Henderson Road Traffic Study

Prepared for:

City of Angleton, TX

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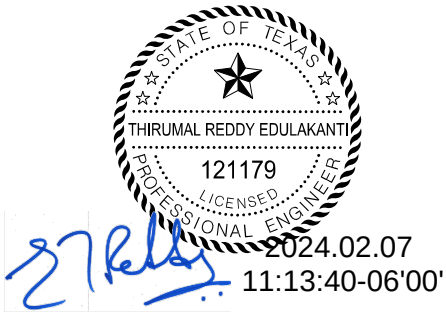

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1 Introduction

The City of Angleton (City) has requested that HDR Engineering, Inc. (HDR) perform a traffic study along Henderson Road from N Velasco Street (BU 288) to E Mulberry Street (SH 35). The objective of this study was to evaluate traffic conditions for Year 2020 and Build Year 2030 and to provide recommendations to improve the traffic flow throughout the corridor. The City has been undergoing a lot of new development with several residential communities proposed or undergoing construction. This study is intended to advise the City on the improvements required to maintain adequate transportation operations along the corridor. The purpose of this report is to document the study methodology, analysis results, and recommendations.

2 Study Methodology

This section describes the study area, data collection, analysis peak hours, analysis methodology, and traffic analysis tool employed to perform the traffic study.

2.1 Study Area

The study area extends from N Velasco Street (BU 288) on the west to E Mulberry Street (SH 35) on the east along Henderson Road corridor to include the following intersections and driveways:

- Henderson Road at N Velasco Street (BU 288)
- Henderson Road at N Valderas Street
- Henderson Road at N Downing Street
- Henderson Road at Angleton Junior High school (AJHS) West Access
- Henderson Road at Angleton Junior High school (AJHS) East Access
- Henderson Road at Heritage Park Drive/Buchta Road
- Henderson Road at Meadowview Drive and
- Henderson Road at E Mulberry Street

See Figure 2-1 for the location of study intersections and the intersection traffic control.

Field observations were made, and photographs were taken at the study intersections and their vicinities within the study area. This was done in order to determine the existing roadway and geometric conditions, lane assignments, traffic control, posted speed limits, sight distance issues, and other site characteristics that may have an influence on the traffic flow and safety at the intersections.

Figure 2-1 Existing Conditions Traffic Control

2.2 Data Collection

The data for this project corridor was obtained from three sources: traffic counts by CJ Hensch and Associates (CJH), previous traffic studies and sample counts. Table 2-1 lists the intersections where the turning movement count (TMC) data was obtained, the intersection control type and the source of the traffic counts.

CJH recorded five-hour turning movement counts at four study intersections on Wednesday, November 18, 2020, from 6:30 AM to 8:30 AM and from 3:30 PM to 6:30 PM. These counts were recorded in 15-minute intervals. The intersections at which CJH recorded the data are:

- Henderson Road at N Velasco Street (BU 288)
- Henderson Road at N Valderas Street
- Henderson Road at N Downing Street
- Henderson Road at Meadowview Drive

The traffic counts from previous traffic studies were used to obtain data for the following two study intersections along the corridor:

- Henderson Road at Heritage Park Drive/Buchta Road - Counts conducted on Tuesday, October 22, 2019, for a study done for Texas Angleton Ranch Apartments were used.
- Henderson Road at E Mulberry Street (SH 35) – Counts conducted on Wednesday, October 16, 2019, for a study done for Windrose Green Development were used.

In addition to the six main study intersections, two driveways provide access to Angleton Junior High School (AJHS) along Henderson Road to the east of Downing Street. Though counts were available at these driveways from a previous traffic study, intersection turning movement counts were conducted by HDR on January 12, 2021, from 7:00 AM to 8:15 AM and from 3:30 PM to 4:45 PM and were used to perform the analysis. The updated counts were collected to capture the current traffic flow patterns in terms of the driveway utilization and directionality.

Table 2-1 Turning Movement Count Locations and Control Type

Intersection No.	Intersection	Intersection Control	Data Source
1	Henderson Road and N Velasco Street (BU 288)	Signalized	CJH
2	Henderson Road and N Valderas Street	All Way STOP	CJH
3	Henderson Road and N Downing Street	All Way STOP	CJH
4	Henderson Road and AJHS West Access	Two-Way STOP	HDR
5	Henderson Road and AJHS East Access	Two-Way STOP	HDR
6	Henderson Road and Heritage Park Drive/Buchta Road	All Way STOP	Previous Traffic Study
7	Henderson Road and Meadowview Drive	Two-Way STOP	CJH
8	Henderson Road and E Mulberry Street (SH 35)	Two-Way STOP	Previous Traffic Study

2.2.1 Crash Data Collection

Crash data was primarily utilized to perform signal warrant analysis at the intersections. Crash data was obtained from TxDOT's Crash Records Information System (CRIS) for the three latest years on file—Year 2018 to Year 2020—at the study intersections and their vicinities.

2.3 Capacity Analysis Peak Hours

Based on review of the turning movement counts, the peak hours for the intersections were identified for individual intersections during the AM peak and PM peak periods. The AM peak hour for most intersections was between 7:00 AM to 8:00 AM, except at N Downing Street where the peak hour is offset by 15 min and starts at 7:15 AM to match the peak hour of the adjacent school driveways. The PM peak hour for most intersections was between 4:00 PM to 5:00 PM except at N Downing Street where the peak hour is offset by 15 min and starts at 3:45 PM to match the peak hour of the adjacent school driveways. Another exception is that the PM peak hour for the intersection of Henderson Road and E Mulberry Street (SH 35) was 4:45 PM to 5:45 PM. The AM and PM peak hours used for analysis at the study intersections are summarized in Table 2-2.

Table 2-2 Peak Hours for Study Intersections

Intersection No.	Intersection	AM Peak Hour	PM Peak Hour
1	Henderson Road and N Velasco Street (BU 288)	7:00 AM – 8:00 AM	4:00 PM – 5:00 PM
2	Henderson Road and N Valderas Street	7:00 AM – 8:00 AM	4:00 PM – 5:00 PM
3	Henderson Road and N Downing Street	7:15 AM – 8:15 AM	3:45 PM – 4:45 PM
4	Henderson Road and AJHS West Access	7:15 AM – 8:15 AM	3:45 PM – 4:45 PM
5	Henderson Road and AJHS East Access	7:15 AM – 8:15 AM	3:45 PM – 4:45 PM
6	Henderson Road and Heritage Park Drive/Buchta Road	7:00 AM – 8:00 AM	4:00 PM – 5:00 PM
7	Henderson Road and Meadowview Drive	7:00 AM – 8:00 AM	4:00 PM – 5:00 PM
8	Henderson Road and E Mulberry Street (SH 35)	7:00 AM – 8:00 AM	4:45 PM – 5:45 PM

2.4 Capacity Analysis Methodology

Capacity analysis is a method by which traffic volumes are compared to the calculated roadway and intersection capacities to evaluate existing and future traffic conditions. The Transportation Research Board describes the methodology used in the Highway Capacity Manual (HCM) 6th edition. In general, the term “Level of Service” (LOS) is used to provide a qualitative evaluation based on certain quantitative calculations related to empirical values. The definition of Level of Service (LOS) as contained in the HCM 6th edition is briefly described below.

Level of Service ranges from A to F. In general, LOS A represents the best traffic operating condition and LOS F represents the worst condition (typically associated with congestion and long delays). The LOS values for unsignalized and signalized intersections are defined in terms of average delay. Delay is used as a measure of driver discomfort, frustration, efficiency, etc. See Table 2-3 for the LOS criteria for signalized and unsignalized intersections. Any intersection that operates at LOS E or F requires mitigation to achieve LOS D or better.

Table 2-3 HCM 6th Edition LOS Criteria for Signalized and Unsignalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)	
	Signalized	Unsignalized
A	Less than or equal to 10.0	Less than or equal to 10.0
B	Greater than 10.0 to 20.0	Greater than 10.0 to 15.0
C	Greater than 20.0 to 35.0	Greater than 15.0 to 25.0
D	Greater than 35.0 to 55.0	Greater than 25.0 to 35.0
E	Greater than 55.0 to 80.0	Greater than 35.0 to 50.0
F	Greater than 80.0	Greater than 50.0
Source: HCM 6th Edition		

2.5 Traffic Analysis Tool

The operational conditions within the study area were evaluated using LOS as the measure of effectiveness (MOE). The traffic analysis program known as Synchro (version 11.0) was utilized to determine intersection delay and LOS. In Synchro, the delay can be calculated using standard HCM 6th Edition methodology or Synchro methodology, which is based on HCM 6th Edition but is modified to include the influence of signal coordination and actuation. Synchro methodology was used to calculate delays and LOS at signalized intersections within the study area. Meanwhile, HCM 6th edition was utilized to calculate delays and LOS at unsignalized intersections within the study area.

3 Existing Conditions Analysis

3.1 Existing Intersection Geometry

The section of Henderson Road within the study area is an east-west roadway with one lane in each direction between N Velasco Street (BU 288) and E Mulberry Street (SH 35). Left-turn lanes are present along Henderson Road at a few intersections. The speed limit on Henderson Road is 30 mph within the study area.

The intersection of Henderson Road and N Velasco Street (BU 288) is a four-legged signalized intersection. The northbound approach consists of a left-turn storage lane, two through lanes and a right-turn storage lane. The southbound approach consists of a two-way left-turn lane (TWLTL) which converts into a left-turn storage lane near the intersection, one through lane and one shared through/right-turn lane. The eastbound approach consists of a left-turn storage lane and one shared through/right-turn lane. The westbound approach consists of a left-turn storage lane and one shared through/right-turn lane.

The intersection of Henderson Road and N Valderas Street is a four-legged unsignalized intersection. All the approaches at this intersection are stop-controlled. The northbound approach consists of one left-turn storage lane and one shared through/right-turn lane. The southbound approach consists of one left-turn storage lane and one shared through/right-turn lane. The eastbound approach consists of one shared through/left/right-turn lane. The westbound approach consists of one shared through/left/right-turn lane.

The intersection of Henderson Road and N Downing Street is a four-legged unsignalized intersection. All the approaches at this intersection are stop-controlled. The northbound approach consists of a TWLTL which transitions near the intersection into one left-turn lane, one through lane and one right-turn lane. The southbound approach consists of one left-turn storage lane, one through lane and one channelized right-turn lane which is also stop-controlled. The eastbound approach consists of one left-turn lane and one shared through/right-turn lane. The westbound approach consists of one left-turn lane and one shared through/right-turn lane.

The driveways of Angleton Junior High School (AJHS) West Access and East Access are located east of the Downing Street intersection. The driveways are stop-controlled and exit only onto Henderson Road. Henderson Road is free-flowing at this intersection. Pavement markings are not present at the driveways, but each driveway is wide enough to accommodate two vehicles simultaneously. The driveways are assumed to have one left-turn lane and one right-turn lane based on field observations.

The intersection of Henderson Road and Heritage Park Drive/Buchta Road is a four-legged unsignalized intersection. All the approaches at the intersection are stop-controlled. The northbound approach consists of a TWLTL which transitions into a left-turn storage lane and one shared through/right-turn lane. The southbound approach consists of one right-turn lane and one shared through/left-turn lane. The eastbound approach consists of one left-turn storage lane and one shared through/right-turn lane. The westbound approach consists of one left-turn storage lane and one shared through/ right-turn lane.

The intersection of Henderson Road and Meadowview Street is a three-legged unsignalized intersection. The northbound approach is stop-controlled and eastbound/westbound approaches are free-flowing. The northbound approach consists of one shared left/right-turn lane. The eastbound approach consists of a shared through/right-turn lane. The westbound approach consists of a shared through/left-turn lane.

The intersection of Henderson Road and E Mulberry Street (SH 35) is a four-legged unsignalized intersection. The eastbound and westbound approaches are stop-controlled while the northbound and southbound approaches are free-flowing. All the approaches consist of a shared through/left/right-turn lane.

3.2 Existing Traffic Volume

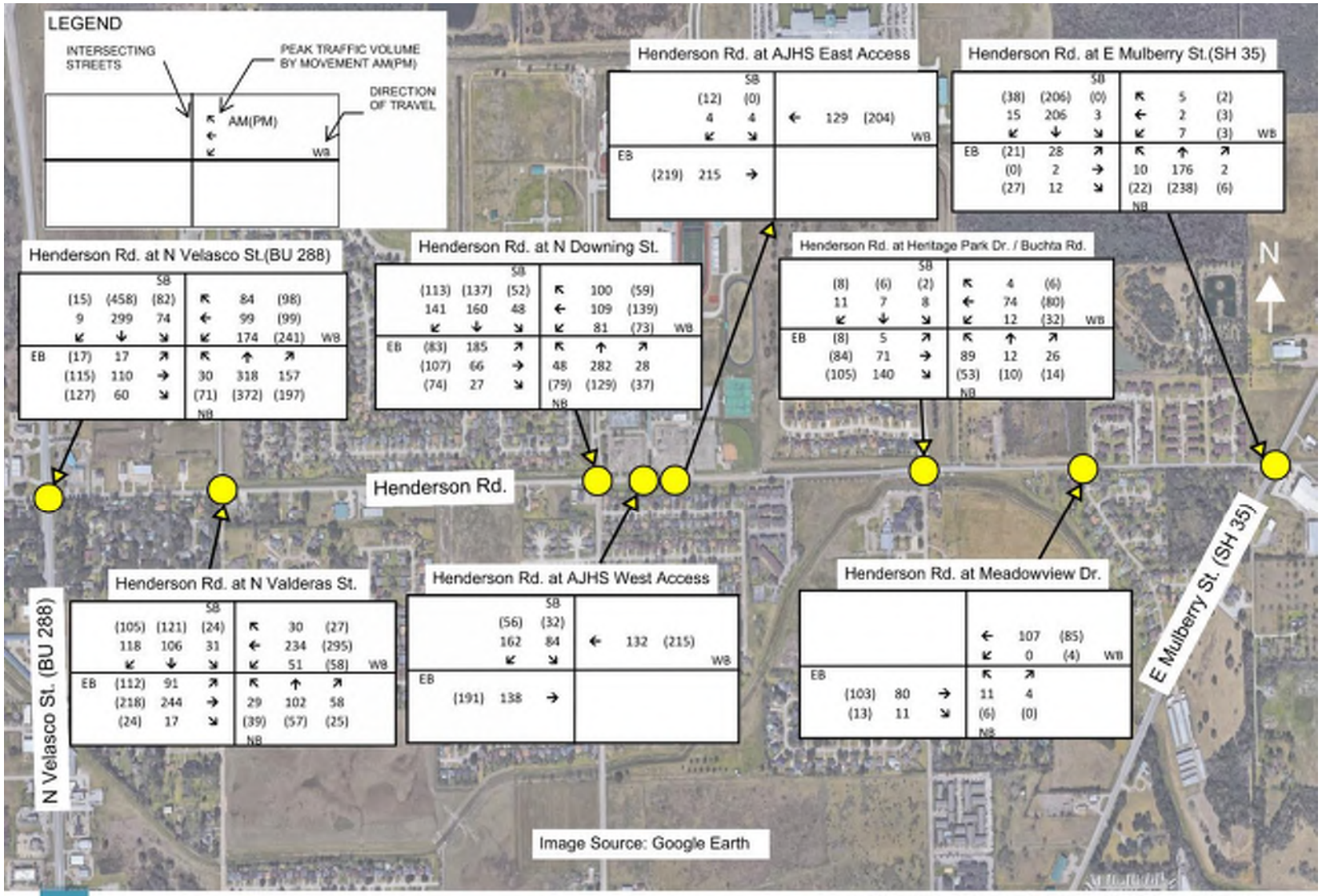
Turning movement count volumes were balanced only when the volume imbalance between the intersections could not be attributed to the presence of residential or commercial driveways in between the intersections. A growth factor was applied to the traffic counts obtained from the traffic studies performed in 2019 to project them to year 2020 which is the existing year for this analysis. Since the traffic counts were collected during the COVID-19 pandemic (November 2020, January 2021), traffic volumes along the corridor were increased by 10% to remove the effects of pandemic related travel reduction. This percentage was estimated based on a comparison of traffic counts collected before and during COVID conditions in the study area.

Similarly, a 20% growth rate was applied to the AJHS related traffic at Downing Street intersection and school driveways to Henderson Road. This percentage was estimated based on the impact of COVID-19 on student enrollment and attendance information provided by the AJHS staff. See Figure 3-1 for the 2020 existing traffic volumes at each intersection.

3.3 Existing Capacity Analysis and Findings

The delay and LOS by each movement, approach and overall intersection for existing conditions are shown in Table 3-1. The movements, approaches and intersections operating at LOS E and F are highlighted in yellow and orange respectively. Under existing conditions, intersection operations are similar during the AM and PM peak hours at each study intersection. All the intersections had a LOS D or better except N Valderas Street which operated at LOS F during both AM and PM peak hours. The Synchro outputs are provided in Appendix A.

Figure 3-1 Existing Traffic Volumes



2020 EXISTING TRAFFIC VOLUMES AM (PM)

FIGURE 3-1

Table 3-1 Existing Conditions Synchro Analysis

			2020 Existing Conditions													
			AM Peak Hour							PM Peak Hour						
Int ID	Street Name	Movement	Movement Delay	Movement LOS	Approach Delay	Approach LOS	Queue Length	Int. Delay	Int. LOS	Movement Delay	Movement LOS	Approach Delay	Approach LOS	Queue Length	Int. Delay	Int. LOS
1	North Velasco Street/SH 288 Business	EBL	40.1	D	57.3	E	29	36.4	D	34.2	C	51.2	D	24	40.6	D
		EBT	59.4	E			185			53.0	D			211		
		EBR														
		WBL	59.0	E	49.9	D	175			61.2	E	51.9	D	#270		
		WBT	38.3	D			164			39.7	D			192		
		WBR														
		NBL	60.0	E	23.2	C	48			69.4	E	29.2	C	99		
		NBT	26.6	C			144			32.3	C			176		
		NBR	7.1	A			46			9.0	A			58		
		SBL	67.3	E	32.1	C	105			65.5	E	38.7	D	116		
		SBT	25.6	C			134			34.6	C			233		
		SBR														
2	North Valderas Street/County Road 48	EBL	81.7	F	81.7	F	358	59.4	F	62.2	F	62.2	F	300	52.6	F
		EBT														
		EBR														
		WBL	81.0	F	81.0	F	355			71.2	F	71.2	F	328		
		WBT														
		WBR														
		NBL	13.8	B	20.5	C	8			14.4	B	15.8	C	13		
		NBT	21.6	C			73			16.3	C			33		
		NBR														
		SBL	14.0	B	26.6	D	13			12.6	B	36.4	E	8		
		SBT	29.1	D			128			38.5	E			190		
		SBR														
3	Downing Street	EBL	44.6	E	35.9	E	158	34.8	D	21.5	C	24.2	C	55	26.2	D
		EBT	19.9	C			45			26.1	D			93		
		EBR														
		WBL	20.0	C	39.9	E	40			17.6	C	30.6	D	30		
		WBT	47.8	E			185			35.4	E			140		
		WBR														
		NBL	16.2	C	35.5	E	15			18.3	C	18.7	C	33		
		NBT	46.9	E			178			19.7	C			45		

			2020 Existing Conditions													
			AM Peak Hour							PM Peak Hour						
Int ID	Street Name	Movement	Movement Delay	Movement LOS	Approach Delay	Approach LOS	Queue Length	Int. Delay	Int. LOS	Movement Delay	Movement LOS	Approach Delay	Approach LOS	Queue Length	Int. Delay	Int. LOS
		NBR	23.8	C			70			17.8	C			38		
		SBL	16.5	C			18			16.2	C			25		
		SBT	37.0	E	29.0	D	135			28.3	D	29.1	D	110		
		SBR	22.7	C			70			33.6	D			153		
4	Angleton Junior High School Access West	EBT	0.0	A	0.0	A	-	5.0	A	0.0	A	0.0	A	-	4.2	A
		WBT	0.0	A	0.0	A	-			0.0	A	0.0	A	-		
		SBL	11.9	B	11.2	B	20			12.2	B	11.5	B	15		
		SBR	10.7	B			20			11.1	B			23		
5	Angleton Junior High School Access East	EBT	0.0	A	0.0	A	-	0.3	A	0.0	A	0.0	A	-	0.5	A
		WBT	0.0	A	0.0	A	-			0.0	A	0.0	A	-		
		SBL	13.2	B	11.9	B	0			0.0	A	11.7	B	-		
		SBR	11.1	B			0			11.7	B			3		
6	Buchta Road/Heritage Park	EBL	8.6	A	11.7	B	0	10.8	B	8.5	A	11.4	B	3	10.4	B
		EBT	11.8	B			58			11.5	B			58		
		EBR														
		WBL	9.0	A	10.0	B	3			9.1	A	9.2	A	8		
		WBT	10.1	B			20			9.2	A			15		
		WBR														
		NBL	10.6	B	10.0	B	18			10.1	B	9.6	A	13		
		NBT	8.7	A			5			8.7	A			5		
		NBR														
		SBL	9.5	A	9.2	A	5			9.3	A	8.9	A	3		
		SBT														
		SBR	8.2	A			3			8.2	A			3		
7	Meadowview Drive	EBT	0.0	A	0.0	A	-	0.9	A	0.0	A	0.0	A	-	0.5	A
		EBR														
		WBL	0.0	A	0.0	A	-			0.0	A	0.5	A	-		
		WBT	-	-						`	-					
		NBL	9.7	A	9.7	A	3			10.4	B	10.4	B	0		
		NBR														
8	East Mulberry Street/SH 35	EBL	14.5	B	14.5	B	10	2.0	A	13.3	B	13.3	B	13	2.0	A
		EBT														

			2020 Existing Conditions														
			AM Peak Hour							PM Peak Hour							
Int ID	Street Name	Movement	Movement Delay	Movement LOS	Approach Delay	Approach LOS	Queue Length	Int. Delay	Int. LOS	Movement Delay	Movement LOS	Approach Delay	Approach LOS	Queue Length	Int. Delay	Int. LOS
		EBR														
		WBL	13.7	B	13.7	B	5			13.8	B	13.8	B	3		
		WBT														
		WBR														
		NBL	8.2	A	0.6	A	0			7.9	A	0.7	A	3		
		NBT	0.0	A			-			0.0	A			-		
		NBR														
		SBL	7.7	A	0.2	A	0			0.0	A	0.0	A	0		
		SBT	0.0	A			-			0.0	A			-		
		SBR														

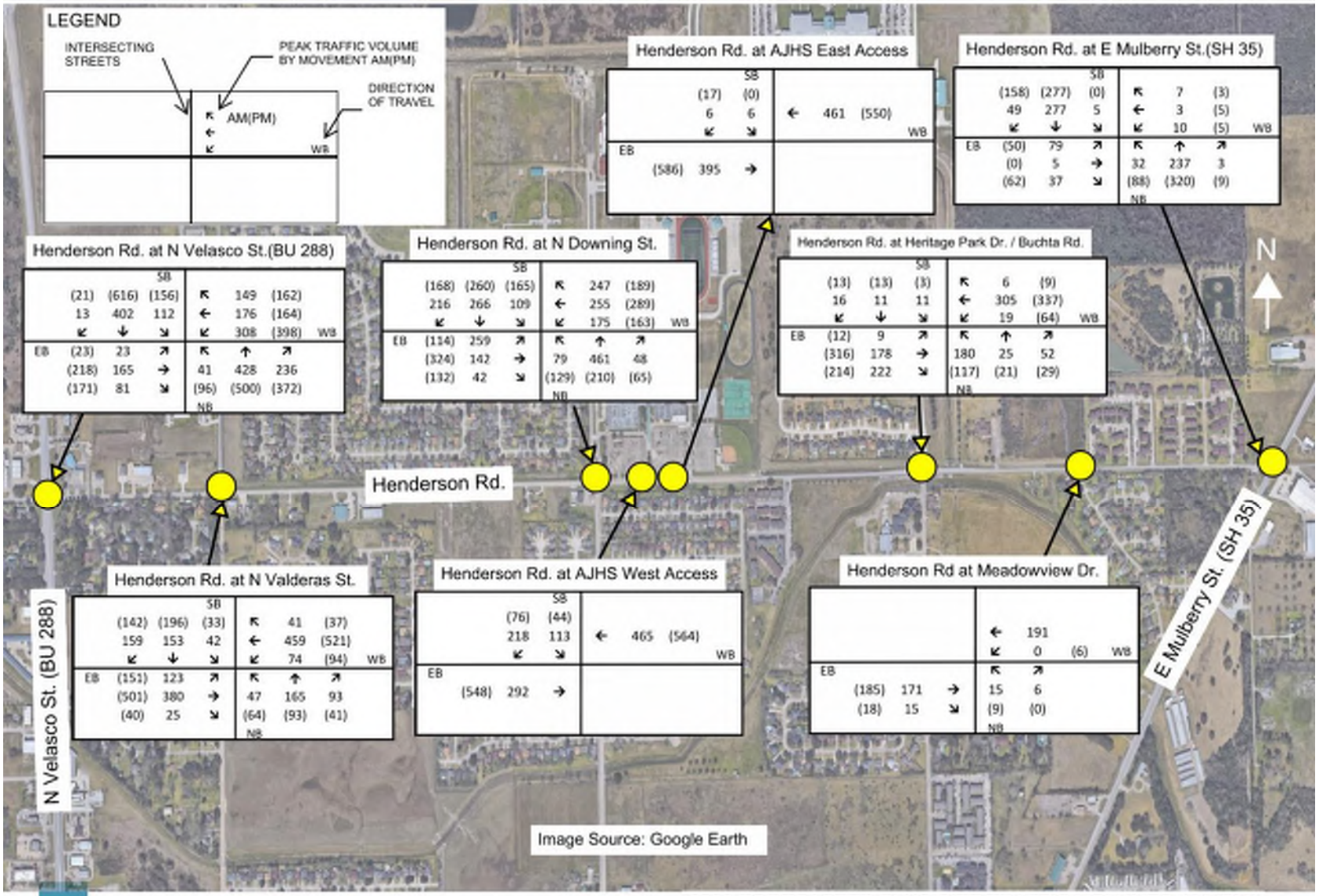
4 Future Condition Analysis

This study evaluated future conditions for year 2030 including the following two conditions: A No-Build condition without any lane configuration changes and a Build condition with modifications to the geometry and traffic control at the intersections. This section describes the future traffic volumes development, intersection geometry and resulting capacity analysis of these two conditions.

4.1 Future Traffic Volumes

The future analysis year for this study was selected as 2030, and the existing traffic volumes were projected to the year 2030. The average annual growth rate based off the historic counts from TxDOT's Traffic Count Database System (TCDS) was 2.6%. Based on expected future development, a growth rate of 3% was agreed upon with the City for future analysis. In addition to the background traffic, the estimated traffic generated by proposed residential developments, either in planning stages or under construction along the Henderson Road corridor was considered in the analysis. The details of the developments are described in the next section. The 2030 future volumes are illustrated in Figure 4-1.

Figure 4-1 2030 Future Traffic Volumes



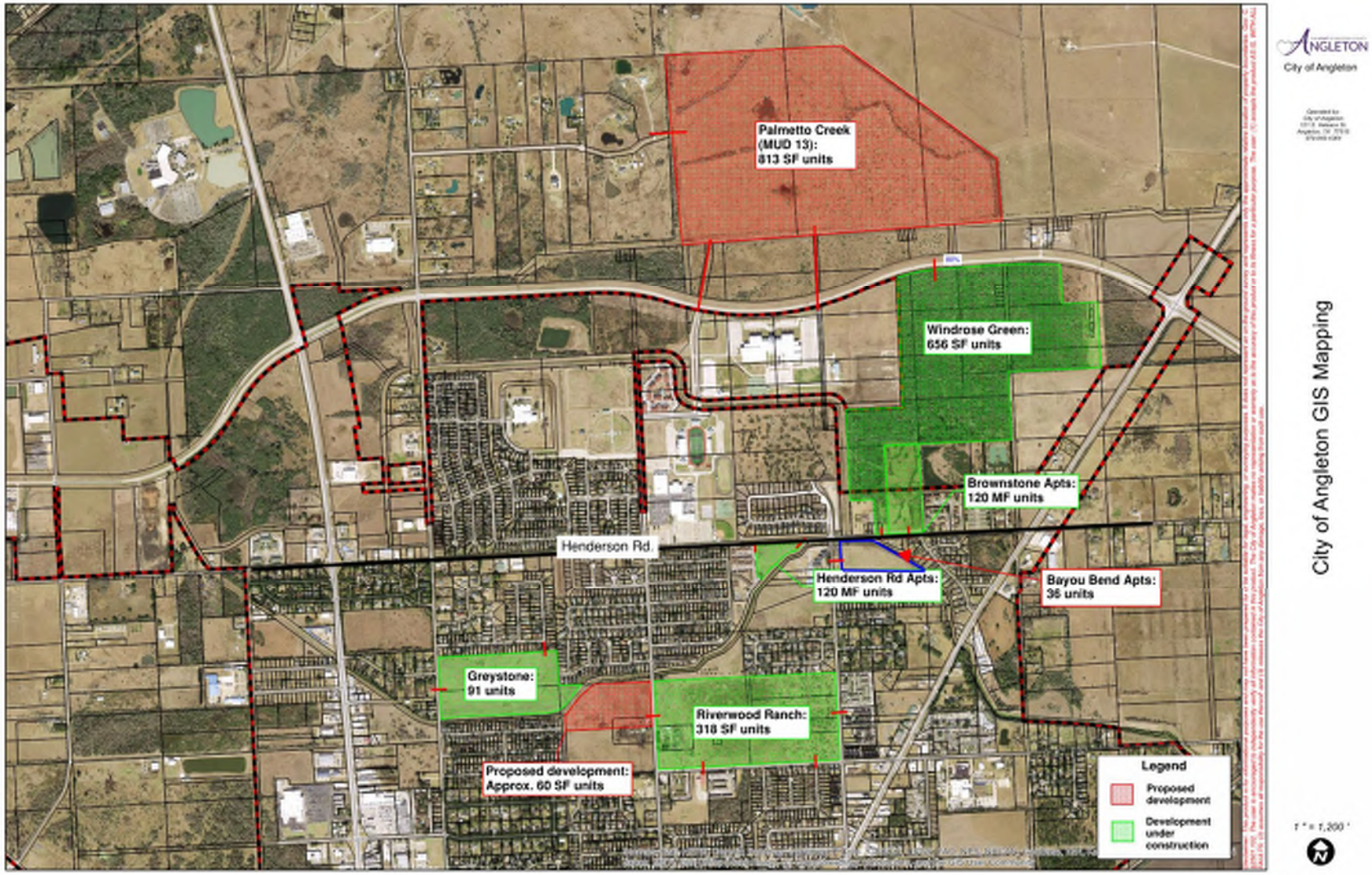
4.1.1 New Developments Along the Corridor

Figure 4-2 shows the future developments near the corridor along with the details of the number and type of housing units in each of these developments. The Institute of Transportation Engineer's (ITE) Trip Generation Manual 10th edition was used to calculate the trips generated by these developments during the AM and PM peak hours. Table 4-1 summarizes the trips generated from the developments during the AM and PM peak hours. As seen in the table, the new developments along the corridor generate significant traffic during the peak hours that could impact the operations at the study intersections.

Table 4-1 Trips Generated by New Developments during Peak Hours

Development Name	# of Access Points	# of Dwelling Units	Land Use	ITE Code	Daily Trips	AM Peak Hour		PM Peak Hour	
						Enter	Exit	Enter	Exit
Windrose Green	2	656	Single-Family	210	5868	118	353	389	229
Henderson Road Apartments	2	120	Multi-Family (low rise)	220	866	13	44	43	26
Brownstone Apartments	1	120	Multi-Family (low rise)	220	866	13	44	43	26
Palmetto Creek	3	813	Single-Family	210	7149	145	437	479	281
Riverwood Ranch	4	318	Single-Family	210	3014	58	173	194	114
Greystone	2	91	Single-Family	210	953	17	52	58	35
Unnamed Development	1	60	Single-Family	210	650	11	36	39	23
Bayou Bend Subdivision	1	36	Single-Family	210	406	7	23	24	14
				Total	19772	382	1162	1269	748

Figure 4-2 Study Area Proposed Developments



4.2 2030 No-Build Condition

4.2.1 No-Build Intersection Geometry

There was no geometry change made for No-Build Condition. In addition, traffic control types of all study intersections were kept the same as that of the year 2020. Signal timing schemes of the signalized intersection were also left unchanged.

4.2.2 No-Build Capacity Analysis

The delay and LOS by each movement, approach, and overall intersection for No-Build conditions are shown in Table 4-2. The movements, approaches and intersections operating at LOS E and F are highlighted in yellow and orange, respectively. The 2030 No-Build intersection LOS during AM and PM peak hours are provided in Figure 4-4 and Figure 4-5, respectively. The Synchro outputs are provided in Appendix A.

During the AM peak period, the delays and queuing increase compared to existing conditions at the major study intersections.

- The operational performance at N Velasco Street (BU 288) intersection remains LOS D but with higher delays.
- The operational performance at N Valderas Street intersection remains LOS F but the overall intersection delay is significantly higher compared to the existing conditions. Also queues on eastbound (EB) and westbound (WB) approaches increase from 350 ft. in existing conditions to almost 900 ft. and 1300 ft. respectively.
- The operational performance at N Downing Street intersection gets worse and becomes LOS F. The queue on WB approach increases from 200 ft. in existing conditions to 1300 ft. in No-Build conditions.
- The operational performance at Heritage Park Drive/Buchta Road intersection decreases to LOS F. The queue on the EB approach increases from 60 ft. in existing to over 500 ft. in No-Build and the queue on the WB approach increases from 20 ft. in existing to is over 400 ft. in No-Build.
- The delays at the remaining study intersections (AJHS driveways, Meadowview Drive and E Mulberry Street (SH 35)) increase compared to existing conditions, but all these intersections continue to operate at LOS A.

During the PM peak period, the delays and queuing increase compared to existing conditions at the major study intersections.

- The operational performance at N Velasco Street (BU 288) intersection becomes LOS F from LOS D in the existing conditions.
- The operational performance at N Valderas Street remains LOS F but the overall intersection delay is significantly higher compared to the existing conditions. The queue on the EB approach increases from 300 ft. in existing conditions to over 1200

ft. in No-Build and the queue on the WB approach increases from about 330 ft. in existing conditions to over 900 ft. in No-Build.

- The operational performance at N Downing Street intersection gets worse and becomes a LOS F in No-Build conditions from LOS D under existing conditions. The queues on both EB and WB approaches increase from about 150 ft. in existing conditions to over 1000 ft in No-Build.
- The operational performance at Heritage Park Drive/ Buchta Road intersection decreases to LOS F in No-Build conditions compared to LOS B under existing conditions. The queue on EB approach also increased to over 1300 ft. in No-Build conditions compared to 60 ft. in existing conditions.
- The delays at the remaining study intersections (AJHS driveways, Meadowview Drive and E Mulberry Street (SH 35)) increase compared to existing conditions, but all these intersections continue to operate at LOS A.

4.3 2030 Build Condition

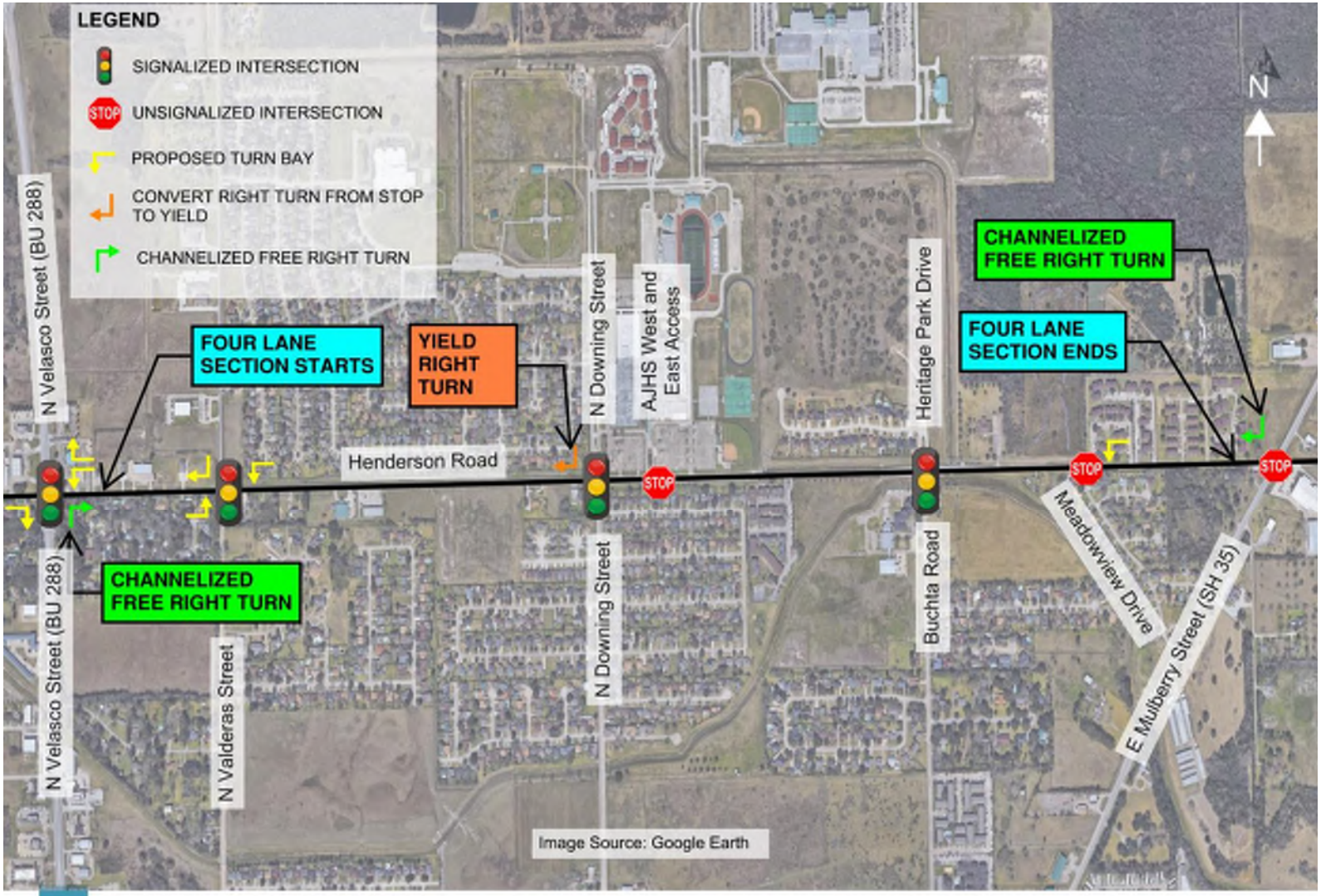
Based on the No-Build analysis, a four-lane cross-section with a raised median is proposed between N Velasco Street (BU 288) and E Mulberry Street (SH 35) to increase roadway and intersection capacity and improve operations. Additional geometric design upgrades and traffic control upgrades were proposed at individual intersections. Figure 4-3 illustrates the proposed geometric and traffic control changes.

Table 4-2 2030 No-Build and Build Conditions Synchro Analysis

			2030 No-Build Conditions													2030 Build Conditions													
			AM Peak Hour							PM Peak Hour							AM Peak Hour							PM Peak Hour					
Int	Street Name	Movement	Movement Delay	Movement LOS	Approach	Approach LOS	Queue	Int. Dela	Int. LO	Movement Delay	Movement LOS	Approach	Approach LOS	Queue	Int. Dela	Int. LO	Movement Delay	Movement LOS	Approach	Approach LOS	Queue	Int. Dela	Int. LO	Movement Delay	Movement LOS	Approach	Approach LOS	Queue	Int. Dela	Int. LO
1	North Velasco Street/SH 288 Business	EBL	38.9	D	71.7	E	36	50.8	D	30.5	C	68.6	E	30	93.2	F	64.8	E	42.9	D	42	32.0	C	65.6	E	39.0	D	40	35.2	D
		EBT	75.6	E			#311			71.9	E			#419			61.4	E			187			61.6	E			231		
		EBR															1.2	A			0			4.6	A			12		
		WBL	82.4	F	65.8	E	315			252.7	F	188.8	F	#576			52.6	D	37.5	D	146			53.8	D	37.2	D	194		
		WBT	44.5	D			#339			106.5	F			#423			31.4	C			153			27.3	C			141		
		WBR															2.9	A			27			4.3	A			32		
		NBL	65.4	E	31.6	C	61			83.8	F	39.4	D	#138			64.1	E	22.1	C	61			73.6	E	25.1	C	#138		
		NBT	36.7	D			194			42.5	D			238			29.0	C			194			35.4	D			238		
		NBR	14.8	B			100			24.1	C			169			0.3	A			0			0.5	A			0		
		SBL	108.9	F	48.7	D	#185			134.9	F	80.2	F	#269			66.5	E	33.2	C	#145			67.7	E	42.8	D	#220		
		SBT	36.2	D			181			68.4	E			#346			26.3	C			173			37.4	D			307		
		SBR																												
2	North Valderas Street/County Road 48	EBL	421.2	F	421.2	F	873	359.4	F	551.4	F	551.4	F	1215	375.3	F	12.2	B	12.1	B	57	21.3	C	12.0	B	14.5	B	73	19.7	B
		EBT															12.1	B			117			15.2	B			166		
		EBR																												
		WBL	595.2	F	595.2	F	1305			446.2	F	446.2	F	938			9.3	A	12.2	B	36			11.8	B	12.9	B	49		
		WBT															12.8	B			122			13.2	B			158		
		WBR																												
		NBL	20.3	C	62.1	F	15			23.1	C	30.8	D	23			34.2	C	44.9	D	54			54.2	D	34.6	C	72		
		NBT	69.3	F			190			33.8	D			73			46.8	D			233			26.9	C			86		
		NBR																												
		SBL	20.7	C	89.9	F	20			17.4	C	183.9	F	10			75.7	E	32.0	C	48			25.9	C	29.2	C	35		
		SBT	103.0	F			273			197.3	F			485			38.3	D			130			42.4	D			136		
		SBR															6.4	A			39			5.5	A			22		
3	Downing Street	EBL	216.3	F	161.2	F	463	300.3	F	55.1	F	392.8	F	155	304.3	F	35.7	D	25.3	C	72	28.3	C	17.9	B	15.3	B	18	23.0	C
		EBT	89.2	F			245			518.2	F			1045			11.8	B			30			14.3	B			35		
		EBR																												
		WBL	85.9	F	552.0	F	223			60.5	F	494.1	F	168			13.4	B	16.2	B	83			27.0	C	19.6	B	83		
		WBT	717.9	F			1393			639.5	F			1270			17.2	B			92			17.1	B			136		
		WBR																												
		NBL	26.9	D	236.3	F	40			9.7	A	11.1	B	123			23.6	C	42.2	D	64			29.8	C	26.5	C	80		
		NBT	355.6	F			650			13.8	B			283			44.5	D			204			25.2	C			84		
		NBR	116.6	F			268			9.2	A			195																
		SBL	39.4	E	182.9	F	70			114.9	F	257.0	F	255			34.3	C	30.5	C	83			29.1	C	28.7	C	93		
		SBT	287.6	F			478			328.5	F			605			46.5	D			233			48.6	D			191		
		SBR	104.6	F			225			274.5	F			545			5.9	A			26			8.2	A			0		
4	Angleton Junior High School Access West	EBT	0.0	A	0.0	A	-	9.7	A	0.0	A	0.0	A	-	6.5	A	0.0	A	0.0	A	-	8.6	A	0.0	A	0.0	A	-	5.7	A
		WBT	0.0	A	0.0	A	-			0.0	A	0.0	A	-			0.0	A	0.0	A	-			0.0	A	0.0	A	-		
		SBL	36.8	E	29.1	D	118			39.8	E	29.5	D	88			41.1	E	25.8	D	128			44.7	E	25.7	D	98		
		SBR	23.3	C			98			23.2	C			83			14.1	B			53			13.9	B			43		
5		EBT	0.0	A	0.0	A	-	0.4	A	0.0	A	0.0	A	-	0.5	A	0.0	A	0.0	A	-	0.3	A	0.0	A	0.0	A	-	0.3	A

			2030 No-Build Conditions													2030 Build Conditions												
			AM Peak Hour							PM Peak Hour							AM Peak Hour							PM Peak Hour					
Int	Street Name	Movement	Movement Delay	Movement LOS	Approach	Approach LOS	Queue	Int. Dela	Int. LO	Movement Delay	Movement LOS	Approach	Approach LOS	Queue	Int. Dela	Int. LO	Movement Delay	Movement LOS	Approach	Approach LOS	Queue	Int. Dela	Int. LO	Movement Delay	Movement LOS	Approach	Approach LOS	Queue	Int. Dela	Int. LO
	Angleton Junior High School Access East	WBT	0.0	A	0.0	A	-			0.0	A	0.0	A	-			0.0	A	0.0	A	-			0.0	A	0.0	A	-		
		SBL	26.3	D	20.3	C	3			0.0	A	19.9	C	-			21.1	C	15.8	C	3			0.0	A	14.1	B	0		
		SBR	17.2	C			5			19.9	C			10			13.1	B			3			14.1	B			8		
6	Buchta Road/Heritage Park	EBL	10.8	B	111.6	F	3	81.4	F	10.3	B	336.7	F	3	188.6	F	11.1	B	5.1	A	m10	16.0	B	5.5	A	4.4	A	m7	11.5	B
		EBT	114.6	F			515			343.9	F			1373			5.0	A			47			4.4	A			42		
		EBR																												
		WBL	11.1	B	92.8	F	5			13.1	B	31.5	D	23			10.6	B	10.3	B	17			12.4	B	8.2	A	38		
		WBT	97.0	F			423			36.4	E			198			10.2	B			80			7.1	A			74		
		WBR																												
		NBL	20.8	C	18.3	C	70			18.3	C	16.6	C	48			53.6	D	41.6	D	179			50.6	D	39.9	D	111		
		NBT	13.1	B			20			13.1	B			15			16.6	B			38			17.1	B			38		
		NBR																												
		SBL	14.3	B	13.7	B	13			14.0	B	13.4	B	8			52.2	D	39.9	D	31			46.3	D	31.0	C	26		
		SBT																												
		SBR	11.9	B			3			12.3	B			5			1.0	A			0			1.2	A			0		
7	Meadowview Drive	EBT	0.0	A	0.0	A	-	0.8	A	0.0	A	0.0	A	-	0.5	A	0.0	A	0.0	A	-	0.7	A	0.0	A	-	-	-	0.4	A
		EBR																												
		WBL	0.0	A	0.0	A	-			7.8	A	0.3	A	0			-	-	0.0	A	0			7.8	A	0.3	A	0		
		WBT	-	-						-	-						-	-						-	-					
		NBL	11.4	B	11.4	B	5			15.1	C	15.1	C	3			10.5	B	10.5	B	5			12.8	B	12.8	B	3		
		NBR																												
8	East Mulberry Street/SH 35	EBL	35.8	E	35.8	E	85	6.5	A	51.9	F	51.9	F	125	8.3	A	30.5	D	23.2	C	40	4.9	A	43.1	E	25.3	D	55	5.6	A
		EBT															15.1	C			15			10.5	B			10		
		EBR																												
		WBL	22.6	C	22.6	C	18			28.8	D	28.8	D	15			21.0	C	21.0	C	15			23.0	C	23.0	C	13		
		WBT																												
		WBR																												
		NBL	8.9	A		A	5			9.1	A	1.9	A	10			8.6	A	1.4	A	5			8.3	A	1.8	A	10		
		NBT	0.0	A			-			0.0	A			-			0.0	A						0.0	A					
		NBR																												
		SBL	7.8	A	0.3	A	0			0.0	A	0.0	A	0			7.8	A	0.3	A	0			0.0	A	0.0	A	0		
		SBT	0.0	A			-			0.0	A			-			0.0	A						0.0	A					
		SBR																												

Figure 4-3 Proposed Conditions Traffic Control



4.3.1 Geometry and Traffic Control Improvements

Henderson Road at N Velasco Street (BU 288)

Geometric Improvements

On the WB approach, one of the through lanes is proposed to be dropped and converted into a left-turn lane. An additional left-turn lane is proposed on the WB approach due to the high turning volumes. Right-turn lanes are proposed on the EB and WB approaches based on the volumes. The northbound (NB) right-turn lane is proposed to be converted to a channelized free movement utilizing the proposed EB through lane as an acceleration lane. Turn lane modifications (storage length, deceleration length and taper length) are also recommended for the existing turn lanes on the NB and southbound (SB) approaches to meet the TxDOT design standards. All the new turn lanes are recommended to meet the TxDOT standards.

Traffic Control Improvements

The phasing of the traffic signal is converted from split phasing on Henderson Road to protected left-turn phasing. The cycle lengths remain unchanged, but the splits are adjusted to reflect the traffic conditions. N Velasco Street (BU 288) is coordinated along the north-south direction. Therefore, it cannot be coordinated with newly proposed signals on Henderson Road.

Henderson Road at N Valderas Street

Geometric Improvements

A left-turn lane is proposed for both the EB and WB approaches. A right-turn lane is proposed for the SB approach to serve anticipated high volumes. Turn lane modifications (storage length, deceleration length and taper length) are also recommended for the existing turn lanes on the NB and SB approaches to meet the TxDOT design standards. All the new turn lanes are recommended to meet the TxDOT design standards.

Traffic Control Improvements

The intersection control is proposed to be updated from all-way stop control to a traffic signal. Protected plus permitted left-turn phasing with flashing yellow arrows (FYA) are recommended for the EB and WB approach left-turn movements. The NB and SB approach left-turn movements operate as permissive movements. It is recommended that the proposed traffic signal be coordinated with signals proposed at N Downing Street and Heritage Park Drive/ Buchta Road.

Henderson Road at N Downing Street

Geometric Improvements

Turn lane modifications (storage length, deceleration length and taper length) are recommended for the existing turn lanes on the NB and SB approaches to meet the

TxDOT design standards. All the new turn lanes are recommended to meet the TxDOT design standards.

Traffic Control Improvements

The intersection control is proposed to be updated from all-way stop control to a traffic signal. Pedestrian signals and crosswalks are proposed for all approaches to provide safety for AJHS students using the intersection. The SB right-turn is proposed to be converted from stop control to a yield control. The left-turn phasing on all the approaches is proposed to serve protected plus permissive lefts with FYA signal heads. It is recommended that the proposed traffic signal be coordinated with signals proposed at N Valderas Street and Heritage Park Drive/Buchta Road.

Henderson Road at AJHS West and East Access

No additional changes are proposed at these intersections.

Henderson Road at Heritage Park Drive/Buchta Road

Geometric Improvements

Turn lane modifications (storage length, deceleration length and taper length) are recommended for the existing turn lanes on NB and SB approaches to meet the TxDOT design standards. All the new turn lanes are recommended to meet the TxDOT design standards.

Traffic Control Improvements

The intersection control is proposed to be updated from all-way stop control to a traffic signal. The left-turn phasing on the EB and WB approaches is proposed to serve permissive left-turns with FYA signal heads. The NB and SB approaches are proposed to operate with split phasing due to the shared left/through lane configuration on the SB approach. It is recommended that the proposed traffic signal be coordinated with signals proposed at N Valderas Street and N Downing Street.

Henderson Road at Meadowview Drive

Geometric Improvements

A left-turn lane is proposed for the WB approach. The proposed storage length and taper length are recommended based on TxDOT design standards.

Henderson Road at E Mulberry Street (SH 35)

Geometric Improvements

On the EB approach, one of the through lanes is proposed to be dropped and converted into a left-turn lane. The SB right-turn is proposed to be a free channelized right-turn utilizing the proposed new through lane as an acceleration lane.

4.3.2 Build Capacity Analysis

The delay and LOS by each movement, approach, and overall intersection for Build conditions are shown in Table 4-2. The movements, approaches and intersections

operating at LOS E and F are highlighted in yellow and orange respectively. The 2030 Build intersection LOS during AM and PM peak hours are provided in Figure 4-4 and Figure 4-5, respectively. The Synchro outputs are shown in Appendix A.

During the AM peak period, the delays for the study intersections are expected to be reduced significantly due to the proposed geometric and traffic control changes from No-Build to Build conditions.

- The operational performance at N Velasco Street (BU 288) improved from LOS D in No-Build to LOS C in Build.
- The operational performance at N Valderas Street improved from LOS F in No-Build to LOS C in Build.
- The operational performance at N Downing Street improved from LOS F in No-Build to LOS C in Build.
- The operational performance at Heritage Park Drive/Buchta Road improved from LOS F in No-Build to LOS B in Build.
- All the other intersections (AJHS driveways, Meadowview Drive and E Mulberry Street (SH 35)) continue to operate at LOS A in the Build conditions.

During the PM peak period, the delays for the study intersections are expected to be reduced significantly due to the proposed geometric and traffic control changes from No-Build to Build conditions.

- The operational performance at N Velasco Street (BU 288) improved from LOS F in No-Build to LOS D in Build.
- The operational performance at N Valderas Street improved from LOS F in No-Build to LOS B in Build.
- The operational performance at N Downing Street improved from LOS F in No-Build to LOS C in Build.
- The operational performance at Heritage Park Drive/ Buchta Road improved from LOS F in No-Build to LOS B in Build.
- All the other intersections (AJHS driveways, Meadowview Drive and E Mulberry Street (SH 35)) continue to operate at LOS A in the Build conditions.

Figure 4-4 AM Peak Period Level of Service

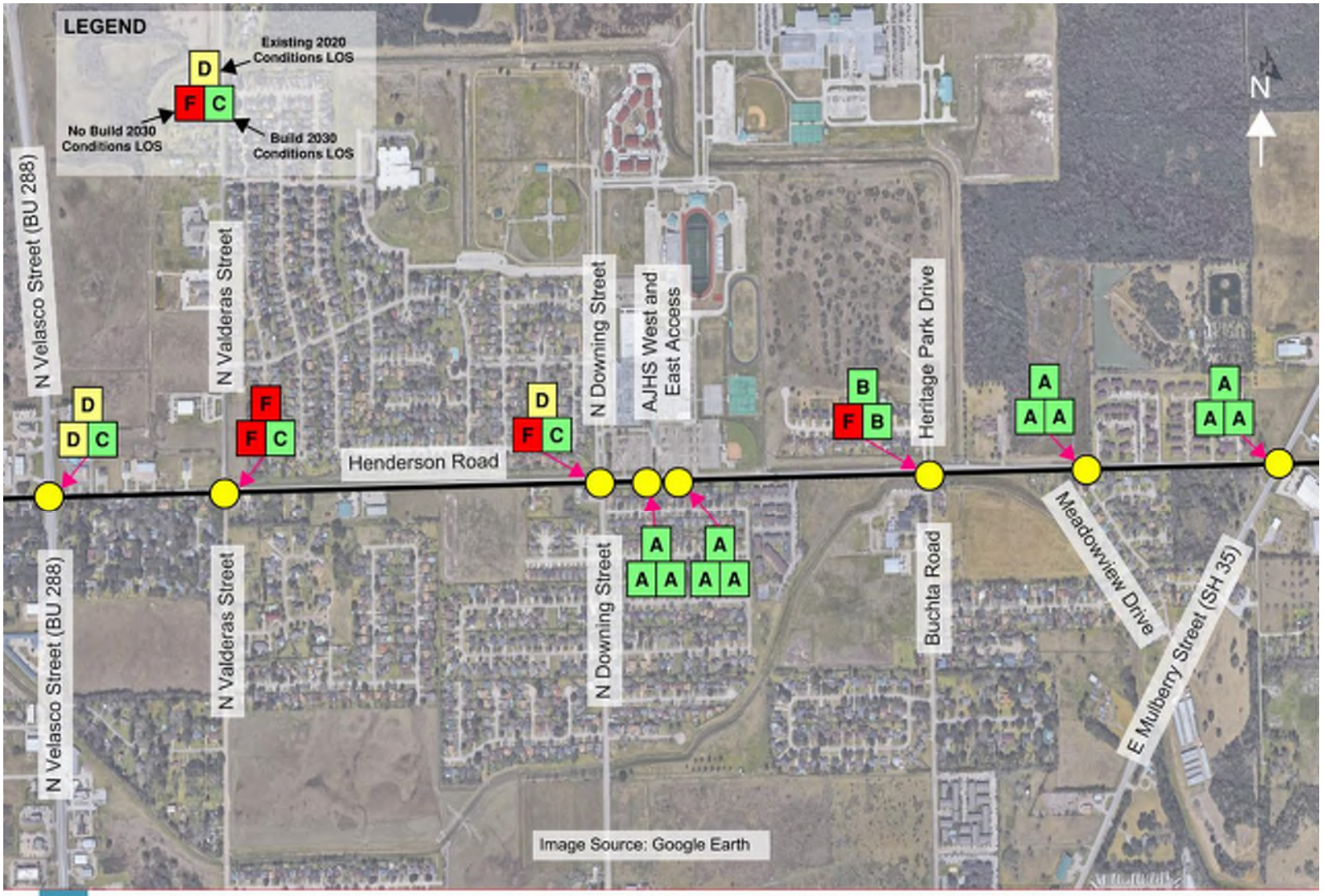
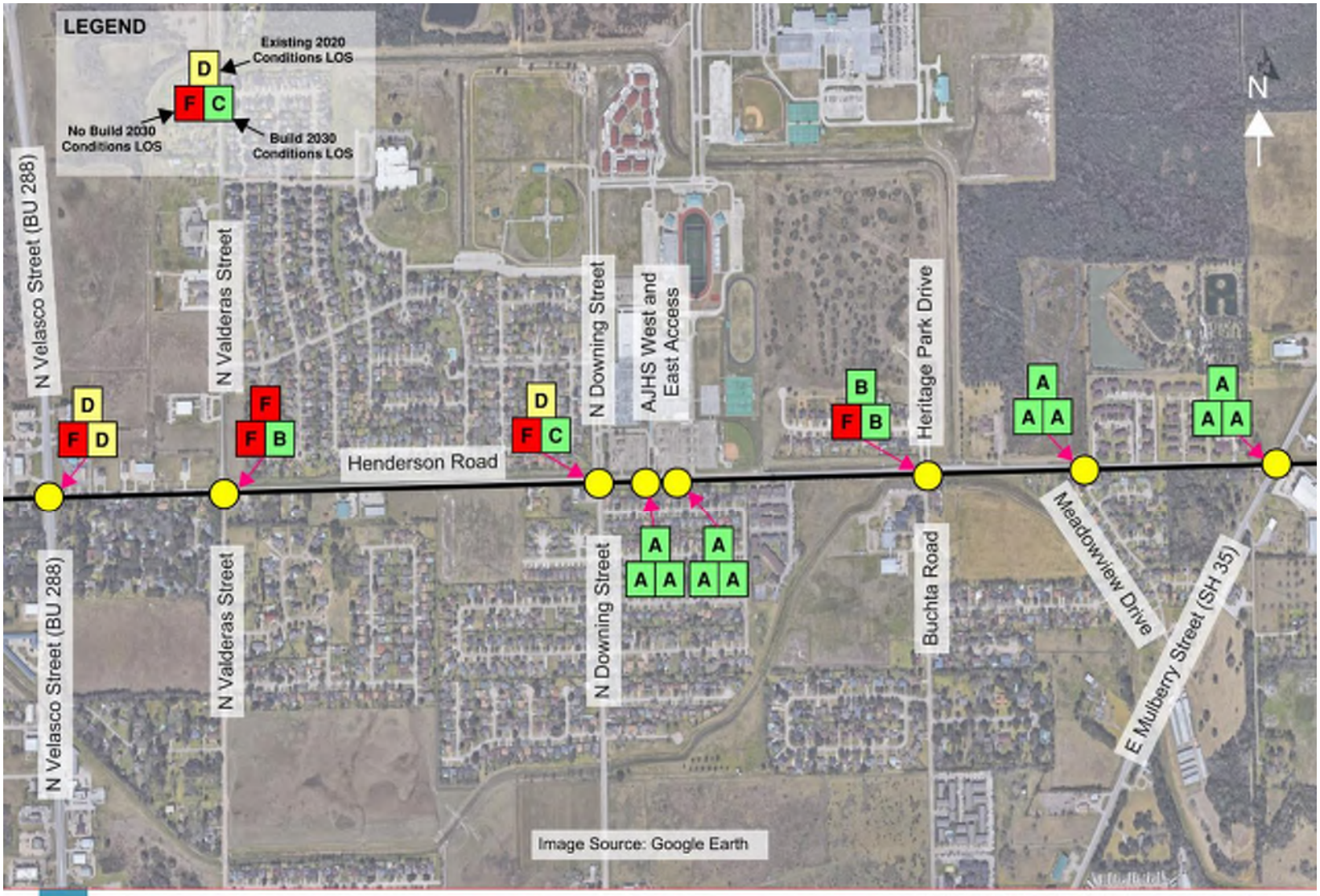


Figure 4-5 PM Peak Period Level of Service



5 Warrant Analyses

A traffic signal warrant analysis was performed for the Year 2020 and 2030 roadway conditions per the guidelines presented in the 2011 Texas Manual on Uniform Traffic Control Devices (TMUTCD) Revision 2. The summaries of the warrant studies at the intersections are reported in this section. The detailed analysis of the warrants is provided in Appendix C.

5.1 Henderson Road at N Valderas Street

5.1.1 Existing Conditions

Henderson Road and N Valderas Street operates as an unsignalized four-legged intersection with stop-control on all approaches. Based on the field observations, the pavement condition and pavement markings are fair for all approaches. The adjacent land use is commercial and residential. The closest signalized intersection on Henderson Road is approximately a quarter of a mile to the west at N Velasco Street. The closest signalized intersection on N Valderas Street is approximately three quarters of a mile to the north at FM 523.

Henderson Road

Henderson Road is an east-west roadway with a posted speed limit of 30 miles per hour in the vicinity of the study intersection. The east leg and west legs are two-lane undivided roadways. Figure 5-1 and Figure 5-2 show the existing Henderson Road approaches and lane configurations.

N Valderas Street

N Valderas Street is a north-south roadway with a posted speed limit of 30 miles per hour in the vicinity of the study intersection. The south leg is a three-lane undivided roadway. The north leg is a two-lane undivided roadway that becomes three lanes at the intersection. Figure 5-3 and Figure 5-4 show the existing N Valderas Street approaches and lane configurations.

Figure 5-1 Henderson Road at N Valderas Street East Leg

Figure 5-2 Henderson Road at N Valderas Street West Leg

Figure 5-3 Henderson Road at N Valderas Street South Leg

Figure 5-4 Henderson Road at N Valderas Street North Leg

5.1.2 Intersection Turning Movement Counts

Counts were recorded in 15-minute intervals from 6:30 AM to 8:30 AM and 3:30 PM to 6:30 PM on Wednesday, November 18th, 2020 by CJ Hensch to represent the typical weekday traffic. Table 5-1 below summarizes the hourly volumes.

Table 5-1 Intersection TMC – Henderson Road at N Valderas Street

Peak Hour Start	Henderson Rd Eastbound			Henderson Rd Westbound			N Valderas St Northbound			N Valderas St Southbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:30	75	155	12	15	127	27	24	60	30	18	65	95	**703**
07:30	43	163	21	51	192	20	24	66	32	14	69	71	**766**
15:30	111	214	22	50	219	20	31	52	37	38	128	108	**1030**
16:30	105	252	34	41	252	24	28	78	26	19	75	69	**1003**
17:30	112	195	30	27	162	16	22	52	26	11	66	66	**785**

5.1.3 Crash Data

The crash data report for the study intersection was obtained from TxDOT's CRIS for the three most recent years: 2018 to 2020. There were less than five crashes within any 12-month period; thus, Warrant 7 Crash Experience is not satisfied. See Table 5-2 below for a summary of the number of intersection related crashes. The crash data report is included in Appendix B.

Table 5-2 Crash Summary – Henderson Road at N Valderas Street

Year	Intersection Related Crashes
2018	1
2019	4
2020	1

5.1.4 Traffic Analysis Year 2020

The data collected for the intersection was analyzed and compared with the criteria for installing a traffic control signal outlined in Section 4C.01 *Studies and Factors for Justifying Traffic Control Signals* in the 2011 TMUTCD Revision 2. Henderson Road is considered the major approach due to the greater traffic volume compared to N Valderas Street, which is considered the minor approach. The right turn volumes are included in

the minor street volumes to perform the warrant analysis since the right turn and through have a shared lane and the volume of right turns is significant on both the approaches. Table 5-3 below summarizes and ranks the highest volumes of the turning movement counts for the study intersection.

Table 5-3 Hourly Volumes – Henderson Road at N Valderas Street

Time Interval	Sum of Major Approach - Henderson Rd	High Minor Approach - N Valderas St	Rank[1]
06:30 – 07:30	411	178	2
07:30 – 08:30	490	154	4
15:30 – 16:30	636	274	1
16:30 – 17:30	708	163	3
17:30 – 18:30	542	143	5

[1] Ranked based on the minor street volume followed by major street volume in case of a tie.

The justification for a traffic control signal was analyzed with the volumes in Table 5-3 along with other applicable factors related to existing operations and safety at the study intersection. The satisfaction of one or more of the warrants listed in Table 5-4 below along with engineering judgment need to be considered for signalizing the intersection. The study intersection is not located in an isolated community with a population less than 10,000 and does not have a posted speed limit exceeding 40 miles per hour; thus, the 70 percent volume requirements were not considered in the analysis. Based on the summary provided in Table 5-4, a traffic signal is currently warranted based on Warrant 8.

Table 5-4 Summary of Warrants – Henderson Road at N Valderas Street

Number	Warrant Type	Result
1	Eight-Hour Vehicular Volume	Not Applicable
2	Four-Hour Vehicular Volume	Not Satisfied
3	Peak Hour	Not Satisfied
4	Pedestrian Volume	Not Satisfied
5	School Crossing	Not Applicable
6	Coordinated Signal System	Not Evaluated
7	Crash Experience	Not Satisfied
8	Roadway Network	Satisfied
9	Intersections Near a Grade Crossing	Not Applicable

5.1.5 Traffic Analysis Year 2030

The signal warrants were evaluated for Build Year 2030 that includes the projected traffic and the traffic due to new developments. Due to the availability of only the peak hour data due to the new developments, only Warrant 3 could be evaluated for Year 2030. Table 5-5 below summarizes the peak hour counts for the AM and PM peak hours.

Table 5-5 Year 2030 Peak Hour Volumes – Henderson Road at N Valderas Street

Street	AM Peak Hour (7:00 AM – 8:00 AM)	PM Peak Hour (4:00 PM – 5:00 PM)
Major Street	1,102	1,344
Minor Street	354	371
Warrant Met?	Yes	Yes

The peak hour warrant (Warrant 3) is met in Year 2030 for both the AM and PM peak hours.

5.1.6 Results and Recommendations

Traffic signal warrants were evaluated for the intersection of Henderson Road and N Valderas Street. Based on the analysis, Warrant 8 Roadway Network is satisfied in the Year 2020 and the projected traffic in Year 2025 meets the peak hour warrant (Warrant 3). Furthermore, this warrant was met on the criterion that the projected volume in Year 2030 is projected to satisfy Warrant 3 Peak Hour. N Valderas Street is one of two roadways that connect FM 523 and Henderson Road within the study area; thus, the projected growth may increase the demand on this roadway. The intersection of Henderson Road and N Valderas Street is recommended to be signalized based on Warrant 8.

5.2 Henderson Road at N Downing Street

5.2.1 Existing Conditions

Henderson Road and N Downing Street operates as an unsignalized four-legged intersection with stop-control on all approaches. Based on the field observations, the pavement condition and pavement markings are fair for all approaches. The adjacent land use is residential with Angleton Junior High School and Angleton High School in the vicinity of the study intersection. The closest signalized intersection on Henderson Road is approximately a mile to the west at N Velasco Street. There are no signalized intersections on N Downing Street within a mile of the study intersection.

Henderson Road

Henderson Road is an east-west roadway with a posted speed limit of 30 miles per hour in the vicinity of the study intersection. The east leg is a three-lane undivided roadway. The west leg is a two-lane undivided roadway that becomes three lanes at the intersection. Figure 5-5 and Figure 5-6 show the existing Henderson Road approaches and lane configurations.

N Downing Street

N Downing Street is a north-south roadway with a posted speed limit of 20 miles per hour during the school hours of 6:45 to 8:15 AM and 2:45 to 4:00 PM in the vicinity of the study intersection. The south leg is a three-lane undivided roadway that becomes four lanes at the intersection. The north leg is a four-lane divided roadway that becomes five lanes at the intersection. Figure 5-7 and Figure 5-8 show the existing N Downing Street approaches and lane configurations.

Figure 5-5 Henderson Road at N Downing Street East Leg

Figure 5-6 Henderson Road at N Downing Street West Leg

Figure 5-7 Henderson Road at N Downing Street South Leg

Figure 5-8 Henderson Road at N Downing Street North Leg

5.2.2 Intersection Turning Movement Counts

Counts were recorded in 15-minute intervals from 6:30 AM to 8:30 AM and 3:30 PM to 6:30 PM on Wednesday, November 18th, 2020 by CJ Hensch to represent the typical weekday traffic. Table 5-6 below summarizes the hourly volumes.

Table 5-6 Intersection TMC – Henderson Road at N Downing Street

Peak Hour Start	Henderson Rd Eastbound			Henderson Rd Westbound			Downing St Northbound			Downing St Southbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:30	87	57	25	22	72	39	52	78	13	19	43	31	539
07:30	104	52	25	66	84	65	38	192	26	35	118	99	904
15:30	81	98	68	60	116	51	63	120	26	45	105	85	918
16:30	41	106	120	44	138	30	95	73	34	24	71	47	823
17:30	37	120	79	24	105	19	54	57	22	13	58	25	613

5.2.3 Crash Data

The crash data report for the study intersection was obtained from TxDOT's CRIS for the three most recent years: 2018 to 2020.There were less than five crashes within any 12-month period; thus, Warrant 7 Crash Experience is not satisfied. See Table 5-7 below for a summary of the number of intersection related crashes. The crash data report is included in Appendix C.

Table 5-7 Crash Summary – Henderson Road at N Downing Street

Year	Intersection Related Crashes
2018	1
2019	0
2020	0

5.2.4 Traffic Analysis Year 2020

The data collected for the intersection was analyzed and compared with the criteria for installing a traffic control signal outlined in Section 4C.01 *Studies and Factors for Justifying Traffic Control Signals* in the 2011 TMUTCD Revision 2. Henderson Road is considered the major approach due to the greater amount of traffic volume compared to Downing Street, which is considered the minor approach. The right turn volumes are

included in the minor street volumes to perform the warrant analysis. There are exclusive right turn lanes on both the NB, SB approaches of the minor street but just one through lane on the major street. Therefore, the right turning vehicles are expected to have conflicts. The minor street can be considered as 2-lane approach based on the turning volumes on NB, SB approaches. Table 5-8 below summarizes and ranks the highest volumes of the turning movement counts for the study intersection.

Table 5-8 Hourly Volumes – Henderson Road at N Downing Street

Time Interval	Sum of Major Approach - Henderson Rd	High Minor Approach - Downing St	Rank[1]
06:30 – 07:30	302	143	4
07:30 – 08:30	396	256	1
15:30 – 16:30	474	235	2
16:30 – 17:30	479	202	3
17:30 – 18:30	384	133	5

[1] Ranked based on the minor street volume followed by major street volume in case of a tie.

The justification for a traffic control signal was analyzed with the volumes in Table 5-8 along with other applicable factors related to existing operations and safety at the study intersection. The satisfaction of one or more of the warrants listed in Table 5-9 below along with engineering judgment need to be considered for signalizing the intersection. The study intersection is not located in an isolated community with a population less than 10,000 and does not have a posted speed limit exceeding 40 miles per hour; thus, the 70 percent volume requirements were not considered in the analysis. Based on the summary in Table 5-9, none of the warrants are met for Year 2020.

Table 5-9 Summary of Warrants – Henderson Road at N Downing Street

Number	Warrant Type	Result
1	Eight-Hour Vehicular Volume	Not Applicable
2	Four-Hour Vehicular Volume	Not Satisfied
3	Peak Hour	Not Satisfied
4	Pedestrian Volume	Not Satisfied
5	School Crossing	Not Evaluated
6	Coordinated Signal System	Not Evaluated
7	Crash Experience	Not Satisfied
8	Roadway Network	Not Satisfied
9	Intersections Near a Grade Crossing	Not Applicable

5.2.5 Traffic Analysis Year 2030

The signal warrants were evaluated for Build Year 2030 that includes the projected traffic and the traffic due to new developments. Due to the availability of only the peak hour data due to the new developments, only Warrant 3 could be evaluated for Year 2030. Table 5-10 below summarizes the peak hour counts for the AM and PM peak hours.

Table 5-10 Year 2030 Peak Hour Volumes – Henderson Road at N Downing Street

Street	AM Peak Hour (7:15 AM – 8:15 AM)	PM Peak Hour (3:45 PM – 4:45 PM)
Major Street	1,120	1,211
Minor Street	591	428
Warrant Met?	Yes	Yes

The peak hour warrant (Warrant 3) is projected to be met in Year 2030 for both the AM and PM peak hours.

5.2.6 Results and Recommendations

Traffic signal warrants were evaluated for the intersection of Henderson Road and Downing Street. Based on the Year 2020 traffic conditions, none of the warrants were satisfied. Warrant 5 School Crossing may be applicable as well but could not be evaluated for all three criteria due to lack of data to verify the available gaps in the traffic flow. In addition, there are currently school zone speed limit signs and school crossing guards for students crossing at the study intersection. On the other hand, Peak Hour Warrant (Warrant 3) is projected to be satisfied in Year 2030 traffic conditions. The intersection of Henderson Road and Downing Street is recommended to be signalized when the warrants are met.

5.3 Henderson Road at Heritage Park Drive/Buchta Road

The 2020 existing conditions operational analysis showed that Heritage Park Drive/Buchta Road intersection operates at LOS B during the AM and PM peak hours. Moreover, even the minor street approaches operate at LOS B or better during the peak hours. Due to the low volumes of traffic and no operational issues, the warrant analysis for this intersection was not performed based on engineering judgement.

5.3.1 Traffic Analysis Year 2030

Though the volumes are low during the existing conditions, the future developments along the corridor are expected to increase the traffic volumes on Henderson Road at this intersection. The No-Build analysis showed that the delay is projected to increase significantly at the intersection and reduce the overall operations to LOS F. Therefore, it was necessary to perform a Warrant Analysis to see if a traffic signal is warranted for this intersection under year 2030 conditions.

The signal warrants were evaluated for Build Year 2030 which includes the projected traffic and the traffic due to new developments. Due to the availability of only the peak hour data due to the new developments, only Warrant 3 could be evaluated for Year 2030. Table 5-11 below summarizes the peak hour counts for the AM and PM peak hours.

Table 5-11 Year 2030 Peak Hour Volumes – Henderson Road at Heritage Park Drive/Buchta Road

Street	AM Peak Hour (7:00 AM – 8:00 AM)	PM Peak Hour (4:00 PM – 5:00 PM)
Major Street	764	1010
Minor Street	194	127
Warrant Met?	No	No

The peak hour warrant (Warrant 3) is not met for either the AM or PM peak hours.

5.3.2 Results and Recommendations

Though the peak hour warrant is not met for Year 2030, it is still recommended to signalize the intersection based on the high volume of traffic on Henderson Rd. The stop-control would cause high delays and queues along Henderson Rd. Moreover, installing a traffic signal would give the benefits of signal coordination with other proposed signals along Henderson Rd. which would minimize the stops and reduce the delays.

6 Pedestrian and Bicyclist Considerations

The land use along Henderson Road corridor is primarily residential in nature with a school (Angleton Junior High School) located to the east of N Downing Street. Along with the vehicular traffic, it is important to design project facilities to accommodate other users, such as pedestrians and bicyclists. In the existing conditions, there are no continuous sidewalks, shared-use paths, or bicycle lanes along the corridor. However, in the proposed design, accommodations for bicyclists and pedestrians are recommended. In addition to the crosswalks and pedestrian signals at the N Downing Street intersection, the following two design alternatives are proposed part of the roadway cross-section for the whole corridor segment:

1. Option 1 – 10’ shared use path on the north side and 5’ sidewalk on the south side
2. Option 2 – 10’ shared use path on the north side

The cross-sections of the two options can be seen in Figure 6-1 and Figure 6-2. One of the primary concerns for selection of the design alternatives is the availability of the right-of-way (ROW). The ROW requirements for the two options are shown in Table 6-1. The measured ROW (based on parcel data from the Brazoria County GIS file) across the corridor at various sections and the ROW required for the two options are shown in Figure 6-3.

Table 6-1 Right of Way Requirements

Options	WB Approach of intersection with N Velasco Street (Widest cross-section)	Rest of corridor
Option 1	103’	90’
Option 2	93’	80’

Figure 6-1 Henderson Road Option 1 Cross-Section

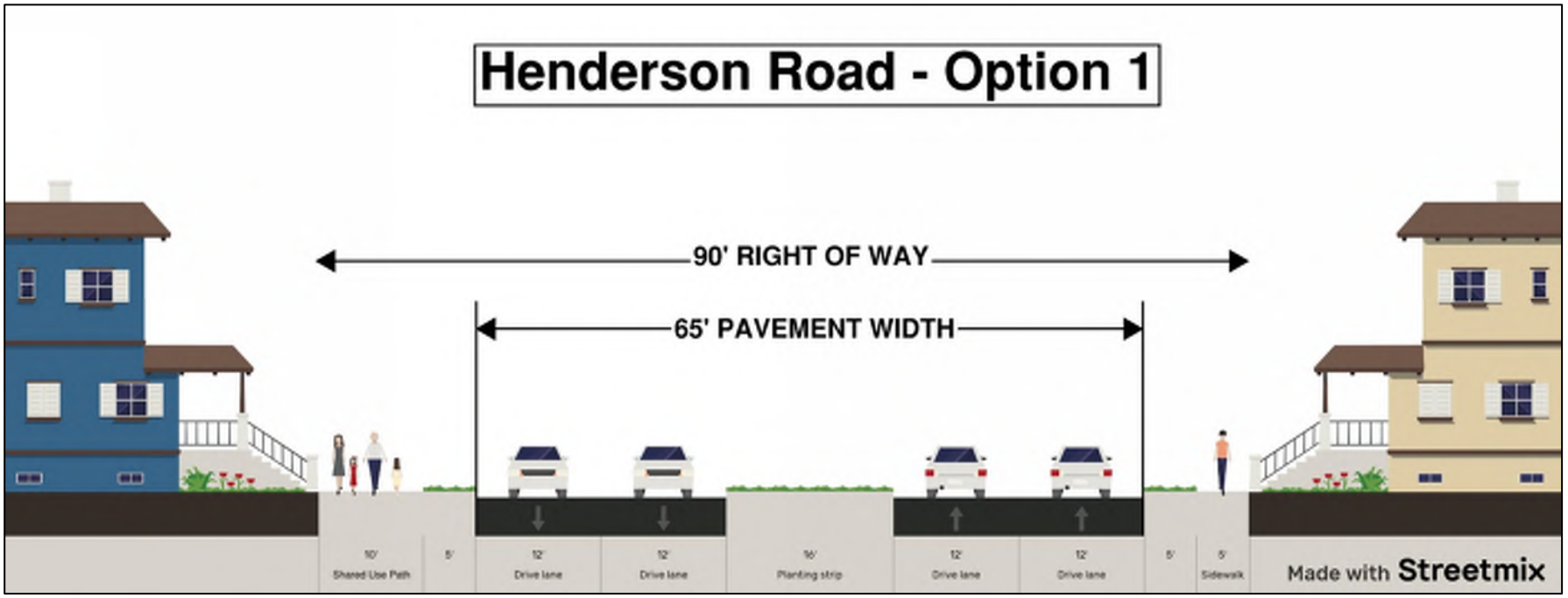


Figure 6-2 Henderson Road Option 2 Cross-Section

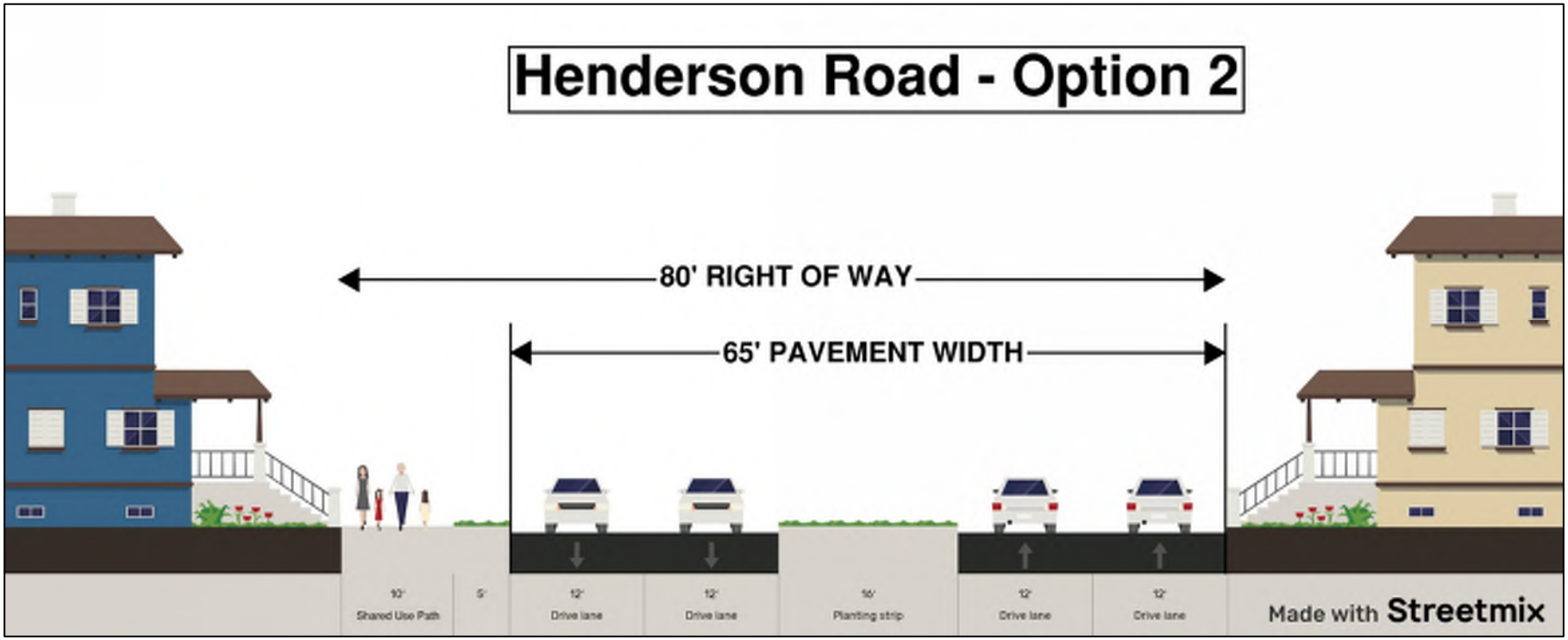


Figure 6-3 ROW Required Along the Corridor

7 Recommendations

Based on traffic analysis, the following improvements are recommended:

1. An additional through lane is recommended to be added in each direction on Henderson Road, along with a raised median between N Velasco Street (BU 288) and E Mulberry Street (SH 35).
2. Existing turn lanes are recommended to be upgraded (storage length, deceleration length and taper length) to TxDOT standards. New turn lanes proposed at the study intersections are summarized in Table 7-1.
3. Traffic control and timing modification improvements are summarized in Table 7-2.

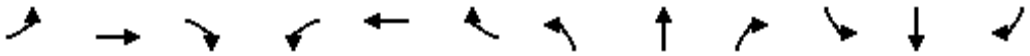
Table 7-1 Proposed Turn Lanes

Intersection	Turn Lanes Proposed
Henderson Road and N Velasco Street (BU 288)	EBR, WBL, WBR, and NBR channelized free
Henderson Road and N Valderas Street	EBL, WBL, and SBR
Henderson Road and Meadowview Street	WBL
Henderson Road and E Mulberry Street (SH 35)	SBR channelized free

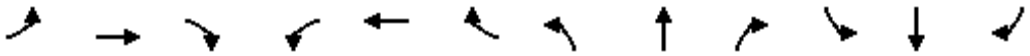
Table 7-2 Traffic Control and Timing Modifications

Intersection	Traffic Control and Timing Modifications
Henderson Road and N Velasco Street (BU 288)	Phasing changed to protected left for EB, WB and timing adjustments
Henderson Road and N Valderas Street	Traffic signal proposed. Protected plus permissive lefts with FYA for EB and WB. Permissive left-turn movements for NB and SB
Henderson Road and N Downing Street	Traffic signal proposed. Protected plus permissive lefts with FYA on all approaches. Pedestrian signals and crosswalks on all approaches. SBR converted from stop to yield control.
Henderson Road and Heritage Park Drive/Buchta Road	Traffic signal proposed. Permissive lefts with FYA on EB and WB approaches. Split phasing for NB and SB approaches.

Appendix A. Synchro Analysis Report



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	110	60	174	99	84	30	318	157	74	299	9
Future Volume (vph)	17	110	60	174	99	84	30	318	157	74	299	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	62		0	117		0	245		81	163		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	145			120			98			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.944			0.930				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1782	0	1805	1767	0	1736	3610	1615	1805	3592	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1782	0	1805	1767	0	1736	3610	1615	1805	3592	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			38				177		3	
Link Speed (mph)		30			30			45			55	
Link Distance (ft)		1209			1435			1089			1119	
Travel Time (s)		27.5			32.6			16.5			13.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.63	0.83	0.75	0.68	0.94	0.90	0.61	0.78	0.79	0.80	0.62	0.50
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	1%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	27	133	80	256	105	93	49	408	199	93	482	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	213	0	256	198	0	49	408	199	93	500	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases									2			
Detector Phase	3	3		4	4		5	2	2	1	6	
Switch Phase												

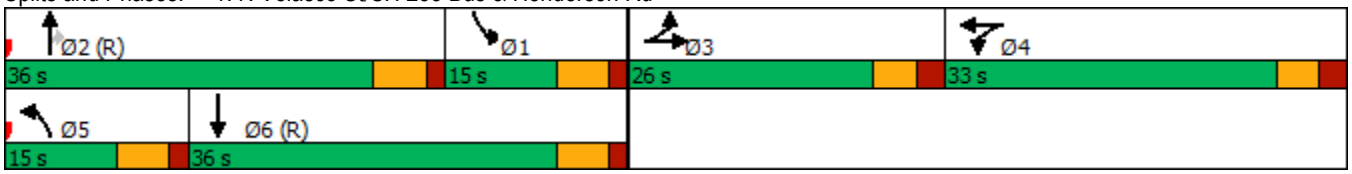


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	9.0	9.0	5.0	9.0	
Minimum Split (s)	23.9	23.9		23.9	23.9		10.8	23.8	23.8	10.8	23.8	
Total Split (s)	26.0	26.0		33.0	33.0		15.0	36.0	36.0	15.0	36.0	
Total Split (%)	23.6%	23.6%		30.0%	30.0%		13.6%	32.7%	32.7%	13.6%	32.7%	
Maximum Green (s)	20.1	20.1		27.1	27.1		9.2	30.2	30.2	9.2	30.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.3	4.3	4.3	4.3	4.3	
All-Red Time (s)	2.4	2.4		2.4	2.4		1.5	1.5	1.5	1.5	1.5	
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)	5.9	5.9		5.9	5.9		5.8	5.8	5.8	5.8	5.8	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	3.0	3.0	2.0	3.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	3.0	3.0	2.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	15.6	15.6		20.0	20.0		7.3	41.8	41.8	9.2	45.9	
Actuated g/C Ratio	0.14	0.14		0.18	0.18		0.07	0.38	0.38	0.08	0.42	
v/c Ratio	0.11	0.78		0.78	0.56		0.43	0.30	0.27	0.62	0.33	
Control Delay	40.1	59.4		59.0	38.3		60.0	26.6	7.1	67.3	25.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	40.1	59.4		59.0	38.3		60.0	26.6	7.1	67.3	25.6	
LOS	D	E		E	D		E	C	A	E	C	
Approach Delay		57.3			49.9			23.2			32.1	
Approach LOS		E			D			C			C	
90th %ile Green (s)	20.1	20.1		27.1	27.1		9.2	30.2	30.2	9.2	30.2	
90th %ile Term Code	Max	Max		Max	Max		Max	Coord	Coord	Max	Coord	
70th %ile Green (s)	18.8	18.8		22.8	22.8		8.8	35.8	35.8	9.2	36.2	
70th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Max	Coord	
50th %ile Green (s)	16.1	16.1		20.0	20.0		7.5	41.3	41.3	9.2	43.0	
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Max	Coord	
30th %ile Green (s)	13.4	13.4		17.1	17.1		6.2	46.9	46.9	9.2	49.9	
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Hold	Coord	
10th %ile Green (s)	9.5	9.5		12.9	12.9		0.0	55.0	55.0	9.2	70.0	
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord	Coord	Hold	Coord	
Stops (vph)	16	144		161	131		28	223	25	68	211	
Fuel Used(gal)	0	4		5	4		1	7	2	3	8	
CO Emissions (g/hr)	27	311		344	292		65	471	115	196	539	
NOx Emissions (g/hr)	5	61		67	57		13	92	22	38	105	
VOC Emissions (g/hr)	6	72		80	68		15	109	27	45	125	
Dilemma Vehicles (#)	0	0		0	0		0	14	0	0	14	
Queue Length 50th (ft)	17	130		174	103		34	105	10	65	128	
Queue Length 95th (ft)	29	185		175	164		48	144	46	105	134	
Internal Link Dist (ft)		1129			1355			1009			1039	
Turn Bay Length (ft)	62			117			245		81	163		
Base Capacity (vph)	308	345		444	463		145	1373	724	150	1499	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.09	0.62		0.58	0.43		0.34	0.30	0.27	0.62	0.33	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 51 (46%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 36.4		Intersection LOS: D	
Intersection Capacity Utilization 51.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: N Velasco St/SH 288 Bus & Henderson Rd



Intersection	
Intersection Delay, s/veh	59.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	91	244	17	51	234	30	29	102	58	31	106	118
Future Vol, veh/h	91	244	17	51	234	30	29	102	58	31	106	118
Peak Hour Factor	0.64	0.79	0.63	0.52	0.67	0.96	0.81	0.85	0.65	0.54	0.69	0.84
Heavy Vehicles, %	1	0	7	2	0	0	0	0	0	0	0	0
Mvmt Flow	142	309	27	98	349	31	36	120	89	57	154	140
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	81.7	81	20.5	26.6
HCM LOS	F	F	C	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	26%	16%	100%	0%
Vol Thru, %	0%	64%	69%	74%	0%	47%
Vol Right, %	0%	36%	5%	10%	0%	53%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	29	160	352	315	31	224
LT Vol	29	0	91	51	31	0
Through Vol	0	102	244	234	0	106
RT Vol	0	58	17	30	0	118
Lane Flow Rate	36	209	478	479	57	294
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.096	0.521	1.038	1.036	0.148	0.694
Departure Headway (Hd)	10.059	9.266	8.081	8.053	9.669	8.758
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	358	391	454	455	373	415
Service Time	7.759	6.966	6.081	6.053	7.369	6.458
HCM Lane V/C Ratio	0.101	0.535	1.053	1.053	0.153	0.708
HCM Control Delay	13.8	21.6	81.7	81	14	29.1
HCM Lane LOS	B	C	F	F	B	D
HCM 95th-tile Q	0.3	2.9	14.3	14.2	0.5	5.1

Intersection	
Intersection Delay, s/veh	34.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	185	66	27	81	109	100	48	282	28	48	160	141
Future Vol, veh/h	185	66	27	81	109	100	48	282	28	48	160	141
Peak Hour Factor	0.73	0.68	0.67	0.70	0.71	0.72	0.83	0.67	0.78	0.77	0.65	0.75
Heavy Vehicles, %	1	2	4	4	1	0	2	1	8	0	1	0
Mvmt Flow	253	97	40	116	154	139	58	421	36	62	246	188
Number of Lanes	1	1	0	1	1	0	1	2	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	35.9	39.9	35.5	29
HCM LOS	E	E	E	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	77%	0%	71%	0%	52%	0%	100%	0%
Vol Right, %	0%	0%	23%	0%	29%	0%	48%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	48	188	122	185	93	81	209	48	160	141
LT Vol	48	0	0	185	0	81	0	48	0	0
Through Vol	0	188	94	0	66	0	109	0	160	0
RT Vol	0	0	28	0	27	0	100	0	0	141
Lane Flow Rate	58	281	176	253	137	116	292	62	246	188
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.177	0.818	0.512	0.783	0.397	0.358	0.831	0.192	0.725	0.514
Departure Headway (Hd)	11.045	10.5	10.457	11.116	10.41	11.14	10.229	11.115	10.606	9.85
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	325	345	345	324	346	323	354	323	340	365
Service Time	8.816	8.272	8.228	8.889	8.182	8.909	7.998	8.888	8.379	7.623
HCM Lane V/C Ratio	0.178	0.814	0.51	0.781	0.396	0.359	0.825	0.192	0.724	0.515
HCM Control Delay	16.2	46.9	23.8	44.6	19.9	20	47.8	16.5	37	22.7
HCM Lane LOS	C	E	C	E	C	C	E	C	E	C
HCM 95th-tile Q	0.6	7.1	2.8	6.3	1.8	1.6	7.4	0.7	5.4	2.8

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑		↰	↱
Traffic Vol, veh/h	0	134	167	0	75	136
Future Vol, veh/h	0	134	167	0	75	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	74	73	92	51	75
Heavy Vehicles, %	2	3	2	2	0	0
Mvmt Flow	0	181	229	0	147	181

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	320	229
Stage 1	-	-	-	-	229	-
Stage 2	-	-	-	-	91	-
Critical Hdwy	-	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	666	815
Stage 1	0	-	-	0	814	-
Stage 2	0	-	-	0	928	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	666	815
Mov Cap-2 Maneuver	-	-	-	-	666	-
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	928	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	666	815
HCM Lane V/C Ratio	-	-	0.221	0.222
HCM Control Delay (s)	-	-	11.9	10.7
HCM Lane LOS	-	-	B	B
HCM 95th %tile Q(veh)	-	-	0.8	0.8

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	202	164	0	4	3
Future Vol, veh/h	0	202	164	0	4	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	74	73	92	75	38
Heavy Vehicles, %	2	3	2	2	100	100
Mvmt Flow	0	273	225	0	5	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	362	225
Stage 1	-	-	-	-	225	-
Stage 2	-	-	-	-	137	-
Critical Hdwy	-	-	-	-	8.1	7.7
Critical Hdwy Stg 1	-	-	-	-	6.9	-
Critical Hdwy Stg 2	-	-	-	-	7.3	-
Follow-up Hdwy	-	-	-	-	4.45	4.25
Pot Cap-1 Maneuver	0	-	-	0	444	596
Stage 1	0	-	-	0	602	-
Stage 2	0	-	-	0	666	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	444	596
Mov Cap-2 Maneuver	-	-	-	-	444	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	666	-

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

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	444	596
HCM Lane V/C Ratio	-	-	0.012	0.013
HCM Control Delay (s)	-	-	13.2	11.1
HCM Lane LOS	-	-	B	B
HCM 95th %tile Q(veh)	-	-	0	0

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	71	140	12	74	4	89	12	26	8	7	11
Future Vol, veh/h	5	71	140	12	74	4	89	12	26	8	7	11
Peak Hour Factor	0.50	0.69	0.63	0.69	0.58	0.75	0.84	0.69	0.78	0.35	0.38	0.83
Heavy Vehicles, %	0	10	10	5	21	0	3	8	0	0	0	0
Mvmt Flow	10	103	222	17	128	5	106	17	33	23	18	13
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	11.7	10	10	9.2
HCM LOS	B	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	53%	0%
Vol Thru, %	0%	32%	0%	34%	0%	95%	47%	0%
Vol Right, %	0%	68%	0%	66%	0%	5%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	89	38	5	211	12	78	15	11
LT Vol	89	0	5	0	12	0	8	0
Through Vol	0	12	0	71	0	74	7	0
RT Vol	0	26	0	140	0	4	0	11
Lane Flow Rate	106	51	10	325	17	133	41	13
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.187	0.077	0.016	0.449	0.029	0.213	0.072	0.02
Departure Headway (Hd)	6.338	5.435	5.775	4.976	6.022	5.756	6.322	5.343
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	562	652	616	719	590	618	570	674
Service Time	4.131	3.228	3.546	2.746	3.807	3.54	4.022	3.043
HCM Lane V/C Ratio	0.189	0.078	0.016	0.452	0.029	0.215	0.072	0.019
HCM Control Delay	10.6	8.7	8.6	11.8	9	10.1	9.5	8.2
HCM Lane LOS	B	A	A	B	A	B	A	A
HCM 95th-tile Q	0.7	0.2	0	2.3	0.1	0.8	0.2	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	80	11	0	107	11	4
Future Vol, veh/h	80	11	0	107	11	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	72	50	25	73	63	38
Heavy Vehicles, %	8	0	0	0	0	0
Mvmt Flow	111	22	0	147	17	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	133	0	269	122
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	147	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1464	-	725	935
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1464	-	725	935
Mov Cap-2 Maneuver	-	-	-	-	725	-
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	885	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	792	-	-	1464	-
HCM Lane V/C Ratio	0.035	-	-	-	-
HCM Control Delay (s)	9.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

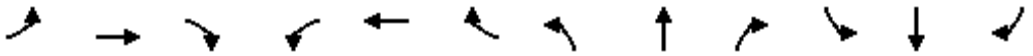
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	28	2	12	7	2	5	10	176	2	3	206	15
Future Vol, veh/h	28	2	12	7	2	5	10	176	2	3	206	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	25	69	50	25	50	56	86	25	25	58	58
Heavy Vehicles, %	1	0	2	0	0	0	8	3	0	0	2	1
Mvmt Flow	29	8	17	14	8	10	18	205	8	12	355	26

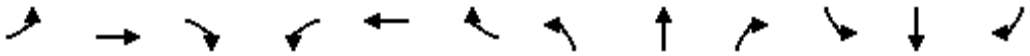
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	646	641	368	650	650	209	381	0	0	213	0	0
Stage 1	392	392	-	245	245	-	-	-	-	-	-	-
Stage 2	254	249	-	405	405	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.5	6.22	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4	3.318	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	386	395	677	385	391	836	1145	-	-	1369	-	-
Stage 1	635	610	-	763	707	-	-	-	-	-	-	-
Stage 2	753	704	-	626	602	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	367	384	677	361	380	836	1145	-	-	1369	-	-
Mov Cap-2 Maneuver	367	384	-	361	380	-	-	-	-	-	-	-
Stage 1	624	603	-	749	694	-	-	-	-	-	-	-
Stage 2	722	691	-	595	595	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.5	13.7	0.6	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1145	-	-	433	446	1369	-	-
HCM Lane V/C Ratio	0.016	-	-	0.126	0.072	0.009	-	-
HCM Control Delay (s)	8.2	0	-	14.5	13.7	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	115	127	241	99	98	71	372	197	82	458	15
Future Volume (vph)	17	115	127	241	99	98	71	372	197	82	458	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	62		0	117		0	245		81	163		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	145			120			98			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.922			0.925				0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1743	0	1805	1732	0	1770	3610	1615	1805	3585	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1805	1743	0	1805	1732	0	1770	3610	1615	1805	3585	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			41				215		4	
Link Speed (mph)		30			30			45			55	
Link Distance (ft)		1209			1435			1089			1119	
Travel Time (s)		27.5			32.6			16.5			13.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.54	0.79	0.80	0.78	0.83	0.82	0.76	0.94	0.79	0.88	0.79	0.54
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	2%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	31	146	159	309	119	120	93	396	249	93	580	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	305	0	309	239	0	93	396	249	93	608	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases									2			
Detector Phase	3	3		4	4		5	2	2	1	6	
Switch Phase												

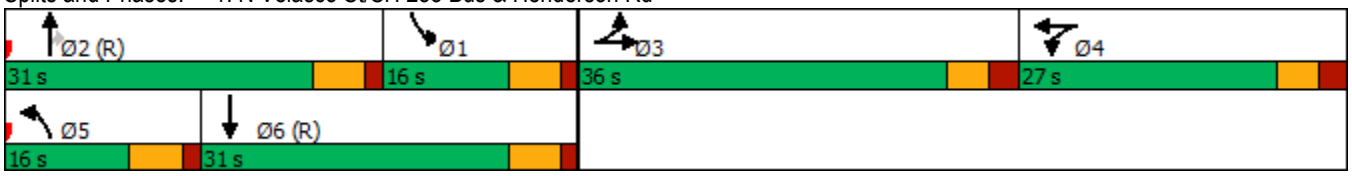


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	9.0	9.0	5.0	9.0	
Minimum Split (s)	23.9	23.9		23.9	23.9		10.8	23.8	23.8	10.8	23.8	
Total Split (s)	36.0	36.0		27.0	27.0		16.0	31.0	31.0	16.0	31.0	
Total Split (%)	32.7%	32.7%		24.5%	24.5%		14.5%	28.2%	28.2%	14.5%	28.2%	
Maximum Green (s)	30.1	30.1		21.1	21.1		10.2	25.2	25.2	10.2	25.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.3	4.3	4.3	4.3	4.3	
All-Red Time (s)	2.4	2.4		2.4	2.4		1.5	1.5	1.5	1.5	1.5	
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)	5.9	5.9		5.9	5.9		5.8	5.8	5.8	5.8	5.8	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	3.0	3.0	2.0	3.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	3.0	3.0	2.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	21.0	21.0		22.7	22.7		8.9	35.9	35.9	9.3	36.3	
Actuated g/C Ratio	0.19	0.19		0.21	0.21		0.08	0.33	0.33	0.08	0.33	
v/c Ratio	0.09	0.82		0.83	0.61		0.65	0.34	0.37	0.61	0.51	
Control Delay	34.2	53.0		61.2	39.7		69.4	32.3	9.0	65.5	34.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	34.2	53.0		61.2	39.7		69.4	32.3	9.0	65.5	34.6	
LOS	C	D		E	D		E	C	A	E	C	
Approach Delay		51.2			51.9			29.2			38.7	
Approach LOS		D			D			C			D	
90th %ile Green (s)	29.0	29.0		22.2	22.2		10.2	25.2	25.2	10.2	25.2	
90th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Coord	Max	Coord	
70th %ile Green (s)	24.4	24.4		26.8	26.8		10.2	25.2	25.2	10.2	25.2	
70th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Coord	Max	Coord	
50th %ile Green (s)	21.1	21.1		25.0	25.0		10.1	30.3	30.3	10.2	30.4	
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Hold	Coord	
30th %ile Green (s)	17.7	17.7		21.9	21.9		8.4	36.8	36.8	10.2	38.6	
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Hold	Coord	
10th %ile Green (s)	12.7	12.7		17.5	17.5		0.0	62.2	62.2	0.0	62.2	
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord	Coord	Skip	Coord	
Stops (vph)	14	193		213	147		68	286	36	78	384	
Fuel Used(gal)	0	6		7	5		2	9	2	3	14	
CO Emissions (g/hr)	25	418		481	322		164	604	154	218	966	
NOx Emissions (g/hr)	5	81		94	63		32	117	30	42	188	
VOC Emissions (g/hr)	6	97		111	75		38	140	36	51	224	
Dilemma Vehicles (#)	0	0		0	0		0	17	0	0	21	
Queue Length 50th (ft)	18	176		205	124		64	120	18	64	195	
Queue Length 95th (ft)	24	211		#270	192		99	176	58	116	233	
Internal Link Dist (ft)		1129			1355			1009			1039	
Turn Bay Length (ft)	62			117			245		81	163		
Base Capacity (vph)	493	512		384	400		164	1179	672	167	1186	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.06	0.60		0.80	0.60		0.57	0.34	0.37	0.56	0.51	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 51 (46%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 40.6		Intersection LOS: D	
Intersection Capacity Utilization 64.0%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: N Velasco St/SH 288 Bus & Henderson Rd



Intersection	
Intersection Delay, s/veh	52.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	112	218	24	58	295	27	39	57	25	24	121	105
Future Vol, veh/h	112	218	24	58	295	27	39	57	25	24	121	105
Peak Hour Factor	0.81	0.77	0.75	0.65	0.91	0.67	0.80	0.64	0.69	0.75	0.55	0.74
Heavy Vehicles, %	0	2	0	12	0	0	6	0	0	0	0	0
Mvmt Flow	138	283	32	89	324	40	49	89	36	32	220	142
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	62.2	71.2	15.8	36.4
HCM LOS	F	F	C	E

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	32%	15%	100%	0%
Vol Thru, %	0%	70%	62%	78%	0%	54%
Vol Right, %	0%	30%	7%	7%	0%	46%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	82	354	380	24	226
LT Vol	39	0	112	58	24	0
Through Vol	0	57	218	295	0	121
RT Vol	0	25	24	27	0	105
Lane Flow Rate	49	125	453	454	32	362
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.135	0.318	0.967	1.002	0.079	0.816
Departure Headway (Hd)	10.161	9.304	7.819	7.947	9.139	8.278
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	355	388	467	463	394	442
Service Time	7.861	7.004	5.819	5.934	6.839	5.978
HCM Lane V/C Ratio	0.138	0.322	0.97	0.981	0.081	0.819
HCM Control Delay	14.4	16.3	62.2	71.2	12.6	38.5
HCM Lane LOS	B	C	F	F	B	E
HCM 95th-tile Q	0.5	1.3	12	13.1	0.3	7.6

Intersection	
Intersection Delay, s/veh	26.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	83	107	74	73	139	59	79	129	37	52	137	113
Future Vol, veh/h	83	107	74	73	139	59	79	129	37	52	137	113
Peak Hour Factor	0.54	0.76	0.93	0.75	0.75	0.72	0.77	0.62	0.69	0.57	0.56	0.37
Heavy Vehicles, %	1	6	0	8	6	4	1	2	3	0	0	0
Mvmt Flow	154	141	80	97	185	82	103	208	54	91	245	305
Number of Lanes	1	1	0	1	1	0	1	2	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	24.2	30.6	18.7	29.1
HCM LOS	C	D	C	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	54%	0%	59%	0%	70%	0%	100%	0%
Vol Right, %	0%	0%	46%	0%	41%	0%	30%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	79	86	80	83	181	73	198	52	137	113
LT Vol	79	0	0	83	0	73	0	52	0	0
Through Vol	0	86	43	0	107	0	139	0	137	0
RT Vol	0	0	37	0	74	0	59	0	0	113
Lane Flow Rate	103	139	123	154	220	97	267	91	245	305
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.308	0.396	0.34	0.448	0.598	0.287	0.732	0.255	0.649	0.749
Departure Headway (Hd)	10.792	10.285	9.963	10.495	9.777	10.613	9.854	10.078	9.555	8.824
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	333	350	362	343	370	339	366	359	382	412
Service Time	8.552	8.045	7.723	8.253	7.535	8.37	7.61	7.778	7.255	6.524
HCM Lane V/C Ratio	0.309	0.397	0.34	0.449	0.595	0.286	0.73	0.253	0.641	0.74
HCM Control Delay	18.3	19.7	17.8	21.5	26.1	17.6	35.4	16.2	28.3	33.6
HCM Lane LOS	C	C	C	C	D	C	E	C	D	D
HCM 95th-tile Q	1.3	1.8	1.5	2.2	3.7	1.2	5.6	1	4.4	6.1

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑		↰	↱
Traffic Vol, veh/h	0	191	215	0	32	56
Future Vol, veh/h	0	191	215	0	32	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	87	78	92	30	32
Heavy Vehicles, %	2	4	6	2	0	0
Mvmt Flow	0	220	276	0	107	175

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	386	276
Stage 1	-	-	-	-	276	-
Stage 2	-	-	-	-	110	-
Critical Hdwy	-	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	608	768
Stage 1	0	-	-	0	775	-
Stage 2	0	-	-	0	908	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	608	768
Mov Cap-2 Maneuver	-	-	-	-	608	-
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	908	-

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

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	608	768
HCM Lane V/C Ratio	-	-	0.175	0.228
HCM Control Delay (s)	-	-	12.2	11.1
HCM Lane LOS	-	-	B	B
HCM 95th %tile Q(veh)	-	-	0.6	0.9

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑		↰	↱
Traffic Vol, veh/h	0	219	204	0	0	12
Future Vol, veh/h	0	219	204	0	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	87	78	92	25	50
Heavy Vehicles, %	2	4	6	2	2	100
Mvmt Flow	0	252	262	0	0	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	388	262
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	126	-
Critical Hdwy	-	-	-	-	6.63	7.7
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	-	-	3.519	4.25
Pot Cap-1 Maneuver	0	-	-	0	602	562
Stage 1	0	-	-	0	781	-
Stage 2	0	-	-	0	887	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	602	562
Mov Cap-2 Maneuver	-	-	-	-	602	-
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	887	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	-	562
HCM Lane V/C Ratio	-	-	-	0.043
HCM Control Delay (s)	-	-	0	11.7
HCM Lane LOS	-	-	A	B
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	84	105	32	80	6	53	10	14	2	6	8
Future Vol, veh/h	8	84	105	32	80	6	53	10	14	2	6	8
Peak Hour Factor	0.58	0.53	0.62	0.55	0.81	0.42	0.67	0.75	0.54	0.25	0.42	0.58
Heavy Vehicles, %	0	8	1	0	7	0	2	9	0	11	4	2
Mvmt Flow	14	158	169	58	99	14	79	13	26	8	14	14
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	11.4	9.2	9.6	8.9
HCM LOS	B	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	25%	0%
Vol Thru, %	0%	42%	0%	44%	0%	93%	75%	0%
Vol Right, %	0%	58%	0%	56%	0%	7%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	24	8	189	32	86	8	8
LT Vol	53	0	8	0	32	0	2	0
Through Vol	0	10	0	84	0	80	6	0
RT Vol	0	14	0	105	0	6	0	8
Lane Flow Rate	79	39	14	328	58	113	22	14
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.139	0.06	0.022	0.443	0.093	0.167	0.039	0.02
Departure Headway (Hd)	6.324	5.527	5.626	4.869	5.76	5.328	6.235	5.28
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	564	644	635	738	620	670	570	672
Service Time	4.095	3.298	3.371	2.614	3.516	3.083	4.018	3.062
HCM Lane V/C Ratio	0.14	0.061	0.022	0.444	0.094	0.169	0.039	0.021
HCM Control Delay	10.1	8.7	8.5	11.5	9.1	9.2	9.3	8.2
HCM Lane LOS	B	A	A	B	A	A	A	A
HCM 95th-tile Q	0.5	0.2	0.1	2.3	0.3	0.6	0.1	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	103	13	4	85	6	0
Future Vol, veh/h	103	13	4	85	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	69	38	60	63	25
Heavy Vehicles, %	17	0	0	18	0	0
Mvmt Flow	141	19	11	142	10	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	160	0	315	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	164	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1432	-	682	901
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1432	-	677	901
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	677	-	-	1432	-
HCM Lane V/C Ratio	0.014	-	-	0.007	-
HCM Control Delay (s)	10.4	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

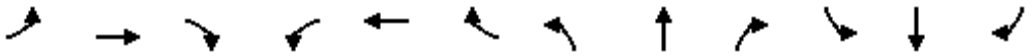
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	21	0	27	3	3	2	22	238	6	0	206	38
Future Vol, veh/h	21	0	27	3	3	2	22	238	6	0	206	38
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	25	65	50	50	25	66	67	63	25	95	71
Heavy Vehicles, %	1	0	2	0	0	0	8	3	0	0	2	1
Mvmt Flow	33	0	42	6	6	8	33	355	10	0	217	54

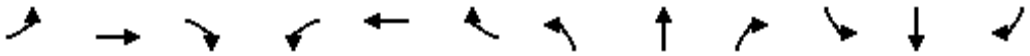
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	677	675	244	691	697	360	271	0	0	365	0	0
Stage 1	244	244	-	426	426	-	-	-	-	-	-	-
Stage 2	433	431	-	265	271	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.5	6.22	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4	3.318	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	368	378	795	362	367	689	1258	-	-	1205	-	-
Stage 1	762	708	-	610	589	-	-	-	-	-	-	-
Stage 2	603	586	-	745	689	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	350	366	795	334	355	689	1258	-	-	1205	-	-
Mov Cap-2 Maneuver	350	366	-	334	355	-	-	-	-	-	-	-
Stage 1	737	708	-	590	570	-	-	-	-	-	-	-
Stage 2	570	567	-	706	689	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	13.8	0.7	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1258	-	-	508	430	1205	-	-
HCM Lane V/C Ratio	0.026	-	-	0.147	0.047	-	-	-
HCM Control Delay (s)	7.9	0	-	13.3	13.8	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	165	81	308	176	149	41	428	236	112	402	13
Future Volume (vph)	23	165	81	308	176	149	41	428	236	112	402	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	62		0	117		0	245		81	163		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	145			120			98			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.947			0.929				0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1788	0	1805	1765	0	1736	3610	1615	1805	3588	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1788	0	1805	1765	0	1736	3610	1615	1805	3588	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			39				198		4	
Link Speed (mph)		30			30			45			55	
Link Distance (ft)		1209			1435			1089			1119	
Travel Time (s)		27.5			32.6			16.5			13.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.63	0.83	0.75	0.68	0.94	0.90	0.61	0.78	0.79	0.80	0.62	0.50
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	1%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	37	199	108	453	187	166	67	549	299	140	648	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	307	0	453	353	0	67	549	299	140	674	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases									2			
Detector Phase	3	3		4	4		5	2	2	1	6	
Switch Phase												

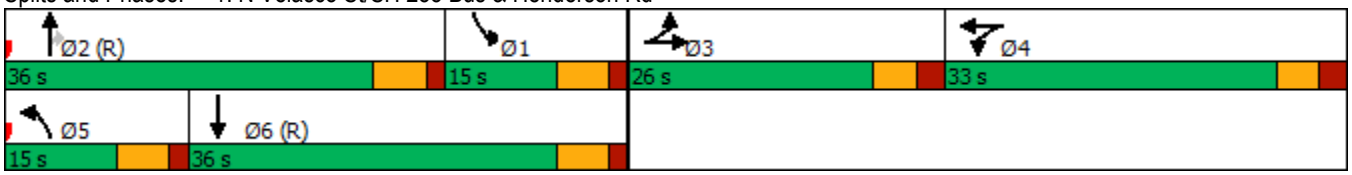


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	9.0	9.0	5.0	9.0	
Minimum Split (s)	23.9	23.9		23.9	23.9		10.8	23.8	23.8	10.8	23.8	
Total Split (s)	26.0	26.0		33.0	33.0		15.0	36.0	36.0	15.0	36.0	
Total Split (%)	23.6%	23.6%		30.0%	30.0%		13.6%	32.7%	32.7%	13.6%	32.7%	
Maximum Green (s)	20.1	20.1		27.1	27.1		9.2	30.2	30.2	9.2	30.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.3	4.3	4.3	4.3	4.3	
All-Red Time (s)	2.4	2.4		2.4	2.4		1.5	1.5	1.5	1.5	1.5	
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)	5.9	5.9		5.9	5.9		5.8	5.8	5.8	5.8	5.8	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	3.0	3.0	2.0	3.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	3.0	3.0	2.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	19.3	19.3		27.9	27.9		7.8	30.2	30.2	9.2	33.7	
Actuated g/C Ratio	0.18	0.18		0.25	0.25		0.07	0.27	0.27	0.08	0.31	
v/c Ratio	0.12	0.92		0.99	0.74		0.54	0.55	0.51	0.93	0.61	
Control Delay	38.9	75.6		82.4	44.5		65.4	36.7	14.8	108.9	36.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	38.9	75.6		82.4	44.5		65.4	36.7	14.8	108.9	36.2	
LOS	D	E		F	D		E	D	B	F	D	
Approach Delay		71.7			65.8			31.6			48.7	
Approach LOS		E			E			C			D	
90th %ile Green (s)	20.1	20.1		27.1	27.1		9.2	30.2	30.2	9.2	30.2	
90th %ile Term Code	Max	Max		Max	Max		Max	Coord	Coord	Max	Coord	
70th %ile Green (s)	20.1	20.1		27.1	27.1		9.2	30.2	30.2	9.2	30.2	
70th %ile Term Code	Max	Max		Max	Max		Max	Coord	Coord	Max	Coord	
50th %ile Green (s)	20.1	20.1		27.1	27.1		8.6	30.2	30.2	9.2	30.8	
50th %ile Term Code	Max	Max		Max	Max		Gap	Coord	Coord	Max	Coord	
30th %ile Green (s)	20.1	20.1		27.1	27.1		7.1	30.2	30.2	9.2	32.3	
30th %ile Term Code	Max	Max		Max	Max		Gap	Coord	Coord	Max	Coord	
10th %ile Green (s)	16.3	16.3		30.9	30.9		0.0	30.2	30.2	9.2	45.2	
10th %ile Term Code	Gap	Gap		Max	Max		Skip	Coord	Coord	Max	Coord	
Stops (vph)	20	204		262	262		38	357	72	94	347	
Fuel Used(gal)	1	7		10	8		1	11	3	5	12	
CO Emissions (g/hr)	36	506		703	561		91	745	229	351	870	
NOx Emissions (g/hr)	7	98		137	109		18	145	45	68	169	
VOC Emissions (g/hr)	8	117		163	130		21	173	53	81	202	
Dilemma Vehicles (#)	0	0		0	0		0	19	0	0	19	
Queue Length 50th (ft)	22	199		~331	208		46	174	55	100	220	
Queue Length 95th (ft)	36	#311		315	#339		61	194	100	#185	181	
Internal Link Dist (ft)		1129			1355			1009			1039	
Turn Bay Length (ft)	62			117			245		81	163		
Base Capacity (vph)	308	344		457	476		145	991	587	150	1103	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.12	0.89		0.99	0.74		0.46	0.55	0.51	0.93	0.61	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 51 (46%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 50.8		Intersection LOS: D	
Intersection Capacity Utilization 68.2%		ICU Level of Service C	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: N Velasco St/SH 288 Bus & Henderson Rd



Intersection	
Intersection Delay, s/veh	359.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	123	380	25	74	459	41	47	165	93	42	153	159
Future Vol, veh/h	123	380	25	74	459	41	47	165	93	42	153	159
Peak Hour Factor	0.64	0.79	0.63	0.52	0.67	0.96	0.81	0.85	0.65	0.54	0.69	0.84
Heavy Vehicles, %	1	0	7	2	0	0	0	0	0	0	0	0
Mvmt Flow	192	481	40	142	685	43	58	194	143	78	222	189
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	421.2	595.2	62.1	89.9
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	23%	13%	100%	0%
Vol Thru, %	0%	64%	72%	80%	0%	49%
Vol Right, %	0%	36%	5%	7%	0%	51%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	47	258	528	574	42	312
LT Vol	47	0	123	74	42	0
Through Vol	0	165	380	459	0	153
RT Vol	0	93	25	41	0	159
Lane Flow Rate	58	337	713	870	78	411
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.164	0.884	1.842	2.244	0.215	1.036
Departure Headway (Hd)	14.715	13.903	12.89	11.827	14.149	13.225
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	245	263	292	313	256	279
Service Time	12.415	11.603	10.89	9.827	11.849	10.925
HCM Lane V/C Ratio	0.237	1.281	2.442	2.78	0.305	1.473
HCM Control Delay	20.3	69.3	421.2	595.2	20.7	103
HCM Lane LOS	C	F	F	F	C	F
HCM 95th-tile Q	0.6	7.6	34.9	52.2	0.8	10.9

Intersection	
Intersection Delay, s/veh	300.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	259	142	42	175	255	247	79	461	48	109	266	216
Future Vol, veh/h	259	142	42	175	255	247	79	461	48	109	266	216
Peak Hour Factor	0.73	0.68	0.67	0.70	0.71	0.72	0.83	0.67	0.78	0.77	0.65	0.75
Heavy Vehicles, %	1	2	4	4	1	0	2	1	8	0	1	0
Mvmt Flow	355	209	63	250	359	343	95	688	62	142	409	288
Number of Lanes	1	1	0	1	1	0	1	2	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	161.2	552	236.3	182.9
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	76%	0%	77%	0%	51%	0%	100%	0%
Vol Right, %	0%	0%	24%	0%	23%	0%	49%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	79	307	202	259	184	175	502	109	266	216
LT Vol	79	0	0	259	0	175	0	109	0	0
Through Vol	0	307	154	0	142	0	255	0	266	0
RT Vol	0	0	48	0	42	0	247	0	0	216
Lane Flow Rate	95	459	291	355	272	250	702	142	409	288
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.361	1.676	1.059	1.35	0.985	0.956	2.512	0.537	1.498	0.997
Departure Headway (Hd)	15.601	15.05	14.999	13.89	13.223	14.24	13.312	17.787	17.273	16.509
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	232	248	244	266	277	258	281	204	213	222
Service Time	13.301	12.75	12.699	11.59	10.923	11.94	11.012	15.487	14.973	14.209
HCM Lane V/C Ratio	0.409	1.851	1.193	1.335	0.982	0.969	2.498	0.696	1.92	1.297
HCM Control Delay	26.9	355.6	116.6	216.3	89.2	85.9	717.9	39.4	287.6	104.6
HCM Lane LOS	D	F	F	F	F	F	F	E	F	F
HCM 95th-tile Q	1.6	26	10.7	18.5	9.8	8.9	55.7	2.8	19.1	9

Intersection	
Int Delay, s/veh	9.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	292	465	0	113	218
Future Vol, veh/h	0	292	465	0	113	218
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	74	73	92	51	75
Heavy Vehicles, %	2	3	2	2	0	0
Mvmt Flow	0	395	637	0	222	291

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	835	637
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	198	-
Critical Hdwy	-	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	325	481
Stage 1	0	-	-	0	531	-
Stage 2	0	-	-	0	822	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	325	481
Mov Cap-2 Maneuver	-	-	-	-	325	-
Stage 1	-	-	-	-	531	-
Stage 2	-	-	-	-	822	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	29.1
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	325	481
HCM Lane V/C Ratio	-	-	0.682	0.604
HCM Control Delay (s)	-	-	36.8	23.3
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	4.7	3.9

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑		↰	↱
Traffic Vol, veh/h	0	395	461	0	6	6
Future Vol, veh/h	0	395	461	0	6	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	74	73	92	75	38
Heavy Vehicles, %	2	3	2	2	100	100
Mvmt Flow	0	534	632	0	8	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	899	632
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	267	-
Critical Hdwy	-	-	-	-	8.1	7.7
Critical Hdwy Stg 1	-	-	-	-	6.9	-
Critical Hdwy Stg 2	-	-	-	-	7.3	-
Follow-up Hdwy	-	-	-	-	4.45	4.25
Pot Cap-1 Maneuver	0	-	-	0	177	311
Stage 1	0	-	-	0	347	-
Stage 2	0	-	-	0	553	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	177	311
Mov Cap-2 Maneuver	-	-	-	-	177	-
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	553	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.3
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	177	311
HCM Lane V/C Ratio	-	-	0.045	0.051
HCM Control Delay (s)	-	-	26.3	17.2
HCM Lane LOS	-	-	D	C
HCM 95th %tile Q(veh)	-	-	0.1	0.2

Intersection	
Intersection Delay, s/veh	81.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	178	222	19	306	6	180	25	52	11	11	16
Future Vol, veh/h	9	178	222	19	306	6	180	25	52	11	11	16
Peak Hour Factor	0.50	0.69	0.63	0.69	0.58	0.75	0.84	0.69	0.78	0.35	0.38	0.83
Heavy Vehicles, %	0	10	10	5	21	0	3	8	0	0	0	0
Mvmt Flow	18	258	352	28	528	8	214	36	67	31	29	19
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	111.6	92.8	18.3	13.7
HCM LOS	F	F	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	50%	0%
Vol Thru, %	0%	32%	0%	44%	0%	98%	50%	0%
Vol Right, %	0%	68%	0%	56%	0%	2%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	77	9	400	19	312	22	16
LT Vol	180	0	9	0	19	0	11	0
Through Vol	0	25	0	178	0	306	11	0
RT Vol	0	52	0	222	0	6	0	16
Lane Flow Rate	214	103	18	610	28	536	60	19
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.508	0.219	0.038	1.155	0.058	1.095	0.153	0.044
Departure Headway (Hd)	9.076	8.151	7.812	7.073	7.954	7.705	9.795	8.796
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	401	443	461	519	453	477	368	410
Service Time	6.776	5.851	5.512	4.773	5.654	5.405	7.495	6.496
HCM Lane V/C Ratio	0.534	0.233	0.039	1.175	0.062	1.124	0.163	0.046
HCM Control Delay	20.8	13.1	10.8	114.6	11.1	97	14.3	11.9
HCM Lane LOS	C	B	B	F	B	F	B	B
HCM 95th-tile Q	2.8	0.8	0.1	20.6	0.2	16.9	0.5	0.1

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	171	15	0	191	15	6
Future Vol, veh/h	171	15	0	191	15	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	72	50	25	73	63	38
Heavy Vehicles, %	8	0	0	0	0	0
Mvmt Flow	238	30	0	262	24	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	268	0	515	253
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	262	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1307	-	523	791
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	786	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1307	-	523	791
Mov Cap-2 Maneuver	-	-	-	-	523	-
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	786	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	605	-	-	1307	-
HCM Lane V/C Ratio	0.065	-	-	-	-
HCM Control Delay (s)	11.4	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	6.5

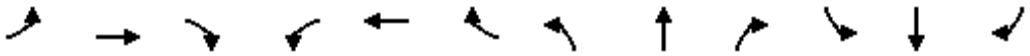
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	79	5	37	10	3	7	32	237	3	5	277	49
Future Vol, veh/h	79	5	37	10	3	7	32	237	3	5	277	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	25	69	50	25	50	56	86	25	25	58	58
Heavy Vehicles, %	1	0	2	0	0	0	8	3	0	0	2	1
Mvmt Flow	82	20	54	20	12	14	57	276	12	20	478	84

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	969	962	520	993	998	282	562	0	0	288	0	0
Stage 1	560	560	-	396	396	-	-	-	-	-	-	-
Stage 2	409	402	-	597	602	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.5	6.22	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4	3.318	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	234	258	556	226	246	762	980	-	-	1286	-	-
Stage 1	515	514	-	633	607	-	-	-	-	-	-	-
Stage 2	621	604	-	493	492	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	205	235	556	178	224	762	980	-	-	1286	-	-
Mov Cap-2 Maneuver	205	235	-	178	224	-	-	-	-	-	-	-
Stage 1	479	502	-	589	565	-	-	-	-	-	-	-
Stage 2	555	562	-	418	481	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.8	22.6	1.5	0.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	980	-	-	267	250	1286	-	-
HCM Lane V/C Ratio	0.058	-	-	0.584	0.184	0.016	-	-
HCM Control Delay (s)	8.9	0	-	35.8	22.6	7.8	0	-
HCM Lane LOS	A	A	-	E	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	3.4	0.7	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	218	171	398	164	162	96	500	372	156	616	21
Future Volume (vph)	23	218	171	398	164	162	96	500	372	156	616	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	62		0	117		0	245		81	163		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	145			120			98			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.934			0.925				0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1765	0	1805	1732	0	1770	3610	1615	1805	3585	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1805	1765	0	1805	1732	0	1770	3610	1615	1805	3585	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			40				303		4	
Link Speed (mph)		30			30			45			55	
Link Distance (ft)		1209			1435			1089			1119	
Travel Time (s)		27.5			32.6			16.5			13.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.54	0.79	0.80	0.78	0.83	0.82	0.76	0.94	0.79	0.88	0.79	0.54
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	2%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	43	276	214	510	198	198	126	532	471	177	780	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	490	0	510	396	0	126	532	471	177	819	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turn Type	Split	NA		Split	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases									2			
Detector Phase	3	3		4	4		5	2	2	1	6	
Switch Phase												

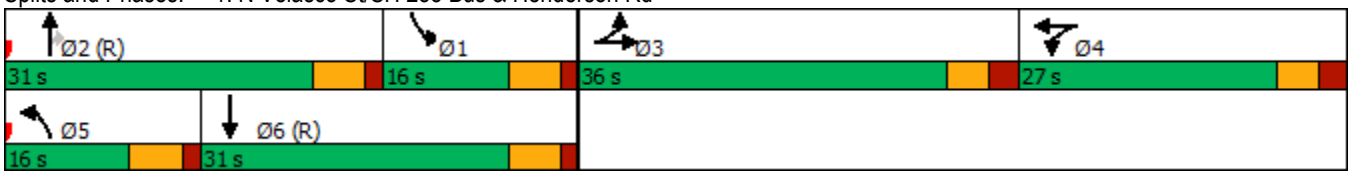


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	9.0	9.0	5.0	9.0	
Minimum Split (s)	23.9	23.9		23.9	23.9		10.8	23.8	23.8	10.8	23.8	
Total Split (s)	36.0	36.0		27.0	27.0		16.0	31.0	31.0	16.0	31.0	
Total Split (%)	32.7%	32.7%		24.5%	24.5%		14.5%	28.2%	28.2%	14.5%	28.2%	
Maximum Green (s)	30.1	30.1		21.1	21.1		10.2	25.2	25.2	10.2	25.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		4.3	4.3	4.3	4.3	4.3	
All-Red Time (s)	2.4	2.4		2.4	2.4		1.5	1.5	1.5	1.5	1.5	
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)	5.9	5.9		5.9	5.9		5.8	5.8	5.8	5.8	5.8	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	3.0	3.0	2.0	3.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	3.0	3.0	2.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	29.8	29.8		21.4	21.4		9.8	25.2	25.2	10.2	25.6	
Actuated g/C Ratio	0.27	0.27		0.19	0.19		0.09	0.23	0.23	0.09	0.23	
v/c Ratio	0.09	0.97		1.45	1.07		0.80	0.64	0.78	1.06	0.98	
Control Delay	30.5	71.9		252.7	106.5		83.8	42.5	24.1	134.9	68.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	30.5	71.9		252.7	106.5		83.8	42.5	24.1	134.9	68.4	
LOS	C	E		F	F		F	D	C	F	E	
Approach Delay		68.6			188.8			39.4			80.2	
Approach LOS		E			F			D			F	
90th %ile Green (s)	30.1	30.1		21.1	21.1		10.2	25.2	25.2	10.2	25.2	
90th %ile Term Code	Max	Max		Max	Max		Max	Coord	Coord	Max	Coord	
70th %ile Green (s)	30.1	30.1		21.1	21.1		10.2	25.2	25.2	10.2	25.2	
70th %ile Term Code	Max	Max		Max	Max		Max	Coord	Coord	Max	Coord	
50th %ile Green (s)	30.1	30.1		21.1	21.1		10.2	25.2	25.2	10.2	25.2	
50th %ile Term Code	Max	Max		Max	Max		Max	Coord	Coord	Max	Coord	
30th %ile Green (s)	30.1	30.1		21.1	21.1		10.2	25.2	25.2	10.2	25.2	
30th %ile Term Code	Max	Max		Max	Max		Max	Coord	Coord	Max	Coord	
10th %ile Green (s)	28.5	28.5		22.7	22.7		8.0	25.2	25.2	10.2	27.4	
10th %ile Term Code	Gap	Gap		Max	Max		Gap	Coord	Coord	Max	Coord	
Stops (vph)	17	320		296	245		87	442	137	127	565	
Fuel Used(gal)	0	11		27	12		3	13	6	8	24	
CO Emissions (g/hr)	32	778		1857	846		238	934	430	542	1669	
NOx Emissions (g/hr)	6	151		361	165		46	182	84	105	325	
VOC Emissions (g/hr)	7	180		430	196		55	216	100	126	387	
Dilemma Vehicles (#)	0	0		0	0		0	23	0	0	27	
Queue Length 50th (ft)	23	321		~496	~291		88	180	112	~137	304	
Queue Length 95th (ft)	30	#419		#576	#423		#138	238	169	#269	#346	
Internal Link Dist (ft)		1129			1355			1009			1039	
Turn Bay Length (ft)	62			117			245		81	163		
Base Capacity (vph)	493	508		351	369		164	827	603	167	838	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.09	0.96		1.45	1.07		0.77	0.64	0.78	1.06	0.98	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 51 (46%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green			
Natural Cycle: 125			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.45			
Intersection Signal Delay: 93.2		Intersection LOS: F	
Intersection Capacity Utilization 86.5%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: N Velasco St/SH 288 Bus & Henderson Rd



Intersection	
Intersection Delay, s/veh	375.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	151	501	40	94	521	37	64	93	41	33	196	142
Future Vol, veh/h	151	501	40	94	521	37	64	93	41	33	196	142
Peak Hour Factor	0.81	0.77	0.75	0.65	0.91	0.67	0.80	0.64	0.69	0.75	0.55	0.74
Heavy Vehicles, %	0	2	0	12	0	0	6	0	0	0	0	0
Mvmt Flow	186	651	53	145	573	55	80	145	59	44	356	192
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	551.4	446.2	30.8	183.9
HCM LOS	F	F	D	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	22%	14%	100%	0%
Vol Thru, %	0%	69%	72%	80%	0%	58%
Vol Right, %	0%	31%	6%	6%	0%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	64	134	692	652	33	338
LT Vol	64	0	151	94	33	0
Through Vol	0	93	501	521	0	196
RT Vol	0	41	40	37	0	142
Lane Flow Rate	80	205	890	772	44	548
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.229	0.539	2.145	1.901	0.115	1.318
Departure Headway (Hd)	15.783	14.9	11.839	12.653	12.974	12.12
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	230	246	321	293	278	307
Service Time	13.483	12.6	9.839	10.653	10.674	9.82
HCM Lane V/C Ratio	0.348	0.833	2.773	2.635	0.158	1.785
HCM Control Delay	23.1	33.8	551.4	446.2	17.4	197.3
HCM Lane LOS	C	D	F	F	C	F
HCM 95th-tile Q	0.9	2.9	48.6	37.5	0.4	19.4

Intersection	
Intersection Delay, s/veh	304.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	114	324	132	163	289	189	129	210	65	165	260	168
Future Vol, veh/h	114	324	132	163	289	189	129	210	65	165	260	168
Peak Hour Factor	0.54	0.76	0.93	0.75	0.75	0.72	0.77	0.62	0.69	0.57	0.56	0.37
Heavy Vehicles, %	1	6	0	8	6	4	1	2	3	0	0	0
Mvmt Flow	211	426	142	217	385	263	168	339	94	289	464	454
Number of Lanes	1	1	0	1	1	0	1	2	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	392.8	494.1	11.1	257
HCM LOS	F	F	B	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	52%	0%	71%	0%	60%	0%	100%	0%
Vol Right, %	0%	0%	48%	0%	29%	0%	40%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	129	140	135	114	456	163	478	165	260	168
LT Vol	129	0	0	114	0	163	0	165	0	0
Through Vol	0	140	70	0	324	0	289	0	260	0
RT Vol	0	0	65	0	132	0	189	0	0	168
Lane Flow Rate	168	226	207	211	568	217	648	289	464	454
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.639	0.831	0.744	0.803	2.063	0.833	2.337	1.045	1.612	1.489
Departure Headway (Hd)	2.575	2.054	1.71	13.688	13.072	13.925	12.989	15.653	15.115	14.362
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	1401	1757	2108	266	284	261	285	234	246	259
Service Time	0.275	-0.246	-0.59	11.373	10.73	11.625	10.78	13.353	12.815	12.062
HCM Lane V/C Ratio	0.12	0.129	0.098	0.793	2	0.831	2.274	1.235	1.886	1.753
HCM Control Delay	9.7	13.8	9.2	55.1	518.2	60.5	639.5	114.9	328.5	274.5
HCM Lane LOS	A	B	A	F	F	F	F	F	F	F
HCM 95th-tile Q	4.9	11.3	7.8	6.2	41.8	6.7	50.8	10.2	24.2	21.8

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑		↰	↱
Traffic Vol, veh/h	0	548	564	0	44	76
Future Vol, veh/h	0	548	564	0	44	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	87	78	92	30	32
Heavy Vehicles, %	2	4	6	2	0	0
Mvmt Flow	0	630	723	0	147	238

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1038	723
Stage 1	-	-	-	-	723	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	-	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	244	430
Stage 1	0	-	-	0	484	-
Stage 2	0	-	-	0	719	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	244	430
Mov Cap-2 Maneuver	-	-	-	-	244	-
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	29.5
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	244	430
HCM Lane V/C Ratio	-	-	0.601	0.552
HCM Control Delay (s)	-	-	39.8	23.2
HCM Lane LOS	-	-	E	C
HCM 95th %tile Q(veh)	-	-	3.5	3.3

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑		↰	↱
Traffic Vol, veh/h	0	586	550	0	0	17
Future Vol, veh/h	0	586	550	0	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	87	78	92	92	50
Heavy Vehicles, %	2	4	6	2	2	100
Mvmt Flow	0	674	705	0	0	34

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1042	705
Stage 1	-	-	-	-	705	-
Stage 2	-	-	-	-	337	-
Critical Hdwy	-	-	-	-	6.63	7.7
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	-	-	3.519	4.25
Pot Cap-1 Maneuver	0	-	-	0	239	276
Stage 1	0	-	-	0	489	-
Stage 2	0	-	-	0	696	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	239	276
Mov Cap-2 Maneuver	-	-	-	-	239	-
Stage 1	-	-	-	-	489	-
Stage 2	-	-	-	-	696	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	19.9
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	-	276
HCM Lane V/C Ratio	-	-	-	0.123
HCM Control Delay (s)	-	-	0	19.9
HCM Lane LOS	-	-	A	C
HCM 95th %tile Q(veh)	-	-	-	0.4

Intersection	
Intersection Delay, s/veh	188.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	316	214	64	337	9	117	21	29	3	13	13
Future Vol, veh/h	12	316	214	64	337	9	117	21	29	3	13	13
Peak Hour Factor	0.58	0.53	0.62	0.55	0.81	0.42	0.67	0.75	0.54	0.25	0.42	0.58
Heavy Vehicles, %	0	8	1	0	7	0	2	9	0	11	4	2
Mvmt Flow	21	596	345	116	416	21	175	28	54	12	31	22
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	336.7	31.5	16.6	13.4
HCM LOS	F	D	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	19%	0%
Vol Thru, %	0%	42%	0%	60%	0%	97%	81%	0%
Vol Right, %	0%	58%	0%	40%	0%	3%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	117	50	12	530	64	346	16	13
LT Vol	117	0	12	0	64	0	3	0
Through Vol	0	21	0	316	0	337	13	0
RT Vol	0	29	0	214	0	9	0	13
Lane Flow Rate	175	82	21	941	116	437	43	22
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.4	0.169	0.041	1.71	0.231	0.82	0.103	0.048
Departure Headway (Hd)	9.431	8.608	7.201	6.541	7.989	7.577	10.115	9.151
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	384	419	497	565	453	481	357	394
Service Time	7.131	6.308	4.948	4.288	5.689	5.277	7.815	6.851
HCM Lane V/C Ratio	0.456	0.196	0.042	1.665	0.256	0.909	0.12	0.056
HCM Control Delay	18.3	13.1	10.3	343.9	13.1	36.4	14	12.3
HCM Lane LOS	C	B	B	F	B	E	B	B
HCM 95th-tile Q	1.9	0.6	0.1	54.9	0.9	7.9	0.3	0.2

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	185	18	6	279	9	0
Future Vol, veh/h	185	18	6	279	9	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	69	38	60	63	25
Heavy Vehicles, %	17	0	0	18	0	0
Mvmt Flow	253	26	16	465	14	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	279	0	763	266
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	497	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1295	-	375	778
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	615	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1295	-	369	778
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	605	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	15.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	369	-	-	1295	-
HCM Lane V/C Ratio	0.039	-	-	0.012	-
HCM Control Delay (s)	15.1	-	-	7.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

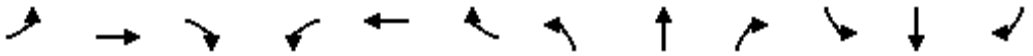
Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	50	0	62	5	5	3	88	320	9	0	277	158
Future Vol, veh/h	50	0	62	5	5	3	88	320	9	0	277	158
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	25	65	50	50	25	66	67	63	25	95	71
Heavy Vehicles, %	1	0	2	0	0	0	8	3	0	0	2	1
Mvmt Flow	79	0	95	10	10	12	133	478	14	0	292	223

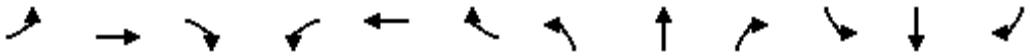
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1166	1162	404	1202	1266	485	515	0	0	492	0	0
Stage 1	404	404	-	751	751	-	-	-	-	-	-	-
Stage 2	762	758	-	451	515	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.5	6.22	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4	3.318	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	172	197	647	163	171	586	1021	-	-	1082	-	-
Stage 1	625	603	-	406	421	-	-	-	-	-	-	-
Stage 2	399	418	-	592	538	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	162	647	120	140	586	1021	-	-	1082	-	-
Mov Cap-2 Maneuver	137	162	-	120	140	-	-	-	-	-	-	-
Stage 1	513	603	-	333	345	-	-	-	-	-	-	-
Stage 2	311	343	-	505	538	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	51.9	28.8	1.9	0
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1021	-	-	240	183	1082	-	-
HCM Lane V/C Ratio	0.131	-	-	0.728	0.175	-	-	-
HCM Control Delay (s)	9.1	0	-	51.9	28.8	0	-	-
HCM Lane LOS	A	A	-	F	D	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	5	0.6	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	165	81	308	176	149	41	428	236	112	402	13
Future Volume (vph)	23	165	81	308	176	149	41	428	236	112	402	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	210		210	305		210	385		345	730		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	50			50			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1687	1881	1615	3502	1900	1615	1736	3610	1615	1805	3588	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1687	1881	1615	3502	1900	1615	1736	3610	1615	1805	3588	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			260			201			318		4	
Link Speed (mph)		30			30			45			55	
Link Distance (ft)		1209			1435			1089			1119	
Travel Time (s)		27.5			32.6			16.5			13.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.63	0.83	0.75	0.68	0.94	0.90	0.61	0.78	0.79	0.80	0.62	0.50
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	1%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	37	199	108	453	187	166	67	549	299	140	648	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	199	108	453	187	166	67	549	299	140	674	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Free	Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases			8			4			Free			
Detector Phase	3	8	8	7	4	4	5	2		1	6	
Switch Phase												

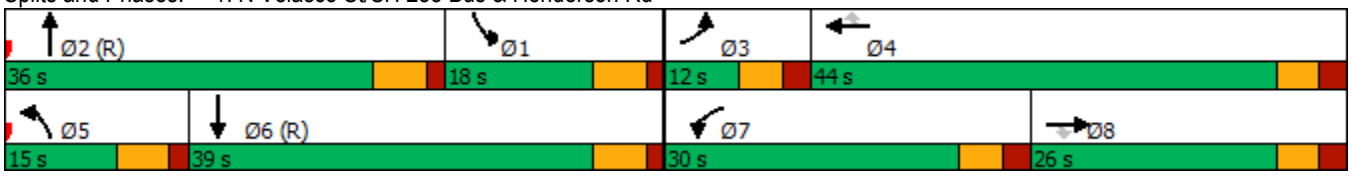


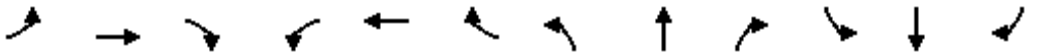
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	9.0		5.0	9.0	
Minimum Split (s)	23.9	23.9	23.9	23.9	23.9	23.9	10.8	23.8		10.8	23.8	
Total Split (s)	12.0	26.0	26.0	30.0	44.0	44.0	15.0	36.0		18.0	39.0	
Total Split (%)	10.9%	23.6%	23.6%	27.3%	40.0%	40.0%	13.6%	32.7%		16.4%	35.5%	
Maximum Green (s)	6.1	20.1	20.1	24.1	38.1	38.1	9.2	30.2		12.2	33.2	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.3	4.3		4.3	4.3	
All-Red Time (s)	2.4	2.4	2.4	2.4	2.4	2.4	1.5	1.5		1.5	1.5	
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)	5.9	5.9	5.9	5.9	5.9	5.9	5.8	5.8		5.8	5.8	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	5.8	15.7	15.7	18.5	32.9	32.9	8.0	40.2	110.0	12.2	46.5	
Actuated g/C Ratio	0.05	0.14	0.14	0.17	0.30	0.30	0.07	0.37	1.00	0.11	0.42	
v/c Ratio	0.42	0.74	0.24	0.77	0.33	0.27	0.53	0.42	0.19	0.70	0.44	
Control Delay	64.8	61.4	1.2	52.6	31.4	2.9	64.1	29.0	0.3	66.5	26.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	64.8	61.4	1.2	52.6	31.4	2.9	64.1	29.0	0.3	66.5	26.3	
LOS	E	E	A	D	C	A	E	C	A	E	C	
Approach Delay		42.9			37.5			22.1			33.2	
Approach LOS		D			D			C			C	
90th %ile Green (s)	6.1	20.9	20.9	23.3	38.1	38.1	9.2	30.2		12.2	33.2	
90th %ile Term Code	Max	Max	Max	Gap	Hold	Hold	Max	Coord		Max	Coord	
70th %ile Green (s)	6.1	18.3	18.3	20.5	32.7	32.7	10.2	35.6		12.2	37.6	
70th %ile Term Code	Max	Gap	Gap	Gap	Hold	Hold	Gap	Coord		Max	Coord	
50th %ile Green (s)	6.1	15.9	15.9	18.5	28.3	28.3	8.6	40.0		12.2	43.6	
50th %ile Term Code	Max	Gap	Gap	Gap	Hold	Hold	Gap	Coord		Max	Coord	
30th %ile Green (s)	0.0	13.5	13.5	16.6	36.0	36.0	7.1	44.3		12.2	49.4	
30th %ile Term Code	Skip	Gap	Gap	Gap	Hold	Hold	Gap	Coord		Hold	Coord	
10th %ile Green (s)	0.0	10.0	10.0	13.7	29.6	29.6	0.0	50.7		12.2	68.7	
10th %ile Term Code	Skip	Gap	Gap	Gap	Hold	Hold	Skip	Coord		Hold	Coord	
Stops (vph)	23	154	0	286	132	8	38	318	0	102	295	
Fuel Used(gal)	1	4	1	8	4	2	1	10	2	4	11	
CO Emissions (g/hr)	45	312	55	582	267	126	91	664	117	294	744	
NOx Emissions (g/hr)	9	61	11	113	52	24	18	129	23	57	145	
VOC Emissions (g/hr)	10	72	13	135	62	29	21	154	27	68	172	
Dilemma Vehicles (#)	0	0	0	0	0	0	0	19	0	0	19	
Queue Length 50th (ft)	26	136	0	159	109	0	46	151	0	97	182	
Queue Length 95th (ft)	42	187	0	146	153	27	61	194	0	#145	173	
Internal Link Dist (ft)		1129			1355			1009			1039	
Turn Bay Length (ft)	210		210	305		210	385		345	730		
Base Capacity (vph)	93	346	509	767	658	690	148	1317	1615	200	1519	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.40	0.58	0.21	0.59	0.28	0.24	0.45	0.42	0.19	0.70	0.44	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 51 (46%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 32.0		Intersection LOS: C	
Intersection Capacity Utilization 55.0%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: N Velasco St/SH 288 Bus & Henderson Rd





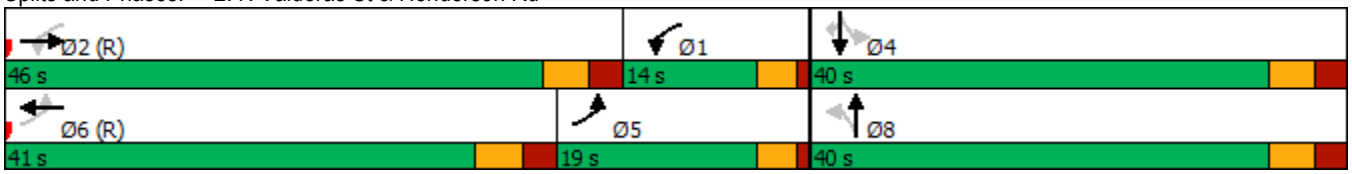
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	380	25	74	459	41	47	165	93	42	153	159
Future Volume (vph)	123	380	25	74	459	41	47	165	93	42	153	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	210		0	210		0	210		0	210		210
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			50			50		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.988			0.991			0.936				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3548	0	1770	3578	0	1805	1778	0	1805	1900	1615
Flt Permitted	0.325			0.445			0.477			0.250		
Satd. Flow (perm)	611	3548	0	829	3578	0	906	1778	0	475	1900	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			7			40				189
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1435			3109			677			815	
Travel Time (s)		32.6			70.7			15.4			18.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.64	0.79	0.63	0.52	0.67	0.96	0.81	0.85	0.65	0.54	0.69	0.84
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	0%	7%	2%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	192	481	40	142	685	43	58	194	143	78	222	189
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	521	0	142	728	0	58	337	0	78	222	189
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	D.P+P	NA		D.P+P	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2			8			4		4
Detector Phase	5	2		1	6		8	8		4	4	4
Switch Phase												

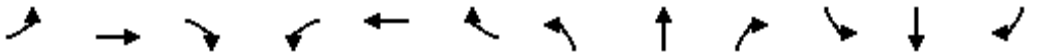
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	16.0		12.0	16.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	19.0	46.0		14.0	41.0		40.0	40.0		40.0	40.0	40.0
Total Split (%)	19.0%	46.0%		14.0%	41.0%		40.0%	40.0%		40.0%	40.0%	40.0%
Maximum Green (s)	15.0	40.0		10.0	35.0		34.0	34.0		34.0	34.0	34.0
Yellow Time (s)	3.0	3.5		3.0	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	2.5		1.0	2.5		2.5	2.5		2.5	2.5	2.5
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)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	64.2	57.0		64.2	52.0		21.8	21.8		21.8	21.8	21.8
Actuated g/C Ratio	0.64	0.57		0.64	0.52		0.22	0.22		0.22	0.22	0.22
v/c Ratio	0.38	0.26		0.24	0.39		0.29	0.80		0.76	0.54	0.38
Control Delay	12.2	12.1		9.3	12.8		34.2	46.8		75.7	38.3	6.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	12.2	12.1		9.3	12.8		34.2	46.8		75.7	38.3	6.4
LOS	B	B		A	B		C	D		E	D	A
Approach Delay		12.1			12.2			44.9			32.0	
Approach LOS		B			B			D			C	
90th %ile Green (s)	11.2	47.4		6.2	42.4		30.4	30.4		30.4	30.4	30.4
90th %ile Term Code	Gap	Coord		Hold	Coord		Gap	Gap		Hold	Hold	Hold
70th %ile Green (s)	10.0	53.9		5.0	48.9		25.1	25.1		25.1	25.1	25.1
70th %ile Term Code	Hold	Coord		Min	Coord		Gap	Gap		Hold	Hold	Hold
50th %ile Green (s)	10.0	57.3		5.0	52.3		21.7	21.7		21.7	21.7	21.7
50th %ile Term Code	Hold	Coord		Min	Coord		Gap	Gap		Hold	Hold	Hold
30th %ile Green (s)	10.0	60.7		5.0	55.7		18.3	18.3		18.3	18.3	18.3
30th %ile Term Code	Hold	Coord		Min	Coord		Gap	Gap		Hold	Hold	Hold
10th %ile Green (s)	10.0	65.5		5.0	60.5		13.5	13.5		13.5	13.5	13.5
10th %ile Term Code	Hold	Coord		Min	Coord		Gap	Gap		Hold	Hold	Hold
Stops (vph)	46	196		26	245		37	211		40	129	19
Fuel Used(gal)	2	7		2	15		1	5		1	3	1
CO Emissions (g/hr)	135	462		145	1033		55	348		79	201	93
NOx Emissions (g/hr)	26	90		28	201		11	68		15	39	18
VOC Emissions (g/hr)	31	107		34	239		13	81		18	47	21
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	0
Queue Length 50th (ft)	39	80		26	106		31	182		47	126	0
Queue Length 95th (ft)	57	117		36	122		54	233		48	130	39
Internal Link Dist (ft)		1355			3029			597			735	
Turn Bay Length (ft)	210			210			210			210		210
Base Capacity (vph)	597	2025		665	1862		308	630		161	646	673

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.32	0.26		0.21	0.39		0.19	0.53		0.48	0.34	0.28

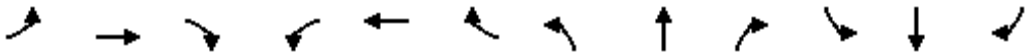
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 53 (53%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 21.3		Intersection LOS: C	
Intersection Capacity Utilization 57.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: N Valderas St & Henderson Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	142	42	175	255	247	79	461	48	109	266	216
Future Volume (vph)	259	142	42	175	255	247	79	461	48	109	266	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		0	210		0	210		123	215		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	50			50			50			50		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.965			0.927			0.988				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3400	0	1736	3329	0	1770	3511	0	1805	1881	1615
Flt Permitted	0.224			0.584			0.233			0.158		
Satd. Flow (perm)	421	3400	0	1067	3329	0	434	3511	0	300	1881	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			240			9				288
Link Speed (mph)		30			30			20			20	
Link Distance (ft)		3109			420			904			1113	
Travel Time (s)		70.7			9.5			30.8			37.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.73	0.68	0.67	0.70	0.71	0.72	0.83	0.67	0.78	0.77	0.65	0.75
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	4%	4%	1%	0%	2%	1%	8%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	355	209	63	250	359	343	95	688	62	142	409	288
Shared Lane Traffic (%)												
Lane Group Flow (vph)	355	272	0	250	702	0	95	750	0	142	409	288
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2			4			8		4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												

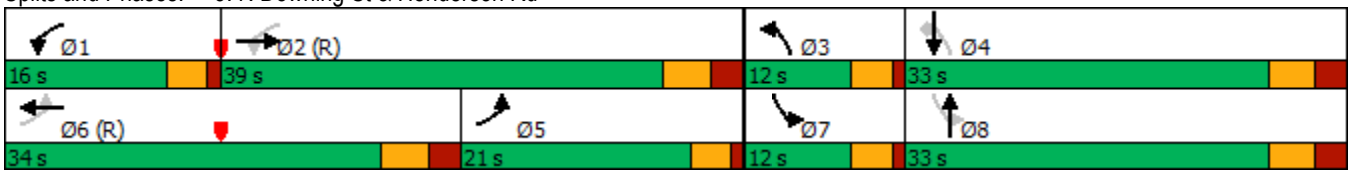


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.0	33.0		12.0	33.0		12.0	33.0		12.0	33.0	33.0
Total Split (s)	21.0	39.0		16.0	34.0		12.0	33.0		12.0	33.0	33.0
Total Split (%)	21.0%	39.0%		16.0%	34.0%		12.0%	33.0%		12.0%	33.0%	33.0%
Maximum Green (s)	17.0	33.0		12.0	28.0		8.0	27.0		8.0	27.0	27.0
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	2.5		1.0	2.5		1.0	2.5		1.0	2.5	2.5
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)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		20.0			20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	49.1	36.3		49.1	30.1		35.7	25.2		34.9	27.6	27.6
Actuated g/C Ratio	0.49	0.36		0.49	0.30		0.36	0.25		0.35	0.28	0.28
v/c Ratio	0.81	0.22		0.42	0.60		0.38	0.84		0.65	0.79	0.44
Control Delay	35.7	11.8		13.6	17.5		23.6	44.5		34.3	46.5	5.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	35.7	11.8		13.6	17.5		23.6	44.5		34.3	46.5	5.9
LOS	D	B		B	B		C	D		C	D	A
Approach Delay		25.3			16.5			42.2			30.5	
Approach LOS		C			B			D			C	
90th %ile Green (s)	17.0	33.0		12.0	28.0		8.0	27.0		8.0	27.0	27.0
90th %ile Term Code	Max	Coord		Max	Coord		Max	Max		Max	Max	Max
70th %ile Green (s)	17.0	33.0		12.0	28.0		8.0	27.0		8.0	27.0	27.0
70th %ile Term Code	Max	Coord		Max	Coord		Max	Max		Max	Max	Max
50th %ile Green (s)	17.0	33.0		12.0	28.0		7.8	27.0		8.0	27.2	27.2
50th %ile Term Code	Max	Coord		Max	Coord		Gap	Hold		Max	Max	Max
30th %ile Green (s)	17.0	36.9		10.5	30.4		6.8	24.6		8.0	25.8	25.8
30th %ile Term Code	Hold	Coord		Gap	Coord		Gap	Gap		Max	Hold	Hold
10th %ile Green (s)	17.0	45.5		7.7	36.2		0.0	20.4		6.4	30.8	30.8
10th %ile Term Code	Hold	Coord		Gap	Coord		Skip	Gap		Gap	Hold	Hold
Stops (vph)	225	105		97	273		51	463		72	234	23
Fuel Used(gal)	9	5		2	5		1	10		2	6	3
CO Emissions (g/hr)	657	383		111	345		82	704		145	410	180
NOx Emissions (g/hr)	128	75		22	67		16	137		28	80	35
VOC Emissions (g/hr)	152	89		26	80		19	163		34	95	42
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	0
Queue Length 50th (ft)	139	42		80	134		37	230		57	243	0
Queue Length 95th (ft)	72	30		83	93		64	204		83	233	26
Internal Link Dist (ft)		3029			340			824			1033	
Turn Bay Length (ft)	250			210			210			215		
Base Capacity (vph)	439	1260		615	1170		263	954		226	522	656

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.81	0.22		0.41	0.60		0.36	0.79		0.63	0.78	0.44

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 98 (98%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 28.4		Intersection LOS: C	
Intersection Capacity Utilization 66.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: N Downing St & Henderson Rd



Intersection	
Int Delay, s/veh	8.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↰	↱
Traffic Vol, veh/h	0	292	465	0	113	218
Future Vol, veh/h	0	292	465	0	113	218
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	74	73	92	51	75
Heavy Vehicles, %	2	3	2	2	0	0
Mvmt Flow	0	395	637	0	222	291

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	835	319
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	198	-
Critical Hdwy	-	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	310	683
Stage 1	0	-	-	0	494	-
Stage 2	0	-	-	0	822	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	310	683
Mov Cap-2 Maneuver	-	-	-	-	310	-
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	822	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.8
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	310	683
HCM Lane V/C Ratio	-	-	0.715	0.426
HCM Control Delay (s)	-	-	41.1	14.1
HCM Lane LOS	-	-	E	B
HCM 95th %tile Q(veh)	-	-	5.1	2.1

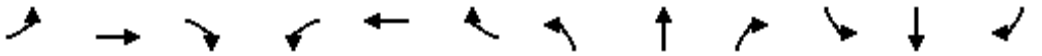
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↰	↱
Traffic Vol, veh/h	0	395	461	0	6	6
Future Vol, veh/h	0	395	461	0	6	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	74	73	92	75	38
Heavy Vehicles, %	2	3	2	2	100	100
Mvmt Flow	0	534	632	0	8	16

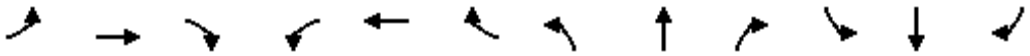
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	899	316
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	267	-
Critical Hdwy	-	-	-	-	8.8	8.9
Critical Hdwy Stg 1	-	-	-	-	7.8	-
Critical Hdwy Stg 2	-	-	-	-	7.8	-
Follow-up Hdwy	-	-	-	-	4.5	4.3
Pot Cap-1 Maneuver	0	-	-	0	148	460
Stage 1	0	-	-	0	294	-
Stage 2	0	-	-	0	528	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	148	460
Mov Cap-2 Maneuver	-	-	-	-	231	-
Stage 1	-	-	-	-	294	-
Stage 2	-	-	-	-	528	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	15.8
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	231	460
HCM Lane V/C Ratio	-	-	0.035	0.034
HCM Control Delay (s)	-	-	21.1	13.1
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	0.1	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	178	222	19	306	6	180	25	52	11	11	16
Future Volume (vph)	9	178	222	19	306	6	180	25	52	11	11	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	210		0	210		0	350		0	0		0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	50			50			50			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.913			0.998			0.902				0.850
Flt Protected	0.950			0.950			0.950				0.975	
Satd. Flow (prot)	1805	2996	0	1719	2985	0	1752	1667	0	0	1852	1615
Flt Permitted	0.446			0.407			0.950				0.975	
Satd. Flow (perm)	847	2996	0	736	2985	0	1752	1667	0	0	1852	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		352			2			67				76
Link Speed (mph)		30			30			30			25	
Link Distance (ft)		1123			1318			523			375	
Travel Time (s)		25.5			30.0			11.9			10.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.50	0.69	0.63	0.69	0.58	0.75	0.84	0.69	0.78	0.35	0.38	0.83
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	10%	10%	5%	21%	0%	3%	8%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	18	258	352	28	528	8	214	36	67	31	29	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	610	0	28	536	0	214	103	0	0	60	19
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		14			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	D.Pm	NA		D.Pm	NA		Split	NA		Split	NA	Perm
Protected Phases		2			6		3	3		4	4	
Permitted Phases	6			2								4
Detector Phase	6	2		2	6		3	3		4	4	4
Switch Phase												

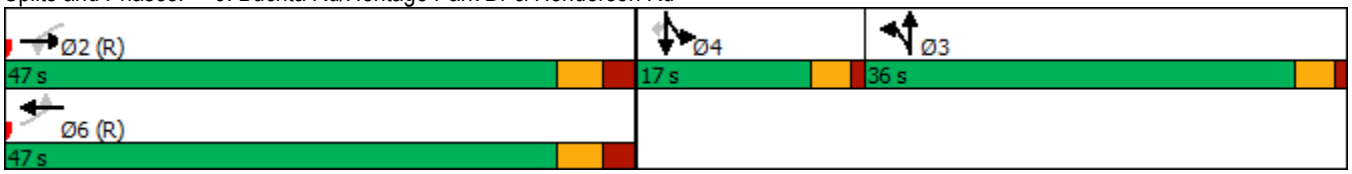


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	16.0	16.0		16.0	16.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	47.0	47.0		47.0	47.0		36.0	36.0		17.0	17.0	17.0
Total Split (%)	47.0%	47.0%		47.0%	47.0%		36.0%	36.0%		17.0%	17.0%	17.0%
Maximum Green (s)	41.0	41.0		41.0	41.0		32.0	32.0		13.0	13.0	13.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.5	2.5		2.5	2.5		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)	6.0	6.0		6.0	6.0		4.0	4.0			4.0	4.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	63.3	63.3		63.3	63.3		16.7	16.7			7.7	7.7
Actuated g/C Ratio	0.63	0.63		0.63	0.63		0.17	0.17			0.08	0.08
v/c Ratio	0.03	0.30		0.06	0.28		0.73	0.31			0.42	0.10
Control Delay	11.1	5.0		10.6	10.2		53.6	16.6			52.2	1.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	11.1	5.0		10.6	10.2		53.6	16.6			52.2	1.0
LOS	B	A		B	B		D	B			D	A
Approach Delay		5.1			10.3			41.6			39.9	
Approach LOS		A			B			D			D	
90th %ile Green (s)	52.0	52.0		52.0	52.0		23.2	23.2		10.8	10.8	10.8
90th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Gap	Gap	Gap
70th %ile Green (s)	57.7	57.7		57.7	57.7		19.4	19.4		8.9	8.9	8.9
70th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Gap	Gap	Gap
50th %ile Green (s)	61.7	61.7		61.7	61.7		16.7	16.7		7.6	7.6	7.6
50th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Gap	Gap	Gap
30th %ile Green (s)	65.5	65.5		65.5	65.5		14.1	14.1		6.4	6.4	6.4
30th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Gap	Gap	Gap
10th %ile Green (s)	79.8	79.8		79.8	79.8		10.2	10.2		0.0	0.0	0.0
10th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Skip	Skip	Skip
Stops (vph)	5	94		10	139		165	27			21	0
Fuel Used(gal)	0	4		0	5		4	1			0	0
CO Emissions (g/hr)	9	309		20	323		252	51			27	4
NOx Emissions (g/hr)	2	60		4	63		49	10			5	1
VOC Emissions (g/hr)	2	72		5	75		59	12			6	1
Dilemma Vehicles (#)	0	0		0	0		0	0			0	0
Queue Length 50th (ft)	4	34		7	76		131	20			37	0
Queue Length 95th (ft)	m10	47		17	80		179	38			31	0
Internal Link Dist (ft)		1043			1238			443			295	
Turn Bay Length (ft)	210			210			350					
Base Capacity (vph)	536	2026		466	1891		560	579			240	276

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.03	0.30		0.06	0.28		0.38	0.18			0.25	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 40 (40%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 40.8%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 6: Buchta Rd/Heritage Park Dr & Henderson Rd



Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	171	15	0	191	15	6
Future Vol, veh/h	171	15	0	191	15	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	210	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	72	50	25	73	63	38
Heavy Vehicles, %	8	0	0	0	0	0
Mvmt Flow	238	30	0	262	24	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	268	0	384	134
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	131	-
Critical Hdwy	-	-	4.1	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1307	-	597	897
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	887	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1307	-	597	897
Mov Cap-2 Maneuver	-	-	-	-	597	-
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	887	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	689	-	-	1307	-
HCM Lane V/C Ratio	0.057	-	-	-	-
HCM Control Delay (s)	10.5	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

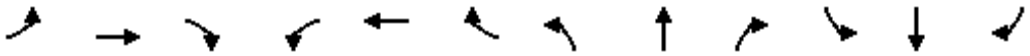
Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	79	5	37	10	3	7	32	237	3	5	277	49
Future Vol, veh/h	79	5	37	10	3	7	32	237	3	5	277	49
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	0	-	-	-	-	-	-	-	-	-	-	510
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	25	69	50	25	50	56	86	25	25	58	58
Heavy Vehicles, %	1	0	2	0	0	0	8	3	0	0	2	1
Mvmt Flow	82	20	54	20	12	14	57	276	12	20	478	84

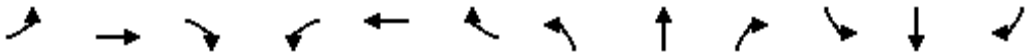
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	927	920	478	951	914	282	478	0	0	288	0	0
Stage 1	518	518	-	396	396	-	-	-	-	-	-	-
Stage 2	409	402	-	555	518	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.5	6.22	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4	3.318	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	250	273	587	242	275	762	1054	-	-	1286	-	0
Stage 1	542	536	-	633	607	-	-	-	-	-	-	0
Stage 2	621	604	-	520	536	-	-	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	222	250	587	193	252	762	1054	-	-	1286	-	-
Mov Cap-2 Maneuver	222	250	-	193	252	-	-	-	-	-	-	-
Stage 1	507	525	-	592	568	-	-	-	-	-	-	-
Stage 2	559	565	-	445	525	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.2	21	1.4	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT
Capacity (veh/h)	1054	-	-	222	430	271	1286	-
HCM Lane V/C Ratio	0.054	-	-	0.371	0.171	0.17	0.016	-
HCM Control Delay (s)	8.6	0	-	30.5	15.1	21	7.8	0
HCM Lane LOS	A	A	-	D	C	C	A	A
HCM 95th %tile Q(veh)	0.2	-	-	1.6	0.6	0.6	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	218	171	398	164	162	96	500	372	156	616	21
Future Volume (vph)	23	218	171	398	164	162	96	500	372	156	616	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	210		210	305		210	385		345	730		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	50			50			100			100		
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1881	1615	3502	1845	1615	1770	3610	1615	1805	3585	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1805	1881	1615	3502	1845	1615	1770	3610	1615	1805	3585	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			260			201			471		4	
Link Speed (mph)		30			30			45			55	
Link Distance (ft)		1209			1435			1089			1119	
Travel Time (s)		27.5			32.6			16.5			13.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.54	0.79	0.80	0.78	0.83	0.82	0.76	0.94	0.79	0.88	0.79	0.54
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	3%	0%	2%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	43	276	214	510	198	198	126	532	471	177	780	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	276	214	510	198	198	126	532	471	177	819	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Free	Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases			8			4			Free			
Detector Phase	3	8	8	7	4	4	5	2		1	6	
Switch Phase												

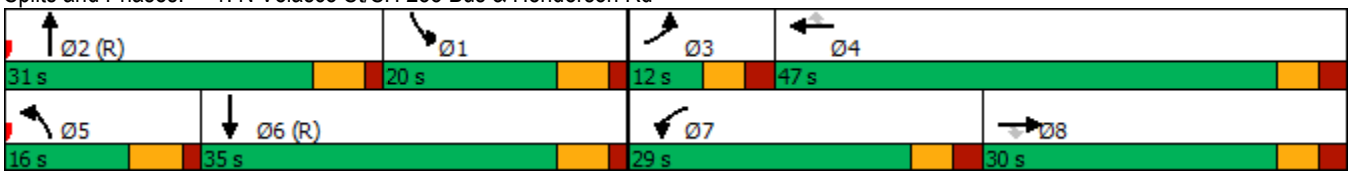


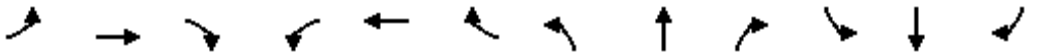
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	9.0		5.0	9.0	
Minimum Split (s)	23.9	23.9	23.9	23.9	23.9	23.9	10.8	23.8		10.8	23.8	
Total Split (s)	12.0	30.0	30.0	29.0	47.0	47.0	16.0	31.0		20.0	35.0	
Total Split (%)	10.9%	27.3%	27.3%	26.4%	42.7%	42.7%	14.5%	28.2%		18.2%	31.8%	
Maximum Green (s)	6.1	24.1	24.1	23.1	41.1	41.1	10.2	25.2		14.2	29.2	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	4.3	4.3		4.3	4.3	
All-Red Time (s)	2.4	2.4	2.4	2.4	2.4	2.4	1.5	1.5		1.5	1.5	
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)	5.9	5.9	5.9	5.9	5.9	5.9	5.8	5.8		5.8	5.8	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	5.8	19.9	19.9	19.8	38.4	38.4	10.6	32.7	110.0	14.2	36.2	
Actuated g/C Ratio	0.05	0.18	0.18	0.18	0.35	0.35	0.10	0.30	1.00	0.13	0.33	
v/c Ratio	0.45	0.81	0.42	0.81	0.31	0.29	0.74	0.50	0.29	0.76	0.69	
Control Delay	65.6	61.6	4.6	53.8	27.3	4.3	73.6	35.4	0.5	67.7	37.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.6	61.6	4.6	53.8	27.3	4.3	73.6	35.4	0.5	67.7	37.4	
LOS	E	E	A	D	C	A	E	D	A	E	D	
Approach Delay		39.0			37.2			25.1			42.8	
Approach LOS		D			D			C			D	
90th %ile Green (s)	6.1	24.1	24.1	23.1	41.1	41.1	10.2	25.2		14.2	29.2	
90th %ile Term Code	Max	Max	Max	Max	Hold	Hold	Max	Coord		Max	Coord	
70th %ile Green (s)	6.1	24.0	24.0	22.3	40.2	40.2	11.1	26.1		14.2	29.2	
70th %ile Term Code	Max	Gap	Gap	Gap	Hold	Hold	Max	Coord		Max	Coord	
50th %ile Green (s)	6.1	20.4	20.4	20.3	34.6	34.6	13.0	31.7		14.2	32.9	
50th %ile Term Code	Max	Gap	Gap	Gap	Hold	Hold	Gap	Coord		Max	Coord	
30th %ile Green (s)	0.0	17.6	17.6	18.2	41.7	41.7	10.9	36.6		14.2	39.9	
30th %ile Term Code	Skip	Gap	Gap	Gap	Hold	Hold	Gap	Coord		Hold	Coord	
10th %ile Green (s)	0.0	13.4	13.4	15.2	34.5	34.5	8.0	43.8		14.2	50.0	
10th %ile Term Code	Skip	Gap	Gap	Gap	Hold	Hold	Gap	Coord		Hold	Coord	
Stops (vph)	22	205	8	372	115	16	85	410	0	141	533	
Fuel Used(gal)	1	6	2	11	3	2	3	12	3	6	19	
CO Emissions (g/hr)	45	414	127	759	236	143	222	856	186	411	1347	
NOx Emissions (g/hr)	9	81	25	148	46	28	43	166	36	80	262	
VOC Emissions (g/hr)	10	96	29	176	55	33	51	198	43	95	312	
Dilemma Vehicles (#)	0	0	0	0	0	0	0	23	0	0	28	
Queue Length 50th (ft)	30	188	0	178	107	0	86	165	0	123	274	
Queue Length 95th (ft)	40	231	12	194	141	32	#138	238	0	#220	307	
Internal Link Dist (ft)		1129			1355			1009			1039	
Turn Bay Length (ft)	210		210	305		210	385		345	730		
Base Capacity (vph)	100	412	556	735	691	731	178	1072	1615	233	1183	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.43	0.67	0.38	0.69	0.29	0.27	0.71	0.50	0.29	0.76	0.69	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 51 (46%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 35.2		Intersection LOS: D	
Intersection Capacity Utilization 65.3%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: N Velasco St/SH 288 Bus & Henderson Rd





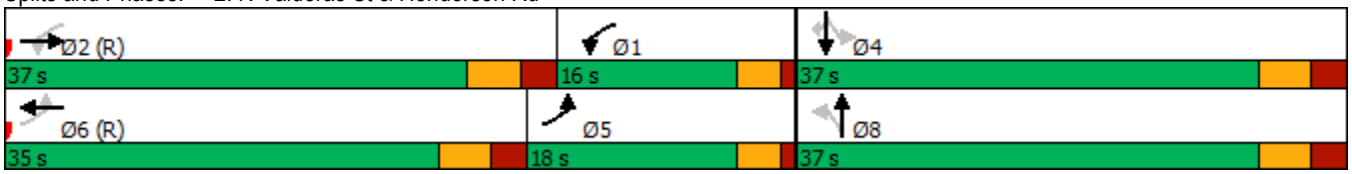
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	501	40	94	521	37	64	93	41	33	196	142
Future Volume (vph)	151	501	40	94	521	37	64	93	41	33	196	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	210		0	210		0	210		0	210		210
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	50			50			50			50		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.987			0.957				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3505	0	1612	3563	0	1703	1818	0	1805	1900	1615
Flt Permitted	0.374			0.340			0.280			0.553		
Satd. Flow (perm)	711	3505	0	577	3563	0	502	1818	0	1051	1900	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			12			25				192
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1435			3109			677			815	
Travel Time (s)		32.6			70.7			15.4			18.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.81	0.77	0.75	0.65	0.91	0.67	0.80	0.64	0.69	0.75	0.55	0.74
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	12%	0%	0%	6%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	186	651	53	145	573	55	80	145	59	44	356	192
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	704	0	145	628	0	80	204	0	44	356	192
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	D.P+P	NA		D.P+P	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2			8			4		4
Detector Phase	5	2		1	6		8	8		4	4	4
Switch Phase												

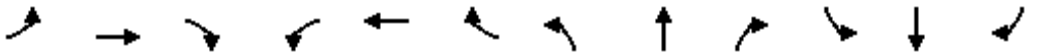
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	12.0	16.0		12.0	16.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	18.0	37.0		16.0	35.0		37.0	37.0		37.0	37.0	37.0
Total Split (%)	20.0%	41.1%		17.8%	38.9%		41.1%	41.1%		41.1%	41.1%	41.1%
Maximum Green (s)	14.0	31.0		12.0	29.0		31.0	31.0		31.0	31.0	31.0
Yellow Time (s)	3.0	3.5		3.0	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	2.5		1.0	2.5		2.5	2.5		2.5	2.5	2.5
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)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	54.0	46.3		54.0	44.3		22.0	22.0		22.0	22.0	22.0
Actuated g/C Ratio	0.60	0.51		0.60	0.49		0.24	0.24		0.24	0.24	0.24
v/c Ratio	0.36	0.39		0.35	0.36		0.66	0.44		0.17	0.77	0.36
Control Delay	12.0	15.2		11.8	13.2		54.2	26.9		25.9	42.4	5.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	12.0	15.2		11.8	13.2		54.2	26.9		25.9	42.4	5.5
LOS	B	B		B	B		D	C		C	D	A
Approach Delay		14.5			12.9			34.6			29.2	
Approach LOS		B			B			C			C	
90th %ile Green (s)	10.5	35.8		8.5	33.8		29.7	29.7		29.7	29.7	29.7
90th %ile Term Code	Hold	Coord		Gap	Coord		Hold	Hold		Gap	Gap	Gap
70th %ile Green (s)	7.2	43.6		5.2	41.6		25.2	25.2		25.2	25.2	25.2
70th %ile Term Code	Hold	Coord		Gap	Coord		Hold	Hold		Gap	Gap	Gap
50th %ile Green (s)	7.0	46.7		5.0	44.7		22.3	22.3		22.3	22.3	22.3
50th %ile Term Code	Hold	Coord		Min	Coord		Hold	Hold		Gap	Gap	Gap
30th %ile Green (s)	7.0	50.5		5.0	48.5		18.5	18.5		18.5	18.5	18.5
30th %ile Term Code	Hold	Coord		Min	Coord		Hold	Hold		Gap	Gap	Gap
10th %ile Green (s)	7.0	54.9		5.0	52.9		14.1	14.1		14.1	14.1	14.1
10th %ile Term Code	Hold	Coord		Min	Coord		Hold	Hold		Gap	Gap	Gap
Stops (vph)	63	319		42	325		57	94		26	175	17
Fuel Used(gal)	2	9		3	17		1	2		1	4	1
CO Emissions (g/hr)	168	663		191	1176		95	137		37	273	81
NOx Emissions (g/hr)	33	129		37	229		18	27		7	53	16
VOC Emissions (g/hr)	39	154		44	273		22	32		9	63	19
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	0
Queue Length 50th (ft)	38	118		37	112		41	85		20	188	0
Queue Length 95th (ft)	73	166		49	158		72	86		35	136	22
Internal Link Dist (ft)		1355			3029			597			735	
Turn Bay Length (ft)	210			210			210			210		210
Base Capacity (vph)	646	1808		524	1759		172	642		362	654	682

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.29	0.39		0.28	0.36		0.47	0.32		0.12	0.54	0.28

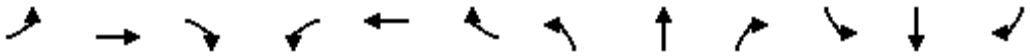
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 5 (6%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 19.7		Intersection LOS: B	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: N Valderas St & Henderson Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	324	132	163	289	189	129	210	65	165	260	168
Future Volume (vph)	114	324	132	163	289	189	129	210	65	165	260	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		0	210		0	210		123	215		0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	50			50			50			50		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.962			0.939			0.967				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3323	0	1671	3223	0	1787	3415	0	1805	1900	1615
Flt Permitted	0.290			0.346			0.173			0.432		
Satd. Flow (perm)	546	3323	0	609	3223	0	325	3415	0	821	1900	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			193			40				404
Link Speed (mph)		30			30			20			20	
Link Distance (ft)		3109			420			904			1113	
Travel Time (s)		70.7			9.5			30.8			37.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.54	0.76	0.93	0.75	0.75	0.72	0.77	0.62	0.69	0.57	0.56	0.37
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	6%	0%	8%	6%	4%	1%	2%	3%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	211	426	142	217	385	263	168	339	94	289	464	454
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	568	0	217	648	0	168	433	0	289	464	454
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	D.P+P	NA		D.P+P	NA		D.P+P	NA		D.P+P	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2			4			8		4
Detector Phase	5	2		1	6		3	8		7	4	4
Switch Phase												

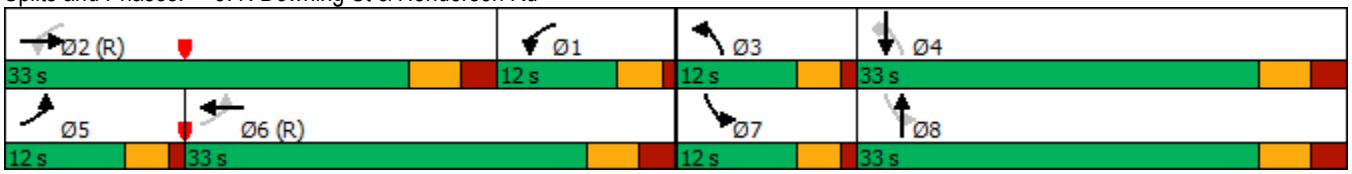


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.0	33.0		12.0	33.0		12.0	33.0		12.0	33.0	33.0
Total Split (s)	12.0	33.0		12.0	33.0		12.0	33.0		12.0	33.0	33.0
Total Split (%)	13.3%	36.7%		13.3%	36.7%		13.3%	36.7%		13.3%	36.7%	36.7%
Maximum Green (s)	8.0	27.0		8.0	27.0		8.0	27.0		8.0	27.0	27.0
Yellow Time (s)	3.0	3.5		3.0	3.5		3.0	3.5		3.0	3.5	3.5
All-Red Time (s)	1.0	2.5		1.0	2.5		1.0	2.5		1.0	2.5	2.5
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)	4.0	6.0		4.0	6.0		4.0	6.0		4.0	6.0	6.0
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		20.0			20.0			20.0			20.0	20.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	39.0	29.0		39.0	29.0		35.0	25.0		35.0	25.3	25.3
Actuated g/C Ratio	0.43	0.32		0.43	0.32		0.39	0.28		0.39	0.28	0.28
v/c Ratio	0.61	0.51		0.61	0.55		0.67	0.44		0.71	0.87	0.61
Control Delay	17.9	14.3		27.6	17.8		29.8	25.2		29.1	48.6	8.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	17.9	14.3		27.6	17.8		29.8	25.2		29.1	48.6	8.2
LOS	B	B		C	B		C	C		C	D	A
Approach Delay		15.3			20.3			26.5			28.7	
Approach LOS		B			C			C			C	
90th %ile Green (s)	8.0	27.0		8.0	27.0		8.0	27.0		8.0	27.0	27.0
90th %ile Term Code	Max	Coord		Max	Coord		Max	Hold		Max	Max	Max
70th %ile Green (s)	8.0	27.0		8.0	27.0		8.0	27.0		8.0	27.0	27.0
70th %ile Term Code	Max	Coord		Max	Coord		Max	Hold		Max	Max	Max
50th %ile Green (s)	8.0	27.0		8.0	27.0		8.0	27.0		8.0	27.0	27.0
50th %ile Term Code	Max	Coord		Hold	Coord		Max	Hold		Max	Max	Max
30th %ile Green (s)	9.1	28.1		8.0	27.0		8.0	25.9		8.0	25.9	25.9
30th %ile Term Code	Max	Coord		Hold	Coord		Max	Hold		Max	Gap	Gap
10th %ile Green (s)	6.7	35.7		8.0	37.0		6.6	18.3		8.0	19.7	19.7
10th %ile Term Code	Gap	Coord		Hold	Coord		Gap	Hold		Max	Gap	Gap
Stops (vph)	74	389		155	321		78	196		120	231	27
Fuel Used(gal)	4	15		2	5		2	4		3	6	2
CO Emissions (g/hr)	251	1016		161	355		145	295		209	409	147
NOx Emissions (g/hr)	49	198		31	69		28	57		41	80	29
VOC Emissions (g/hr)	58	235		37	82		33	68		49	95	34
Dilemma Vehicles (#)	0	0		0	0		0	0		0	0	0
Queue Length 50th (ft)	89	135		66	124		55	92		103	243	20
Queue Length 95th (ft)	18	35		84	136		80	84		93	191	0
Internal Link Dist (ft)		3029			340			824			1033	
Turn Bay Length (ft)	250			210			210			215		
Base Capacity (vph)	351	1104		357	1169		257	1052		406	570	767

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.60	0.51		0.61	0.55		0.65	0.41		0.71	0.81	0.59

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 84 (93%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 59.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: N Downing St & Henderson Rd



Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↰	↱
Traffic Vol, veh/h	0	548	564	0	44	76
Future Vol, veh/h	0	548	564	0	44	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	87	78	92	30	32
Heavy Vehicles, %	2	4	6	2	0	0
Mvmt Flow	0	630	723	0	147	238

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1038	362
Stage 1	-	-	-	-	723	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	230	641
Stage 1	0	-	-	0	447	-
Stage 2	0	-	-	0	719	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	230	641
Mov Cap-2 Maneuver	-	-	-	-	230	-
Stage 1	-	-	-	-	447	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.7
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	230	641
HCM Lane V/C Ratio	-	-	0.638	0.371
HCM Control Delay (s)	-	-	44.7	13.9
HCM Lane LOS	-	-	E	B
HCM 95th %tile Q(veh)	-	-	3.9	1.7

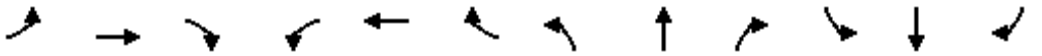
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↰	↱
Traffic Vol, veh/h	0	586	550	0	0	17
Future Vol, veh/h	0	586	550	0	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	87	78	92	92	50
Heavy Vehicles, %	2	4	6	2	2	100
Mvmt Flow	0	674	705	0	0	34

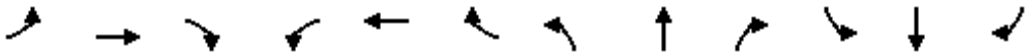
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1042	353
Stage 1	-	-	-	-	705	-
Stage 2	-	-	-	-	337	-
Critical Hdwy	-	-	-	-	6.84	8.9
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	-	-	3.52	4.3
Pot Cap-1 Maneuver	0	-	-	0	225	429
Stage 1	0	-	-	0	451	-
Stage 2	0	-	-	0	695	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	225	429
Mov Cap-2 Maneuver	-	-	-	-	345	-
Stage 1	-	-	-	-	451	-
Stage 2	-	-	-	-	695	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	-	429
HCM Lane V/C Ratio	-	-	-	0.079
HCM Control Delay (s)	-	-	0	14.1
HCM Lane LOS	-	-	A	B
HCM 95th %tile Q(veh)	-	-	-	0.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	316	214	64	337	9	117	21	29	3	13	13
Future Volume (vph)	12	316	214	64	337	9	117	21	29	3	13	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	210		0	210		0	350		0	0		0
Storage Lanes	1		0	1		0	1		0	0		1
Taper Length (ft)	50			50			50			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.945			0.993			0.901				0.850
Flt Protected	0.950			0.950			0.950				0.986	
Satd. Flow (prot)	1805	3236	0	1805	3361	0	1770	1661	0	0	1768	1583
Flt Permitted	0.498			0.273			0.950				0.986	
Satd. Flow (perm)	946	3236	0	519	3361	0	1770	1661	0	0	1768	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		212			9			54				85
Link Speed (mph)		30			30			30			25	
Link Distance (ft)		1123			1318			413			375	
Travel Time (s)		25.5			30.0			9.4			10.2	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.58	0.53	0.62	0.55	0.81	0.42	0.67	0.75	0.54	0.25	0.42	0.58
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	8%	1%	0%	7%	0%	2%	9%	0%	11%	4%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	21	596	345	116	416	21	175	28	54	12	31	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	941	0	116	437	0	175	82	0	0	43	22
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		14			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turn Type	D.Pm	NA		D.Pm	NA		Split	NA		Split	NA	Perm
Protected Phases		2			6		3	3		4	4	
Permitted Phases	6			2								4
Detector Phase	6	2		2	6		3	3		4	4	4
Switch Phase												

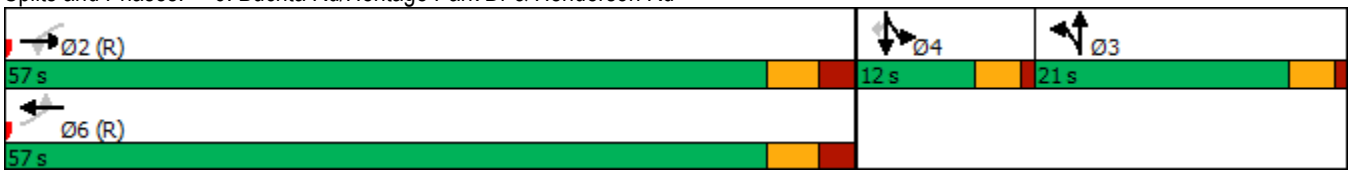


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	16.0	16.0		16.0	16.0		12.0	12.0		12.0	12.0	12.0
Total Split (s)	57.0	57.0		57.0	57.0		21.0	21.0		12.0	12.0	12.0
Total Split (%)	63.3%	63.3%		63.3%	63.3%		23.3%	23.3%		13.3%	13.3%	13.3%
Maximum Green (s)	51.0	51.0		51.0	51.0		17.0	17.0		8.0	8.0	8.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.5	2.5		2.5	2.5		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)	6.0	6.0		6.0	6.0		4.0	4.0			4.0	4.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	60.3	60.3		60.3	60.3		12.9	12.9			6.6	6.6
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.14	0.14			0.07	0.07
v/c Ratio	0.03	0.42		0.33	0.19		0.69	0.29			0.33	0.11
Control Delay	5.5	4.4		12.4	7.1		50.6	17.1			46.3	1.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	5.5	4.4		12.4	7.1		50.6	17.1			46.3	1.2
LOS	A	A		B	A		D	B			D	A
Approach Delay		4.4			8.2			39.9			31.0	
Approach LOS		A			A			D			C	
90th %ile Green (s)	51.0	51.0		51.0	51.0		17.0	17.0		8.0	8.0	8.0
90th %ile Term Code	Coord	Coord		Coord	Coord		Max	Max		Max	Max	Max
70th %ile Green (s)	52.9	52.9		52.9	52.9		15.4	15.4		7.7	7.7	7.7
70th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Gap	Gap	Gap
50th %ile Green (s)	56.2	56.2		56.2	56.2		13.2	13.2		6.6	6.6	6.6
50th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Gap	Gap	Gap
30th %ile Green (s)	69.0	69.0		69.0	69.0		11.0	11.0		0.0	0.0	0.0
30th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Skip	Skip	Skip
10th %ile Green (s)	72.2	72.2		72.2	72.2		7.8	7.8		0.0	0.0	0.0
10th %ile Term Code	Coord	Coord		Coord	Coord		Gap	Gap		Skip	Skip	Skip
Stops (vph)	4	142		32	127		108	20			16	0
Fuel Used(gal)	0	6		1	5		2	0			0	0
CO Emissions (g/hr)	10	413		70	333		152	31			18	3
NOx Emissions (g/hr)	2	80		14	65		30	6			4	1
VOC Emissions (g/hr)	2	96		16	77		35	7			4	1
Dilemma Vehicles (#)	0	0		0	0		0	0			0	0
Queue Length 50th (ft)	4	80		29	50		96	14			24	0
Queue Length 95th (ft)	m7	42		38	74		111	38			26	0
Internal Link Dist (ft)		1043			1238			333			295	
Turn Bay Length (ft)	210			210			350					
Base Capacity (vph)	633	2236		347	2253		334	357			157	218

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.03	0.42		0.33	0.19		0.52	0.23			0.27	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 19 (21%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 50.4%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 6: Buchta Rd/Heritage Park Dr & Henderson Rd



Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	185	18	6	279	9	0
Future Vol, veh/h	185	18	6	279	9	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	210	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	69	38	60	63	25
Heavy Vehicles, %	17	0	0	18	0	0
Mvmt Flow	253	26	16	465	14	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	279	0	531	140
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	265	-
Critical Hdwy	-	-	4.1	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1295	-	483	889
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	761	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1295	-	477	889
Mov Cap-2 Maneuver	-	-	-	-	477	-
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	752	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	477	-	-	1295	-
HCM Lane V/C Ratio	0.03	-	-	0.012	-
HCM Control Delay (s)	12.8	-	-	7.8	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	0	62	5	5	3	88	320	9	0	277	158
Future Vol, veh/h	50	0	62	5	5	3	88	320	9	0	277	158
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Free
Storage Length	0	-	-	-	-	-	-	-	-	-	-	510
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	25	65	50	50	25	66	67	63	25	95	71
Heavy Vehicles, %	1	0	2	0	0	0	8	3	0	0	2	1
Mvmt Flow	79	0	95	10	10	12	133	478	14	0	292	223

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1054	1050	292	1091	1043	485	292	0	0	492	0	0
Stage 1	292	292	-	751	751	-	-	-	-	-	-	-
Stage 2	762	758	-	340	292	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.5	6.22	7.1	6.5	6.2	4.18	-	-	4.1	-	-
Critical Hdwy Stg 1	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4	3.318	3.5	4	3.3	2.272	-	-	2.2	-	-
Pot Cap-1 Maneuver	205	229	747	194	231	586	1236	-	-	1082	-	0
Stage 1	718	675	-	406	421	-	-	-	-	-	-	0
Stage 2	399	418	-	679	675	-	-	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	171	195	747	150	197	586	1236	-	-	1082	-	-
Mov Cap-2 Maneuver	171	195	-	150	197	-	-	-	-	-	-	-
Stage 1	612	675	-	346	359	-	-	-	-	-	-	-
Stage 2	324	356	-	592	675	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.3	23	1.8	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT
Capacity (veh/h)	1236	-	-	171	747	232	1082	-
HCM Lane V/C Ratio	0.108	-	-	0.464	0.128	0.138	-	-
HCM Control Delay (s)	8.3	0	-	43.1	10.5	23	0	-
HCM Lane LOS	A	A	-	E	B	C	A	-
HCM 95th %tile Q(veh)	0.4	-	-	2.2	0.4	0.5	0	-

Appendix B. Crash Data Report

Crash Data - Henderson Rd. Downing St.

Crash ID	Crash Severity	Crash Year	Street Name	Intersecting Street Name	Intersection Related	Light Condition	Manner of Collision	Surface Condition	Weather Condition	Contributing Factor 1	Charge
16770280	N - NOT INJURED	2018	E HENDERSON RD	N DOWNING ST	INTERSECTION	1 - DAYLIGHT	ANGLE - BOTH GOING STRAIGHT	1 - DRY	2 - CLOUDY	35 - FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NO DRIVER LICENSE, FAILED TO YIELD RIGHT OF WAY
16770280	N - NOT INJURED	2018	E HENDERSON RD	N DOWNING ST	INTERSECTION	1 - DAYLIGHT	ANGLE - BOTH GOING STRAIGHT	1 - DRY	2 - CLOUDY	35 - FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NO CHARGES
16770280	N - NOT INJURED	2018	E HENDERSON RD	N DOWNING ST	INTERSECTION	1 - DAYLIGHT	ANGLE - BOTH GOING STRAIGHT	1 - DRY	2 - CLOUDY	35 - FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NO CHARGES
16770280	N - NOT INJURED	2018	E HENDERSON RD	N DOWNING ST	INTERSECTION	1 - DAYLIGHT	ANGLE - BOTH GOING STRAIGHT	1 - DRY	2 - CLOUDY	No Data	NO CHARGES

Crash Data - Henderson Rd. N Valderas St.

Crash ID	Crash Severity	Crash Year	Street Name	Intersecting Street Name	Intersection Related	Light Condition	Manner of Collision	Surface Condition	Weather Condition	Contributing Factor 1	Charge
16629346	N - NOT INJURED	2018	N VALDERAS ST	E HENDERSON RD	INTERSECTION	1 - DAYLIGHT	ANGLE - BOTH GOING STRAIGHT	1 - DRY	1 - CLEAR	No Data	NO CHARGES
16629346	N - NOT INJURED	2018	N VALDERAS ST	E HENDERSON RD	INTERSECTION	1 - DAYLIGHT	ANGLE - BOTH GOING STRAIGHT	1 - DRY	1 - CLEAR	No Data	NO CHARGES
16893921	N - NOT INJURED	2019	E HENDERSON RD	N VALDERAS ST	INTERSECTION RELATED	1 - DAYLIGHT	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	1 - DRY	2 - CLOUDY	22 - FAILED TO CONTROL SPEED	FAIL TO CONTROL SPEED
16893921	N - NOT INJURED	2019	E HENDERSON RD	N VALDERAS ST	INTERSECTION RELATED	1 - DAYLIGHT	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	1 - DRY	2 - CLOUDY	No Data	NO CHARGES
16893921	N - NOT INJURED	2019	E HENDERSON RD	N VALDERAS ST	INTERSECTION RELATED	1 - DAYLIGHT	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	1 - DRY	2 - CLOUDY	No Data	NO CHARGES
16975709	C - POSSIBLE INJURY	2019	E HENDERSON RD	N VALDERAS ST	INTERSECTION	3 - DARK, LIGHTED	ANGLE - BOTH GOING STRAIGHT	1 - DRY	1 - CLEAR	20 - DRIVER INATTENTION	NO DRIVER LICENSE
16975709	C - POSSIBLE INJURY	2019	E HENDERSON RD	N VALDERAS ST	INTERSECTION	3 - DARK, LIGHTED	ANGLE - BOTH GOING STRAIGHT	1 - DRY	1 - CLEAR	No Data	NO MOTOR VEHICLE LIABILITY INSURANCE
17231639	N - NOT INJURED	2019	N VALDERAS ST	E HENDERSON RD	INTERSECTION RELATED	1 - DAYLIGHT	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	1 - DRY	1 - CLEAR	22 - FAILED TO CONTROL SPEED	FAIL TO CONTROL SPEED
17231639	N - NOT INJURED	2019	N VALDERAS ST	E HENDERSON RD	INTERSECTION RELATED	1 - DAYLIGHT	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	1 - DRY	1 - CLEAR	No Data	NO CHARGES
17231639	N - NOT INJURED	2019	N VALDERAS ST	E HENDERSON RD	INTERSECTION RELATED	1 - DAYLIGHT	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	1 - DRY	1 - CLEAR	No Data	NO CHARGES
17231639	N - NOT INJURED	2019	N VALDERAS ST	E HENDERSON RD	INTERSECTION RELATED	1 - DAYLIGHT	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	1 - DRY	1 - CLEAR	No Data	NO CHARGES
17412687	N - NOT INJURED	2019	E HENDERSON RD	CR0048	INTERSECTION	1 - DAYLIGHT	ANGLE - BOTH GOING STRAIGHT	1 - DRY	1 - CLEAR	33 - FAILED TO YIELD RIGHT OF WAY - OPEN INTERSECTION	NO DRIVER LICENSE, DISPLAY EXPIRED LICENSE PLATES, FAIL TO MAINTAIN FIN. RESPONSIBILITY

Crash Data - Henderson Rd. N Valderas St.

17412687	N - NOT INJURED	2019	E HENDERSON RD	CR0048	INTERSECTION	1 - DAYLIGHT	ANGLE - BOTH GOING STRAIGHT	1 - DRY	1 - CLEAR	No Data	NO CHARGES
17993564	N - NOT INJURED	2020	E HENDERSON RD	N VALDERAS ST	INTERSECTION	1 - DAYLIGHT	ANGLE - ONE STRAIGHT-ONE RIGHT TURN	1 - DRY	1 - CLEAR	16 - DISREGARD STOP SIGN OR LIGHT	RAN STOP SIGN
17993564	N - NOT INJURED	2020	E HENDERSON RD	N VALDERAS ST	INTERSECTION	1 - DAYLIGHT	ANGLE - ONE STRAIGHT-ONE RIGHT TURN	1 - DRY	1 - CLEAR	No Data	NO CHARGES

Appendix C. Warrant Analysis

Traffic Survey — Count Analysis

Form Revised 2/27/2012

2011 TMUTCD Warrants

County: Brazoria District: Houston

City: Angleton Population: 19,000 Survey Date: 11/18/2020

		Name	Control	Section	85% Speed
Major		Henderson Rd	STOP		30 MPH
Minor		Downing St	STOP		30 MPH

Eight Highest Hours: Include the same 8 hours for the Major and Minor St. volumes.

Time	Major St. - Both App.		Minor St. - Hi. Vol. App.	
Ends	Veh. Total	Ped. Total	Veh. Total	Ped. Total
8:30 AM	396	31	256	
4:30 PM	474	162	235	
5:30 PM	479	10	202	
7:30 AM	302	15	143	
6:30 PM	384	3	133	

Comments:

Warrant 1. Eight Hour Vehicular Volume

☐ Yes ☐ No N/A — Meets 70%[c] (and major-street speed exceeds 40 mph or population less than 10,000) *or* 100%[a] (regardless of speed) of Condition A.

– or –

☐ Yes ☐ No N/A — Meets 70%[c] (and major-street speed exceeds 40 mph or population less than 10,000) *or* 100%[a] (regardless of speed) of Condition B.

– or –

☐ Yes ☐ No N/A — Meets 80%[b] of Conditions A and B.

– or –

☐ Yes ☐ No N/A — Meets 56%[d] of Conditions A and B (and major-street speed exceeds 40 mph or population less than 10,000).

Condition A - Minimum Vehicle Volume

Number of Lanes		Vehicles per hour on Major St (Total of Both Approaches)					Vehicles per hour on higher-volume Minor St approach (One Direction Only)				
Major	Minor	Required				Existing	Required				Existing
Street	Street	100%[a]	80%[b]	70%[c]	56%[d]		100%[a]	80%[b]	70%[c]	56%[d]	
1	1	500	400	350	280		150	120	105	84	
2 or more	1	600	480	420	336		150	120	105	84	
2 or more	2 or more	600	480	420	336		200	160	140	112	
1	2 or more	500	400	350	280		200	160	140	112	

Condition B - Interruption of Continuous Traffic

Number of Lanes		Vehicles per hour on Major St (Total of Both Approaches)					Vehicles per hour on higher-volume Minor St approach (One Direction Only)				
Major	Minor	Required				Existing	Required				Existing
Street	Street	100%[a]	80%[b]	70%[c]	56%[d]		100%[a]	80%[b]	70%[c]	56%[d]	
1	1	750	600	525	420		75	60	53	42	
2 or more	1	900	720	630	504		75	60	53	42	
2 or more	2 or more	900	720	630	504		100	80	70	56	
1	2 or more	750	600	525	420		100	80	70	56	

[a]Basic minimum hourly volume.

[b]Used for combination of Conditions A and B after adequate trial of other remedial measures.

[c]May be used when the major-street speed exceeds 40 mph or in a community with a population of less than 10,000.

[d]May be used for combination of Conditions A and B after adequat trial of other remedial measures when major street exceeds 40 mph or in an isolated community with a population of less than 10,000.

Warrant 5. School Crossing

☐ Yes ☐ No **NOT EVALUATED**	Is the number of adequate gaps in traffic stream during the period when the children are using the crossing less than the number of minutes in the same period?	
	– and –	
☑ Yes ☐ No	Is there a minimum of 20 students during the highest crossing hour?	
	– and –	
☑ Yes ☐ No	Is the nearest signal located more than 300 feet away? (This warrant may be applied, if the proposed signal is less than 300 feet and does not restrict the progressive movement of traffic.)	

Warrant 6. Coordinated Signal System

☐ Yes ☐ No **N/A**	On a one-way street or a street with traffic predominantly in one direction, are the adjacent signals far enough apart that the necessary degree of vehicle platooning does not occur?
	– or –
☐ Yes ☐ No **NOT EVALUATED**	On a two-way street, are the adjacent signals far enough appart that the necessary degree of vehicle platooning does not occur and would the proposed and adjacent traffic control signal provide a progressive operation?

Warrant 7. Crash Experience

☐ Yes ☑ No	Is one of the following conditions met?: ♦ 80% of Condition A or Condition B in Warrant 1 *N/A* ♦ 56% of Condition A or B in Warrant 1 (major-street speed exceeding 40 mph or population less than 10,000) *N/A* ♦ 80 % or more of Warrant 4 met? *No*
	– and –
☐ Yes ☑ No	Have there been 5 or more reportable crashes susceptible to correction by a traffic signal within a 12 month period?

Warrant 8. Roadway Network

☐ Yes ☐ No **NOT EVALUATED**	Is the total existing, or immediately projected, entering volume on all approaches greater than 1000 vehicles for each of any 5 hours of a Saturday and/or Sunday.
	– or –
☐ Yes ☑ No	Is the total existing, or immediately projected, entering volume greater than 1000 vehicles for the peak hour of a typical weekday, and do the 5 year projected traffic volumes meet one or more of Warrants 1, 2, and 3 during an average weekday?

Check applicable characteristics of each route:

Major Street	Minor Street	
☐	☐	It is part of street or highway system that serves as the principal roadway network for through traffic flow.
☐	☐	It includes rural or suburban highways outside, entering, or traversing a city.
☐	☐	It appears as a major route on an official plan such as a major street plan in an urban area traffic and transportation study.

Remarks:

Warrant 2. Four Hour Volumes

☐ Yes ☑ No	Meets each of 4 Highest Hours (Warrant 2 — see Figure 1).

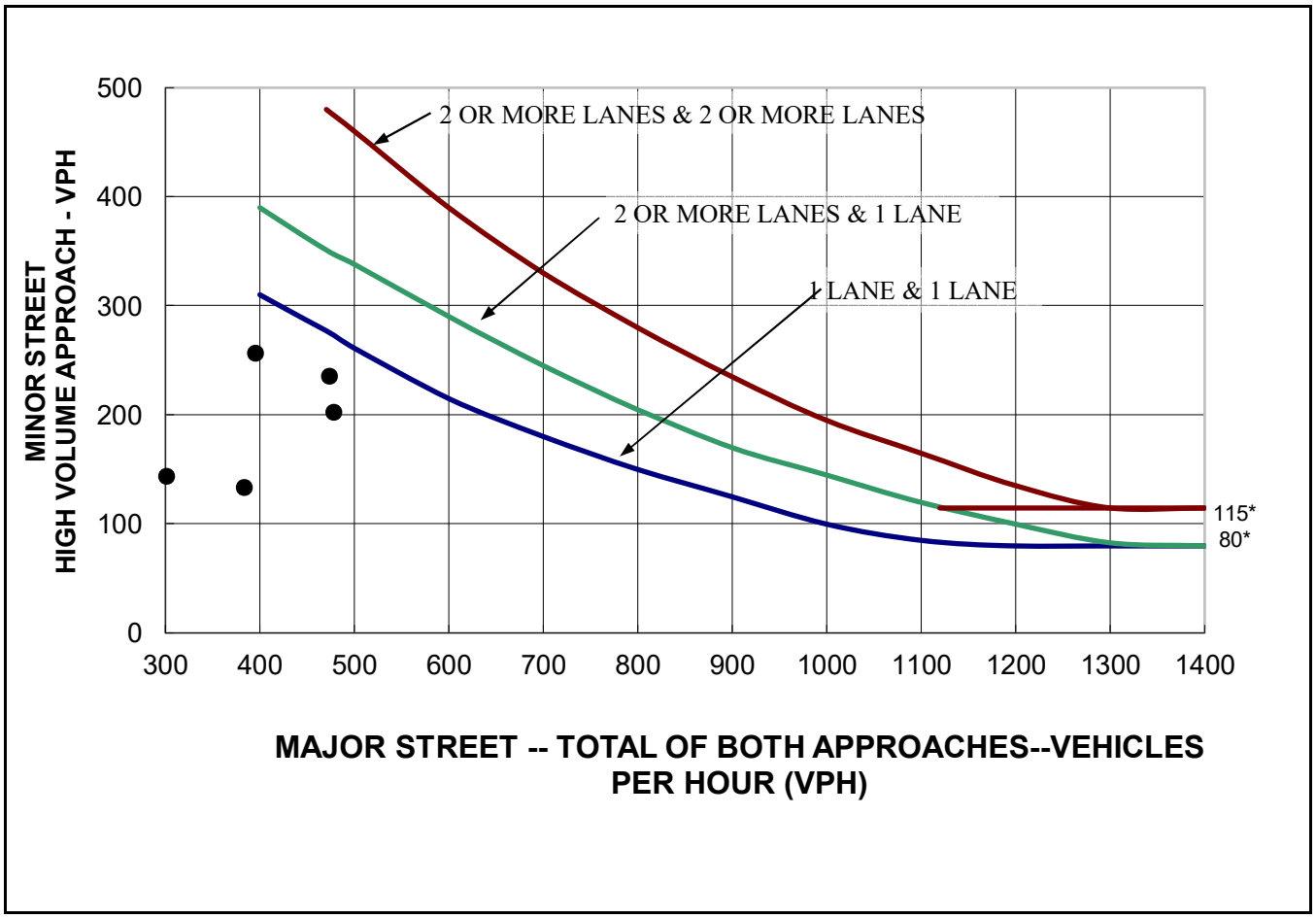


Figure 1. Four-hour volume warrant. (Warrant 2.)

Warrant 3. Peak Hour

☐ Yes ☐ No Not Evaluated	Are all of the following conditions true for any four consecutive 15 minute periods? 1. The total stopped time delay experienced by the traffic on one minor street approach (one direction only) controlled by a stop sign equals or exceeds 4 vehicle-hours for a one-lane approach and 5 vehicle-hours for a two-lane approach, *and* 2. The volume of the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, *and* 3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four (or more) approaches.
	– or –
☐ Yes ☑ No	Meets one High Hour (Warrant 3 — see Figure 2).

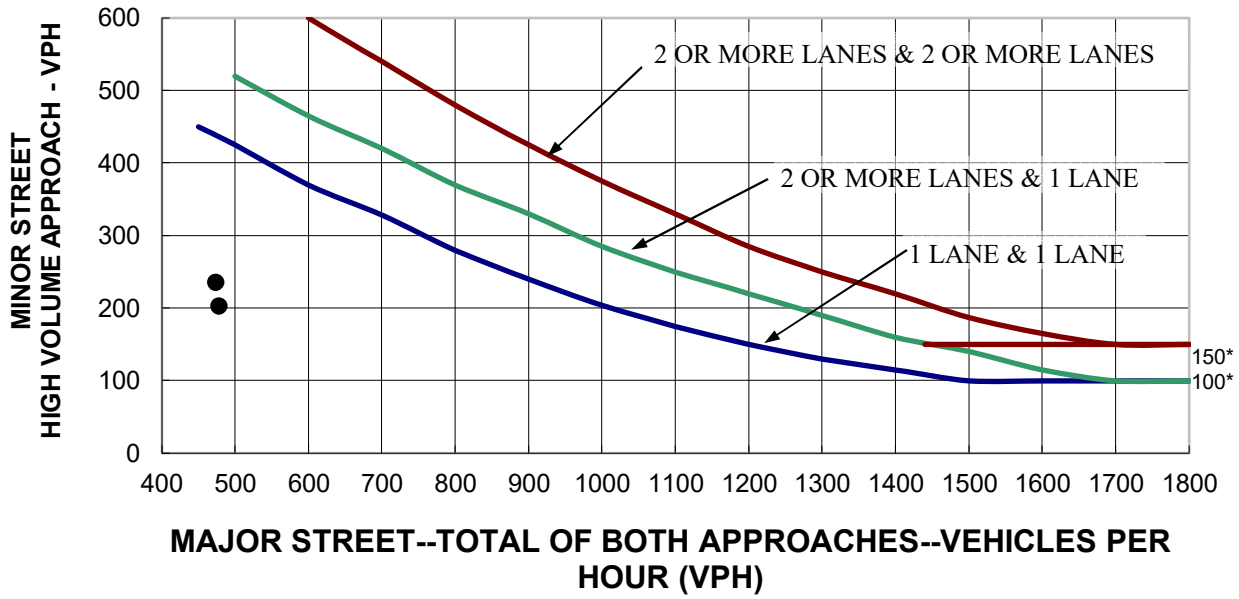


Figure 2. Peak hour volume warrant. (Warrant 3.)

Warrant 4. Four Hour Pedestrian Volumes

☐ Yes ☑ No	Meets each of 4 Highest Hours (Warrant 4 — see Figure 3).

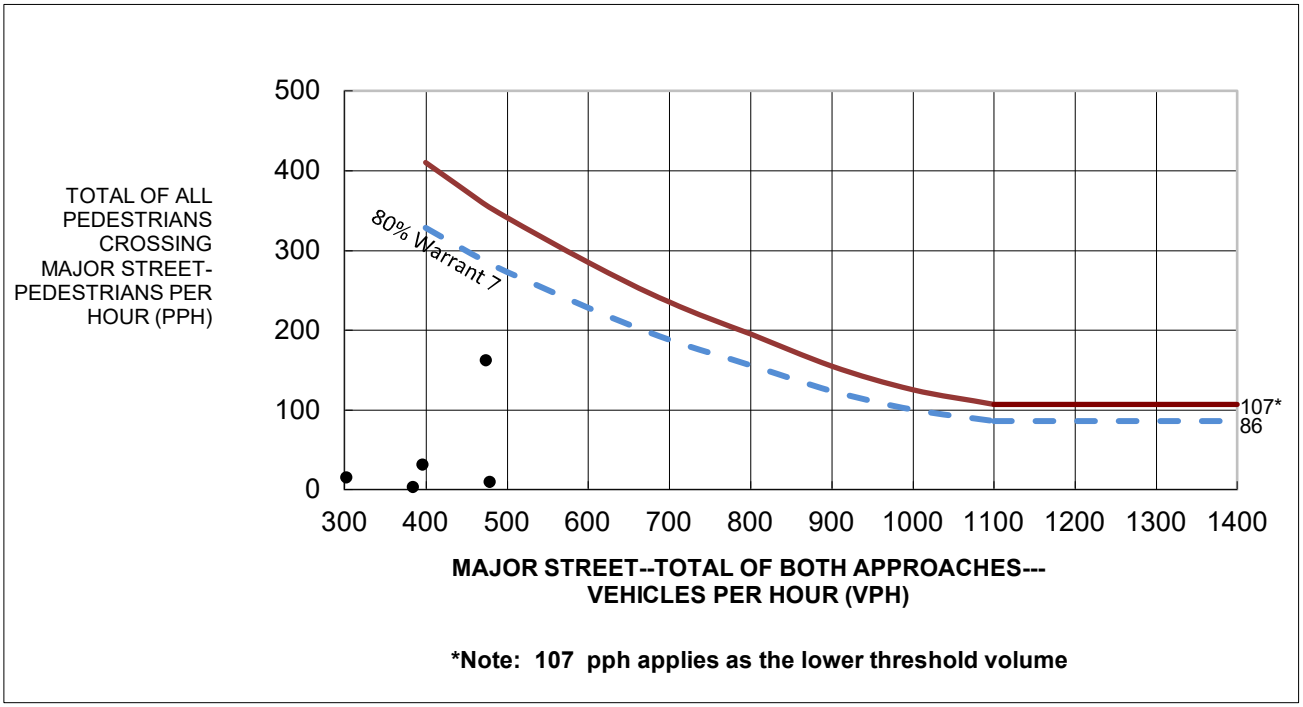


Figure 3. Four-hour pedestrian warrant. (Warrant 4.)

Warrant 4. Peak Hour Pedestrian Volumes

☐ Yes ☑ No	Meets each of 4 Highest Hours (Warrant 4 — see Figure 3).

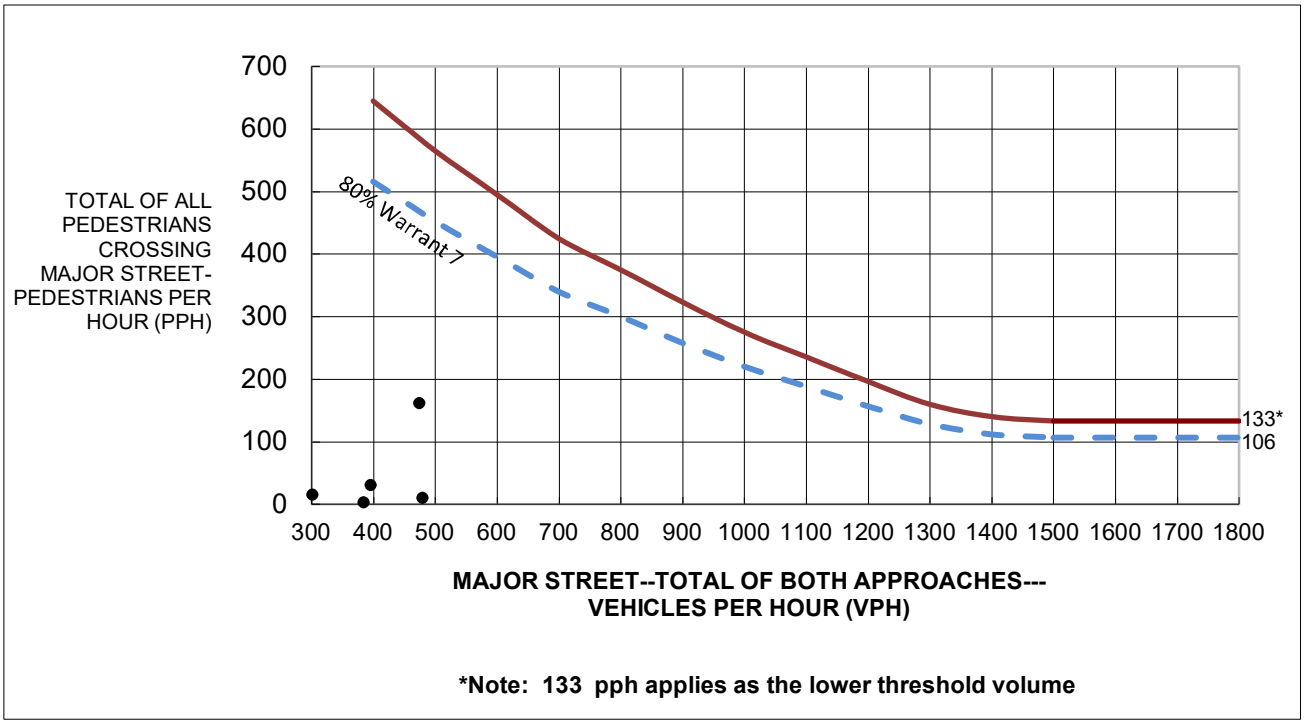


Figure 4. Peak hour pedestrian warrant. (Warrant 4.)

Warrant 9. Intersection Near a Grade Crossing (Two or More Approach Lanes at the Track Crossing)

☐ Yes ☐ No	Meets one High Hour (Warrant 9 — see Figure 5).

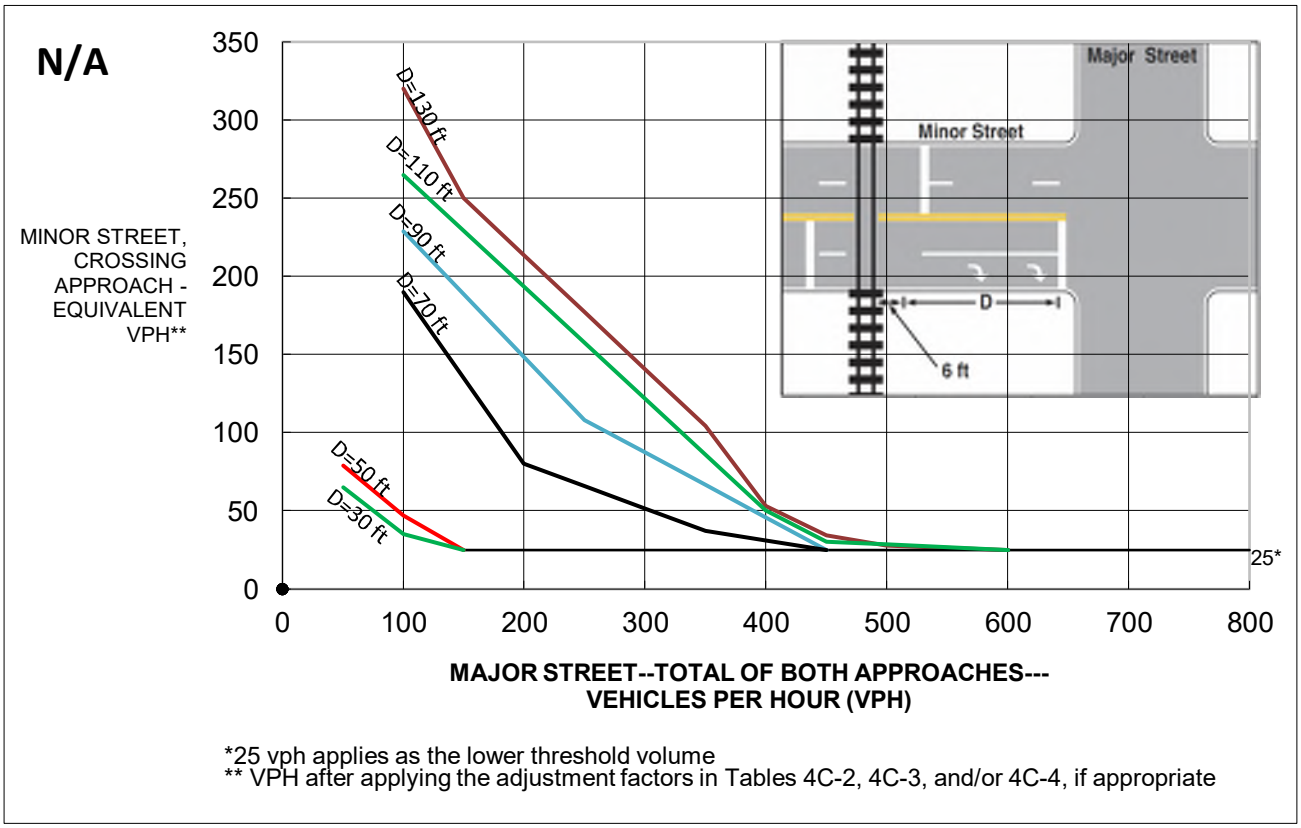


Figure 5. Railroad Grade Crossing (Two or More Approach Lanes at the Track Crossing). (Warrant 9.)

Warrant 3. Peak Hour Year 2030 Henderson Rd. & N Downing St.

☐ Yes ☐ No	Are all of the following conditions true for any four consecutive 15 minute periods? 1. The total stopped time delay experienced by the traffic on one minor street approach (one direction only) controlled by a stop sign equals or exceeds 4 vehicle-hours for a one-lane approach and 5 vehicle-hours for a two-lane approach, *and* 2. The volume of the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, *and* 3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four (or more) approaches.
	– or –
☑ Yes ☐ No	Meets one High Hour (Warrant 3 — see Figure 2).

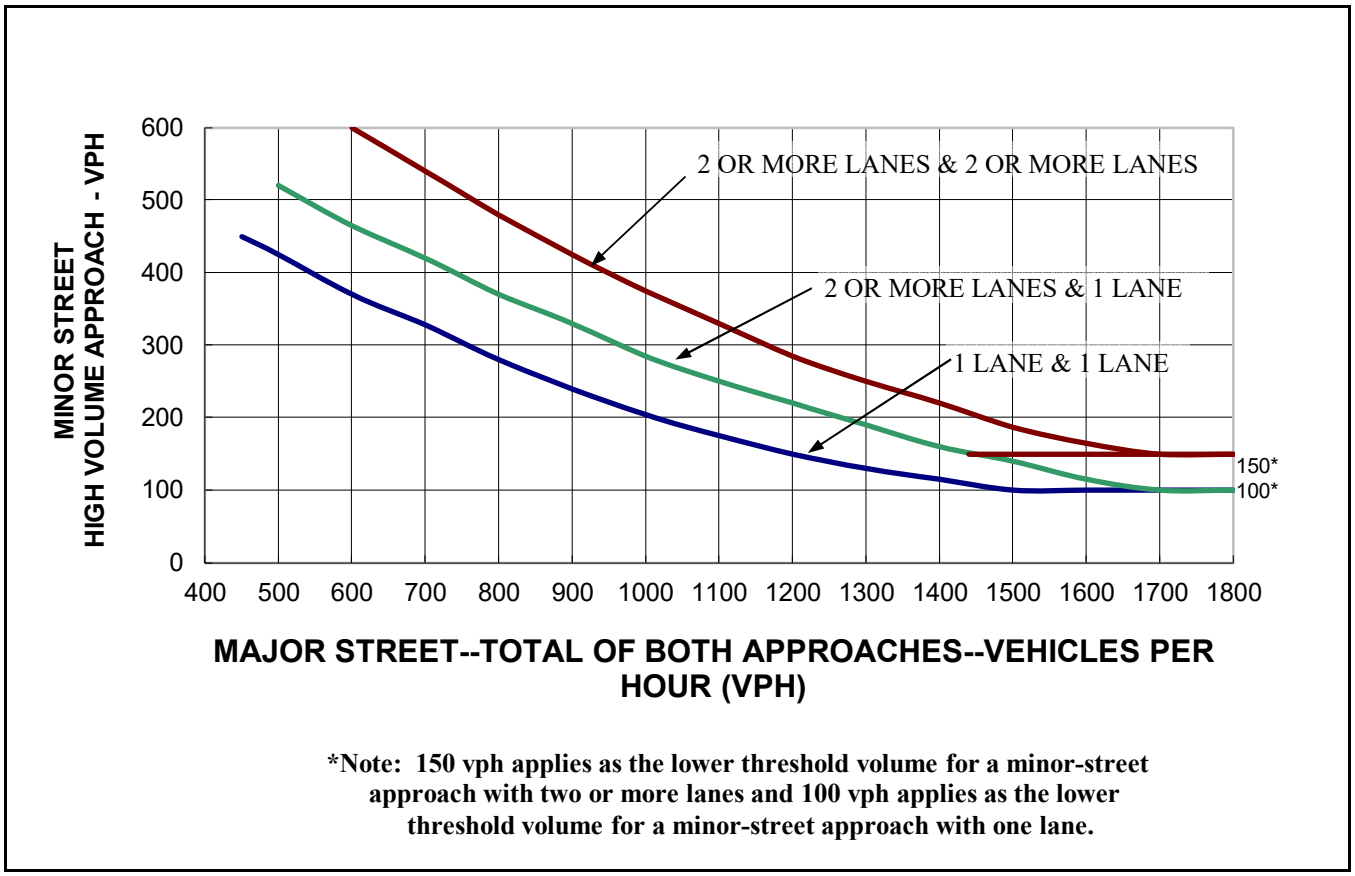


Figure 2. Peak hour volume warrant. (Warrant 3.)

Traffic Survey — Count Analysis

Form Revised 2/27/2012

2011 TMUTCD Warrants

County: Brazoria District: Houston

City: Angleton Population: 19,000 Survey Date: 11/18/2020

		Name	Control	Section	85% Speed
Major		Henderson Rd	STOP		30 MPH
Minor		N Valderas St	STOP		30 MPH

Eight Highest Hours: Include the same 8 hours for the Major and Minor St. volumes.

Time	Major St. - Both App.		Minor St. - Hi. Vol. App.	
Ends	Veh. Total	Ped. Total	Veh. Total	Ped. Total
4:30 PM	636		274	
7:30 AM	411		178	
5:30 PM	708		163	
8:30 AM	490	1	154	
6:30 PM	542		143	

Comments:

Warrant 1. Eight Hour Vehicular Volume

☐ Yes ☐ No N/A — Meets 70%[c] (and major-street speed exceeds 40 mph or population less than 10,000) *or* 100%[a] (regardless of speed) of Condition A.

– or –

☐ Yes ☐ No N/A — Meets 70%[c] (and major-street speed exceeds 40 mph or population less than 10,000) *or* 100%[a] (regardless of speed) of Condition B.

– or –

☐ Yes ☐ No N/A — Meets 80%[b] of Conditions A and B.

– or –

☐ Yes ☐ No N/A — Meets 56%[d] of Conditions A and B (and major-street speed exceeds 40 mph or population less than 10,000).

Condition A - Minimum Vehicle Volume

Number of Lanes		Vehicles per hour on Major St (Total of Both Approaches)					Vehicles per hour on higher-volume Minor St approach (One Direction Only)				
Major	Minor	Required				Existing	Required				Existing
Street	Street	100%[a]	80%[b]	70%[c]	56%[d]		100%[a]	80%[b]	70%[c]	56%[d]	
1	1	500	400	350	280		150	120	105	84	
2 or more	1	600	480	420	336		150	120	105	84	
2 or more	2 or more	600	480	420	336		200	160	140	112	
1	2 or more	500	400	350	280		200	160	140	112	

Condition B - Interruption of Continuous Traffic

Number of Lanes		Vehicles per hour on Major St (Total of Both Approaches)					Vehicles per hour on higher-volume Minor St approach (One Direction Only)				
Major	Minor	Required				Existing	Required				Existing
Street	Street	100%[a]	80%[b]	70%[c]	56%[d]		100%[a]	80%[b]	70%[c]	56%[d]	
1	1	750	600	525	420		75	60	53	42	
2 or more	1	900	720	630	504		75	60	53	42	
2 or more	2 or more	900	720	630	504		100	80	70	56	
1	2 or more	750	600	525	420		100	80	70	56	

[a]Basic minimum hourly volume.

[b]Used for combination of Conditions A and B after adequate trial of other remedial measures.

[c]May be used when the major-street speed exceeds 40 mph or in a community with a population of less than 10,000.

[d]May be used for combination of Conditions A and B after adequat trial of other remedial measures when major street exceeds 40 mph or in an isolated community with a population of less than 10,000.

Warrant 2. Four Hour Volumes

☐ Yes ☑ No	Meets each of 4 Highest Hours (Warrant 2 — see Figure 1).

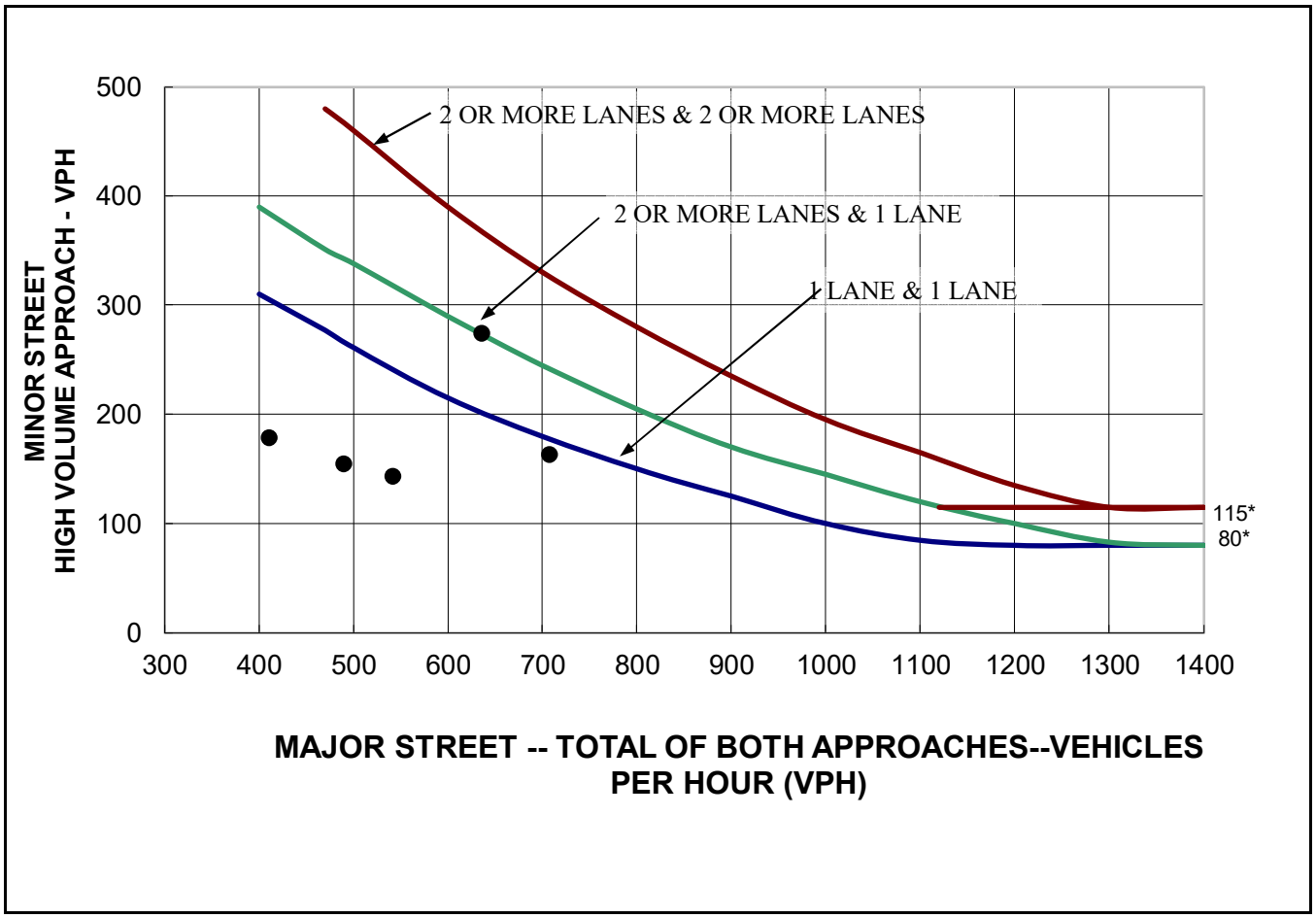


Figure 1. Four-hour volume warrant. (Warrant 2.)

Warrant 3. Peak Hour

☐ Yes ☐ No Not Evaluated	Are all of the following conditions true for any four consecutive 15 minute periods? 1. The total stopped time delay experienced by the traffic on one minor street approach (one direction only) controlled by a stop sign equals or exceeds 4 vehicle-hours for a one-lane approach and 5 vehicle-hours for a two-lane approach, *and* 2. The volume of the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, *and* 3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four (or more) approaches.
	– or –
☐ Yes ☑ No	Meets one High Hour (Warrant 3 — see Figure 2).

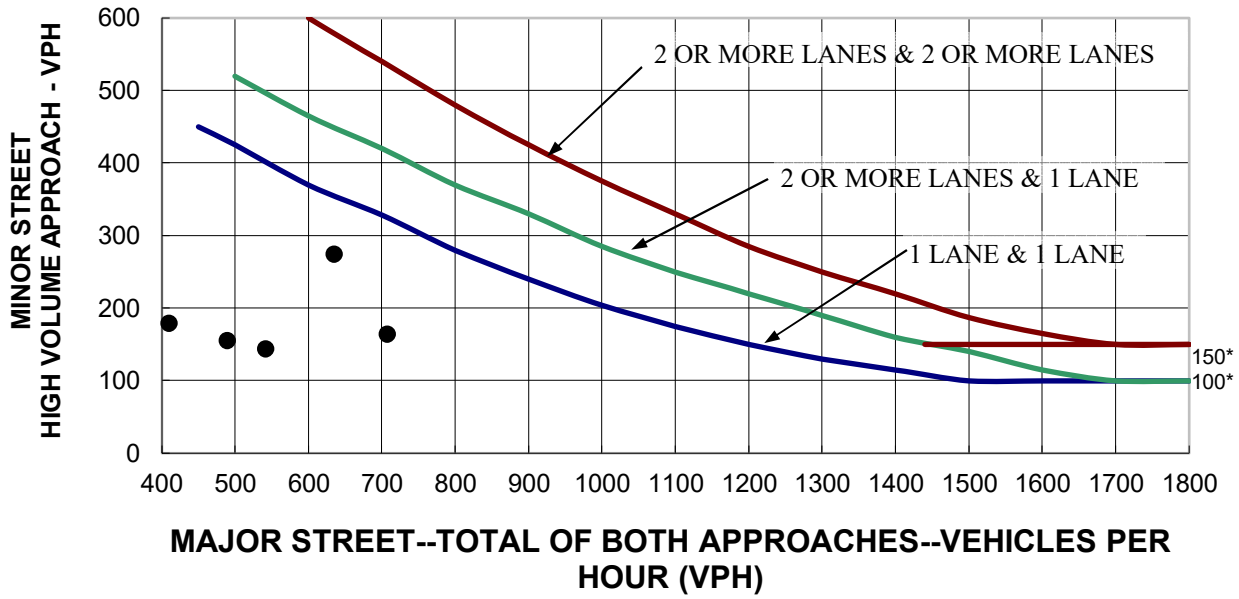


Figure 2. Peak hour volume warrant. (Warrant 3.)

Warrant 4. Four Hour Pedestrian Volumes

☐ Yes ☑ No	Meets each of 4 Highest Hours (Warrant 4 — see Figure 3).

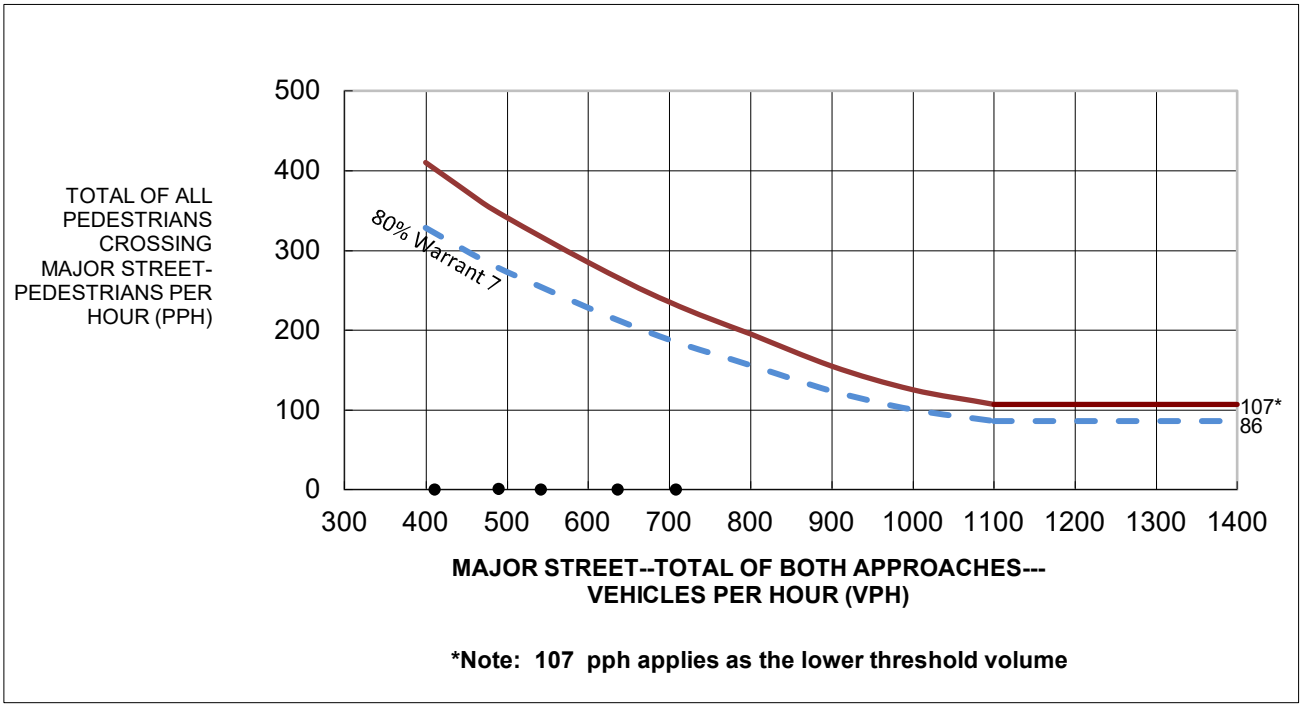


Figure 3. Four-hour pedestrian warrant. (Warrant 4.)

Warrant 4. Peak Hour Pedestrian Volumes

☐ Yes ☑ No	Meets each of 4 Highest Hours (Warrant 4 — see Figure 3).

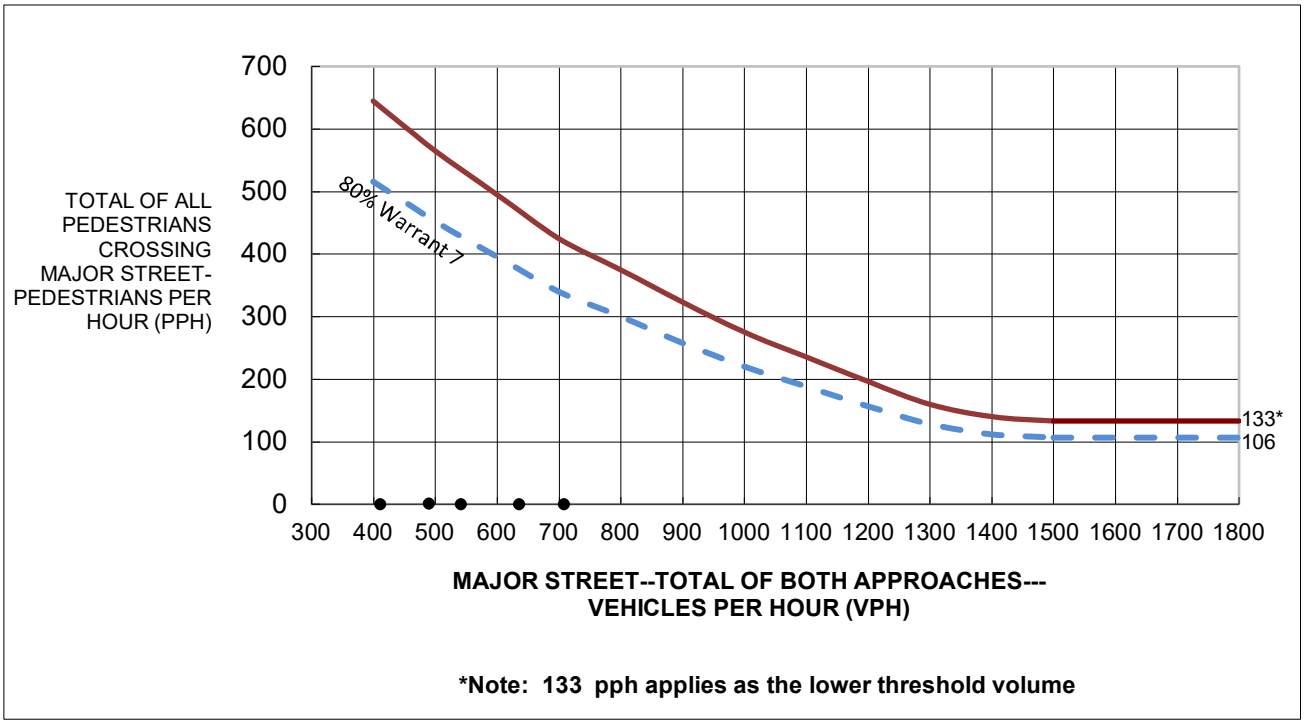


Figure 4. Peak hour pedestrian warrant. (Warrant 4.)

Warrant 5. School Crossing

☐ Yes ☐ No N/A	Is the number of adequate gaps in traffic stream during the period when the children are using the crossing less than the number of minutes in the same period? ***– and –***
☐ Yes ☐ No N/A	Is there a minimum of 20 students during the highest crossing hour? ***– and –***
☐ Yes ☐ No N/A	Is the nearest signal located more than 300 feet away? (This warrant may be applied, if the proposed signal is less than 300 feet and does not restrict the progressive movement of traffic.)

Warrant 6. Coordinated Signal System

☐ Yes ☐ No **N/A**	On a one-way street or a street with traffic predominantly in one direction, are the adjacent signals far enough apart that the necessary degree of vehicle platooning does not occur? ***– or –***
☐ Yes ☐ No **Not Evaluated**	On a two-way street, are the adjacent signals far enough appart that the necessary degree of vehicle platooning does not occur and would the proposed and adjacent traffic control signal provide a progressive operation?

Warrant 7. Crash Experience

☐ Yes ☑ No	Is one of the following conditions met?: ♦ 80% of Condition A or Condition B in Warrant 1 *N/A* ♦ 56% of Condition A or B in Warrant 1 (major-street speed exceeding 40 mph or population less than 10,000) *N/A* ♦ 80 % or more of Warrant 4 met? *No* ***– and –***
☐ Yes ☑ No	Have there been 5 or more reportable crashes susceptible to correction by a traffic signal within a 12 month period?

Warrant 8. Roadway Network

☐ Yes ☐ No **Not Evaluated**	Is the total existing, or immediately projected, entering volume on all approaches greater than 1000 vehicles for each of any 5 hours of a Saturday and/or Sunday. ***– or –***
☑ Yes ☐ No	Is the total existing, or immediately projected, entering volume greater than 1000 vehicles for the peak hour of a typical weekday, and do the 5 year projected traffic volumes meet one or more of Warrants 1, 2, and 3 during an average weekday?

Check applicable characteristics of each route:

Major Street	Minor Street	
☐	☐	It is part of street or highway system that serves as the principal roadway network for through traffic flow.
☐	☐	It includes rural or suburban highways outside, entering, or traversing a city.
☐	☐	It appears as a major route on an official plan such as a major street plan in an urban area traffic and transportation study.

Remarks:

Warrant 9. Intersection Near a Grade Crossing (Two or More Approach Lanes at the Track Crossing)

☐ Yes ☐ No	Meets one High Hour (Warrant 9 — see Figure 5).

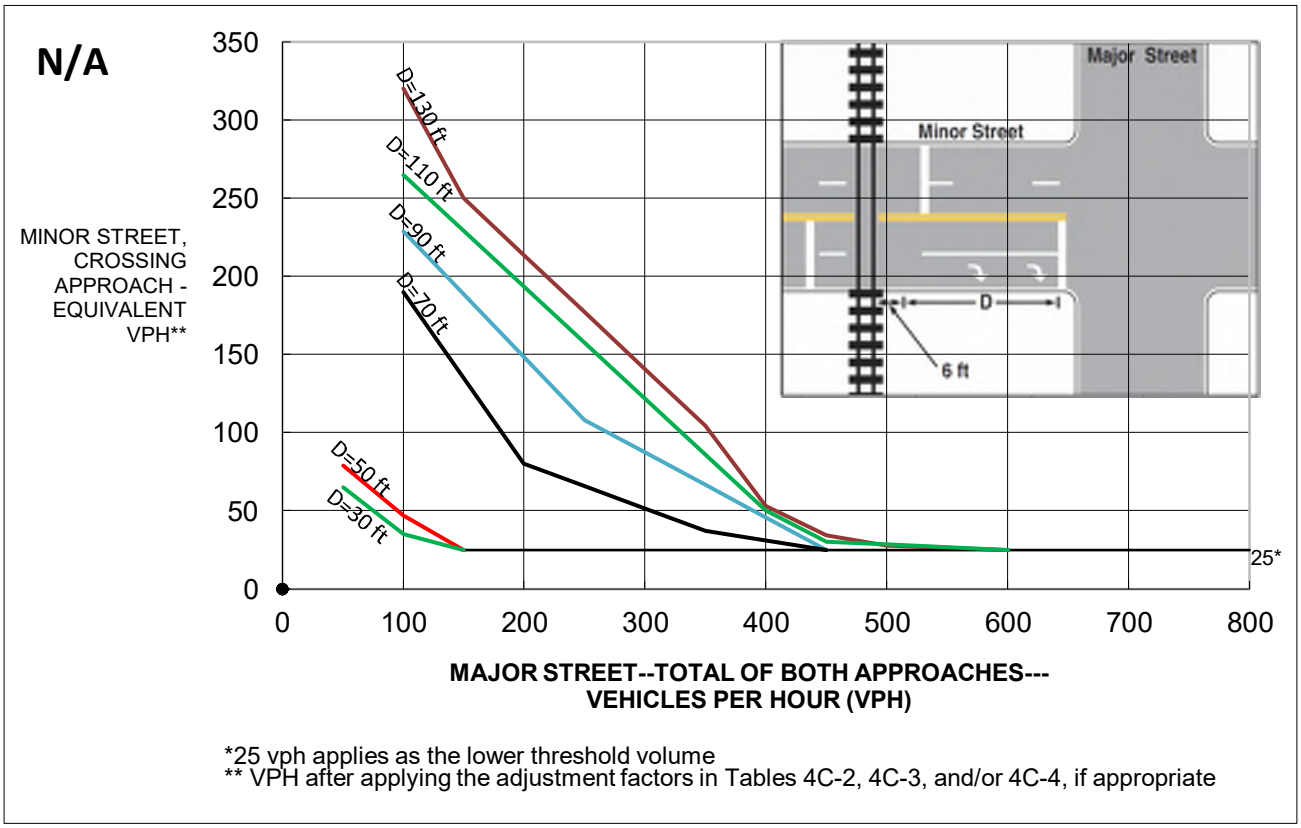
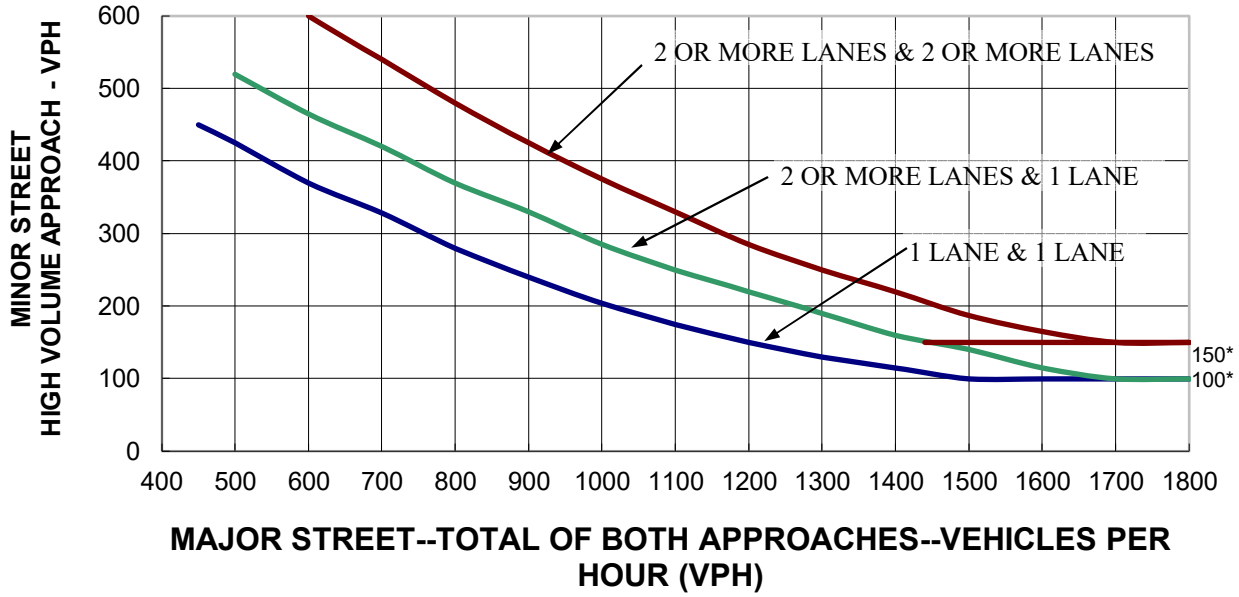


Figure 5. Railroad Grade Crossing (Two or More Approach Lanes at the Track Crossing). (Warrant 9.)

Warrant 3. Peak Hour Year 2030 Henderson Rd. and N Valderas St.

☐ Yes ☐ No	Are all of the following conditions true for any four consecutive 15 minute periods? 1. The total stopped time delay experienced by the traffic on one minor street approach (one direction only) controlled by a stop sign equals or exceeds 4 vehicle-hours for a one-lane approach and 5 vehicle-hours for a two-lane approach, *and* 2. The volume of the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, *and* 3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four (or more) approaches.
	– or –
☑ Yes ☐ No	Meets one High Hour (Warrant 3 — see Figure 2).

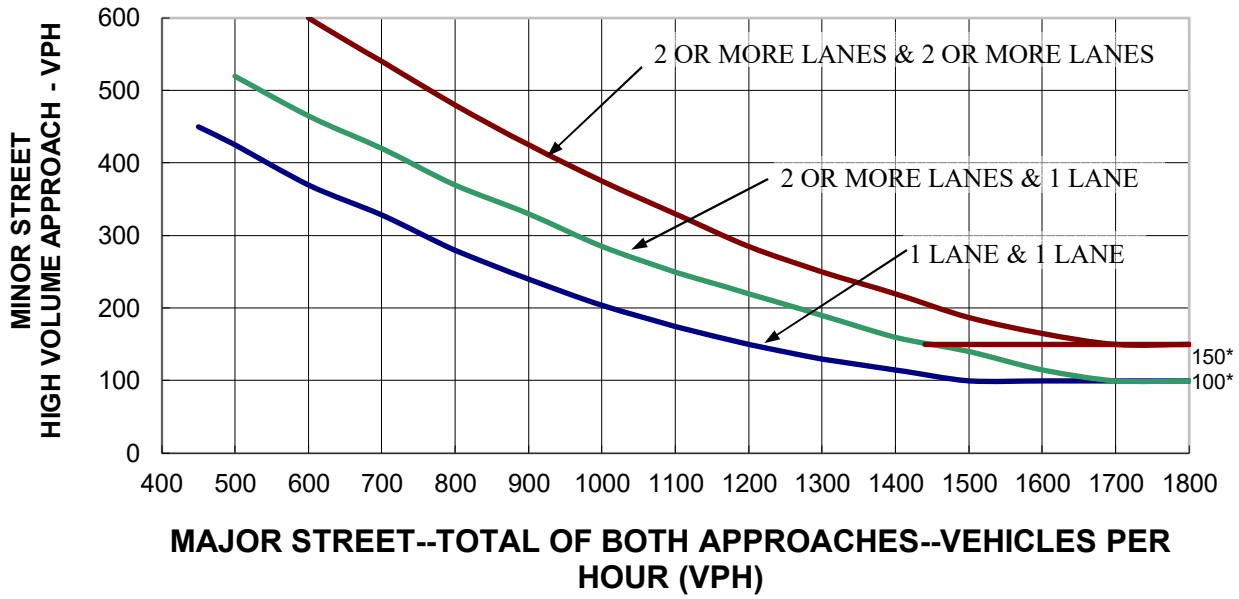


***Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.**

Figure 2. Peak hour volume warrant. (Warrant 3.)

Warrant 3. Peak Hour Year 2030 Henderson Rd. & Heritage Park Dr./ Buchta Rd.

☐ Yes ☑ No	Are all of the following conditions true for any four consecutive 15 minute periods? 1. The total stopped time delay experienced by the traffic on one minor street approach (one direction only) controlled by a stop sign equals or exceeds 4 vehicle-hours for a one-lane approach and 5 vehicle-hours for a two-lane approach, *and* 2. The volume of the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, *and* 3. The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 800 vph for intersections with four (or more) approaches.
	– or –
☐ Yes ☑ No	Meets one High Hour (Warrant 3 — see Figure 2).



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

Figure 2. Peak hour volume warrant. (Warrant 3.)