Rancho Harvest General Plan Amendment

Administrative Draft Transportation Impact Study

Prepared For: SWCA Environmental Consultants

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Contents

Executive Summary

This Transportation Impact Study (TIS) evaluates the potential transportation impacts of the rezoning proposed for the Rancho Harvest project, located on the northwest corner of Blosser Road and La Brea Avenue in the City of Santa Maria. The site is currently occupied by a plumbing store and agricultural services company. The project would modify the zoning from General Manufacturing to Planned Development General Commercial to allow for a range of commercial and housing development. The site plan is shown in **Figure 1.**

The proposed project would generate 5,060 net new vehicle trips per weekday, including 305 AM peak hour trips and 255 PM peak hour trips.

INTERSECTION OPERATIONS

All study intersections operate acceptably with and without the project under Existing Conditions. Under Cumulative Conditions with and without the project, one or more intersections operate unacceptably. However, updating the corridor signal timing including yellow clearance times, cycle lengths, and force-off values will improve operations to LOS D with the addition of project traffic.

At the intersection of Blosser Rd/La Brea Ave (#2), the following improvements are recommended with the addition of project traffic:

- Modify traffic signal to allow southbound protected U-turns. This may require widening on the east side of Blosser Road. If this improvement is infeasible upon construction, the signal timing should be modified to provide more green time for the La Brea Avenue approach.
- Add standard crosswalk on west leg.
- Remove parking on the south side of La Brea Avenue to allow for two approach lanes to Blosser Road.

These improvements would provide acceptable operations.

SITE ACCESS AND ON-SITE CIRCULATION

The following are recommended based on review of the preliminary site plan:

- Restrict outbound left turns at the primary (middle) driveway on Blosser Road. Modify driveway design to place crosswalk(s) where visible to turning traffic and minimize pedestrian crossing distance.
- The southernmost driveway on Blosser Road should be restricted to right-in, right-out only and located as far as practical from the intersection. The northernmost driveway should also be restricted to right-in, right-out or removed.
- Construct a Class I path and Class II bike lane on the west side of Blosser Road fronting the project site consistent with the Bicycle Master Plan and improvements south of the site.
- Prohibit parking for at least six feet (ten feet preferred) on either side of La Brea Avenue driveway to maintain adequate sight distance.
- Provide convenient bike parking and access.
- Provide pedestrian connections between front and rear buildings and frontage improvements.
- Remove on-site gate for circulation and access to La Brea Avenue driveway.
- Confirm truck turning movements for deliveries, including fuel trucks at the gas station.

VEHICLE MILES TRAVELED (VMT)

The project would reduce total regional VMT by providing jobs and shopping destinations in a predominantly residential area. This is a less than significant impact using the Office of Planning and Research (OPR) redevelopment threshold.

Introduction

This study evaluates the potential transportation impacts of the rezoning proposed for the Rancho Harvest project, located on the western edge of the City of Santa Maria on Blosser Road south of Stowell Road. The site is currently occupied by a plumbing store and agricultural services company. The project would modify the zoning from General Manufacturing to Planned Development General Commercial to allow for a range of commercial development. The project site plan is shown on **Figure 1**.

The TIS evaluates the following signalized intersections during the weekday AM and PM peak hours:

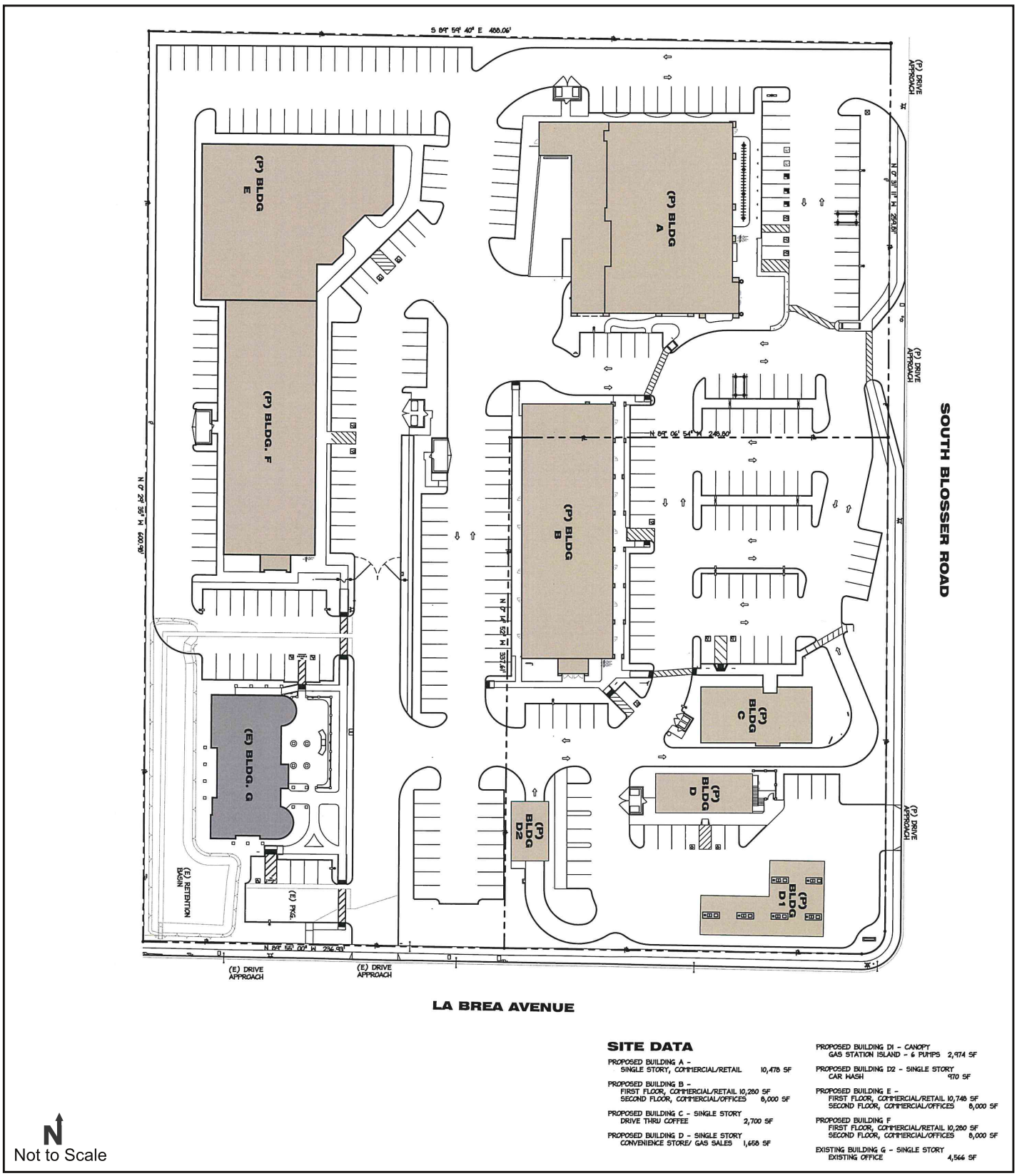
1. Blosser Road/Stowell Road
2. Blosser Road /La Brea Avenue
3. Blosser Road /Battles Road

The study locations were evaluated under these scenarios:

- **Existing Conditions** reflects existing traffic counts and the existing transportation network.
- **Existing Plus Project** adds Project-generated traffic to Existing Conditions volumes.
- **Cumulative Conditions** reflects buildout of approved and pending projects in the City, not including the proposed Project.
- **Cumulative Plus Project** reflects buildout of approved and pending projects in the City, including the proposed project.

Each scenario is described in more detail in the appropriate chapter.

Figure 1: Project Site Plan



Source: tom b. martinez & associates (December 2020)

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Analysis Methods

The analysis approach was developed based on City of Santa Maria thresholds.

The State Office of Planning and Research (OPR) published a Technical Advisory in December 2018 with recommendations for evaluating VMT for various project types. Where a project replaces existing VMT-generating uses, the project would have a less-than-significant impact on VMT if it reduces overall VMT. If it increases overall VMT then thresholds for the individual uses should be applied. The SBCAG Travel Demand Model is used to evaluate the project's change to VMT.

While LOS is not an allowable CEQA metric it remains in planning documents for the City of Santa Maria. The level of service thresholds for intersections based on the 6th Edition Highway Capacity Manual (HCM) are presented in **Table 1**.

Table 1: Intersection LOS Thresholds

Intersection Level of Service Thresholds			
Signalized Intersections[1]		**Stop Controlled Intersections[2]**	
Control Delay (sec/vehicle)	**Level of Service**	**Control Delay (sec/vehicle)**	**Level of Service**
≤ 10	A	≤ 10	A
> 10 - 20	B	> 10 - 15	B
> 20 - 35	C	> 15 - 25	C
> 35 - 55	D	> 25 - 35	D
> 55 - 80	E	> 35 - 50	E
> 80	F	> 50 or v/c > 1	F
1. Source: Exhibit 19-8 of the Highway Capacity Manual 6th Edition.			
2. Source: Exhibits 20-2 and 21-8 of the Highway Capacity Manual 6th Edition.			

The City of Santa Maria considers LOS D acceptable for intersection operations.

The intersection LOS was calculated using the Synchro 10 software package applying the Highway Capacity Manual (HCM) 2000 and 6th Edition methodology. HCM 2000 was used at Blosser Road /La Brea Avenue (#2) and Blosser Road /Battles Road (#3) due to the presence of U-turn volumes.

Existing Conditions

This section describes the existing transportation system and current operating conditions.

EXISTING CIRCULATION NETWORK

This section describes the existing roadways adjacent to the proposed project. Bicycle facilities in the study area consist of Class I and II bikeways. A Class I facilities provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with crossflow by motorists minimized. A Class II bike lane provides a striped lane for one-way bicycle travel on the side of the street adjacent to vehicle traffic. The roadways in the vicinity of the project are described below.

- *Battles Road* is an east-west four-lane secondary arterial near Blosser Road. The posted speed limit is 45-mph west of Blosser Road and 40-mph east of Blosser Road. There is a sidewalk on the north side of the road, existing Class II bike lanes on both sides, and a Class I bike path on the south side of the road.
- *Blosser Road* is a north-south four-lane primary arterial near the project site. The posted speed limit is 40-mph north of Stowell Road and 45-mph south of Stowell Road. There is continuous sidewalk on the west side of the road between Stowell Road and Battles Road with intermittent sidewalks on the east side. There is an existing Class I bike path and Class II bike lanes on the west side of the road between La Brea Avenue and Battles Road. The Class I bike path is proposed to extend north of La Brea Ave and terminate at Stowell Road. Adjacent development east of Blosser Road will construct a bike lane and sidewalk on the east side of the road.
- *La Brea Avenue* is an east-west two-lane roadway with no posted speed limit. There are sidewalks on both sides of the road and no existing or proposed bikeways. The roadway currently terminates at Blosser Road and adjacent development east of Blosser Road will construct a new eastern leg of this intersection.
- *Stowell Road* is an east-west four-lane 40-mph secondary arterial near Blosser Road with an interchange at US 101 to the east. There are intermittent sidewalks and no existing or proposed bikeways on the corridor.

The existing study intersections are described below.

- Blosser Road/Stowell Road (#1): Pedestrian signals on all legs with a marked crosswalk on the south leg only. Protected left turn phase on all approaches with U-turns prohibited.
- Blosser Road /La Brea Avenue (#2): Pedestrian signals on north, south, and west legs with no marked crosswalks. Northbound protected left turn phase on Blosser Road with U-turns permitted, southbound left and U-turns are prohibited, and eastbound U-turns are also prohibited.
- Blosser Road /Battles Road (#3): Pedestrian signals and crosswalks are present on all legs. Protected left turn phasing with U-turns permitted on all approaches.

Transit

Santa Maria Area Transit (SMAT) operates transit service in the City of Santa Maria and in Orcutt. *SMAT Route 4* travels between the northeastern area of the City and the Airport via the Santa Maria Transit Center with 30-minute weekday headways and 45-minute weekend headways. The closest stop to the project site is approximately 2,000 feet away on Stowell Road at S. Western Avenue a quarter mile east of Blosser Road.

The Santa Maria Transit Center is located on the southeast corner of Miller Street and Boone Street approximately two miles from the project site. Connections to other services including the Breeze Bus and Clean Air Express are available at the Santa Maria Transit Center.

The City's Circulation Element supports the phased implementation of a light rail transportation system. The proposed corridor utilizes the Santa Maria Valley Railroad right-of-way both north and east of the project site.

EXISTING INTERSECTION OPERATIONS

Due to the pandemic, no new traffic count data was collected. The Acquistapace Blosser Southeast (Area 5B) Specific Plan Amendment: Revised Traffic Impact Study (Associated Transportation Engineers, 2019) evaluated the parcels on the east side of Blosser Road across from the proposed project. September 2018 traffic count data from the study was used for this analysis. CCTC conducted a field visit in November 2020 to the study intersections to observe existing traffic operations and signal timing.

Figure 2 shows the Existing weekday peak hour intersection traffic volumes and lane configurations. Traffic count sheets are provided in **Appendix A**.

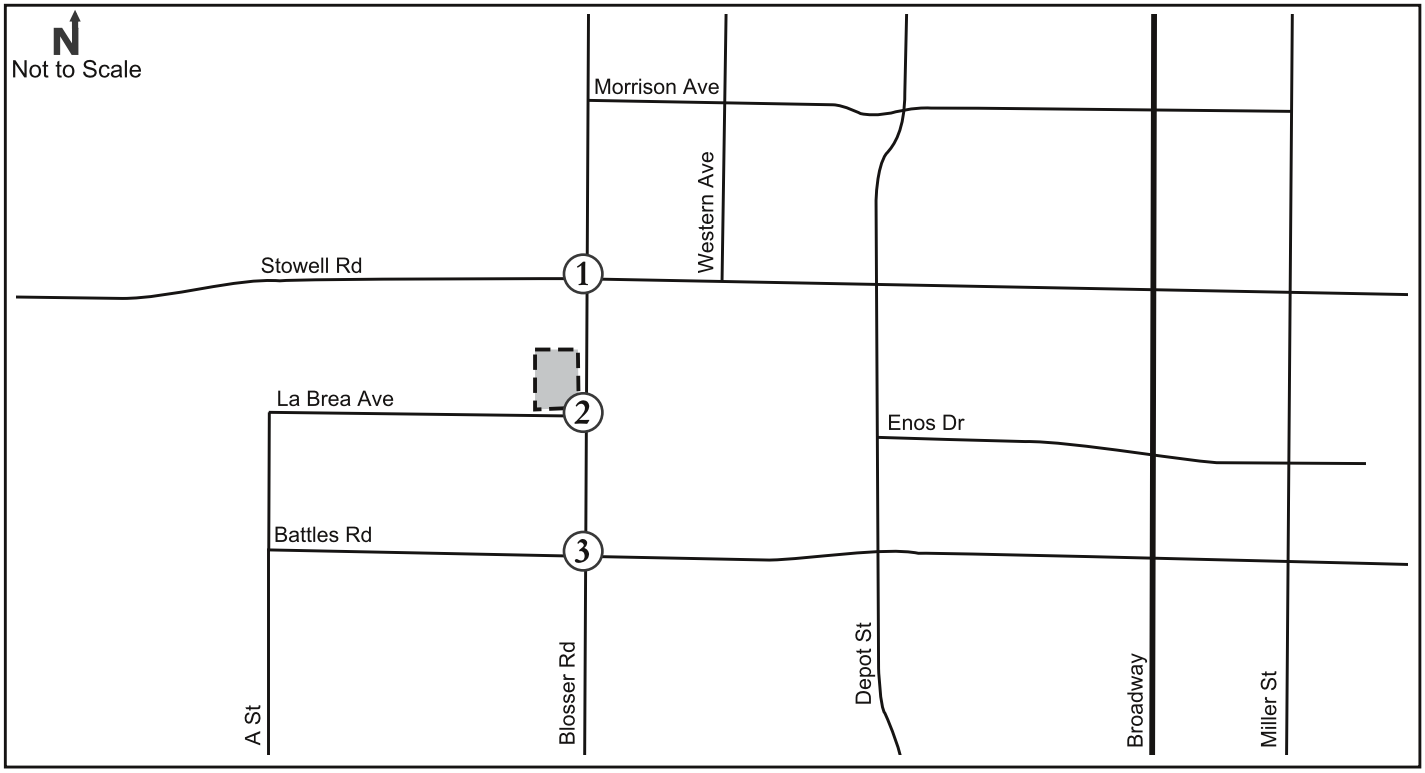
Table 2 shows the vehicular LOS for the study intersections, with detailed calculation sheets included in **Appendix B**.

Table 2: Existing Intersection LOS

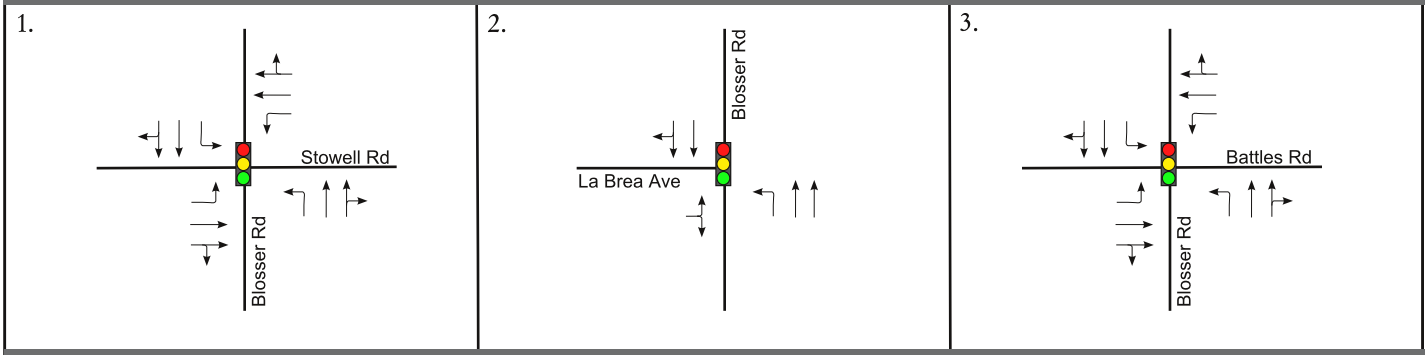
Existing Intersection Levels of Service					
Intersection	**Control**	**Peak Hour**	**Delay[1]**	**LOS**	**LOS Standard**
1. Blosser Rd/Stowell Rd	Signal	AM	22.4	C	D
		PM	41.8	D	
2. Blosser Rd/La Brea Ave	Signal	AM	7.0	A	D
		PM	14.5	B	
3. Blosser Rd/Battles Rd	Signal	AM	41.3	C	D
		PM	50.2	D	
1. HCM average control delay in seconds per vehicle for signalized intersections. Note: Unacceptable operations shown in **bold** text.					

All study intersections operate acceptably under Existing Conditions. In addition, all turn lane 95th percentile queue lengths would not exceed the storage length where a median is present or can be accommodated in an existing two-way left turn lane and would not block adjacent intersections, except the southbound left turn movement at Blosser Road/Battles Road (#3). This movement is reported to spill out of the left turn lane and block the through lane with a 95th percentile queue of approximately 260 feet. The existing left turn striping is 200 feet with approximately 225 feet of storage. The 50th percentile queue would not exceed storage.

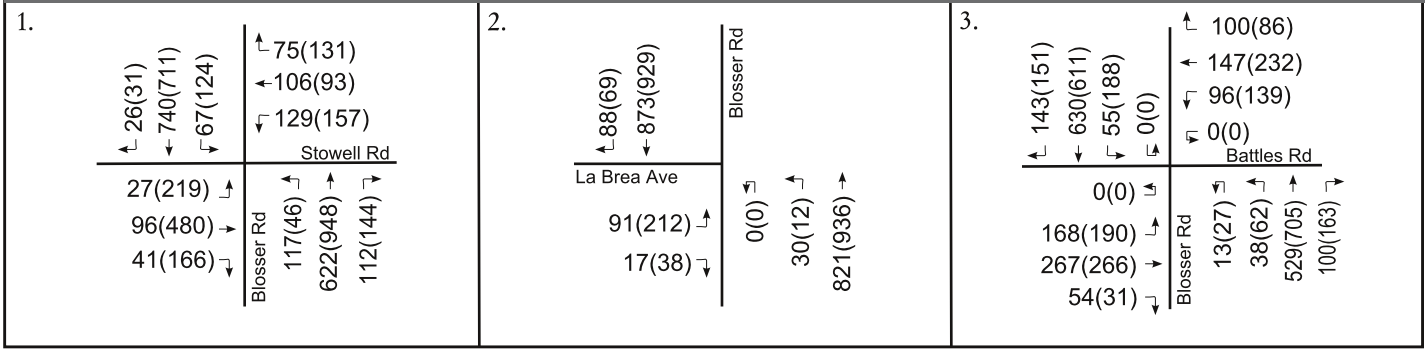
Figure 2: Existing Peak Hour Volumes and Lane Configurations



Existing Lane Configurations



Existing Volumes



Legend:

xx(yy) - AM(PM) Peak Hour Traffic Volumes

(x) - Study Intersection

- Project Site

- Traffic Signal

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Existing Plus Project Conditions

This section evaluates the impacts of the proposed project on the surrounding transportation network.

PROJECT TRAFFIC

The amount of project traffic affecting the study locations is estimated in three steps: trip generation, trip distribution, and trip assignment. Trip generation refers to the total number of trips generated by the site. Trip distribution identifies the general origins and destination of these trips, and trip assignment specifies the routes taken to reach these origins and destinations. The Institute of Transportation Engineers (ITE) *Trip Generation Manual* 10th Edition was used to estimate the project trip generation. Currently the site has approximately 40,000 SF of office, warehouse, showroom, vehicle repair, and storage use. The proposed project will keep an existing 4,566 SF office constructed within the past ten years and add additional office, commercial, and retail uses. **Table 3** summarizes the project trip generation.

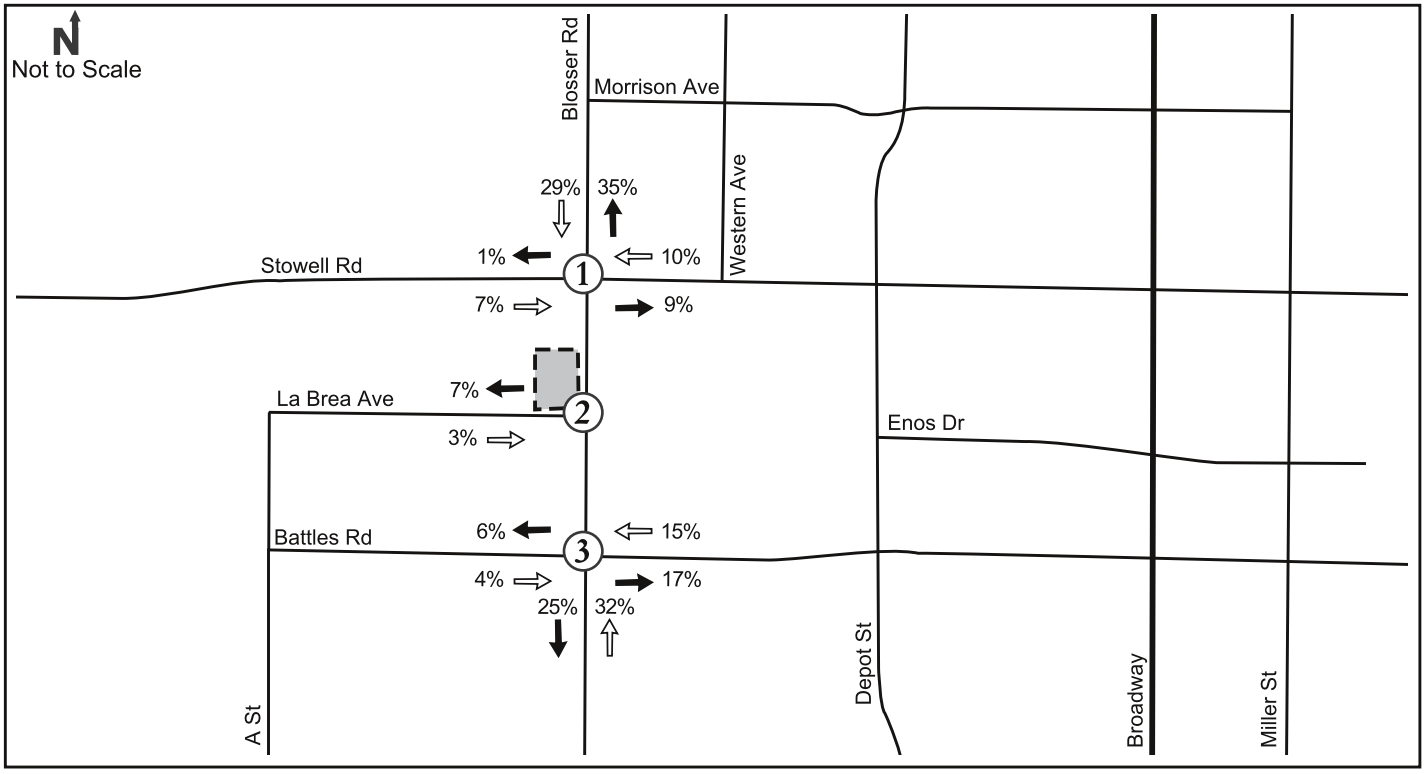
Table 3: Project Trip Generation

Project Trip Generation									
			Daily	AM Peak Hour			PM Peak Hour		
Land Use	Size		Total	In	Out	Total	In	Out	Total
Office[1]	24,000	SF	266	42	7	49	5	24	29
Commercial/Retail[2]	41,786	SF	3,321	107	66	173	137	148	285
Drive Thru Coffee[3]	2,700	SF	2,215	122	118	240	59	58	117
Gas Station & Car Wash[4]	6	Pumps	1,032	31	31	62	42	42	84
		Subtotal	**6,834**	**302**	**222**	**524**	**243**	**272**	**515**
		Internal Capture Trips[5]	*-500*	*-32*	*-32*	*-64*	*-50*	*-50*	*-100*
Existing Trips from Project Site[6]	*34,975*	*SF*	-544	*-11*	*-3*	*-14*	*-3*	*-11*	*-14*
		Total External Trips	***5,790***	***259***	***187***	***446***	***190***	***211***	***401***
		Pass-by Trips (Commercial/Retail)[2,7]	*-390*	*0*	*0*	*0*	*-39*	*-39*	*-78*
		Pass-by Trips (Drive-Thru Coffee)[3,7]	*-160*	*-53*	*-52*	*-105*	*-16*	*-16*	*-32*
		Pass-by Trips (Gas Station & Car Wash)[4,7]	*-180*	*-18*	*-18*	*-36*	*-18*	*-18*	*-36*
		Total Pass-By Trips	*-730*	*-71*	*-70*	*-141*	*-73*	*-73*	*-146*
		Net New Vehicle Trips	**5,060**	**188**	**117**	**305**	**117**	**138**	**255**

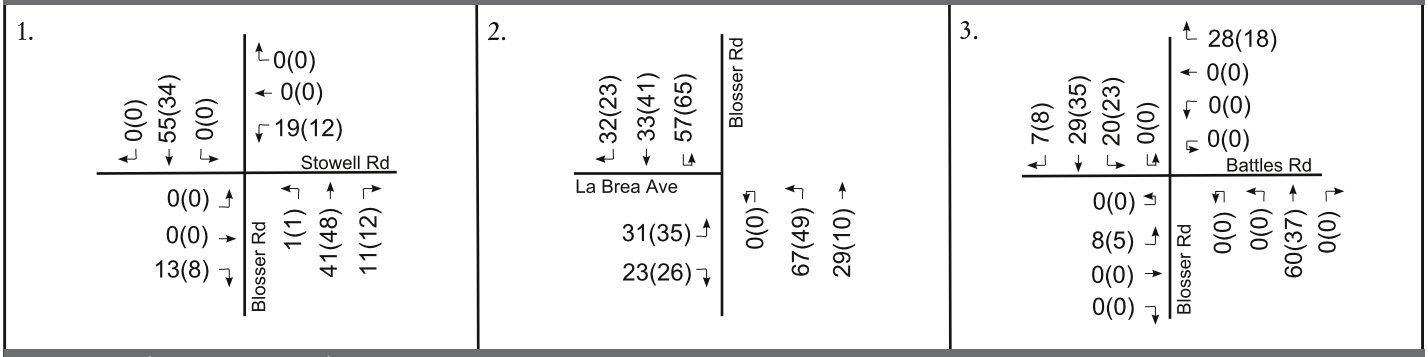
SF = Square Feet; ITE = Institute of Transportation Engineers.
1. ITE Land Use Code #710, General Office Building. Fitted curve equations used.
2. ITE Land Use Code #820, Shopping Center. Fitted curve equations used. AM pass-by not given; PM pass-by 34%.
3. ITE Land Use Code #937, Coffee/Donut Shop w/Drive-Through Window. Average rates used. Assumed AM pass-by 50%; PM pass-by 34% based on similar land uses.
4. ITE Land Use Code #944, Gasoline/Service Station. Average rates used. AM pass-by 58%; PM pass-by 42%.
5. AM (12%) & PM (19%) Internal Trips from TripGen 10 software; Daily Internal Trips assumed five times PM internal trips.
6. ITE Land Use Code #130, Industrial Park. Fitted curve equation used for daily. Average rates used for AM and PM.
7. PM peak hour pass-by trips multiplied by a factor of 5 to determine daily pass-by trips.
Source: ITE Trip Generation Manual, 10th Ed. and Trip Generation Handbook, 3rd Ed., 2017; CCTC, 2020.

The proposed project would generate 5,060 net new vehicle trips per weekday, including 305 AM peak hour trips and 255 PM peak hour trips. The trip distribution was estimated using a select zone analysis within the City's Travel Demand Model. **Figure 3** summarizes the project trip distribution, assignment, and Existing Plus Project volumes.

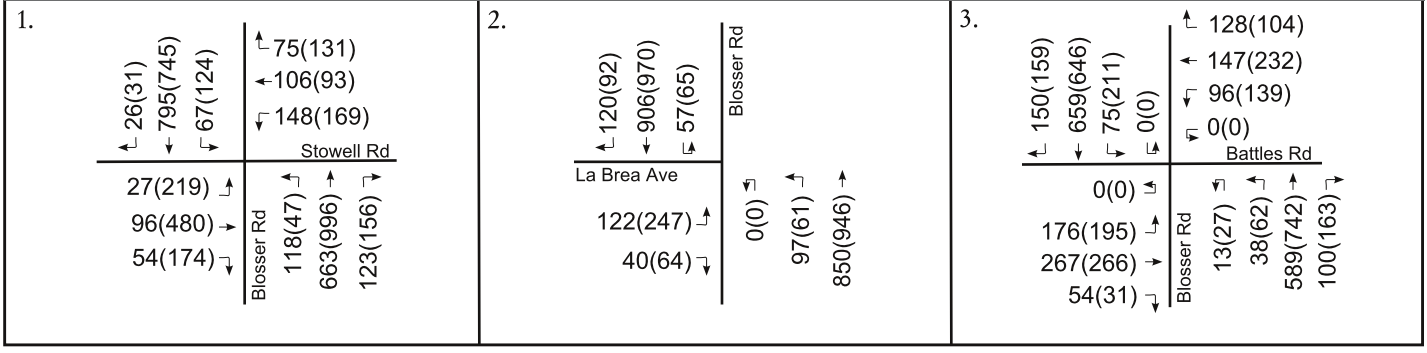
Figure 3: Trip Distribution, Trip Assignment, and Existing Plus Project Volumes



Trip Assignment including Pass-By



Existing Plus Project Volumes



Legend:

- (x) - Study Intersection
- Project Site
- xx(yy) - AM(PM) Peak Hour Traffic Volumes
- x% - Inbound Trip Distribution
- y% - Outbound Trip Distribution

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EXISTING PLUS PROJECT INTERSECTION OPERATIONS

Figure 3 shows the Existing Plus Project peak hour traffic volumes. **Table 4** shows the vehicular LOS for the study intersections under Existing Plus Project Conditions, with detailed calculation sheets included in **Appendix B**.

Table 4: Existing and Existing Plus Project Intersection LOS

Existing and Existing Plus Project Intersection Levels of Service					
	Peak	Existing		Existing + Project	
Intersection	Hour	Delay[1]	LOS	Delay[1]	LOS
1. Blosser Rd/Stowell Rd	AM	22.4	C	23.4	C
	PM	41.8	D	41.3	D
2. Blosser Rd/La Brea Ave	AM	7.0	A	14.4	B
	PM	14.5	B	19.9	B
3. Blosser Rd/Battles Rd	AM	41.3	C	43.0	D
	PM	50.2	D	53.9	D

1. HCM average control delay in seconds per vehicle for signalized intersections.
Note: Unacceptable operations shown in **bold** text.

All study intersections operate acceptably under Existing and Existing Plus Project Conditions. At Blosser Rd/Stowell Rd (#1) the project adds more traffic to non-impacted movements than impacted movements decreasing the overall delay.

In addition, all turn lane 95th percentile queue lengths would not exceed the storage length where a median is present or can be accommodated in existing two-way left turn lanes and would not block adjacent intersections, except the southbound left turn movement at Blosser Road/Battles Road (#3). The addition of project traffic would exacerbate the southbound left turn queue by less than two vehicles. Updating the Force-off value allowing additional green time for the southbound left turn would improve the queue to no project conditions. However, the 95th percentile queue would still exceed the storage length by approximately two vehicles.

As detailed in the following section, left turns from the project site to Blosser Road would operate unacceptably. We recommend the Blosser Rd/La Brea Ave (#2) intersection be modified to allow southbound U-turns with the addition of project traffic. If U-turns cannot be accommodated under Existing Plus Project Conditions, increasing the force-off values for the La Brea Avenue approach to the traffic signal is recommended to minimize queuing.

SITE ACCESS AND ON-SITE CIRCULATION

CCTC reviewed the proposed site plan shown on **Figure 1**, for vehicle, truck, pedestrian, and bike access and circulation. The site plan is conceptual at this time and will be refined as the project progresses to the design phase. The site access, on-site circulation, and frontage improvement recommendations are detailed below and shown on **Figure 4**.

Site Access

Site access is proposed from four full-access driveways. The American Association of State Highway and Transportation Officials (AASHTO) states that, "ideally, driveways should not be located within the functional area of an intersection or the influence area of an adjacent driveway."

There are two existing driveways on La Brea Avenue and Blosser Road, one for each parcel. The eastern most driveway on La Brea Avenue adjacent to Blosser Road will be removed. The existing western driveway on La

Brea Avenue is located approximately 320 feet west of the Blosser Road traffic signal. No additional driveways are recommended on La Brea Avenue based on the traffic signal operations.

The existing driveways on Blosser Road will be removed, and three new full access driveways are proposed. Allowing left turns from the project site to Blosser Road would result in unacceptable driveway operations and we recommend prohibiting outbound left turns at all three driveways. Left turns in to the site at the primary driveway on Blosser Road would operate acceptably under Existing and Cumulative Plus Project Conditions. Pedestrian and bicycle access should be visible and accommodated through all of the driveways. The primary (middle) driveway crosswalk is currently shown too far from turning traffic with a large undesirable crossing distance.

The southernmost driveway is located approximately 80 feet from the La Brea Avenue intersection within the intersection's influence area. We recommend that the southernmost driveway on Blosser Road be restricted to right-in, right-out and located as far as practical from the traffic signal. The northernmost driveway is located less than 200 feet from the primary (middle) driveway and we recommend this driveway be removed or restricted to right-in, right-out.

A reduction in driveways at the site would meet Land Use Objective 10d in the City's General Plan to, "allow retail and office uses to use shared parking arrangements to meet parking requirements where appropriate and encourage common access between centers to reduce the number of ingress and egress points along Broadway, Main, and other major arterials." Adjacent development has also been subject to access restrictions on Blosser Road.

If the City requires construction of a median on Blosser Road with no turns, the median south of La Brea Avenue would likely need to be modified for additional northbound left turn storage.

On-Site Circulation

We recommend truck turning templates be applied to the site plan to confirm access for deliveries and gas station fuel trucks. We also recommend pedestrian access be provided between the front and rear buildings connecting to the public street sidewalk network. We also recommend convenient and secure bike parking be located near buildings. The existing gate on the west side of the property should be removed for overall site circulation and driveway access.

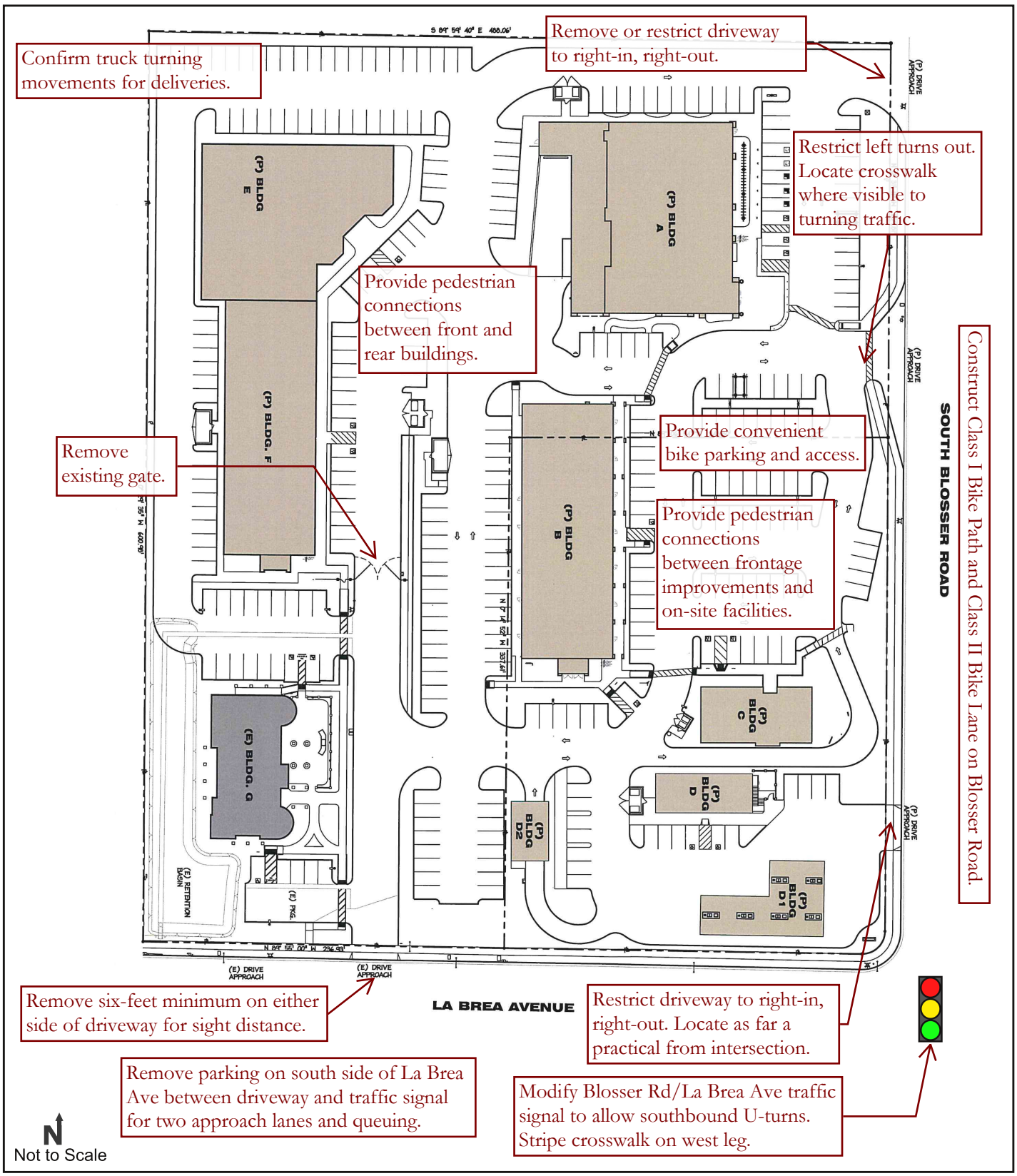
Frontage Improvements

The site plan currently shows a five-foot detached sidewalk on Blosser Road. The existing improvements south of La Brea Avenue include a meandering eight-foot path and an on-street southbound Class II bike lane. We recommend the project construct a Class I path and Class II bike lane on the west side of Blosser Road fronting the project site consistent with the City's Bikeways Master Plan.

The Blosser Road /La Brea Avenue (#2) intersection currently has pedestrian signals with no marked crosswalks. We recommend installation of a standard crosswalk on the west leg. Crosswalks on Blosser Road should be installed when the eastern leg is constructed. With no existing east leg of the intersection, southbound left and U-turns are prohibited. We recommend the traffic signal be modified to allow U-turns with the additional of project traffic. Note that widening may be required on the east side of Blosser Road to accommodate the U-turn movement under Existing Conditions. Adjacent development will construct the east leg of the Blosser Rd/La Brea Ave (#2) intersection including frontage improvements on the east side of Blosser Road. However, the timing of the improvements is unknown.

Parking removal on the south side of La Brea Avenue from the traffic signal to the driveway is recommended for two approach lanes to the traffic signal to accommodate the vehicle queuing and future restriping to a left turn and through-right lane when the eastern leg is constructed. We also recommend the removal of parking on the north side of the road on both sides of the existing driveway for sight distance. The California Manual on Uniform Traffic Control Devices (CAMUTCD) Section 3B.19 notes that, "A clearance of 6 feet measured from the curb return should be provided at alleys and driveways." Ten feet is preferred.

Figure 4: Project Site Plan Recommendations



Source: tom b. martinez & associates (December 2020)

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VEHICLE MILES TRAVELED (VMT)

The City of Santa Maria has not adopted VMT thresholds at this time, so thresholds recommended by the Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA are applied below.

The State Office of Planning and Research (OPR) published a Technical Advisory in December 2018 with recommendations for evaluating VMT for various project types including redevelopment projects. Where a project replaces existing VMT-generating uses, the project would have a less-than-significant impact on VMT if it reduces overall VMT. If it increases overall VMT then thresholds for the individual uses should be applied. The SBCAG Travel Demand Model is used to evaluate the project's change to VMT.

The SBCAG Travel Demand Model was used to develop VMT estimates with and without buildout of the proposed project. The model includes land use inputs in both square feet and employees. The employees calculated for the project were based on the average number of employees per 1,000 square feet in the model for the City of Santa Maria. A new Traffic Analysis Zone (TAZ) was added to the model for the project and the 2020 model year was run for conditions with and without the project. No TDM reductions for the 101 In Motion project were applied to either run.

The proposed project's effect on total regional VMT is summarized in **Table 5.**

Table 5: Regional VMT Summary

2020 Regional VMT			
	No Project	**With Project**	**Change**
SB County Employees	220,237	220,434	197
SB County VMT	9,524,546	9,515,858	-8,688
Source: SBCAG TDM, CCTC, 2021			

The project would reduce total regional VMT by providing jobs and shopping destinations in a predominantly residential area. This is a less than significant impact using OPR's redevelopment threshold.

Cumulative Conditions

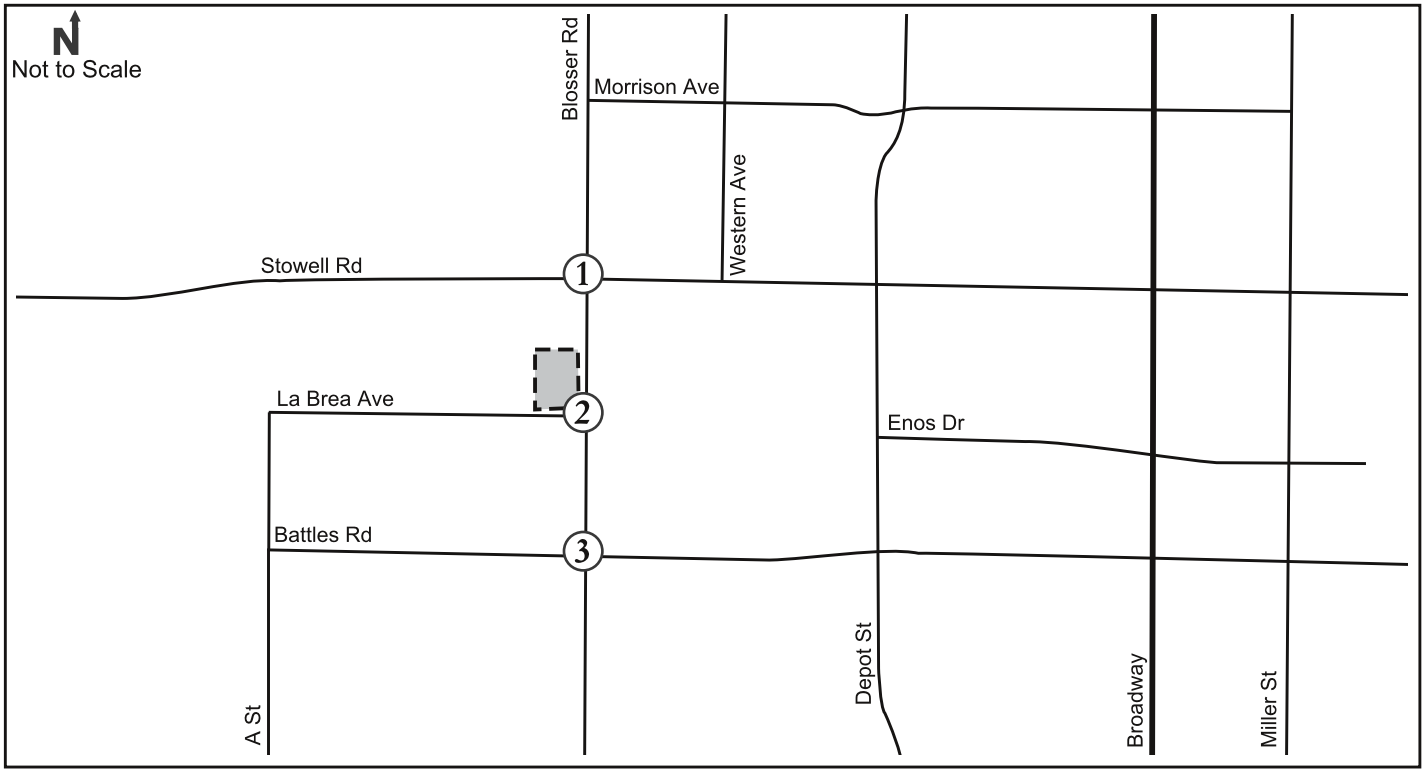
Cumulative Conditions represents future traffic conditions including approved and pending projects located in the City of Santa Maria.

CUMULATIVE METHODOLOGY

Cumulative traffic volume forecasts were developed from the Acquistapace Blosser Southeast (Area 5B) Specific Plan Amendment: Revised Traffic Impact Study (Associated Transportation Engineers, 2019). The Specific Plan improvements including construction of an east leg of La Brea Avenue was assumed under Cumulative Conditions. Under Cumulative Conditions a PHF of 0.92 was used for the analysis. However, if the existing PHF exceeded this value the higher PHF was used.

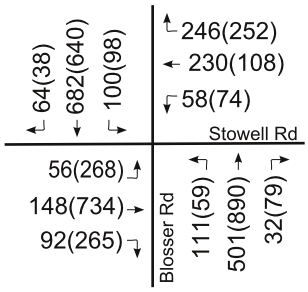
Cumulative and Cumulative Plus Project volumes are shown on **Figure 5**.

Figure 5: Cumulative and Cumulative Plus Project Volumes



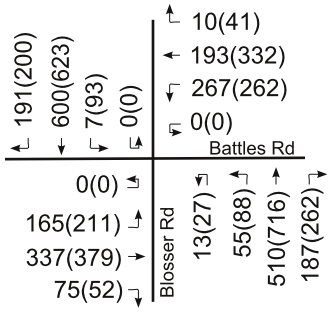
Cumulative Volumes

1.



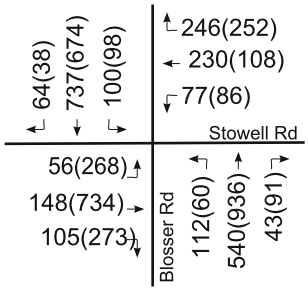
2.

3.

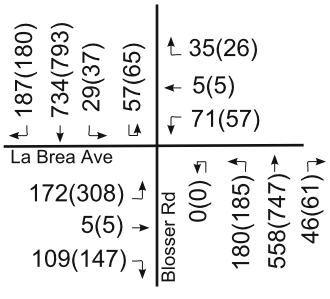


Cumulative Plus Project Volumes

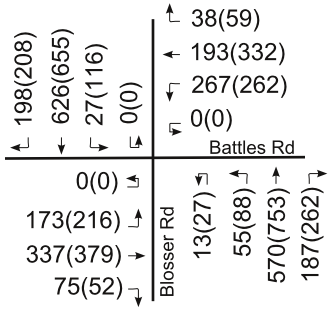
1.



2.



3.



Legend:

- Project Site
- xx(yy) - AM(PM) Peak Hour Traffic Volumes
- (x) - Study Intersection

Central Coast Transportation Consulting
Traffic Engineering & Transportation Planning

January 2021

Rancho Harvest Santa Maria

CUMULATIVE INTERSECTION OPERATIONS

Table 6 shows the vehicular LOS for the study intersections under Cumulative and Cumulative Plus Project Conditions, with detailed calculation sheets included in **Appendix B**.

Table 6: Cumulative and Cumulative Plus Project Intersection LOS

Cumulative and Cumulative Plus Project Intersection Levels of Service							
		Cumulative (Existing Timing)		Cumulative + Project (Existing Timing)		Cumulative + Project (Modified Timing)	
Intersection	Peak Hour	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
1. Blosser Rd/Stowell Rd	AM	28.3	C	28.3	C	34.7	C
	PM	54.8	D	**58.6**	**E**	49.0	D
2. Blosser Rd/La Brea Ave	AM	18.1	B	23.7	C	18.2	B
	PM	27.4	C	42.7	D	26.1	C
3. Blosser Rd/Battles Rd	AM	41.1	D	45.8	D	39.2	D
	PM	**57.2**	**E**	**59.8**	**E**	52.7	D

1. HCM average control delay in seconds per vehicle for signalized intersections.
Note: Unacceptable operations shown in **bold** text.

All study intersections operate acceptably under Cumulative Plus Project Conditions with the following improvements:

- Update yellow change intervals for through movement phases at study intersections in compliance with CAMUTCD Section 4D.26.
- Modify AM and PM Force-off times, offsets, and corridor cycle length.
- Modify the Blosser Rd/La Brea Ave (#2) intersection and traffic signal operations as follows:
    - Add signal phase for protected southbound left and U-turns. U-turn phasing is consistent with Existing Plus Project recommendations.
    - Add a crosswalk on west leg consistent with Existing Plus Project recommendations.
    - Add eastern leg of La Brea Avenue with left turn lane and through-right lane with permissive signal phasing. Add crosswalk on north, south, and east legs. (Note: Improvements to be completed by adjacent development).

In addition, all turn lane 95th percentile queue lengths would not exceed the storage length where a median is present or can be accommodated in an existing two-way left turn lane and would not block adjacent intersections.

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Prepared by National Data & Surveying Services

S Blosser Rd & W Stowell Rd

Peak Hour Turning Movement Count

ID: 18-02092-001
City: Santa Maria

Day: Thursday
Date: 09/06/2018

PEAK HOURS

AM: 07:15 AM - 08:15 AM
NOON: NONE
PM: 04:30 PM - 05:30 PM

COUNT PERIODS

AM: 07:00 AM - 09:00 AM
NOON: NONE
PM: 04:00 PM - 06:00 PM

S Blosser Rd — SOUTHBOUND

AM	26	740	67	0	724	AM
NOON	0	0	0	0	0	NOON
PM	31	711	124	0	1298	PM

W Stowell Rd — EASTBOUND

AM	NOON	PM	
249	0	170	⇦
0	0	0	↶ 0
27	0	219	↱ 0
96	0	480	→ 0
41	0	166	↴ 0
AM	NOON	PM	

W Stowell Rd — WESTBOUND

PM	NOON	AM	
131	0	75	0 ↰
93	0	106	0 ←
157	0	129	0 ↶
0	0	0	0 ↶
748	0	275	⇨
PM	NOON	AM	

CONTROL

0

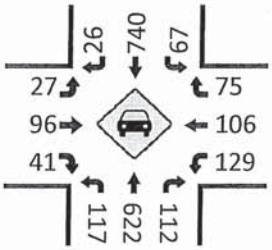
TEV	2158 AM	0 NOON	3250 PM
PHF	0.82		0.98

S Blosser Rd — NORTHBOUND

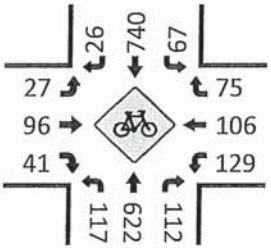
PM	1034	0	46	948	144	PM
NOON	0	0	0	0	0	NOON
AM	910	0	117	622	112	AM

S Blosser Rd

Total Vehicles (AM)



(AM)



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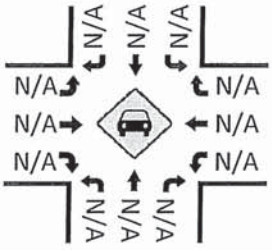
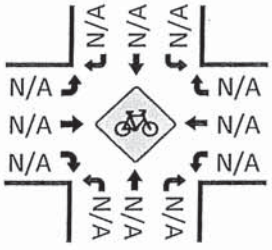
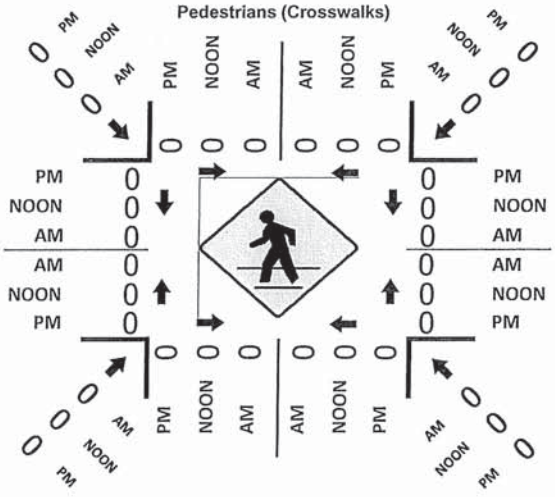


(NOON)



Pedestrians (Crosswalks)



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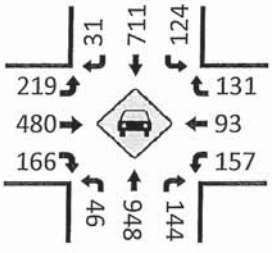

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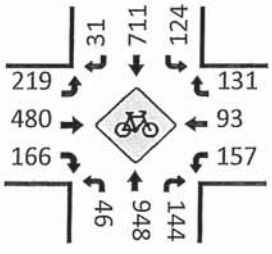


Prepared by National Data & Surveying Services

Blosser Rd & La Brea Ave

Peak Hour Turning Movement Count

ID: 19-02018-002
City: Santa Maria

Day: Thursday
Date: 03/28/2019

PEAK HOURS

AM	07:15 AM - 08:15 AM
NOON	NONE
PM	04:30 PM - 05:30 PM

COUNT PERIODS

AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

Blosser Rd — SOUTHBOUND

AM	88	873	0	0	912	AM
NOON	0	0	0	0	0	NOON
PM	69	929	0	0	1148	PM

0 2 0 0

La Brea Ave — EASTBOUND

AM	NOON	PM		
118	0	81		
0	0	0	0	
91	0	212	0	
0	0	0	1	
17	0	38	1	
AM	NOON	PM		

La Brea Ave — WESTBOUND

PM	NOON	AM	
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	
PM	NOON	AM	

CONTROL

Signalized

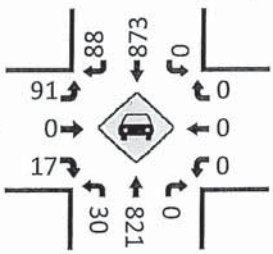
TEV	1920 AM	0 NOON	2196 PM
PHF	0.80		0.94

0 1 2 0

Blosser Rd — NORTHBOUND

PM	967	0	12	936	0	PM
NOON	0	0	0	0	0	NOON
AM	890	0	30	821	0	AM

Total Vehicles (AM)



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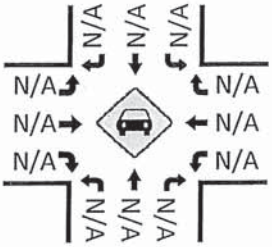
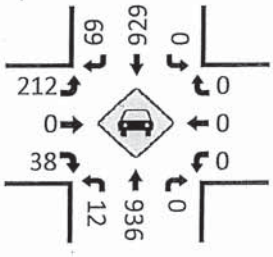
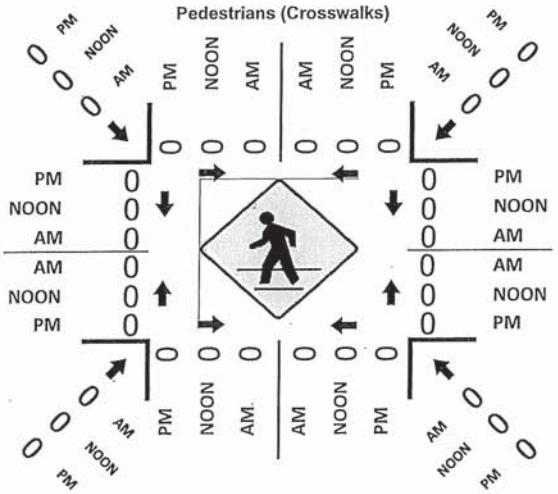


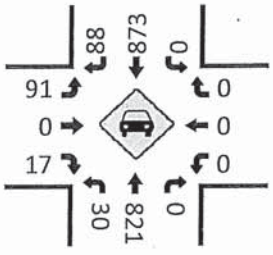
Total Vehicles (PM)



Pedestrians (Crosswalks)



Total Vehicles (AM)



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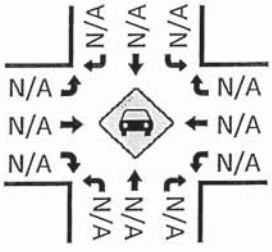
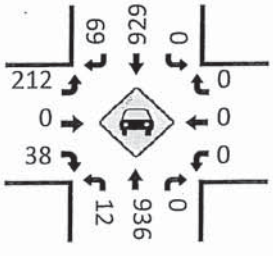


Total Vehicles (PM)



Prepared by National Data & Surveying Services

S Blosser Rd & W Battles Rd

Peak Hour Turning Movement Count

ID: 18-02092-002
City: Santa Maria

Day: Thursday
Date: 09/06/2018

PEAK HOURS		COUNT PERIODS
AM	07:15 AM - 08:15 AM	07:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:30 PM - 05:30 PM	04:00 PM - 06:00 PM

S Blosser Rd – SOUTHBOUND

	Right	Thru	Left	U-Turn	Departing (northbound)
AM	143	630	55	0	797
NOON	0	0	0	0	0
PM	151	611	188	0	981
Lanes	0	0	0	0	

W Battles Rd – EASTBOUND

	AM	NOON	PM	Lanes
Departing (westbound)	328	0	445	
U-Turn	0	0	0	0
Left	168	0	190	0
Thru	267	0	266	0
Right	54	0	31	0

W Battles Rd – WESTBOUND

	PM	NOON	AM	Lanes
Right	86	0	100	0
Thru	232	0	147	0
Left	139	0	96	0
U-Turn	0	0	0	0
Departing (eastbound)	617	0	422	

S Blosser Rd – NORTHBOUND

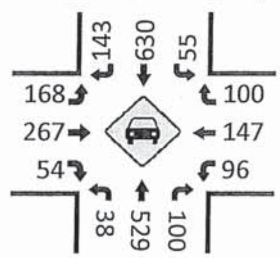
	Departing (southbound)	U-Turn	Left	Thru	Right
Lanes		0	0	0	0
PM	808	27	62	705	163
NOON	0	0	0	0	0
AM	793	13	38	529	100

CONTROL

0

	AM	NOON	PM
TEV	2340	0	2851
PHF	0.77		0.96

Total Vehicles (AM)



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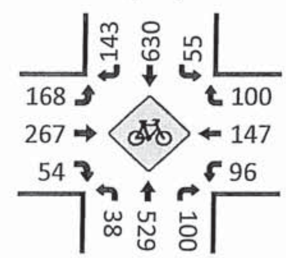
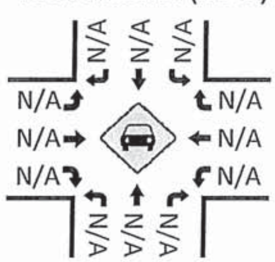


Total Vehicles (Noon)



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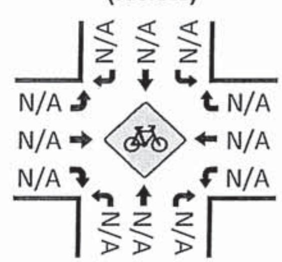
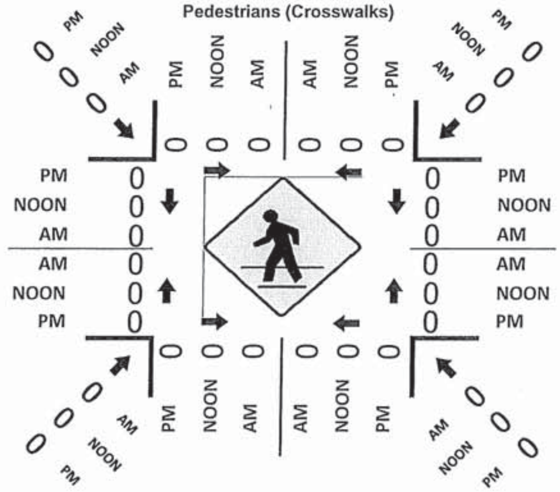
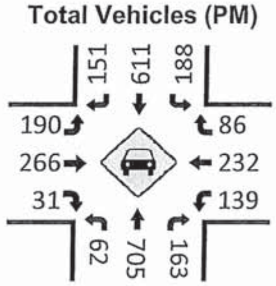


Pedestrians (Crosswalks)



Total Vehicles (PM)



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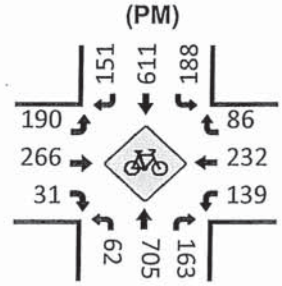
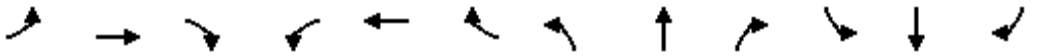
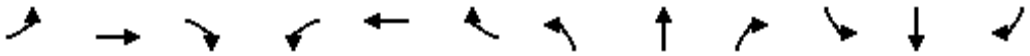




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	96	41	129	106	75	117	622	112	67	740	26
Future Volume (veh/h)	27	96	41	129	106	75	117	622	112	67	740	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	117	50	157	129	91	143	759	137	82	902	32
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	180	73	188	319	210	169	1774	320	104	1938	69
Arrive On Green	0.02	0.07	0.07	0.11	0.16	0.16	0.19	1.00	1.00	0.06	0.55	0.55
Sat Flow, veh/h	1781	2464	1003	1781	2053	1351	1781	3007	543	1781	3501	124
Grp Volume(v), veh/h	33	83	84	157	110	110	143	448	448	82	458	476
Grp Sat Flow(s),veh/h/ln	1781	1777	1690	1781	1777	1627	1781	1777	1773	1781	1777	1848
Q Serve(g_s), s	2.0	5.0	5.4	9.5	6.2	6.7	8.5	0.0	0.0	5.0	17.0	17.0
Cycle Q Clear(g_c), s	2.0	5.0	5.4	9.5	6.2	6.7	8.5	0.0	0.0	5.0	17.0	17.0
Prop In Lane	1.00		0.59	1.00		0.83	1.00		0.31	1.00		0.07
Lane Grp Cap(c), veh/h	41	130	124	188	276	253	169	1048	1046	104	984	1023
V/C Ratio(X)	0.80	0.64	0.68	0.84	0.40	0.43	0.85	0.43	0.43	0.79	0.47	0.47
Avail Cap(c_a), veh/h	97	388	369	275	565	518	227	1048	1046	178	984	1023
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.5	49.6	49.7	48.3	41.8	42.1	43.8	0.0	0.0	51.1	14.8	14.8
Incr Delay (d2), s/veh	12.0	5.1	6.4	9.1	0.9	1.2	14.4	1.2	1.2	4.8	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.3	2.4	4.6	2.7	2.7	4.0	0.3	0.3	2.3	6.8	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.5	54.6	56.2	57.4	42.8	43.2	58.2	1.2	1.2	55.9	16.3	16.3
LnGrp LOS	E	D	E	E	D	D	E	A	A	E	B	B
Approach Vol, veh/h		200			377			1039			1016	
Approach Delay, s/veh		57.1			49.0			9.0			19.5	
Approach LOS		E			D			A			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.4	66.9	6.6	22.1	10.4	70.9	15.6	13.0
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	14.0	36.0	6.0	35.0	11.0	39.0	17.0	24.0
Max Q Clear Time (g_c+I1), s	10.5	19.0	4.0	8.7	7.0	2.0	11.5	7.4
Green Ext Time (p_c), s	0.1	10.6	0.0	1.2	0.0	16.2	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	0	17	0	0	0	30	821	0	0	873	88
Future Volume (vph)	91	0	17	0	0	0	30	821	0	0	873	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	5.5			5.5	
Lane Util. Factor	1.00		1.00				1.00	0.95			0.95	
Frt	1.00		0.85				1.00	1.00			0.99	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1770		1583				1770	3539			3491	
Flt Permitted	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (perm)	1770		1583				1770	3539			3491	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	114	0	21	0	0	0	38	1026	0	0	1091	110
RTOR Reduction (vph)	0	0	18	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	114	0	3	0	0	0	38	1026	0	0	1197	0
Turn Type	Perm		Perm				Prot	NA			NA	
Protected Phases							1	6			2	
Permitted Phases	8		8									
Actuated Green, G (s)	13.3		13.3				4.5	87.2			78.7	
Effective Green, g (s)	13.3		13.3				4.5	87.2			78.7	
Actuated g/C Ratio	0.12		0.12				0.04	0.79			0.72	
Clearance Time (s)	4.0		4.0				4.0	5.5			5.5	
Vehicle Extension (s)	4.0		4.0				1.5	6.0			6.0	
Lane Grp Cap (vph)	214		191				72	2805			2497	
v/s Ratio Prot							c0.02	0.29			c0.34	
v/s Ratio Perm	c0.06		0.00									
v/c Ratio	0.53		0.01				0.53	0.37			0.48	
Uniform Delay, d1	45.4		42.6				51.7	3.3			6.8	
Progression Factor	1.00		1.00				1.22	0.87			0.46	
Incremental Delay, d2	3.2		0.0				2.8	0.3			0.6	
Delay (s)	48.7		42.6				66.0	3.2			3.7	
Level of Service	D		D				E	A			A	
Approach Delay (s)		47.7			0.0			5.5			3.7	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Edition methodology does not support Non-NEMA phasing.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	168	267	54	96	147	100	13	38	529	100	55	630
Future Volume (vph)	168	267	54	96	147	100	13	38	529	100	55	630
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.97		1.00	0.94			1.00	0.98		1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3450		1770	3324			1770	3455		1770	3441
Flt Permitted	0.95	1.00		0.95	1.00			0.38	1.00		0.95	1.00
Satd. Flow (perm)	1770	3450		1770	3324			710	3455		1770	3441
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	218	347	70	125	191	130	17	49	687	130	71	818
RTOR Reduction (vph)	0	18	0	0	111	0	0	0	11	0	0	15
Lane Group Flow (vph)	218	399	0	125	210	0	0	66	806	0	71	989
Turn Type	Prot	NA		Prot	NA		custom	Prot	NA		Prot	NA
Protected Phases	3	8		7	4			1	6		5	2
Permitted Phases							1					
Actuated Green, G (s)	16.1	20.8		11.3	16.0			10.5	53.3		5.6	48.4
Effective Green, g (s)	16.1	20.8		11.3	16.0			10.5	53.3		5.6	48.4
Actuated g/C Ratio	0.15	0.19		0.10	0.15			0.10	0.48		0.05	0.44
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	259	652		181	483			67	1674		90	1514
v/s Ratio Prot	c0.12	c0.12		0.07	0.06				0.23		0.04	c0.29
v/s Ratio Perm								c0.09				
v/c Ratio	0.84	0.61		0.69	0.43			0.99	0.48		0.79	0.65
Uniform Delay, d1	45.7	40.9		47.7	42.9			49.7	19.1		51.6	24.2
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.82	1.56
Incremental Delay, d2	20.4	2.7		8.8	1.5			103.8	1.0		30.6	2.0
Delay (s)	66.2	43.6		56.5	44.4			153.5	20.1		73.1	39.7
Level of Service	E	D		E	D			F	C		E	D
Approach Delay (s)		51.4			47.8				30.0			41.9
Approach LOS		D			D				C			D

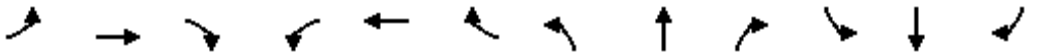
Intersection Summary			
HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	143
Future Volume (vph)	143
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.77
Adj. Flow (vph)	186
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

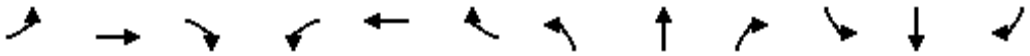
HCM 6th Edition cannot analyze u-turn movements.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	219	480	166	157	93	131	46	948	144	124	711	31
Future Volume (veh/h)	219	480	166	157	93	131	46	948	144	124	711	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	223	490	169	160	95	134	47	967	147	127	726	32
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	563	193	189	322	288	60	1292	196	154	1631	72
Arrive On Green	0.14	0.22	0.22	0.11	0.18	0.18	0.03	0.42	0.42	0.09	0.47	0.47
Sat Flow, veh/h	1781	2597	890	1781	1777	1585	1781	3093	470	1781	3467	153
Grp Volume(v), veh/h	223	334	325	160	95	134	47	555	559	127	372	386
Grp Sat Flow(s),veh/h/ln	1781	1777	1710	1781	1777	1585	1781	1777	1786	1781	1777	1843
Q Serve(g_s), s	13.5	20.0	20.2	9.7	5.1	8.3	2.9	29.1	29.2	7.7	15.4	15.4
Cycle Q Clear(g_c), s	13.5	20.0	20.2	9.7	5.1	8.3	2.9	29.1	29.2	7.7	15.4	15.4
Prop In Lane	1.00		0.52	1.00		1.00	1.00		0.26	1.00		0.08
Lane Grp Cap(c), veh/h	252	385	371	189	322	288	60	742	746	154	836	867
V/C Ratio(X)	0.89	0.87	0.88	0.85	0.29	0.47	0.78	0.75	0.75	0.82	0.44	0.45
Avail Cap(c_a), veh/h	275	436	420	227	388	346	113	742	746	178	836	867
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	0.90	0.90	0.90	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	41.6	41.6	48.3	38.9	40.3	52.7	27.1	27.1	49.4	19.5	19.5
Incr Delay (d2), s/veh	24.4	15.4	16.9	19.0	0.5	1.2	7.1	6.1	6.1	20.4	1.7	1.7
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	7.5	10.1	10.0	5.2	2.2	3.3	1.4	12.8	12.8	4.2	6.4	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.8	57.0	58.5	67.3	39.4	41.4	59.8	33.3	33.3	69.8	21.2	21.2
LnGrp LOS	E	E	E	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		882			389			1161			885	
Approach Delay, s/veh		61.0			51.6			34.3			28.2	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	57.8	19.6	25.0	13.5	52.0	15.7	28.9
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	7.0	43.0	17.0	24.0	11.0	39.0	14.0	27.0
Max Q Clear Time (g_c+I1), s	4.9	17.4	15.5	10.3	9.7	31.2	11.7	22.2
Green Ext Time (p_c), s	0.0	11.2	0.1	1.0	0.0	6.3	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	41.8
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	0	38	0	0	0	12	936	0	0	929	69
Future Volume (vph)	212	0	38	0	0	0	12	936	0	0	929	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	5.5			5.5	
Lane Util. Factor	1.00		1.00				1.00	0.95			0.95	
Frt	1.00		0.85				1.00	1.00			0.99	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1770		1583				1770	3539			3503	
Flt Permitted	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (perm)	1770		1583				1770	3539			3503	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	226	0	40	0	0	0	13	996	0	0	988	73
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	226	0	7	0	0	0	13	996	0	0	1057	0
Turn Type	Perm		Perm				Prot	NA			NA	
Protected Phases							1	6			2	
Permitted Phases	8		8									
Actuated Green, G (s)	20.1		20.1				2.3	80.4			74.1	
Effective Green, g (s)	20.1		20.1				2.3	80.4			74.1	
Actuated g/C Ratio	0.18		0.18				0.02	0.73			0.67	
Clearance Time (s)	4.0		4.0				4.0	5.5			5.5	
Vehicle Extension (s)	4.0		4.0				1.5	6.0			6.0	
Lane Grp Cap (vph)	323		289				37	2586			2359	
v/s Ratio Prot							0.01	c0.28			c0.30	
v/s Ratio Perm	c0.13		0.00									
v/c Ratio	0.70		0.03				0.35	0.39			0.45	
Uniform Delay, d1	42.1		36.9				53.1	5.5			8.4	
Progression Factor	1.00		1.00				1.31	0.69			1.77	
Incremental Delay, d2	7.0		0.0				1.6	0.3			0.5	
Delay (s)	49.1		37.0				71.0	4.2			15.3	
Level of Service	D		D				E	A			B	
Approach Delay (s)		47.3			0.0			5.0			15.3	
Approach LOS		D			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Edition methodology does not support Non-NEMA phasing.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	190	266	31	139	232	86	27	62	705	163	188	611
Future Volume (vph)	190	266	31	139	232	86	27	62	705	163	188	611
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.98		1.00	0.96			1.00	0.97		1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3484		1770	3395			1770	3439		1770	3434
Flt Permitted	0.95	1.00		0.95	1.00			0.18	1.00		0.95	1.00
Satd. Flow (perm)	1770	3484		1770	3395			331	3439		1770	3434
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	198	277	32	145	242	90	28	65	734	170	196	636
RTOR Reduction (vph)	0	9	0	0	40	0	0	0	15	0	0	20
Lane Group Flow (vph)	198	300	0	145	292	0	0	93	889	0	196	773
Turn Type	Prot	NA		Prot	NA		custom	Prot	NA		Prot	NA
Protected Phases	3	8		7	4			1	6		5	2
Permitted Phases							1					
Actuated Green, G (s)	13.6	19.8		11.1	17.3			22.5	46.6		13.5	37.6
Effective Green, g (s)	13.6	19.8		11.1	17.3			22.5	46.6		13.5	37.6
Actuated g/C Ratio	0.12	0.18		0.10	0.16			0.20	0.42		0.12	0.34
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	218	627		178	533			67	1456		217	1173
v/s Ratio Prot	c0.11	c0.09		0.08	0.09				0.26		0.11	c0.23
v/s Ratio Perm								c0.28				
v/c Ratio	0.91	0.48		0.81	0.55			1.39	0.61		0.90	0.66
Uniform Delay, d1	47.6	40.5		48.4	42.7			43.8	24.6		47.6	30.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.09	1.01
Incremental Delay, d2	35.9	1.4		22.9	2.3			243.5	1.9		33.2	2.7
Delay (s)	83.5	41.9		71.4	45.0			287.3	26.6		85.2	33.8
Level of Service	F	D		E	D			F	C		F	C
Approach Delay (s)		58.1			53.0				50.9			44.0
Approach LOS		E			D				D			D

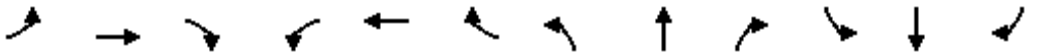
Intersection Summary			
HCM 2000 Control Delay	50.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	151
Future Volume (vph)	151
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	157
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

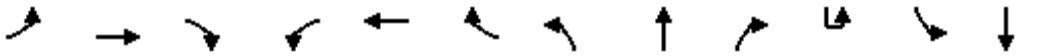
HCM 6th Edition cannot analyze u-turn movements.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	96	54	148	106	75	118	663	123	67	795	26
Future Volume (veh/h)	27	96	54	148	106	75	118	663	123	67	795	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	33	117	66	180	129	91	144	809	150	82	970	32
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	41	178	94	210	358	235	170	1709	317	104	1876	62
Arrive On Green	0.02	0.08	0.08	0.12	0.17	0.17	0.19	1.00	1.00	0.06	0.53	0.53
Sat Flow, veh/h	1781	2243	1190	1781	2053	1351	1781	2992	555	1781	3511	116
Grp Volume(v), veh/h	33	91	92	180	110	110	144	480	479	82	491	511
Grp Sat Flow(s),veh/h/ln	1781	1777	1656	1781	1777	1627	1781	1777	1770	1781	1777	1850
Q Serve(g_s), s	2.0	5.5	5.9	10.9	6.0	6.6	8.6	0.0	0.0	5.0	19.6	19.6
Cycle Q Clear(g_c), s	2.0	5.5	5.9	10.9	6.0	6.6	8.6	0.0	0.0	5.0	19.6	19.6
Prop In Lane	1.00		0.72	1.00		0.83	1.00		0.31	1.00		0.06
Lane Grp Cap(c), veh/h	41	141	131	210	309	283	170	1015	1011	104	949	988
V/C Ratio(X)	0.80	0.65	0.70	0.86	0.36	0.39	0.85	0.47	0.47	0.79	0.52	0.52
Avail Cap(c_a), veh/h	97	388	361	275	565	518	227	1015	1011	178	949	988
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.5	49.1	49.4	47.6	40.0	40.2	43.7	0.0	0.0	51.1	16.5	16.5
Incr Delay (d2), s/veh	12.0	4.9	6.6	15.0	0.7	0.9	15.7	1.6	1.6	4.8	2.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.6	2.6	5.6	2.6	2.6	4.1	0.4	0.4	2.3	7.9	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.5	54.0	55.9	62.5	40.7	41.1	59.4	1.6	1.6	55.9	18.5	18.4
LnGrp LOS	E	D	E	E	D	D	E	A	A	E	B	B
Approach Vol, veh/h		216			400			1103			1084	
Approach Delay, s/veh		56.6			50.6			9.1			21.3	
Approach LOS		E			D			A			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.5	64.8	6.6	24.2	10.4	68.8	17.0	13.7
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	14.0	36.0	6.0	35.0	11.0	39.0	17.0	24.0
Max Q Clear Time (g_c+I1), s	10.6	21.6	4.0	8.6	7.0	2.0	12.9	7.9
Green Ext Time (p_c), s	0.1	9.9	0.0	1.2	0.0	17.7	0.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	23.4
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	122	0	40	0	0	0	97	850	0	57	0	906
Future Volume (vph)	122	0	40	0	0	0	97	850	0	57	0	906
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	5.5			4.5	5.5
Lane Util. Factor	1.00		1.00				1.00	0.95			1.00	0.95
Frt	1.00		0.85				1.00	1.00			1.00	0.98
Flt Protected	0.95		1.00				0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770		1583				1770	3539			1770	3477
Flt Permitted	0.95		1.00				0.95	1.00			0.95	1.00
Satd. Flow (perm)	1770		1583				1770	3539			1770	3477
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	152	0	50	0	0	0	121	1062	0	71	0	1132
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	153	0	7	0	0	0	121	1063	0	0	71	1275
Turn Type	Perm		Perm				Prot	NA		Prot	Prot	NA
Protected Phases							1	6		5	5	2
Permitted Phases	8		8									
Actuated Green, G (s)	15.7		15.7				12.9	69.7			10.6	67.9
Effective Green, g (s)	15.7		15.7				12.9	69.7			10.6	67.9
Actuated g/C Ratio	0.14		0.14				0.12	0.63			0.10	0.62
Clearance Time (s)	4.0		4.0				4.0	5.5			4.5	5.5
Vehicle Extension (s)	4.0		4.0				1.5	6.0			3.0	6.0
Lane Grp Cap (vph)	252		225				207	2242			170	2146
v/s Ratio Prot							c0.07	0.30			0.04	c0.37
v/s Ratio Perm	c0.09		0.00									
v/c Ratio	0.61		0.03				0.58	0.47			0.42	0.59
Uniform Delay, d1	44.3		40.6				46.0	10.6			46.8	12.7
Progression Factor	1.00		1.00				1.32	0.61			1.32	0.54
Incremental Delay, d2	4.7		0.1				2.3	0.6			1.5	1.1
Delay (s)	49.0		40.7				63.2	7.1			63.2	7.9
Level of Service	D		D				E	A			E	A
Approach Delay (s)		46.9			0.0			12.8				10.8
Approach LOS		D			A			B				B

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	120
Future Volume (vph)	120
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.80
Adj. Flow (vph)	150
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology does not support Non-NEMA phasing.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	176	267	54	96	147	128	13	38	589	100	75	659
Future Volume (vph)	176	267	54	96	147	128	13	38	589	100	75	659
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.97		1.00	0.93			1.00	0.98		1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3450		1770	3292			1770	3462		1770	3441
Flt Permitted	0.95	1.00		0.95	1.00			0.38	1.00		0.95	1.00
Satd. Flow (perm)	1770	3450		1770	3292			710	3462		1770	3441
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	229	347	70	125	191	166	17	49	765	130	97	856
RTOR Reduction (vph)	0	18	0	0	142	0	0	0	10	0	0	15
Lane Group Flow (vph)	229	399	0	125	215	0	0	66	885	0	97	1036
Turn Type	Prot	NA		Prot	NA		custom	Prot	NA		Prot	NA
Protected Phases	3	8		7	4			1	6		5	2
Permitted Phases							1					
Actuated Green, G (s)	16.4	21.0		11.3	15.9			10.5	51.7		7.0	48.2
Effective Green, g (s)	16.4	21.0		11.3	15.9			10.5	51.7		7.0	48.2
Actuated g/C Ratio	0.15	0.19		0.10	0.14			0.10	0.47		0.06	0.44
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	263	658		181	475			67	1627		112	1507
v/s Ratio Prot	c0.13	c0.12		0.07	0.07				c0.26		0.05	c0.30
v/s Ratio Perm								c0.09				
v/c Ratio	0.87	0.61		0.69	0.45			0.99	0.54		0.87	0.69
Uniform Delay, d1	45.8	40.7		47.7	43.1			49.7	20.8		51.0	24.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.75	1.63
Incremental Delay, d2	24.8	2.6		8.8	1.7			103.8	1.3		38.9	2.1
Delay (s)	70.5	43.3		56.5	44.7			153.5	22.1		77.1	42.5
Level of Service	E	D		E	D			F	C		E	D
Approach Delay (s)		53.0			47.8				31.1			45.5
Approach LOS		D			D				C			D

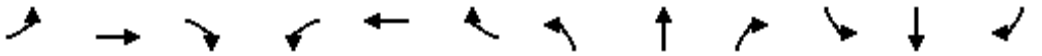
Intersection Summary			
HCM 2000 Control Delay	43.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	150
Future Volume (vph)	150
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.77
Adj. Flow (vph)	195
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

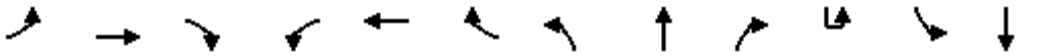
HCM 6th Edition cannot analyze u-turn movements.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	219	480	174	169	93	131	47	996	156	124	745	31
Future Volume (veh/h)	219	480	174	169	93	131	47	996	156	124	745	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	223	490	178	172	95	134	48	1016	159	127	760	32
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	252	561	202	201	339	302	62	1258	197	154	1601	67
Arrive On Green	0.14	0.22	0.22	0.11	0.19	0.19	0.05	0.54	0.54	0.09	0.46	0.46
Sat Flow, veh/h	1781	2558	923	1781	1777	1585	1781	3079	481	1781	3475	146
Grp Volume(v), veh/h	223	340	328	172	95	134	48	586	589	127	389	403
Grp Sat Flow(s),veh/h/ln	1781	1777	1704	1781	1777	1585	1781	1777	1784	1781	1777	1844
Q Serve(g_s), s	13.5	20.3	20.5	10.4	5.0	8.2	2.9	29.5	29.6	7.7	16.6	16.6
Cycle Q Clear(g_c), s	13.5	20.3	20.5	10.4	5.0	8.2	2.9	29.5	29.6	7.7	16.6	16.6
Prop In Lane	1.00		0.54	1.00		1.00	1.00		0.27	1.00		0.08
Lane Grp Cap(c), veh/h	252	389	374	201	339	302	62	726	729	154	819	850
V/C Ratio(X)	0.89	0.87	0.88	0.86	0.28	0.44	0.78	0.81	0.81	0.82	0.47	0.47
Avail Cap(c_a), veh/h	275	436	418	227	388	346	113	726	729	178	819	850
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	41.5	41.5	47.9	38.1	39.4	52.1	21.6	21.6	49.4	20.5	20.5
Incr Delay (d2), s/veh	24.4	16.0	17.6	22.1	0.4	1.0	7.7	9.3	9.4	20.4	2.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	10.3	10.2	5.8	2.2	3.2	1.4	11.5	11.6	4.2	7.0	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.8	57.5	59.1	70.1	38.5	40.4	59.8	30.9	31.0	69.8	22.4	22.4
LnGrp LOS	E	E	E	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		891			401			1223			919	
Approach Delay, s/veh		61.4			52.7			32.1			28.9	
Approach LOS		E			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	56.7	19.6	26.0	13.5	51.0	16.4	29.1
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	7.0	43.0	17.0	24.0	11.0	39.0	14.0	27.0
Max Q Clear Time (g_c+I1), s	4.9	18.6	15.5	10.2	9.7	31.6	12.4	22.5
Green Ext Time (p_c), s	0.0	11.5	0.1	1.0	0.0	6.1	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	41.3
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	247	0	64	0	0	0	61	946	0	65	0	970
Future Volume (vph)	247	0	64	0	0	0	61	946	0	65	0	970
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0				4.0	5.5			4.5	5.5
Lane Util. Factor	1.00		1.00				1.00	0.95			1.00	0.95
Frt	1.00		0.85				1.00	1.00			1.00	0.99
Flt Protected	0.95		1.00				0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770		1583				1770	3539			1770	3493
Flt Permitted	0.95		1.00				0.95	1.00			0.95	1.00
Satd. Flow (perm)	1770		1583				1770	3539			1770	3493
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.94	0.94
Adj. Flow (vph)	263	0	68	0	0	0	65	1006	0	71	0	1032
RTOR Reduction (vph)	0	0	54	0	0	0	0	0	0	0	0	5
Lane Group Flow (vph)	263	0	14	0	0	0	65	1006	0	0	71	1125
Turn Type	Perm		Perm				Prot	NA		Prot	Prot	NA
Protected Phases							1	6		5	5	2
Permitted Phases	8		8									
Actuated Green, G (s)	22.1		22.1				6.4	64.6			9.3	68.0
Effective Green, g (s)	22.1		22.1				6.4	64.6			9.3	68.0
Actuated g/C Ratio	0.20		0.20				0.06	0.59			0.08	0.62
Clearance Time (s)	4.0		4.0				4.0	5.5			4.5	5.5
Vehicle Extension (s)	4.0		4.0				1.5	6.0			3.0	6.0
Lane Grp Cap (vph)	355		318				102	2078			149	2159
v/s Ratio Prot							c0.04	0.28			0.04	c0.32
v/s Ratio Perm	c0.15		0.01									
v/c Ratio	0.74		0.04				0.64	0.48			0.48	0.52
Uniform Delay, d1	41.3		35.4				50.7	13.1			48.0	11.8
Progression Factor	1.00		1.00				1.30	0.55			0.89	1.47
Incremental Delay, d2	8.6		0.1				6.9	0.6			2.1	0.8
Delay (s)	49.8		35.5				72.7	7.8			45.0	18.2
Level of Service	D		D				E	A			D	B
Approach Delay (s)		46.9			0.0			11.8				19.8
Approach LOS		D			A			B				B

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	92
Future Volume (vph)	92
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	98
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology does not support Non-NEMA phasing.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	195	266	31	139	232	104	27	62	742	163	211	646
Future Volume (vph)	195	266	31	139	232	104	27	62	742	163	211	646
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.98		1.00	0.95			1.00	0.97		1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3484		1770	3375			1770	3444		1770	3434
Flt Permitted	0.95	1.00		0.95	1.00			0.18	1.00		0.95	1.00
Satd. Flow (perm)	1770	3484		1770	3375			334	3444		1770	3434
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	203	277	32	145	242	108	28	65	773	170	220	673
RTOR Reduction (vph)	0	9	0	0	54	0	0	0	14	0	0	20
Lane Group Flow (vph)	203	300	0	145	296	0	0	93	929	0	220	819
Turn Type	Prot	NA		Prot	NA		custom	Prot	NA		Prot	NA
Protected Phases	3	8		7	4			1	6		5	2
Permitted Phases							1					
Actuated Green, G (s)	13.7	20.1		11.1	17.5			22.3	45.8		14.0	37.5
Effective Green, g (s)	13.7	20.1		11.1	17.5			22.3	45.8		14.0	37.5
Actuated g/C Ratio	0.12	0.18		0.10	0.16			0.20	0.42		0.13	0.34
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	220	636		178	536			67	1433		225	1170
v/s Ratio Prot	c0.11	c0.09		0.08	c0.09				0.27		0.12	c0.24
v/s Ratio Perm								c0.28				
v/c Ratio	0.92	0.47		0.81	0.55			1.39	0.65		0.98	0.70
Uniform Delay, d1	47.6	40.2		48.4	42.6			43.9	25.7		47.8	31.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.88	1.32
Incremental Delay, d2	39.3	1.4		22.9	2.4			243.5	2.3		49.5	3.1
Delay (s)	86.9	41.6		71.4	45.0			287.4	27.9		91.7	44.4
Level of Service	F	D		E	D			F	C		F	D
Approach Delay (s)		59.5			52.7				51.2			54.2
Approach LOS		E			D				D			D

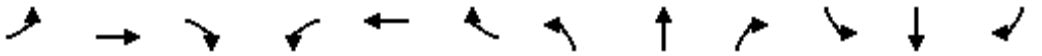
Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	159
Future Volume (vph)	159
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	166
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

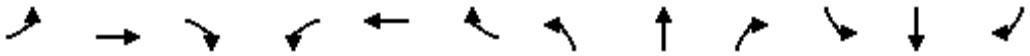
HCM 6th Edition cannot analyze u-turn movements.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	148	92	58	230	246	111	501	32	100	682	64
Future Volume (veh/h)	56	148	92	58	230	246	111	501	32	100	682	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	61	161	100	63	250	267	121	545	35	109	741	70
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	78	419	246	95	362	323	147	1708	109	135	1632	154
Arrive On Green	0.04	0.19	0.19	0.05	0.20	0.20	0.16	1.00	1.00	0.08	0.50	0.50
Sat Flow, veh/h	1781	2154	1266	1781	1777	1585	1781	3391	217	1781	3282	310
Grp Volume(v), veh/h	61	131	130	63	250	267	121	285	295	109	401	410
Grp Sat Flow(s),veh/h/ln	1781	1777	1643	1781	1777	1585	1781	1777	1831	1781	1777	1815
Q Serve(g_s), s	3.7	7.1	7.6	3.8	14.3	17.7	7.2	0.0	0.0	6.6	16.1	16.1
Cycle Q Clear(g_c), s	3.7	7.1	7.6	3.8	14.3	17.7	7.2	0.0	0.0	6.6	16.1	16.1
Prop In Lane	1.00		0.77	1.00		1.00	1.00		0.12	1.00		0.17
Lane Grp Cap(c), veh/h	78	346	319	95	362	323	147	895	922	135	884	902
V/C Ratio(X)	0.78	0.38	0.41	0.66	0.69	0.83	0.83	0.32	0.32	0.81	0.45	0.45
Avail Cap(c_a), veh/h	97	388	358	275	565	504	227	895	922	178	884	902
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	38.5	38.8	51.1	40.6	41.9	45.2	0.0	0.0	50.0	17.9	18.0
Incr Delay (d2), s/veh	21.0	0.7	0.8	3.0	2.4	6.5	7.2	0.9	0.9	13.8	1.7	1.6
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	2.1	3.1	3.1	1.7	6.3	7.3	3.2	0.2	0.2	3.4	6.6	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.0	39.2	39.6	54.1	42.9	48.4	52.4	0.9	0.9	63.8	19.6	19.6
LnGrp LOS	E	D	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		322			580			701			920	
Approach Delay, s/veh		45.8			46.7			9.8			24.9	
Approach LOS		D			D			A			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	60.7	8.8	27.4	12.3	61.4	9.9	26.4
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	14.0	36.0	6.0	35.0	11.0	39.0	17.0	24.0
Max Q Clear Time (g_c+I1), s	9.2	18.1	5.7	19.7	8.6	2.0	5.8	9.6
Green Ext Time (p_c), s	0.1	9.7	0.0	2.7	0.0	9.4	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	0	86	74	0	37	113	529	46	29	701	155
Future Volume (vph)	141	0	86	74	0	37	113	529	46	29	701	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.0	4.0		4.0	5.5		4.5	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1583		1770	1583		1770	3497		1770	3443	
Flt Permitted	0.73	1.00		0.68	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1362	1583		1260	1583		1770	3497		1770	3443	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	0	93	80	0	40	123	575	50	32	762	168
RTOR Reduction (vph)	0	78	0	0	33	0	0	5	0	0	16	0
Lane Group Flow (vph)	153	15	0	80	7	0	123	620	0	32	914	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	17.6	17.6		18.1	18.1		13.5	72.8		5.1	64.9	
Effective Green, g (s)	17.6	17.6		18.1	18.1		13.5	72.8		5.1	64.9	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.12	0.66		0.05	0.59	
Clearance Time (s)	4.5	4.5		4.0	4.0		4.0	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0		4.0	4.0		1.5	6.0		3.0	6.0	
Lane Grp Cap (vph)	217	253		207	260		217	2314		82	2031	
v/s Ratio Prot		0.01			0.00		c0.07	0.18		0.02	c0.27	
v/s Ratio Perm	c0.11			0.06								
v/c Ratio	0.71	0.06		0.39	0.03		0.57	0.27		0.39	0.45	
Uniform Delay, d1	43.7	39.2		41.0	38.5		45.5	7.6		50.9	12.6	
Progression Factor	1.00	1.00		1.00	1.00		1.37	0.76		1.22	0.54	
Incremental Delay, d2	10.0	0.1		1.6	0.1		1.8	0.3		2.9	0.7	
Delay (s)	53.7	39.3		42.6	38.6		63.9	6.1		64.9	7.5	
Level of Service	D	D		D	D		E	A		E	A	
Approach Delay (s)		48.2			41.3			15.6			9.4	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	165	337	75	267	193	10	13	55	510	187	7	600
Future Volume (vph)	165	337	75	267	193	10	13	55	510	187	7	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.97		1.00	0.99			1.00	0.96		1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3442		1770	3513			1770	3397		1770	3411
Flt Permitted	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1770	3442		1770	3513			1770	3397		1770	3411
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	366	82	290	210	11	14	60	554	203	8	652
RTOR Reduction (vph)	0	20	0	0	4	0	0	0	29	0	0	27
Lane Group Flow (vph)	179	428	0	290	217	0	0	74	728	0	8	833
Turn Type	Prot	NA		Prot	NA		Prot	Prot	NA		Prot	NA
Protected Phases	3	8		7	4		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)	14.4	22.2		19.6	27.4			9.5	48.1		1.1	39.7
Effective Green, g (s)	14.4	22.2		19.6	27.4			9.5	48.1		1.1	39.7
Actuated g/C Ratio	0.13	0.20		0.18	0.25			0.09	0.44		0.01	0.36
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	231	694		315	875			152	1485		17	1231
v/s Ratio Prot	0.10	c0.12		c0.16	0.06			c0.04	0.21		0.00	c0.24
v/s Ratio Perm												
v/c Ratio	0.77	0.62		0.92	0.25			0.49	0.49		0.47	0.68
Uniform Delay, d1	46.2	40.0		44.4	33.1			47.9	22.2		54.2	29.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.91	1.31
Incremental Delay, d2	13.7	2.6		30.6	0.4			0.9	1.2		6.8	2.8
Delay (s)	59.9	42.6		75.0	33.4			48.8	23.3		56.2	41.9
Level of Service	E	D		E	C			D	C		E	D
Approach Delay (s)		47.6			57.0				25.6			42.0
Approach LOS		D			E				C			D

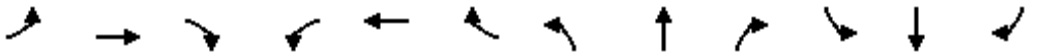
Intersection Summary			
HCM 2000 Control Delay	41.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	191
Future Volume (vph)	191
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	208
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition cannot analyze u-turn movements.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	734	265	74	108	252	59	890	79	98	640	38
Future Volume (veh/h)	268	734	265	74	108	252	59	890	79	98	640	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	273	749	270	76	110	257	60	908	81	100	653	39
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	726	262	97	327	292	77	1381	123	125	1518	91
Arrive On Green	0.15	0.28	0.28	0.05	0.18	0.18	0.04	0.42	0.42	0.07	0.45	0.45
Sat Flow, veh/h	1781	2559	922	1781	1777	1585	1781	3300	294	1781	3407	203
Grp Volume(v), veh/h	273	520	499	76	110	257	60	489	500	100	340	352
Grp Sat Flow(s),veh/h/ln	1781	1777	1704	1781	1777	1585	1781	1777	1817	1781	1777	1834
Q Serve(g_s), s	16.8	31.2	31.2	4.6	5.9	17.4	3.7	24.3	24.3	6.1	14.4	14.5
Cycle Q Clear(g_c), s	16.8	31.2	31.2	4.6	5.9	17.4	3.7	24.3	24.3	6.1	14.4	14.5
Prop In Lane	1.00		0.54	1.00		1.00	1.00		0.16	1.00		0.11
Lane Grp Cap(c), veh/h	275	504	484	97	327	292	77	744	761	125	791	817
V/C Ratio(X)	0.99	1.03	1.03	0.78	0.34	0.88	0.78	0.66	0.66	0.80	0.43	0.43
Avail Cap(c_a), veh/h	275	504	484	227	388	346	113	744	761	178	791	817
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	0.85	0.85	0.85	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	39.4	39.4	51.3	39.0	43.7	52.1	25.7	25.7	50.4	20.9	20.9
Incr Delay (d2), s/veh	51.8	48.4	49.3	5.0	0.6	19.9	8.6	3.9	3.8	10.0	1.7	1.7
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	11.2	19.8	19.1	2.2	2.6	8.2	1.8	10.4	10.6	3.0	6.1	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	98.2	87.7	88.6	56.3	39.6	63.7	60.6	29.5	29.4	60.3	22.6	22.6
LnGrp LOS	F	F	F	E	D	E	E	C	C	E	C	C
Approach Vol, veh/h		1292			443			1049			792	
Approach Delay, s/veh		90.3			56.4			31.3			27.4	
Approach LOS		F			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	55.0	21.0	25.2	11.7	52.0	10.0	36.2
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	7.0	43.0	17.0	24.0	11.0	39.0	14.0	27.0
Max Q Clear Time (g_c+I1), s	5.7	16.5	18.8	19.4	8.1	26.3	6.6	33.2
Green Ext Time (p_c), s	0.0	10.4	0.0	0.9	0.0	8.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	54.8
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	0	121	60	0	28	136	737	61	37	752	157
Future Volume (vph)	273	0	121	60	0	28	136	737	61	37	752	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.0	4.0		4.0	5.5		4.5	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.85		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1583		1770	1583		1770	3499		1770	3448	
Flt Permitted	0.74	1.00		0.63	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1374	1583		1177	1583		1770	3499		1770	3448	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	290	0	129	64	0	30	145	784	65	39	800	167
RTOR Reduction (vph)	0	96	0	0	22	0	0	6	0	0	18	0
Lane Group Flow (vph)	290	33	0	64	8	0	145	843	0	39	949	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8								
Actuated Green, G (s)	28.3	28.3		28.8	28.8		14.0	62.8		4.4	53.7	
Effective Green, g (s)	28.3	28.3		28.8	28.8		14.0	62.8		4.4	53.7	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.13	0.57		0.04	0.49	
Clearance Time (s)	4.5	4.5		4.0	4.0		4.0	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	3.0		4.0	4.0		1.5	6.0		3.0	6.0	
Lane Grp Cap (vph)	353	407		308	414		225	1997		70	1683	
v/s Ratio Prot		0.02			0.00		c0.08	0.24		0.02	c0.28	
v/s Ratio Perm	c0.21			0.05								
v/c Ratio	0.82	0.08		0.21	0.02		0.64	0.42		0.56	0.56	
Uniform Delay, d1	38.5	31.0		31.7	30.1		45.6	13.3		51.8	19.9	
Progression Factor	1.00	1.00		1.00	1.00		1.32	0.46		0.99	1.49	
Incremental Delay, d2	14.2	0.1		0.5	0.0		3.0	0.4		7.6	1.1	
Delay (s)	52.7	31.1		32.2	30.1		63.3	6.5		58.9	30.7	
Level of Service	D	C		C	C		E	A		E	C	
Approach Delay (s)		46.0			31.5			14.8			31.8	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	211	379	52	262	332	41	27	88	716	262	93	623
Future Volume (vph)	211	379	52	262	332	41	27	88	716	262	93	623
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.98		1.00	0.98			1.00	0.96		1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3475		1770	3481			1770	3397		1770	3410
Flt Permitted	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1770	3475		1770	3481			1770	3397		1770	3410
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	220	395	54	273	346	43	28	92	746	273	97	649
RTOR Reduction (vph)	0	11	0	0	10	0	0	0	28	0	0	26
Lane Group Flow (vph)	220	438	0	273	379	0	0	120	991	0	97	831
Turn Type	Prot	NA		Prot	NA		Prot	Prot	NA		Prot	NA
Protected Phases	3	8		7	4		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)	14.0	22.3		12.8	21.1			11.7	46.1		9.8	44.2
Effective Green, g (s)	14.0	22.3		12.8	21.1			11.7	46.1		9.8	44.2
Actuated g/C Ratio	0.13	0.20		0.12	0.19			0.11	0.42		0.09	0.40
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	225	704		205	667			188	1423		157	1370
v/s Ratio Prot	0.12	c0.13		c0.15	0.11			c0.07	c0.29		0.05	0.24
v/s Ratio Perm												
v/c Ratio	0.98	0.62		1.33	0.57			0.64	0.70		0.62	0.61
Uniform Delay, d1	47.8	40.0		48.6	40.3			47.1	26.2		48.3	26.0
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.75	1.56
Incremental Delay, d2	52.9	2.7		178.7	2.1			5.1	2.8		4.6	1.8
Delay (s)	100.8	42.7		227.3	42.4			52.3	29.0		40.8	42.3
Level of Service	F	D		F	D			D	C		D	D
Approach Delay (s)		61.8			118.7				31.5			42.2
Approach LOS		E			F				C			D

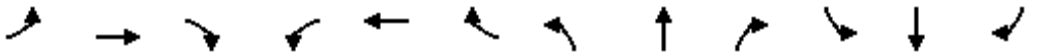
Intersection Summary			
HCM 2000 Control Delay	57.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	200
Future Volume (vph)	200
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	208
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition cannot analyze u-turn movements.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	148	105	77	230	246	112	540	43	100	737	64
Future Volume (veh/h)	56	148	105	77	230	246	112	540	43	100	737	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	61	161	114	84	250	267	122	587	47	109	801	70
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	78	373	249	116	362	323	148	1679	134	135	1642	144
Arrive On Green	0.04	0.18	0.18	0.06	0.20	0.20	0.17	1.00	1.00	0.08	0.50	0.50
Sat Flow, veh/h	1781	2042	1361	1781	1777	1585	1781	3333	266	1781	3306	289
Grp Volume(v), veh/h	61	139	136	84	250	267	122	312	322	109	430	441
Grp Sat Flow(s),veh/h/ln	1781	1777	1625	1781	1777	1585	1781	1777	1822	1781	1777	1818
Q Serve(g_s), s	3.7	7.6	8.2	5.1	14.3	17.7	7.3	0.0	0.0	6.6	17.7	17.7
Cycle Q Clear(g_c), s	3.7	7.6	8.2	5.1	14.3	17.7	7.3	0.0	0.0	6.6	17.7	17.7
Prop In Lane	1.00		0.84	1.00		1.00	1.00		0.15	1.00		0.16
Lane Grp Cap(c), veh/h	78	325	297	116	362	323	148	895	918	135	883	903
V/C Ratio(X)	0.78	0.43	0.46	0.73	0.69	0.83	0.83	0.35	0.35	0.81	0.49	0.49
Avail Cap(c_a), veh/h	97	388	355	275	565	504	227	895	918	178	883	903
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	39.8	40.1	50.5	40.6	41.9	45.1	0.0	0.0	50.0	18.4	18.4
Incr Delay (d2), s/veh	21.0	0.9	1.1	3.2	2.4	6.5	7.9	1.1	1.1	13.8	1.9	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	3.3	3.3	2.3	6.3	7.3	3.2	0.3	0.3	3.4	7.3	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.0	40.7	41.2	53.7	42.9	48.4	53.1	1.1	1.1	63.8	20.3	20.3
LnGrp LOS	E	D	D	D	D	D	D	A	A	E	C	C
Approach Vol, veh/h		336			601			756			980	
Approach Delay, s/veh		46.8			46.9			9.5			25.1	
Approach LOS		D			D			A			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	60.6	8.8	27.4	12.3	61.4	11.1	25.1
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	14.0	36.0	6.0	35.0	11.0	39.0	17.0	24.0
Max Q Clear Time (g_c+I1), s	9.3	19.7	5.7	19.7	8.6	2.0	7.1	10.2
Green Ext Time (p_c), s	0.1	9.7	0.0	2.7	0.0	10.5	0.1	1.2

Intersection Summary	
HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	172	5	109	71	5	35	180	558	46	57	29	734
Future Volume (vph)	172	5	109	71	5	35	180	558	46	57	29	734
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.0	4.0		4.0	5.5			4.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95			1.00	0.95
Frt	1.00	0.86		1.00	0.87		1.00	0.99			1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1595		1770	1616		1770	3499			1770	3432
Flt Permitted	0.73	1.00		0.61	1.00		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1358	1595		1139	1616		1770	3499			1770	3432
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	187	5	118	77	5	38	196	607	50	62	32	798
RTOR Reduction (vph)	0	96	0	0	31	0	0	6	0	0	0	24
Lane Group Flow (vph)	187	27	0	77	12	0	196	651	0	0	94	977
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	Prot	NA
Protected Phases		4			8		1	6		5	5	2
Permitted Phases	4			8								
Actuated Green, G (s)	20.5	20.5		21.0	21.0		21.9	62.3			12.7	53.6
Effective Green, g (s)	20.5	20.5		21.0	21.0		21.9	62.3			12.7	53.6
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.20	0.57			0.12	0.49
Clearance Time (s)	4.5	4.5		4.0	4.0		4.0	5.5			4.5	5.5
Vehicle Extension (s)	3.0	3.0		4.0	4.0		1.5	6.0			3.0	6.0
Lane Grp Cap (vph)	253	297		217	308		352	1981			204	1672
v/s Ratio Prot		0.02			0.01		c0.11	0.19			0.05	c0.28
v/s Ratio Perm	c0.14			0.07								
v/c Ratio	0.74	0.09		0.35	0.04		0.56	0.33			0.46	0.58
Uniform Delay, d1	42.2	37.0		38.6	36.3		39.7	12.7			45.5	20.2
Progression Factor	1.00	1.00		1.00	1.00		1.45	0.47			1.35	0.70
Incremental Delay, d2	10.7	0.1		1.4	0.1		0.9	0.4			1.6	1.4
Delay (s)	53.0	37.2		40.0	36.4		58.5	6.4			62.8	15.7
Level of Service	D	D		D	D		E	A			E	B
Approach Delay (s)		46.7			38.7			18.3				19.7
Approach LOS		D			D			B				B

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	187
Future Volume (vph)	187
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	203
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition cannot analyze u-turn movements.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	173	337	75	267	193	38	13	55	570	187	27	626
Future Volume (vph)	173	337	75	267	193	38	13	55	570	187	27	626
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.97		1.00	0.98			1.00	0.96		1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3442		1770	3452			1770	3408		1770	3412
Flt Permitted	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1770	3442		1770	3452			1770	3408		1770	3412
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	188	366	82	290	210	41	14	60	620	203	29	680
RTOR Reduction (vph)	0	20	0	0	15	0	0	0	25	0	0	27
Lane Group Flow (vph)	188	428	0	290	236	0	0	74	798	0	29	868
Turn Type	Prot	NA		Prot	NA		Prot	Prot	NA		Prot	NA
Protected Phases	3	8		7	4		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)	14.8	22.1		19.2	26.5			9.5	45.8		3.9	40.2
Effective Green, g (s)	14.8	22.1		19.2	26.5			9.5	45.8		3.9	40.2
Actuated g/C Ratio	0.13	0.20		0.17	0.24			0.09	0.42		0.04	0.37
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	238	691		308	831			152	1418		62	1246
v/s Ratio Prot	0.11	c0.12		c0.16	0.07			c0.04	0.23		0.02	c0.25
v/s Ratio Perm												
v/c Ratio	0.79	0.62		0.94	0.28			0.49	0.56		0.47	0.70
Uniform Delay, d1	46.1	40.1		44.8	34.0			47.9	24.5		52.0	29.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.85	1.72
Incremental Delay, d2	14.8	2.6		35.7	0.5			0.9	1.6		1.8	2.9
Delay (s)	60.9	42.8		80.5	34.5			48.8	26.1		45.8	53.9
Level of Service	E	D		F	C			D	C		D	D
Approach Delay (s)		48.1			59.1				28.0			53.6
Approach LOS		D			E				C			D

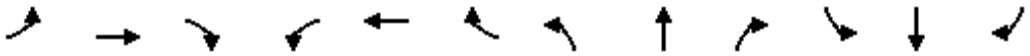
Intersection Summary			
HCM 2000 Control Delay	45.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	198
Future Volume (vph)	198
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	215
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

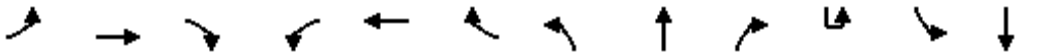
HCM 6th Edition cannot analyze u-turn movements.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	734	273	86	108	252	60	936	91	98	674	38
Future Volume (veh/h)	268	734	273	86	108	252	60	936	91	98	674	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	273	749	279	88	110	257	61	955	93	100	688	39
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	699	260	112	327	292	78	1369	133	125	1520	86
Arrive On Green	0.15	0.28	0.28	0.06	0.18	0.18	0.04	0.42	0.42	0.07	0.44	0.44
Sat Flow, veh/h	1781	2534	944	1781	1777	1585	1781	3271	319	1781	3419	194
Grp Volume(v), veh/h	273	525	503	88	110	257	61	519	529	100	357	370
Grp Sat Flow(s),veh/h/ln	1781	1777	1701	1781	1777	1585	1781	1777	1813	1781	1777	1835
Q Serve(g_s), s	16.8	30.3	30.3	5.4	5.9	17.4	3.7	26.4	26.4	6.1	15.4	15.4
Cycle Q Clear(g_c), s	16.8	30.3	30.3	5.4	5.9	17.4	3.7	26.4	26.4	6.1	15.4	15.4
Prop In Lane	1.00		0.55	1.00		1.00	1.00		0.18	1.00		0.11
Lane Grp Cap(c), veh/h	275	490	469	112	327	292	78	744	759	125	790	816
V/C Ratio(X)	0.99	1.07	1.07	0.79	0.34	0.88	0.78	0.70	0.70	0.80	0.45	0.45
Avail Cap(c_a), veh/h	275	490	469	227	388	346	113	744	759	178	790	816
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	39.8	39.8	50.8	39.0	43.7	52.0	26.3	26.3	50.4	21.2	21.2
Incr Delay (d2), s/veh	51.8	61.2	62.2	4.6	0.6	19.9	10.9	5.4	5.3	10.0	1.9	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.2	21.0	20.3	2.5	2.6	8.2	1.9	11.5	11.7	3.0	6.5	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	98.2	101.1	102.0	55.4	39.6	63.7	62.9	31.6	31.5	60.3	23.1	23.0
LnGrp LOS	F	F	F	E	D	E	E	C	C	E	C	C
Approach Vol, veh/h		1301			455			1109			827	
Approach Delay, s/veh		100.8			56.3			33.3			27.6	
Approach LOS		F			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	54.9	21.0	25.2	11.7	52.0	10.9	35.3
Change Period (Y+Rc), s	4.0	6.0	4.0	5.0	4.0	6.0	4.0	5.0
Max Green Setting (Gmax), s	7.0	43.0	17.0	24.0	11.0	39.0	14.0	27.0
Max Q Clear Time (g_c+I1), s	5.7	17.4	18.8	19.4	8.1	28.4	7.4	32.3
Green Ext Time (p_c), s	0.0	10.7	0.0	0.9	0.0	7.9	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	58.6
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	308	5	147	57	5	26	185	747	61	65	37	793
Future Volume (vph)	308	5	147	57	5	26	185	747	61	65	37	793
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.0	4.0		4.0	5.5			4.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95			1.00	0.95
Frt	1.00	0.85		1.00	0.87		1.00	0.99			1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1592		1770	1626		1770	3499			1770	3441
Flt Permitted	0.74	1.00		0.59	1.00		0.95	1.00			0.33	1.00
Satd. Flow (perm)	1370	1592		1099	1626		1770	3499			606	3441
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.94	0.94
Adj. Flow (vph)	328	5	156	61	5	28	197	795	65	71	39	844
RTOR Reduction (vph)	0	111	0	0	20	0	0	7	0	0	0	22
Lane Group Flow (vph)	328	50	0	61	13	0	197	853	0	0	110	1013
Turn Type	Perm	NA		Perm	NA		Prot	NA		custom	Prot	NA
Protected Phases		4			8		1	6			5	2
Permitted Phases	4			8						5		
Actuated Green, G (s)	31.7	31.7		32.2	32.2		15.9	51.5			12.3	48.4
Effective Green, g (s)	31.7	31.7		32.2	32.2		15.9	51.5			12.3	48.4
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.14	0.47			0.11	0.44
Clearance Time (s)	4.5	4.5		4.0	4.0		4.0	5.5			4.5	5.5
Vehicle Extension (s)	3.0	3.0		4.0	4.0		1.5	6.0			3.0	6.0
Lane Grp Cap (vph)	394	458		321	475		255	1638			67	1514
v/s Ratio Prot		0.03			0.01		0.11	c0.24				c0.29
v/s Ratio Perm	c0.24			0.06							c0.18	
v/c Ratio	0.83	0.11		0.19	0.03		0.77	0.52			1.64	0.67
Uniform Delay, d1	36.7	28.8		29.1	27.7		45.3	20.6			48.9	24.4
Progression Factor	1.00	1.00		1.00	1.00		1.09	0.50			1.01	1.16
Incremental Delay, d2	13.9	0.1		0.4	0.0		7.8	0.7			339.3	2.0
Delay (s)	50.6	28.9		29.5	27.8		57.3	11.1			388.8	30.3
Level of Service	D	C		C	C		E	B			F	C
Approach Delay (s)		43.5			28.9			19.7				64.8
Approach LOS		D			C			B				E

Intersection Summary			
HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	180
Future Volume (vph)	180
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	191
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Edition cannot analyze u-turn movements.

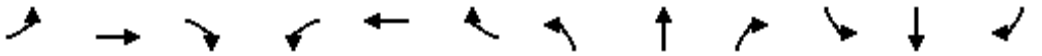
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	216	379	52	262	332	59	27	88	753	262	116	655
Future Volume (vph)	216	379	52	262	332	59	27	88	753	262	116	655
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.98		1.00	0.98			1.00	0.96		1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3475		1770	3460			1770	3402		1770	3411
Flt Permitted	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1770	3475		1770	3460			1770	3402		1770	3411
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	225	395	54	273	346	61	28	92	784	273	121	682
RTOR Reduction (vph)	0	11	0	0	15	0	0	0	26	0	0	25
Lane Group Flow (vph)	225	438	0	273	392	0	0	120	1031	0	121	874
Turn Type	Prot	NA		Prot	NA		Prot	Prot	NA		Prot	NA
Protected Phases	3	8		7	4		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)	14.0	22.7		12.0	20.7			11.6	45.4		10.9	44.7
Effective Green, g (s)	14.0	22.7		12.0	20.7			11.6	45.4		10.9	44.7
Actuated g/C Ratio	0.13	0.21		0.11	0.19			0.11	0.41		0.10	0.41
Clearance Time (s)	4.0	5.0		4.0	5.0			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	225	717		193	651			186	1404		175	1386
v/s Ratio Prot	0.13	c0.13		c0.15	0.11			0.07	c0.30		c0.07	0.26
v/s Ratio Perm												
v/c Ratio	1.00	0.61		1.41	0.60			0.65	0.73		0.69	0.63
Uniform Delay, d1	48.0	39.6		49.0	40.9			47.2	27.2		47.9	26.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.74	1.45
Incremental Delay, d2	60.0	2.5		214.2	2.6			5.6	3.4		8.2	1.9
Delay (s)	108.0	42.1		263.2	43.4			52.9	30.7		43.5	39.8
Level of Service	F	D		F	D			D	C		D	D
Approach Delay (s)		64.1			131.7				32.9			40.2
Approach LOS		E			F				C			D

Intersection Summary			
HCM 2000 Control Delay	59.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	208
Future Volume (vph)	208
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	217
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM 6th Edition cannot analyze u-turn movements.



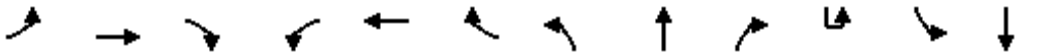
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	148	105	77	230	246	112	540	43	100	737	64
Future Volume (veh/h)	56	148	105	77	230	246	112	540	43	100	737	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	61	161	114	84	250	267	122	587	47	109	801	70
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	79	227	152	205	348	310	428	1663	133	136	1044	91
Arrive On Green	0.04	0.11	0.11	0.12	0.20	0.20	0.48	1.00	1.00	0.08	0.32	0.32
Sat Flow, veh/h	1781	2042	1361	1781	1777	1585	1781	3333	266	1781	3306	289
Grp Volume(v), veh/h	61	139	136	84	250	267	122	312	322	109	430	441
Grp Sat Flow(s),veh/h/ln	1781	1777	1625	1781	1777	1585	1781	1777	1822	1781	1777	1818
Q Serve(g_s), s	3.6	7.9	8.5	4.6	13.8	17.1	4.3	0.1	0.1	6.3	23.0	23.0
Cycle Q Clear(g_c), s	3.6	7.9	8.5	4.6	13.8	17.1	4.3	0.1	0.1	6.3	23.0	23.0
Prop In Lane	1.00		0.84	1.00		1.00	1.00		0.15	1.00		0.16
Lane Grp Cap(c), veh/h	79	198	181	205	348	310	428	887	909	136	561	574
V/C Ratio(X)	0.78	0.70	0.75	0.41	0.72	0.86	0.28	0.35	0.35	0.80	0.77	0.77
Avail Cap(c_a), veh/h	153	399	365	205	416	371	428	887	909	221	643	658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.7	45.0	45.2	43.1	39.5	40.8	21.8	0.1	0.1	47.7	32.4	32.4
Incr Delay (d2), s/veh	6.0	4.5	6.2	0.5	4.8	16.0	0.1	1.1	1.1	4.1	9.7	9.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	3.6	3.7	2.0	6.3	7.8	1.6	0.3	0.3	2.9	10.9	11.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	49.4	51.4	43.6	44.3	56.8	21.9	1.2	1.1	51.8	42.1	41.9
LnGrp LOS	E	D	D	D	D	E	C	A	A	D	D	D
Approach Vol, veh/h		336			601			756			980	
Approach Delay, s/veh		51.4			49.8			4.5			43.1	
Approach LOS		D			D			A			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.3	39.2	8.6	25.9	12.0	58.4	17.5	17.1
Change Period (Y+Rc), s	6.0	* 6	4.0	5.4	4.0	6.0	5.4	* 5.4
Max Green Setting (Gmax), s	14.0	* 38	9.0	24.6	13.0	39.0	10.0	* 24
Max Q Clear Time (g_c+I1), s	6.3	25.0	5.6	19.1	8.3	2.1	6.6	10.5
Green Ext Time (p_c), s	0.1	8.2	0.0	1.4	0.0	10.5	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	34.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	172	5	109	71	5	35	180	558	46	57	29	734
Future Volume (vph)	172	5	109	71	5	35	180	558	46	57	29	734
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.6	4.6		4.0	5.8			4.0	5.8
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95			1.00	0.95
Frt	1.00	0.86		1.00	0.87		1.00	0.99			1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1595		1770	1616		1770	3499			1770	3432
Flt Permitted	0.73	1.00		0.62	1.00		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1358	1595		1155	1616		1770	3499			1770	3432
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	187	5	118	77	5	38	196	607	50	62	32	798
RTOR Reduction (vph)	0	96	0	0	31	0	0	5	0	0	0	17
Lane Group Flow (vph)	187	27	0	77	12	0	196	652	0	0	94	984
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	Prot	NA
Protected Phases		4			8		1	6		5	5	2
Permitted Phases	4			8								
Actuated Green, G (s)	19.5	19.5		19.5	19.5		16.3	61.8			9.3	54.8
Effective Green, g (s)	19.5	19.5		19.5	19.5		16.3	61.8			9.3	54.8
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.16	0.59			0.09	0.52
Clearance Time (s)	4.6	4.6		4.6	4.6		4.0	5.8			4.0	5.8
Vehicle Extension (s)	3.0	3.0		4.0	4.0		1.5	6.0			3.0	6.0
Lane Grp Cap (vph)	252	296		214	300		274	2059			156	1791
v/s Ratio Prot		0.02			0.01		c0.11	0.19			0.05	c0.29
v/s Ratio Perm	c0.14			0.07								
v/c Ratio	0.74	0.09		0.36	0.04		0.72	0.32			0.60	0.55
Uniform Delay, d1	40.4	35.4		37.3	35.1		42.1	10.9			46.1	16.8
Progression Factor	1.00	1.00		1.00	1.00		0.82	0.43			1.28	0.37
Incremental Delay, d2	11.2	0.1		1.4	0.1		6.1	0.3			6.0	1.1
Delay (s)	51.5	35.5		38.7	35.1		40.7	5.0			64.9	7.4
Level of Service	D	D		D	D		D	A			E	A
Approach Delay (s)		45.2			37.4			13.2				12.3
Approach LOS		D			D			B				B

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	14.4
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	187
Future Volume (vph)	187
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	203
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition cannot analyze u-turn movements.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	173	337	75	267	193	38	13	55	570	187	27	626
Future Volume (vph)	173	337	75	267	193	38	13	55	570	187	27	626
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.8		4.0	5.4			4.0	5.8		4.0	5.8
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.97		1.00	0.98			1.00	0.96		1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3442		1770	3452			1770	3408		1770	3412
Flt Permitted	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1770	3442		1770	3452			1770	3408		1770	3412
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	188	366	82	290	210	41	14	60	620	203	29	680
RTOR Reduction (vph)	0	21	0	0	17	0	0	0	26	0	0	27
Lane Group Flow (vph)	188	427	0	290	234	0	0	74	797	0	29	868
Turn Type	Prot	NA		Prot	NA		Prot	Prot	NA		Prot	NA
Protected Phases	3	8		7	4		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)	14.6	21.5		18.4	25.7			8.7	43.1		2.4	36.8
Effective Green, g (s)	14.6	21.5		18.4	25.7			8.7	43.1		2.4	36.8
Actuated g/C Ratio	0.14	0.20		0.18	0.24			0.08	0.41		0.02	0.35
Clearance Time (s)	4.0	5.8		4.0	5.4			4.0	5.8		4.0	5.8
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	246	704		310	844			146	1398		40	1195
v/s Ratio Prot	0.11	c0.12		c0.16	c0.07			c0.04	0.23		0.02	c0.25
v/s Ratio Perm												
v/c Ratio	0.76	0.61		0.94	0.28			0.51	0.57		0.72	0.73
Uniform Delay, d1	43.5	37.9		42.7	32.1			46.1	23.8		51.0	29.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.13	1.06
Incremental Delay, d2	11.9	2.4		33.9	0.4			1.0	1.7		38.5	3.4
Delay (s)	55.5	40.3		76.6	32.6			47.1	25.5		95.9	34.9
Level of Service	E	D		E	C			D	C		F	C
Approach Delay (s)		44.8			56.2				27.3			36.8
Approach LOS		D			E				C			D

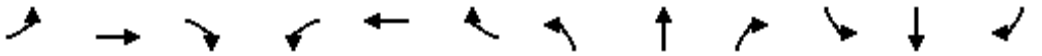
Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	198
Future Volume (vph)	198
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	215
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

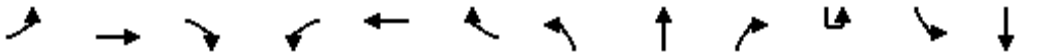
HCM 6th Edition cannot analyze u-turn movements.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	734	273	86	108	252	60	936	91	98	674	38
Future Volume (veh/h)	268	734	273	86	108	252	60	936	91	98	674	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	273	749	279	88	110	257	61	955	93	100	688	39
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	303	822	306	107	381	340	79	1183	115	107	1290	73
Arrive On Green	0.17	0.32	0.32	0.06	0.21	0.21	0.01	0.12	0.12	0.06	0.38	0.38
Sat Flow, veh/h	1781	2534	944	1781	1777	1585	1781	3271	319	1781	3419	194
Grp Volume(v), veh/h	273	525	503	88	110	257	61	519	529	100	357	370
Grp Sat Flow(s),veh/h/ln	1781	1777	1701	1781	1777	1585	1781	1777	1813	1781	1777	1835
Q Serve(g_s), s	15.0	28.4	28.4	4.9	5.2	15.2	3.4	28.4	28.5	5.6	15.7	15.7
Cycle Q Clear(g_c), s	15.0	28.4	28.4	4.9	5.2	15.2	3.4	28.4	28.5	5.6	15.7	15.7
Prop In Lane	1.00		0.55	1.00		1.00	1.00		0.18	1.00		0.11
Lane Grp Cap(c), veh/h	303	576	551	107	381	340	79	643	656	107	671	693
V/C Ratio(X)	0.90	0.91	0.91	0.82	0.29	0.76	0.77	0.81	0.81	0.94	0.53	0.53
Avail Cap(c_a), veh/h	303	604	578	107	409	365	160	643	656	107	671	693
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.7	32.4	32.4	46.5	32.9	36.8	48.8	40.6	40.6	46.8	24.3	24.3
Incr Delay (d2), s/veh	27.5	17.7	18.4	36.4	0.4	8.2	5.9	10.5	10.3	65.9	3.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	14.3	13.8	3.2	2.2	6.4	1.6	15.2	15.5	4.4	6.8	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.2	50.1	50.8	82.8	33.3	45.1	54.7	51.1	50.9	112.7	27.3	27.2
LnGrp LOS	E	D	D	F	C	D	D	D	D	F	C	C
Approach Vol, veh/h		1301			455			1109			827	
Approach Delay, s/veh		54.2			49.5			51.2			37.6	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	43.7	21.0	26.8	10.0	42.2	10.0	37.8
Change Period (Y+Rc), s	4.0	6.0	4.0	5.4	4.0	6.0	4.0	5.4
Max Green Setting (Gmax), s	9.0	31.6	17.0	23.0	6.0	34.6	6.0	34.0
Max Q Clear Time (g_c+I1), s	5.4	17.7	17.0	17.2	7.6	30.5	6.9	30.4
Green Ext Time (p_c), s	0.0	7.3	0.0	1.0	0.0	3.4	0.0	2.1

Intersection Summary	
HCM 6th Ctrl Delay	49.0
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	308	5	147	57	5	26	185	747	61	65	37	793
Future Volume (vph)	308	5	147	57	5	26	185	747	61	65	37	793
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6		4.6	4.6		4.0	5.8			4.0	5.8
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95			1.00	0.95
Frt	1.00	0.85		1.00	0.87		1.00	0.99			1.00	0.97
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	1592		1770	1626		1770	3499			1770	3441
Flt Permitted	0.74	1.00		0.60	1.00		0.95	1.00			0.95	1.00
Satd. Flow (perm)	1370	1592		1120	1626		1770	3499			1770	3441
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.94	0.94
Adj. Flow (vph)	328	5	156	61	5	28	197	795	65	71	39	844
RTOR Reduction (vph)	0	111	0	0	20	0	0	5	0	0	0	17
Lane Group Flow (vph)	328	50	0	61	13	0	197	855	0	0	110	1018
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	Prot	NA
Protected Phases		4			8		1	6		5	5	2
Permitted Phases	4			8								
Actuated Green, G (s)	29.0	29.0		29.0	29.0		14.0	46.3			10.3	42.6
Effective Green, g (s)	29.0	29.0		29.0	29.0		14.0	46.3			10.3	42.6
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.14	0.46			0.10	0.43
Clearance Time (s)	4.6	4.6		4.6	4.6		4.0	5.8			4.0	5.8
Vehicle Extension (s)	3.0	3.0		4.0	4.0		1.5	6.0			3.0	6.0
Lane Grp Cap (vph)	397	461		324	471		247	1620			182	1465
v/s Ratio Prot		0.03			0.01		c0.11	c0.24			0.06	c0.30
v/s Ratio Perm	c0.24			0.05								
v/c Ratio	0.83	0.11		0.19	0.03		0.80	0.53			0.60	0.69
Uniform Delay, d1	33.1	26.0		26.7	25.4		41.6	19.1			42.9	23.4
Progression Factor	1.00	1.00		1.00	1.00		1.06	0.99			1.11	0.64
Incremental Delay, d2	13.1	0.1		0.4	0.0		9.1	0.7			4.7	2.3
Delay (s)	46.3	26.1		27.0	25.4		53.1	19.5			52.1	17.2
Level of Service	D	C		C	C		D	B			D	B
Approach Delay (s)		39.7			26.5			25.8				20.6
Approach LOS		D			C			C				C

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.4
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	180
Future Volume (vph)	180
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	191
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition cannot analyze u-turn movements.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	216	379	52	262	332	59	27	88	753	262	116	655
Future Volume (vph)	216	379	52	262	332	59	27	88	753	262	116	655
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.8		4.0	5.4			4.0	6.0		4.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frt	1.00	0.98		1.00	0.98			1.00	0.96		1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3475		1770	3460			1770	3402		1770	3411
Flt Permitted	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1770	3475		1770	3460			1770	3402		1770	3411
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	225	395	54	273	346	61	28	92	784	273	121	682
RTOR Reduction (vph)	0	12	0	0	16	0	0	0	30	0	0	27
Lane Group Flow (vph)	225	437	0	273	391	0	0	120	1027	0	121	872
Turn Type	Prot	NA		Prot	NA		Prot	Prot	NA		Prot	NA
Protected Phases	3	8		7	4		1	1	6		5	2
Permitted Phases												
Actuated Green, G (s)	13.0	20.8		14.0	22.2			7.9	38.4		7.0	37.5
Effective Green, g (s)	13.0	20.8		14.0	22.2			7.9	38.4		7.0	37.5
Actuated g/C Ratio	0.13	0.21		0.14	0.22			0.08	0.38		0.07	0.38
Clearance Time (s)	4.0	5.8		4.0	5.4			4.0	6.0		4.0	6.0
Vehicle Extension (s)	1.5	5.5		1.5	5.5			1.5	6.0		1.5	6.0
Lane Grp Cap (vph)	230	722		247	768			139	1306		123	1279
v/s Ratio Prot	0.13	c0.13		c0.15	0.11			c0.07	c0.30		c0.07	0.26
v/s Ratio Perm												
v/c Ratio	0.98	0.61		1.11	0.51			0.86	0.79		0.98	0.68
Uniform Delay, d1	43.4	35.9		43.0	34.1			45.5	27.2		46.4	26.2
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.09	1.60
Incremental Delay, d2	52.4	2.3		88.4	1.3			37.9	4.8		67.3	2.4
Delay (s)	95.8	38.2		131.4	35.4			83.4	32.0		118.1	44.4
Level of Service	F	D		F	D			F	C		F	D
Approach Delay (s)		57.4			73.9				37.2			53.2
Approach LOS		E			E				D			D

Intersection Summary			
HCM 2000 Control Delay	52.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	19.8
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	208
Future Volume (vph)	208
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	217
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition cannot analyze u-turn movements.