



# 10th Ave. at Juan Sanchez Blvd.

Traffic Impact Analysis and  
Traffic Signal Needs Assessment

San Luis, Arizona

September 2015

CivTech Project No. 15-870

Prepared For:

**Core Engineering Group, PLLC**  
200 East 16th Street, Suite 150  
Yuma, Arizona 85364

For Submittal to:

**City of San Luis**

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# 10<sup>TH</sup> AVENUE AT JUAN SANCHEZ BOULEVARD TRAFFIC IMPACT ANALYSIS AND TRAFFIC SIGNAL NEEDS ASSESSMENT

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## EXECUTIVE SUMMARY

This report documents a traffic impact study and a traffic signal needs assessment performed for the intersection of 10<sup>th</sup> Avenue and Juan Sanchez. The intersection is the primary access to two Gadsden Elementary School District schools; Harvest Preparatory Academy, a publicly-funded, charter elementary school; and two residential subdivisions. This study was prompted in part by the ongoing consolidation and proposed expansion of Harvest Prep. In the absence of any TIA guidelines having been formally adopted by the City of San Luis, CivTech prepared this study in conformance with the City of Yuma's traffic impact study guidelines as outlined in Yuma Standard No. 2-100 and detailed in separate *Traffic Impact Study Guidelines* dated September 20, 2006. These guidelines recommend that text be kept to a minimum.

The following conclusions are documented in this study:

- ◆ The AM and PM peak hour intersection level of service analyses reveal that all study movements currently operate at overall LOS C or better during the peak hours under the existing traffic volumes and traffic controls with the exception of the northbound through/right southbound shared movements, which currently operates at LOS F during the AM peak hour with average control delays of 59.6 and 76.7 seconds, respectively. With simulated winter volumes, that is, with the Juan Sanchez Boulevard through movements recorded in May increased by a seasonal factor of 20%, the results are generally similar, with the corresponding delays increasing to 69.7 and 78.8 seconds. In terms of volume-to-capacity (V/C) ratio, the existing conditions show the southbound approach to be operating during the AM peak hour at just slightly over capacity with a V/C ratio of 1.098.
- ◆ Harvest Prep Academy intends to relocate the first existing driveway north of Juan Sanchez Boulevard to the Plaza Riedel on the west side of 10<sup>th</sup> Avenue to the south approximately 100 feet. The new location, approximately 300 feet (on center) north of Juan Sanchez Boulevard, exceeds the 150-foot minimum face-of-curb to edge-of-driveway spacing required for the first driveway along a collector roadway per City of Yuma Construction Standard Detail Drawing No. 3-250.
- ◆ The current consolidation and expansion of the Harvest Prep Academy is anticipated to generate an additional 292 trips daily with 98 trips (54 in/44 out) occurring during the AM peak hour, 38 trips (19 in/19 out) occurring during the PM peak hour, and 70 (31 in/39 out) during the school afternoon peak hour (school release time) net of a reduction to account for approximately ten percent of the students walking to school from nearby neighborhoods. At its planned maximum enrollment, Harvest Prep Academy is anticipated to generate an additional 852 trips daily with 284 trips (156 in/128 out) occurring during the AM peak hour, 111 trips (54 in/57 out) occurring during the PM peak hour, and 202 (89 in/113 out) during the school afternoon peak hour (school release time). Thus, with respect to current levels of trips, the total number of trips over current levels could eventually total 1,144 additional trips daily with 382 more (210 in/172 out) occurring during the AM peak hour, 149 more (73 in/76 out) occurring during the PM peak hour, and 272 (120 in/152 out) more during the school afternoon peak hour (school release time).

- ◆ The 2016 opening year level of service reveals that, without and with the proposed and potential school expansion, that the results are similar to the existing condition. With the ultimate expansion of the school, the outbound/southbound 10<sup>th</sup> Avenue movement approaching Juan Sanchez Boulevard could operate at LOS E during the PM peak hour. The biggest difference in average control delay is expected to occur on the northbound approach, the delay of which is expected to increase from 69.7 seconds as reported earlier to 78.2 sec in 2016 with the increase in the enrollment at Harvest Prep; thereafter, it would increase to 81.2 sec by 2026 if Harvest Prep increases its enrollment further. By 2026 the average control delays without or with the additional trips generated by more Harvest Prep students for both the northbound through/right (79.7 vs. 81.2 sec) and southbound shared (78.8 vs. 81.9 sec) movements are not very different. Thus, these increases can also be attributed, in part, to the increase in regional traffic volumes on Juan Sanchez Boulevard. The V/C ratio on the southbound approach increases to 1.235 with the additional trips generated by the additional enrollment at Harvest Prep.
- ◆ The 2016 opening year and 2026 horizon year level of service analyses of the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard revealed that, without and with the proposed and potential Harvest Prep expansions, a two-phase traffic signal operating with a 90-second cycle with the addition of a new southbound left turn lane would improve the overall operation of the intersection, with all of the movements operating at a good LOS B or better.
- ◆ To summarize the traffic signal needs assessment, the warrant-satisfying criteria have been met or exceeded for the peak hour warrant at the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard based on current traffic volumes and numbers of school children crossing here. Since the Gadsden school district has agreed to contribute half of the cost of the signal and Harvest Prep will be required to make a further contribution to the cost of the signal, there is an incentive to install a traffic signal during the current expansion of Harvest Prep rather than wait for some future expansion that may not occur.
- ◆ No exclusive right turn lanes are warranted on any approach to the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard. Three of the approaches to the intersection already provide exclusive left turn lanes. If a signal is to be installed, a southbound left turn should be provided.
- ◆ CivTech cites several reasons as justification for the City to require Harvest Prep to contribute up to one-quarter of the cost of the signal. They are detailed in the text.
- ◆ Potential queuing of up to 2,425 feet, sufficient to accommodate the current expansion to 670 students, is available; however, it is insufficient to accommodate the estimated 3,000 feet that would be required if enrollment were to be increased to 1,000 students.
- ◆ Photos from a field review and aerial photography reveal there is sidewalk along the west side of 10<sup>th</sup> Avenue for its entire length up to County 22<sup>nd</sup> Street; thus, most of the school children that may walk to school have facilities that separate them from motor vehicles. There are, however, no bicycle lanes on Juan Sanchez Boulevard or 10<sup>th</sup> Avenue to facilitate the use of bicycles. Nor does it appear, based on improvements already made at the intersection of 10<sup>th</sup> Avenue and County 22<sup>nd</sup> Street, that the ultimate cross-section of 10<sup>th</sup> Avenue will include bicycle lanes. Children bicycling to school will have to learn how to ride safely with traffic if they are to continue to do so.

- ◆ The 95<sup>th</sup> percentile queue for the southbound movement on 10<sup>th</sup> Avenue approaching Juan Sanchez Boulevard is expected to be nearly twelve vehicles with all-way stop control. With a traffic signal, which is recommended, the 50<sup>th</sup> percentile queue is less than three vehicles. Therefore, no movement restrictions at the first Plaza Reidel driveway on 10<sup>th</sup> Avenue north of Juan Sanchez Boulevard are warranted, either at its current location or, if it is eventually relocated, at its future location approximately 300 feet (on-center) north of Juan Sanchez Boulevard. Nor are restrictions warranted at the first Reidel Plaza driveway on Juan Sanchez Boulevard west of 10<sup>th</sup> Avenue, primarily because it is a driveway on the departure side of the intersection.

Based on the above conclusions, the following are recommended

- ◆ The north leg of the intersection should be widened to the east in order to provide a new 125-foot long southbound left turn lane approaching the intersection. The new pavement should extend back 125 feet from the stop bar with a minimal 80-foot long taper back to the existing edge of pavement.
- ◆ In the future, if/when Harvest Prep expands again, the school should be required by the City to provide a circulation plan showing at least 3,000 feet of queuing available before the City approves any plans for the expansion.
- ◆ A traffic signal at the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard.

CivTech understands that the schedule for implementation of these improvements will be coordinated between the parties funding them, these being the City of San Luis; the developers of the two subdivisions (Comite de Bienestar, the developer of the Beinestar Apartments at 690 North 10<sup>th</sup> Avenue, and Reidel Construction), each of which have agreed to pay one-fourth of the cost of the signal); and the Harvest Preparatory Academy.

## INTRODUCTION

The intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard in San Luis, Arizona serves as the primary access to three elementary schools. **Figure 1** is a vicinity map showing the intersection, its lane configurations and the three schools. This study was prompted by the ongoing consolidation and enrollment increase and potential future expansion of one of the schools, the Harvest Preparatory Academy, a publicly-funded charter elementary school.

### **PURPOSE OF REPORT AND STUDY OBJECTIVES**

CivTech Inc. was retained by Core Engineering Group of Yuma to prepare this Traffic Impact Analysis and Traffic Signal Needs Assessment (TIA).

The purpose of this TIA is to analyze the impacts of the proposed expansion of Harvest Prep on the existing surrounding street system. In the absence of any TIA guidelines having been formally adopted by the City of San Luis, CivTech prepared this study in conformance with the City of Yuma's traffic impact study guidelines as outlined in Yuma Standard No. 2-100 and detailed in separate *Traffic Impact Study Guidelines* dated September 20, 2006. These guidelines recommend that text be kept to a minimum. The specific objectives of the study are:

- ◆ To determine the effect of the currently-planned expansion of Harvest Prep on 10<sup>th</sup> Avenue and on Juan Sanchez Boulevard;
- ◆ To identify any low-cost street improvements or other measures that may, where needed, mitigate the additional site-generated traffic;
- ◆ To evaluate the site access driveways and study intersection; and,
- ◆ Assess the need for a traffic control signal at the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard.

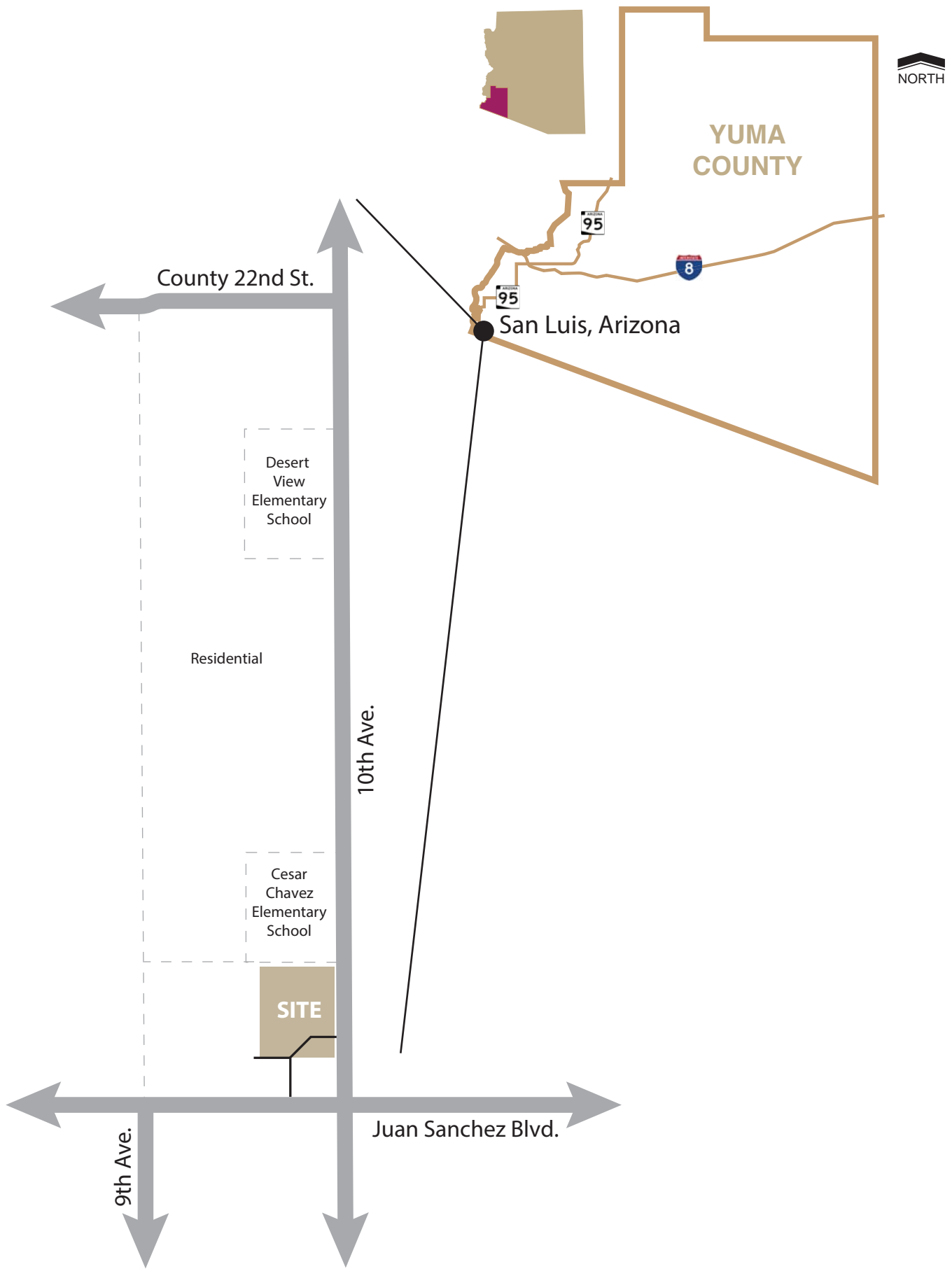
An unsealed draft of this document was reviewed by City staff. CivTech received comments (see **Appendix A**) and revised this final version accordingly. Formal responses to the City comments were not prepared.

### **Study Area**

Yuma's guidelines specify that the study area should include any roadway segments and intersections that are expected to experience 100 or more additional peak hour trips as a result of the proposed development. With the expansion of Harvest Prep to its ultimate enrollment as currently envisioned (not a certainty), there could be more than 100 additional trips on 10<sup>th</sup> Avenue and on Juan Sanchez Boulevard; thus, the scope of the study will include both of these roadways and their intersection.

### **Analysis Years**

This study will consider two analysis scenarios: for the currently proposed consolidation and expansion of Harvest Prep and for its potential ultimate enrollment. For the first expansion, this will be assumed for the 2016-2017 school year. For the second expansion, which is currently not planned, a horizon year of 2026 will be assumed.



**Figure 1: Vicinity Map**

**10th Ave. at Juan Sanchez Blvd.**

## EXISTING CONDITIONS

The study area consists of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard and their intersection. There are three elementary schools along 10<sup>th</sup> Avenue. Two are public elementary schools of the Gadsden Elementary School District: Desert View Elementary at 1508 North 10<sup>th</sup> Avenue and Cesar Chavez Elementary at 1130 North 10<sup>th</sup> Avenue. The Harvest Prep Academy, a publicly-funded charter elementary school, is located at 1044 North 10<sup>th</sup> Avenue, on an approximately 7.4-acre parcel that is essentially within the broad limits of the Plaza Riedel, a grocery-anchored retail plaza. There is residential development surrounding them and the retail plaza, including the Bienestar Apartments at 690 North 10<sup>th</sup> Avenue and single family homes developed by Reidel Construction. (CivTech understands that the Comite de Bienestar, a not-for-profit agency that assists immigrants and constructed the apartments, and Reidel each previously agreed to fund one-quarter of the cost of a signal at 10<sup>th</sup> Avenue and Juan Sanchez Boulevard.) There is no development on the east side of 10<sup>th</sup> Avenue across from the schools; this property belongs to the Federal government and it is not expected to develop for many (twenty or more) years.

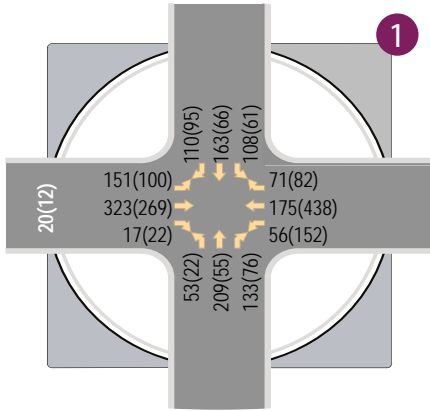
### **ROADWAY NETWORK AND INTERSECTION CONFIGURATION**

**10<sup>th</sup> Avenue** is a north-south collector roadway that begins less than one mile south of Juan Sanchez Boulevard and extends nearly two miles north into the Los Alamos residential subdivision. South of Juan Sanchez Boulevard, it is striped to provide one lane in each direction with a continuous two-way left turn lane to Urtuzuastegui (or “U”) Street and then narrows to two lanes. North of Juan Sanchez Boulevard, 10<sup>th</sup> Avenue has 32 feet of pavement and is striped to provide two lanes, widening as it approaches County 22<sup>nd</sup> Street. With North of County 22<sup>nd</sup> Street, 10<sup>th</sup> Avenue the pavement is narrowed and two lanes are provided into the Los Alamos neighborhood. The posted speed limit of 10<sup>th</sup> Avenue is 25 mph.

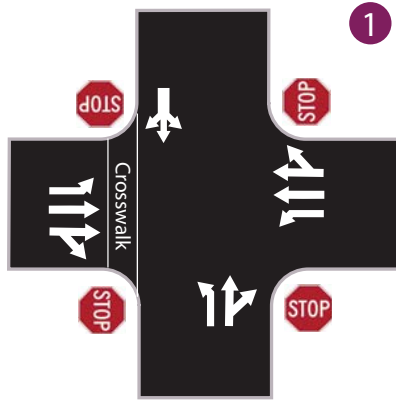
**Juan Sanchez** is an east-west roadway within the City of San Luis that was abandoned by the Arizona Department of Transportation (ADOT) to the City. The section of Juan Sanchez Boulevard within the City limits was at one time designated State Route 195 (SR 195), which was constructed as a bypass or an alternative for US 95 from the US-Mexico border to Yuma. SR 195 begins approximately three miles east of 10<sup>th</sup> Avenue on Juan Sanchez Boulevard. West of 10<sup>th</sup> Avenue, Juan Sanchez Boulevard has a posted speed limit of 35 mph and consists of two through lanes in each direction separated by a continuous two-way left-turn lane.

The intersection of **10<sup>th</sup> Avenue and Juan Sanchez Boulevard** is a 4-legged, all-way stop-controlled (AWSC) intersection. The east- and westbound Juan Sanchez Boulevard approaches are configured with an exclusive left turn lane, a through lane, and a shared through/right turn lane. The southbound 10<sup>th</sup> Avenue approach is a single shared lane. The northbound 10<sup>th</sup> Avenue approach is configured to provide an exclusive left turn lane, a through lane, and an exclusive right turn lane.

The existing lane configurations and traffic controls are illustrated in **Figure 2**. Photographs of existing conditions can be found **Appendix B**.



10th Ave & Juan Sanchez Blvd



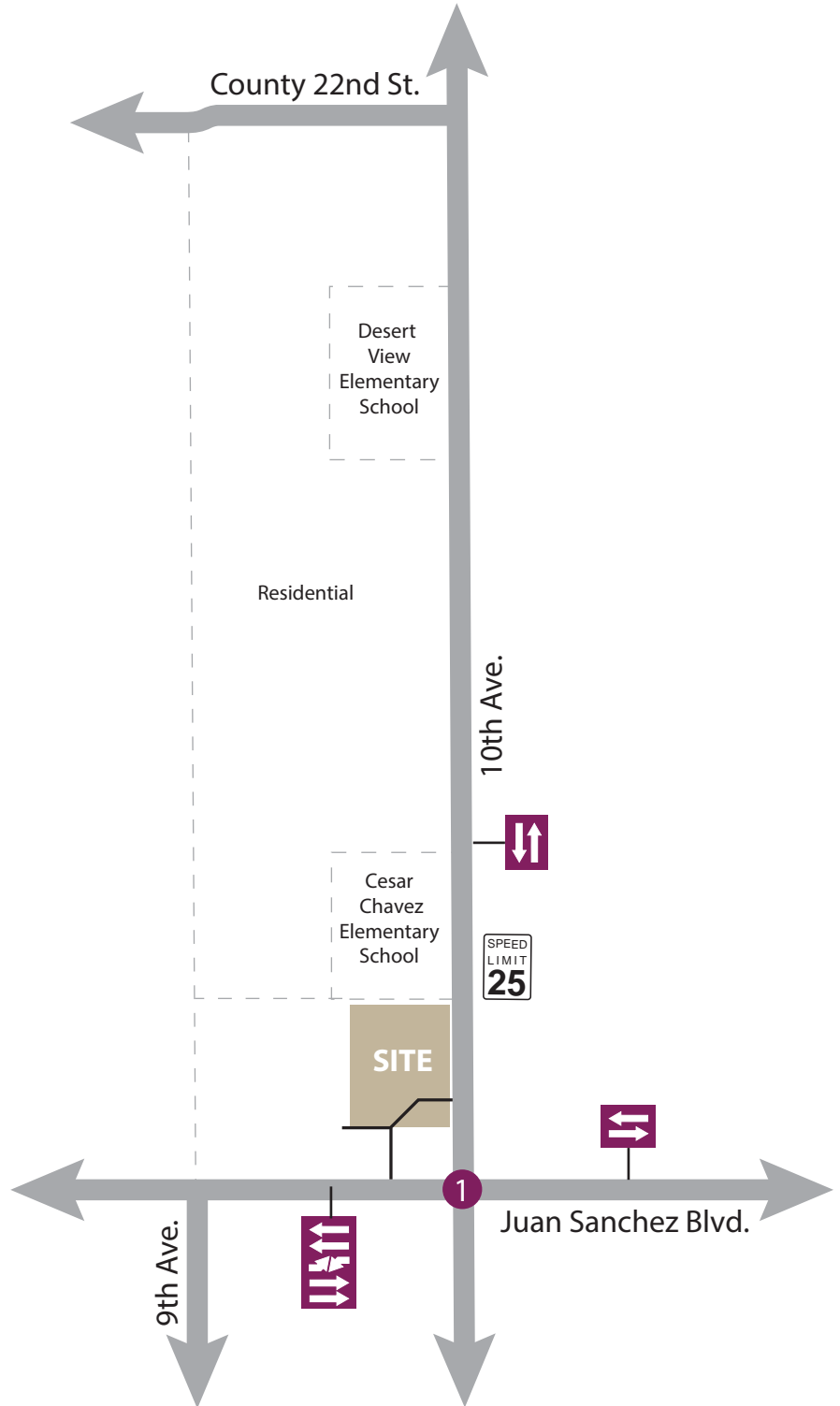
**LEGEND**

- Thru or Turning Movement
- Two-Way Left Turn-Lane
- Traffic Signal
- Stop Sign
- Speed Limit



XX(XX) - AM(PM) Peak Hour Traffic Volumes

XX(XX) - AM(PM) Peak Hour Pedestrian Counts



**Figure 2: Existing Conditions**

## TRAFFIC VOLUMES

Core Engineering Group performed AM and school PM peak hour turning movement counts at the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard. The counts were performed on a day when the schools were in session, Monday, May 11, 2015, from 6:30 AM to 8:30 AM and 2:30 PM to 4:30 PM. **Figure 2** also depicts the recorded AM and school PM peak hour turning movement volumes. The sheets on which the volumes were reported are provided in **Appendix B**.

Please note that, since the area attracts a substantial number of visitors and seasonal agricultural workers during the winter months and these counts were conducted during the late spring while school, as noted, was still in session. By May, winter visitors have typically returned to their permanent homes and agricultural production may yet be in full operation or nearly so; thus, in the analysis it may be prudent to consider the application of some level of adjustment to the recorded volumes. This is considered below.

Seasonal Adjustment Factor. CivTech reviewed historical traffic volume data available from the Yuma Metropolitan Planning Organization (YMPO) to estimate an appropriate adjustment factor to be applied to the existing traffic counts in order to have the capacity analysis better approximate conditions in the busier winter months. YMPO records traffic counts twice each year: in February and the following July. CivTech also reviewed recent historical vehicular traffic volumes on 10<sup>th</sup> Avenue south of Juan Sanchez Boulevard (not immediately adjacent to the schools) and on Juan Sanchez Boulevard east of US 95, which could be almost two miles to the west of 10<sup>th</sup> Avenue. A summary of the data compiled is found at the end of **Appendix B**.

YMPO includes the San Luis area in its "South Valley Subarea". The data shows that the traffic volumes recorded in the South Valley Subarea increased about six and one-half percent per year from 2011 to 2012 and from 2013 to 2014 with only a minor increase (about one-half percent) from 2012 to 2013. However, on Juan Sanchez Boulevard there was actually a drop of more than eight percent from 2012 to 2013 before a rebound of about one-third from 2013 to 2014. On 10<sup>th</sup> Avenue south of Juan Sanchez Boulevard, the 2013 winter count was only one-third of the 2012 winter count and much less than the summer count that year. It can only be speculated that the count was inaccurate for some reason or something occurred to detour drivers from 10<sup>th</sup> Avenue the day of the count. For this reason only the summer-to-winter variation on Juan Sanchez Boulevard will be applied to the recorded counts.

The summer-to-winter variations for the subarea averaged 29.31% in 2012, 19.24% in 2013, and 30.02% in 2014. For Juan Sanchez Boulevard, the average changes were 22.84% in 2012, 34.15 % in 2013, and 29.49% in 2014. The overall average variation at the intersection for the three years was 28.65%. As noted, this overall variation was calculated using February and July data and the counts were recorded in May, when most winter visitors have left, some agricultural workers may remain, and many local residents have not left for vacations (since schools are still in session). Therefore, a reduced factor of 20% to account for the seasonal variation between the busy winter season and the late spring counts will be applied to the recorded traffic volumes.

## CAPACITY ANALYSIS

The concept of level-of-service (LOS) uses qualitative measures that characterize operational conditions within roadway facilities. The individual levels of service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level-of-service represents a range of operating conditions. Levels of service for intersections are defined in terms of average delay ranges for vehicles. **Table 1** lists the level-of-service criteria for signalized and unsignalized intersections. *Please note that the actual average delays that determine the levels of service are very different for signalized and unsignalized intersections. A driver waiting an average of 55 seconds to enter an unsignalized intersection from a stop sign is considered to be encountering a LOS F, whereas the same average wait at a traffic signal is LOS D. This is noted here because, even if this existing all-way stop-controlled (AWSC) intersection operates at LOS D or LOS E, the average driver may still experience less of a delay than if a [costly] signal were provided.*

**Table 1: Level-of-Service Criteria**

Level of Service	Control Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

Source: Exhibit 18-4 and Exhibit 19-1, Highway Capacity Manual 2010

AM and PM peak hour capacity analyses were conducted for the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard using the methodologies presented in the Highway Capacity Manual 2010 using Synchro traffic analysis software. The resulting LOS for the existing conditions is summarized in **Table 2**. Where the LOS is poor or failing (LOS E or F), the average control delay (in seconds) for the movement is shown. The table also includes the volume-to-capacity (V/C) ratio for the lane or approach with the highest V/C ratio. (A V/C ratio greater than 1.0 indicates the traffic volumes are more than a lane or approach can theoretically accommodate.) The worksheets for the analysis of existing (2015) conditions are included in **Appendix C**.

**Table 2: Existing Peak Hour Levels-of-Service**

ID	Intersection	Traffic Control	Movement	Existing LOS/Delay May, No Adjustment		Existing LOS/Delay 20% Adjustment Applied	
				AM	PM	AM	PM
1	10 <sup>th</sup> Avenue & Juan Sanchez Boulevard	All-way stop	NB left	B	B	B	B
			NB thru/right	F/59.6	C	F/69.7	C
			SB shared	F/76.7	C	F/78.8	C
			EB left	C	B	C	C
			EB thru	C	C	D	C
			EB thru/right	C	B	C	B
			WB left	C	C	C	C
			WB thru	C	C	C	D
			WB thru/right	C	C	C	C
			<b>Overall Hi Lane V/C</b>	<b>E</b> 1.053	<b>C</b> 0.549	<b>E</b> 1.098	<b>C</b> 0.665

The AM and PM peak hour intersection level of service analyses summarized in **Table 2** reveal that all study movements currently operate at overall LOS C or better during the peak hours under the existing traffic volumes and traffic controls with the exception of the northbound through/right southbound shared movements, which currently operates at LOS F during the AM peak hour with average control delays of 59.6 and 76.7 seconds, respectively. With simulated winter volumes, that is, with the Juan Sanchez Boulevard through movements recorded in May increased by a seasonal factor of 20%, the results are generally similar, with the corresponding delays increasing to 69.7 and 78.8 seconds.

## PROPOSED DEVELOPMENT

This study was prompted in part by a consolidation and expansion of the Harvest Prep Academy current headquartered at 1044 North 10<sup>th</sup> Avenue and occupying several storefronts in the Plaza Riedel. The school has an enrollment of 530 students and provides 10 grades, Pre-K (4-year olds), Kindergarten and grades 1 through 8. Harvest Prep operates a high school in Yuma and buses students there from San Luis. A Harvest Prep high school will likely be opened in San Luis; however, it is expected at a site well away from the elementary school site and is not considered to be part of this proposed expansion.

CivTech contacted Mr. Dave Garrison of MJY & Company, a developer of charter schools. Mr. Garrison explained that the school has been occupying store fronts as noted. The company purchased a parcel of nearly 7½ acres (Yuma County Assessor parcel number 776-28-215) and is currently in the process of constructing a facility that will provide 18 classrooms, three more than their current capacity, with a total enrollment of approximately 650 students by the 2016-17 school year, a net increase of an estimated 120 students. This is the first and only certain expansion that will occur. The ultimate expansion, could be to 30 classrooms or up to three classrooms for each grade, with a total enrollment approaching 1,000 students. The date of the ultimate expansion is unknown, since it would occur only in response to market conditions; a horizon year of 2026 is assumed for this ultimate expansion.

No site plan was provided for the current consolidation/expansion. It is expected that the ultimate expansion would be completed on the same site. No new accesses to the parcel would be necessary; however, CivTech understands that the first existing driveway north of Juan Sanchez Boulevard to the Plaza Riedel on the west side of 10<sup>th</sup> Avenue could be relocated to the south approximately 100 feet, although aerial photography from March 2015 shows the new school building, but no change in the location of the driveway or any indication that it was to be relocated. The proposed new location, approximately 300 feet (on center) north of Juan Sanchez Boulevard, exceeds the 150-foot minimum face-of-curb to edge-of-driveway spacing required for the first driveway along a collector roadway per City of Yuma Construction Standard Detail Drawing No. 3-250.

CivTech was told that the school, since it is located within a retail plaza, has sufficient parking and circulation for student drop-off in the morning and for pick-up in the afternoon. In addition, parents carpool and more than ten percent of the students walk to school from adjacent neighborhoods. However, since the City raised the issues of site circulation and on-site queuing in a comment on the draft of this study, these will be subsequently addressed.

Subsequent to this, CivTech learned that Harvest Prep was issued a permit by the City for their current headquarters and that, after that permit was issued, the retail space was rented to provide classrooms above and beyond what was approved in the permit. When CivTech suggested that the impacts of the trips generated by the retail space-cum-classrooms would have been considered in a traffic study done for the retail plaza, CivTech learned that there was no such study and that the City has no development or impact fees. Thus, in effect, all of the trips generated by Harvest Prep can be considered new trips for purposes of assessing their impacts. In terms of trip generation (see next section), however, the only “new” trips are those due to the charter school’s current

consolidation and expansion efforts, since the trips for 530 of the students are already on the adjacent roadways and accounted for in the turning movements recorded in May.

### **SITE TRIP GENERATION**

The Institute of Transportation Engineers (ITE) periodically publishes its *Trip Generation Manual*, which contains trip generation and other related data for a variety of different land uses. Currently in its 9<sup>th</sup> edition, the data includes average rates and equations to which the size or capacity of a land use can be applied to yield an estimate of the trips generated by that land use for a typical day or for peak hours during the day.

The *Trip Generation Manual* provides information for daily and peak hour trips for public and private school, not for charter schools, which, while publicly-funded, are considered to be more akin to that of a private school because many or most charter schools do not provide busing for their students. CivTech compiled data for several charter schools in the Phoenix metropolitan area and developed average trip generation rates for the AM peak hour and for the schools' PM peak hour.

The average trip generation rates for a Private School (K-8) (Land Use Code 534) as published in the *Trip Generation Manual* are 0.90 and 0.60 trips per student for the AM and school PM peak hours, respectively. CivTech will use its own value of 0.65 for the school PM peak hour rate, which is eight percent higher than the published rates. CivTech increased the daily per-student trip generation rates by almost 10% from 2.48 to 2.70 and more than doubled the PM peak hour (of adjacent street traffic) rate from 0.17 to 0.35. Since, as noted, more than ten percent of the students currently live in the residential areas immediately surrounding the school and the trip generation reflect a ten percent reduction in vehicle trips to account for students walking to the school from those nearby neighborhoods.

Since the turning movement counts recorded in May include trips generated by Harvest Prep and the other schools on 10<sup>th</sup> Avenue, **Table 3** presents detailed trip generation calculations for the potential net increases of 120 students for the current expansion project and for an increase of another 330 students (up to a total enrollment of 1,000 students) if there is an ultimate increase that provides three classrooms per grade.

**Table 3 – Proposed Trip Generation**

Land Use	ITE LUC	ITE Land Use Name	Quantity	Units	AM Distribution		PM Distribution		Midday Distribution					
					In	Out	In	Out	In	Out				
Current Expansion	n/a	Charter School (K-8)	120	Students	55%	45%	49%	51%	44%	56%				
Future Expansion	n/a	Charter School (K-8)	330	Students	55%	45%	49%	51%	44%	56%				
Totals to Ultimate			470	Students										
Land Use	ADT		AM Peak Hour			PM Peak Hour of Street			PM Peak Hour of Generator					
	Average Rate	Total	Average Rate	In	Out	Total	Average Rate	In	Out	Total	Average Rate	In	Out	Total
Current Expansion	2.70	292	0.90	54	44	98	0.35	19	19	38	0.64	31	39	70
Future Expansion	2.70	852	0.90	156	128	284	0.35	54	57	111	0.64	89	113	202
Totals to Ultimate		1,144		210	172	382		73	76	149		120	152	272

A review of the results of the trip generation that will be used in this analysis presented in **Table 3** reveals that the current consolidation and expansion of the Harvest Prep Academy

is anticipated to generate an additional 292 trips daily with 98 trips (54 in/44 out) occurring during the AM peak hour, 38 trips (19 in/19 out) occurring during the PM peak hour, and 70 (31 in/39 out) during the school afternoon peak hour (school release time).

Should the school expand further in the future, at its planned maximum enrollment, Harvest Prep Academy is anticipated to generate an additional 852 trips daily with 284 trips (156 in/128 out) occurring during the AM peak hour, 111 trips (54 in/57 out) occurring during the PM peak hour, and 202 (89 in/113 out) during the school afternoon peak hour (school release time).

With respect to current levels of trips, the total number of trips over current levels could eventually total 1,144 additional trips daily with 382 more (210 in/172 out) occurring during the AM peak hour, 149 more (73 in/76 out) occurring during the PM peak hour, and 272 more (120 in/152 out) during the school afternoon peak hour (school release time).

### **SITE TRIP DISTRIBUTION**

A single trip distribution pattern was assumed for this study relative to the school use. Since detailed socioeconomic data is not generally available for the San Luis area, the relative density of development visible in aerial photography of the area was used as a basis to estimate trip distribution. The directional distribution was adjusted to the roadway network based on the major travel routes within the study area. The resulting trip distribution is shown in **Table 4** and depicted in **Figure 3**.

**Table 4 – Trip Distribution by Direction**

To/From	Distribution
North via 10 <sup>th</sup> Ave.	10%
South via 10 <sup>th</sup> Ave.	30%
West via Juan Sanchez	60%
<b>TOTAL</b>	<b>100%</b>

### **BACKGROUND TRAFFIC**

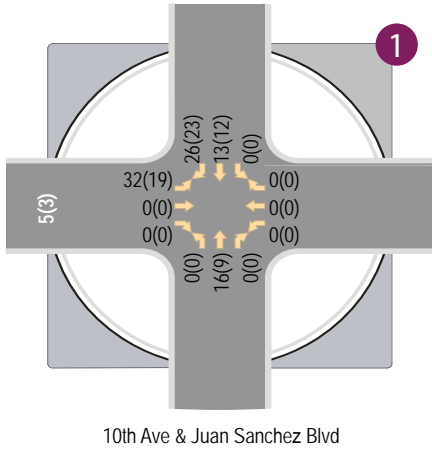
In addition to the seasonal adjustment factor, the application of an annual growth factor to account for regional growth was considered. A review of projected 2030 traffic volumes on SR 195 available from ADOT, revealed an annual growth rate of under two percent per year through 2030 on SR 195 east of San Luis. CivTech, therefore, assumed a modest growth rate of 2 percent from 2015 to the opening year 2016. In addition to the seasonal adjustment factor, a growth factor of 1.020 was thus applied to the turning movements recorded at the study intersections to estimate the turning movements for the opening year (2016). For the 2026 horizon year, a growth factor of 1.24 (=1.02<sup>11</sup>) was applied. The background traffic volumes for the 2016 opening year and 2026 assumed horizon year are depicted in **Figure 4**.

### **FUTURE TOTAL TRAFFIC**

Anticipated total traffic volumes for the 2016 and 2026 analysis years were computed by adding the site generated traffic to the background traffic expected in 2016 and 2026. Total traffic volumes for 2016 and 2026 are also shown in **Figure 4**.

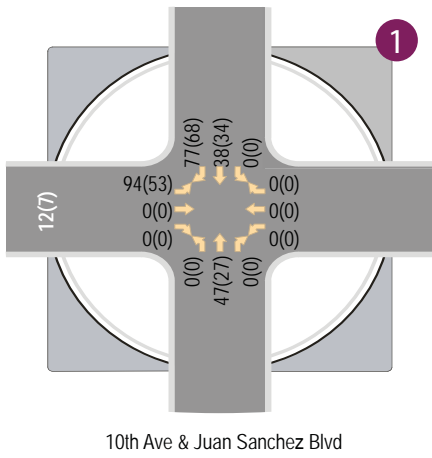
2016

Proposed Expansion



2026

Potential Build-Out

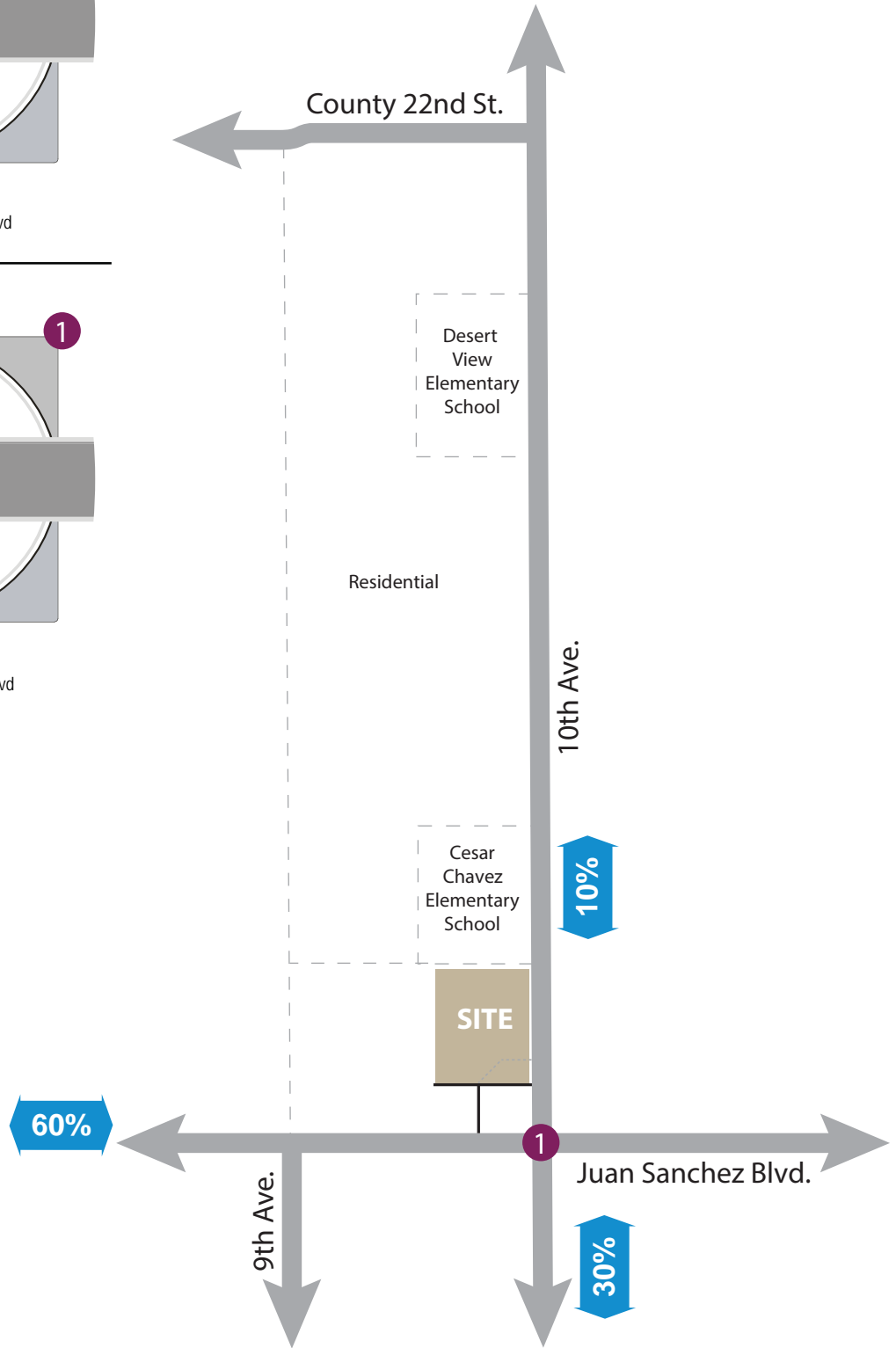


**LEGEND**

XX(XX) - AM(PM) Peak Hour Traffic Volumes

XX(XX) - AM(PM) Peak Hour Pedestrian Counts

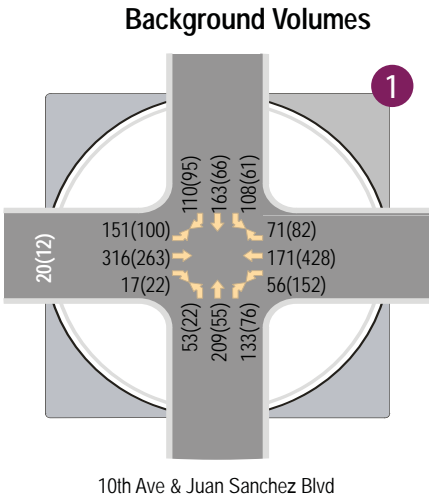
XX% - Percentage Trip Distribution



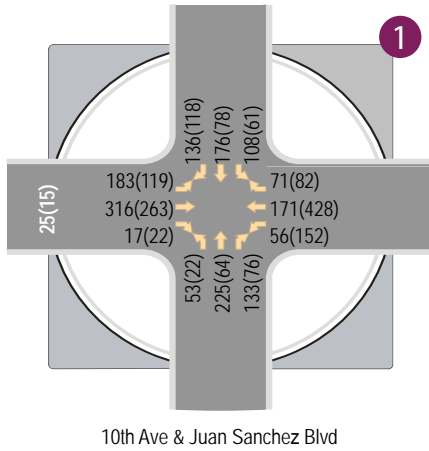
**Figure 3: Site Volumes/Trip Distribution**

2016

Proposed Expansion

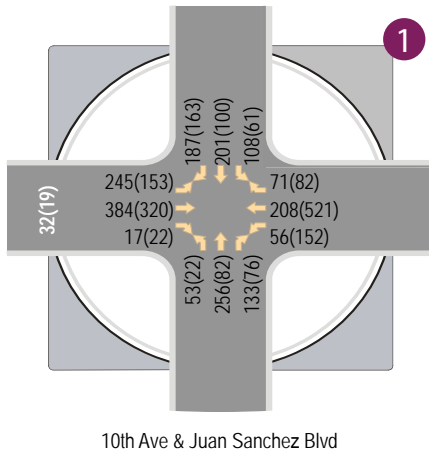
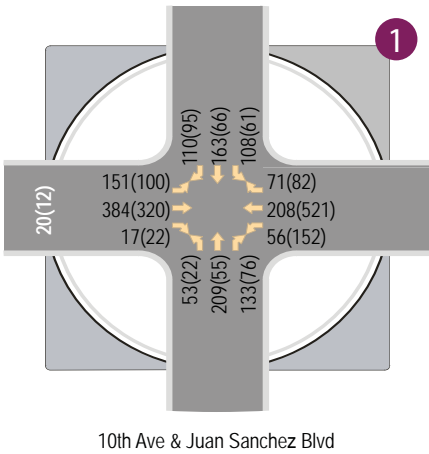


Total Volumes



2026

Potential Build-Out

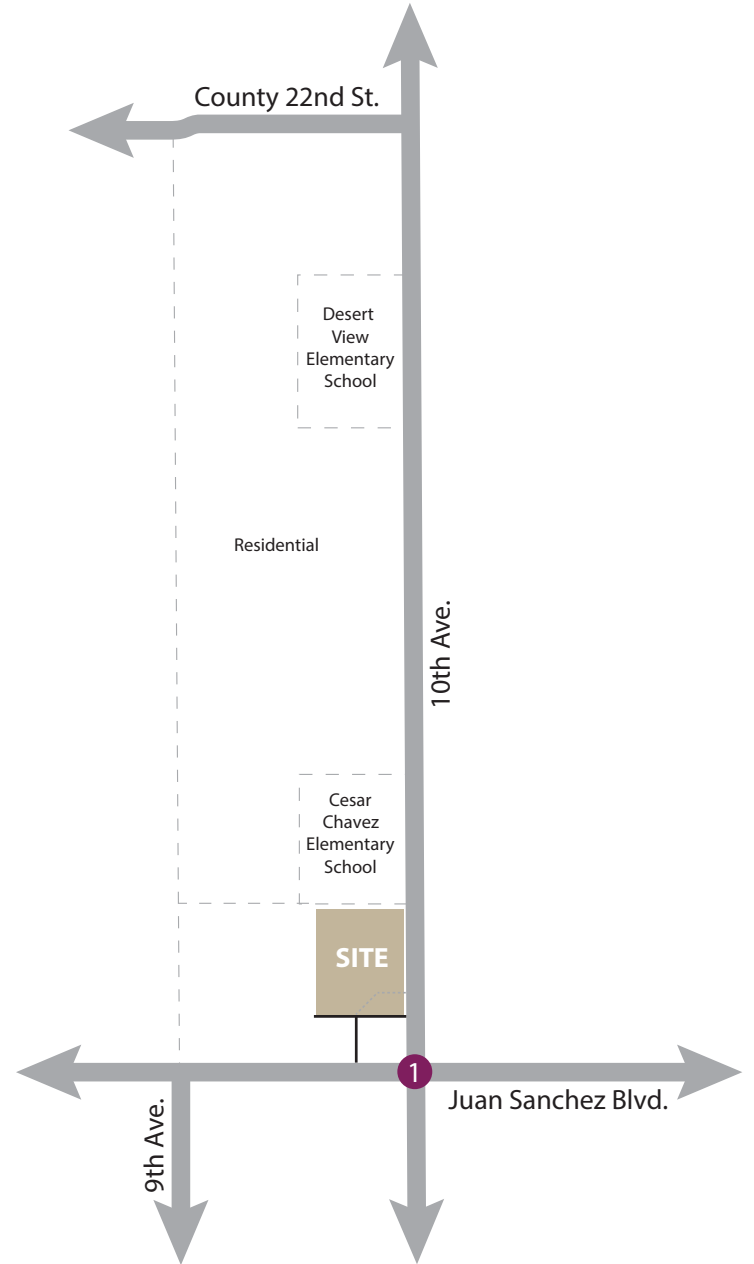


**LEGEND**

XX(XX) - AM(PM) Peak Hour Traffic Volumes  
XX(XX) - AM(PM) Peak Hour Pedestrian Counts



NORTH



**Figure 4: Background and Total Volumes**

## LEVEL OF SERVICE ANALYSIS

Two peak hour analyses were completed for the study horizon year for each of two scenarios: one without the proposed development and one with the development. The overall intersection, approach and/or movement levels of service and V/C ratios yielded by the analysis are summarized in **Table 5**. Synchro worksheets for the 2016 and 2026 analyses are included in **Appendix D** and in **Appendix E** for 2026. To account for the seasonal adjustment of 20% plus the annual growth rate of 2% and not have it applied to the additional expected site trips (which do not change), total “growth adjustment” factors of 1.22 and 1.44, respectively, were applied *before* site trips were added into the analyses for 2016 and 2026.

**Table 5: Peak Hour Levels of Service as All-Way Stop**

ID	Intersection	Traffic Control	Movement	2016 AM(PM) LOS/Delay		2026 AM(PM) LOS/Delay	
				Background	Total	Background	Total
1	10 <sup>th</sup> Avenue & Juan Sanchez Boulevard	All-Way Stop	NB left	B(B)	C(B)	C(B)	C(C)
			NB thru/right	F/70.8(C)	F/78.2(C)	F/79.7(C)	F/81.2(D)
			SB shared	F/79.0(C)	F/79.2(D)	F/80.8(D)	F/81.9(F/77.8)
			EB left	C(C)	D(C)	C(C)	E(C)
			EB thru	D(C)	D(C)	E(C)	E(D)
			EB thru/right	C(B)	C(C)	C(B)	C(C)
			WB left	C(C)	C(C)	C(C)	C(C)
			WB thru	C(D)	C(D)	C(D)	C(F)
			WB thru/right	C(C)	C(C)	C(C)	C(D)
					<b>Overall Hi Lane V/C</b>	<b>E(C)</b> 1.110(0.588)	<b>E(C)</b> 1.235(0.719)

A review of the results of the 2016 opening year level of service analyses summarized in **Table 5** reveals that, without and with the proposed and potential Harvest Prep expansions, that the results are similar to the existing condition. That is, all study movements should operate at LOS C or better with the exception of the northbound through/right turn movement and the southbound shared movement in the existing configuration. In addition, with ultimate expansion of Harvest Prep, the outbound/southbound 10<sup>th</sup> Avenue movement approaching Juan Sanchez Boulevard could operate at LOS E during the PM peak hour.

The biggest difference in average control delay is expected to occur on the northbound approach, the delay of which is expected to increase from 69.7 seconds as reported earlier to 78.2 sec in 2016 with the increase in the enrollment at Harvest Prep; thereafter, it would increase to 81.2 sec by 2026 if Harvest Prep increases its enrollment further. By 2026 the average control delays without or with the additional trips generated by more Harvest Prep students for both the northbound through/right (79.7 vs. 81.2 sec) and southbound shared (78.8 vs. 81.9 sec) movements are not very different. Thus, these increases can also be attributed, in part, to the increase in regional traffic volumes on Juan Sanchez Boulevard.

In terms of V/C ratios, as shown in **Table 2**, the existing conditions already show the southbound approach to be operating during the AM peak hour at just slightly over capacity with a V/C ratio of 1.098. This increases to 1.235 with the additional trips

generated by the additional enrollment at Harvest Prep. (Please note that the theoretical or calculated capacity of an approach is not simply based on how many vehicles a lane can accommodate; at an intersection, the capacity of an approach is affected by the amount of cross-traffic. Cross-traffic on the intersecting street takes away from the time available to enter from the approach or cross it, decreasing the theoretical capacity of the approach and thereby increasing the V/C ratio in such a way that it may appear to be disproportionate to the increase in approach traffic volumes.) The AM V/C ratios and volumes are more critical in this situation because after dropping off their children, the parents join the parents from the other schools and commuters in using 10<sup>th</sup> Avenue. During the school PM peak hour, the outbound trips do not include the same level of commuter traffic.

In the event that a signal were to be warranted and installed, CivTech conducted an additional analysis of the intersection for the same scenarios assuming a two-phase signal (that is, no exclusive left turn phasing) operating with a cycle length of 90 seconds and the addition of an exclusive southbound left turn lane as suggested below. The results of these analyses are summarized in **Table 6**. The Synchro worksheets are included in their respective appendices.

**Table 6: Peak Hour Levels of Service with Traffic Signal**

ID	Intersection	Traffic Control	Movement	2016 AM(PM) LOS/Delay		2026 AM(PM) LOS/Delay	
				Background	Total	Background	Total
1	10 <sup>th</sup> Avenue & Juan Sanchez Boulevard	All-Way Stop	NB left	A(B)	B(B)	B(B)	B(B)
			NB thru/right	A(A)	A(A)	A(B)	B(B)
			SB left	B(B)	B(B)	B(B)	B(B)
			SB thru/right	A(A)	A(B)	A(B)	B(B)
			EB left	B(A)	B(A)	B(A)	B(B)
			EB thru	A(A)	B(A)	A(A)	B(A)
			EB thru/right	A(A)	B(A)	A(A)	B(A)
			WB left	B(A)	B(A)	B(A)	B(A)
			WB thru	A(A)	A(A)	A(A)	B(A)
			WB thru/right	A(A)	A(A)	A(A)	B(A)
			<b>Overall LOS</b>	<b>A(A)</b>	<b>A(A)</b>	<b>A(A)</b>	<b>B(A)</b>
			<b>Average Delay</b>	9.3(6.8)	10.0(7.3)	9.7(7.0)	12.6(8.9)

A review of the results of the 2016 opening year and 2026 horizon year level of service analyses of the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard summarized in **Table 6** reveals that, without and with the proposed and potential Harvest Prep expansions, a two-phase traffic signal operating with a 90-second cycle with the addition of a new southbound left turn lane would improve the overall operation of the intersection, with all of the movements operating at a good LOS B or better.

## MITIGATION AND IMPROVEMENT ANALYSIS

### TRAFFIC SIGNAL NEEDS ASSESSMENT

As noted, Yuma guidelines suggest text be minimized and the use of tables and figures to convey information be maximized. With respect to traffic signals needs, it is suggested that the study author assumes the reader/reviewer is familiar with the requirements of the *Manual on Uniform Traffic Control Devices* (MUTCD) and simply repeat verbatim the descriptions of the warrants, etc., which is often found in a full traffic control signal warrant study. This being the case, this section will consider three of the nine warrants found in the MUTCD, Warrant 3, based on peak hour volumes; Warrant 4, based on pedestrian volumes; and Warrant 5, which is considered when there is a school crossing.

Warrant 3, Peak Hour. With three schools on 10<sup>th</sup> Avenue north of Juan Sanchez Boulevard, it is likely that there is a surge of southbound traffic during either the AM or school PM peak hour as parents leave the schools after having dropped off or picked up their children. Typically applied in special circumstances (such as an office or factory where outbound trips peak during a very short period of time at the end of a shift or work day), if the number of vehicles on a minor street approach exceeds a certain number determined in part on the volume on the major street, a signal is warranted. Based on the unadjusted volumes recorded in May, that is, without the seasonal factor applied to the through volumes on Juan Sanchez Boulevard, this intersection already warrants a traffic signal for at least one hour per day; therefore, unless there is a decrease in traffic volumes—an unlikely scenario—a signal will be warranted with future traffic volumes. Thus, since the warrant-satisfying criteria have been met or exceeded, and, as CivTech was told, the Gadsden school district has agreed to contribute half of the cost of the signal, there is an incentive to install a traffic signal sooner rather than later, especially since school children cross here (see additional warrant discussions below).

Warrant 4, Pedestrian Volume. Depending on the volume on Juan Sanchez Boulevard, a signal may be warranted for reasons of as few as 93 pedestrians crossing during a peak hour. The pedestrian counts recorded in May 2015 show a maximum of 20 pedestrian per hour crossing Juan Sanchez Boulevard, which, presumably, are not just students of Harvest Prep and their parents. Even if 18 additional parents and students cross (attributed to and reflective of a near-doubling of the Harvest Prep enrollment from 530 to a potential ultimate enrollment of 1,000) each morning peak hour, the new total is still well short of satisfying the pedestrian peak hour warrant; nor is the four-hour warrant, which requires only four hours with 75 crossings per hour, met.

Warrant 5, School Crossing. This warrant is met when there are a minimum of 20 schoolchildren crossing during the peak hour and the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period. CivTech did not conduct a study of the frequency and adequacy of gaps in the traffic stream along Juan Sanchez Boulevard. Such a study was not considered necessary because the intersection is all-way stop-controlled, creating gaps in the traffic and allowing schoolchildren and others to cross. The traffic counts recorded for CivTech did not distinguish between schoolchildren and other pedestrians; however, with a current maximum pedestrian crossing volume of 20 pedestrians per hour and three nearby schools, it could be assumed that the minimum peak hour volume of 20 crossing schoolchildren will be met.

Analysis. To summarize the above assessments, the warrant-satisfying criteria have been met or exceeded for the peak hour warrant at the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard based on current traffic volumes and numbers of school children crossing here. Since the two developers (Comite de Bienestar and Reidel Construction) have agreed to contribute half of the cost of the signal (one-quarter each) and Harvest Prep will be required to make a further contribution to the cost of the signal, there is an incentive to install a traffic signal during the current expansion of Harvest Prep rather than wait for some future expansion that may not occur.

CivTech cites the following reasons as justification for the City to require Harvest Prep to contribute one-quarter of the cost of the signal (or to at least start its negotiations with Harvest Prep at that level):

- Three of the corners of the intersection remain undeveloped, the two to the east indefinitely due to their being Federally-owned. It is not known if and when the southwest corner, which is in unincorporated Yuma County, may develop and whether the City can enforce any requirements or fees on the owner/developer in the future.
- Neither Plaza Riedel nor Harvest Prep was previously subjected to impact fees.
- The two developers are contributing one-half of the cost of the signal. Essentially, each is contributing one-quarter of the cost of the signal for residents of its development.
- Harvest Prep, as the primary occupant of the retail plaza, represents, in effect, the entire retail plaza, which, as the occupier of one corner of the intersection, would have been asked to contribute one-quarter of the cost of the signal.

### **AUXILIARY LANES**

CivTech was asked to determine if additional lanes were warranted at the intersection. Three of the approaches to the intersection already provide exclusive left turn lanes. Maximum right turning volumes of under 190 right turns per hour (an average of just over 3 right turns per minute) do not warrant exclusive right turn lanes on any of the approaches.

With respect to providing a left turn lane on the southbound approach, that is, the north leg of the intersection, it was noted that the developer of Plaza Riedel provided “half-street” improvements (curb, gutter, and sidewalk) along the plaza’s frontages. CivTech estimates the north leg of 10<sup>th</sup> Avenue to be 36 feet wide west of the Section line within 50 feet of right of way per Yuma County Assessor mapping. To the east of the Section line, the same mapping indicates that there is 33 feet of right of way.

South of Juan Sanchez Boulevard, 10<sup>th</sup> Avenue has approximately 48 feet of pavement, providing, as noted previously, a northbound left turn lane as well as a paved shoulder on the east side. The west side has been improved with similar half-street improvements as provided on the north leg.

The west side curbs of 10<sup>th</sup> Avenue align north and south of Juan Sanchez Boulevard. Since a signal is warranted, the north- and southbound approaches should be similar, that is, a new southbound left turn lane should mirror the existing northbound left turn lane. CivTech notes that the extension of the existing edge striping for the northbound

approach is to the east of the existing pavement on the north leg, suggesting that some widening of the pavement of the north leg to the east, perhaps 6 to 8 additional feet is warranted. Although three 12-foot wide lanes can be accommodated on the existing 36 feet of pavement, additional pavement will allow better alignment of the left turn lanes across the intersection, which will improve the sight distances of the drivers of opposing left-turning vehicles and thereby reduce the chances of conflict, improving the overall operation of the intersection.

The storage capacity of the recommended left turn lane is 125 feet, which is more than the minimum required for case 1L per City of Yuma Standard Detail No. 3-352. The capacity was calculated using the methodology of the American Association of State Highway and Transportation Officials, in which the storage length for a turn lane is typically estimated as the length required to hold the average number of arriving vehicles per 1½ signal cycles. Thus, the recommended pavement widening should extend back at least 125 feet from the stop bar with an 80-foot long taper (per the same standard detail) back to the existing edge of pavement.

The future traffic control and lane configuration of the intersection is shown in

**Figure 5.****ON-SITE CIRCULATION AND QUEUING ANALYSIS**






CivTech was asked via a comment on the preliminary draft of this study to consider an on-site circulation and queuing analysis for Harvest Prep. In the absence of a full site plan that shows the parking areas, CivTech is left to viewing aerial photographs of the Plaza Reidel, in which the school is located and attempting to determine if there is sufficient area for parents' vehicles to queue when dropping their children off in the morning and picking them up in the afternoon. Before that assessment, the anticipated queue lengths must be calculated.

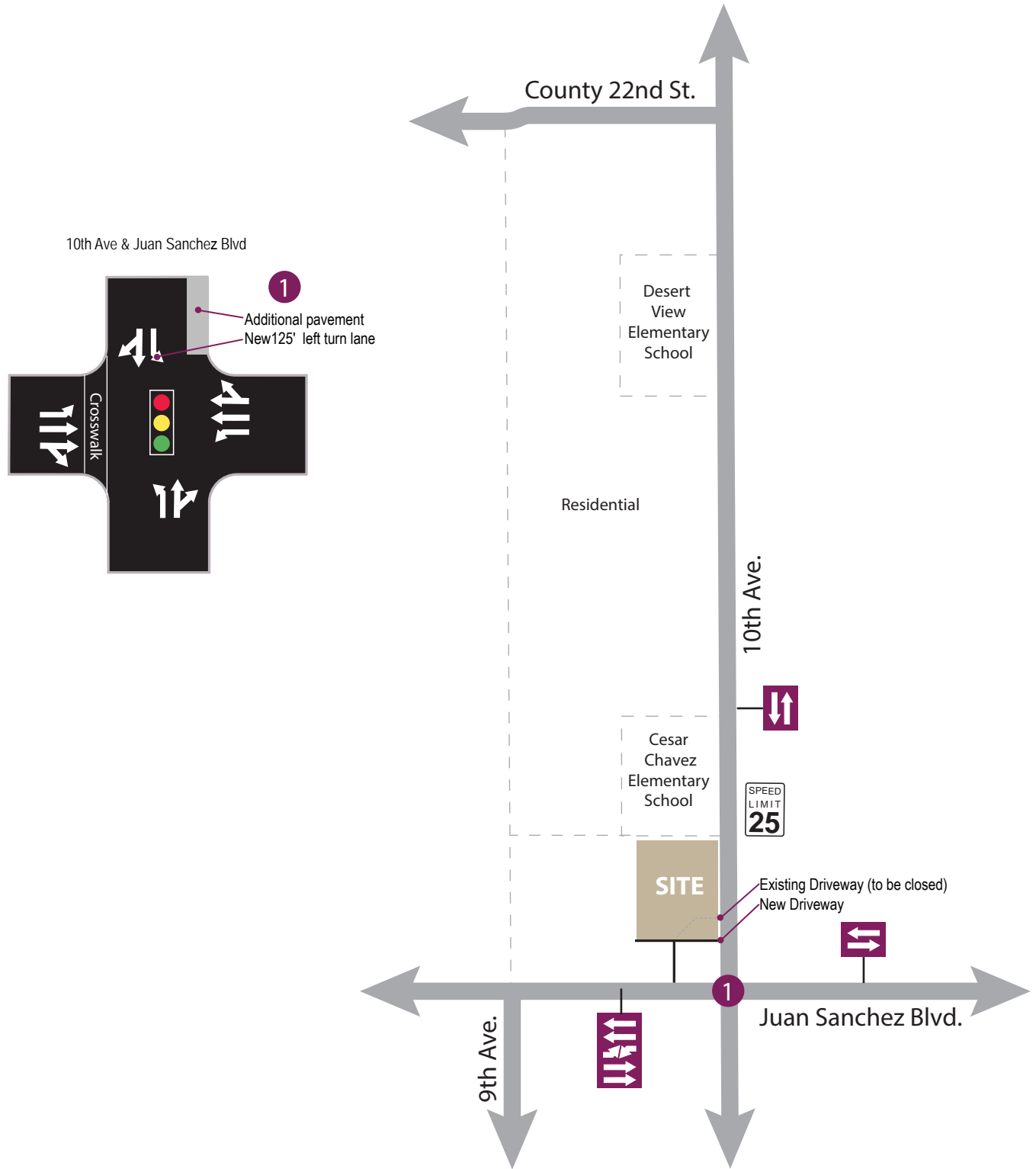
CivTech has developed a maximum drop-off/pick-up queue storage recommendation rate through observations of queuing characteristics of several schools. Most observations resulted with a maximum queuing length below or near 0.10 vehicle (or 2.5 feet) per student, including the length of the drop-off/pick-up location(s). For recent private school studies, CivTech has recommended providing queue storage of at least 0.10 vehicles per student during the morning drop-off time and 0.15 vehicles (or 3.75 feet) per student during the school release time. Note that on-site circulation does not commonly differ between morning drop-off and afternoon pick-up so 0.15 is generally recommended. It is CivTech's understanding that providing this ratio of on-site queue storage per student is a conservative length sufficient for typical school days.

The results of on-site queuing calculations are provided in Error! Reference source not found. for Harvest Prep. The interim and full enrollments are assumed, reduced by 20% for carpooling and students who walk or ride bicycles. The results summarized in Error! Reference source not found. show that recommended storage lengths for Harvest Prep are 2,025 feet with an interim enrollment of 670 students and 3,000 feet at full enrollment of 1,000 students.

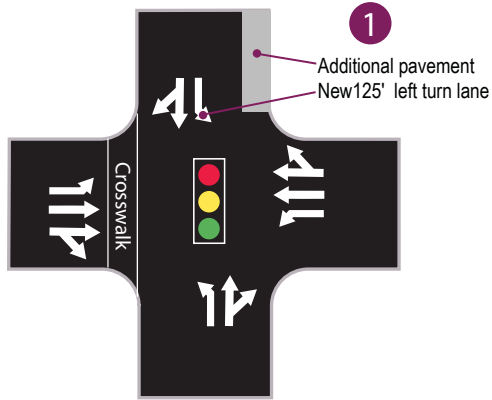
A review of the aerial photography reveals that the Plaza Reidel parking lot is laid out in a somewhat unusual pattern. First of all, the parking field is in the center of the plaza,

**LEGEND**

-  Thru or Turning Movement
-  Two-Way Left Turn-Lane
-  Traffic Signal
-  Stop Sign
-  Speed Limit



10th Ave & Juan Sanchez Blvd



**Figure 5:** Future Traffic Control and Lane Configuration

**Table 7: Estimated Maximum Queue**

<b>Enrollment Condition</b>	<b>Students (after reduction)*</b>	<b>Vehicles / Student Factor</b>	<b>Number of Vehicles</b>	<b>Queue Length</b>
Interim AM Drop-off	536	0.10	54	1,350 ft.
Interim PM Pick-up	536	0.15	81	<b>2,025 ft.</b>
Full AM Drop-off	800	0.10	80	2,000 ft.
Full PM Pick-up	800	0.15	120	<b>3,000 ft.</b>

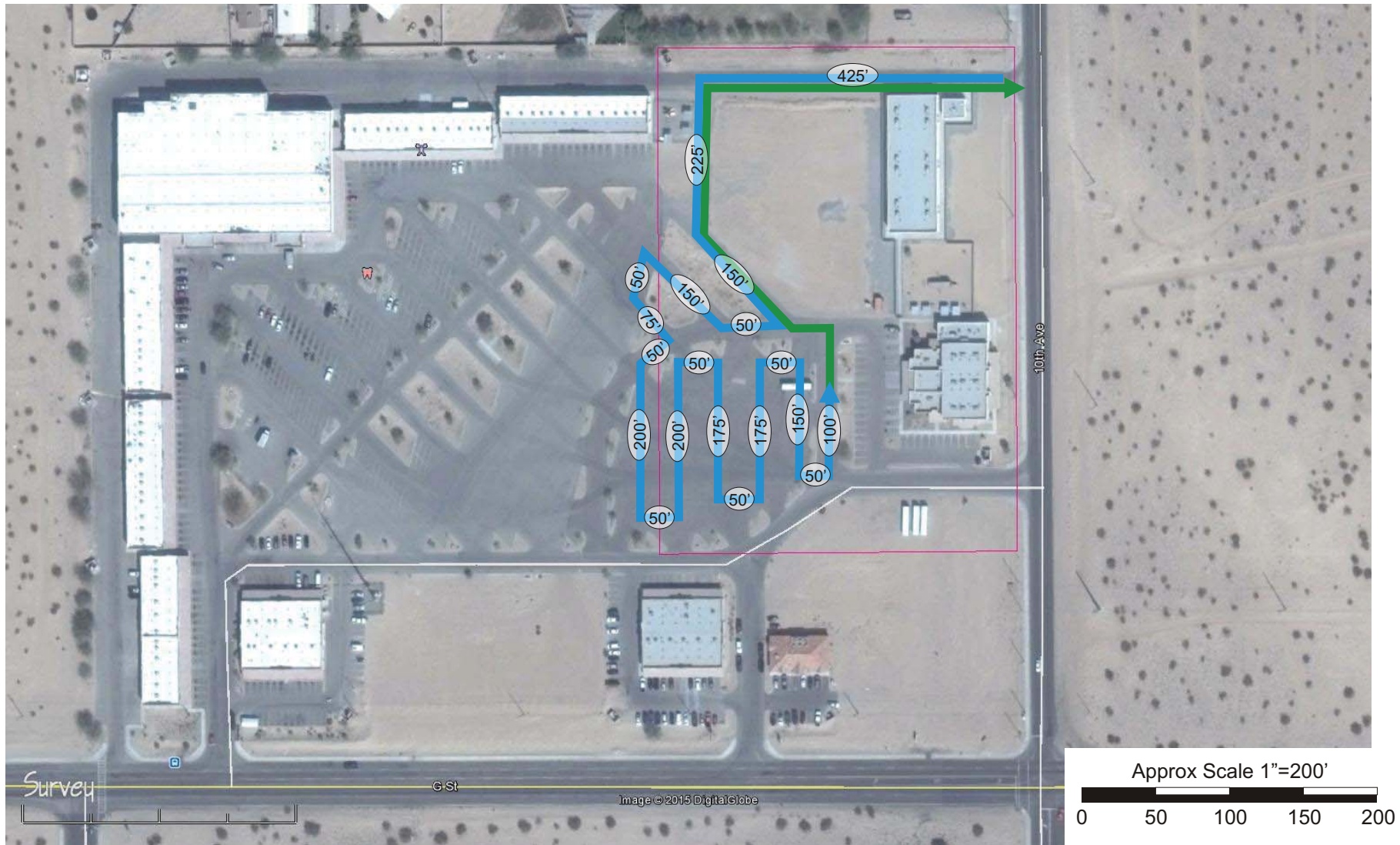
\* Number of students enrolled less 20% for carpooling and use of other modes (walking, bicycling).

surrounded by Harvest Prep on the east, other buildings and undeveloped land on the south and then the L-shaped strip plaza on the west and north. The southwest driveway from Juan Sanchez Boulevard splits into three drive aisles: one to the north along the shops on the west side of the plaza, one to the east along the shops on the south side of the plaza, and one to the northeast into the parking field. It is from this northeasterly drive aisle that other parking aisles branch off at right angles. In front of Harvest Prep, there is a drive aisle that begins in a westerly direction and then curves in a 90-degree arc to the south. Previously marked to provide two asphalt basketball courts for Harvest Prep students, the March 2015 photos show evidence of vehicles tracking through it in a radiating pattern from the first driveway on 10<sup>th</sup> Avenue. The pattern in which the landscaped islands at the end of each parking aisle and along the arc make it difficult to discern a natural circulation pattern of vehicles as they approach the site and queue. Additionally, in the future when more shops and restaurants are built and occupied, there will not be as many empty parking spaces as appear in the aerial photos.

**Figure 6** is a conceptual site plan for Harvest Prep. With the unusual parking field, CivTech was still able to show potential queuing of up to 2,425 feet, sufficient to accommodate the current expansion to 670 students and insufficient to accommodate the estimated 3,000 feet that would be required if enrollment were to be increased to 1,000 students. CivTech did not attempt to define where monitors (school staff) might be located to facilitate the flow of traffic. The only criteria CivTech considered were that most of the queuing would be within the property of the school, that paths of entering and exiting vehicles could not cross, and that student drop-off/pick-up would be on the right side of a vehicle. If the school were allowed to queue vehicles around the back of the retail plaza, substantially more queuing could be accommodated; however, that service drive is not on the school's property. CivTech recommends that, in the future, if/when Harvest Prep expands again, the school should be required by the City to provide a circulation plan showing at least 3,000 feet of queuing available before the City approves any plans for the expansion.

### **SITE DRIVEWAY ACCESS RESTRICTIONS**

A comment from the City on the draft of this study raised the issue of the need to restrict movements at the site driveways due to the potential circulation issues of Harvest Prep. The two Plaza Reidel driveways nearest the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard are both located approximately 400 feet on-center from the driveway, one on 10<sup>th</sup> Avenue north of Juan Sanchez Boulevard and the other on Juan Sanchez Boulevard west of 10<sup>th</sup> Avenue. In many jurisdictions, driveways closer than 660 feet (1/8-



**LEGEND**

- ▬ Entering
- ▬ Exiting

**QUEUING SUMMARY**

Estimated Maximum Queue:	
Interim (670 students)	2,025 feet
Ultimate (1,000 students)	3,000 feet
Available Storage (approx.):	2,425 feet

**Figure 6:** Harvest Preparatory Conceptual Circulation Plan



mile) to such an intersection would not be permitted full movements if there were a raised median in the adjacent roadway.

With respect to the driveway on Juan Sanchez Boulevard west of 10<sup>th</sup> Avenue, this driveway is on the departure side of the intersection; therefore, there would be no queueing with which the driveway could interfere and vice versa. Thus, no restrictions are recommended.

With respect to the first driveway on 10<sup>th</sup> Avenue north of Juan Sanchez Boulevard, this driveway is on the side of traffic approaching the intersection. A review of the LOS analysis sheets in **Appendix E** reveals that the 95<sup>th</sup> percentile queue for the southbound movement on 10<sup>th</sup> Avenue approaching Juan Sanchez Boulevard is expected to be nearly twelve vehicles (300 feet at 25 feet per vehicle) with all-way stop control. With a traffic signal, the 50<sup>th</sup> percentile queue is less than three vehicles. (HCM 2010 does not calculate a 95<sup>th</sup> percentile queue for signalized intersections.) Therefore, no movement restrictions at the first Plaza Reidel driveway on 10<sup>th</sup> Avenue north of Juan Sanchez Boulevard are warranted, either at its current location 400 feet north of Juan Sanchez Boulevard or, if it is eventually relocated, at its future location approximately 300 feet (on-center) north of Juan Sanchez Boulevard. The anticipated queues should not extend so far back that inbound/northbound vehicles turning left into the driveway would be obstructed or that outbound driveway traffic would interfere with the queued vehicles.

### **ALTERNATIVES MODES**

The Safe Routes to School program was a federally-funded program that ended in 2012 that would reimburse entities that implemented programs and strategies that promoted elementary and middle school children to walk and bicycle to school in part by identifying or providing alternative routes and/or making existing routes safer and more convenient. Although the program as it was known has ended, the aims of the original program are still being furthered under the broader funding category of Transportation Alternatives.

This is of note only as a way to introduce the subject of this brief section, which is the availability of facilities that could encourage the use of alternative modes of travel to and from the schools, that is, modes other than motorized vehicles (passenger vehicles and school buses). Two of the obvious facilities that could be provided are sidewalks and bicycle lanes.

A CivTech engineer documented and photographed the area during a field review. The photos and a review of aerial photography reveal there is sidewalk along the west side of 10<sup>th</sup> Avenue for its entire length up to County 22<sup>nd</sup> Street; thus, most of the schoolchildren that may walk to school have facilities that separate them from motor vehicles. There are, however, no bicycle lanes on Juan Sanchez Boulevard or 10<sup>th</sup> Avenue to facilitate the use of bicycles. Nor does it appear, based on improvements already made at the intersection of 10<sup>th</sup> Avenue and County 22<sup>nd</sup> Street, that the ultimate cross-section of 10<sup>th</sup> Avenue will include bicycle lanes. Children bicycling to school will have to learn how to ride safely with traffic if they are to continue to do so.

## CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are documented in this study:

- ◆ The AM and PM peak hour intersection level of service analyses reveal that all study movements currently operate at overall LOS C or better during the peak hours under the existing traffic volumes and traffic controls with the exception of the northbound through/right southbound shared movements, which currently operates at LOS F during the AM peak hour with average control delays of 59.6 and 76.7 seconds, respectively. With simulated winter volumes, that is, with the Juan Sanchez Boulevard through movements recorded in May increased by a seasonal factor of 20%, the results are generally similar, with the corresponding delays increasing to 69.7 and 78.8 seconds. In terms of volume-to-capacity (V/C) ratio, the existing conditions show the southbound approach to be operating during the AM peak hour at just slightly over capacity with a V/C ratio of 1.098.
- ◆ Harvest Prep Academy intends to relocate the first existing driveway north of Juan Sanchez Boulevard to the Plaza Riedel on the west side of 10<sup>th</sup> Avenue to the south approximately 100 feet. The new location, approximately 300 feet (on center) north of Juan Sanchez Boulevard, exceeds the 150-foot minimum face-of-curb to edge-of-driveway spacing required for the first driveway along a collector roadway per City of Yuma Construction Standard Detail Drawing No. 3-250.
- ◆ The current consolidation and expansion of the Harvest Prep Academy is anticipated to generate an additional 292 trips daily with 98 trips (54 in/44 out) occurring during the AM peak hour, 38 trips (19 in/19 out) occurring during the PM peak hour, and 70 (31 in/39 out) during the school afternoon peak hour (school release time) net of a reduction to account for approximately ten percent of the students walking to school from nearby neighborhoods. At its planned maximum enrollment, Harvest Prep Academy is anticipated to generate an additional 852 trips daily with 284 trips (156 in/128 out) occurring during the AM peak hour, 111 trips (54 in/57 out) occurring during the PM peak hour, and 202 (89 in/113 out) during the school afternoon peak hour (school release time). Thus, with respect to current levels of trips, the total number of trips over current levels could eventually total 1,144 additional trips daily with 382 more (210 in/172 out) occurring during the AM peak hour, 149 more (73 in/76 out) occurring during the PM peak hour, and 272 (120 in/152 out) more during the school afternoon peak hour (school release time).
- ◆ The 2016 opening year level of service reveals that, without and with the proposed and potential school expansion, that the results are similar to the existing condition. With the ultimate expansion of the school, the outbound/southbound 10<sup>th</sup> Avenue movement approaching Juan Sanchez Boulevard could operate at LOS E during the PM peak hour. The biggest difference in average control delay is expected to occur on the northbound approach, the delay of which is expected to increase from 69.7 seconds as reported earlier to 78.2 sec in 2016 with the increase in the enrollment at Harvest Prep; thereafter, it would increase to 81.2 sec by 2026 if Harvest Prep increases its enrollment further. By 2026 the average control delays without or with the additional trips generated by more Harvest Prep students for both the northbound through/right (79.7 vs. 81.2 sec) and southbound shared (78.8 vs. 81.9 sec)

movements are not very different. Thus, these increases can also be attributed, in part, to the increase in regional traffic volumes on Juan Sanchez Boulevard. The V/C ratio on the southbound approach increases to 1.235 with the additional trips generated by the additional enrollment at Harvest Prep.

- ◆ The 2016 opening year and 2026 horizon year level of service analyses of the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard revealed that, without and with the proposed and potential Harvest Prep expansions, a two-phase traffic signal operating with a 90-second cycle with the addition of a new southbound left turn lane would improve the overall operation of the intersection, with all of the movements operating at a good LOS B or better.
- ◆ To summarize the traffic signal needs assessment, the warrant-satisfying criteria have been met or exceeded for the peak hour warrant at the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard based on current traffic volumes and numbers of school children crossing here. Since the Gadsden school district has agreed to contribute half of the cost of the signal and Harvest Prep will be required to make a further contribution to the cost of the signal, there is an incentive to install a traffic signal during the current expansion of Harvest Prep rather than wait for some future expansion that may not occur.
- ◆ No exclusive right turn lanes are warranted on any approach to the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard. Three of the approaches to the intersection already provide exclusive left turn lanes. If a signal is to be installed, a southbound left turn should be provided.
- ◆ CivTech cites several reasons as justification for the City to require Harvest Prep to contribute up to one-quarter of the cost of the signal. They are detailed in the text.
- ◆ Potential queuing of up to 2,425 feet, sufficient to accommodate the current expansion to 670 students, is available; however, it is insufficient to accommodate the estimated 3,000 feet that would be required if enrollment were to be increased to 1,000 students.
- ◆ Photos from a field review and aerial photography reveal there is sidewalk along the west side of 10<sup>th</sup> Avenue for its entire length up to County 22<sup>nd</sup> Street; thus, most of the school children that may walk to school have facilities that separate them from motor vehicles. There are, however, no bicycle lanes on Juan Sanchez Boulevard or 10<sup>th</sup> Avenue to facilitate the use of bicycles. Nor does it appear, based on improvements already made at the intersection of 10<sup>th</sup> Avenue and County 22<sup>nd</sup> Street, that the ultimate cross-section of 10<sup>th</sup> Avenue will include bicycle lanes. Children bicycling to school will have to learn how to ride safely with traffic if they are to continue to do so.
- ◆ The 95<sup>th</sup> percentile queue for the southbound movement on 10<sup>th</sup> Avenue approaching Juan Sanchez Boulevard is expected to be nearly twelve vehicles with all-way stop control. With a traffic signal, which is recommended, the 50<sup>th</sup> percentile queue is less than three vehicles. Therefore, no movement restrictions at the first Plaza Reidel driveway on 10<sup>th</sup> Avenue north of Juan Sanchez Boulevard are warranted, either at its current location or, if it is eventually relocated, at its future location approximately 300 feet (on-center) north of Juan Sanchez Boulevard. Nor are restrictions warranted at the first Reidel Plaza driveway on Juan Sanchez Boulevard west of 10<sup>th</sup> Avenue, primarily because it is a driveway on the departure side of the intersection.

Based on the above conclusions, the following are recommended

- ◆ The north leg of the intersection should be widened to the east in order to provide a new 125-foot long southbound left turn lane approaching the intersection. The new pavement should extend back 125 feet from the stop bar with a minimal 80-foot long taper back to the existing edge of pavement.
- ◆ In the future, if/when Harvest Prep expands again, the school should be required by the City to provide a circulation plan showing at least 3,000 feet of queuing available before the City approves any plans for the expansion.
- ◆ A traffic signal at the intersection of 10<sup>th</sup> Avenue and Juan Sanchez Boulevard.

CivTech understands that the schedule for implementation of these improvements will be coordinated between the parties funding them, these being the City of San Luis; the developers of the two subdivisions (Comite de Bienestar, the developer of the Beinestar Apartments at 690 North 10th Avenue, and Reidel Construction), each of which have agreed to pay one-fourth of the cost of the signal); and the Harvest Preparatory Academy.

## LIST OF REFERENCES

*A Policy on Geometric Design of Highways and Streets.* American Association of State Highway and Transportation Officials, Washington, D.C., 2011.

*Highway Capacity Manual.* Transportation Research Board, Washington, D.C., 2010.

*Manual on Uniform Traffic Control Devices.* U.S. Department of Transportation, Federal Highways Administration, Washington, D.C., 2009.

*NPTS Urban Travel Patterns Report.* December 1999.

*Trip Generation Manual, 9<sup>th</sup> Edition.* Institute of Transportation Engineers, Washington, D.C, 2012.

*Trip Generation Handbook, 2<sup>nd</sup> Edition,* Institute of Transportation Engineers, Washington, D.C., 2004.

## TECHNICAL APPENDIX

APPENDIX A	CITY COMMENTS ON DRAFT STUDY
APPENDIX B	PHOTOGRAPHS AND TRAFFIC COUNTS
APPENDIX C	EXISTING PEAK HOUR CAPACITY ANALYSIS
APPENDIX D	2016 PEAK HOUR CAPACITY ANALYSIS
APPENDIX E	2026 PEAK HOUR CAPACITY ANALYSIS

**APPENDIX A**

**CITY COMMENTS ON DRAFT STUDY**

**From:** Eulogio Vera [<mailto:evera@cityofsanluis.org>]  
**Sent:** Wednesday, August 19, 2015 5:41 PM  
**To:** Douglas Nicholls <[dnicholls@core-e-g.com](mailto:dnicholls@core-e-g.com)>  
**Cc:** Kevin Burge <[kburge@core-e-g.com](mailto:kburge@core-e-g.com)>; Manuel Rojas <[MRojas@cityofsanluis.org](mailto:MRojas@cityofsanluis.org)>  
**Subject:** 10th Avenue and Juan Sanchez Blvd Traffic Study - Comments

Doug-

Below are the comments on the 10<sup>th</sup> and JS Blvd Traffic Study.

Gadsden School District Schools

Page 2

- Exec. Summary - Gadsden School District has not agreed (or has been approached) to pay a part of this intersection improvements. Talking to the City Attorney, it would be very difficult to get any funding from the school if they are not willing to participate. Though, per existing development agreements, each of the two developers who built the subdivisions to the north along 10<sup>th</sup> Avenue agreed to pay a quarter of the cost for the signal.

Page 5

- Speed limit on Juan Sanchez west of 10<sup>th</sup> Avenue is posted 35 MPH.

Page 8

- First paragraph - Intersection is already an AWSC intersection.

Page 9

Information on this page is mainly what I wanted to discuss with you.

- Would the overall traffic study benefit from reviewing onsite traffic circulation and queuing? Existing driveway location (and possible new location noted in report) on 10<sup>th</sup> off the shopping center could be critical to the intersection. Would they have to be right only (including ones of JSB)?

Page 21

- Harvest Prep, Bienestar, and Reidel Construction would be the only private contributors to the cost of the signal. Gadsden Elementary School will probably not want to contribute.

Please review and let me know if you have any questions. Also, could you provide a time frame as to when you anticipate finalizing it.

Thanks  
Eulogio

## **APPENDIX B**

### **PHOTOGRAPHS AND TRAFFIC COUNTS**



1. Looking East at utility line crossing



2. Looking north on NWC



3. NEC looking north



4. NEC looking NW at power lines



5. NEC looking south



6. NEC looking west 2



7. NEC looking west



8. NEC no curb or ramps



9. NEC signs



10. North leg by school



11. NWC 1



12. NWC looking east



13. NWC Looking north



14. NWC looking NW



15. NWC looking west



16. NWC Ped Crossing



17. NWC Ped Ramp



18. NWC Ped ramps and crosswalk



19. NWC Power Drop



20. NWC Ramp



21. NWC Stop oversized



22. NWC Utility boxes



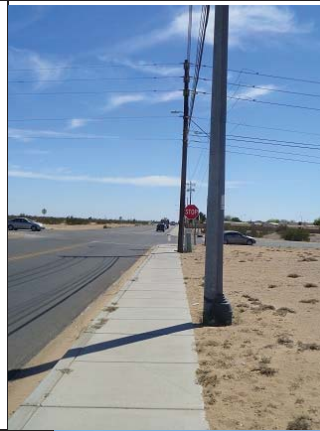
23. SEC ADOT Pull Box



24. SWC looking west



25. SEC regulation size stop sign



26. Southbound approach utility poles



27. SWC ADOT Pull box



28. SWC looking east 2



29. SWC looking east



30. SWC Ped Ramp



31. SWC Signs, ADOT pullbox, looking NE



32. SWC Utilities



33. West leg School crossing sign

Juan Sanchez Boulevard and 10th Avenue

5/11/2015

Street Name	PED	10TH AVENUE - From North					PED	JUAN SANCHEZ BOULEVARD - From East					PED	10TH AVENUE - From South					PED	JUAN SANCHEZ BOULEVARD - From West					Grand Total
		West	Right	Thru	Left	Total		North	Right	Thru	Left	Total		East	Right	Thru	Left	Total		South	Right	Thru	Left	Total	
6:30	0	12	7	15	34	0	9	27	6	42	0	33	5	3	41	0	0	60	7	67	184				
6:45	10	25	10	11	46	0	15	38	9	62	0	21	28	6	55	0	3	55	24	82	245				
7:00	10	28	35	25	88	0	21	40	15	76	0	23	59	18	100	0	3	50	45	98	362				
7:15	1	28	45	28	101	0	15	35	10	60	0	30	57	19	106	0	7	76	43	126	393				
7:30	0	22	53	28	103	0	11	30	17	58	0	52	61	7	120	0	5	78	45	128	409				
7:45	9	32	30	27	89	0	24	35	14	73	0	28	32	9	69	0	2	54	18	74	305				
8:00	1	19	23	24	66	0	22	29	7	58	0	16	17	5	38	0	3	48	20	71	233				
8:15	0	19	6	16	41	0	5	29	3	37	0	26	9	3	38	0	4	54	8	66	182				
<b>7-9 Total</b>	<b>31</b>	<b>185</b>	<b>209</b>	<b>174</b>	<b>568</b>	<b>0</b>	<b>122</b>	<b>263</b>	<b>81</b>	<b>466</b>	<b>0</b>	<b>229</b>	<b>268</b>	<b>70</b>	<b>567</b>	<b>0</b>	<b>27</b>	<b>475</b>	<b>210</b>	<b>712</b>	<b>2313</b>				
2:30	5	41	34	8	83	0	15	55	30	100	0	18	32	4	54	0	6	38	30	74	311				
2:45	0	50	26	21	97	0	17	72	23	112	0	25	16	6	47	0	8	53	30	91	347				
3:00	1	29	13	14	56	0	19	62	30	111	0	18	16	13	47	0	4	37	25	66	280				
3:15	0	21	26	17	64	0	15	72	27	114	0	18	13	6	37	0	5	60	22	87	302				
3:30	6	24	18	21	63	0	16	66	30	112	0	14	12	7	33	0	7	53	16	76	284				
3:45	0	26	15	17	58	0	22	86	33	141	0	18	17	7	42	0	9	61	30	100	341				
4:00	0	26	18	13	57	0	14	83	42	139	0	22	15	4	41	0	1	52	24	77	314				
4:15	0	19	15	10	44	0	30	115	47	192	0	22	11	4	37	0	5	49	30	84	357				
<b>4-6 Total</b>	<b>12</b>	<b>236</b>	<b>165</b>	<b>121</b>	<b>522</b>	<b>0</b>	<b>148</b>	<b>611</b>	<b>262</b>	<b>1021</b>	<b>0</b>	<b>155</b>	<b>132</b>	<b>51</b>	<b>338</b>	<b>0</b>	<b>45</b>	<b>403</b>	<b>207</b>	<b>655</b>	<b>2536</b>				

Courtesy of Core Engineering Group, PLLC

## APPENDIX C

### EXISTING PEAK HOUR CAPACITY ANALYSIS

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
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	0.991			0.950			0.942			0.961		
Flt Protected	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (prot)	1770	3507	0	1770	3362	0	1770	1755	0	0	1765	0
Flt Permitted	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (perm)	1770	3507	0	1770	3362	0	1770	1755	0	0	1765	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

Intersection Summary

Area Type: Other

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
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	0.986			0.972			0.913			0.942		
Flt Protected	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (prot)	1770	3490	0	1770	3440	0	1770	1701	0	0	1730	0
Flt Permitted	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (perm)	1770	3490	0	1770	3440	0	1770	1701	0	0	1730	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

Intersection Summary

Area Type: Other

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	43											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	151	258	17	0	56	140	71	0	53	209	133
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	164	280	18	0	61	152	77	0	58	227	145
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	19.5	16.6	53.5
HCM LOS	C	C	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	28%
Vol Thru, %	0%	61%	0%	100%	83%	0%	100%	40%	43%
Vol Right, %	0%	39%	0%	0%	17%	0%	0%	60%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	342	151	172	103	56	93	118	381
LT Vol	0	209	0	172	86	0	93	47	163
Through Vol	0	133	0	0	17	0	0	71	110
RT Vol	53	0	151	0	0	56	0	0	108
Lane Flow Rate	58	372	164	187	112	61	101	128	414
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.156	0.93	0.45	0.486	0.288	0.176	0.28	0.338	1
Departure Headway (Hd)	9.773	9.005	9.862	9.364	9.249	10.433	9.935	9.514	9.307
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	368	401	364	383	387	343	361	377	393
Service Time	7.524	6.756	7.644	7.145	7.03	8.222	7.724	7.303	7.007
HCM Lane V/C Ratio	0.158	0.928	0.451	0.488	0.289	0.178	0.28	0.34	1.053
HCM Control Delay	14.3	59.6	20.5	20.8	15.8	15.5	16.6	17.1	76.7
HCM Lane LOS	B	F	C	C	C	C	C	C	F
HCM 95th-tile Q	0.5	10.2	2.3	2.6	1.2	0.6	1.1	1.5	12

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	16.6											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	100	215	22	0	152	350	82	0	22	55	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	109	234	24	0	165	380	89	0	24	60	83
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	14.4	16.8	14.8
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	27%
Vol Thru, %	0%	42%	0%	100%	77%	0%	100%	59%	30%
Vol Right, %	0%	58%	0%	0%	23%	0%	0%	41%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	131	100	143	94	152	233	199	222
LT Vol	0	55	0	143	72	0	233	117	66
Through Vol	0	76	0	0	22	0	0	82	95
RT Vol	22	0	100	0	0	152	0	0	61
Lane Flow Rate	24	142	109	156	102	165	254	216	241
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.062	0.329	0.26	0.351	0.224	0.37	0.532	0.435	0.547
Departure Headway (Hd)	9.338	8.313	8.623	8.107	7.937	8.068	7.554	7.257	8.168
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	386	430	415	441	450	444	474	495	439
Service Time	7.038	6.112	6.414	5.897	5.728	5.849	5.335	5.037	5.958
HCM Lane V/C Ratio	0.062	0.33	0.263	0.354	0.227	0.372	0.536	0.436	0.549
HCM Control Delay	12.7	15.2	14.4	15.3	13	15.6	18.7	15.6	20.5
HCM Lane LOS	B	C	B	C	B	C	C	C	C
HCM 95th-tile Q	0.2	1.4	1	1.6	0.8	1.7	3.1	2.2	3.2

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	108	163	110
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	117	177	120
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		2		
Conflicting Approach Left		WB		
Conflicting Lanes Left		3		
Conflicting Approach Right		EB		
Conflicting Lanes Right		3		
HCM Control Delay		76.7		
HCM LOS		F		
Lane				

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	61	66	95
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	66	72	103
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		2		
Conflicting Approach Left		WB		
Conflicting Lanes Left		3		
Conflicting Approach Right		EB		
Conflicting Lanes Right		3		
HCM Control Delay		20.5		
HCM LOS		C		
Lane				

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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%		0%		0%	
Storage Length (ft)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25			25			25			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	0.992		0.956		0.942		0.961					
Flt Protected	0.950			0.950			0.950				0.986	
Satd. Flow (prot)	1770	3511	0	1770	3383	0	1770	1755	0	0	1765	0
Flt Permitted	0.950			0.950			0.950				0.986	
Satd. Flow (perm)	1770	3511	0	1770	3383	0	1770	1755	0	0	1765	0
Link Speed (mph)	45		45		25		25		25		25	
Link Distance (ft)	500		200		500		500		500		500	
Travel Time (s)	7.6		3.0		13.6		13.6		13.6		13.6	

**Intersection Summary**

Area Type: Other

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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%		0%		0%	
Storage Length (ft)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25			25			25			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	0.988		0.976		0.913		0.942					
Flt Protected	0.950			0.950			0.950				0.986	
Satd. Flow (prot)	1770	3497	0	1770	3454	0	1770	1701	0	0	1730	0
Flt Permitted	0.950			0.950			0.950				0.986	
Satd. Flow (perm)	1770	3497	0	1770	3454	0	1770	1701	0	0	1730	0
Link Speed (mph)	45		45		25		25		25		25	
Link Distance (ft)	500		200		500		500		500		500	
Travel Time (s)	7.6		3.0		13.6		13.6		13.6		13.6	

**Intersection Summary**

Area Type: Other

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	45.5											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	151	310	17	0	56	168	71	0	53	209	133
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	164	337	18	0	61	183	77	0	58	227	145
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	22.2	18	62.3
HCM LOS	C	C	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	28%
Vol Thru, %	0%	61%	0%	100%	86%	0%	100%	44%	43%
Vol Right, %	0%	39%	0%	0%	14%	0%	0%	56%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	342	151	207	120	56	112	127	381
LT Vol	0	209	0	207	103	0	112	56	163
Through Vol	0	133	0	0	17	0	0	71	110
RT Vol	53	0	151	0	0	56	0	0	108
Lane Flow Rate	58	372	164	225	131	61	122	138	414
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.162	0.969	0.46	0.599	0.345	0.181	0.346	0.377	1
Departure Headway (Hd)	10.151	9.384	10.099	9.601	9.502	10.732	10.234	9.844	9.765
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	354	387	356	375	378	334	351	364	377
Service Time	7.898	7.131	7.874	7.376	7.277	8.515	8.017	7.627	7.465
HCM Lane V/C Ratio	0.164	0.961	0.461	0.6	0.347	0.183	0.348	0.379	1.098
HCM Control Delay	14.9	69.7	21.3	25.8	17.2	15.9	18.4	18.5	78.8
HCM Lane LOS	B	F	C	D	C	C	C	C	F
HCM 95th-tile Q	0.6	11.1	2.3	3.7	1.5	0.7	1.5	1.7	11.8

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	19.4											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	100	258	22	0	152	420	82	0	22	55	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	109	280	24	0	165	457	89	0	24	60	83
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	16.2	20.8	16
HCM LOS	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	27%
Vol Thru, %	0%	42%	0%	100%	80%	0%	100%	63%	30%
Vol Right, %	0%	58%	0%	0%	20%	0%	0%	37%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	131	100	172	108	152	280	222	222
LT Vol	0	55	0	172	86	0	280	140	66
Through Vol	0	76	0	0	22	0	0	82	95
RT Vol	22	0	100	0	0	152	0	0	61
Lane Flow Rate	24	142	109	187	117	165	304	241	241
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.065	0.353	0.273	0.443	0.273	0.387	0.669	0.513	0.585
Departure Headway (Hd)	9.855	8.925	9.042	8.525	8.377	8.43	7.914	7.648	8.727
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	363	403	398	423	428	428	457	473	413
Service Time	7.614	6.683	6.791	6.273	6.126	6.173	5.657	5.39	6.477
HCM Lane V/C Ratio	0.066	0.352	0.274	0.442	0.273	0.386	0.665	0.51	0.584
HCM Control Delay	13.3	16.5	15.2	17.9	14.3	16.4	25.3	18.2	23.1
HCM Lane LOS	B	C	C	C	B	C	D	C	C
HCM 95th-tile Q	0.2	1.6	1.1	2.2	1.1	1.8	4.8	2.9	3.6

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	108	163	110
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	117	177	120
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		2		
Conflicting Approach Left		WB		
Conflicting Lanes Left		3		
Conflicting Approach Right		EB		
Conflicting Lanes Right		3		
HCM Control Delay		78.8		
HCM LOS		F		
Lane				

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	61	66	95
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	66	72	103
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		2		
Conflicting Approach Left		WB		
Conflicting Lanes Left		3		
Conflicting Approach Right		EB		
Conflicting Lanes Right		3		
HCM Control Delay		23.1		
HCM LOS		C		
Lane				

## APPENDIX D

### 2016 TOTAL PEAK HOUR CAPACITY ANALYSIS

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
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	0.993			0.956			0.942			0.961		
Flt Protected	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (prot)	1770	3514	0	1770	3383	0	1770	1755	0	0	1765	0
Flt Permitted	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (perm)	1770	3514	0	1770	3383	0	1770	1755	0	0	1765	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

Intersection Summary

Area Type: Other

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
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	0.988			0.976			0.913			0.942		
Flt Protected	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (prot)	1770	3497	0	1770	3454	0	1770	1701	0	0	1730	0
Flt Permitted	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (perm)	1770	3497	0	1770	3454	0	1770	1701	0	0	1730	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

Intersection Summary

Area Type: Other

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	45.9											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	151	316	17	0	56	171	71	0	53	209	133
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	164	343	18	0	61	186	77	0	58	227	145
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	22.7	18.1	63.3
HCM LOS	C	C	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	28%
Vol Thru, %	0%	61%	0%	100%	86%	0%	100%	45%	43%
Vol Right, %	0%	39%	0%	0%	14%	0%	0%	55%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	342	151	211	122	56	114	128	381
LT Vol	0	209	0	211	105	0	114	57	163
Through Vol	0	133	0	0	17	0	0	71	110
RT Vol	53	0	151	0	0	56	0	0	108
Lane Flow Rate	58	372	164	229	133	61	124	139	414
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.163	0.973	0.462	0.612	0.352	0.182	0.353	0.382	1
Departure Headway (Hd)	10.194	9.427	10.125	9.627	9.53	10.768	10.27	9.883	9.819
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	353	387	356	376	376	333	349	363	373
Service Time	7.942	7.175	7.9	7.402	7.305	8.549	8.051	7.664	7.519
HCM Lane V/C Ratio	0.164	0.961	0.461	0.609	0.354	0.183	0.355	0.383	1.11
HCM Control Delay	14.9	70.8	21.4	26.6	17.4	15.9	18.6	18.7	79
HCM Lane LOS	B	F	C	D	C	C	C	C	F
HCM 95th-tile Q	0.6	11.2	2.3	3.9	1.6	0.7	1.6	1.7	11.7

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	19.8											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	100	263	22	0	152	428	82	0	22	55	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	109	286	24	0	165	465	89	0	24	60	83
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	16.4	21.4	16.1
HCM LOS	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	27%
Vol Thru, %	0%	42%	0%	100%	80%	0%	100%	64%	30%
Vol Right, %	0%	58%	0%	0%	20%	0%	0%	36%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	131	100	175	110	152	285	225	222
LT Vol	0	55	0	175	88	0	285	143	66
Through Vol	0	76	0	0	22	0	0	82	95
RT Vol	22	0	100	0	0	152	0	0	61
Lane Flow Rate	24	142	109	191	119	165	310	244	241
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.066	0.355	0.274	0.453	0.279	0.388	0.685	0.521	0.589
Departure Headway (Hd)	9.917	8.986	9.08	8.563	8.417	8.463	7.947	7.684	8.782
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	361	400	396	421	427	426	456	469	410
Service Time	7.676	6.744	6.831	6.313	6.167	6.208	5.692	5.428	6.533
HCM Lane V/C Ratio	0.066	0.355	0.275	0.454	0.279	0.387	0.68	0.52	0.588
HCM Control Delay	13.4	16.6	15.2	18.3	14.4	16.5	26.3	18.5	23.4
HCM Lane LOS	B	C	C	C	B	C	D	C	C
HCM 95th-tile Q	0.2	1.6	1.1	2.3	1.1	1.8	5.1	3	3.7

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	108	163	110
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	117	177	120
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	79
HCM LOS	F

Lane

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	61	66	95
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	66	72	103
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	23.4
HCM LOS	C

Lane

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25			25			25			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	0.993			0.956			0.944			0.956		
Flt Protected	0.950			0.950			0.950				0.987	
Satd. Flow (prot)	1770	3514	0	1770	3383	0	1770	1758	0	0	1758	0
Flt Permitted	0.950			0.950			0.950				0.987	
Satd. Flow (perm)	1770	3514	0	1770	3383	0	1770	1758	0	0	1758	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

**Intersection Summary**

Area Type: Other

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25			25			25			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	0.988			0.976			0.919			0.938		
Flt Protected	0.950			0.950			0.950				0.988	
Satd. Flow (prot)	1770	3497	0	1770	3454	0	1770	1712	0	0	1726	0
Flt Permitted	0.950			0.950			0.950				0.988	
Satd. Flow (perm)	1770	3497	0	1770	3454	0	1770	1712	0	0	1726	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

**Intersection Summary**

Area Type: Other

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	48.8											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	183	316	17	0	56	171	71	0	53	225	133
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	199	343	18	0	61	186	77	0	58	245	145
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	24.4	18.6	70.1
HCM LOS	C	C	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	26%
Vol Thru, %	0%	63%	0%	100%	86%	0%	100%	45%	42%
Vol Right, %	0%	37%	0%	0%	14%	0%	0%	55%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	358	183	211	122	56	114	128	420
LT Vol	0	225	0	211	105	0	114	57	176
Through Vol	0	133	0	0	17	0	0	71	136
RT Vol	53	0	183	0	0	56	0	0	108
Lane Flow Rate	58	389	199	229	133	61	124	139	457
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.165	1	0.566	0.62	0.356	0.186	0.361	0.39	1
Departure Headway (Hd)	10.306	9.551	10.244	9.745	9.648	10.985	10.487	10.1	9.764
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	347	377	352	371	374	327	343	356	370
Service Time	8.098	7.343	7.988	7.49	7.393	8.74	8.242	7.855	7.559
HCM Lane V/C Ratio	0.167	1.032	0.565	0.617	0.356	0.187	0.362	0.39	1.235
HCM Control Delay	15.1	78.2	25.6	27.2	17.7	16.2	19.1	19.2	79.2
HCM Lane LOS	C	F	D	D	C	C	C	C	F
HCM 95th-tile Q	0.6	11.8	3.3	4	1.6	0.7	1.6	1.8	11.7

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	22.8											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	119	263	22	0	152	428	82	0	22	64	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	129	286	24	0	165	465	89	0	24	70	83
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	17.7	24	17.9
HCM LOS	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	24%
Vol Thru, %	0%	46%	0%	100%	80%	0%	100%	64%	30%
Vol Right, %	0%	54%	0%	0%	20%	0%	0%	36%	46%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	140	119	175	110	152	285	225	257
LT Vol	0	64	0	175	88	0	285	143	78
Through Vol	0	76	0	0	22	0	0	82	118
RT Vol	22	0	119	0	0	152	0	0	61
Lane Flow Rate	24	152	129	191	119	165	310	244	279
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.069	0.4	0.341	0.475	0.292	0.409	0.722	0.551	0.701
Departure Headway (Hd)	10.367	9.458	9.497	8.977	8.831	8.903	8.384	8.119	9.037
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	345	380	378	400	406	405	431	444	399
Service Time	8.147	7.238	7.269	6.748	6.601	6.666	6.147	5.882	6.809
HCM Lane V/C Ratio	0.07	0.4	0.341	0.477	0.293	0.407	0.719	0.55	0.699
HCM Control Delay	13.9	18.5	17.1	19.7	15.2	17.7	30.2	20.5	30.6
HCM Lane LOS	B	C	C	C	C	C	D	C	D
HCM 95th-tile Q	0.2	1.9	1.5	2.5	1.2	1.9	5.6	3.3	5.2

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	108	176	136
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	117	191	148
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	79.2
HCM LOS	F

Lane

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	61	78	118
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	66	85	128
Number of Lanes	0	0	1	0

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

Lane

HCM 2010 Signalized Intersection Summary

1:

7/10/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (veh/h)	151	316	17	56	171	71	53	209	133	108	163	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	0.98		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	164	343	18	61	186	77	58	227	145	117	177	120
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	508	1192	62	457	862	344	540	475	304	481	463	314
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	1112	3416	179	1001	2472	987	1070	1057	675	1000	1030	698
Grp Volume(v), veh/h	164	177	184	61	131	132	58	0	372	117	0	297
Grp Sat Flow(s),veh/h/ln	1112	1770	1825	1001	1770	1689	1070	0	1733	1000	0	1728
Q Serve(g_s), s	4.8	2.9	2.9	1.9	2.1	2.2	1.5	0.0	6.0	3.7	0.0	4.5
Cycle Q Clear(g_c), s	7.0	2.9	2.9	4.8	2.1	2.2	6.0	0.0	6.0	9.7	0.0	4.5
Prop In Lane	1.00		0.10	1.00		0.58	1.00		0.39	1.00		0.40
Lane Grp Cap(c), veh/h	508	617	637	457	617	589	540	0	779	481	0	777
V/C Ratio(X)	0.32	0.29	0.29	0.13	0.21	0.22	0.11	0.00	0.48	0.24	0.00	0.38
Avail Cap(c_a), veh/h	1185	1694	1747	1066	1694	1617	1245	0	1921	1140	0	1916
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.6	9.3	9.4	11.1	9.1	9.1	9.3	0.0	7.7	11.0	0.0	7.3
Incr Delay (d2), s/veh	0.4	0.3	0.2	0.1	0.2	0.2	0.1	0.0	0.5	0.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.4	1.5	0.5	1.0	1.1	0.4	0.0	2.9	1.0	0.0	2.2
LnGrp Delay(d),s/veh	12.0	9.6	9.6	11.2	9.3	9.3	9.4	0.0	8.1	11.3	0.0	7.6
LnGrp LOS	B	A	A	B	A	A	A		A	B		A
Approach Vol, veh/h	525			324				430			414	
Approach Delay, s/veh	10.3			9.6				8.3			8.6	
Approach LOS	B			A				A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	21.8		17.8		21.8		17.8					
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0					
Max Green Setting (Gmax), s	44.0		38.0		44.0		38.0					
Max Q Clear Time (g_c+I1), s	8.0		9.0		11.7		6.8					
Green Ext Time (p_c), s	6.3		4.6		6.2		4.6					
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay	9.3											
HCM 2010 LOS	A											

HCM 2010 Signalized Intersection Summary

1:

7/10/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (veh/h)	100	263	22	152	428	82	22	55	76	61	66	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	109	286	24	165	465	89	24	60	83	66	72	103
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	545	1573	131	673	1413	269	452	194	269	479	190	272
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	851	3304	275	1057	2968	565	1194	703	973	1229	689	985
Grp Volume(v), veh/h	109	152	158	165	276	278	24	0	143	66	0	175
Grp Sat Flow(s),veh/h/ln	851	1770	1810	1057	1770	1763	1194	0	1676	1229	0	1674
Q Serve(g_s), s	3.0	1.6	1.6	3.4	3.1	3.2	0.5	0.0	2.2	1.5	0.0	2.7
Cycle Q Clear(g_c), s	6.1	1.6	1.6	5.0	3.1	3.2	3.3	0.0	2.2	3.6	0.0	2.7
Prop In Lane	1.00		0.15	1.00		0.32	1.00		0.58	1.00		0.59
Lane Grp Cap(c), veh/h	545	842	862	673	842	839	452	0	463	479	0	462
V/C Ratio(X)	0.20	0.18	0.18	0.25	0.33	0.33	0.05	0.00	0.31	0.14	0.00	0.38
Avail Cap(c_a), veh/h	1457	2740	2803	1807	2740	2730	1306	0	1661	1358	0	1659
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.2	4.8	4.9	6.3	5.3	5.3	10.8	0.0	9.2	10.7	0.0	9.4
Incr Delay (d2), s/veh	0.2	0.1	0.1	0.2	0.2	0.2	0.0	0.0	0.4	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.8	0.8	1.0	1.5	1.5	0.2	0.0	1.0	0.5	0.0	1.3
LnGrp Delay(d),s/veh	7.3	5.0	5.0	6.5	5.5	5.5	10.8	0.0	9.6	10.8	0.0	10.0
LnGrp LOS	A	A	A	A	A	A	B		A	B		A
Approach Vol, veh/h	419			719				167			241	
Approach Delay, s/veh	5.6			5.7				9.8			10.2	
Approach LOS	A			A				A			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	12.9		19.4		12.9		19.4					
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0					
Max Green Setting (Gmax), s	32.0		50.0		32.0		50.0					
Max Q Clear Time (g_c+I1), s	5.3		8.1		5.6		7.0					
Green Ext Time (p_c), s	2.5		7.2		2.5		7.2					
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay	6.8											
HCM 2010 LOS	A											

Timing Report, Sorted By Phase

1:

7/10/2015



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	48	42	48	42
Maximum Split (%)	53.3%	46.7%	53.3%	46.7%
Minimum Split (s)	20	20	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	48	0	48
End Time (s)	48	0	48	0
Yield/Force Off (s)	44	86	44	86
Yield/Force Off 170(s)	44	75	44	75
Local Start Time (s)	0	48	0	48
Local Yield (s)	44	86	44	86
Local Yield 170(s)	44	75	44	75

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	40

Splits and Phases: 1:

2	4
48 s	42 s
6	8
48 s	42 s

Timing Report, Sorted By Phase

1:

7/10/2015



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	36	54	36	54
Maximum Split (%)	40.0%	60.0%	40.0%	60.0%
Minimum Split (s)	20	20	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	36	0	36
End Time (s)	36	0	36	0
Yield/Force Off (s)	32	86	32	86
Yield/Force Off 170(s)	32	75	32	75
Local Start Time (s)	0	36	0	36
Local Yield (s)	32	86	32	86
Local Yield 170(s)	32	75	32	75

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	40

Splits and Phases: 1:

2	4
36 s	54 s
6	8
36 s	54 s

HCM 2010 Signalized Intersection Summary

1:

7/10/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (veh/h)	183	316	17	56	171	71	53	225	133	108	176	136
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	0.98		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	199	343	18	61	186	77	58	245	145	117	191	148
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	509	1237	65	458	895	357	495	494	293	456	438	340
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	1112	3416	179	1001	2472	987	1031	1092	646	984	968	750
Grp Volume(v), veh/h	199	177	184	61	131	132	58	0	390	117	0	339
Grp Sat Flow(s),veh/h/ln	1112	1770	1825	1001	1770	1689	1031	0	1738	984	0	1718
Q Serve(g_s), s	6.5	3.1	3.1	2.0	2.2	2.3	1.8	0.0	6.8	4.1	0.0	5.8
Cycle Q Clear(g_c), s	8.9	3.1	3.1	5.1	2.2	2.3	7.6	0.0	6.8	11.0	0.0	5.8
Prop In Lane	1.00		0.10	1.00		0.58	1.00		0.37	1.00		0.44
Lane Grp Cap(c), veh/h	509	641	661	458	641	612	495	0	787	456	0	778
V/C Ratio(X)	0.39	0.28	0.28	0.13	0.20	0.22	0.12	0.00	0.50	0.26	0.00	0.44
Avail Cap(c_a), veh/h	1161	1678	1731	1044	1678	1601	1005	0	1648	944	0	1629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	9.8	9.8	11.6	9.5	9.5	10.6	0.0	8.3	12.2	0.0	8.1
Incr Delay (d2), s/veh	0.5	0.2	0.2	0.1	0.2	0.2	0.1	0.0	0.5	0.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	1.5	1.6	0.6	1.1	1.1	0.5	0.0	3.4	1.1	0.0	2.8
LnGrp Delay(d),s/veh	13.1	10.0	10.0	11.7	9.7	9.7	10.8	0.0	8.8	12.5	0.0	8.5
LnGrp LOS	B	B	B	B	A	A	B		A	B		A
Approach Vol, veh/h	560			324				448			456	
Approach Delay, s/veh	11.1			10.1				9.1			9.5	
Approach LOS	B			B				A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	23.6		19.7		23.6		19.7					
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0					
Max Green Setting (Gmax), s	41.0		41.0		41.0		41.0					
Max Q Clear Time (g_c+I1), s	9.6		10.9		13.0		7.1					
Green Ext Time (p_c), s	6.8		4.8		6.6		4.8					
Intersection Summary												
HCM 2010 Ctrl Delay	10.0											
HCM 2010 LOS	A											

HCM 2010 Signalized Intersection Summary

1:

7/10/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Volume (veh/h)	119	263	22	152	428	82	22	64	76	61	78	118
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		1.00	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	129	286	24	165	465	89	24	70	83	66	85	128
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	537	1589	132	666	1427	271	420	221	262	471	191	287
Arrive On Green	0.48	0.48	0.48	0.48	0.48	0.48	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	851	3304	275	1057	2968	565	1155	772	915	1218	667	1004
Grp Volume(v), veh/h	129	152	158	165	276	278	24	0	153	66	0	213
Grp Sat Flow(s),veh/h/ln	851	1770	1810	1057	1770	1763	1155	0	1687	1218	0	1671
Q Serve(g_s), s	3.8	1.7	1.7	3.6	3.3	3.3	0.6	0.0	2.4	1.5	0.0	3.6
Cycle Q Clear(g_c), s	7.1	1.7	1.7	5.3	3.3	3.3	4.2	0.0	2.4	4.0	0.0	3.6
Prop In Lane	1.00		0.15	1.00		0.32	1.00		0.54	1.00		0.60
Lane Grp Cap(c), veh/h	537	851	870	666	851	848	420	0	482	471	0	477
V/C Ratio(X)	0.24	0.18	0.18	0.25	0.32	0.33	0.06	0.00	0.32	0.14	0.00	0.45
Avail Cap(c_a), veh/h	1344	2530	2588	1669	2530	2521	1202	0	1625	1296	0	1609
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.7	5.1	5.1	6.6	5.5	5.5	11.7	0.0	9.6	11.2	0.0	10.0
Incr Delay (d2), s/veh	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.0	0.4	0.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.8	0.9	1.0	1.6	1.6	0.2	0.0	1.2	0.5	0.0	1.7
LnGrp Delay(d),s/veh	7.9	5.2	5.2	6.8	5.7	5.7	11.8	0.0	10.0	11.3	0.0	10.7
LnGrp LOS	A	A	A	A	A	A	B		A	B		B
Approach Vol, veh/h	439			719				177			279	
Approach Delay, s/veh	6.0			5.9				10.2			10.8	
Approach LOS	A			A				B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	13.8		20.5		13.8		20.5					
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0					
Max Green Setting (Gmax), s	33.0		49.0		33.0		49.0					
Max Q Clear Time (g_c+I1), s	6.2		9.1		6.0		7.3					
Green Ext Time (p_c), s	2.9		7.4		2.9		7.4					
Intersection Summary												
HCM 2010 Ctrl Delay	7.3											
HCM 2010 LOS	A											

Timing Report, Sorted By Phase

1:

7/10/2015



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	45	45	45	45
Maximum Split (%)	50.0%	50.0%	50.0%	50.0%
Minimum Split (s)	20	20	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	45	0	45
End Time (s)	45	0	45	0
Yield/Force Off (s)	41	86	41	86
Yield/Force Off 170(s)	41	75	41	75
Local Start Time (s)	0	45	0	45
Local Yield (s)	41	86	41	86
Local Yield 170(s)	41	75	41	75

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	40

Splits and Phases: 1:

2	4
45 s	45 s
6	8
45 s	45 s

Timing Report, Sorted By Phase

1:

7/10/2015



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	37	53	37	53
Maximum Split (%)	41.1%	58.9%	41.1%	58.9%
Minimum Split (s)	20	20	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	37	0	37
End Time (s)	37	0	37	0
Yield/Force Off (s)	33	86	33	86
Yield/Force Off 170(s)	33	75	33	75
Local Start Time (s)	0	37	0	37
Local Yield (s)	33	86	33	86
Local Yield 170(s)	33	75	33	75

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	40

Splits and Phases: 1:

2	4
37 s	53 s
6	8
37 s	53 s

## APPENDIX E

### 2026 TOTAL PEAK HOUR CAPACITY ANALYSIS

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
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	0.994			0.962			0.942			0.961		
Flt Protected	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (prot)	1770	3518	0	1770	3405	0	1770	1755	0	0	1765	0
Flt Permitted	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (perm)	1770	3518	0	1770	3405	0	1770	1755	0	0	1765	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

Intersection Summary

Area Type: Other

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
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	0.990			0.980			0.913			0.942		
Flt Protected	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (prot)	1770	3504	0	1770	3468	0	1770	1701	0	0	1730	0
Flt Permitted	0.950	0	0	0.950	0	0	0.950	0	0	0.986	0	0
Satd. Flow (perm)	1770	3504	0	1770	3468	0	1770	1701	0	0	1730	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

Intersection Summary

Area Type: Other

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	49.4											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	151	384	17	0	56	208	71	0	53	209	133
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	164	417	18	0	61	226	77	0	58	227	145
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	29.6	20.5	71.1
HCM LOS	D	C	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	28%
Vol Thru, %	0%	61%	0%	100%	88%	0%	100%	49%	43%
Vol Right, %	0%	39%	0%	0%	12%	0%	0%	51%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	342	151	256	145	56	139	140	381
LT Vol	0	209	0	256	128	0	139	69	163
Through Vol	0	133	0	0	17	0	0	71	110
RT Vol	53	0	151	0	0	56	0	0	108
Lane Flow Rate	58	372	164	278	158	61	151	153	414
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.171	1	0.477	0.77	0.433	0.189	0.447	0.437	1
Departure Headway (Hd)	10.7	9.933	10.459	9.961	9.879	11.175	10.677	10.324	10.197
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	336	368	346	365	366	322	339	351	356
Service Time	8.446	7.679	8.183	7.685	7.603	8.902	8.404	8.051	7.945
HCM Lane V/C Ratio	0.173	1.011	0.474	0.762	0.432	0.189	0.445	0.436	1.163
HCM Control Delay	15.6	79.7	22.4	39.3	20	16.5	21.8	20.8	80.8
HCM Lane LOS	C	F	C	E	C	C	C	C	F
HCM 95th-tile Q	0.6	11.6	2.5	6.3	2.1	0.7	2.2	2.1	11.5

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	27											
Intersection LOS	D											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	100	320	22	0	152	521	82	0	22	55	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	109	348	24	0	165	566	89	0	24	60	83
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	19.8	33	17.8
HCM LOS	C	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	27%
Vol Thru, %	0%	42%	0%	100%	83%	0%	100%	68%	30%
Vol Right, %	0%	58%	0%	0%	17%	0%	0%	32%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	131	100	213	129	152	347	256	222
LT Vol	0	55	0	213	107	0	347	174	66
Through Vol	0	76	0	0	22	0	0	82	95
RT Vol	22	0	100	0	0	152	0	0	61
Lane Flow Rate	24	142	109	232	140	165	378	278	241
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.071	0.383	0.287	0.58	0.345	0.406	0.873	0.625	0.633
Departure Headway (Hd)	10.627	9.692	9.519	9	8.876	8.845	8.327	8.094	9.437
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	336	370	377	401	404	406	434	445	381
Service Time	8.414	7.478	7.293	6.773	6.649	6.611	6.093	5.86	7.213
HCM Lane V/C Ratio	0.071	0.384	0.289	0.579	0.347	0.406	0.871	0.625	0.633
HCM Control Delay	14.2	18.4	16.1	23.6	16.3	17.6	46.7	23.5	27.3
HCM Lane LOS	B	C	C	C	C	C	E	C	D
HCM 95th-tile Q	0.2	1.8	1.2	3.5	1.5	1.9	8.9	4.2	4.2

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	108	163	110
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	117	177	120
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		2		
Conflicting Approach Left		WB		
Conflicting Lanes Left		3		
Conflicting Approach Right		EB		
Conflicting Lanes Right		3		
HCM Control Delay		80.8		
HCM LOS		F		
Lane				

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	61	66	95
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	66	72	103
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		2		
Conflicting Approach Left		WB		
Conflicting Lanes Left		3		
Conflicting Approach Right		EB		
Conflicting Lanes Right		3		
HCM Control Delay		27.3		
HCM LOS		D		
Lane				

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
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	0.994			0.962			0.949			0.949		
Flt Protected	0.950	0	0	0.950	0	0	0.950	0	0	0.989	0	0
Satd. Flow (prot)	1770	3518	0	1770	3405	0	1770	1768	0	0	1748	0
Flt Permitted	0.950	0	0	0.950	0	0	0.950	0	0	0.989	0	0
Satd. Flow (perm)	1770	3518	0	1770	3405	0	1770	1768	0	0	1748	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

Intersection Summary

Area Type: Other

Lanes and Geometrics

1: 6/26/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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)	95	0	0	100	0	0	200	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	1	0	0	0	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
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	0.990			0.980			0.928			0.932		
Flt Protected	0.950	0	0	0.950	0	0	0.950	0	0	0.991	0	0
Satd. Flow (prot)	1770	3504	0	1770	3468	0	1770	1729	0	0	1720	0
Flt Permitted	0.950	0	0	0.950	0	0	0.950	0	0	0.991	0	0
Satd. Flow (perm)	1770	3504	0	1770	3468	0	1770	1729	0	0	1720	0
Link Speed (mph)	45			45			25			25		
Link Distance (ft)	500			200			500			500		
Travel Time (s)	7.6			3.0			13.6			13.6		

Intersection Summary

Area Type: Other

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	53.8											
Intersection LOS	F											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	245	384	17	0	56	208	71	0	53	256	133
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	266	417	18	0	61	226	77	0	58	278	145
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	35.6	21.4	73.4
HCM LOS	E	C	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	22%
Vol Thru, %	0%	66%	0%	100%	88%	0%	100%	49%	41%
Vol Right, %	0%	34%	0%	0%	12%	0%	0%	51%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	53	389	245	256	145	56	139	140	496
LT Vol	0	256	0	256	128	0	139	69	201
Through Vol	0	133	0	0	17	0	0	71	187
RT Vol	53	0	245	0	0	56	0	0	108
Lane Flow Rate	58	423	266	278	158	61	151	153	539
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.177	1	0.771	0.767	0.431	0.194	0.46	0.45	1
Departure Headway (Hd)	11.055	10.321	10.53	10.031	9.95	11.483	10.985	10.632	10.472
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	326	355	346	362	364	314	330	340	350
Service Time	8.77	8.036	8.23	7.731	7.65	9.185	8.687	8.335	8.19
HCM Lane V/C Ratio	0.178	1.192	0.769	0.768	0.434	0.194	0.458	0.45	1.54
HCM Control Delay	16.1	81.2	41.1	39.1	20	16.9	22.7	21.8	81.9
HCM Lane LOS	C	F	E	E	C	C	C	C	F
HCM 95th-tile Q	0.6	11.4	6.2	6.2	2.1	0.7	2.3	2.2	11.3

HCM 2010 AWSC

1:

6/26/2015

Intersection												
Intersection Delay, s/veh	46.7											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	153	320	22	0	152	521	82	0	22	82	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	166	348	24	0	165	566	89	0	24	89	83
Number of Lanes	0	1	2	0	0	1	2	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	3
HCM Control Delay	25.3	51.2	24.4
HCM LOS	D	F	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	19%
Vol Thru, %	0%	52%	0%	100%	83%	0%	100%	68%	31%
Vol Right, %	0%	48%	0%	0%	17%	0%	0%	32%	50%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	158	153	213	129	152	347	256	324
LT Vol	0	82	0	213	107	0	347	174	100
Through Vol	0	76	0	0	22	0	0	82	163
RT Vol	22	0	153	0	0	152	0	0	61
Lane Flow Rate	24	172	166	232	140	165	378	278	352
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.079	0.531	0.494	0.657	0.392	0.464	1	0.724	1
Departure Headway (Hd)	11.953	11.122	10.7	10.202	10.082	10.106	9.608	9.384	10.393
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	303	328	339	357	361	360	381	389	352
Service Time	9.589	8.758	8.366	7.867	7.748	7.756	7.257	7.034	8.035
HCM Lane V/C Ratio	0.079	0.524	0.49	0.65	0.388	0.458	0.992	0.715	1
HCM Control Delay	15.6	25.6	23.3	30.4	19.1	21.2	77.8	33	81.2
HCM Lane LOS	C	D	C	D	C	C	F	D	F
HCM 95th-tile Q	0.3	2.9	2.6	4.4	1.8	2.4	11.9	5.6	11.4

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	108	201	187
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	117	218	203
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		2		
Conflicting Approach Left		WB		
Conflicting Lanes Left		3		
Conflicting Approach Right		EB		
Conflicting Lanes Right		3		
HCM Control Delay		81.9		
HCM LOS		F		
Lane				

HCM 2010 AWSC

1:

6/26/2015

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	61	100	163
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	66	109	177
Number of Lanes	0	0	1	0
Approach		SB		
Opposing Approach		NB		
Opposing Lanes		2		
Conflicting Approach Left		WB		
Conflicting Lanes Left		3		
Conflicting Approach Right		EB		
Conflicting Lanes Right		3		
HCM Control Delay		81.2		
HCM LOS		F		
Lane				

HCM 2010 Signalized Intersection Summary

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7/10/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔	
Volume (veh/h)	151	384	17	56	208	71	53	209	133	108	163	110	
Number	7	4	14	3	8	18	5	2	12	1	6	16	
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		1.00	0.99		0.99	0.99		0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900	
Adj Flow Rate, veh/h	164	417	18	61	226	77	58	227	145	117	177	120	
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	500	1267	55	435	959	318	521	467	298	461	455	308	
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.44	0.44	0.44	0.44	0.44	0.44	
Sat Flow, veh/h	1072	3453	149	937	2613	867	1070	1057	675	1000	1030	698	
Grp Volume(v), veh/h	164	213	222	61	151	152	58	0	372	117	0	297	
Grp Sat Flow(s),veh/h/ln	1072	1770	1832	937	1770	1710	1070	0	1733	1000	0	1728	
Q Serve(g_s), s	5.2	3.6	3.6	2.1	2.5	2.6	1.6	0.0	6.4	3.9	0.0	4.8	
Cycle Q Clear(g_c), s	7.8	3.6	3.6	5.7	2.5	2.6	6.5	0.0	6.4	10.3	0.0	4.8	
Prop In Lane	1.00		0.08	1.00		0.51	1.00		0.39	1.00		0.40	
Lane Grp Cap(c), veh/h	500	649	672	435	649	627	521	0	765	461	0	763	
V/C Ratio(X)	0.33	0.33	0.33	0.14	0.23	0.24	0.11	0.00	0.49	0.25	0.00	0.39	
Avail Cap(c_a), veh/h	1107	1653	1711	966	1653	1597	1150	0	1784	1050	0	1780	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	
Uniform Delay (d), s/veh	11.9	9.5	9.5	11.6	9.1	9.2	10.0	0.0	8.3	12.0	0.0	7.9	
Incr Delay (d2), s/veh	0.4	0.3	0.3	0.1	0.2	0.2	0.1	0.0	0.5	0.3	0.0	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.6	1.8	1.9	0.6	1.2	1.2	0.5	0.0	3.1	1.1	0.0	2.4	
LnGrp Delay(d),s/veh	12.3	9.8	9.8	11.7	9.3	9.4	10.1	0.0	8.8	12.2	0.0	8.2	
LnGrp LOS	B	A	A	B	A	A	B		A	B		A	
Approach Vol, veh/h	599			364				430			414		
Approach Delay, s/veh	10.5			9.8				9.0			9.3		
Approach LOS	B			A				A			A		
Timer	1	2	3	4	5	6	7	8					
Assigned Phs	2		4		6		8						
Phs Duration (G+Y+Rc), s	22.4		19.3		22.4		19.3						
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0						
Max Green Setting (Gmax), s	43.0		39.0		43.0		39.0						
Max Q Clear Time (g_c+I1), s	8.5		9.8		12.3		7.7						
Green Ext Time (p_c), s	6.3		5.4		6.1		5.5						
<b>Intersection Summary</b>													
HCM 2010 Ctrl Delay	9.7												
HCM 2010 LOS	A												

HCM 2010 Signalized Intersection Summary

1:

7/10/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔	
Volume (veh/h)	100	320	22	152	521	82	22	55	76	61	66	95	
Number	7	4	14	3	8	18	5	2	12	1	6	16	
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		1.00	0.99		0.99	0.99		0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900	
Adj Flow Rate, veh/h	109	348	24	165	566	89	24	60	83	66	72	103	
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	514	1728	119	659	1578	247	411	184	255	438	180	258	
Arrive On Green	0.51	0.51	0.51	0.51	0.51	0.51	0.26	0.26	0.26	0.26	0.26	0.26	
Sat Flow, veh/h	775	3358	230	1000	3067	481	1194	703	972	1228	688	985	
Grp Volume(v), veh/h	109	183	189	165	326	329	24	0	143	66	0	175	
Grp Sat Flow(s),veh/h/ln	775	1770	1819	1000	1770	1778	1194	0	1675	1228	0	1673	
Q Serve(g_s), s	3.5	2.0	2.0	3.8	3.9	3.9	0.6	0.0	2.5	1.6	0.0	3.1	
Cycle Q Clear(g_c), s	7.4	2.0	2.0	5.9	3.9	3.9	3.7	0.0	2.5	4.1	0.0	3.1	
Prop In Lane	1.00		0.13	1.00		0.27	1.00		0.58	1.00		0.59	
Lane Grp Cap(c), veh/h	514	910	936	659	910	915	411	0	439	438	0	438	
V/C Ratio(X)	0.21	0.20	0.20	0.25	0.36	0.36	0.06	0.00	0.33	0.15	0.00	0.40	
Avail Cap(c_a), veh/h	1242	2571	2643	1598	2571	2583	1099	0	1404	1146	0	1402	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	
Uniform Delay (d), s/veh	7.4	4.7	4.7	6.3	5.2	5.2	12.4	0.0	10.7	12.3	0.0	10.9	
Incr Delay (d2), s/veh	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.0	0.4	0.2	0.0	0.6	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.8	1.0	1.0	1.1	2.0	2.0	0.2	0.0	1.2	0.6	0.0	1.5	
LnGrp Delay(d),s/veh	7.6	4.8	4.8	6.5	5.4	5.4	12.5	0.0	11.1	12.5	0.0	11.5	
LnGrp LOS	A	A	A	A	A	A	B		B	B		B	
Approach Vol, veh/h	481			820				167			241		
Approach Delay, s/veh	5.4			5.6				11.3			11.7		
Approach LOS	A			A				B			B		
Timer	1	2	3	4	5	6	7	8					
Assigned Phs	2		4		6		8						
Phs Duration (G+Y+Rc), s	13.4		22.4		13.4		22.4						
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0						
Max Green Setting (Gmax), s	30.0		52.0		30.0		52.0						
Max Q Clear Time (g_c+I1), s	5.7		9.4		6.1		7.9						
Green Ext Time (p_c), s	2.4		9.0		2.4		9.0						
<b>Intersection Summary</b>													
HCM 2010 Ctrl Delay	7.0												
HCM 2010 LOS	A												

Timing Report, Sorted By Phase

1:

7/10/2015



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	47	43	47	43
Maximum Split (%)	52.2%	47.8%	52.2%	47.8%
Minimum Split (s)	20	20	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	47	0	47
End Time (s)	47	0	47	0
Yield/Force Off (s)	43	86	43	86
Yield/Force Off 170(s)	43	75	43	75
Local Start Time (s)	0	47	0	47
Local Yield (s)	43	86	43	86
Local Yield 170(s)	43	75	43	75

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	40

Splits and Phases: 1:

φ2	φ4
47 s	43 s
φ6	φ8
47 s	43 s

Timing Report, Sorted By Phase

1:

7/10/2015



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	34	56	34	56
Maximum Split (%)	37.8%	62.2%	37.8%	62.2%
Minimum Split (s)	20	20	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	34	0	34
End Time (s)	34	0	34	0
Yield/Force Off (s)	30	86	30	86
Yield/Force Off 170(s)	30	75	30	75
Local Start Time (s)	0	34	0	34
Local Yield (s)	30	86	30	86
Local Yield 170(s)	30	75	30	75

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	40

Splits and Phases: 1:

φ2	φ4
34 s	56 s
φ6	φ8
34 s	56 s

HCM 2010 Signalized Intersection Summary

1:

7/10/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔	
Volume (veh/h)	245	384	17	56	208	71	53	256	133	108	201	187	
Number	7	4	14	3	8	18	5	2	12	1	6	16	
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		1.00	1.00		0.99	1.00		0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900	
Adj Flow Rate, veh/h	266	417	18	61	226	77	58	278	145	117	218	203	
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	511	1426	61	442	1079	358	379	509	265	383	391	364	
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44	
Sat Flow, veh/h	1072	3453	149	940	2613	867	959	1148	599	957	883	822	
Grp Volume(v), veh/h	266	213	222	61	151	152	58	0	423	117	0	421	
Grp Sat Flow(s),veh/h/ln	1072	1770	1832	940	1770	1710	959	0	1747	957	0	1704	
Q Serve(g_s), s	11.8	4.5	4.5	2.6	3.0	3.2	2.6	0.0	9.9	5.7	0.0	10.1	
Cycle Q Clear(g_c), s	15.0	4.5	4.5	7.1	3.0	3.2	12.8	0.0	9.9	15.6	0.0	10.1	
Prop In Lane	1.00		0.08	1.00		0.51	1.00		0.34	1.00		0.48	
Lane Grp Cap(c), veh/h	511	731	756	442	731	706	379	0	774	383	0	755	
V/C Ratio(X)	0.52	0.29	0.29	0.14	0.21	0.22	0.15	0.00	0.55	0.31	0.00	0.56	
Avail Cap(c_a), veh/h	918	1403	1452	799	1403	1355	611	0	1196	615	0	1167	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	15.3	10.9	10.9	13.2	10.5	10.5	16.2	0.0	11.4	17.1	0.0	11.4	
Incr Delay (d2), s/veh	0.8	0.2	0.2	0.1	0.1	0.2	0.2	0.0	0.6	0.4	0.0	0.6	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	3.6	2.2	2.3	0.7	1.5	1.5	0.7	0.0	4.8	1.5	0.0	4.8	
LnGrp Delay(d),s/veh	16.1	11.1	11.1	13.4	10.6	10.6	16.3	0.0	12.0	17.5	0.0	12.1	
LnGrp LOS	B	B	B	B	B	B	B		B	B		B	
Approach Vol, veh/h	701			364				481			538		
Approach Delay, s/veh	13.0			11.1				12.5			13.3		
Approach LOS	B			B				B			B		
Timer	1	2	3	4	5	6	7	8					
Assigned Phs	2		4		6		8						
Phs Duration (G+Y+Rc), s	28.6		26.9		28.6		26.9						
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0						
Max Green Setting (Gmax), s	38.0		44.0		38.0		44.0						
Max Q Clear Time (g_c+I1), s	14.8		17.0		17.6		9.1						
Green Ext Time (p_c), s	7.4		5.9		7.0		6.2						
<b>Intersection Summary</b>													
HCM 2010 Ctrl Delay	12.6												
HCM 2010 LOS	B												

HCM 2010 Signalized Intersection Summary

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔	
Volume (veh/h)	153	320	22	152	521	82	22	82	76	61	100	163	
Number	7	4	14	3	8	18	5	2	12	1	6	16	
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		1.00	0.99		0.99	0.99		0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900	
Adj Flow Rate, veh/h	166	348	24	165	566	89	24	89	83	66	109	177	
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	484	1762	121	631	1609	252	324	261	244	421	188	305	
Arrive On Green	0.52	0.52	0.52	0.52	0.52	0.52	0.30	0.30	0.30	0.30	0.30	0.30	
Sat Flow, veh/h	775	3358	230	1000	3067	481	1082	883	823	1198	635	1031	
Grp Volume(v), veh/h	166	183	189	165	326	329	24	0	172	66	0	286	
Grp Sat Flow(s),veh/h/ln	775	1770	1819	1000	1770	1778	1082	0	1706	1198	0	1666	
Q Serve(g_s), s	7.1	2.4	2.5	4.7	4.8	4.8	0.9	0.0	3.5	2.0	0.0	6.5	
Cycle Q Clear(g_c), s	11.9	2.4	2.5	7.1	4.8	4.8	7.4	0.0	3.5	5.6	0.0	6.5	
Prop In Lane	1.00		0.13	1.00		0.27	1.00		0.48	1.00		0.62	
Lane Grp Cap(c), veh/h	484	928	954	631	928	933	324	0	505	421	0	493	
V/C Ratio(X)	0.34	0.20	0.20	0.26	0.35	0.35	0.07	0.00	0.34	0.16	0.00	0.58	
Avail Cap(c_a), veh/h	981	2063	2120	1272	2063	2072	731	0	1147	872	0	1120	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
Uniform Delay (d), s/veh	9.7	5.6	5.6	7.5	6.2	6.2	16.5	0.0	12.3	14.5	0.0	13.3	
Incr Delay (d2), s/veh	0.4	0.1	0.1	0.2	0.2	0.2	0.1	0.0	0.4	0.2	0.0	1.1	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.5	1.2	1.2	1.3	2.3	2.3	0.3	0.0	1.7	0.7	0.0	3.1	
LnGrp Delay(d),s/veh	10.1	5.7	5.7	7.7	6.4	6.4	16.6	0.0	12.7	14.6	0.0	14.4	
LnGrp LOS	B	A	A	A	A	A	B		B	B		B	
Approach Vol, veh/h	538			820				196			352		
Approach Delay, s/veh	7.1			6.7				13.2			14.5		
Approach LOS	A			A				B			B		
Timer	1	2	3	4	5	6	7	8					
Assigned Phs	2		4		6		8						
Phs Duration (G+Y+Rc), s	17.2		27.4		17.2		27.4						
Change Period (Y+Rc), s	4.0		4.0		4.0		4.0						
Max Green Setting (Gmax), s	30.0		52.0		30.0		52.0						
Max Q Clear Time (g_c+I1), s	9.4		13.9		8.5		9.1						
Green Ext Time (p_c), s	3.4		9.5		3.4		9.7						
<b>Intersection Summary</b>													
HCM 2010 Ctrl Delay	8.9												
HCM 2010 LOS	A												

Timing Report, Sorted By Phase

1:

7/10/2015



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	42	48	42	48
Maximum Split (%)	46.7%	53.3%	46.7%	53.3%
Minimum Split (s)	20	20	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	42	0	42
End Time (s)	42	0	42	0
Yield/Force Off (s)	38	86	38	86
Yield/Force Off 170(s)	38	75	38	75
Local Start Time (s)	0	42	0	42
Local Yield (s)	38	86	38	86
Local Yield 170(s)	38	75	38	75

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	40

Splits and Phases: 1:

φ2	φ4
42 s	48 s
φ6	φ8
42 s	48 s

Timing Report, Sorted By Phase

1:

7/10/2015



Phase Number	2	4	6	8
Movement	NBTL	EBTL	SBTL	WBTL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	34	56	34	56
Maximum Split (%)	37.8%	62.2%	37.8%	62.2%
Minimum Split (s)	20	20	20	20
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Minimum Initial (s)	4	4	4	4
Vehicle Extension (s)	3	3	3	3
Minimum Gap (s)	3	3	3	3
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)	5	5	5	5
Flash Dont Walk (s)	11	11	11	11
Dual Entry	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	34	0	34
End Time (s)	34	0	34	0
Yield/Force Off (s)	30	86	30	86
Yield/Force Off 170(s)	30	75	30	75
Local Start Time (s)	0	34	0	34
Local Yield (s)	30	86	30	86
Local Yield 170(s)	30	75	30	75

Intersection Summary

Cycle Length	90
Control Type	Actuated-Uncoordinated
Natural Cycle	45

Splits and Phases: 1:

φ2	φ4
34 s	56 s
φ6	φ8
34 s	56 s