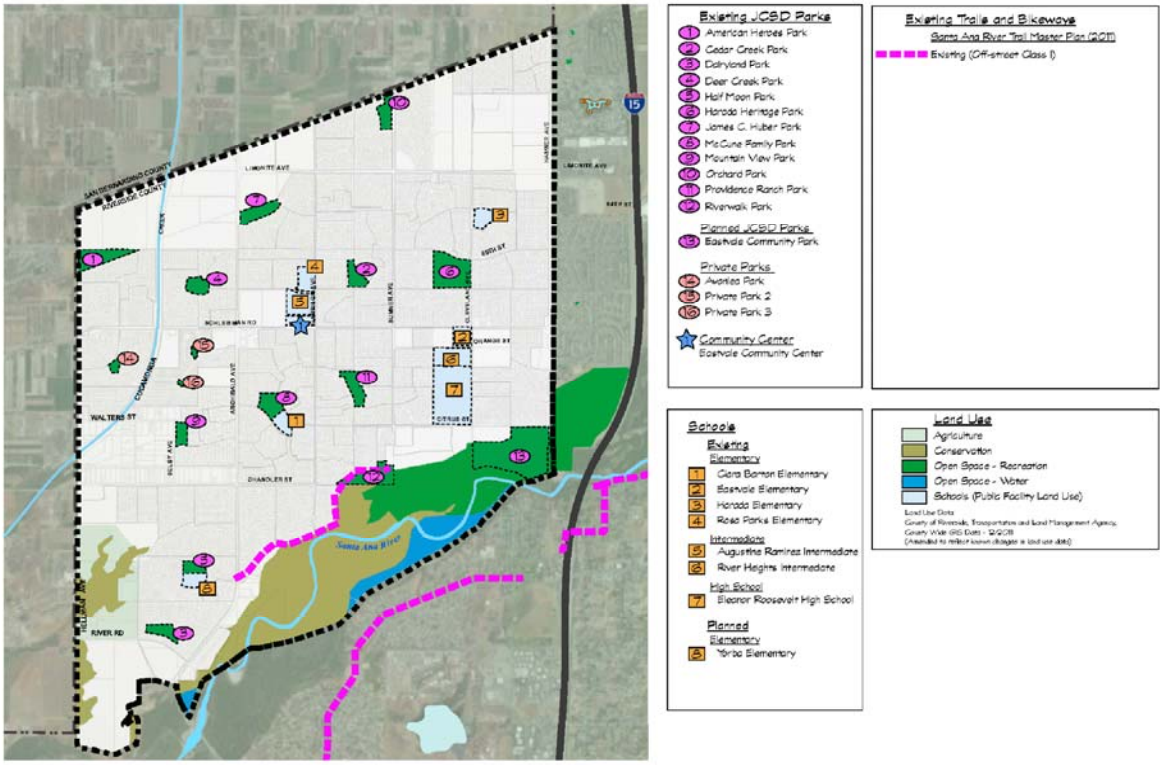


Exhibit 2.8-1 Existing Trails

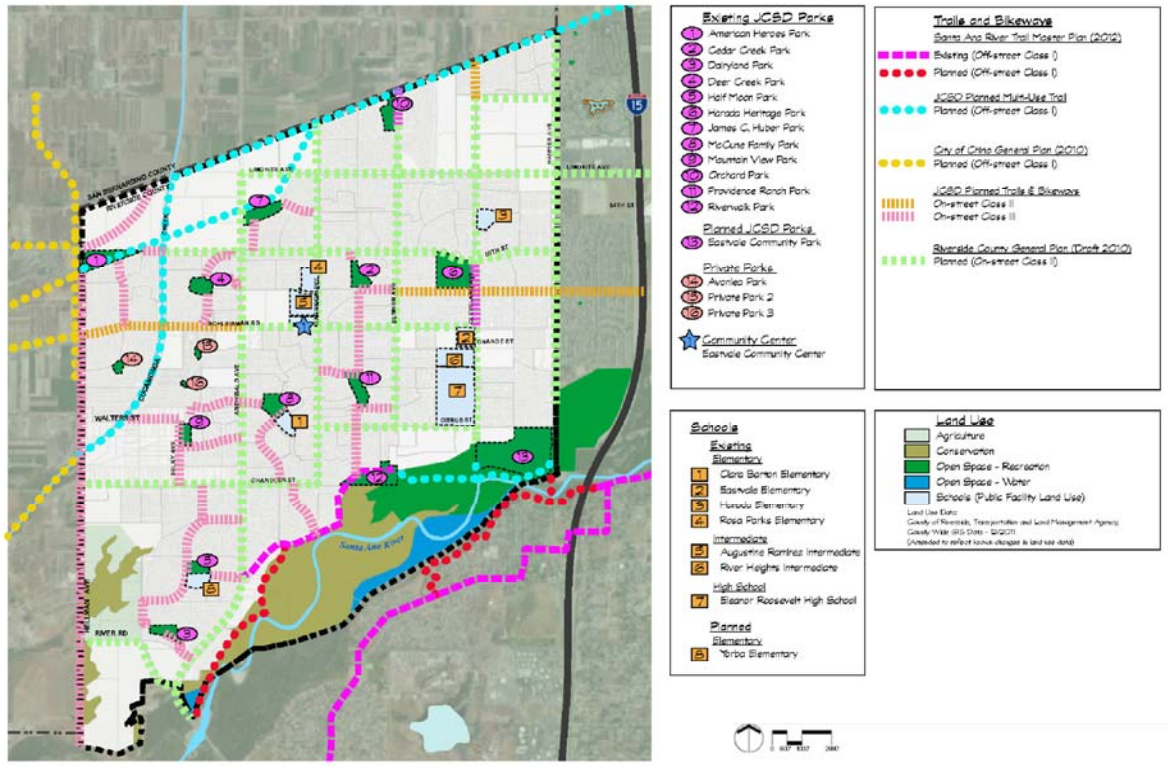


Exhibit 2.8-2 Planned Trails

3.5 EXISTING (2016) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the Sunday peak hour conditions using traffic count data collected in April 2016. Based on discussions with City staff, the following peak hour was selected and evaluated for the purposes of this analysis:

- Sunday Peak Hour (peak hour between 10:00 AM and 1:00 PM)

The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

Existing Sunday peak hour intersection volumes are shown on Exhibit 3-7.

3.6 EXISTING (2016) CONDITIONS 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 study area intersections are currently operating at acceptable LOS during the Sunday peak hour.

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-8. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

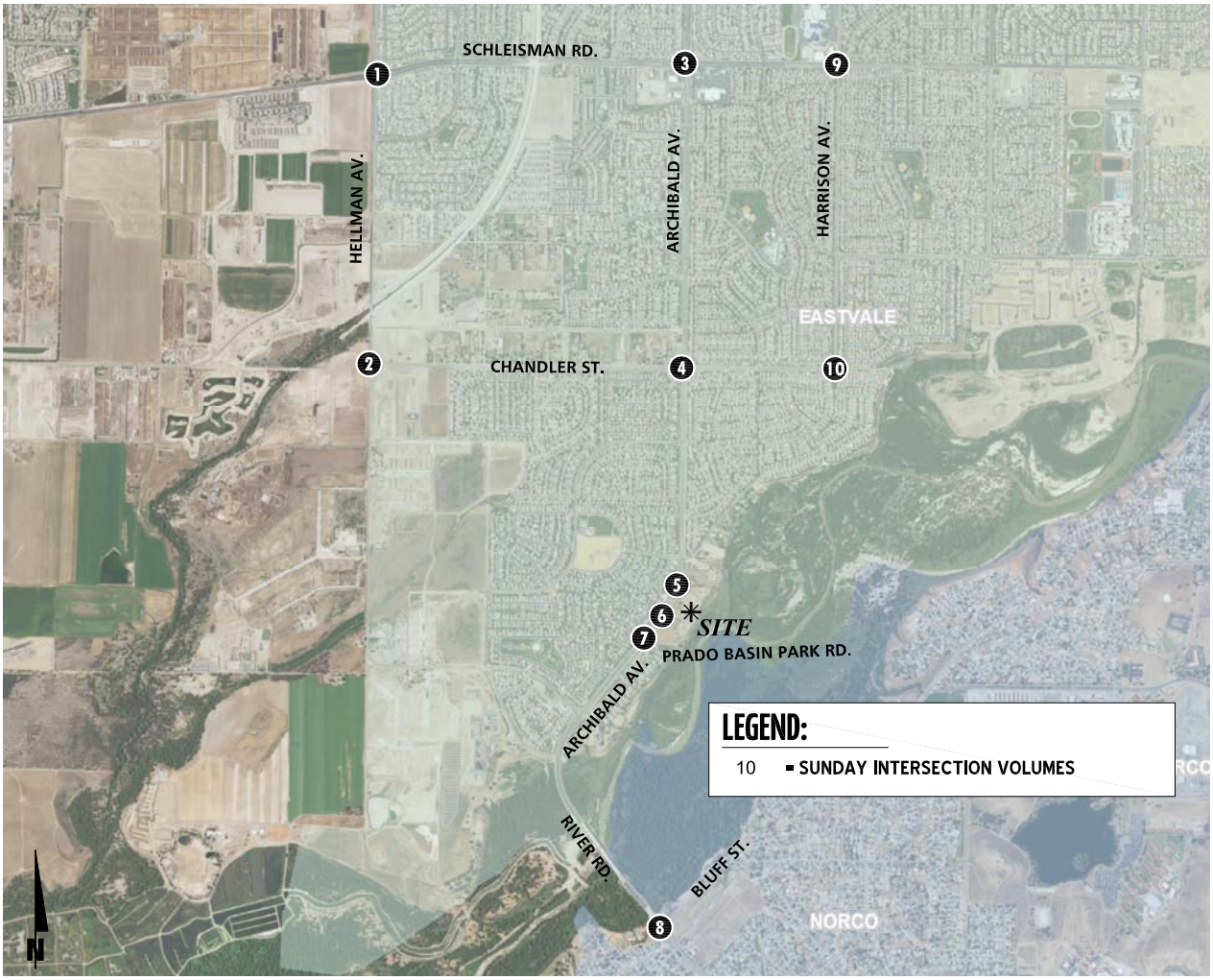
3.7 EXISTING (2016) CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. There are no study area intersections that currently warrant a traffic signal. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

3.8 RECOMMENDED IMPROVEMENTS

All study area intersections were found to operate at acceptable LOS during Existing conditions. As such, no improvements are necessary and have not been recommended.

EXHIBIT 3-7: EXISTING (2016) SUNDAY TRAFFIC VOLUMES



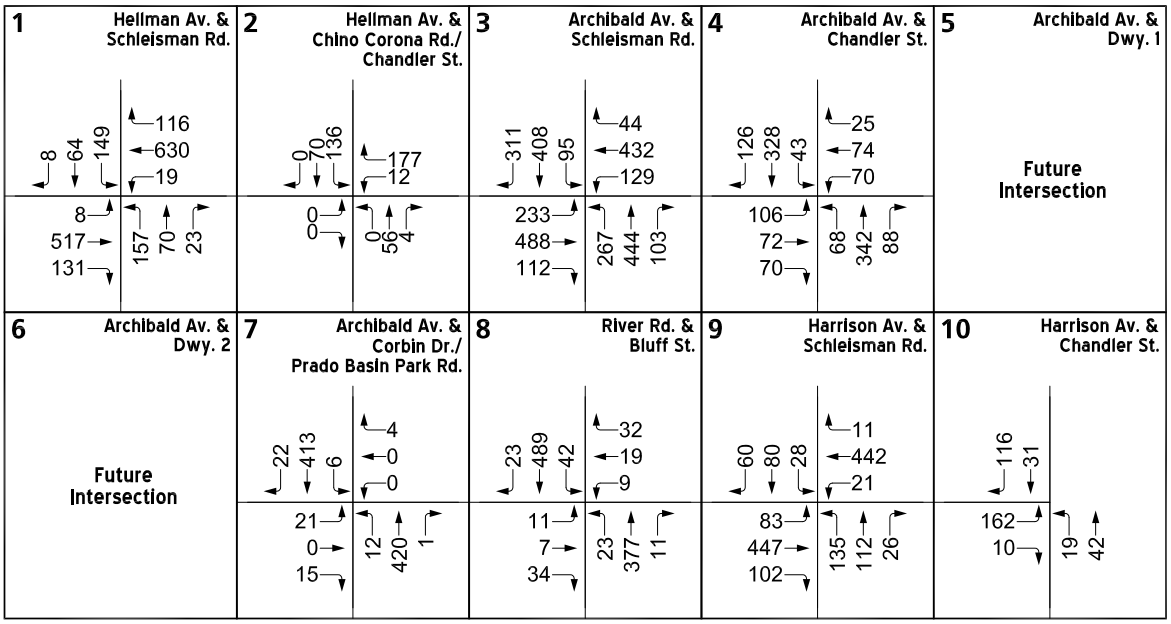


EXHIBIT 3-8: EXISTING (2016) SUMMARY OF LOS

LEGEND:

- = SUNDAY PEAK HOUR ACCEPTABLE LOS
- = SUNDAY PEAK HOUR DEFICIENT LOS
- = SUNDAY PEAK HOUR ACCEPTABLE LOS
- = SUNDAY PEAK HOUR DEFICIENT LOS
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

N

Table 3-1

Intersection Analysis for Existing (2016) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)	Level of Service
			Northbound			Southbound			Eastbound			Westbound				
			L	T	R	L	T	R	L	T	R	L	T	R	Sunday	
1	Hellman Av. & Pine Av./Schleisman Rd.	TS	2	2	1	2	2	1	2	2	1>	2	2	1>	32.5	C
2	Hellman Av. & Chandler St.	TS	1	1	1	1	1	0	0	1	0	1	0	1	28.6	C
3	Archibald Av. & Schleisman Rd.	TS	2	3	1	2	3	1	2	3	1	2	3	1	51.2	D
4	Archibald Av. & Chandler St.	TS	1	3	0	1	2	0	1	2	d	1	2	1	27.2	C
5	Archibald Av. & Driveway 1		Future Intersection													
6	Archibald Av. & Driveway 2		Future Intersection													
7	Archibald Av. & Prado Basin Park Rd.	TS	1	1	1	1	3	d	0	1	0	0	1	0	5.2	A
8	River Rd. & Bluff St.	TS	1	1	0	1	2	1	0	1	0	0	1	0	9.1	A
9	Harrison Av. & Schleisman Rd.	TS	1	2	0	1	2	0	1	2	1	1	2	0	42.8	D
10	Harrison Av. & Chandler St.	AWS	0	1	0	0	1	1	1	0	1	0	0	0	9.0	A

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; d= Defacto Right Turn Lane

[2] Per the 2010 Highway Capacity Manual, 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.

[3] TS = Traffic Signal; AWS = All Way Stop

This Page Intentionally Left Blank

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 the development of a 1,200 seat church. For the purposes of this analysis, it is assumed that the Project will be constructed within a single phase of development, and is anticipated to be fully built and reach maximum capacity by Year 2025.

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.

Trip generation rates used to estimate Project traffic are shown in Table 4-1 and a summary of the Project's trip generation is also shown in Table 4-1. The trip generation rates are based upon data collected by the ITE for Church (ITE Land Use Code 560) land use in their published Trip Generation manual, 9th Edition, 2012. (1)

Sunday peak hour and daily trip generation has also been estimated. The Project is estimated to generate a net total of 2,200 trip-ends per day on a typical Sunday with approximately 732 trips during the morning peak hour.

4.2 PROJECT TRIP DISTRIBUTION

Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. The Project trip distribution was developed based on anticipated travel patterns to and from the Project site. It is our understanding that approximately 60 percent of the membership would be from the Eastvale/Mira Loma area, with the remaining 40 percent coming from the Norco/Corona, Chino/Chino Hills, and Ontario areas.

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

Table 4-1

Project Trip Generation Summary

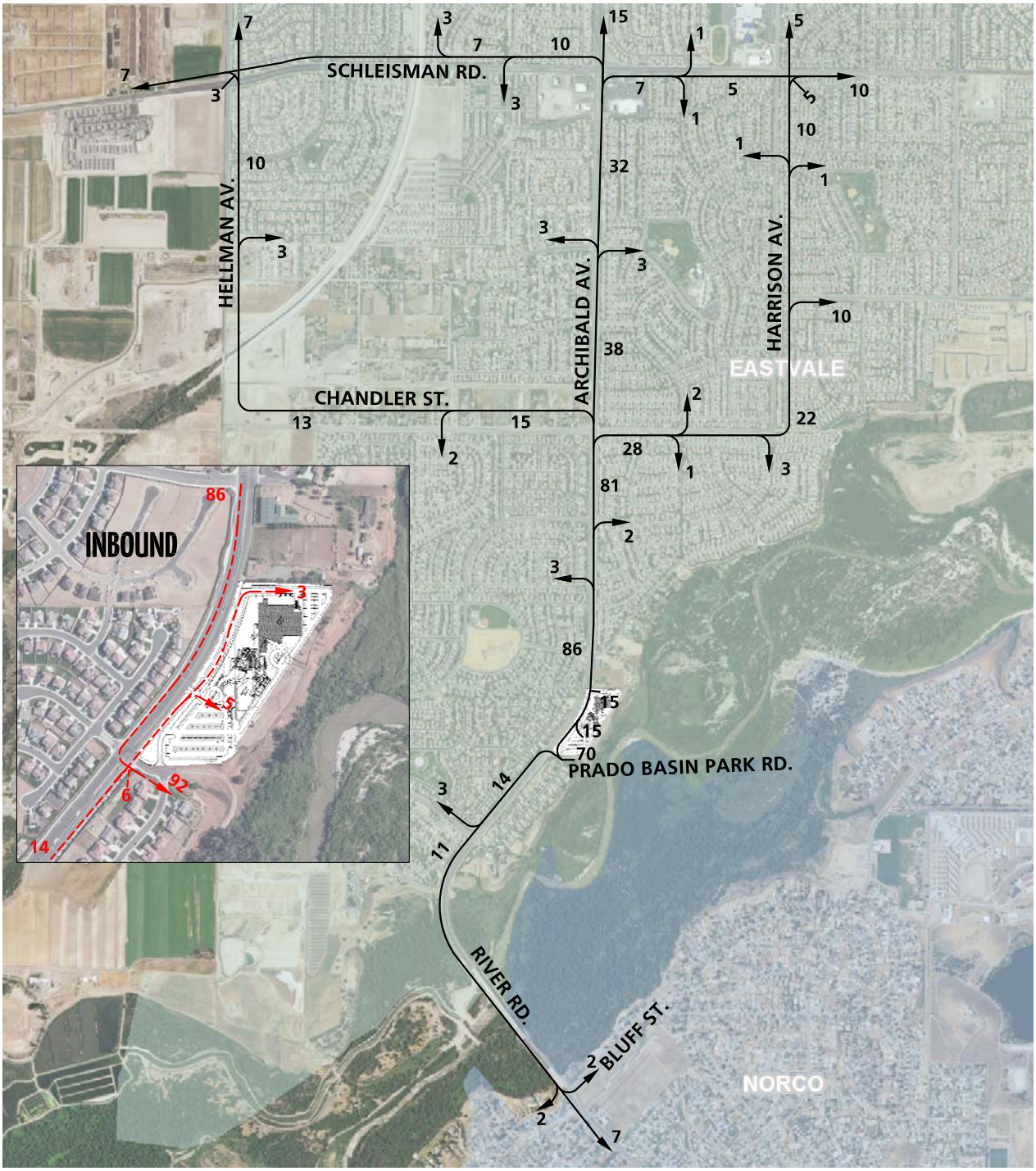
Land Use	Units[2]	ITE LU Code	Sunday Peak Hour			Sunday Daily
			In	Out	Total	
Trip Generation Rates[1]						
Church	Seats	560	0.310	0.300	0.610	1.850

Project Trip Generation Rates (Actual Vehicles)

Land Use[1]	Quantity	Units[2]	Sunday Peak Hour			Sunday Daily
			In	Out	Total	
Trip Generation Summary						
Church	1,200	Seats	372	360	732	2,220

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

EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

◄—— = OUTBOUND

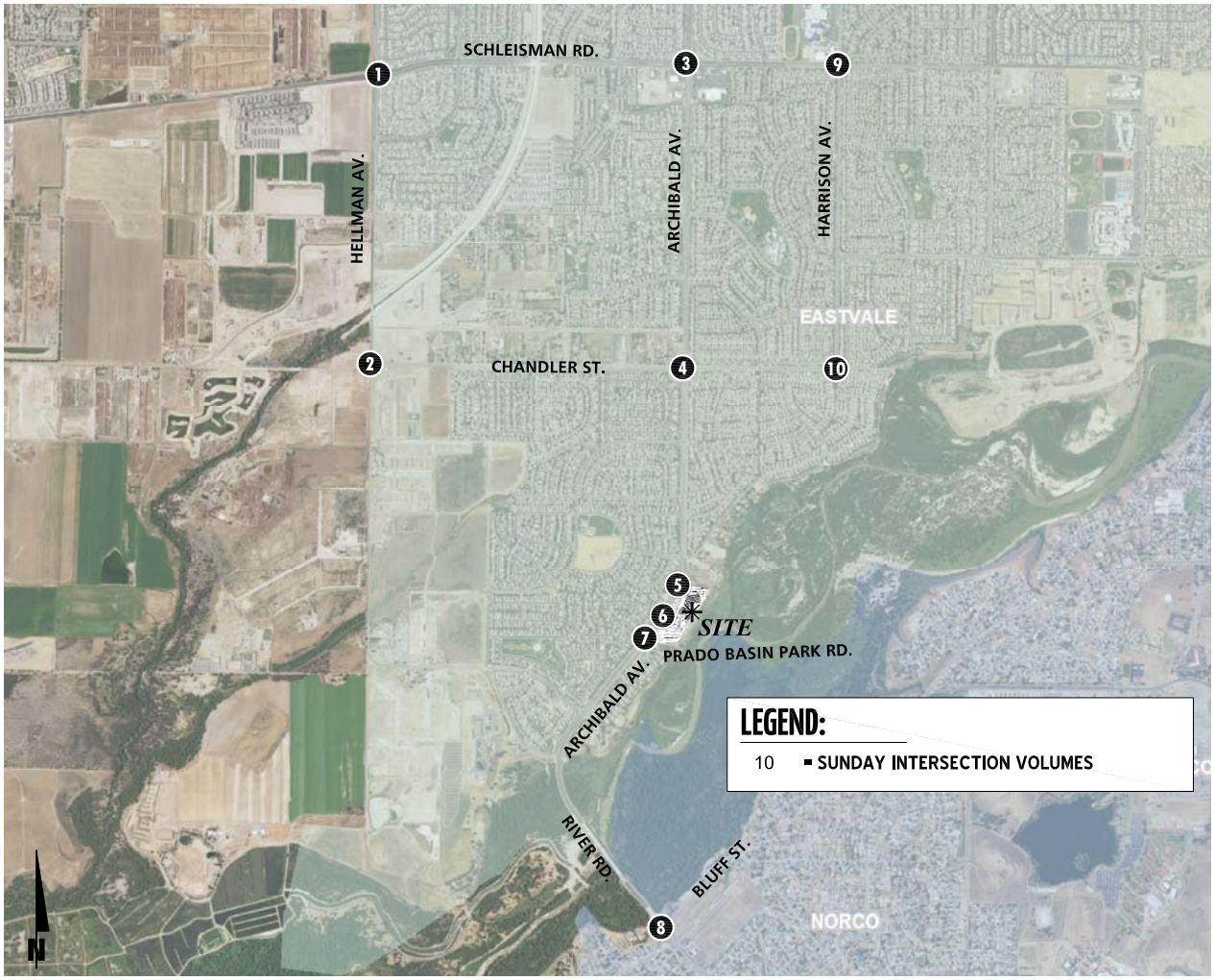
◄- - - = INBOUND

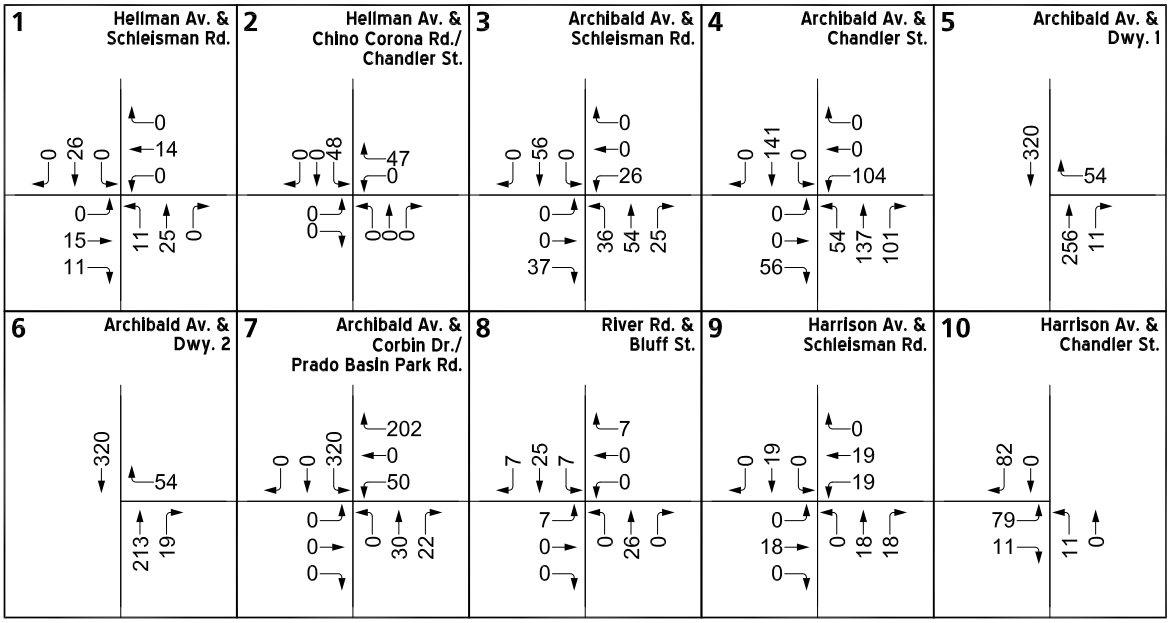
N

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 Sunday peak hour intersection turning movement volumes are shown on Exhibit 4-2.

EXHIBIT 4-2: PROJECT ONLY SUNDAY TRAFFIC VOLUMES





This Page Intentionally Left Blank

5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions 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 E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project (Buildout) traffic. Exhibit 5-1 shows the Sunday peak hour intersection turning movement volumes.

5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1, which indicates that all analysis locations will continue to operate at an acceptable LOS during the Sunday peak hour.

A summary of the peak hour intersection LOS for E+P conditions are shown on Exhibit 5-2. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TIA.

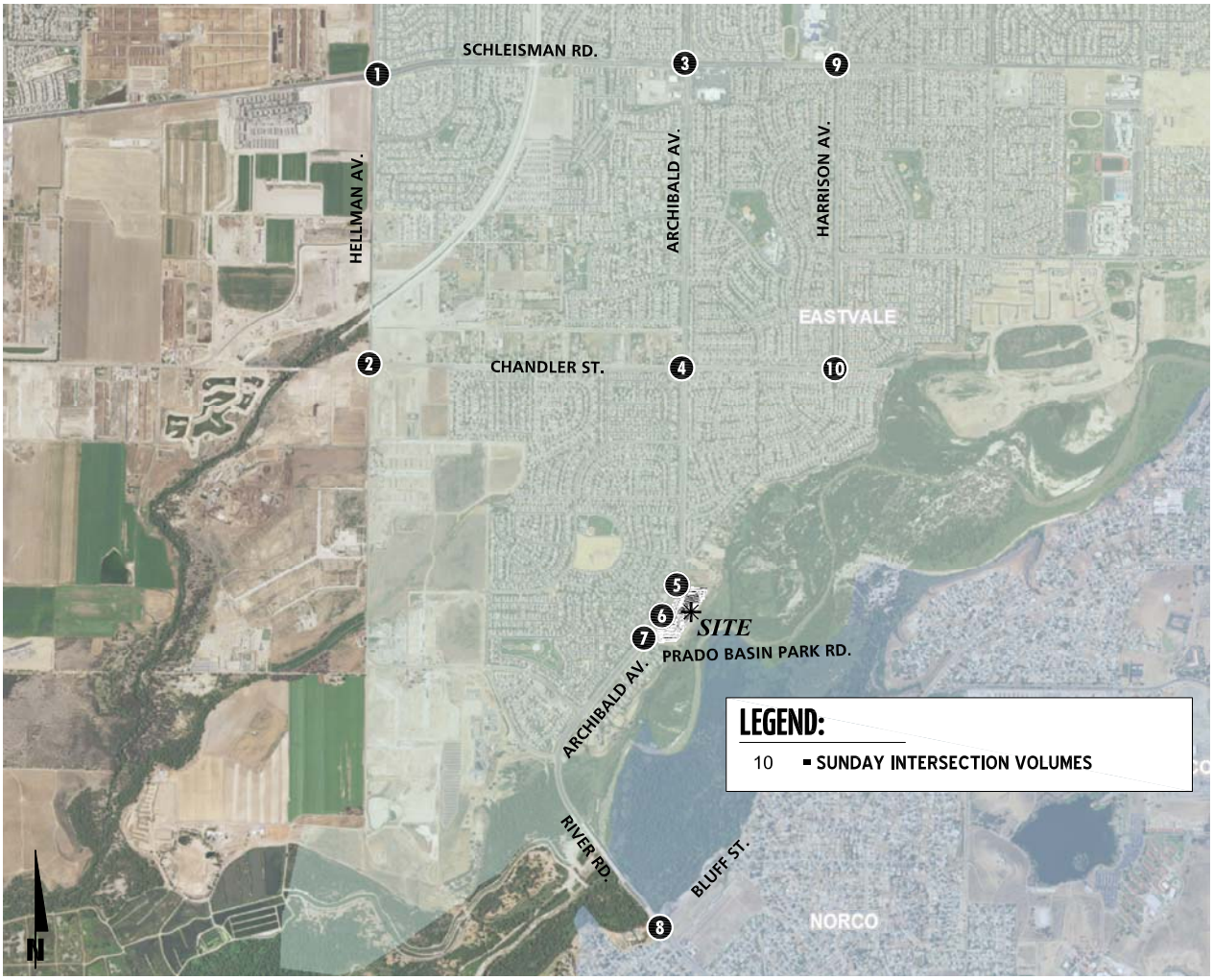
5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

For E+P conditions, no study area intersections are anticipated to warrant a traffic signal (see Appendix 5.2).

5.6 RECOMMENDED IMPROVEMENTS

All study area intersections were found to operate at an acceptable LOS during the Sunday peak hour with the addition of Project traffic. As such, improvements are not necessary and have not been recommended. The Project's impact to off-site study area intersections is less than significant.

EXHIBIT 5-1: E+P SUNDAY TRAFFIC VOLUMES



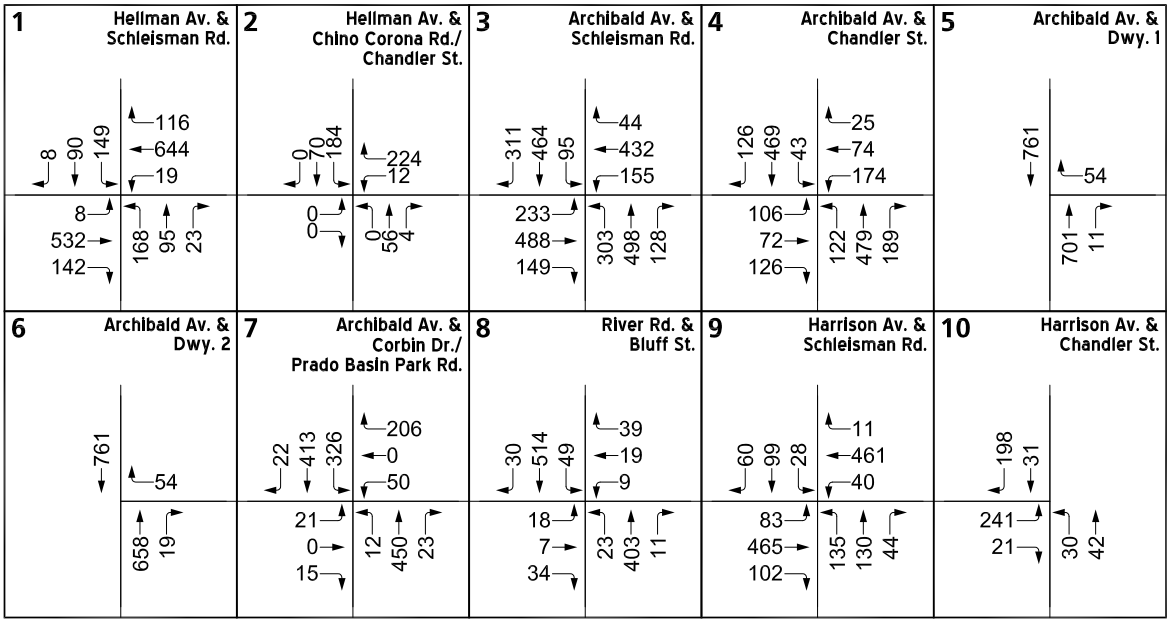


EXHIBIT 5-2: E+P SUMMARY OF LOS

LEGEND:

- = SUNDAY PEAK HOUR ACCEPTABLE LOS
- = SUNDAY PEAK HOUR DEFICIENT LOS
- = SUNDAY PEAK HOUR ACCEPTABLE LOS
- = SUNDAY PEAK HOUR DEFICIENT LOS

N

Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2016) Delay[1] (secs.)	Existing (2016) LOS[3]	E+P Delay[1] (secs.)	E+P LOS[3]
			Sunday		Sunday	
1	Hellman Av. & Pine Av./Schleisman Rd.	TS	32.5	C	32.5	C
2	Hellman Av. & Chandler St.	TS	28.6	C	39.6	D
3	Archibald Av. & Schleisman Rd.	TS	51.2	D	52.5	D
4	Archibald Av. & Chandler St.	TS	27.2	C	41.1	D
5	Archibald Av. & Driveway 1	**CSS**	Future Intersection		11.5	B
6	Archibald Av. & Driveway 2	**CSS**	Future Intersection		11.3	B
7	Archibald Av. & Prado Basin Park Rd.	TS	5.2	A	35.3	D
8	River Rd. & Bluff St.	TS	9.1	A	9.8	A
9	Harrison Av. & Schleisman Rd.	TS	42.8	D	42.8	D
10	Harrison Av. & Chandler St.	AWS	9.0	A	10.6	B

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the 2010 Highway Capacity Manual, 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.

[2] TS = Traffic Signal; AWS = All Way Stop; CSS = Cross Street Stop; **CSS** = Improvement

[3] LOS = Level of Service

6 REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation.* 9th Edition. 2012.
2. **Western Riverside Council of Governments.** *TUMF Nexus Study, 2009 Program Update.* Fall 2009.
3. **Transportation Research Board.** *Highway Capacity Manual (HCM).* s.l. : National Academy of Sciences, 2000 and 2010.
4. **Federal Highway Administration.** Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2012.

This Page Intentionally Left Blank

URBAN CROSSROADS

41 Corporate Park | Suite 300 | Irvine, CA 92606 | (949) 660-1994
www.urbanXroads.com

May 23, 2016

Mr. George Alvarez
City of Eastvale
12363 Limonite Avenue, Suite 910
Eastvale, CA 91752

SUBJECT: VANTAGE POINT CHURCH FOCUSED TRAFFIC IMPACT ANALYSIS

Dear Mr. George Alvarez:

Urban Crossroads, Inc. is pleased to submit this addendum to the Focused Traffic Impact Analysis prepared for the proposed Vantage Point Church development (referred to as "Project"), dated April 29, 2016. The proposed Project is located on the northeast corner of Archibald Road and Prado Basin Park Road in the City of Eastvale. The Project is proposed to include the development of a 1,200 seat church. Upon completion of the focused traffic impact analysis, Urban Crossroads, Inc. was provided with a more detailed list of other proposed uses, activities, and special events, which would occur during varying days, times, and number of participants.

The proposed uses, activities, and special events would either start towards the beginning or end of the AM/PM peak hours or during off-peak hours and would end during off-peak hours. However, it should be noted that the impacts of these other proposed uses, activities, and special events are not anticipated to impact the study area intersections beyond those evaluated and identified in the focused traffic impact analysis based on a 1,200 seat church during the Sunday service time. As such, no additional analysis beyond that evaluated in the focused traffic impact analysis (during the church's peak demand) is necessary to address the other proposed uses, activities, and special events, where the majority of these activities and ancillary uses (e.g., bookstore, café, etc.) are occurring during the weekdays and weekends during the off-peak times and are anticipated to have fewer participants/attendees than the Sunday service time evaluated in the focused traffic impact analysis.

Weekday uses include, but are not limited to:

- Café, which serves food and beverages with ample seating attached to the lobby of the main auditorium. Although open to the public from 7:00 AM to 9:00 PM Monday through Friday and Saturday and Sunday between 7:00 AM and 10:00 PM, it is likely that the café would be frequented by those already on-site for other church related activities.
- Bookstore, which is located in the lobby of the main auditorium and is open to the public during the same hours as the café. However, again, it is likely that the bookstore would be frequented by those already on-site for other church related activities.
- Meeting Areas where 2-3 meeting spaces of various sizes and capacities (maximum of 200 people) for church functions and meetings, as well as use by the City, community, and private entities for private events, meetings, training sessions, etc. between the hours of 7:00 AM and 10:00 PM.

- Splash Pad and other related family-friendly environmental features (e.g., seating areas, playground, free WI-FI access, etc.). Again, although these areas would be open to the public during the café hours, it is anticipated these areas would be utilized by those already on-site for other church related activities.
- Worship services are anticipated to occur during the weekday evenings with a maximum attendance of 1,000 adults and 500 children / youth which may occur on any given weeknight between 5:00 PM and 10:00 PM. It should be noted that these services are anticipated to start towards the end of the weekend peak hours and would end during off-peak hours.

Weekend uses include, but are not limited to:

- Weekend worship services that may be attended by up to 1,000 adults and 500 children / youth during any given service time. These services may typically occur on Saturday evenings between 5:00 PM and 10:00 PM, as well as on Sundays between 7:00 AM and 10:00 PM.

Special event uses include, but are not limited to:

- Weddings, funerals, memorial services, special services, concerts, plays, and other similar indoor services. No more than two of these special events are anticipated per week.
- Wedding receptions, baptisms, family movie nights, and other similar outdoor events will be held in the courtyard area adjacent to the river. Again, no more than two of these special events are anticipated per week.
- Periodic week-long programming, such as children's vacation bible school, which would occur during normal business hours.
- Seasonal events during Christmas (e.g., Christmas Gift Mart, Christmas Tree Lighting, etc.), Easter (e.g., Easter Egg Hunt, Good Friday Services, etc.), Halloween (e.g., Trunk or Treat, etc.), and summer activities (e.g., outdoor BBQ, Summer Picnics, Special 9-11 Service, etc.). The maximum attendance would be no larger than the weekend worship services for any of these events.

Outreach ministry uses include, but are not limited to:

- After school programs such as tutoring, classes, and recreational activities. The anticipated attendance is approximately 200 or less.
- Benevolence ministries such as food pantry and counseling. Again, the anticipated attendance is approximately 200 or less.

If you have any questions, please contact me directly at (949) 336-5982.

Respectfully submitted,

URBAN CROSSROADS, INC.

Charlene So

Charlene So, PE
Senior Transportation Engineer

URBAN CROSSROADS

260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

January 11, 2018

Mr. Tom Lanning, Executive Pastor
Vantage Point Church
5171 Edison Avenue, Suite C
Chino, CA 91710

SUBJECT: VANTAGE POINT CHURCH AIR QUALITY AND GREENHOUSE GAS ANALYSIS

Dear Mr. Tom Lanning:

It is our understanding that the Vantage Point Church intends to phase the construction of physical buildings at the proposed site. It is also our understanding that site preparation and grading activities would occur on the entirety of the site prior to physical building construction.

The air quality and greenhouse gas analysis reports dated October 17, 2016 evaluate the construction and operations of the 1,200-seat church with ancillary uses. Furthermore, air quality impacts and associated thresholds are based on the peak (maximum) daily activity that could occur during construction. As such, the analysis as presented is conservative (i.e. overstates) potential impacts from construction due to the fact that there would be less daily activity due to the proposed phasing of building construction activity.

If you have any questions, please contact me directly at (949) 336-5987.

Respectfully submitted,

URBAN CROSSROADS, INC.

Haseeb Qureshi,
Senior Associate

APPENDIX 1.1:

SITE ADJACENT QUEUING ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Intersection: 5: Archibald Avenue & Driveway 1

Movement	WB
Directions Served	R
Maximum Queue (ft)	59
Average Queue (ft)	28
95th Queue (ft)	51
Link Distance (ft)	209
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Archibald Avenue & Driveway 2

Movement	WB
Directions Served	R
Maximum Queue (ft)	76
Average Queue (ft)	28
95th Queue (ft)	56
Link Distance (ft)	110
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Archibald Avenue & Corbin Drive/Prado Basin Park Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	R	L	T	T	T	R
Maximum Queue (ft)	84	159	44	280	30	293	322	216	48	22
Average Queue (ft)	20	97	12	135	7	182	86	39	6	3
95th Queue (ft)	52	167	39	252	24	277	233	135	29	15
Link Distance (ft)	130	142		1660	1660		343	343	343	343
Upstream Blk Time (%)		6					0			
Queuing Penalty (veh)		15					0			
Storage Bay Dist (ft)			180			200				
Storage Blk Time (%)				6		9	1			
Queuing Penalty (veh)				1		12	4			

Intersection: 101: Driveway & Prado Basin Park Road

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	30	115
Average Queue (ft)	5	59
95th Queue (ft)	24	99
Link Distance (ft)	354	100
Upstream Blk Time (%)		1
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 32

APPENDIX 3.1:

EXISTING TRAFFIC COUNTS – APRIL 2016

This Page Intentionally Left Blank

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268
counts@countsunlimited.com

Location: Eastvale
N/S: Hellman Avenue
E/W: Schleisman Rd

Date: 4/17/2016
Day: SUNDAY
Project # 0

TURNING MOVEMENT COUNT

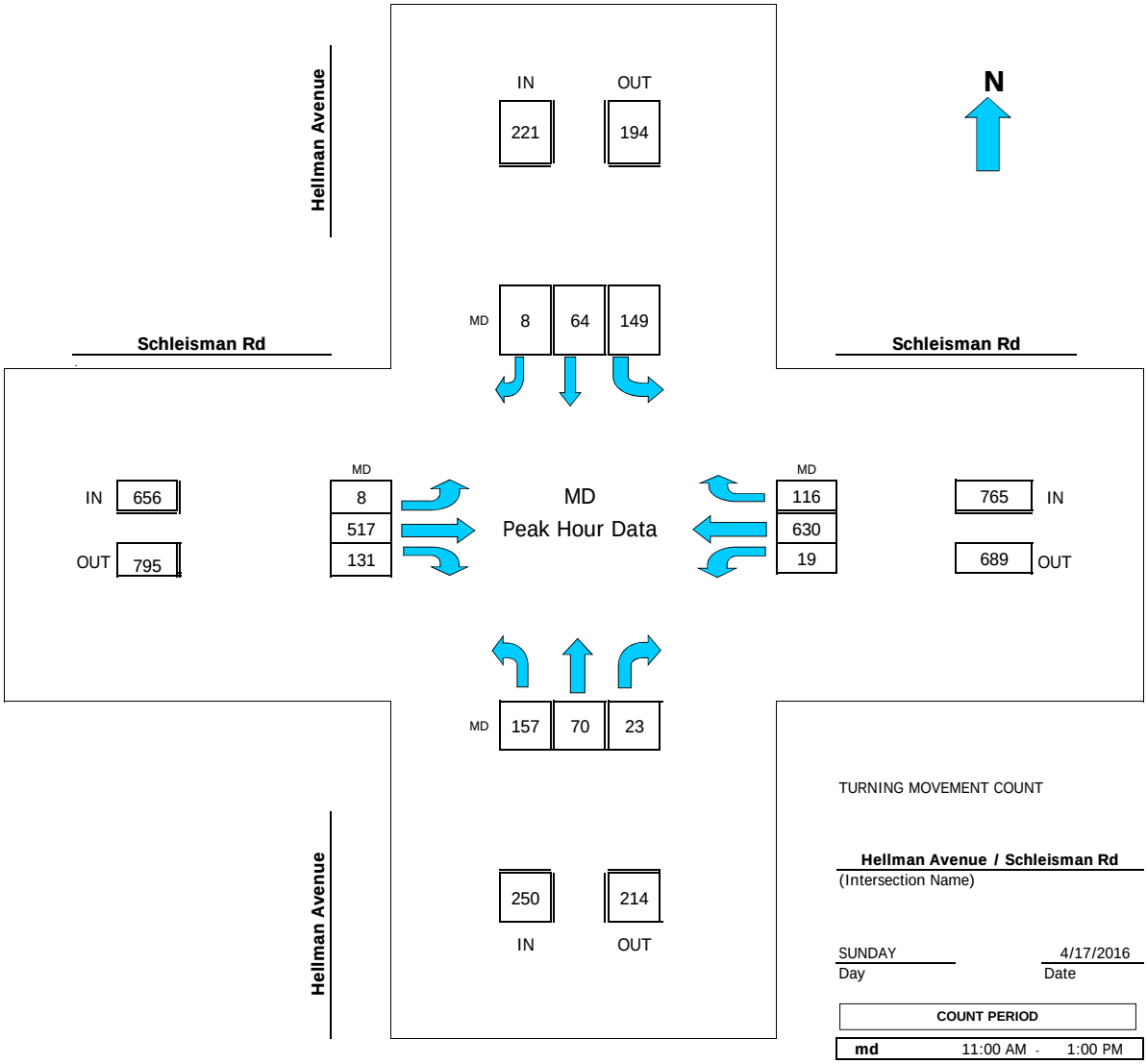
	Hellman Avenue Northbound				Hellman Avenue Southbound				Schleisman Rd Eastbound				Schleisman Rd Westbound				
	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
10:00 AM	35	21	1	1	15	11	1	3	0	76	29	4	1	166	34	4	398
10:15 AM	45	16	5	0	31	13	3	2	1	86	18	7	7	183	30	12	447
10:30 AM	59	20	2	0	27	6	2	1	2	89	31	11	10	188	45	3	493
10:45 AM	32	19	4	4	25	11	6	0	6	91	22	1	2	158	30	2	411
11:00 AM	58	25	4	0	34	15	2	0	1	88	27	8	2	164	29	5	449
11:15 AM	47	16	10	2	34	20	7	2	6	88	19	1	6	177	37	0	467
11:30 AM	47	16	5	1	34	19	6	3	1	90	27	4	6	155	39	1	445
11:45 AM	33	15	4	1	31	19	3	2	3	123	29	2	5	143	42	2	450
12:00 PM	37	12	5	1	36	14	1	0	4	121	28	7	3	144	22	4	427
12:15 PM	39	14	5	0	32	15	1	0	1	109	39	0	6	182	31	2	474
12:30 PM	37	28	3	0	43	19	2	0	2	133	29	6	6	159	29	4	490
12:45 PM	44	16	10	0	38	16	4	0	1	154	35	2	4	145	34	1	501
TOTAL VOLUMES:	513	218	58	10	380	178	38	13	28	1248	333	53	58	1964	402	40	5418

NOON Peak Hr Begins at: 1200 PM

	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
PEAK VOLUMES:	157	70	23	1	149	64	8	0	8	517	131	15	19	630	116	11	1919

PEAK HR FACTOR:	0.893	0.863	0.863	0.873	0.944

Location:	Eastvale	Date:	4/17/2016
N/S:	Hellman Avenue	Day:	SUNDAY
E/W:	Schleisman Rd	Job #	0



TURNING MOVEMENT COUNT

Hellman Avenue / Schleisman Rd
(Intersection Name)

SUNDAY — Day
4/17/2016 — Date

COUNT PERIOD		
md	11:00 AM -	1:00 PM

MD PEAK HOUR 1200 PM

Location: Eastvale
N/S: Hellman Avenue
E/W: Schleisman Rd

Date: 4/17/2016
Day: SUNDAY
Project # 0

PEDESTRIANS

	East Leg Hellman Avenue	West Leg Schleisman Rd	South Leg Hellman Avenue	North Leg Schleisman Rd	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	0	0
10:45 AM	0	0	0	0	0
11:00 AM	0	0	0	0	0
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

Peak Hr	1200	0	0	0	0	0

Location: Eastvale
N/S: Hellman Avenue
E/W: Schleisman Rd

Date: 4/17/2016
Day: SUNDAY
Project # 0

BICYCLES

	East Leg Hellman Avenue	West Leg Schleisman Rd	South Leg Hellman Avenue	North Leg Schleisman Rd	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	0	0
10:45 AM	0	0	0	0	0
11:00 AM	0	0	0	0	0
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

Peak Hr	1200	0	0	0	0	0

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268
counts@countsunlimited.com

Location: Eastvale
N/S: Hellman Avenue
E/W: Chandler St

Date: 4/17/2016
Day: SUNDAY
Project # 0

TURNING MOVEMENT COUNT

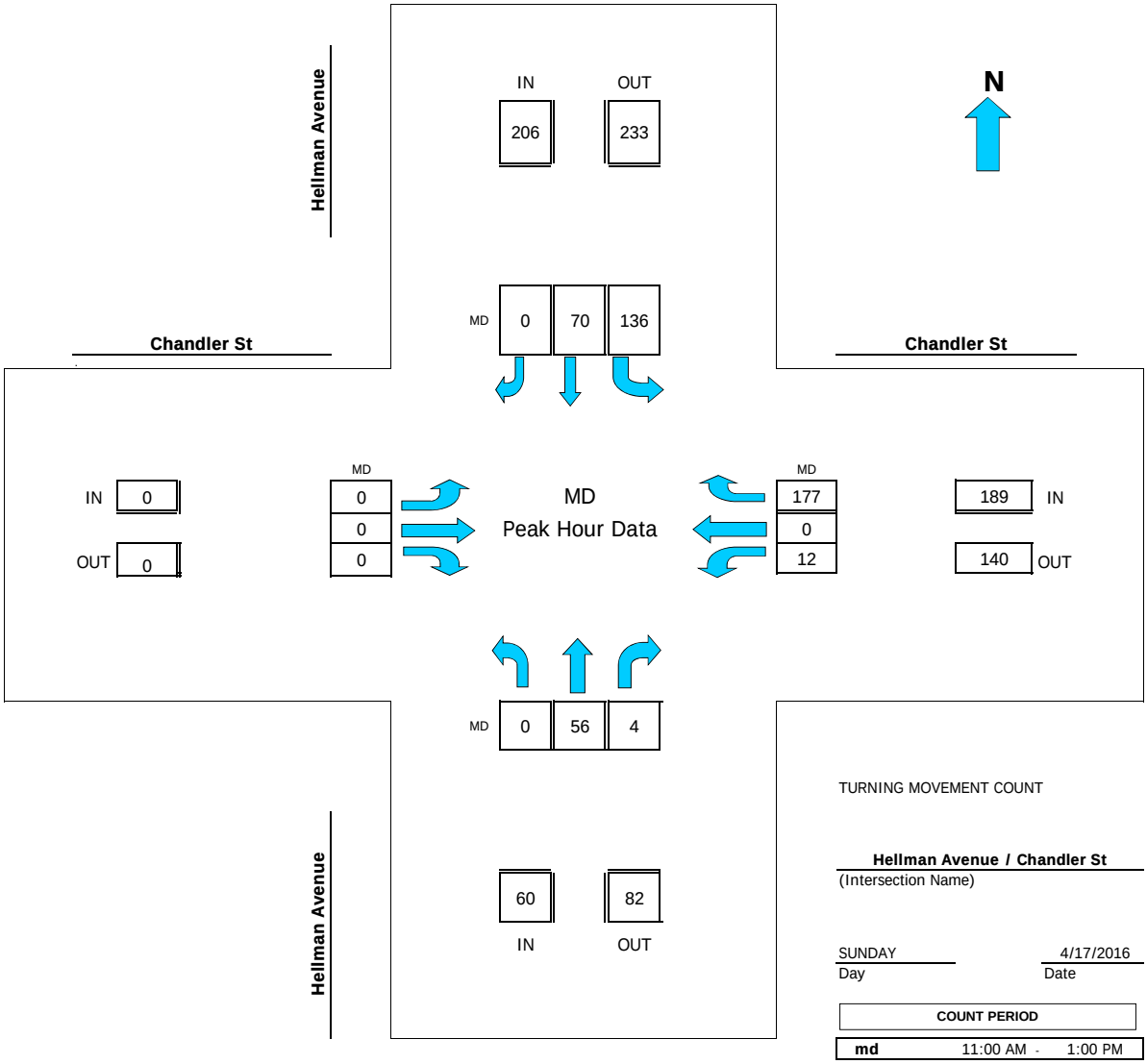
	Hellman Avenue Northbound				Hellman Avenue Southbound				Chandler St Eastbound				Chandler St Westbound				
	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
10:00 AM	0	14	2	0	20	18	0	0	0	0	0	0	5	0	41	0	100
10:15 AM	0	11	2	0	18	24	0	0	0	0	0	0	4	0	40	0	99
10:30 AM	0	18	2	0	26	21	0	0	0	0	0	0	4	0	55	0	126
10:45 AM	0	14	5	0	27	16	0	0	0	0	0	0	0	0	40	0	102
11:00 AM	0	26	4	0	26	13	0	0	0	0	0	0	1	0	53	0	123
11:15 AM	0	19	2	0	27	9	0	0	0	0	0	0	2	0	42	0	101
11:30 AM	0	15	0	0	29	23	0	0	0	0	0	0	2	0	47	0	116
11:45 AM	0	15	2	0	33	22	0	0	0	0	0	0	3	0	37	0	112
12:00 PM	0	14	1	0	32	16	0	0	0	0	0	0	2	0	42	0	107
12:15 PM	0	15	0	0	40	15	0	0	0	0	0	0	3	0	47	0	120
12:30 PM	0	12	1	0	31	17	0	0	0	0	0	0	4	0	51	0	116
12:45 PM	0	11	3	0	31	13	0	0	0	0	0	0	2	0	44	0	104
TOTAL VOLUMES:	0	184	24	0	340	207	0	0	0	0	0	0	32	0	539	0	1326

NOON Peak Hr Begins at: 1145 AM

	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
PEAK VOLUMES:	0	56	4	0	136	70	0	0	0	0	0	0	12	0	177	0	455

PEAK HR FACTOR:	0.882	0.936	0.000	0.859	0.948

Location:	Eastvale	Date:	4/17/2016
N/S:	Hellman Avenue	Day:	SUNDAY
E/W:	Chandler St	Job #	0



TURNING MOVEMENT COUNT

Hellman Avenue / Chandler St
(Intersection Name)

SUNDAY
Day

4/17/2016
Date

COUNT PERIOD		
md	11:00 AM -	1:00 PM

MD PEAK HOUR 1145 AM

Location: Eastvale
N/S: Hellman Avenue
E/W: Chandler St

Date: 4/17/2016
Day: SUNDAY
Project # 0

PEDESTRIANS

	East Leg Hellman Avenue	West Leg Chandler St	South Leg Hellman Avenue	North Leg Chandler St	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	0	0
10:45 AM	0	0	0	0	0
11:00 AM	0	0	0	0	0
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

Peak Hr	1145	0	0	0	0	0

Location: Eastvale
N/S: Hellman Avenue
E/W: Chandler St

Date: 4/17/2016
Day: SUNDAY
Project # 0

BICYCLES

	East Leg Hellman Avenue	West Leg Chandler St	South Leg Hellman Avenue	North Leg Chandler St	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	0	0
10:45 AM	0	0	0	0	0
11:00 AM	0	0	0	0	0
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

Peak Hr	1145	0	0	0	0	0

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268
counts@countsunlimited.com

Location: Eastvale
N/S: Archibald Avenue
E/W: Schleisman Road

Date: 4/17/2016
Day: SUNDAY
Project # 0

TURNING MOVEMENT COUNT

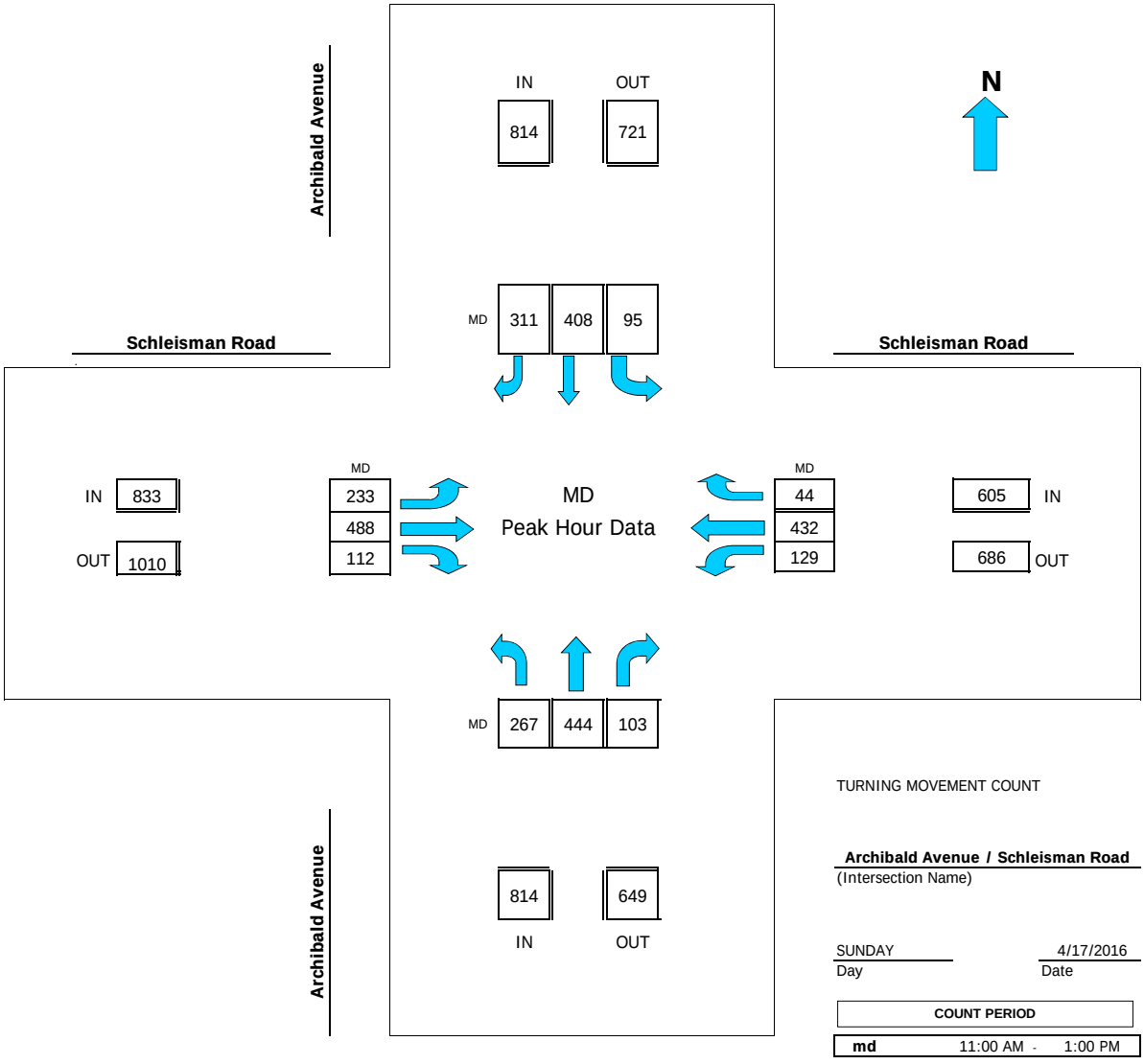
	Archibald Avenue Northbound				Archibald Avenue Southbound				Schleisman Road Eastbound				Schleisman Road Westbound				
	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
10:00 AM	79	79	10	9	14	57	27	28	47	66	11	10	30	76	5	5	548
10:15 AM	53	87	7	3	15	71	36	27	56	87	11	14	15	133	6	2	621
10:30 AM	67	76	8	6	25	76	36	37	51	87	7	20	23	114	11	2	644
10:45 AM	73	99	6	6	19	66	31	16	47	98	4	12	34	87	7	0	605
11:00 AM	60	78	14	5	23	74	61	10	64	89	25	14	20	88	12	4	608
11:15 AM	73	84	22	2	21	82	79	13	61	89	23	7	27	106	16	7	683
11:30 AM	77	96	21	6	30	64	78	45	48	81	33	14	24	84	8	1	644
11:45 AM	59	85	22	7	12	107	84	18	66	116	26	14	33	92	19	2	721
12:00 PM	73	125	26	15	31	120	70	25	50	103	33	13	23	90	6	4	750
12:15 PM	49	110	32	17	13	101	88	43	62	94	18	11	48	121	16	3	752
12:30 PM	75	112	25	10	26	96	76	10	63	135	29	6	34	118	10	3	799
12:45 PM	70	97	20	7	25	91	77	10	58	156	32	19	24	103	12	0	765
TOTAL VOLUMES:	808	1128	213	93	254	1005	743	282	673	1201	252	154	335	1212	128	33	7952

NOON Peak Hr Begins at: 1200 PM

	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
PEAK VOLUMES:	267	444	103	49	95	408	311	88	233	488	112	49	129	432	44	10	3262

PEAK HR FACTOR:	0.908	0.921	0.847	0.818	0.959

Location:	Eastvale	Date:	4/17/2016
N/S:	Archibald Avenue	Day:	SUNDAY
E/W:	Schleisman Road	Job #	0



TURNING MOVEMENT COUNT

Archibald Avenue / Schleisman Road
(Intersection Name)

SUNDAY — Day
4/17/2016 — Date

COUNT PERIOD		
md	11:00 AM -	1:00 PM

MD PEAK HOUR 1200 PM

Location: Eastvale
N/S: Archibald Avenue
E/W: Schleisman Road

Date: 4/17/2016
Day: SUNDAY
Project # 0

PEDESTRIANS

	East Leg Archibald Avenue	West Leg Schleisman Road	South Leg Archibald Avenue	North Leg Schleisman Road	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	1	0	0	0	1
10:30 AM	0	0	0	0	0
10:45 AM	4	0	2	0	6
11:00 AM	0	0	0	0	0
11:15 AM	0	1	0	0	1
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	1	0	0	3	4
12:15 PM	0	0	0	0	0
12:30 PM	1	0	0	0	1
12:45 PM	0	1	0	0	1
TOTAL VOLUMES:	7	2	2	3	14

Peak Hr	1200	2	1	0	3	6

Location: Eastvale
N/S: Archibald Avenue
E/W: Schleisman Road

Date: 4/17/2016
Day: SUNDAY
Project # 0

BICYCLES

	East Leg Archibald Avenue	West Leg Schleisman Road	South Leg Archibald Avenue	North Leg Schleisman Road	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	3	0	0	3
10:30 AM	0	0	0	0	0
10:45 AM	3	0	0	0	3
11:00 AM	1	0	0	0	1
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	4	3	0	0	7

Peak Hr	1200	0	0	0	0	0

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268
counts@countsunlimited.com

Location: Eastvale
N/S: Archibald Avenue
E/W: Chandler Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

TURNING MOVEMENT COUNT

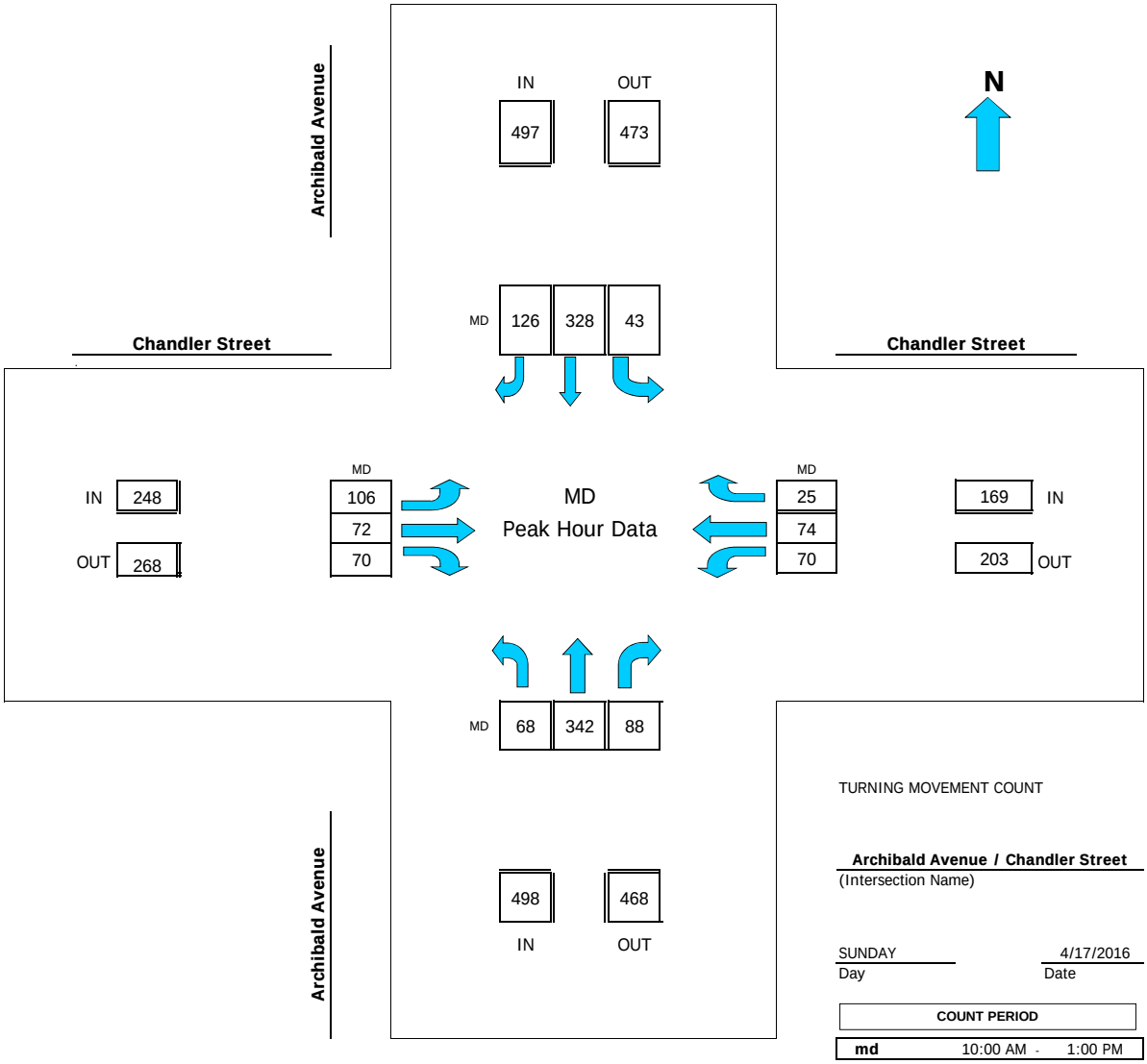
	Archibald Avenue Northbound				Archibald Avenue Southbound				Chandler Street Eastbound				Chandler Street Westbound				
	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
10:00 AM	10	62	11	3	3	68	8	8	28	12	10	8	13	18	8	3	270
10:15 AM	7	74	13	8	8	54	9	6	22	14	4	9	39	19	6	8	292
10:30 AM	8	73	9	9	9	79	8	7	25	16	9	2	23	25	9	3	311
10:45 AM	10	88	11	14	14	70	15	2	29	18	8	6	25	17	11	9	338
11:00 AM	14	75	25	10	15	70	19	5	21	21	22	12	13	16	7	2	318
11:15 AM	7	100	28	14	15	70	18	3	25	11	12	7	33	25	8	4	352
11:30 AM	15	73	20	11	11	73	16	5	23	23	10	4	22	16	12	4	314
11:45 AM	14	64	17	6	10	83	21	1	21	11	11	4	19	14	11	5	296
12:00 PM	14	80	27	15	9	93	33	8	26	20	18	6	17	20	3	1	360
12:15 PM	17	89	25	10	12	73	34	8	18	14	18	7	17	19	6	4	342
12:30 PM	19	92	14	11	13	69	31	10	32	20	13	11	22	18	9	7	352
12:45 PM	18	81	22	5	9	93	28	4	30	18	21	13	14	17	7	5	358
TOTAL VOLUMES:	153	951	222	116	128	895	240	67	300	198	156	89	257	224	97	55	3821

NOON Peak Hr Begins at: 1200 PM

	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
PEAK VOLUMES:	68	342	88	41	43	328	126	30	106	72	70	37	70	74	25	17	1537

PEAK HR FACTOR:	0.950	0.920	0.899	0.862	0.981

Location:	Eastvale	Date:	4/17/2016
N/S:	Archibald Avenue	Day:	SUNDAY
E/W:	Chandler Street	Job #	0



TURNING MOVEMENT COUNT

Archibald Avenue / Chandler Street
(Intersection Name)

SUNDAY
Day

4/17/2016
Date

COUNT PERIOD		
md	10:00 AM -	1:00 PM

MD PEAK HOUR 1200 PM

Location: Eastvale
N/S: Archibald Avenue
E/W: Chandler Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

PEDESTRIANS

	East Leg Archibald Avenue	West Leg Chandler Street	South Leg Archibald Avenue	North Leg Chandler Street	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	1	0	0	0	1
10:45 AM	1	0	0	0	1
11:00 AM	0	0	0	0	0
11:15 AM	1	0	0	0	1
11:30 AM	0	1	0	0	1
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	3	1	0	0	4

Peak Hr	1200	0	0	0	0	0

Location: Eastvale
N/S: Archibald Avenue
E/W: Chandler Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

BICYCLES

	East Leg Archibald Avenue	West Leg Chandler Street	South Leg Archibald Avenue	North Leg Chandler Street	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	1	0	0	1
10:30 AM	0	1	0	0	1
10:45 AM	4	0	2	0	6
11:00 AM	0	1	0	0	1
11:15 AM	1	1	1	0	3
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	1	1	0	0	2
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	6	5	3	0	14

Peak Hr	1200	1	1	0	0	0

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268
counts@countsunlimited.com

Location: Eastvale
N/S: Archibald Avenue
E/W: Corbin Avenue

Date: 4/17/2016
Day: SUNDAY
Project # 0

TURNING MOVEMENT COUNT

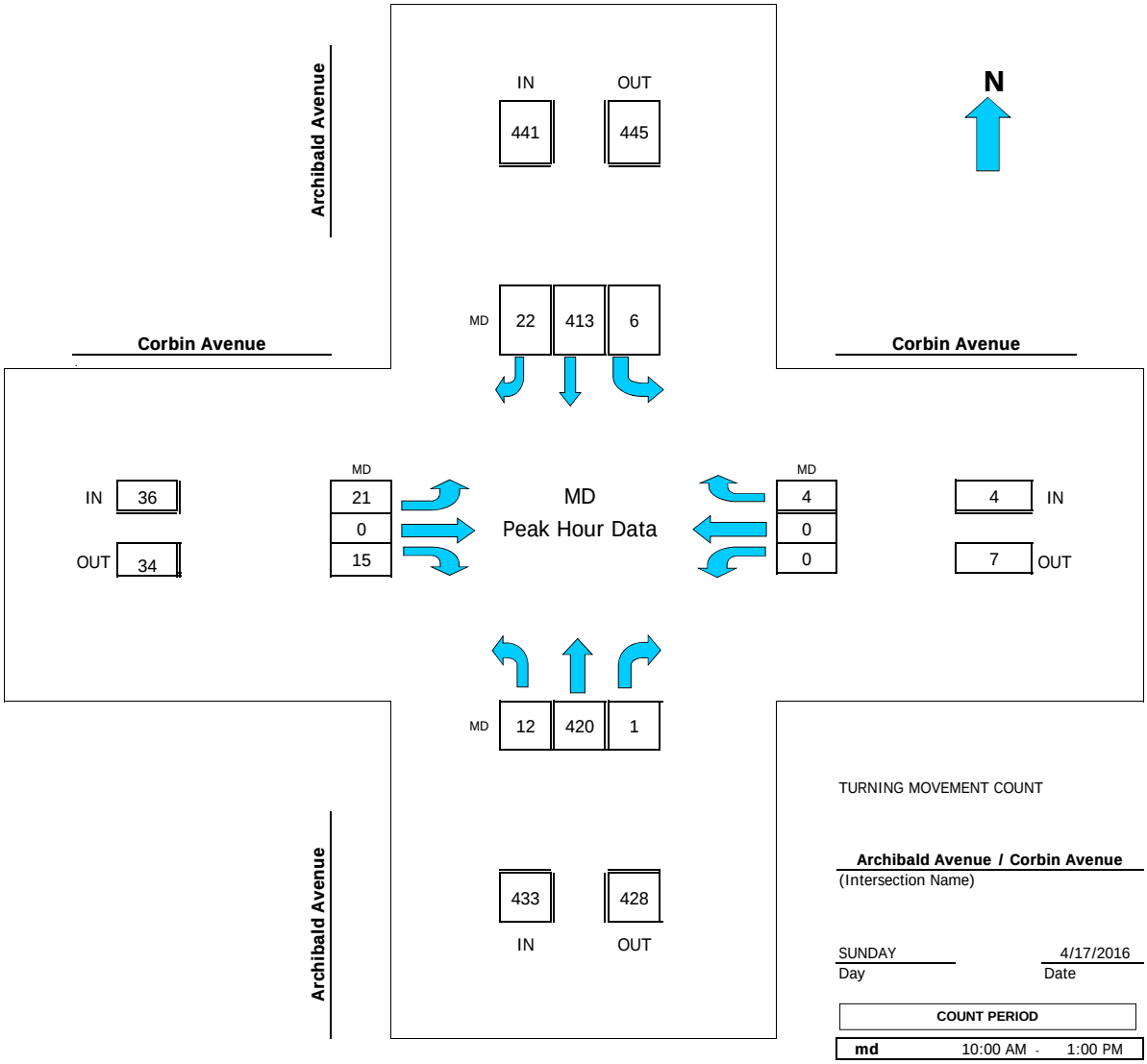
	Archibald Avenue Northbound				Archibald Avenue Southbound				Corbin Avenue Eastbound				Corbin Avenue Westbound				
	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
10:00 AM	3	77	0	0	1	93	3	0	3	1	0	2	0	0	0	0	183
10:15 AM	3	84	0	0	0	96	4	0	3	0	1	4	0	0	0	1	195
10:30 AM	3	64	0	0	0	104	4	0	7	0	0	4	0	0	1	2	187
10:45 AM	3	107	0	0	0	109	2	1	8	0	1	5	0	0	0	0	236
11:00 AM	4	88	0	0	1	103	1	0	4	0	4	2	0	0	1	0	206
11:15 AM	5	107	1	0	0	98	4	0	5	0	0	0	0	0	1	0	221
11:30 AM	3	77	1	0	0	101	3	0	6	0	2	0	0	0	0	0	193
11:45 AM	2	80	0	0	3	103	4	0	4	0	4	3	0	0	1	1	201
12:00 PM	1	98	0	0	0	104	8	2	6	0	4	2	0	0	2	2	223
12:15 PM	6	116	0	0	1	102	6	0	2	0	3	3	0	0	0	0	236
12:30 PM	0	101	1	0	3	94	5	0	7	0	5	5	0	0	1	1	217
12:45 PM	5	105	0	0	2	113	3	0	6	0	3	3	0	0	1	1	238
TOTAL VOLUMES:	38	1104	3	0	11	1220	47	3	61	1	27	33	0	0	8	8	2520

NOON Peak Hr Begins at: 1200 PM

	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
PEAK VOLUMES:	12	420	1	0	6	413	22	2	21	0	15	13	0	0	4	4	933

PEAK HR FACTOR:	0.887	0.934	0.750	0.500	0.960

Location:	Eastvale	Date:	4/17/2016
N/S:	Archibald Avenue	Day:	SUNDAY
E/W:	Corbin Avenue	Job #	0



TURNING MOVEMENT COUNT

Archibald Avenue / Corbin Avenue
(Intersection Name)

SUNDAY — Day
4/17/2016 — Date

COUNT PERIOD		
md	10:00 AM -	1:00 PM

MD PEAK HOUR 1200 PM

Location: Eastvale
N/S: Archibald Avenue
E/W: Corbin Avenue

Date: 4/17/2016
Day: SUNDAY
Project # 0

PEDESTRIANS

	East Leg Archibald Avenue	West Leg Corbin Avenue	South Leg Archibald Avenue	North Leg Corbin Avenue	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	0	0
10:45 AM	0	1	0	0	1
11:00 AM	0	0	0	0	0
11:15 AM	1	1	0	0	2
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	1	2	0	0	3

Peak Hr	1200	0	0	0	0	0

Location: Eastvale
N/S: Archibald Avenue
E/W: Corbin Avenue

Date: 4/17/2016
Day: SUNDAY
Project # 0

BICYCLES

	East Leg Archibald Avenue	West Leg Corbin Avenue	South Leg Archibald Avenue	North Leg Corbin Avenue	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	3	0	0	3
10:30 AM	0	0	0	0	0
10:45 AM	3	0	0	3	6
11:00 AM	0	0	0	0	0
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	3	3	0	3	9

Peak Hr	1200	0	0	0	0	0

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268
counts@countsunlimited.com

Location: Norco
N/S: River Road
E/W: Bluff Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

TURNING MOVEMENT COUNT

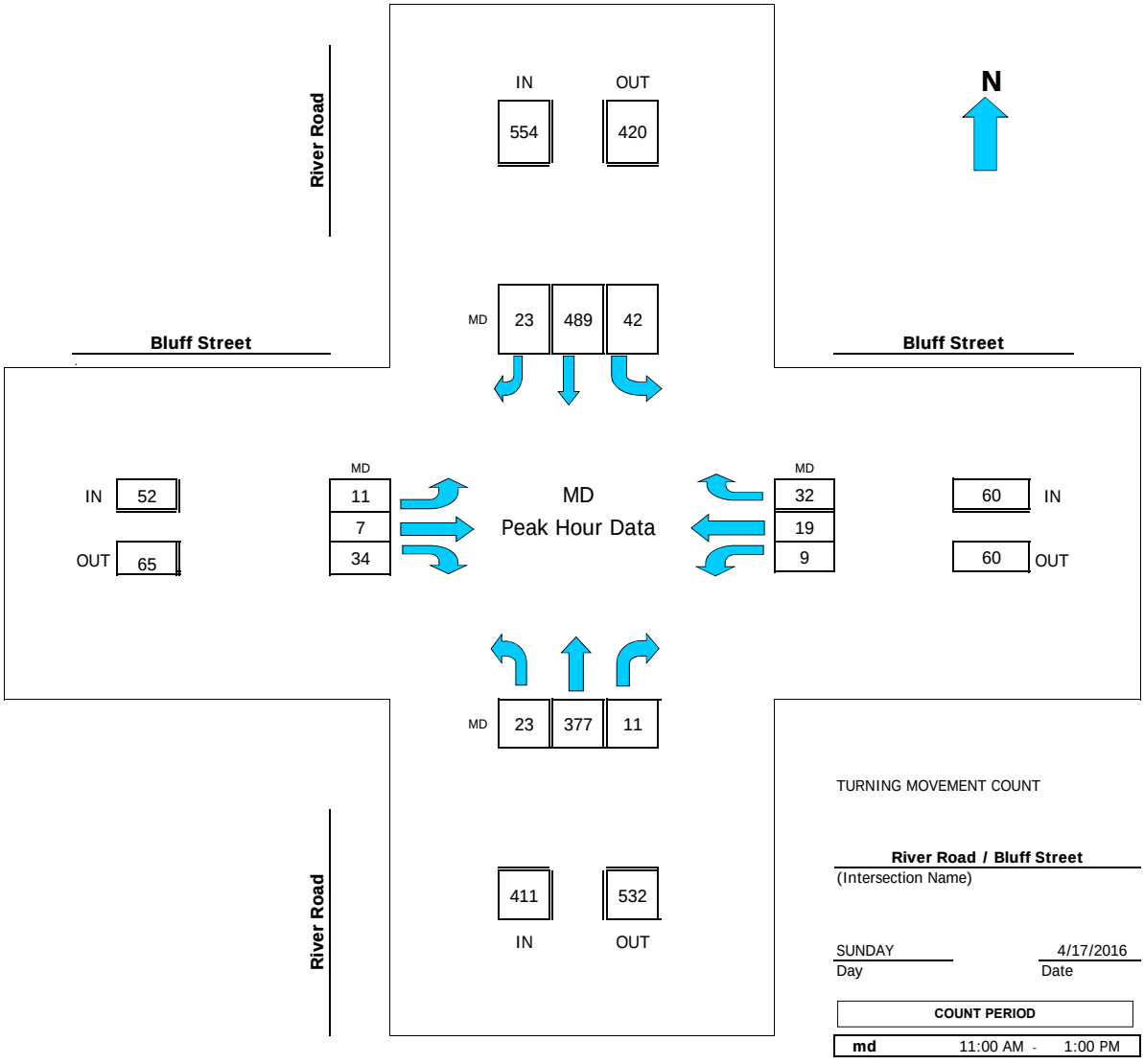
	River Road Northbound				River Road Southbound				Bluff Street Eastbound				Bluff Street Westbound				
	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
10:00 AM	5	68	2	0	3	119	2	0	1	2	2	6	2	3	2	7	217
10:15 AM	2	74	2	0	7	121	3	0	3	4	2	7	2	2	2	5	231
10:30 AM	3	57	7	0	4	137	0	1	3	2	0	7	1	5	0	8	227
10:45 AM	6	94	3	0	6	142	4	1	1	5	2	9	3	7	2	10	285
11:00 AM	8	78	5	1	5	122	7	2	2	3	9	8	1	2	11	8	253
11:15 AM	6	96	4	1	7	108	2	0	4	7	12	11	1	5	12	11	264
11:30 AM	5	68	5	0	9	111	5	0	2	3	12	10	0	3	9	7	232
11:45 AM	5	69	9	2	4	122	5	1	5	5	7	7	2	3	8	8	244
12:00 PM	3	84	4	0	10	128	3	0	3	2	11	10	2	6	9	7	265
12:15 PM	7	104	2	0	8	110	7	0	4	1	6	6	1	3	7	5	260
12:30 PM	5	96	3	1	11	107	9	0	1	1	7	7	4	5	9	8	258
12:45 PM	8	93	2	0	13	144	4	0	3	3	10	9	2	5	7	7	294
TOTAL VOLUMES:	63	981	48	5	87	1471	51	5	32	38	80	97	21	49	78	91	2999

NOON Peak Hr Begins at: 1200 PM

	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
PEAK VOLUMES:	23	377	11	1	42	489	23	0	11	7	34	32	9	19	32	27	1137

PEAK HR FACTOR:	0.909	0.860	0.813	0.833	0.916

Location:	Norco	Date:	4/17/2016
N/S:	River Road	Day:	SUNDAY
E/W:	Bluff Street	Job #	0



TURNING MOVEMENT COUNT

River Road / Bluff Street
(Intersection Name)

SUNDAY — Day
4/17/2016 — Date

COUNT PERIOD		
md	11:00 AM -	1:00 PM

MD PEAK HOUR 1200 PM

Location: Norco
N/S: River Road
E/W: Bluff Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

PEDESTRIANS

	East Leg River Road	West Leg Bluff Street	South Leg River Road	North Leg Bluff Street	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	1	0	0	1
10:30 AM	0	1	0	0	1
10:45 AM	0	0	0	0	0
11:00 AM	0	0	0	0	0
11:15 AM	0	0	0	0	0
11:30 AM	0	1	0	0	1
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	1	0	0	1
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	4	0	0	4

Peak Hr	1200	0	1	0	0	1

Location: Norco
N/S: River Road
E/W: Bluff Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

BICYCLES

	East Leg River Road	West Leg Bluff Street	South Leg River Road	North Leg Bluff Street	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	2	0	0	2
10:45 AM	0	0	0	0	0
11:00 AM	0	0	0	0	0
11:15 AM	1	0	0	0	1
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	1	2	0	0	3

Peak Hr	1200	0	0	0	0	0

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268
counts@countsunlimited.com

Location: Eastvale
N/S: Harrison Avenue
E/W: Schleisman Road

Date: 4/17/2016
Day: SUNDAY
Project # 0

TURNING MOVEMENT COUNT

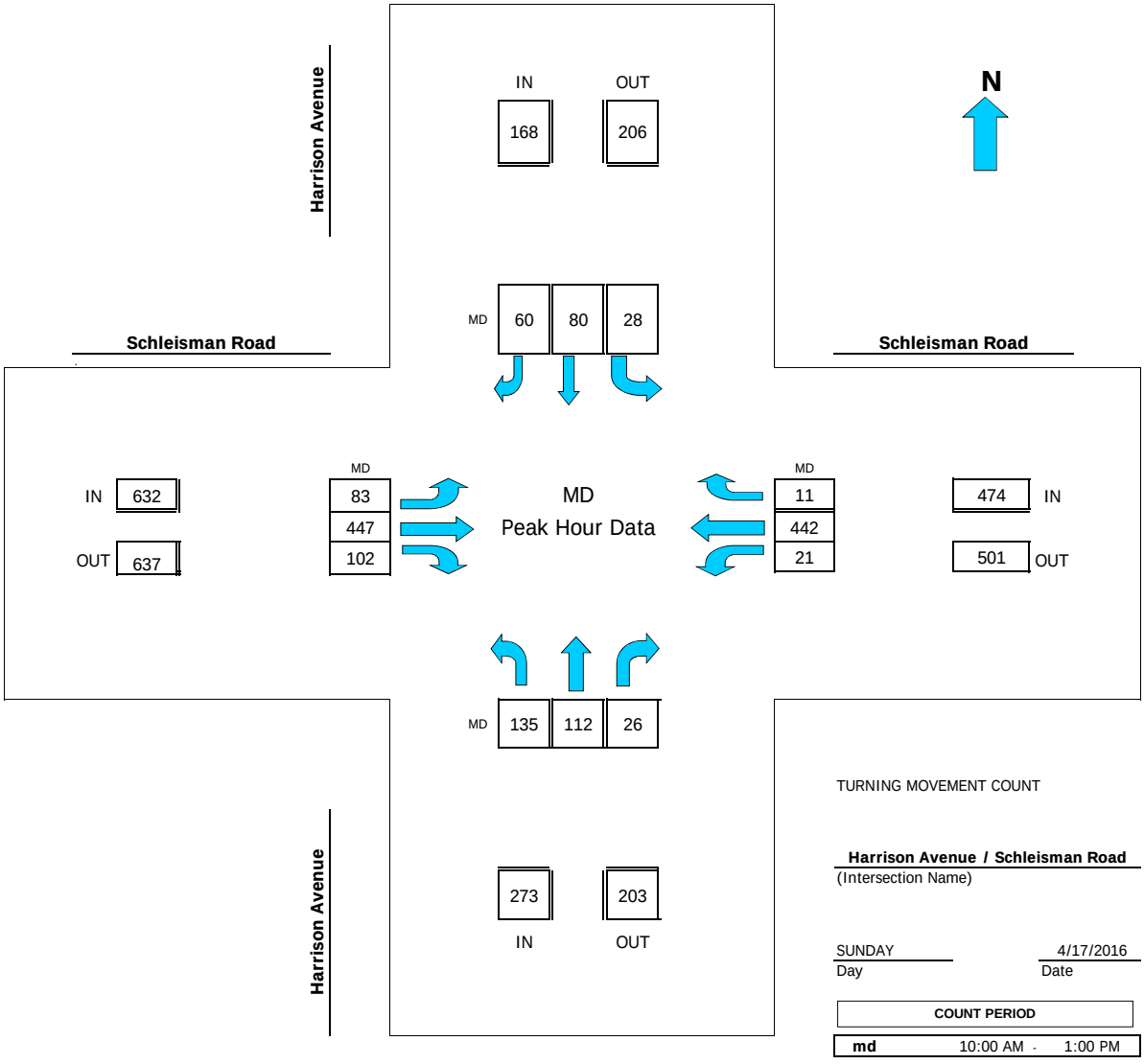
	Harrison Avenue Northbound				Harrison Avenue Southbound				Schleisman Road Eastbound				Schleisman Road Westbound				
	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
10:00 AM	30	17	5	2	0	10	13	3	7	70	6	8	7	92	9	4	279
10:15 AM	48	29	3	2	2	20	15	3	12	81	11	8	4	107	2	1	347
10:30 AM	27	20	3	1	5	13	10	3	11	81	26	10	3	108	6	1	327
10:45 AM	31	16	6	7	16	19	13	5	14	120	13	5	6	80	1	2	352
11:00 AM	23	25	11	7	3	20	20	8	13	96	18	6	2	96	5	1	332
11:15 AM	33	20	5	2	15	30	26	7	18	88	19	11	5	92	7	2	358
11:30 AM	30	23	4	2	10	16	11	3	11	104	17	6	1	101	7	0	335
11:45 AM	35	30	9	2	2	16	19	4	19	102	24	8	2	83	5	0	346
12:00 PM	23	27	7	2	3	10	17	1	18	108	16	7	8	101	1	1	339
12:15 PM	36	27	7	4	12	21	12	1	23	86	20	9	2	106	4	2	356
12:30 PM	32	32	8	7	8	30	11	1	17	129	36	10	10	120	4	1	437
12:45 PM	44	26	4	1	5	19	20	5	25	124	30	10	1	115	2	1	415
TOTAL VOLUMES:	392	292	72	39	81	224	187	44	188	1189	236	98	51	1201	53	16	4166

NOON Peak Hr Begins at: 1200 PM

	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
PEAK VOLUMES:	135	112	26	14	28	80	60	8	83	447	102	36	21	442	11	5	1610

PEAK HR FACTOR:	0.922	0.857	0.868	0.884	0.885

Location:	Eastvale	Date:	4/17/2016
N/S:	Harrison Avenue	Day:	SUNDAY
E/W:	Schleisman Road	Job #	0



TURNING MOVEMENT COUNT

Harrison Avenue / Schleisman Road
(Intersection Name)

SUNDAY
Day

4/17/2016
Date

COUNT PERIOD		
md	10:00 AM -	1:00 PM

MD PEAK HOUR 1200 PM

Location: Eastvale
N/S: Harrison Avenue
E/W: Schleisman Road

Date: 4/17/2016
Day: SUNDAY
Project # 0

PEDESTRIANS

	East Leg Harrison Avenue	West Leg Schleisman Road	South Leg Harrison Avenue	North Leg Schleisman Road	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	0	0
10:45 AM	0	0	0	0	0
11:00 AM	2	0	2	0	4
11:15 AM	1	0	0	0	1
11:30 AM	0	0	0	0	0
11:45 AM	0	1	0	0	1
12:00 PM	3	0	3	0	6
12:15 PM	0	1	0	0	1
12:30 PM	0	0	2	0	2
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	6	2	7	0	15

Peak Hr	1200	3	1	5	0	9

Location: Eastvale
N/S: Harrison Avenue
E/W: Schleisman Road

Date: 4/17/2016
Day: SUNDAY
Project # 0

BICYCLES

	East Leg Harrison Avenue	West Leg Schleisman Road	South Leg Harrison Avenue	North Leg Schleisman Road	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	1	0	0	1
10:30 AM	0	0	0	0	0
10:45 AM	0	0	1	0	1
11:00 AM	1	0	0	0	1
11:15 AM	0	0	0	0	0
11:30 AM	0	0	0	0	0
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	1	1	1	0	3

Peak Hr	1200	0	0	0	0	0

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-6268
counts@countsunlimited.com

Location: Eastvale
N/S: Harrison Avenue
E/W: Chandler Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

TURNING MOVEMENT COUNT

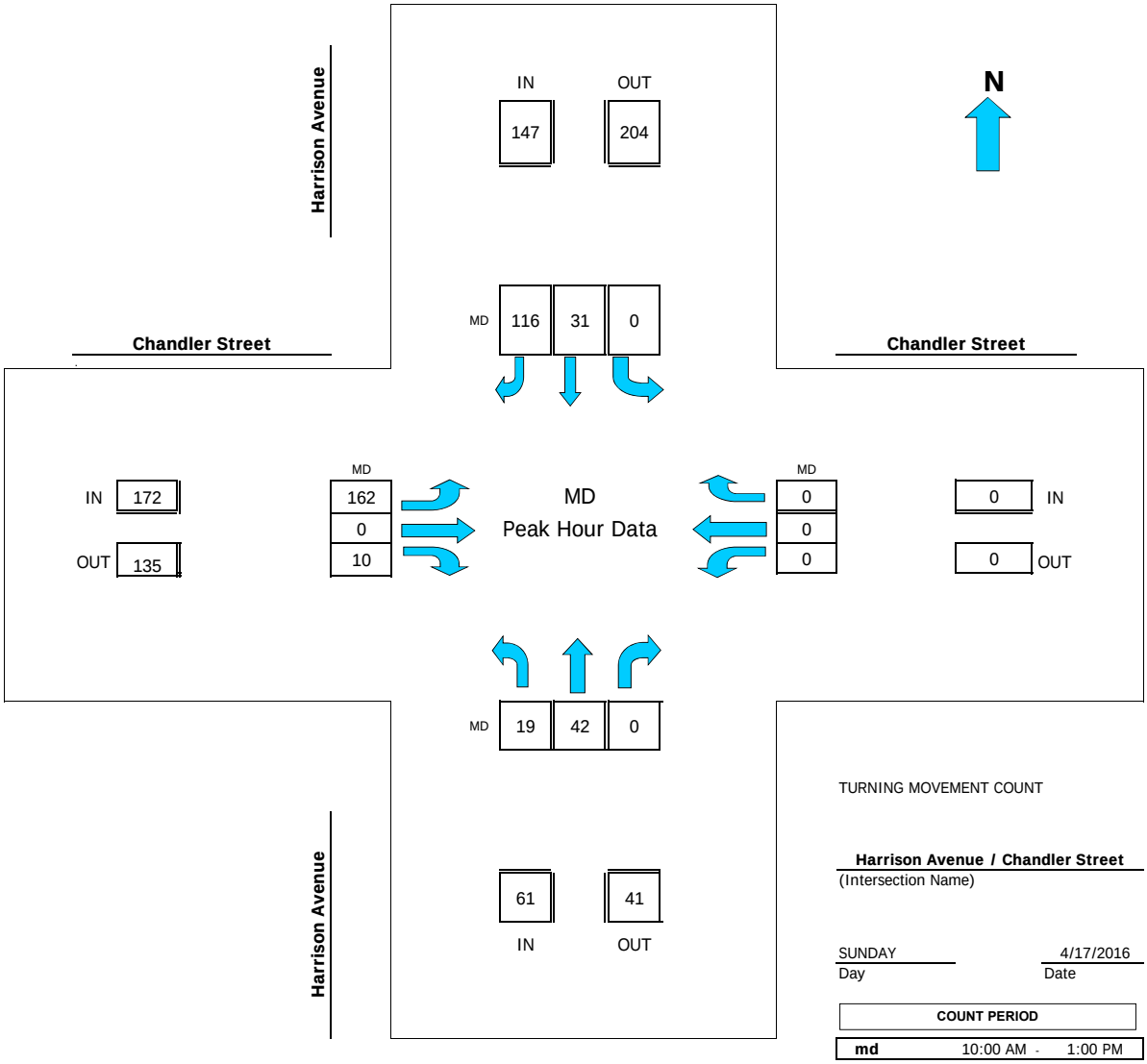
	Harrison Avenue Northbound				Harrison Avenue Southbound				Chandler Street Eastbound				Chandler Street Westbound				
	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
10:00 AM	2	5	0	0	0	6	20	0	22	0	4	0	0	0	0	0	59
10:15 AM	4	11	0	0	0	10	39	0	32	0	3	0	0	0	0	0	99
10:30 AM	7	10	0	0	0	11	29	0	29	0	1	0	0	0	0	0	87
10:45 AM	7	8	0	0	0	9	30	0	41	0	1	0	0	0	0	0	96
11:00 AM	3	9	0	0	0	9	21	0	48	0	5	0	0	0	0	0	95
11:15 AM	3	13	0	0	0	7	42	0	36	0	0	0	0	0	0	0	101
11:30 AM	6	12	0	0	0	6	23	0	37	0	4	0	0	0	0	0	88
11:45 AM	5	10	0	0	0	6	30	0	33	0	2	0	0	0	0	0	86
12:00 PM	1	9	0	0	0	10	21	0	29	0	6	0	0	0	0	0	76
12:15 PM	5	11	0	0	0	9	21	0	32	0	1	0	0	0	0	0	79
12:30 PM	5	6	0	0	0	9	31	0	32	0	1	0	0	0	0	0	84
12:45 PM	3	7	0	0	0	9	18	0	33	0	5	0	0	0	0	0	75
TOTAL VOLUMES:	51	111	0	0	0	101	325	0	404	0	33	0	0	0	0	0	1025

NOON Peak Hr Begins at: 1045 AM

	NL	NT	NR	RTOR	SL	ST	SR	RTOR	EL	ET	ER	RTOR	WL	WT	WR	RTOR	TOTAL
PEAK VOLUMES:	19	42	0	0	0	31	116	0	162	0	10	0	0	0	0	0	380

PEAK HR FACTOR:	0.847	0.750	0.811	0.000	0.941

Location:	Eastvale	Date:	4/17/2016
N/S:	Harrison Avenue	Day:	SUNDAY
E/W:	Chandler Street	Job #	0



TURNING MOVEMENT COUNT

Harrison Avenue / Chandler Street
(Intersection Name)

SUNDAY
Day

4/17/2016
Date

COUNT PERIOD		
md	10:00 AM -	1:00 PM

MD PEAK HOUR 1045 AM

Location: Eastvale
N/S: Harrison Avenue
E/W: Chandler Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

PEDESTRIANS

	East Leg Harrison Avenue	West Leg Chandler Street	South Leg Harrison Avenue	North Leg Chandler Street	TOTAL
10:00 AM	1	1	1	0	3
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	2	2
10:45 AM	0	0	0	0	0
11:00 AM	0	0	0	3	3
11:15 AM	0	0	0	2	2
11:30 AM	4	0	0	0	4
11:45 AM	0	0	0	1	1
12:00 PM	0	0	0	0	0
12:15 PM	0	0	0	0	0
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	5	1	1	8	15

Peak Hr	1045	4	0	0	5	9

Location: Eastvale
N/S: Harrison Avenue
E/W: Chandler Street

Date: 4/17/2016
Day: SUNDAY
Project # 0

BICYCLES

	East Leg Harrison Avenue	West Leg Chandler Street	South Leg Harrison Avenue	North Leg Chandler Street	TOTAL
10:00 AM	0	0	0	0	0
10:15 AM	0	0	0	0	0
10:30 AM	0	0	0	1	1
10:45 AM	0	0	0	0	0
11:00 AM	0	0	0	0	0
11:15 AM	1	0	1	0	2
11:30 AM	1	0	0	0	1
11:45 AM	0	0	0	1	1
12:00 PM	0	0	0	0	0
12:15 PM	2	0	0	0	2
12:30 PM	0	0	0	0	0
12:45 PM	0	0	0	0	0
TOTAL VOLUMES:	4	0	1	2	7

Peak Hr	1045	2	0	1	0	3

APPENDIX 3.2:

EXISTING (2016) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

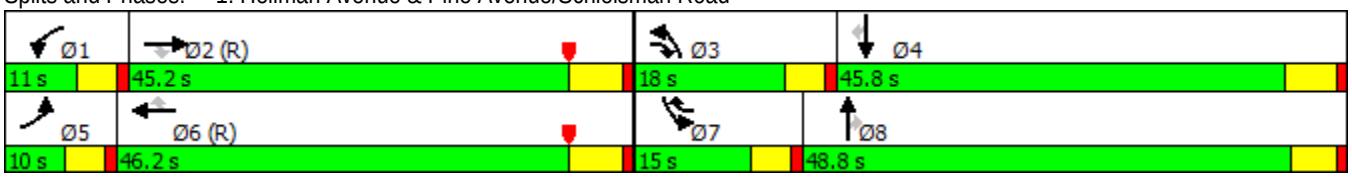
1: Hellman Avenue & Pine Avenue/Schleisman Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	517	131	19	630	116	157	70	23	149	64	8
Future Volume (vph)	8	517	131	19	630	116	157	70	23	149	64	8
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6	7	3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	3	1	6	7	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	36.8	9.6	9.6	36.8	9.6	9.6	45.1	45.1	9.6	45.8	45.8
Total Split (s)	10.0	45.2	18.0	11.0	46.2	15.0	18.0	48.8	48.8	15.0	45.8	45.8
Total Split (%)	8.3%	37.7%	15.0%	9.2%	38.5%	12.5%	15.0%	40.7%	40.7%	12.5%	38.2%	38.2%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	3.6	3.6	4.1	4.1	3.6	4.8	4.8
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	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	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	4.6	4.6	5.1	5.1	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	C-Max	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	5.1	46.2	62.2	5.4	48.4	63.5	10.2	44.8	44.8	9.3	43.2	43.2
Actuated g/C Ratio	0.04	0.38	0.52	0.04	0.40	0.53	0.08	0.37	0.37	0.08	0.36	0.36
v/c Ratio	0.06	0.40	0.16	0.13	0.47	0.14	0.57	0.06	0.04	0.60	0.05	0.01
Control Delay	56.0	28.9	3.2	56.7	28.3	3.2	60.4	24.7	0.1	63.2	26.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	28.9	3.2	56.7	28.3	3.2	60.4	24.7	0.1	63.2	26.1	0.0
LOS	E	C	A	E	C	A	E	C	A	E	C	A
Approach Delay		24.1			25.2			45.0			50.1	
Approach LOS		C			C			D			D	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 30.4 — Intersection LOS: C
Intersection Capacity Utilization 43.7% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Hellman Avenue & Pine Avenue/Schleisman Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	517	131	19	630	116	157	70	23	149	64	8
Future Volume (veh/h)	8	517	131	19	630	116	157	70	23	149	64	8
Number	5	2	12	1	6	16	3	8	18	7	4	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	9	550	123	20	670	111	167	74	23	159	68	9
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	37	1344	705	70	1378	715	224	1289	577	215	1279	572
Arrive On Green	0.01	0.38	0.38	0.02	0.39	0.39	0.07	0.36	0.36	0.06	0.36	0.36
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	9	550	123	20	670	111	167	74	23	159	68	9
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	0.3	13.7	5.6	0.7	17.1	5.0	5.7	1.6	1.1	5.4	1.5	0.4
Cycle Q Clear(g_c), s	0.3	13.7	5.6	0.7	17.1	5.0	5.7	1.6	1.1	5.4	1.5	0.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	37	1344	705	70	1378	715	224	1289	577	215	1279	572
V/C Ratio(X)	0.24	0.41	0.17	0.29	0.49	0.16	0.74	0.06	0.04	0.74	0.05	0.02
Avail Cap(c_a), veh/h	155	1344	705	184	1378	715	384	1289	577	298	1279	572
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.9	27.3	20.0	57.9	27.6	19.4	55.1	24.8	24.6	55.3	25.0	24.6
Incr Delay (d2), s/veh	1.2	0.9	0.5	0.8	1.2	0.5	1.8	0.1	0.1	3.3	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	6.9	2.6	0.3	8.6	2.2	2.8	0.8	0.5	2.7	0.8	0.2
LnGrp Delay(d),s/veh	60.1	28.2	20.6	58.8	28.8	19.9	57.0	24.9	24.7	58.6	25.0	24.7
LnGrp LOS	E	C	C	E	C	B	E	C	C	E	C	C
Approach Vol, veh/h		682			801			264			236	
Approach Delay, s/veh		27.3			28.3			45.1			47.6	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	51.4	12.4	49.2	5.9	52.5	12.1	49.5
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	* 5.8
Max Green Setting (Gmax), s	6.4	39.4	13.4	40.0	5.4	40.4	10.4	* 44
Max Q Clear Time (g_c+I1), s	2.7	15.7	7.7	3.5	2.3	19.1	7.4	3.6
Green Ext Time (p_c), s	0.0	12.6	0.1	0.9	0.0	11.9	0.1	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Notes

2: Hellman Avenue & Chino Corona Road/Chandler Street

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT	Ø4	Ø5
Lane Configurations								
Traffic Volume (vph)	12	0	56	4	136	70		
Future Volume (vph)	12	0	56	4	136	70		
Turn Type	Split	NA	NA	Perm	Prot	NA		
Protected Phases	8	8	2		1	6	4	5
Permitted Phases				2				
Detector Phase	8	8	2	2	1	6		
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0
Minimum Split (s)	15.1	15.1	22.8	22.8	9.6	15.8	15.1	9.6
Total Split (s)	15.2	15.2	22.9	22.9	16.8	30.1	15.1	9.6
Total Split (%)	21.7%	21.7%	32.7%	32.7%	24.0%	43.0%	22%	14%
Yellow Time (s)	4.1	4.1	4.8	4.8	3.6	4.8	4.1	3.6
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		
Total Lost Time (s)	5.1	5.1	5.8	5.8	4.6	5.8		
Lead/Lag			Lead	Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes		Yes
Recall Mode	None	None	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	10.0	10.0	35.7	35.7	10.9	49.1		
Actuated g/C Ratio	0.14	0.14	0.51	0.51	0.16	0.70		
v/c Ratio	0.05	0.17	0.06	0.00	0.52	0.06		
Control Delay	26.6	0.4	10.8	0.0	33.8	3.4		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	26.6	0.4	10.8	0.0	33.8	3.4		
LOS	C	A	B	A	C	A		
Approach Delay		2.1	10.1			23.4		
Approach LOS		A	B			C		

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 12.8 — Intersection LOS: B
Intersection Capacity Utilization 34.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Hellman Avenue & Chino Corona Road/Chandler Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	12	0	177	0	56	4	136	70	0
Future Volume (veh/h)	0	0	0	12	0	177	0	56	4	136	70	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	0	0	0	13	0	186	0	59	4	143	74	0
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	3	0	249	0	222	3	455	387	669	1312	0
Arrive On Green	0.00	0.00	0.00	0.14	0.00	0.14	0.00	0.24	0.24	0.38	0.70	0.00
Sat Flow, veh/h	0	1863	0	1774	0	1583	1774	1863	1583	1774	1863	0
Grp Volume(v), veh/h	0	0	0	13	0	186	0	59	4	143	74	0
Grp Sat Flow(s),veh/h/ln	0	1863	0	1774	0	1583	1774	1863	1583	1774	1863	0
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	8.0	0.0	1.7	0.1	3.8	0.9	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.4	0.0	8.0	0.0	1.7	0.1	3.8	0.9	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	3	0	249	0	222	3	455	387	669	1312	0
V/C Ratio(X)	0.00	0.00	0.00	0.05	0.00	0.84	0.00	0.13	0.01	0.21	0.06	0.00
Avail Cap(c_a), veh/h	0	266	0	256	0	228	127	455	387	669	1312	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	26.1	0.0	29.3	0.0	20.6	20.0	14.8	3.2	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.0	22.7	0.0	0.6	0.0	0.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.2	0.0	4.9	0.0	1.0	0.1	1.9	0.5	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	26.2	0.0	52.0	0.0	21.2	20.1	14.8	3.3	0.0
LnGrp LOS				C		D		C	C	B	A	
Approach Vol, veh/h		0			199			63			217	
Approach Delay, s/veh		0.0			50.3			21.2			10.9	
Approach LOS					D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	32.2	22.9		0.0	0.0	55.1		14.9
Change Period (Y+Rc), s	5.8	* 5.8		5.1	4.6	5.8		5.1
Max Green Setting (Gmax), s	12.2	* 17		10.0	5.0	24.3		10.1
Max Q Clear Time (g_c+I1), s	5.8	3.7		0.0	0.0	2.9		10.0
Green Ext Time (p_c), s	0.2	0.2		0.0	0.0	0.5		0.0

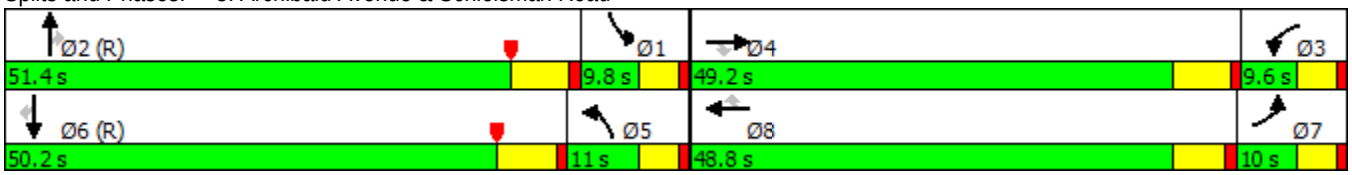
Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	488	112	129	432	44	267	444	103	95	408	311
Future Volume (vph)	233	488	112	129	432	44	267	444	103	95	408	311
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	49.2	49.2	9.6	48.8	48.8	9.6	49.2	49.2	9.6	49.2	49.2
Total Split (s)	10.0	49.2	49.2	9.6	48.8	48.8	11.0	51.4	51.4	9.8	50.2	50.2
Total Split (%)	8.3%	41.0%	41.0%	8.0%	40.7%	40.7%	9.2%	42.8%	42.8%	8.2%	41.8%	41.8%
Yellow Time (s)	3.6	5.2	5.2	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	5.2
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	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	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	6.2
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	16.4	23.4	23.4	14.4	21.8	21.8	6.4	55.4	55.4	5.2	54.2	54.2
Actuated g/C Ratio	0.14	0.20	0.20	0.12	0.18	0.18	0.05	0.46	0.46	0.04	0.45	0.45
v/c Ratio	0.52	0.51	0.29	0.33	0.49	0.12	1.52	0.20	0.14	0.67	0.19	0.38
Control Delay	54.0	44.0	7.4	53.1	44.7	0.7	297.6	20.0	4.4	78.4	20.6	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	44.0	7.4	53.1	44.7	0.7	297.6	20.0	4.4	78.4	20.6	6.1
LOS	D	D	A	D	D	A	F	C	A	E	C	A
Approach Delay		41.9			43.3			109.1			21.8	
Approach LOS		D			D			F			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.52	
Intersection Signal Delay: 54.7	Intersection LOS: D
Intersection Capacity Utilization 77.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Archibald Avenue & Schleisman Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	488	112	129	432	44	267	444	103	95	408	311
Future Volume (veh/h)	233	488	112	129	432	44	267	444	103	95	408	311
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	243	508	66	134	450	36	278	462	56	99	425	232
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
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	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	826	257	143	747	232	858	1915	596	823	1865	579
Arrive On Green	0.06	0.16	0.16	0.04	0.15	0.15	0.25	0.38	0.38	0.24	0.37	0.37
Sat Flow, veh/h	3442	5085	1580	3442	5085	1577	3442	5085	1583	3442	5085	1579
Grp Volume(v), veh/h	243	508	66	134	450	36	278	462	56	99	425	232
Grp Sat Flow(s),veh/h/ln	1721	1695	1580	1721	1695	1577	1721	1695	1583	1721	1695	1579
Q Serve(g_s), s	7.3	11.2	4.4	4.7	9.9	2.4	7.9	7.5	2.7	2.7	6.9	13.1
Cycle Q Clear(g_c), s	7.3	11.2	4.4	4.7	9.9	2.4	7.9	7.5	2.7	2.7	6.9	13.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	826	257	143	747	232	858	1915	596	823	1865	579
V/C Ratio(X)	1.17	0.62	0.26	0.93	0.60	0.16	0.32	0.24	0.09	0.12	0.23	0.40
Avail Cap(c_a), veh/h	208	1822	566	143	1822	565	858	1915	596	823	1865	579
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.4	46.8	43.9	57.3	47.9	44.7	36.8	25.6	24.2	35.8	26.3	28.2
Incr Delay (d2), s/veh	114.9	1.1	0.7	55.0	1.1	0.4	0.1	0.3	0.3	0.0	0.3	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	5.3	2.0	3.3	4.7	1.1	3.8	3.6	1.2	1.3	3.3	6.0
LnGrp Delay(d),s/veh	171.3	47.8	44.7	112.3	49.0	45.1	36.9	25.9	24.5	35.8	26.5	30.3
LnGrp LOS	F	D	D	F	D	D	D	C	C	D	C	C
Approach Vol, veh/h		817			620			796			756	
Approach Delay, s/veh		84.3			62.5			29.7			28.9	
Approach LOS		F			E			C			C	

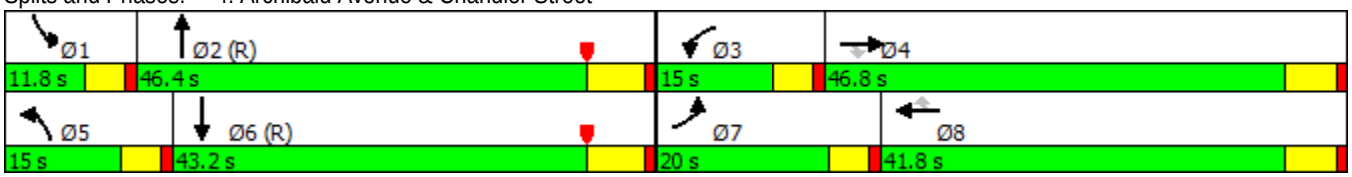
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.3	51.4	9.6	25.7	34.5	50.2	11.9	23.4
Change Period (Y+Rc), s	4.6	6.2	4.6	6.2	4.6	6.2	4.6	5.8
Max Green Setting (Gmax), s	5.2	45.2	5.0	43.0	6.4	44.0	5.4	43.0
Max Q Clear Time (g_c+I1), s	4.7	9.5	6.7	13.2	9.9	15.1	9.3	11.9
Green Ext Time (p_c), s	0.0	4.6	0.0	5.1	0.0	5.1	0.0	4.4

Intersection Summary	
HCM 2010 Ctrl Delay	51.2
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	106	72	70	70	74	25	68	342	43	328
Future Volume (vph)	106	72	70	70	74	25	68	342	43	328
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases			4			8				
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	41.8	41.8	9.6	41.8	41.8	9.6	40.2	9.6	40.2
Total Split (s)	20.0	46.8	46.8	15.0	41.8	41.8	15.0	46.4	11.8	43.2
Total Split (%)	16.7%	39.0%	39.0%	12.5%	34.8%	34.8%	12.5%	38.7%	9.8%	36.0%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	3.6	5.2
All-Red Time (s)	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	5.8	5.8	4.6	5.8	5.8	4.6	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	12.3	17.8	17.8	8.6	15.2	15.2	8.6	69.5	6.9	67.8
Actuated g/C Ratio	0.10	0.15	0.15	0.07	0.13	0.13	0.07	0.58	0.06	0.56
v/c Ratio	0.59	0.14	0.22	0.56	0.17	0.08	0.55	0.15	0.44	0.24
Control Delay	64.9	41.6	2.8	70.5	44.8	0.4	69.5	13.6	67.8	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.9	41.6	2.8	70.5	44.8	0.4	69.5	13.6	67.8	16.0
LOS	E	D	A	E	D	A	E	B	E	B
Approach Delay		40.6			48.7			21.2		20.5
Approach LOS		D			D			C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 27.6	Intersection LOS: C
Intersection Capacity Utilization 43.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Archibald Avenue & Chandler Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	72	70	70	74	25	68	342	88	43	328	126
Future Volume (veh/h)	106	72	70	70	74	25	68	342	88	43	328	126
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	108	73	33	71	76	9	69	349	48	44	335	98
Adj No. of Lanes	1	2	1	1	2	1	1	3	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	133	379	167	91	295	130	88	2871	386	57	1669	481
Arrive On Green	0.07	0.11	0.11	0.05	0.08	0.08	0.05	0.63	0.63	0.03	0.62	0.62
Sat Flow, veh/h	1774	3539	1561	1774	3539	1560	1774	4536	610	1774	2713	782
Grp Volume(v), veh/h	108	73	33	71	76	9	69	259	138	44	217	216
Grp Sat Flow(s),veh/h/ln	1774	1770	1561	1774	1770	1560	1774	1695	1755	1774	1770	1725
Q Serve(g_s), s	7.2	2.3	2.3	4.7	2.4	0.6	4.6	3.6	3.8	3.0	6.4	6.6
Cycle Q Clear(g_c), s	7.2	2.3	2.3	4.7	2.4	0.6	4.6	3.6	3.8	3.0	6.4	6.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.35	1.00		0.45
Lane Grp Cap(c), veh/h	133	379	167	91	295	130	88	2146	1111	57	1089	1061
V/C Ratio(X)	0.81	0.19	0.20	0.78	0.26	0.07	0.78	0.12	0.12	0.77	0.20	0.20
Avail Cap(c_a), veh/h	228	1209	533	154	1062	468	154	2146	1111	106	1089	1061
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.7	48.8	48.9	56.3	51.5	50.7	56.4	8.8	8.8	57.6	10.1	10.2
Incr Delay (d2), s/veh	4.5	0.2	0.6	5.5	0.5	0.2	5.6	0.1	0.2	8.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	1.1	1.0	2.5	1.2	0.3	2.4	1.7	1.9	1.6	3.3	3.3
LnGrp Delay(d),s/veh	59.1	49.1	49.4	61.7	52.0	50.9	61.9	8.9	9.0	65.7	10.5	10.6
LnGrp LOS	E	D	D	E	D	D	E	A	A	E	B	B
Approach Vol, veh/h		214			156			466			477	
Approach Delay, s/veh		54.2			56.4			16.8			15.6	
Approach LOS		D			E			B			B	

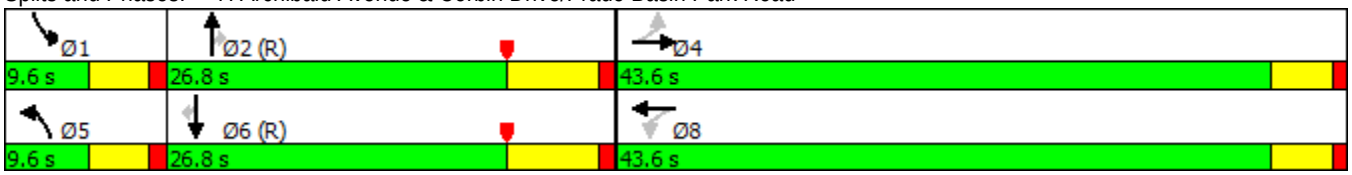
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	82.2	10.7	18.7	10.6	80.0	13.6	15.8
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8
Max Green Setting (Gmax), s	7.2	40.2	10.4	41.0	10.4	37.0	15.4	36.0
Max Q Clear Time (g_c+I1), s	5.0	5.8	6.7	4.3	6.6	8.6	9.2	4.4
Green Ext Time (p_c), s	0.0	7.4	0.0	1.0	0.0	7.1	0.1	1.0

Intersection Summary	
HCM 2010 Ctrl Delay	27.2
HCM 2010 LOS	C

Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	21	0	0	12	420	1	6	413	22
Future Volume (vph)	21	0	0	12	420	1	6	413	22
Turn Type	Perm	NA	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4	8	5	2		1	6	
Permitted Phases	4					2			6
Detector Phase	4	4	8	5	2	2	1	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	43.6	43.6	14.6	9.6	26.5	26.5	9.6	26.5	26.5
Total Split (s)	43.6	43.6	43.6	9.6	26.8	26.8	9.6	26.8	26.8
Total Split (%)	54.5%	54.5%	54.5%	12.0%	33.5%	33.5%	12.0%	33.5%	33.5%
Yellow Time (s)	3.6	3.6	3.6	3.6	5.5	5.5	3.6	5.5	5.5
All-Red Time (s)	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
Total Lost Time (s)		4.6	4.6	4.6	6.5	6.5	4.6	6.5	6.5
Lead/Lag				Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)		15.8	15.8	5.1	59.6	59.6	5.0	59.6	59.6
Actuated g/C Ratio		0.20	0.20	0.06	0.74	0.74	0.06	0.74	0.74
v/c Ratio		0.10	0.01	0.12	0.32	0.00	0.05	0.11	0.02
Control Delay		0.5	0.0	37.8	12.6	0.0	36.5	8.5	0.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		0.5	0.0	37.8	12.6	0.0	36.5	8.5	0.0
LOS		A	A	D	B	A	D	A	A
Approach Delay		0.5	0.0		13.3			8.5	
Approach LOS		A	A		B			A	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.32	
Intersection Signal Delay: 10.4	Intersection LOS: B
Intersection Capacity Utilization 40.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Archibald Avenue & Corbin Drive/Prado Basin Park Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	0	15	0	0	4	12	420	1	6	413	22
Future Volume (veh/h)	21	0	15	0	0	4	12	420	1	6	413	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	22	0	2	0	0	0	12	438	1	6	430	21
Adj No. of Lanes	0	1	0	0	1	0	1	1	1	1	3	1
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	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	151	4	6	0	96	0	26	1386	1178	14	3750	1168
Arrive On Green	0.05	0.00	0.05	0.00	0.00	0.00	0.01	0.74	0.74	0.01	0.74	0.74
Sat Flow, veh/h	1249	74	120	0	1863	0	1774	1863	1583	1774	5085	1583
Grp Volume(v), veh/h	24	0	0	0	0	0	12	438	1	6	430	21
Grp Sat Flow(s),veh/h/ln	1443	0	0	0	1863	0	1774	1863	1583	1774	1695	1583
Q Serve(g_s), s	1.1	0.0	0.0	0.0	0.0	0.0	0.5	6.3	0.0	0.3	1.9	0.3
Cycle Q Clear(g_c), s	1.2	0.0	0.0	0.0	0.0	0.0	0.5	6.3	0.0	0.3	1.9	0.3
Prop In Lane	0.92		0.08	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	161	0	0	0	96	0	26	1386	1178	14	3750	1168
V/C Ratio(X)	0.15	0.00	0.00	0.00	0.00	0.00	0.46	0.32	0.00	0.43	0.11	0.02
Avail Cap(c_a), veh/h	782	0	0	0	908	0	111	1386	1178	111	3750	1168
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.5	0.0	0.0	0.0	0.0	0.0	39.1	3.4	2.6	39.5	3.0	2.8
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.0	0.0	0.0	4.7	0.6	0.0	7.8	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.0	0.0	0.0	0.3	3.4	0.0	0.2	0.9	0.1
LnGrp Delay(d),s/veh	37.0	0.0	0.0	0.0	0.0	0.0	43.8	4.0	2.6	47.3	3.1	2.8
LnGrp LOS	D						D	A	A	D	A	A
Approach Vol, veh/h		24			0			451			457	
Approach Delay, s/veh		37.0			0.0			5.1			3.6	
Approach LOS		D						A			A	

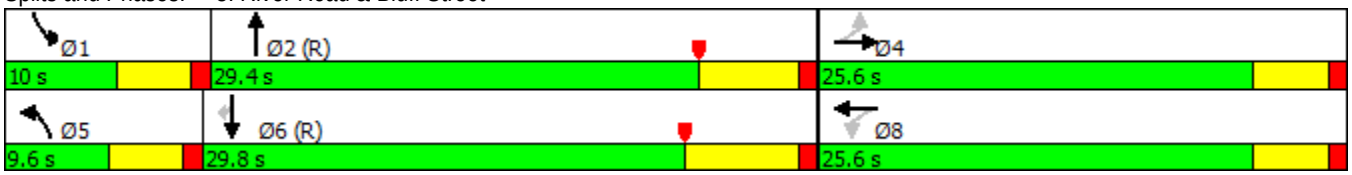
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.2	66.0		8.7	5.8	65.5		8.7
Change Period (Y+Rc), s	4.6	6.5		4.6	4.6	6.5		4.6
Max Green Setting (Gmax), s	5.0	20.3		39.0	5.0	20.3		39.0
Max Q Clear Time (g_c+I1), s	2.3	8.3		3.2	2.5	3.9		0.0
Green Ext Time (p_c), s	0.0	5.2		0.1	0.0	6.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	5.2
HCM 2010 LOS	A

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	11	7	9	19	23	377	42	489	23
Future Volume (vph)	11	7	9	19	23	377	42	489	23
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA	Perm
Protected Phases		4		8	5	2	1	6	
Permitted Phases	4		8						6
Detector Phase	4	4	8	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	25.6	25.6	14.6	14.6	9.6	24.8	9.6	25.5	25.5
Total Split (s)	25.6	25.6	25.6	25.6	9.6	29.4	10.0	29.8	29.8
Total Split (%)	39.4%	39.4%	39.4%	39.4%	14.8%	45.2%	15.4%	45.8%	45.8%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	4.8	3.6	5.5	5.5
All-Red Time (s)	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
Total Lost Time (s)		4.6		4.6	4.6	5.8	4.6	6.5	6.5
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)		12.2		12.2	5.3	44.1	5.7	46.1	46.1
Actuated g/C Ratio		0.19		0.19	0.08	0.68	0.09	0.71	0.71
v/c Ratio		0.18		0.20	0.17	0.34	0.29	0.21	0.02
Control Delay		11.5		13.0	30.8	10.9	32.8	8.0	0.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.5		13.0	30.8	10.9	32.8	8.0	0.0
LOS		B		B	C	B	C	A	A
Approach Delay		11.5		13.0		12.0		9.6	
Approach LOS		B		B		B		A	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.34	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 45.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: River Road & Bluff Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	7	34	9	19	32	23	377	11	42	489	23
Future Volume (veh/h)	11	7	34	9	19	32	23	377	11	42	489	23
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	12	8	2	10	21	6	25	410	11	46	532	25
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	150	83	15	96	121	28	50	1109	30	77	2229	996
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.03	0.61	0.61	0.04	0.63	0.63
Sat Flow, veh/h	643	821	146	252	1198	281	1774	1806	48	1774	3539	1582
Grp Volume(v), veh/h	22	0	0	37	0	0	25	0	421	46	532	25
Grp Sat Flow(s),veh/h/ln	1610	0	0	1730	0	0	1774	0	1854	1774	1770	1582
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	7.4	1.7	4.3	0.4
Cycle Q Clear(g_c), s	0.7	0.0	0.0	1.2	0.0	0.0	0.9	0.0	7.4	1.7	4.3	0.4
Prop In Lane	0.55		0.09	0.27		0.16	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	248	0	0	245	0	0	50	0	1139	77	2229	996
V/C Ratio(X)	0.09	0.00	0.00	0.15	0.00	0.00	0.50	0.00	0.37	0.60	0.24	0.03
Avail Cap(c_a), veh/h	591	0	0	615	0	0	136	0	1139	147	2229	996
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	0.0	0.0	26.8	0.0	0.0	31.1	0.0	6.3	30.5	5.2	4.5
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	2.9	0.0	0.9	2.7	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.6	0.0	0.0	0.5	0.0	4.0	0.9	2.1	0.2
LnGrp Delay(d),s/veh	26.7	0.0	0.0	27.1	0.0	0.0	34.1	0.0	7.2	33.3	5.5	4.6
LnGrp LOS	C			C			C		A	C	A	A
Approach Vol, veh/h		22			37			446			603	
Approach Delay, s/veh		26.7			27.1			8.7			7.6	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.4	46.4		11.2	6.4	47.4		11.2
Change Period (Y+Rc), s	4.6	* 6.5		4.6	4.6	6.5		4.6
Max Green Setting (Gmax), s	5.4	* 24		21.0	5.0	23.3		21.0
Max Q Clear Time (g_c+I1), s	3.7	9.4		2.7	2.9	6.3		3.2
Green Ext Time (p_c), s	0.0	6.4		0.2	0.0	7.1		0.2

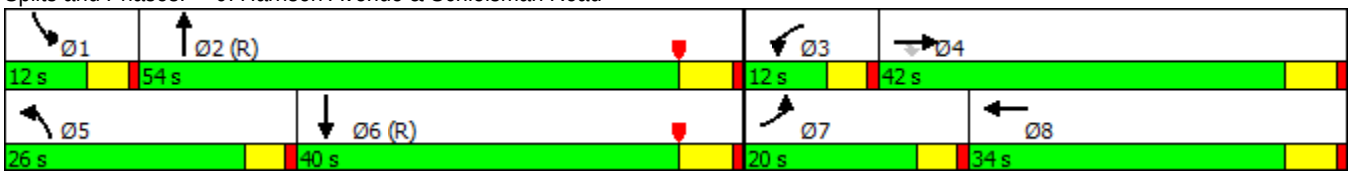
Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 LOS	A

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	83	447	102	21	442	135	112	28	80
Future Volume (vph)	83	447	102	21	442	135	112	28	80
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.8	29.8	9.6	29.8	9.6	35.8	9.6	35.8
Total Split (s)	20.0	42.0	42.0	12.0	34.0	26.0	54.0	12.0	40.0
Total Split (%)	16.7%	35.0%	35.0%	10.0%	28.3%	21.7%	45.0%	10.0%	33.3%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	3.6	4.8
All-Red Time (s)	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
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	10.7	32.0	32.0	6.1	23.6	14.6	62.5	6.4	50.3
Actuated g/C Ratio	0.09	0.27	0.27	0.05	0.20	0.12	0.52	0.05	0.42
v/c Ratio	0.59	0.53	0.22	0.27	0.73	0.71	0.09	0.33	0.11
Control Delay	67.3	39.7	3.0	61.8	51.4	67.5	14.8	63.8	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	39.7	3.0	61.8	51.4	67.5	14.8	63.8	15.0
LOS	E	D	A	E	D	E	B	E	B
Approach Delay		37.4			51.9		40.9		23.1
Approach LOS		D			D		D		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 40.9	Intersection LOS: D
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: Harrison Avenue & Schleisman Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	447	102	21	442	11	135	112	26	28	80	60
Future Volume (veh/h)	83	447	102	21	442	11	135	112	26	28	80	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	502	75	24	497	6	152	126	13	31	90	58
Adj No. of Lanes	1	2	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	116	839	375	41	696	8	180	1750	178	48	992	593
Arrive On Green	0.07	0.24	0.24	0.02	0.19	0.19	0.10	0.54	0.54	0.03	0.47	0.47
Sat Flow, veh/h	1774	3539	1581	1774	3581	43	1774	3243	330	1774	2132	1275
Grp Volume(v), veh/h	93	502	75	24	245	258	152	68	71	31	74	74
Grp Sat Flow(s),veh/h/ln	1774	1770	1581	1774	1770	1855	1774	1770	1803	1774	1770	1638
Q Serve(g_s), s	6.2	15.1	4.6	1.6	15.6	15.6	10.1	2.2	2.3	2.1	2.8	3.1
Cycle Q Clear(g_c), s	6.2	15.1	4.6	1.6	15.6	15.6	10.1	2.2	2.3	2.1	2.8	3.1
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.18	1.00		0.78
Lane Grp Cap(c), veh/h	116	839	375	41	344	361	180	955	973	48	823	762
V/C Ratio(X)	0.80	0.60	0.20	0.59	0.71	0.71	0.85	0.07	0.07	0.65	0.09	0.10
Avail Cap(c_a), veh/h	228	1068	477	109	416	436	316	955	973	109	823	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	40.7	36.7	58.1	45.2	45.2	53.0	13.2	13.2	57.8	17.9	18.0
Incr Delay (d2), s/veh	4.7	1.0	0.4	5.0	5.4	5.2	4.2	0.1	0.1	5.5	0.2	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	3.2	7.5	2.0	0.8	8.2	8.5	5.1	1.1	1.2	1.1	1.4	1.4
LnGrp Delay(d),s/veh	59.9	41.7	37.0	63.0	50.6	50.4	57.2	13.4	13.4	63.3	18.1	18.2
LnGrp LOS	E	D	D	E	D	D	E	B	B	E	B	B
Approach Vol, veh/h		670			527			291			179	
Approach Delay, s/veh		43.7			51.1			36.3			26.0	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	70.6	7.4	34.3	16.7	61.6	12.5	29.1
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	7.4	48.2	7.4	36.2	21.4	34.2	15.4	28.2
Max Q Clear Time (g_c+I1), s	4.1	4.3	3.6	17.1	12.1	5.1	8.2	17.6
Green Ext Time (p_c), s	0.0	1.6	0.0	8.2	0.1	1.5	0.0	5.7

Intersection Summary	
HCM 2010 Ctrl Delay	42.8
HCM 2010 LOS	D

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Traffic Vol, veh/h	0	162	10	0	19	42	0	31	116
Future Vol, veh/h	0	162	10	0	19	42	0	31	116
Peak Hour Factor	0.92	0.94	0.94	0.92	0.94	0.94	0.92	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	172	11	0	20	45	0	33	123
Number of Lanes	0	1	1	0	0	1	0	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.1	8.6	7.9
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	31%	100%	0%	0%	0%
Vol Thru, %	69%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	61	162	10	31	116
LT Vol	19	162	0	0	0
Through Vol	42	0	0	31	0
RT Vol	0	0	10	0	116
Lane Flow Rate	65	172	11	33	123
Geometry Grp	4	7	7	7	7
Degree of Util (X)	0.092	0.266	0.013	0.047	0.152
Departure Headway (Hd)	5.096	5.55	4.346	5.125	4.421
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	704	648	823	700	813
Service Time	3.122	3.279	2.075	2.844	2.14
HCM Lane V/C Ratio	0.092	0.265	0.013	0.047	0.151
HCM Control Delay	8.6	10.3	7.1	8.1	7.9
HCM Lane LOS	A	B	A	A	A
HCM 95th-tile Q	0.3	1.1	0	0.1	0.5

This Page Intentionally Left Blank

APPENDIX 3.3:

EXISTING (2016) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

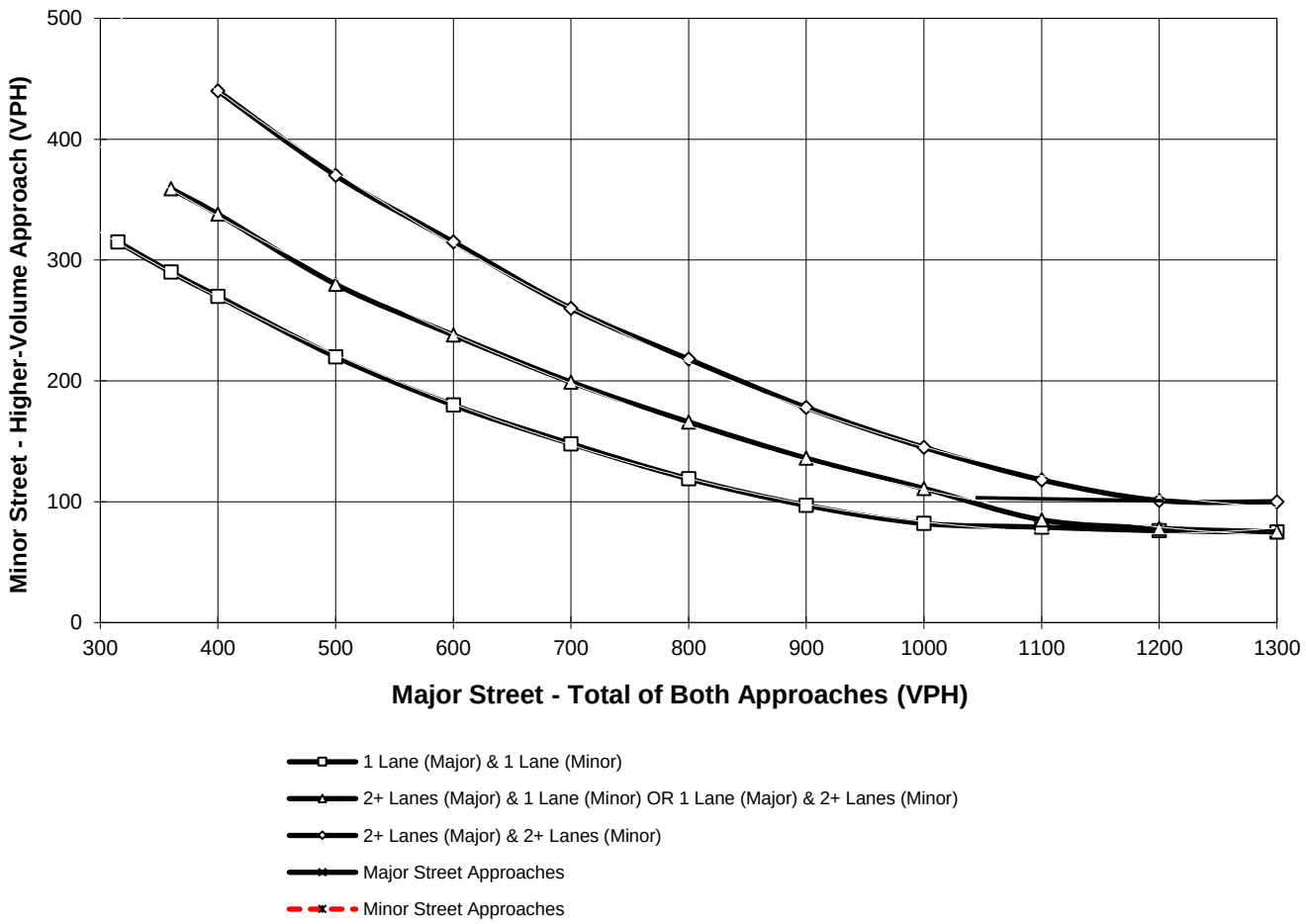
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing (2016) Conditions - Sunday Mid-day Peak Hour**

Major Street Name = **Harrison Avenue**
Total of Both Approaches (VPH) = **208**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Chandler Street**
High Volume Approach (VPH) = **172**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



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

This Page Intentionally Left Blank

APPENDIX 5.1:

E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

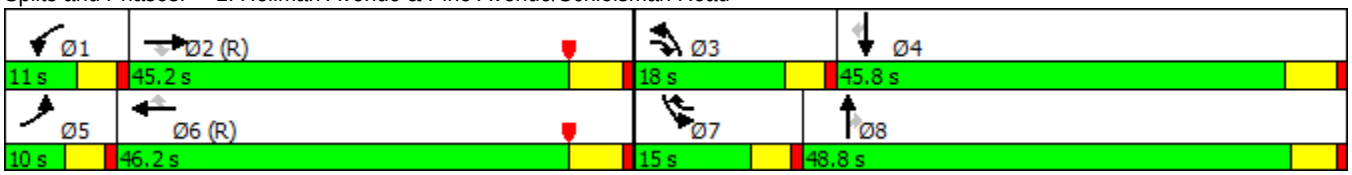
1: Hellman Avenue & Pine Avenue/Schleisman Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	532	142	19	644	116	168	95	23	149	90	8
Future Volume (vph)	8	532	142	19	644	116	168	95	23	149	90	8
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2	3	1	6	7	3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	3	1	6	7	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	36.8	9.6	9.6	36.8	9.6	9.6	45.1	45.1	9.6	45.8	45.8
Total Split (s)	10.0	45.2	18.0	11.0	46.2	15.0	18.0	48.8	48.8	15.0	45.8	45.8
Total Split (%)	8.3%	37.7%	15.0%	9.2%	38.5%	12.5%	15.0%	40.7%	40.7%	12.5%	38.2%	38.2%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	3.6	3.6	4.1	4.1	3.6	4.8	4.8
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	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	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	4.6	4.6	5.1	5.1	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	C-Max	None	None	Max	Max	None	Max	Max
Act Effct Green (s)	5.1	46.2	62.5	5.4	48.4	63.5	10.5	44.8	44.8	9.3	42.9	42.9
Actuated g/C Ratio	0.04	0.38	0.52	0.04	0.40	0.53	0.09	0.37	0.37	0.08	0.36	0.36
v/c Ratio	0.06	0.42	0.17	0.13	0.48	0.14	0.59	0.08	0.04	0.60	0.08	0.01
Control Delay	56.0	29.1	3.1	56.7	28.5	3.2	60.8	24.9	0.1	63.2	26.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	29.1	3.1	56.7	28.5	3.2	60.8	24.9	0.1	63.2	26.5	0.0
LOS	E	C	A	E	C	A	E	C	A	E	C	A
Approach Delay		24.0			25.4			44.0			47.7	
Approach LOS		C			C			D			D	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 30.4 — Intersection LOS: C
Intersection Capacity Utilization 44.4% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: Hellman Avenue & Pine Avenue/Schleisman Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	532	142	19	644	116	168	95	23	149	90	8
Future Volume (veh/h)	8	532	142	19	644	116	168	95	23	149	90	8
Number	5	2	12	1	6	16	3	8	18	7	4	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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	9	566	135	20	685	111	179	101	23	159	96	9
Adj No. of Lanes	2	2	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	37	1344	710	70	1378	715	237	1289	577	215	1266	566
Arrive On Green	0.01	0.38	0.38	0.02	0.39	0.39	0.07	0.36	0.36	0.06	0.36	0.36
Sat Flow, veh/h	3442	3539	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	9	566	135	20	685	111	179	101	23	159	96	9
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	0.3	14.2	6.2	0.7	17.6	5.0	6.1	2.2	1.1	5.4	2.1	0.4
Cycle Q Clear(g_c), s	0.3	14.2	6.2	0.7	17.6	5.0	6.1	2.2	1.1	5.4	2.1	0.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	37	1344	710	70	1378	715	237	1289	577	215	1266	566
V/C Ratio(X)	0.24	0.42	0.19	0.29	0.50	0.16	0.76	0.08	0.04	0.74	0.08	0.02
Avail Cap(c_a), veh/h	155	1344	710	184	1378	715	384	1289	577	298	1266	566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.9	27.5	19.9	57.9	27.7	19.4	54.9	25.0	24.6	55.3	25.4	24.9
Incr Delay (d2), s/veh	1.2	1.0	0.6	0.8	1.3	0.5	1.9	0.1	0.1	3.3	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	7.1	2.8	0.3	8.8	2.2	3.0	1.1	0.5	2.7	1.1	0.2
LnGrp Delay(d),s/veh	60.1	28.4	20.5	58.8	29.0	19.9	56.8	25.1	24.7	58.6	25.6	24.9
LnGrp LOS	E	C	C	E	C	B	E	C	C	E	C	C
Approach Vol, veh/h		710			816			303			264	
Approach Delay, s/veh		27.3			28.5			43.8			45.4	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	51.4	12.8	48.7	5.9	52.5	12.1	49.5
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	* 5.8
Max Green Setting (Gmax), s	6.4	39.4	13.4	40.0	5.4	40.4	10.4	* 44
Max Q Clear Time (g_c+I1), s	2.7	16.2	8.1	4.1	2.3	19.6	7.4	4.2
Green Ext Time (p_c), s	0.0	12.9	0.1	1.3	0.0	12.0	0.1	1.3

Intersection Summary	
HCM 2010 Ctrl Delay	32.5
HCM 2010 LOS	C

Notes

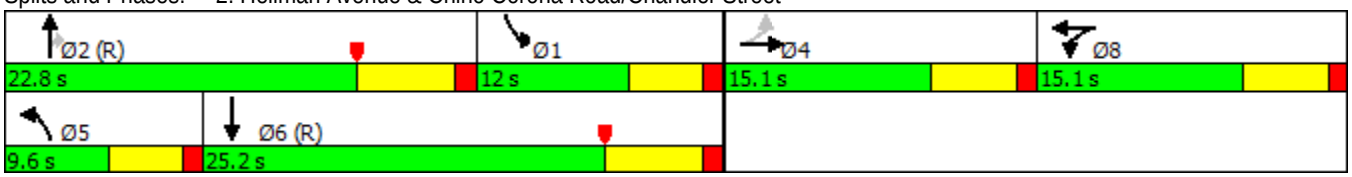
2: Hellman Avenue & Chino Corona Road/Chandler Street

Lane Group	WBL	WBT	NBT	NBR	SBL	SBT	Ø4	Ø5
Lane Configurations								
Traffic Volume (vph)	12	0	56	4	184	70		
Future Volume (vph)	12	0	56	4	184	70		
Turn Type	Split	NA	NA	Perm	Prot	NA		
Protected Phases	8	8	2		1	6	4	5
Permitted Phases				2				
Detector Phase	8	8	2	2	1	6		
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0
Minimum Split (s)	15.1	15.1	22.8	22.8	9.6	15.8	15.1	9.6
Total Split (s)	15.1	15.1	22.8	22.8	12.0	25.2	15.1	9.6
Total Split (%)	23.2%	23.2%	35.1%	35.1%	18.5%	38.8%	23%	15%
Yellow Time (s)	4.1	4.1	4.8	4.8	3.6	4.8	4.1	3.6
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		
Total Lost Time (s)	5.1	5.1	5.8	5.8	4.6	5.8		
Lead/Lag			Lead	Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes		Yes
Recall Mode	None	None	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	10.0	10.0	32.1	32.1	7.4	44.1		
Actuated g/C Ratio	0.15	0.15	0.49	0.49	0.11	0.68		
v/c Ratio	0.05	0.22	0.06	0.00	0.97	0.06		
Control Delay	24.1	0.5	8.9	0.0	89.0	3.7		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	24.1	0.5	8.9	0.0	89.0	3.7		
LOS	C	A	A	A	F	A		
Approach Delay		1.7	8.3			65.5		
Approach LOS		A	A			E		

Intersection Summary

Cycle Length: 65
Actuated Cycle Length: 65
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 31.9 — Intersection LOS: C
Intersection Capacity Utilization 39.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Hellman Avenue & Chino Corona Road/Chandler Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	12	0	224	0	56	4	184	70	0
Future Volume (veh/h)	0	0	0	12	0	224	0	56	4	184	70	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	0	0	0	13	0	236	0	59	4	194	74	0
Adj No. of Lanes	0	1	0	1	1	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	3	0	273	0	244	3	487	414	581	1264	0
Arrive On Green	0.00	0.00	0.00	0.15	0.00	0.15	0.00	0.26	0.26	0.33	0.68	0.00
Sat Flow, veh/h	0	1863	0	1774	0	1583	1774	1863	1583	1774	1863	0
Grp Volume(v), veh/h	0	0	0	13	0	236	0	59	4	194	74	0
Grp Sat Flow(s),veh/h/ln	0	1863	0	1774	0	1583	1774	1863	1583	1774	1863	0
Q Serve(g_s), s	0.0	0.0	0.0	0.4	0.0	9.6	0.0	1.6	0.1	5.4	0.9	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.4	0.0	9.6	0.0	1.6	0.1	5.4	0.9	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	0	3	0	273	0	244	3	487	414	581	1264	0
V/C Ratio(X)	0.00	0.00	0.00	0.05	0.00	0.97	0.00	0.12	0.01	0.33	0.06	0.00
Avail Cap(c_a), veh/h	0	287	0	273	0	244	136	487	414	581	1264	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	23.4	0.0	27.3	0.0	18.3	17.8	16.5	3.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.0	48.8	0.0	0.5	0.0	0.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.2	0.0	7.5	0.0	0.9	0.1	2.6	0.5	0.0
LnGrp Delay(d),s/veh	0.0	0.0	0.0	23.5	0.0	76.1	0.0	18.8	17.8	16.6	3.6	0.0
LnGrp LOS				C		E		B	B	B	A	
Approach Vol, veh/h		0			249			63			268	
Approach Delay, s/veh		0.0			73.4			18.7			13.0	
Approach LOS					E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.1	22.8		0.0	0.0	49.9		15.1
Change Period (Y+Rc), s	5.8	* 5.8		5.1	4.6	5.8		5.1
Max Green Setting (Gmax), s	7.4	* 17		10.0	5.0	19.4		10.0
Max Q Clear Time (g_c+I1), s	7.4	3.6		0.0	0.0	2.9		11.6
Green Ext Time (p_c), s	0.0	0.2		0.0	0.0	0.5		0.0

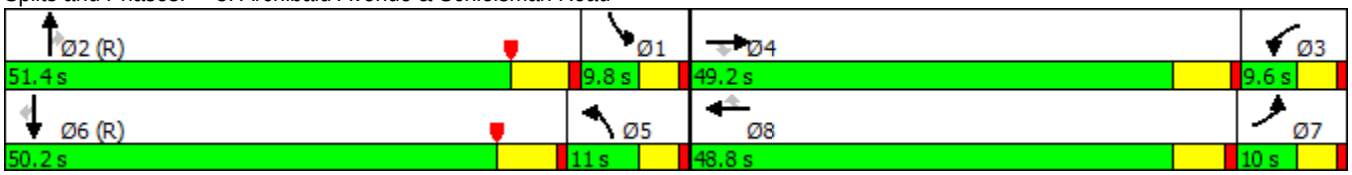
Intersection Summary	
HCM 2010 Ctrl Delay	39.6
HCM 2010 LOS	D

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	488	149	155	432	44	303	498	128	95	464	311
Future Volume (vph)	233	488	149	155	432	44	303	498	128	95	464	311
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	49.2	49.2	9.6	48.8	48.8	9.6	49.2	49.2	9.6	49.2	49.2
Total Split (s)	10.0	49.2	49.2	9.6	48.8	48.8	11.0	51.4	51.4	9.8	50.2	50.2
Total Split (%)	8.3%	41.0%	41.0%	8.0%	40.7%	40.7%	9.2%	42.8%	42.8%	8.2%	41.8%	41.8%
Yellow Time (s)	3.6	5.2	5.2	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	5.2
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	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	0.0	0.0
Total Lost Time (s)	4.6	6.2	6.2	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	6.2
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	16.4	23.6	23.6	14.2	21.8	21.8	6.4	55.4	55.4	5.2	54.2	54.2
Actuated g/C Ratio	0.14	0.20	0.20	0.12	0.18	0.18	0.05	0.46	0.46	0.04	0.45	0.45
v/c Ratio	0.52	0.51	0.36	0.40	0.49	0.12	1.73	0.22	0.17	0.67	0.21	0.38
Control Delay	54.0	43.8	7.2	54.2	44.7	0.7	382.6	20.3	4.3	78.4	20.8	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	43.8	7.2	54.2	44.7	0.7	382.6	20.3	4.3	78.4	20.8	6.2
LOS	D	D	A	D	D	A	F	C	A	E	C	A
Approach Delay		40.3			44.0			136.4			21.9	
Approach LOS		D			D			F			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.73	
Intersection Signal Delay: 63.2	Intersection LOS: E
Intersection Capacity Utilization 78.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Archibald Avenue & Schleisman Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	488	149	155	432	44	303	498	128	95	464	311
Future Volume (veh/h)	233	488	149	155	432	44	303	498	128	95	464	311
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	243	508	104	161	450	36	316	519	82	99	483	232
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
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	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	214	834	259	143	747	232	852	1915	596	818	1865	579
Arrive On Green	0.06	0.16	0.16	0.04	0.15	0.15	0.25	0.38	0.38	0.24	0.37	0.37
Sat Flow, veh/h	3442	5085	1580	3442	5085	1577	3442	5085	1583	3442	5085	1579
Grp Volume(v), veh/h	243	508	104	161	450	36	316	519	82	99	483	232
Grp Sat Flow(s),veh/h/ln	1721	1695	1580	1721	1695	1577	1721	1695	1583	1721	1695	1579
Q Serve(g_s), s	7.5	11.1	7.1	5.0	9.9	2.4	9.1	8.5	4.1	2.7	8.0	13.1
Cycle Q Clear(g_c), s	7.5	11.1	7.1	5.0	9.9	2.4	9.1	8.5	4.1	2.7	8.0	13.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	214	834	259	143	747	232	852	1915	596	818	1865	579
V/C Ratio(X)	1.14	0.61	0.40	1.12	0.60	0.16	0.37	0.27	0.14	0.12	0.26	0.40
Avail Cap(c_a), veh/h	214	1822	566	143	1822	565	852	1915	596	818	1865	579
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.3	46.6	44.9	57.5	47.9	44.7	37.4	26.0	24.6	35.9	26.6	28.2
Incr Delay (d2), s/veh	103.1	1.0	1.4	111.9	1.1	0.4	0.1	0.3	0.5	0.0	0.3	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	5.3	3.2	4.6	4.7	1.1	4.4	4.1	1.9	1.3	3.8	6.0
LnGrp Delay(d),s/veh	159.3	47.6	46.3	169.4	49.0	45.1	37.5	26.3	25.1	35.9	26.9	30.3
LnGrp LOS	F	D	D	F	D	D	D	C	C	D	C	C
Approach Vol, veh/h		855			647			917			814	
Approach Delay, s/veh		79.2			78.8			30.1			29.0	
Approach LOS		E			E			C			C	

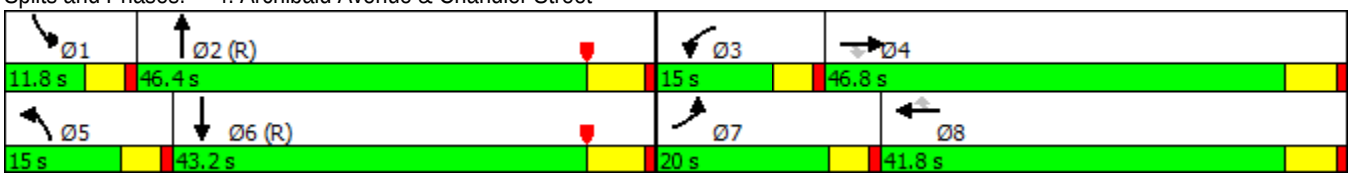
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.1	51.4	9.6	25.9	34.3	50.2	12.1	23.4
Change Period (Y+Rc), s	4.6	6.2	4.6	6.2	4.6	6.2	4.6	5.8
Max Green Setting (Gmax), s	5.2	45.2	5.0	43.0	6.4	44.0	5.4	43.0
Max Q Clear Time (g_c+I1), s	4.7	10.5	7.0	13.1	11.1	15.1	9.5	11.9
Green Ext Time (p_c), s	0.1	5.3	0.0	5.3	0.0	5.7	0.0	4.4

Intersection Summary	
HCM 2010 Ctrl Delay	52.5
HCM 2010 LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	106	72	126	174	74	25	122	479	43	469
Future Volume (vph)	106	72	126	174	74	25	122	479	43	469
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Prot	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases			4			8				
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	41.8	41.8	9.6	41.8	41.8	9.6	40.2	9.6	40.2
Total Split (s)	20.0	46.8	46.8	15.0	41.8	41.8	15.0	46.4	11.8	43.2
Total Split (%)	16.7%	39.0%	39.0%	12.5%	34.8%	34.8%	12.5%	38.7%	9.8%	36.0%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	3.6	5.2
All-Red Time (s)	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	5.8	5.8	4.6	5.8	5.8	4.6	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	15.3	17.1	17.1	10.4	15.3	15.3	12.1	66.3	6.9	59.2
Actuated g/C Ratio	0.13	0.14	0.14	0.09	0.13	0.13	0.10	0.55	0.06	0.49
v/c Ratio	0.48	0.14	0.39	1.16	0.17	0.08	0.70	0.25	0.44	0.36
Control Delay	57.6	42.1	9.3	171.3	44.7	0.4	72.6	14.6	67.8	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	42.1	9.3	171.3	44.7	0.4	72.6	14.6	67.8	20.7
LOS	E	D	A	F	D	A	E	B	E	C
Approach Delay		33.8			121.1			23.5		23.9
Approach LOS		C			F			C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.16	
Intersection Signal Delay: 38.5	Intersection LOS: D
Intersection Capacity Utilization 53.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Archibald Avenue & Chandler Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	72	126	174	74	25	122	479	189	43	469	126
Future Volume (veh/h)	106	72	126	174	74	25	122	479	189	43	469	126
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	108	73	91	178	76	9	124	489	151	44	479	98
Adj No. of Lanes	1	2	1	1	2	1	1	3	0	1	2	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	133	295	130	154	336	148	149	2413	723	57	1668	339
Arrive On Green	0.07	0.08	0.08	0.09	0.10	0.10	0.08	0.62	0.62	0.03	0.57	0.57
Sat Flow, veh/h	1774	3539	1560	1774	3539	1561	1774	3885	1163	1774	2931	596
Grp Volume(v), veh/h	108	73	91	178	76	9	124	425	215	44	288	289
Grp Sat Flow(s),veh/h/ln	1774	1770	1560	1774	1770	1561	1774	1695	1657	1774	1770	1758
Q Serve(g_s), s	7.2	2.3	6.8	10.4	2.4	0.6	8.3	6.5	6.8	3.0	10.1	10.2
Cycle Q Clear(g_c), s	7.2	2.3	6.8	10.4	2.4	0.6	8.3	6.5	6.8	3.0	10.1	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.70	1.00		0.34
Lane Grp Cap(c), veh/h	133	295	130	154	336	148	149	2106	1030	57	1007	1000
V/C Ratio(X)	0.81	0.25	0.70	1.16	0.23	0.06	0.83	0.20	0.21	0.77	0.29	0.29
Avail Cap(c_a), veh/h	228	1209	533	154	1062	468	154	2106	1030	106	1007	1000
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.7	51.5	53.5	54.8	50.2	49.4	54.1	9.8	9.9	57.6	13.3	13.3
Incr Delay (d2), s/veh	4.5	0.4	6.7	121.3	0.3	0.2	27.9	0.2	0.5	8.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	1.2	3.2	10.3	1.2	0.3	5.2	3.1	3.2	1.6	5.1	5.1
LnGrp Delay(d),s/veh	59.1	51.9	60.2	176.1	50.6	49.6	82.0	10.1	10.4	65.7	14.0	14.1
LnGrp LOS	E	D	E	F	D	D	F	B	B	E	B	B
Approach Vol, veh/h		272			263			764			621	
Approach Delay, s/veh		57.5			135.5			21.8			17.7	
Approach LOS		E			F			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	80.8	15.0	15.8	14.7	74.5	13.6	17.2
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8
Max Green Setting (Gmax), s	7.2	40.2	10.4	41.0	10.4	37.0	15.4	36.0
Max Q Clear Time (g_c+I1), s	5.0	8.8	12.4	8.8	10.3	12.2	9.2	4.4
Green Ext Time (p_c), s	0.0	11.7	0.0	1.2	0.0	10.6	0.1	1.2

Intersection Summary	
HCM 2010 Ctrl Delay	41.1
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	54	701	11	0	761
Future Vol, veh/h	0	54	701	11	0	761
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	59	762	12	0	827

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1099	387	0	0	774	0
Stage 1	768	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Critical Hdwy	6.29	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.67	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	239	611	-	-	837	-
Stage 1	407	-	-	-	-	-
Stage 2	663	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	239	611	-	-	837	-
Mov Cap-2 Maneuver	239	-	-	-	-	-
Stage 1	407	-	-	-	-	-
Stage 2	663	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	611	837	-
HCM Lane V/C Ratio	-	-	0.096	-	-
HCM Control Delay (s)	-	-	11.5	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	54	658	19	0	761
Future Vol, veh/h	0	54	658	19	0	761
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	59	715	21	0	827

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1057	368	0	0	736	0
Stage 1	726	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Critical Hdwy	6.29	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.67	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	253	629	-	-	865	-
Stage 1	428	-	-	-	-	-
Stage 2	663	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	253	629	-	-	865	-
Mov Cap-2 Maneuver	253	-	-	-	-	-
Stage 1	428	-	-	-	-	-
Stage 2	663	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	629	865	-
HCM Lane V/C Ratio	-	-	0.093	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

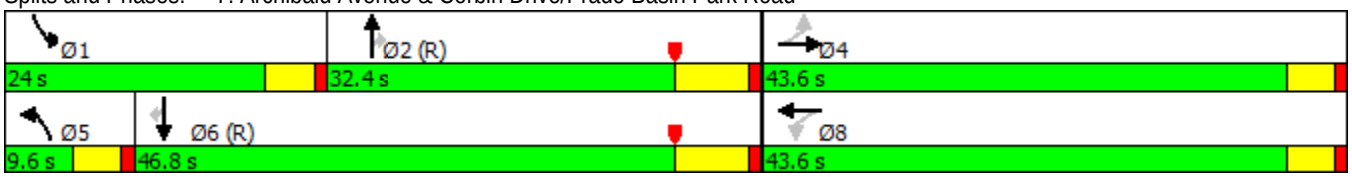
7: Archibald Avenue & Corbin Drive/Prado Basin Park Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	21	0	50	0	12	450	23	326	413	22
Future Volume (vph)	21	0	50	0	12	450	23	326	413	22
Turn Type	Perm	NA	Perm	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		8	5	2		1	6	
Permitted Phases	4		8				2			6
Detector Phase	4	4	8	8	5	2	2	1	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	43.6	43.6	14.6	14.6	9.6	26.5	26.5	9.6	26.5	26.5
Total Split (s)	43.6	43.6	43.6	43.6	9.6	32.4	32.4	24.0	46.8	46.8
Total Split (%)	43.6%	43.6%	43.6%	43.6%	9.6%	32.4%	32.4%	24.0%	46.8%	46.8%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	5.5	5.5	3.6	5.5	5.5
All-Red Time (s)	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
Total Lost Time (s)		4.6		4.6	4.6	6.5	6.5	4.6	6.5	6.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)		16.4		16.4	5.2	43.6	43.6	24.3	70.6	70.6
Actuated g/C Ratio		0.16		0.16	0.05	0.44	0.44	0.24	0.71	0.71
v/c Ratio		0.13		0.62	0.14	0.58	0.03	0.79	0.12	0.02
Control Delay		0.9		14.2	48.8	27.9	0.1	50.8	7.5	0.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		0.9		14.2	48.8	27.9	0.1	50.8	7.5	0.0
LOS		A		B	D	C	A	D	A	A
Approach Delay		0.9		14.2		27.2			25.9	
Approach LOS		A		B		C			C	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 23.7 — Intersection LOS: C
Intersection Capacity Utilization 70.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 7: Archibald Avenue & Corbin Drive/Prado Basin Park Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	0	15	50	0	206	12	450	23	326	413	22
Future Volume (veh/h)	21	0	15	50	0	206	12	450	23	326	413	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	22	0	2	52	0	211	12	469	24	340	430	21
Adj No. of Lanes	0	1	0	0	1	0	1	1	1	1	3	1
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	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	203	3	12	90	15	251	25	837	712	344	3200	996
Arrive On Green	0.20	0.00	0.20	0.20	0.00	0.20	0.01	0.45	0.45	0.19	0.63	0.63
Sat Flow, veh/h	670	15	62	233	77	1256	1774	1863	1583	1774	5085	1583
Grp Volume(v), veh/h	24	0	0	263	0	0	12	469	24	340	430	21
Grp Sat Flow(s),veh/h/ln	748	0	0	1566	0	0	1774	1863	1583	1774	1695	1583
Q Serve(g_s), s	0.0	0.0	0.0	11.3	0.0	0.0	0.7	18.5	0.8	19.1	3.4	0.5
Cycle Q Clear(g_c), s	2.8	0.0	0.0	16.1	0.0	0.0	0.7	18.5	0.8	19.1	3.4	0.5
Prop In Lane	0.92		0.08	0.20		0.80	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	218	0	0	356	0	0	25	837	712	344	3200	996
V/C Ratio(X)	0.11	0.00	0.00	0.74	0.00	0.00	0.48	0.56	0.03	0.99	0.13	0.02
Avail Cap(c_a), veh/h	445	0	0	650	0	0	89	837	712	344	3200	996
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	0.0	0.0	38.4	0.0	0.0	48.9	20.3	15.4	40.2	7.5	7.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	3.0	0.0	0.0	5.1	2.7	0.1	45.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	7.3	0.0	0.0	0.4	10.1	0.4	13.7	1.6	0.2
LnGrp Delay(d),s/veh	33.3	0.0	0.0	41.4	0.0	0.0	54.1	23.0	15.5	85.2	7.6	7.0
LnGrp LOS	C			D			D	C	B	F	A	A
Approach Vol, veh/h		24			263			505			791	
Approach Delay, s/veh		33.3			41.4			23.3			40.9	
Approach LOS		C			D			C			D	

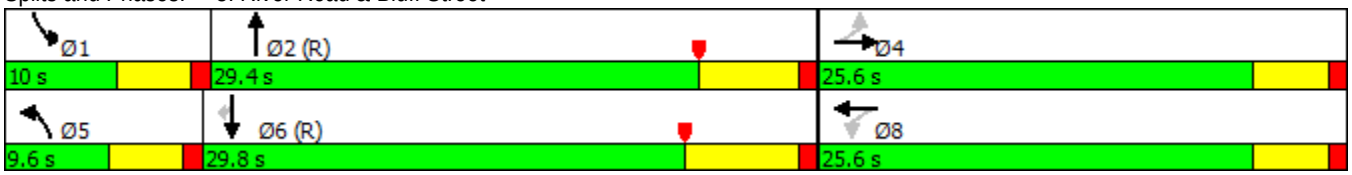
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	24.0	51.4		24.6	6.0	69.4		24.6
Change Period (Y+Rc), s	4.6	6.5		4.6	4.6	6.5		4.6
Max Green Setting (Gmax), s	19.4	25.9		39.0	5.0	40.3		39.0
Max Q Clear Time (g_c+I1), s	21.1	20.5		4.8	2.7	5.4		18.1
Green Ext Time (p_c), s	0.0	3.0		2.1	0.0	8.8		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	35.3
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	18	7	9	19	23	403	49	514	30
Future Volume (vph)	18	7	9	19	23	403	49	514	30
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA	Perm
Protected Phases		4		8	5	2	1	6	
Permitted Phases	4		8						6
Detector Phase	4	4	8	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	25.6	25.6	14.6	14.6	9.6	24.8	9.6	25.5	25.5
Total Split (s)	25.6	25.6	25.6	25.6	9.6	29.4	10.0	29.8	29.8
Total Split (%)	39.4%	39.4%	39.4%	39.4%	14.8%	45.2%	15.4%	45.8%	45.8%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	4.8	3.6	5.5	5.5
All-Red Time (s)	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
Total Lost Time (s)		4.6		4.6	4.6	5.8	4.6	6.5	6.5
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)		12.2		12.2	5.3	44.0	5.9	46.1	46.1
Actuated g/C Ratio		0.19		0.19	0.08	0.68	0.09	0.71	0.71
v/c Ratio		0.21		0.21	0.17	0.36	0.33	0.22	0.03
Control Delay		12.7		12.4	30.8	11.3	33.6	8.1	0.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		12.7		12.4	30.8	11.3	33.6	8.1	0.0
LOS		B		B	C	B	C	A	A
Approach Delay		12.7		12.4		12.3		9.7	
Approach LOS		B		B		B		A	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 11.0	Intersection LOS: B
Intersection Capacity Utilization 46.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: River Road & Bluff Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	7	34	9	19	39	23	403	11	49	514	30
Future Volume (veh/h)	18	7	34	9	19	39	23	403	11	49	514	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	20	8	2	10	21	13	25	438	11	53	559	33
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	191	66	12	90	114	57	50	1081	27	84	2184	976
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.03	0.60	0.60	0.05	0.62	0.62
Sat Flow, veh/h	873	578	104	197	1006	505	1774	1809	45	1774	3539	1582
Grp Volume(v), veh/h	30	0	0	44	0	0	25	0	449	53	559	33
Grp Sat Flow(s),veh/h/ln	1556	0	0	1708	0	0	1774	0	1855	1774	1770	1582
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	8.4	1.9	4.7	0.5
Cycle Q Clear(g_c), s	1.0	0.0	0.0	1.5	0.0	0.0	0.9	0.0	8.4	1.9	4.7	0.5
Prop In Lane	0.67		0.07	0.23		0.30	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	269	0	0	262	0	0	50	0	1109	84	2184	976
V/C Ratio(X)	0.11	0.00	0.00	0.17	0.00	0.00	0.50	0.00	0.41	0.63	0.26	0.03
Avail Cap(c_a), veh/h	581	0	0	608	0	0	136	0	1109	147	2184	976
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	0.0	0.0	26.2	0.0	0.0	31.1	0.0	6.9	30.4	5.7	4.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	0.0	2.9	0.0	1.1	2.9	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.7	0.0	0.0	0.5	0.0	4.6	1.0	2.3	0.2
LnGrp Delay(d),s/veh	26.2	0.0	0.0	26.5	0.0	0.0	34.1	0.0	8.0	33.3	5.9	4.9
LnGrp LOS	C			C			C		A	C	A	A
Approach Vol, veh/h		30			44			474			645	
Approach Delay, s/veh		26.2			26.5			9.4			8.1	
Approach LOS		C			C			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.7	45.3		12.0	6.4	46.6		12.0
Change Period (Y+Rc), s	4.6	* 6.5		4.6	4.6	6.5		4.6
Max Green Setting (Gmax), s	5.4	* 24		21.0	5.0	23.3		21.0
Max Q Clear Time (g_c+I1), s	3.9	10.4		3.0	2.9	6.7		3.5
Green Ext Time (p_c), s	0.0	6.5		0.3	0.0	7.5		0.3

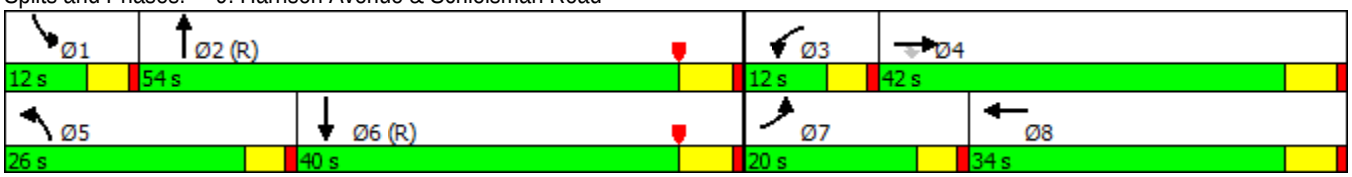
Intersection Summary	
HCM 2010 Ctrl Delay	9.8
HCM 2010 LOS	A

Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	83	465	102	40	461	135	130	28	99
Future Volume (vph)	83	465	102	40	461	135	130	28	99
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	9.6	29.8	29.8	9.6	29.8	9.6	35.8	9.6	35.8
Total Split (s)	20.0	42.0	42.0	12.0	34.0	26.0	54.0	12.0	40.0
Total Split (%)	16.7%	35.0%	35.0%	10.0%	28.3%	21.7%	45.0%	10.0%	33.3%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	3.6	4.8
All-Red Time (s)	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
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	10.7	30.2	30.2	6.7	24.3	14.6	61.8	6.4	49.6
Actuated g/C Ratio	0.09	0.25	0.25	0.06	0.20	0.12	0.52	0.05	0.41
v/c Ratio	0.59	0.59	0.23	0.46	0.74	0.71	0.11	0.33	0.13
Control Delay	67.3	42.1	3.1	69.7	51.2	67.5	14.1	63.8	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	42.1	3.1	69.7	51.2	67.5	14.1	63.8	16.3
LOS	E	D	A	E	D	E	B	E	B
Approach Delay		39.1			52.7		37.5		23.3
Approach LOS		D			D		D		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 41.2	Intersection LOS: D
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: Harrison Avenue & Schleisman Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	465	102	40	461	11	135	130	44	28	99	60
Future Volume (veh/h)	83	465	102	40	461	11	135	130	44	28	99	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	522	75	45	518	6	152	146	33	31	111	58
Adj No. of Lanes	1	2	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	116	822	367	58	713	8	180	1543	340	48	1059	522
Arrive On Green	0.07	0.23	0.23	0.03	0.20	0.20	0.10	0.54	0.54	0.03	0.46	0.46
Sat Flow, veh/h	1774	3539	1581	1774	3583	41	1774	2883	635	1774	2299	1133
Grp Volume(v), veh/h	93	522	75	45	256	268	152	88	91	31	84	85
Grp Sat Flow(s),veh/h/ln	1774	1770	1581	1774	1770	1855	1774	1770	1749	1774	1770	1663
Q Serve(g_s), s	6.2	15.9	4.6	3.0	16.2	16.3	10.1	2.9	3.1	2.1	3.2	3.5
Cycle Q Clear(g_c), s	6.2	15.9	4.6	3.0	16.2	16.3	10.1	2.9	3.1	2.1	3.2	3.5
Prop In Lane	1.00		1.00	1.00		0.02	1.00		0.36	1.00		0.68
Lane Grp Cap(c), veh/h	116	822	367	58	352	369	180	947	936	48	815	766
V/C Ratio(X)	0.80	0.64	0.20	0.78	0.73	0.73	0.85	0.09	0.10	0.65	0.10	0.11
Avail Cap(c_a), veh/h	228	1068	477	109	416	436	316	947	936	109	815	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	41.5	37.1	57.6	45.0	45.0	53.0	13.6	13.7	57.8	18.3	18.4
Incr Delay (d2), s/veh	4.7	1.2	0.4	8.2	6.0	5.8	4.2	0.2	0.2	5.5	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	3.2	7.9	2.0	1.6	8.5	8.9	5.1	1.5	1.5	1.1	1.6	1.7
LnGrp Delay(d),s/veh	59.9	42.7	37.5	65.8	51.0	50.8	57.2	13.8	13.9	63.3	18.6	18.7
LnGrp LOS	E	D	D	E	D	D	E	B	B	E	B	B
Approach Vol, veh/h		690			569			331			200	
Approach Delay, s/veh		44.4			52.1			33.8			25.6	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	70.0	8.5	33.7	16.7	61.1	12.5	29.7
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	7.4	48.2	7.4	36.2	21.4	34.2	15.4	28.2
Max Q Clear Time (g_c+I1), s	4.1	5.1	5.0	17.9	12.1	5.5	8.2	18.3
Green Ext Time (p_c), s	0.0	1.9	0.0	8.3	0.1	1.8	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	42.8
HCM 2010 LOS	D

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Traffic Vol, veh/h	0	241	21	0	30	42	0	31	198
Future Vol, veh/h	0	241	21	0	30	42	0	31	198
Peak Hour Factor	0.92	0.94	0.94	0.92	0.94	0.94	0.92	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	256	22	0	32	45	0	33	211
Number of Lanes	0	1	1	0	0	1	0	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	12.2	9.3	9.2
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	42%	100%	0%	0%	0%
Vol Thru, %	58%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	72	241	21	31	198
LT Vol	30	241	0	0	0
Through Vol	42	0	0	31	0
RT Vol	0	0	21	0	198
Lane Flow Rate	77	256	22	33	211
Geometry Grp	4	7	7	7	7
Degree of Util (X)	0.118	0.413	0.028	0.05	0.277
Departure Headway (Hd)	5.526	5.794	4.588	5.442	4.737
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	646	618	774	657	756
Service Time	3.584	3.558	2.351	3.184	2.478
HCM Lane V/C Ratio	0.119	0.414	0.028	0.05	0.279
HCM Control Delay	9.3	12.6	7.5	8.5	9.3
HCM Lane LOS	A	B	A	A	A
HCM 95th-tile Q	0.4	2	0.1	0.2	1.1

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	342	0	7	0	0	0	4	0	0	0	0	252
Future Vol, veh/h	342	0	7	0	0	0	4	0	0	0	0	252
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	372	0	8	0	0	0	4	0	0	0	0	274

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	0	0	0	8	0	0	884	747	4	747	751	0
Stage 1	-	-	-	-	-	-	747	747	-	0	0	-
Stage 2	-	-	-	-	-	-	137	0	-	747	751	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	-	-	-	1612	-	-	266	341	1080	329	340	-
Stage 1	-	-	-	-	-	-	405	420	-	-	-	-
Stage 2	-	-	-	-	-	-	866	-	-	405	418	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	1612	-	-	-	341	1080	329	340	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	341	-	329	340	-
Stage 1	-	-	-	-	-	-	405	420	-	-	-	-
Stage 2	-	-	-	-	-	-	866	-	-	405	418	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		0		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-	1612	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	-	-	-	-	0	-	-	-
HCM Lane LOS	-	-	-	-	A	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	0	-	-	-

APPENDIX 5.2:

E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

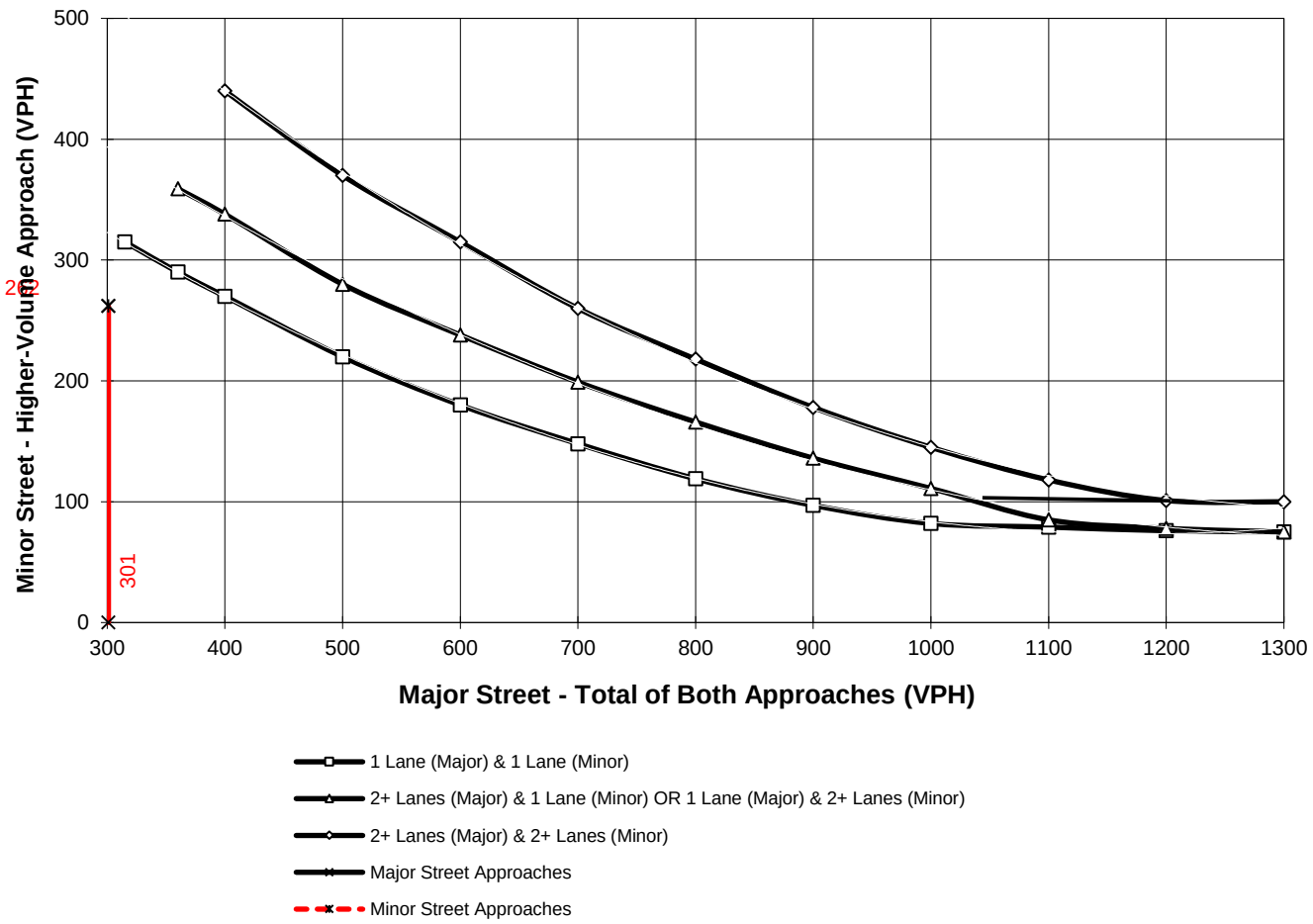
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **E+P Conditions - Sunday Mid-day Peak Hour**

Major Street Name = **Harrison Avenue**
Total of Both Approaches (VPH) = **301**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Chandler Street**
High Volume Approach (VPH) = **262**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



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

This Page Intentionally Left Blank