US 13 AT MEMORIAL DRIVE AND E. HAZELDELL AVENUE INTERSECTIONS STUDY
OCTOBER 15, 2015

INTRODUCTION

This study evaluates the need for and impacts associated with improvements at the US 13 at Memorial Drive and US 13 at E. Hazeldell Avenue intersections in New Castle, Delaware (see **Figure 1**). Field observations performed as part of the US 13 Pedestrian Safety Study identified long southbound left-turn queues at US 13 at Memorial Drive and a significant number of southbound U-turns at US 13 at E. Hazeldell Avenue (that subsequently complete a northbound right turn onto Memorial Drive). As a result of these observations, this study was initiated to investigate these conditions and identify improvement options. Additionally, there has been a recent legislative request for a pedestrian bridge in the vicinity of US 13 at Memorial Drive and E. Hazeldell Avenue; therefore, an assessment of the need for and feasibility of constructing a pedestrian overpass is included in this study.

Relevant Projects and Studies

As part of the US 13 Pedestrian Study, installing sidewalk along the north side of the large grass island provided between the eastbound Memorial Drive and W. Hazeldell Avenue (i.e., spur road) approaches to US 13 and adjusting pedestrian signal timings at US 13 at Memorial Drive was recommended.

Memorial Drive at US 13 was identified as part of the 2003 Hazard Elimination Program – Site K. Closing the median opening along Memorial Drive at the Wawa and former 7-Eleven driveways located east of US 13 was recommended. Additionally, US 13 was identified as part of the 2003 Hazard Elimination Program – Site B. Recommendations included prohibiting the westbound and southbound left-turning movements for non-emergency vehicles at US 13 at E. Hazeldell Avenue (allowing emergency access only). Due to potential concerns from the community regarding access modifications, these proposed improvements were put on hold while conditions were monitored following the installation of a channelizing island for the northbound right-turning movement (which reduced the potential for crashes involving southbound left-turning vehicles and northbound vehicles traveling within the shoulder).

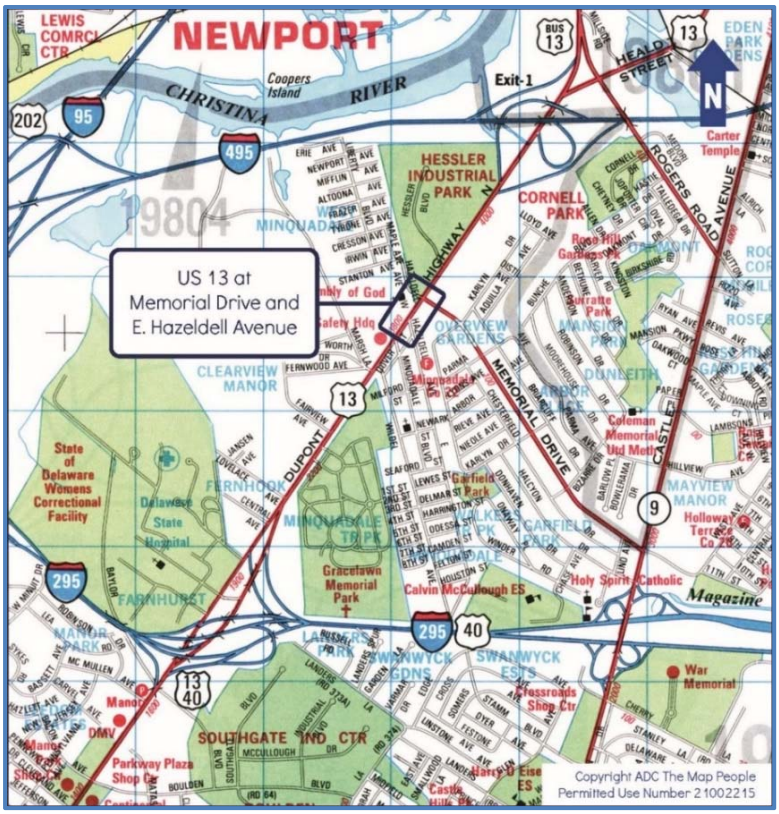
Memorial Drive from US 13 to New Castle Avenue is included as part of a Pavement and Rehabilitation Project (T201606106), which includes concrete patching, spall repairs, joint sealing, ADA improvements, curb and sidewalk improvements, and pavement marking improvements.

As part of a corridor traffic signal retiming project along US 13, signal timing improvements including adjustments to cycle lengths, splits, and offsets, were implemented in August/September 2014.

US 13 at Memorial Drive was the highest ranked intersection on DelDOT's 2015 Electronic Red Light Safety Program (ERLSP) candidate location list based on a review of red light running-related crashes.

Additionally, there have been several legislative requests for improvements along US 13 at Memorial Drive and E. Hazeldell Avenue, including concerns regarding the number of vehicles completing a southbound U-turn at E. Hazeldell Avenue and the request for a pedestrian overpass in the vicinity of Memorial Drive.

Figure 1 – Location Map



EXISTING CONDITIONS

Site Description: US 13 is a six-lane, divided roadway from Marsh Lane/Wildel Avenue to Memorial Drive. E. Hazeldell Avenue is a two-lane, undivided roadway in the vicinity of US 13. Memorial Drive is a four-lane, divided roadway east of US 13 and a two-lane, undivided roadway west of US 13. Access to/from I-295 is located along US 13 approximately one mile south of the US 13 at Marsh Lane/Wildel Avenue intersection and access to/from I-495 is located along US 13 approximately 0.4 mile north of the US 13 at Memorial Drive intersection. The two main study intersections include US 13 at Memorial Drive and US 13 at E. Hazeldell Avenue.

US 13 at Memorial Drive operates with protected/permissive left-turn phasing with flashing red arrow indications on the northbound US 13 approach, protected-only left-turn phasing on the southbound US 13 approach, and split phasing on the eastbound and westbound Memorial Drive approaches. The northbound and southbound US 13 approaches include a channelized left-turn lane, three through lanes, and a channelized right-turn lane. The eastbound Memorial Drive approach includes a left-turn lane and shared left-turn/through lane. Eastbound Memorial Drive right turns onto southbound US 13 are served by a spur road located approximately 150 feet south of the intersection. The westbound Memorial Drive approach includes a left-turn lane, shared left-turn/through lane, and a channelized right-turn lane. YIELD signs are posted for the northbound, southbound, and westbound right-turning movements. An acceleration/deceleration auxiliary lane is provided along northbound US 13 between Memorial Drive and the Wawa driveway located approximately 300 feet north of Memorial Drive. Pedestrian countdown signals and crosswalks are provided across the east, west, and south legs of the intersection.

US 13 at E. Hazeldell Avenue is located approximately 900 feet north of Marsh Lane/Wildel Avenue and approximately 350 feet south of Memorial Drive. US 13 at E. Hazeldell Avenue operates as a fire signal to assist emergency response vehicles from the Minquadale Fire Company which is located along E. Hazeldell Avenue east of US 13. During non-emergency events, the signal operates in flashing mode and under stop control on the westbound E. Hazeldell Avenue approach to US 13 and within the US 13 median. STOP signs are posted for eastbound and westbound vehicles within the US 13 median opening; however, no STOP sign is posted on westbound E. Hazeldell Avenue at northbound US 13. The northbound approach includes a U-turn lane, three through lanes, and a channelized right-turn lane. The southbound approach includes a left-turn/U-turn lane and three through lanes. The westbound E. Hazeldell Avenue approach includes a shared left-turn/right-turn lane. Within the US 13 median opening, an eastbound lane is provided and a westbound lane is provided.

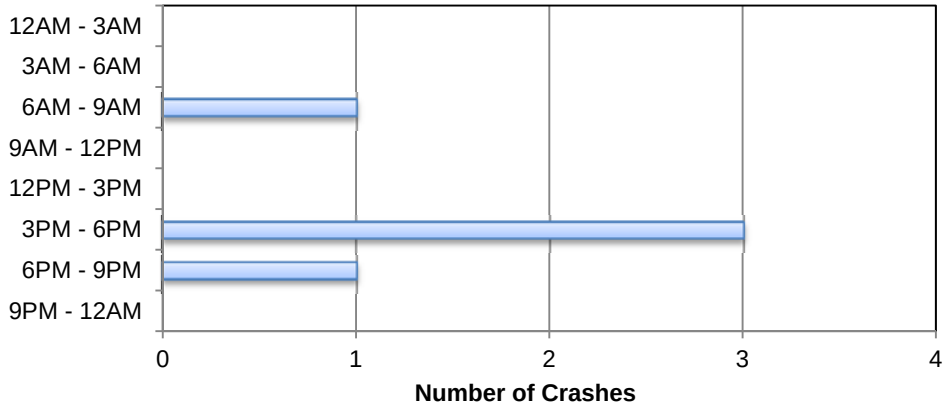
Crash Data Summary: A total of 146 crashes were reported during a 5.7 year study period between January 2010 and August 2015 at US 13 at Memorial Drive and E. Hazeldell Avenue, including 65 (44 percent) rear end crashes and 54 (37 percent) angle crashes. Northbound left-turn crashes at US 13 at Memorial Drive by time of day are shown in **Figure 2**. The following is a summary of the crashes by location and type:

- US 13 at Memorial Drive – 117 crashes
    - 27 northbound/westbound angle crashes
    - 22 northbound rear end crashes (2 crashes involved impaired drivers)
    - 19 southbound rear end crashes (3 crashes involved left-turning vehicles; 1 crash involved an impaired driver)
    - 7 westbound right-turn rear end crashes
    - 5 northbound left-turn crashes (4 crashes occurred in a one-year period from July 2011 to June 2012)
    - 5 northbound sideswipe crashes
    - 4 northbound/eastbound angle crashes
    - 4 southbound left-turn crashes
    - 4 southbound through/westbound left-turn crashes
    - 4 northbound right-turn rear end crashes
    - 2 southbound/eastbound angle crashes
    - 1 northbound left-turn/westbound through crash
    - 1 southbound left-turn/eastbound through crash
    - 1 southbound/westbound angle crash
    - 1 westbound left-turn crash/westbound through crash (involved an impaired driver)
    - 1 westbound rear end crashes
    - 1 westbound sideswipe crash
    - 1 westbound left-turn sideswipe crash
    - 1 northbound reversing-vehicle crash
    - 1 crash involved a westbound left-turning vehicle that struck a pedestrian crossing the south leg of the intersection (occurred in 2015)
    - 1 crash involved a southbound vehicle the stuck a pedestrian crossing the south leg of the intersection (crash resulted in a fatality; occurred in 2013)
    - 1 crash involved a northbound vehicle that struck a pedestrian crossing the north leg of the intersection (occurred in 2014)
    - 1 crash involved an eastbound vehicle the struck a pedestrian crossing the west leg of the intersection (occurred in 2012)

  - 1 crash involved an eastbound right-turning vehicle that lost control and struck a utility pole on the south side of the roadway
  - 1 crash involved a westbound vehicle that lost control and struck curb in the north side of the roadway

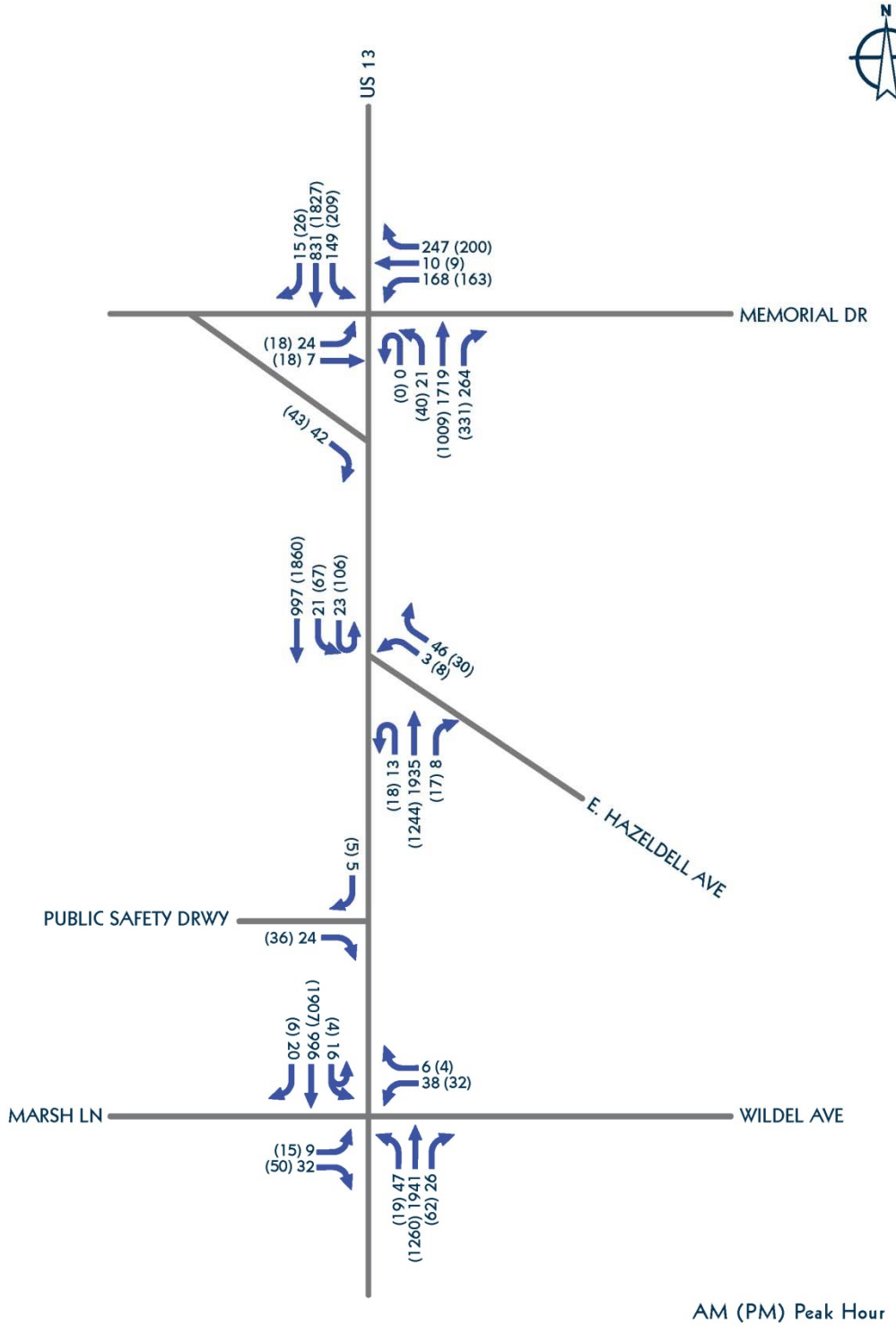
- US 13 at E. Hazeldell Avenue – 29 crashes
  - 7 southbound rear end crashes (4 crashes involved vehicles stopping on the flashing yellow)
  - 4 southbound sideswipe crashes
  - 3 northbound/westbound angle crashes
  - 2 southbound left-turn crashes
  - 2 northbound rear end crashes (both crashes involved vehicles stopping for the flashing yellow signal indication)
  - 2 westbound right-turn sideswipe crashes (involved parked/stationary vehicles)
  - 2 westbound right-turn rear end crashes
  - 1 southbound U-turn/westbound right-turn crash
  - 1 northbound U-turn/westbound left-turn crash
  - 1 northbound sideswipe crash
  - 1 northbound through/westbound right-turn crash
  - 1 eastbound rear end crash (occurred within the median opening)
  - 1 eastbound left-turn/westbound left-turn sideswipe crash
  - 1 crash involved a westbound vehicle that struck a pedestrian crossing the east leg of the intersection (occurred in 2011)

Figure 2
NB US 13 at Memorial Drive Left-Turn Crashes by Time of Day



Traffic Volumes: Peak hour turning movement counts were performed at US 13 at Memorial Drive and US 13 at E. Hazeldell Avenue from 7:00 AM to 10:00 AM, 11:00 AM to 1:00 PM, and 2:00 PM to 6:00 PM on Wednesday, October 1, 2014 as part of the US 13 Pedestrian Safety Study. Additionally, a peak hour turning movement count was obtained for the US 13 at Marsh Lane/Wildel Avenue intersection using the DelDOT Intersection Count Database and Map Application. The count was performed from 6:30 AM to 9:30 AM, 11:00 AM to 1:00 PM, and 3:30 PM to 6:30 PM on Wednesday, March 12, 2014. Traffic volumes were balanced along US 13 between Memorial Drive and Marsh Lane/Wildel Avenue. Peak hour traffic volumes are shown in **Figure 3**.

Figure 3 – US 13, Marsh Lane/Wildel Avenue to Memorial Drive: Existing Traffic Volumes



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Based on the October 1, 2014 turning movement count, U-turning vehicles account for approximately 58 percent of the total southbound US 13 left-turn/U-turn volume at US 13 at E. Hazeldell Avenue (total of 9 hours). It should be noted that businesses located along northbound US 13 between E. Hazeldell Avenue and Memorial Drive include Sharp Shooters Sports Bar, Minquadale Liquors, Kim's Auto World, Boundaries New Hair, and New York Fried Chicken. The Public Storage business is located along southbound US 13 between E. Hazeldell Avenue and Marsh Lane/Wildel Avenue. These businesses may contribute to some of the heavy southbound U-turning movements; however, a significant number of southbound U-turns at US 13 at E. Hazeldell Avenue subsequently complete a northbound right turn onto Memorial Drive.

Queuing and Origin-Destination Studies: Queuing observations were performed for the southbound US 13 left-turning movement at Memorial Drive during the morning and evening peak hours on Wednesday, June 10, 2015. As shown in **Table 1**, southbound US 13 left-turn queues reached 8 and 13 vehicles and did not clear during 5 and 21 cycles during the morning and evening peak hours, respectively. Left-turn queues occasionally spilled into the through lane; however, southbound through motorists were able to bypass the queue by travelling in the adjacent through lanes. An origin-destination study was performed along US 13 between Memorial Drive and E. Hazeldell Avenue in conjunction with the queuing study and is summarized in **Table 2**. As a result of southbound US 13 left-turn queues not clearing at Memorial Drive, several motorists diverted southbound along US 13 to complete a U-turn at the median opening at E. Hazeldell Avenue and a subsequent northbound right turn onto eastbound Memorial Drive. During the June 2015 observations, there were 43 and 109 southbound US 13 U-turning vehicles at E. Hazeldell Avenue during the morning and evening peak hours, respectively, which completed a subsequent northbound US 13 right-turn onto eastbound Memorial Drive. Due to the observed signal phase failures, signal timings at the intersection were reviewed to identify the need for improvements to better serve the southbound US 13 left-turn movement at Memorial Drive. As a result, signal timing improvements were implemented on June 25, 2015 at US 13 at Memorial Drive which increased the southbound US 13 left-turn phase by 6 and 12 seconds during the morning and evening peak periods, respectively.

To determine the effectiveness of the signal timing improvements, queuing and origin-destination studies were performed on Tuesday, September 1, 2015 during the morning and evening peak hours (see **Tables 1 and 2**) similar to those performed in June 2015 prior to the timing adjustments. Southbound US 13 left-turn queues reached 9 and 10 vehicles and did not clear during one cycle during both the morning and evening peak hours based on observations performed after signal timing improvements were implemented. During the September 2015 observations, there were 30 and 41 southbound US 13 U-turning vehicles at E. Hazeldell Avenue during the morning and evening peak hours, respectively, which completed a subsequent northbound US 13 right-turn onto eastbound Memorial Drive. The percentage of southbound US 13 vehicles using the E. Hazeldell Avenue median opening to access eastbound Memorial Drive decreased from 22 to 14 percent and 34 to 16 percent during the morning and evening peak hours, respectively, after signal timing improvements were implemented at US 13 at Memorial Drive.

Before implementing signal timing adjustments, 36 and 49 percent of southbound US 13 left-turning vehicles at Memorial Drive completed their turn during the yellow change or all-red clearance intervals during the morning and evening peak hours, respectively. Following the signal timing adjustments, the portion of vehicles completing their turn during the yellow change or all-red clearance intervals decreased to 20 and 7 percent during the morning and evening peak hours, respectively.

Additional Field Observations: The following observations were noted during June and September 2015.

- Buses stopped at the northbound US 13 bus stop located just south Memorial Drive restrict access to the northbound US 13 right-turn lane at Memorial Drive so motorists frequently use the New York Fried Chicken/NB Hair parking lot located on the southeast corner of the intersection as a "cut-through" to bypass the stopped bus.

- Eastbound Memorial Drive motorists destined for the Wawa located on the northeast corner of US 13 at Memorial Drive frequently use the west Wawa driveway to turn left into the Wawa property. A right-in/right-out channelizing island is provided at the driveway; however, there is no signage prohibiting the eastbound left-turning movement.
- Motorists traveling along northbound US 13 from origins south of Memorial Drive and destined for the Wawa located on the northeast corner of US 13 at Memorial Drive will frequently turn right onto eastbound Memorial Drive and complete a subsequent eastbound left turn at the west Wawa driveway instead of continuing north along US 13 to access at the Wawa driveway located along northbound US 13 approximately 300 feet north of Memorial Drive.
- Northbound left-turn queues did not exceed 3 vehicles and cleared every cycle.

Table 1 – Southbound US 13 at Memorial Drive Left-Turn Queuing Summary

Scenario	Condition	Southbound US 13 Left-Turn at Memorial Drive (250 feet of usable storage)	
		AM Peak (7:30 AM – 8:30 AM)	PM Peak (4:45 PM - 5:45 PM)
Before Signal Timing Improvements (6/10/15)	Longest Queue	8 vehicles (200 feet)	13 vehicles (325 feet)
	Average Queue	5 vehicles (125 feet)	9 vehicles (225 feet)
	% of Left-Turn Vehicles Turning During the Protected Phase	64 %	51 %
	% of Left-Turns Completed During the Yellow or All Red Clearance Interval	36 %	49 %
	Number of Cycle Failures	5	21
After Signal Timing Improvements (9/01/15)	Longest Queue	9 vehicles (225 feet)	10 vehicles (250 feet)
	Average Queue	6 vehicles (150 feet)	7 vehicles (175 feet)
	% of Left-Turn Vehicles Turning During the Protected Phase	80 %	93 %
	% of Permissive Left-Turns Completed During the Yellow or All Red Clearance Interval	20 %	7 %
	Number of Cycle Failures	1	1

Table 2 – Southbound US 13 to Eastbound Memorial Drive Movement Summary

Scenario	Turning Location	AM Peak (7:30 AM – 8:30 AM)		PM Peak (4:45 PM - 5:45 PM)	
		No. of Vehicles	Percent of Total Volume	No. of Vehicles	Percent of Total Volume
Before Signal Timing Improvements (6/10/15)	SB US 13 left turn at Memorial Drive	149	78%	209	66%
	SB US 13 U-turn at E. Hazeldell Avenue to NB US 13 right turn at Memorial Drive	43	22%	109	34%
	TOTAL	**192**	**100%**	**318**	**100%**
After Signal Timing Improvements (9/01/15)	SB US 13 left turn at Memorial Drive	179	86%	217	84%
	SB US 13 U-turn at E. Hazeldell Avenue to NB US 13 right turn at Memorial Drive	30	14%	41	16%
	TOTAL	**209**	**100%**	**258**	**100%**

ALTERNATIVE ANALYSES

Several alternatives were considered to address the issues associated with southbound US 13 left turns at Memorial Drive and the significant number of U-turns at the US 13 at E. Hazeldell Avenue intersection.

Alternative 1 *– Install a second southbound left-turn lane on US 13 at Memorial Drive*

Several southbound left-turning motorists along US 13 at Memorial Drive were observed diverting to the median opening south of Memorial Drive, completing a U-turn, and then completing a subsequent right-turn at Memorial Drive likely due to the southbound left-turn phase not having adequate green time; however, the number of diverting motorists decreased after updated signal timings were implemented. To further increase the southbound US 13 left-turn capacity to Memorial Drive and reduce the likelihood of left-turn queues extending into the through travel lanes on southbound US 13, a second southbound left-turn lane was considered. With this alternative, it is assumed that no southbound left-turning motorists will divert to reflect a worst-case scenario (i.e., highest potential southbound left-turn volume). Traffic volumes for Alternative 1 are shown in **Figure 4**.

Eastbound Memorial Drive is currently two lanes which would provide the receiving lanes necessary for a double left-turn lane on southbound US 13; however, relocating and modifying the channelizing island located on the southeast corner of the intersection would be necessary, which will require relocating the stop lines and crosswalks across the south and east legs (likely requiring rebuilding the traffic signal to provide mast arms). The additional southbound left-turn lane could be constructed within the existing US 13 median, requiring no right-of-way acquisition.

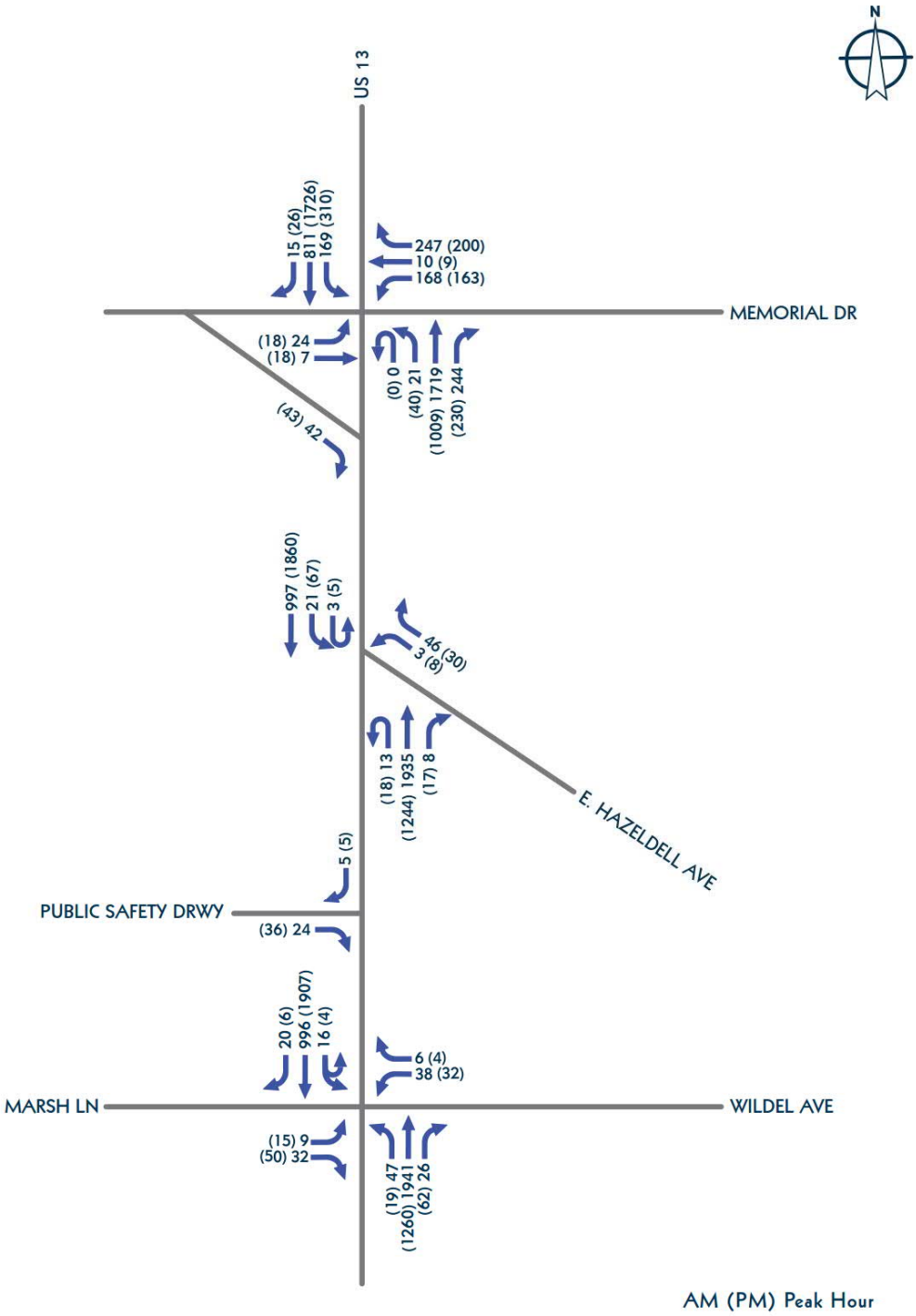
Alternative 2 *– Install a second southbound left-turn lane on US 13 at Memorial Drive AND install protected-only left-turn phasing on northbound US 13 at Memorial Drive*

The existing northbound left-turn sight distance along US 13 at Memorial Drive meets AASHTO criteria with up to two opposing vehicles in queue; however, sight distance may become slightly more restricted with longer queues and larger vehicles. **Photo 1** shows northbound left-turn sight distance with southbound left turns present. Based on crash data and Figure IV-10 (Guidelines for Determining Left-Turn Lane Signal Phasing Treatment) of the *2015 DelDOT Traffic Design Manual*, the northbound US 13 left-turn movement does not meet warrants for protected-only phasing at this time. However, with the installation of a second southbound left-turn lane, the sight distance will likely become restricted by opposing southbound left-turning vehicles. Therefore, converting the northbound left-turn phase to protected-only was considered in conjunction with Alternative 1.



Photo 1: Northbound US 13 at Memorial Drive – Left-Turn Sight Distance with Opposing Left-Turning Vehicles Present

**Figure 4 – US 13, Marsh Lane/Wildel Avenue to Memorial Drive
Reassigned Traffic Volumes with a Second Southbound Left-Turn Lane at Memorial Drive
(Alternatives 1 and 2)**



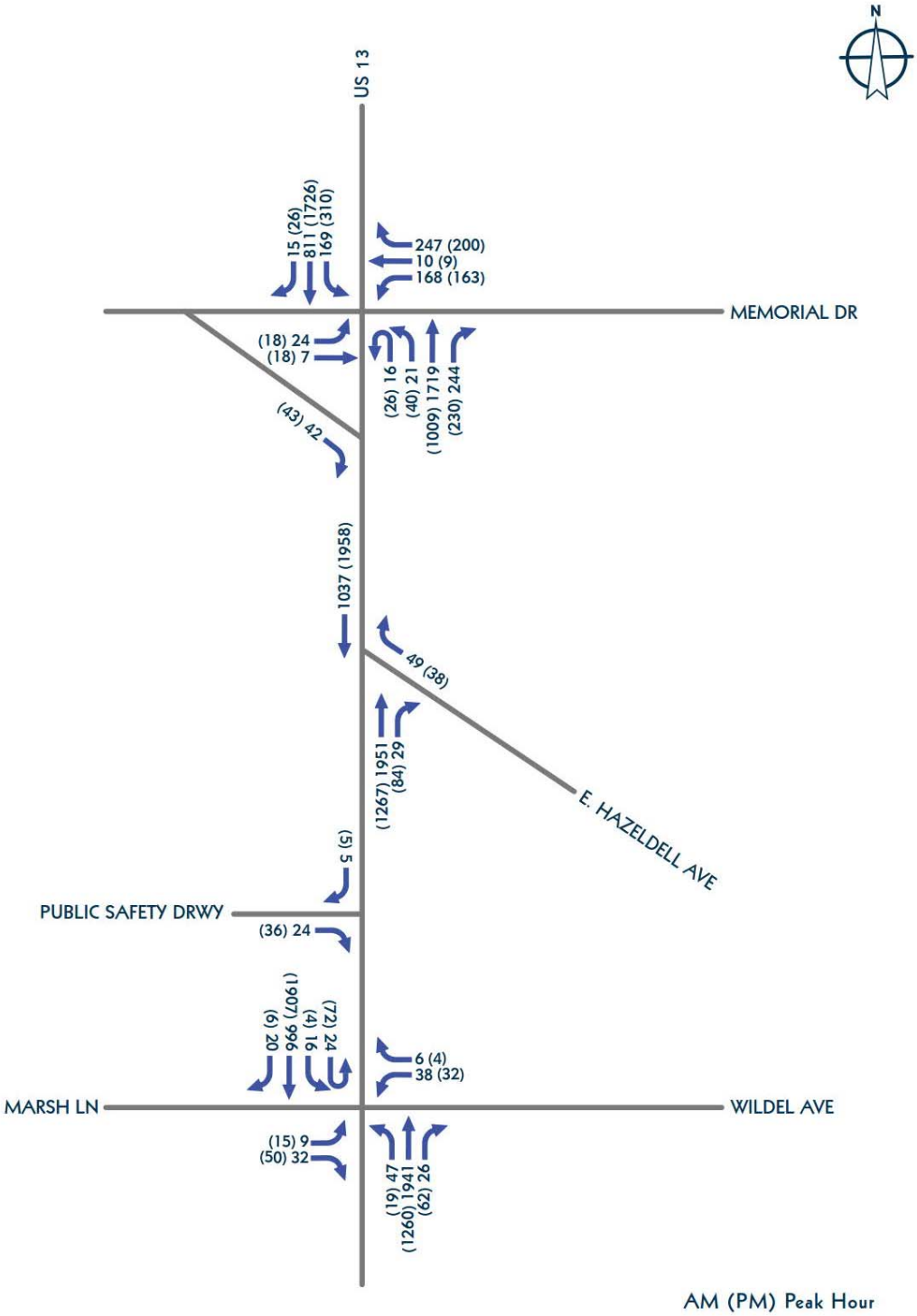
Alternative 3 *– Install a double left-turn lane on southbound US 13 at Memorial Drive, install protected-only left-turn phasing on northbound US 13 at Memorial Drive, AND convert the US 13 median opening at E. Hazeldell Avenue to accommodate authorized vehicles only*

Traffic operations at US 13 at E. Hazeldell Avenue and Memorial Drive were originally assessed from a pedestrian safety perspective as part of the US 13 Pedestrian Safety Study. Several strategies were considered including installing full signalization or closing the median opening at the US 13 at E. Hazeldell Avenue intersection. A preliminary signal warrant analysis for US 13 at E. Hazeldell Avenue was performed as part of the US 13 Pedestrian Safety Study. Westbound E. Hazeldell Avenue left-turn volumes do not exceed 15 vehicles during any hour throughout the day and do not meet the minimum volume thresholds for installation of a traffic signal. The southbound US 13 left-turn/U-turn movement at E. Hazeldell Avenue is relatively heavy; therefore, traffic signal warrant analysis was performed considering the southbound US 13 left-turn/U-turn volume as the "minor-street" volume and northbound US 13 through volumes as the "major-street" volume. Based on the full volumes of southbound left-turn/U-turn movements, the intersection meets Warrant 2 for 6 of the 4 required hours. However, the majority of the southbound US 13 U-turns at E. Hazeldell Avenue were observed avoiding the southbound US 13 left-turn movement at Memorial Drive. Therefore, signal warrant analyses were performed to exclude all southbound U-turning vehicles that are destined to travel eastbound on Memorial Drive. With this assumption, a traffic signal is not warranted at the US 13 at E. Hazeldell Avenue intersection. Therefore, fully signalizing the US 13 at E. Hazeldell Avenue intersection is not recommended. Closing the median opening would require emergency response vehicles from the Minquadale Fire Company to access southbound US 13 via the US 13 at Marsh Lane/Wildel Avenue intersection, increasing emergency response times; therefore, this option is not considered viable. However, closing the median opening to non-emergency vehicles while allowing authorized vehicles only (i.e., emergency response) was considered.

Allowing only emergency vehicles at the US 13 median opening at E. Hazeldell Avenue would divert northbound U-turning, southbound left-turn/U-turning, and westbound left-turning vehicles at US 13 at E. Hazeldell Avenue to alternate routes and likely impact signal operations at adjacent intersections along US 13 including the Marsh Lane/Wildel Avenue and Memorial Drive intersections. Diverted traffic volumes with a median closure at US 13 at E. Hazeldell Avenue are shown in **Figure 5** which are based on the following diversion assumptions:

- A total of three and five vehicles during the morning and evening peak hours, respectively, completed a southbound U-turn at US 13 at E. Hazeldell Avenue without completing a subsequent northbound right turn onto eastbound Memorial Drive during field observations performed on Tuesday, September 1, 2015. With the median closure, these vehicles will be diverted to complete a southbound U-turn at Marsh Lane/Wildel Avenue to access northbound US 13. All other motorists currently completing a southbound US 13 U-turn at E. Hazeldell Avenue will divert upstream and complete a left-turn from southbound US 13 to access eastbound Memorial Drive.
- Motorists currently completing a southbound US 13 left turn onto eastbound E. Hazeldell Avenue will be diverted south along US 13 to complete a southbound U-turn at Marsh Lane/Wildel Lane onto northbound US 13 and subsequently complete a northbound right turn onto eastbound E. Hazeldell Avenue.
- Motorists from westbound E. Hazeldell Avenue currently turning left onto southbound US 13 will be diverted to complete a right turn onto northbound US 13 to subsequently complete a northbound U-turn at Memorial Drive to access southbound US 13 to reflect a worst-case scenario for the US 13 at Memorial Drive intersection (i.e., highest potential northbound left-turn/U-turn volume).
- Motorists currently completing a northbound US 13 U-turn at E. Hazeldell Avenue will be diverted to continue north along US 13 and complete a U-turn at Memorial Drive to access southbound US 13.
- Motorists currently completing a northbound US 13 right-turn onto eastbound E. Hazeldell Avenue and a westbound E. Hazeldell Avenue right-turn onto northbound US 13 will not be diverted, as these movements will continue to be accommodated.

**Figure 5 – US 13, Marsh Lane/Wildel Avenue to Memorial Drive
Diverted Traffic Volumes with Median Closure at US 13 at E. Hazeldell Avenue
(Alternative 3)**



Capacity and Queuing Analysis: Capacity analysis using *Synchro* software (HCM 2010) was performed to determine the impact of installing a second southbound left-turn lane along US 13 at Memorial Drive (Alternative 1). Additional capacity analysis was performed to determine the impacts of converting the northbound US 13 left-turn phase at Memorial Drive to protected-only in conjunction with Alternative 1 (Alternative 2) and to determine the impacts of closing the median opening at US 13 at E. Hazeldell Avenue to non-emergency vehicles in conjunction with Alternatives 1 and 2 (Alternative 3).

As shown in **Table 3**, the southbound US 13 left-turn movement at Memorial Drive currently operates at level of service (LOS) 'D' during both the morning and evening peak hours. With the installation of a second southbound left-turn lane (Alternative 1), the delays will decrease by approximately 8 and 7 seconds during the morning and evening peak hours, respectively. The northbound US 13 left-turn phase at Memorial Drive currently operates at LOS 'C' during both the morning and evening peak hours. With Alternative 2 and Alternative 3 conditions, the phase will operate at LOS 'E' and 'D' during the morning and evening peak hours, respectively. Northbound left-turn delays will increase by approximately 38 and 27 seconds during the morning and evening peak hours, respectively, compared to existing conditions. US 13 at Memorial Drive operates at overall intersection LOS 'C' under existing conditions and with Alternatives 1, 2, and 3. US 13 at Marsh Lane/Wildel Avenue operates at overall intersection LOS 'A' or 'B' with all scenarios.

Southbound US 13 queues at Memorial Drive reached approximately 250 feet during the PM peak hour observations (following the signal timing improvements in September 2015) and were accommodated within the existing left-turn lane. 95th percentile queues calculated using *Synchro* methodologies projects existing PM peak hour queues to extend to approximately 270 feet, just beyond the existing turn lane provided. However, with the reassignment of vehicles that are currently bypassing the southbound left turn at Memorial Drive and making a U-turn at E. Hazeldell Avenue to the southbound left turn at Memorial Drive, the calculated queues will reach approximately 440 feet and extend beyond the existing left-turn lane. Additionally, it should be noted that removing the channelizing island for the northbound US 13 right-turning movement onto eastbound Memorial Drive will result in increased delays and queues for this movement. However, the 95th percentile queue for the northbound right-turning movement will not exceed 150 feet under any of the alternatives.

Table 3 – Capacity Analysis Summary: US 13 at Marsh Lane/Wildel Avenue and Memorial Drive

Scenario		US 13 at Memorial Drive				US 13 at Marsh Lane/Wildel Avenue	
		LOS[1] (Delay)			95th Percentile Queue Length SB Left (ft)	LOS[1] (Delay)	
		Overall Intersection	NB Left/ U-Turn	SB Left/ U-Turn		Overall Intersection	SB Left/ U-Turn
Existing	AM	C (25.7)	C (23.0)	D (51.1)	202 ft	B (12.3)	E (79.4)
	PM	C (29.8)	C (24.2)	D (49.3)	268 ft	A (4.9)	F (88.0)
Existing with Reassigned Volumes	AM	C (26.5)	C (23.6)	E (55.5)	243 ft [4]	B (12.3)	E (79.7)
	PM	D (35.3)	C (26.5)	F (93.2)	438 ft [4]	A (4.9)	F (87.8)
Alternative 1 – Install a Second SB Left-Turn Lane at Memorial Drive [3]	AM	C (28.7)	C (22.3)	D (43.1)	113 ft	B (12.3)	E (79.7)
	PM	C (34.0)	C (24.5)	D (42.0)	188 ft	A (4.9)	F (87.9)
Alternative 2 – Install a Second SB Left-Turn Lane at Memorial Drive and Protected-Only Left-Turn Phasing on NB US 13 at Memorial Drive [3]	AM	C (20.3)	E (61.1)	D (53.5)	119 ft	B (12.1)	E (77.4)
	PM	C (26.4)	D (51.6)	D (53.8)	190 ft	A (4.9)	F (83.3)
Alternative 3 – Install a Second SB Left-Turn Lane at Memorial Drive, Install Protected-Only Left-Turn Phasing on NB US 13 at Memorial Drive, and Convert E. Hazeldell Avenue Median Opening to Accommodate Authorized Vehicles Only [3]	AM	C (20.5)	E (60.5)	D (53.5)	119 ft	B (12.9)	E (77.0)
	PM	C (29.6)	D (52.9)	D (53.8)	190 ft	A (8.0)	E (78.6)

[1] LOS – Level of Service

[2] Authorized vehicles only (accommodating emergency response vehicles from Minquadale Fire Company)

[3] Southbound left-turn volumes include all vehicles currently bypassing the queue based on field observations

[4] 95th percentile volume exceeds capacity, queue length may be longer

PEDESTRIAN OVERPASS ASSESSMENT

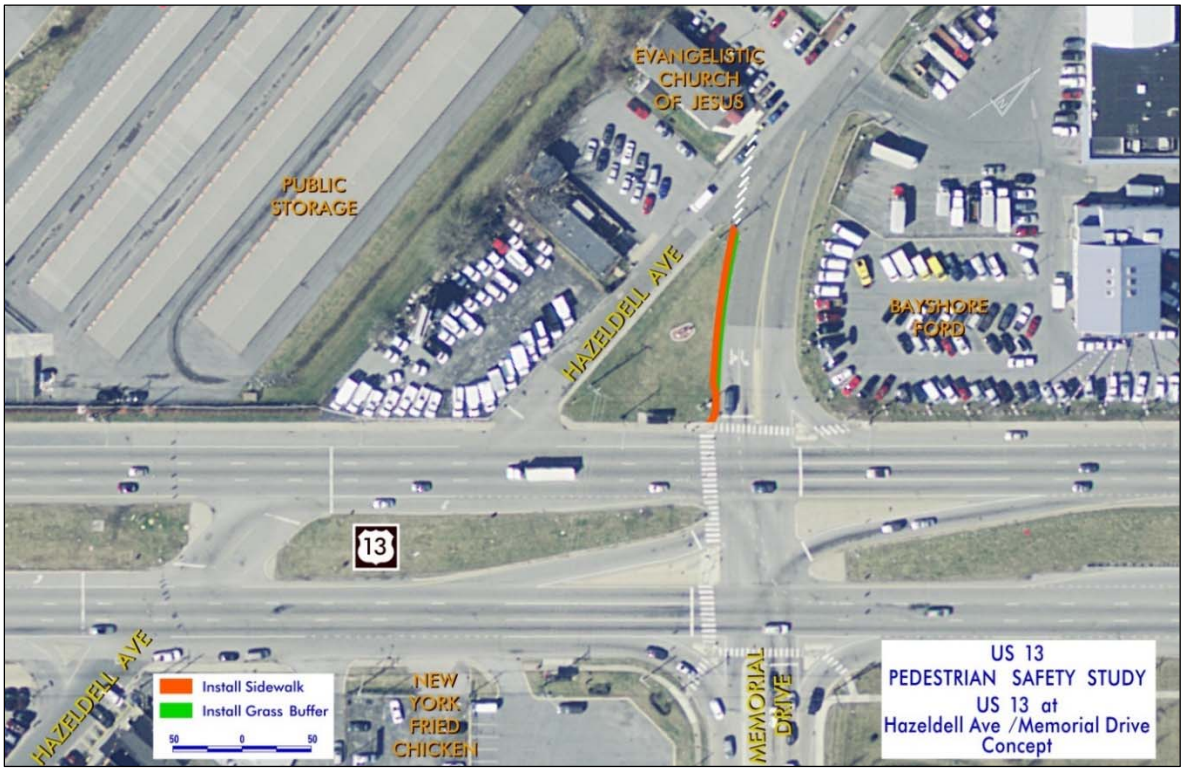
In fall 2013, DelDOT Public Relations received a constituent concern regarding pedestrian safety at the US 13 at Memorial Drive intersection as a result of the July 2013 fatal pedestrian crash. During a Minquadale Community Association meeting, a legislator and constituents expressed a desire to consider a pedestrian overpass across US 13 in the vicinity of Memorial Drive and E. Hazeldell Avenue to improve pedestrian safety.

During April 2014 pedestrian observations performed as part of the US 13 Pedestrian Safety Study, a maximum of 10 pedestrians per hour were observed crossing US 13 near the E. Hazeldell Avenue median opening (i.e., outside a marked crosswalk), which represents the highest crossing cluster along US 13 within the study area of the US 13 Pedestrian Safety Study (excluding locations with an existing marked crosswalk). Many of these pedestrians were noted as having origins and/or destinations to/from the Minquadale Liquor Store located on the east side of US 13 just north of E. Hazeldell Avenue and the community located along W. Hazeldell Avenue/Memorial Drive west of US 13. Comparatively, a maximum of 22 pedestrians per hour were observed crossing US 13 at the marked crosswalk located on the south leg of the US 13 at Memorial Drive intersection. Bus stops with shelters and heavy ridership are provided along both northbound and southbound US 13 immediately south of Memorial Drive. During a walking/bus tour performed by the Pedestrian/Bicycle Safety Working Group, the group noted that concrete at the US 13 median noses at E. Hazeldell Avenue may appear like sidewalk to pedestrians, potentially inviting them to cross US 13 at this location. Additionally, it is possible that the presence of the signal equipment may draw pedestrians to cross US 13 near the flashing fire signal; however, it is more likely that pedestrians are crossing US 13 at this location since it is the shortest path between the land uses on either side of US 13.

Several strategies were considered to improve pedestrian accommodations along US 13 between E. Hazeldell Avenue and Memorial Drive including installing full signalization (as discussed above) or closing the median opening at the US 13 at E. Hazeldell Avenue intersection. Closing the median opening and removing the flashing signal was considered to address the potential that the presence of the signal equipment could be contributing to the high frequency of pedestrian crossings at this location. However, closing the median opening would require emergency response vehicles from the Minquadale Fire Company to access southbound US 13 via the US 13 at Marsh Lane/Wildel Avenue intersection, increasing emergency response times and was therefore not considered further. Closing the median opening to non-emergency traffic while allowing authorized vehicles only (i.e., emergency response) was considered. However, prohibiting non-emergency vehicles at the median opening is not likely to have a significant impact on pedestrian operations.

Installing sidewalk along the north side of the large grass island provided between the eastbound Memorial Drive and W. Hazeldell Avenue (i.e., spur road) approaches to US 13 was recommended as part of the US 13 Pedestrian Safety Study to encourage pedestrians to cross US 13 at the signalized crosswalk located on the south leg of the US 13 at Memorial Drive intersection (see **Figure 6**). Parking restrictions along the south side of Memorial Drive/W. Hazeldell Avenue, west of US 13 should also be considered to improve visibility of pedestrians crossing W. Hazeldell Avenue in addition to signing to encourage pedestrians to cross at the US 13 at Memorial Drive crosswalk.

Figure 6 – US 13 at E. Hazeldell Avenue and Memorial Drive Concept



As part of this study, and to address the legislative request, construction of a pedestrian overpass was also considered. A pedestrian overpass would require ADA-compliant ramps be installed on both sides of the overpass, which would require a significant footprint due to slope requirements. The feasibility of constructing a pedestrian overpass near the intersection of US 13 and Memorial Drive was evaluated based on the following assumptions:

- The overpass would be a painted, steel truss bridge with a width of 10 feet
- The structure depth would be 18 inches with a minimum vertical clearance of 17 feet
- The structure would cross US 13 approximately 35 feet south of the northbound US 13 stop line at Memorial Drive
- The total span length of approximately 200 feet would require a two-span structure with a pier in the median of US 13
- Abutments would be placed beyond the clear zone, but the median pier will require barrier protection
- The pedestrian overpass would require a switch-back ramp to provide ADA accessibility
- The use of an elevator to provide ADA access was not considered
- Existing underground utility conflicts are unknown

Based on ADA requirements, the switch-back ramp would be approximately 330 feet long and would extend approximately 100 feet beyond the structure on both sides of the roadway. On the west side of US 13, there is enough area on the existing directional island in the southwest quadrant of the Memorial Drive intersection to accommodate the ramp structure; however, there are several utility poles and associated aerial utilities that would need to be relocated. On the east side of US 13, in addition to the aerial utility conflicts, there are two commercial businesses that would likely need to be relocated due to the impact on existing parking and access. The existing traffic signal heads on the south leg of the intersection would need to be reconfigured to address sight distance and visibility issues associated with the pedestrian bridge.

A conceptual cost estimate was prepared based on the above assumptions and the estimated cost is approximately $2.9 million.

In summary, although a pedestrian overpass would provide a separated and safe facility for pedestrians to cross US 13 in the vicinity of Memorial Drive and E. Hazeldell Avenue, past studies have shown that many pedestrians will not use an overpass if there is a more direct route or it will result in a longer travel time (which would be the case with the required switch-back ramps). Overpasses are an optimal solution when the structure is located in an area where pedestrians do not have to use ramps to access the structure. For these reasons in addition to the anticipated costs and right-of-way impacts, a pedestrian overpass is not recommended.

RECOMMENDATIONS

Signal timing improvements were implemented at US 13 at Memorial Drive in June 2015 to address inadequate time given to the southbound left-turn phase. Southbound left-turn motorists were frequently observed bypassing the left-turn queue at Memorial Drive in order to complete a southbound U-turn at E. Hazeldell Avenue (located approximately 300 feet south of US 13 at Memorial Drive) and a subsequent northbound right-turn at Memorial Drive. With the signal timing improvements, the frequency of southbound US 13 motorists intending to travel eastbound on Memorial Drive that bypass the southbound left-turn lane decreased from 22 to 14 percent and 34 to 16 percent during the morning and evening peak hours, respectively. Additionally, the crash history at US 13 at E. Hazeldell Avenue does not support closing the median opening at this time and the reduction in U-turns at the intersection further reduces the potential for conflicts at the intersection. For these reasons, closing the median opening at US 13 at E. Hazeldell Avenue to non-emergency traffic is not recommended at this time; however, the intersection should be monitored to determine the need for closing the median opening in the future.

Increasing the southbound left-turn capacity at Memorial Drive by providing a second left-turn lane may encourage more motorists currently bypassing the left-turn to complete the turn at Memorial Drive. This improvement will require rebuilding the traffic signal and may not be entirely effective in eliminating the issue associated with motorists bypassing the signal. If a second left-turn lane is required, a protected northbound left-turn phase should be considered depending on the alignment and sight visibility restrictions. Additionally, constructing a second southbound left-turn lane will require removing the channelizing island for the northbound right-turning movement, which will reduce the capacity of this movement.

Southbound US 13 queues at Memorial Drive reached approximately 250 feet during the evening peak hour (following signal timing improvements in September 2015) and were accommodated within the existing left-turn lane; however, with volume reassignment to include the vehicles currently bypassing the southbound left turn onto eastbound Memorial Drive as southbound left-turning movements, projected queues will reach approximately 440 feet and extend beyond the existing left-turn lane. For this reason, lengthening the southbound US 13 left-turn lane at Memorial Drive approximately 200 to 250 feet farther north (i.e., the maximum practical distance without impacting the signal at US 13 at Hessler Boulevard) is recommended.

In addition to extending the length of the southbound left-turn lane and monitoring both the E. Hazeldell Avenue and Memorial Drive intersections, the following improvements are recommended.

Signing Improvements

- Install a STOP (R1-1) sign (36” x 36”) on westbound E. Hazeldell Avenue at northbound US 13.
- Install signing to discourage eastbound Memorial Drive left turns into the west Wawa driveway (the median opening needs to remain to allow NY Fried Chicken property access to US 13).
    - Install a Movement Prohibition (R3-2) sign (prohibiting left turns) on the median nose at Memorial Drive at the west Wawa driveway facing eastbound traffic.

- Install a Movement Prohibition (R3-2) sign (prohibiting left turns) with the STOP (R1-1) sign posted southbound on the west Wawa Driveway at Memorial Drive.

Other Improvements

- As part of a future redevelopment of the New York Fried Chicken/ NB Hair parking lot, consider improvements to discourage motorists from using the parking lot as a cut-through to access eastbound Memorial Drive.
- As recommended as part of the US 13 Pedestrian Safety Study, install sidewalk along the north side of the large grass island provided between the eastbound Memorial Drive and W. Hazeldell Avenue (i.e., spur road) approaches to US 13 to encourage pedestrians to cross US 13 at the signalized crosswalk located on the south leg of the US 13 at Memorial Drive intersection (see **Figure 6**). Parking restrictions along the south side of Memorial Drive/W. Hazeldell Avenue, west of US 13 should also be considered to improve visibility of pedestrians crossing W. Hazeldell Avenue in addition to signing to encourage pedestrians to cross at the US 13 at Memorial Drive crosswalk.

Appendix

Traffic Counts

RJM Engineering, Inc.
6031 University Blvd, Suite 209
Ellicott City, MD 21043

Location: Wilmington, DE
Intersection: US 13 at Memorial Drive
Date: Wednesday, October 1, 2014

File Name : US 13 at Memorial Dr
Site Code :
Start Date : 10/1/2014
Page No : 1

Groups Printed- CARS & PEDS - TURNS, BIKES & RT from Thru EB - TRUCKS

	Memorial Dr Eastbound					Memorial Dr Westbound					US 13 Northbound					US 13 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	5	4	11	0	20	31	6	51	0	88	3	416	56	4	479	26	165	6	1	198	785
07:15 AM	4	3	14	0	21	45	6	52	1	104	11	410	59	5	485	30	188	7	0	225	835
07:30 AM	5	3	12	0	20	43	3	88	0	134	6	431	66	1	504	34	204	6	0	244	902
07:45 AM	6	0	8	0	14	46	2	63	0	111	6	405	59	1	471	42	245	2	0	289	885
Total	20	10	45	0	75	165	17	254	1	437	26	1662	240	11	1939	132	802	21	1	956	3407
08:00 AM	6	2	12	0	20	43	4	42	0	89	6	451	56	2	515	38	168	5	0	211	835
08:15 AM	7	2	10	0	19	36	1	54	1	92	3	432	83	5	523	35	214	2	0	251	885
08:30 AM	3	3	8	0	14	38	2	41	0	81	8	415	49	0	472	28	176	0	0	204	771
08:45 AM	0	2	15	1	18	28	3	44	0	75	9	505	80	1	595	33	224	7	0	264	952
Total	16	9	45	1	71	145	10	181	1	337	26	1803	268	8	2105	134	782	14	0	930	3443
09:00 AM	1	1	10	0	12	42	2	29	0	73	12	312	39	2	365	42	184	4	0	230	680
09:15 AM	3	7	9	0	19	32	5	25	1	63	2	224	54	1	281	30	192	4	0	226	589
09:30 AM	1	3	14	0	18	30	1	25	0	56	4	248	46	2	300	31	198	5	0	234	608
09:45 AM	7	5	5	0	17	32	3	39	0	74	9	256	59	0	324	16	212	6	0	234	649
Total	12	16	38	0	66	136	11	118	1	266	27	1040	198	5	1270	119	786	19	0	924	2526
11:00 AM	2	7	13	0	22	31	4	25	0	60	8	215	58	2	283	36	207	3	0	246	611
11:15 AM	5	4	10	0	19	36	3	24	0	63	14	230	51	0	295	32	242	8	0	282	659
11:30 AM	3	3	16	1	23	35	3	45	0	83	9	250	51	0	310	29	244	8	1	282	698
11:45 AM	3	2	12	0	17	51	1	31	1	84	17	254	62	1	334	51	234	9	0	294	729
Total	13	16	51	1	81	153	11	125	1	290	48	949	222	3	1222	148	927	28	1	1104	2697
12:00 PM	6	2	16	1	25	39	1	40	0	80	13	246	70	1	330	55	264	3	1	323	758
12:15 PM	4	4	18	1	27	46	2	43	0	91	16	267	62	1	346	44	244	6	0	294	758
12:30 PM	3	3	9	0	15	55	6	30	1	92	10	262	59	1	332	56	299	4	0	359	798
12:45 PM	3	6	8	1	18	33	6	37	0	76	9	255	73	3	340	39	288	6	0	333	767
Total	16	15	51	3	85	173	15	150	1	339	48	1030	264	6	1348	194	1095	19	1	1309	3081
02:00 PM	9	5	10	2	26	32	1	27	0	60	14	235	63	1	313	35	267	1	0	303	702
02:15 PM	5	5	14	2	26	42	2	19	0	63	10	232	68	1	311	40	301	8	0	349	749
02:30 PM	10	6	11	1	28	42	3	28	1	74	14	214	60	0	288	32	297	7	1	337	727
02:45 PM	3	3	11	1	18	57	5	37	0	99	9	283	65	1	358	27	308	5	1	341	816
Total	27	19	46	6	98	173	11	111	1	296	47	964	256	3	1270	134	1173	21	2	1330	2994
03:00 PM	4	4	11	0	19	36	8	26	0	70	8	237	68	2	315	43	305	8	0	356	760
03:15 PM	6	5	13	0	24	34	8	28	0	70	19	247	69	0	335	38	345	7	0	390	819
03:30 PM	7	6	16	1	30	43	4	28	0	75	7	246	63	7	323	43	360	7	0	410	838
03:45 PM	7	4	15	0	26	46	5	24	1	76	10	244	89	3	346	45	380	12	1	438	886
Total	24	19	55	1	99	159	25	106	1	291	44	974	289	12	1319	169	1390	34	1	1594	3303
04:00 PM	5	3	27	1	36	49	2	40	0	91	12	224	63	3	302	53	339	8	1	401	830
04:15 PM	4	10	14	0	28	35	2	30	0	67	11	284	66	1	362	41	447	11	0	499	956
04:30 PM	4	9	22	0	35	37	5	49	0	91	13	235	56	6	310	36	361	4	0	401	837
04:45 PM	5	9	13	0	27	29	6	39	0	74	11	277	86	3	377	47	478	3	0	528	1006
Total	18	31	76	1	126	150	15	158	0	323	47	1020	271	13	1351	177	1625	26	1	1829	3629
05:00 PM	4	1	9	0	14	62	0	65	0	127	10	203	68	2	283	50	461	8	0	519	943
05:15 PM	4	4	9	0	17	35	0	48	0	83	6	296	90	2	394	65	436	8	0	509	1003
05:30 PM	5	4	12	0	21	37	3	48	1	89	13	233	87	4	337	47	452	7	0	506	953
05:45 PM	4	5	13	0	22	56	3	38	0	97	5	258	82	0	345	44	397	11	0	452	916
Total	17	14	43	0	74	190	6	199	1	396	34	990	327	8	1359	206	1746	34	0	1986	3815
Grand Total	163	149	450	13	775	1444	121	1402	8	2975	347	10432	2335	69	13183	1413	10326	216	7	11962	28895
Apprch %	21	19.2	58.1	1.7		48.5	4.1	47.1	0.3		2.6	79.1	17.7	0.5		11.8	86.3	1.8	0.1		
Total %	0.6	0.5	1.6	0	2.7	5	0.4	4.9	0	10.3	1.2	36.1	8.1	0.2	45.6	4.9	35.7	0.7	0	41.4	
CARS & PEDS	141	131	382	9	663	1166	96	1214	8	2484	261	8787	1975	64	11087	1236	8933	196	6	10371	24605
% CARS & PEDS	86.5	87.9	84.9	69.2	85.5	80.7	79.3	86.6	100	83.5	75.2	84.2	84.6	92.8	84.1	87.5	86.5	90.7	85.7	86.7	85.2
U-TURNS, BIKES & RT from Thru EB	2	0	10	4	16	1	0	0	0	1	28	0	0	5	33	36	0	0	1	37	87

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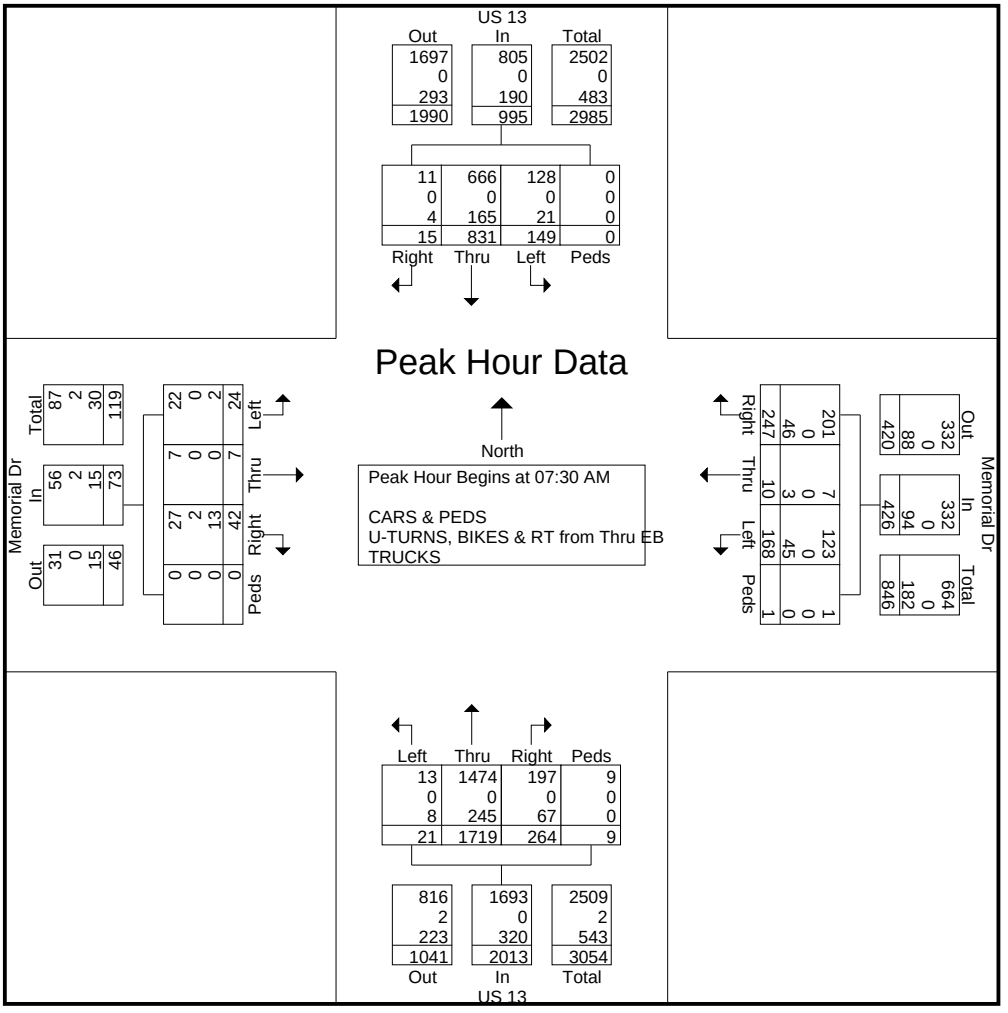
% U-TURNS, BIKES & RT from Thru EB	1.2	0	2.2	30.8	2.1	0.1	0	0	0	0	8.1	0	0	7.2	0.3	2.5	0	0	14.3	0.3	0.3
TRUCKS	20	18	58	0	96	277	25	188	0	490	58	1645	360	0	2063	141	1393	20	0	1554	4203
% TRUCKS	12.3	12.1	12.9	0	12.4	19.2	20.7	13.4	0	16.5	16.7	15.8	15.4	0	15.6	10	13.5	9.3	0	13	14.5

RJM Engineering, Inc.
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Location: Wilmington, DE
Intersection: US 13 at Memorial Drive
Date: Wednesday, October 1, 2014

File Name : US 13 at Memorial Dr
Site Code :
Start Date : 10/1/2014

	Memorial Dr Eastbound					Memorial Dr Westbound					US 13 Northbound					US 13 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	5	**3**	**12**	0	**20**	43	3	**88**	0	**134**	**6**	431	66	1	504	34	204	**6**	0	244	**902**
07:45 AM	6	0	8	0	14	**46**	2	63	0	111	6	405	59	1	471	**42**	**245**	2	0	**289**	885
08:00 AM	6	2	12	0	20	43	**4**	42	0	89	6	**451**	56	2	515	38	168	5	0	211	835
08:15 AM	**7**	2	10	0	19	36	1	54	**1**	92	3	432	**83**	**5**	**523**	35	214	2	0	251	885
Total Volume	24	7	42	0	73	168	10	247	1	426	21	1719	264	9	2013	149	831	15	0	995	3507
% App. Total	32.9	9.6	57.5	0		39.4	2.3	58	0.2		1	85.4	13.1	0.4		15	83.5	1.5	0		
PHF	.857	.583	.875	.000	.913	.913	.625	.702	.250	.795	.875	.953	.795	.450	.962	.887	.848	.625	.000	.861	.972
CARS & PEDS												1474									
% CARS & PEDS	91.7	100	64.3	0	76.7	73.2	70.0	81.4	100	77.9	61.9	85.7	74.6	100	84.1	85.9	80.1	73.3	0	80.9	82.3
U-TURNS, BIKES & RT from Thru EB	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% U-TURNS, BIKES & RT from Thru EB	0	0	4.8	0	2.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
TRUCKS	2	0	13	0	15	45	3	46	0	94	8	245	67	0	320	21	165	4	0	190	619
% TRUCKS	8.3	0	31.0	0	20.5	26.8	30.0	18.6	0	22.1	38.1	14.3	25.4	0	15.9	14.1	19.9	26.7	0	19.1	17.7

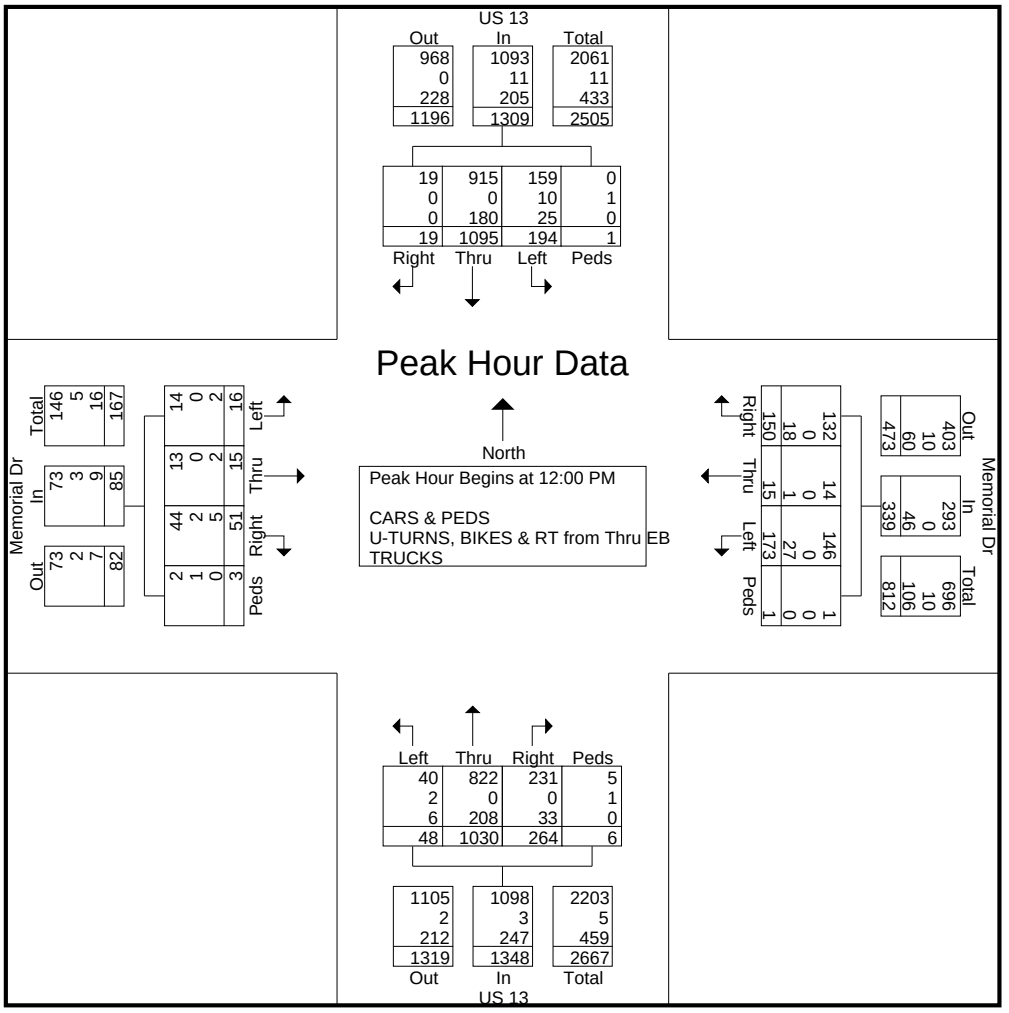


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	Memorial Dr Eastbound					Memorial Dr Westbound					US 13 Northbound					US 13 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	**6**	2	16	**1**	25	39	1	40	0	80	13	246	70	1	330	55	264	3	**1**	323	758
12:15 PM	4	4	**18**	1	**27**	46	2	**43**	0	91	**16**	**267**	62	1	**346**	44	244	**6**	0	294	758
12:30 PM	3	3	9	0	15	**55**	**6**	30	**1**	**92**	10	262	59	1	332	**56**	**299**	4	0	**359**	**798**
12:45 PM	3	**6**	8	1	18	33	6	37	0	76	9	255	**73**	**3**	340	39	288	6	0	333	767
Total Volume	16	15	51	3	85	173	15	150	1	339	48	1030	264	6	1348	194	1095	19	1	1309	3081
% App. Total	18.8	17.6	60	3.5		51	4.4	44.2	0.3		3.6	76.4	19.6	0.4		14.8	83.7	1.5	0.1		
PHF	.667	.625	.708	.750	.787	.786	.625	.872	.250	.921	.750	.964	.904	.500	.974	.866	.916	.792	.250	.912	.965
CARS & PEDS % CARS & PEDS	87.5	86.7	86.3	66.7	85.9	84.4	93.3	88.0	100	86.4	83.3	79.8	87.5	83.3	81.5	82.0	83.6	100	0	83.5	83.0
U-TURNS, BIKES & RT from Thru EB	0	0	2	1	3	0	0	0	0	0	2	0	0	1	3	10	0	0	1	11	17
% U-TURNS, BIKES & RT from Thru EB	0	0	3.9	33.3	3.5	0	0	0	0	0	4.2	0	0	16.7	0.2	5.2	0	0	100	0.8	0.6
TRUCKS	2	2	5	0	9	27	1	18	0	46	6	208	33	0	247	25	180	0	0	205	507
% TRUCKS	12.5	13.3	9.8	0	10.6	15.6	6.7	12.0	0	13.6	12.5	20.2	12.5	0	18.3	12.9	16.4	0	0	15.7	16.5

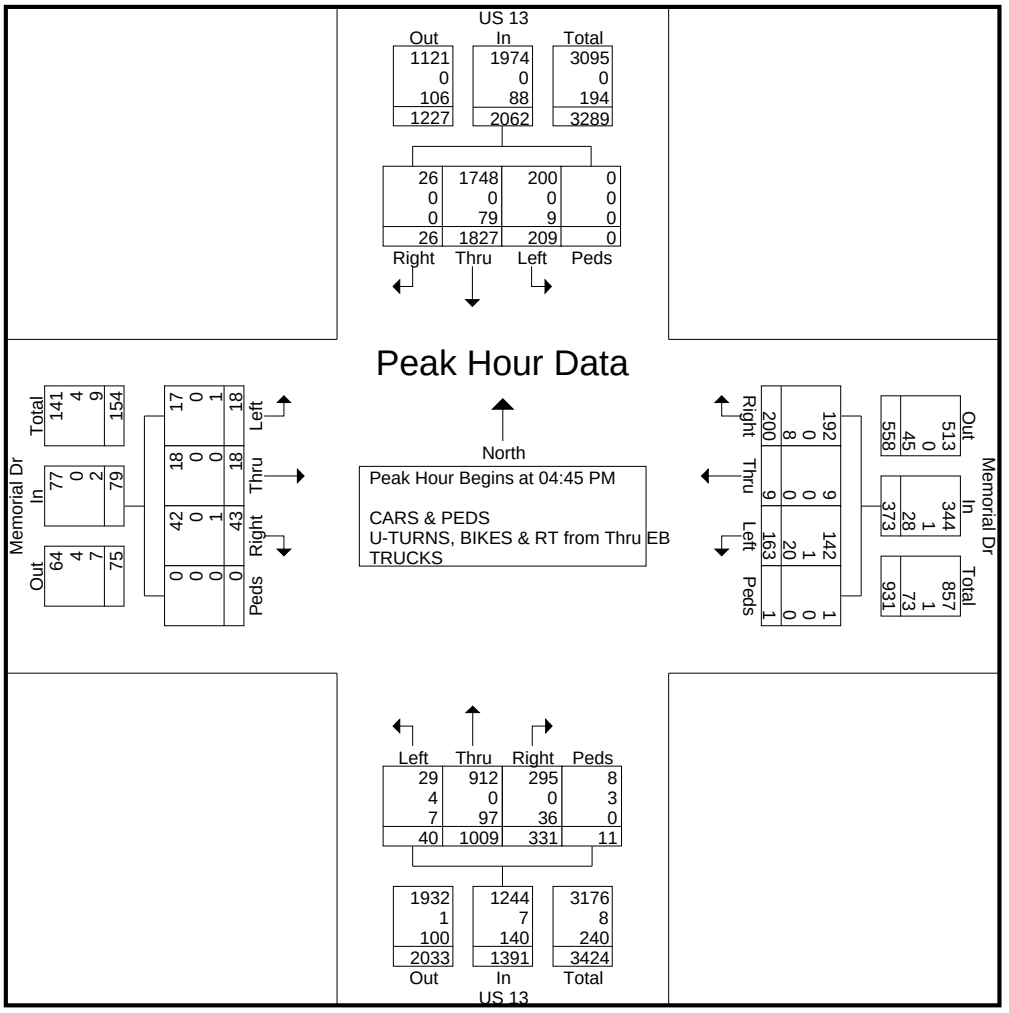


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Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	**5**	**9**	**13**	0	**27**	29	**6**	39	0	74	11	277	86	3	377	47	**478**	3	0	**528**	**1006**
05:00 PM	4	1	9	0	14	**62**	0	**65**	0	**127**	10	203	68	2	283	50	461	**8**	0	519	943
05:15 PM	4	4	9	0	17	35	0	48	0	83	6	**296**	**90**	2	**394**	**65**	436	8	0	509	1003
05:30 PM	5	4	12	0	21	37	3	48	**1**	89	**13**	233	87	**4**	337	47	452	7	0	506	953
Total Volume	18	18	43	0	79	163	9	200	1	373	40	1009	331	11	1391	209	1827	26	0	2062	3905
% App. Total	22.8	22.8	54.4	0		43.7	2.4	53.6	0.3		2.9	72.5	23.8	0.8		10.1	88.6	1.3	0		
PHF	.900	.500	.827	.000	.731	.657	.375	.769	.250	.734	.769	.852	.919	.688	.883	.804	.956	.813	.000	.976	.970
CARS & PEDS																	1748				
% CARS & PEDS	94.4	100	97.7	0	97.5	87.1	100	96.0	100	92.2	72.5	90.4	89.1	72.7	89.4	95.7	95.7	100	0	95.7	93.2
U-TURNS, BIKES & RT from Thru EB	0	0	0	0	0	1	0	0	0	1	4	0	0	3	7	0	0	0	0	0	8
% U-TURNS, BIKES & RT from Thru EB	0	0	0	0	0	0.6	0	0	0	0.3	10.0	0	0	27.3	0.5	0	0	0	0	0	0.2
TRUCKS	1	0	1	0	2	20	0	8	0	28	7	97	36	0	140	9	79	0	0	88	258
% TRUCKS	5.6	0	2.3	0	2.5	12.3	0	4.0	0	7.5	17.5	9.6	10.9	0	10.1	4.3	4.3	0	0	4.3	6.6



RJM Engineering, Inc.
6031 University Blvd, Suite 209
Ellicott City, MD 21043

Location: Wilmington, DE
Intersection: US 13 at E Hazeldell Ave (Fire Signal)
Date: Wednesday, October 1, 2014

File Name : US 13 at Hazeldell Ave
Site Code :
Start Date : 10/1/2014
Page No : 1

Groups Printed- CARS & PEDS - TURNS & BIKES - TRUCKS

	Eastbound					E Hazeldell Ave Westbound					US 13 Northbound					US 13 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	4	0	7	1	12	0	0	0	0	0	12	0	0	0	12	24
07:15 AM	0	0	0	0	0	3	0	11	0	14	4	0	2	0	6	15	0	0	0	15	35
07:30 AM	0	0	0	0	0	2	0	16	0	18	4	0	3	1	8	11	0	0	0	11	37
07:45 AM	0	0	0	0	0	1	0	6	0	7	0	0	4	0	4	11	0	0	0	11	22
Total	0	0	0	0	0	10	0	40	1	51	8	0	9	1	18	49	0	0	0	49	118
08:00 AM	0	0	0	0	0	0	0	20	0	20	5	0	0	0	5	13	0	0	0	13	38
08:15 AM	0	0	0	0	0	0	0	4	0	4	4	0	1	1	6	9	0	0	0	9	19
08:30 AM	0	0	0	0	0	0	0	4	0	4	2	0	0	0	2	5	0	0	0	5	11
08:45 AM	0	0	0	0	0	0	0	8	0	8	3	0	1	0	4	8	0	0	0	8	20
Total	0	0	0	0	0	0	0	36	0	36	14	0	2	1	17	35	0	0	0	35	88
09:00 AM	0	0	0	0	0	3	0	5	0	8	5	0	4	0	9	10	0	0	0	10	27
09:15 AM	0	0	0	0	0	2	0	2	0	4	2	0	5	0	7	22	0	0	0	22	33
09:30 AM	0	0	0	0	0	3	0	6	2	11	4	0	2	0	6	12	0	0	0	12	29
09:45 AM	0	0	0	0	0	2	0	5	2	9	7	0	3	1	11	18	0	0	0	18	38
Total	0	0	0	0	0	10	0	18	4	32	18	0	14	1	33	62	0	0	0	62	127
11:00 AM	0	0	0	0	0	3	0	4	0	7	0	0	2	0	2	14	0	0	0	14	23
11:15 AM	0	0	0	0	0	6	0	5	0	11	2	0	2	0	4	13	0	0	0	13	28
11:30 AM	0	0	0	0	0	3	0	3	1	7	4	0	2	0	6	14	0	0	0	14	27
11:45 AM	0	0	0	0	0	1	0	4	0	5	3	0	4	2	9	14	0	0	0	14	28
Total	0	0	0	0	0	13	0	16	1	30	9	0	10	2	21	55	0	0	0	55	106
12:00 PM	0	0	0	0	0	0	0	6	0	6	2	0	0	0	2	18	0	0	0	18	26
12:15 PM	0	0	0	0	0	2	0	6	0	8	8	0	4	0	12	23	0	0	0	23	43
12:30 PM	0	0	0	0	0	3	0	7	0	10	3	0	0	1	4	31	0	0	0	31	45
12:45 PM	0	0	0	0	0	3	0	5	0	8	3	0	5	2	10	25	0	0	0	25	43
Total	0	0	0	0	0	8	0	24	0	32	16	0	9	3	28	97	0	0	0	97	157
02:00 PM	0	0	0	0	0	4	0	8	0	12	6	0	3	1	10	19	0	0	0	19	41
02:15 PM	0	0	0	0	0	2	0	7	0	9	3	0	2	0	5	27	0	0	0	27	41
02:30 PM	0	0	0	0	0	3	0	8	1	12	6	0	6	0	12	20	0	0	0	20	44
02:45 PM	0	0	0	0	0	6	0	13	1	20	8	0	0	0	8	17	0	0	0	17	45
Total	0	0	0	0	0	15	0	36	2	53	23	0	11	1	35	83	0	0	0	83	171
03:00 PM	0	0	0	0	0	3	0	10	0	13	2	0	3	0	5	25	0	0	0	25	43
03:15 PM	0	0	0	0	0	0	0	13	0	13	1	0	3	0	4	24	0	0	0	24	41
03:30 PM	0	0	0	0	0	3	0	9	0	12	3	0	5	1	9	30	0	0	0	30	51
03:45 PM	0	0	0	0	0	5	0	5	0	10	3	0	1	0	4	25	0	0	0	25	39
Total	0	0	0	0	0	11	0	37	0	48	9	0	12	1	22	104	0	0	0	104	174
04:00 PM	0	0	0	0	0	1	0	9	0	10	3	0	4	0	7	23	0	0	0	23	40
04:15 PM	0	0	0	0	0	0	0	3	0	3	4	0	2	1	7	28	0	0	0	28	38
04:30 PM	0	0	0	0	0	3	0	11	0	14	1	0	1	0	2	32	0	0	0	32	48
04:45 PM	0	0	0	0	0	2	0	7	0	9	3	0	5	0	8	39	0	0	0	39	56
Total	0	0	0	0	0	6	0	30	0	36	11	0	12	1	24	122	0	0	0	122	182
05:00 PM	0	0	0	0	0	3	0	8	0	11	3	0	8	3	14	50	0	0	0	50	75
05:15 PM	0	0	0	0	0	2	0	4	0	6	6	0	2	0	8	39	0	0	0	39	53
05:30 PM	0	0	0	0	0	1	0	11	0	12	6	0	2	1	9	45	0	0	0	45	66
05:45 PM	0	0	0	0	0	4	0	10	4	18	6	0	3	2	11	26	0	0	0	26	55
Total	0	0	0	0	0	10	0	33	4	47	21	0	15	6	42	160	0	0	0	160	249
Grand Total	0	0	0	0	0	83	0	270	12	365	129	0	94	17	240	767	0	0	0	767	1372
Apprch %	0	0	0	0		22.7	0	74	3.3		53.8	0	39.2	7.1		100	0	0	0		
Total %	0	0	0	0	0	6	0	19.7	0.9	26.6	9.4	0	6.9	1.2	17.5	55.9	0	0	0	55.9	
CARS & PEDS	0	0	0	0	0	79	0	238	11	328	0	0	78	17	95	287	0	0	0	287	710
% CARS & PEDS	0	0	0	0	0	95.2	0	88.1	91.7	89.9	0	0	83	100	39.6	37.4	0	0	0	37.4	51.7
U-TURNS & BIKES	0	0	0	0	0	0	0	0	1	1	129	0	0	0	129	441	0	0	0	441	571
% U-TURNS & BIKES	0	0	0	0	0	0	0	0	8.3	0.3	100	0	0	0	53.8	57.5	0	0	0	57.5	41.6

RJM Engineering, Inc.
6031 University Blvd, Suite 209
Ellicott City, MD 21043

Location: Wilmington, DE
Intersection: US 13 at E Hazeldell Ave (Fire Signal)
Date: Wednesday, October 1, 2014

File Name : US 13 at Hazeldell Ave
Site Code :
Start Date : 10/1/2014

Groups Printed- CARS & PEDS - TURNS & BIKES - TRUCKS

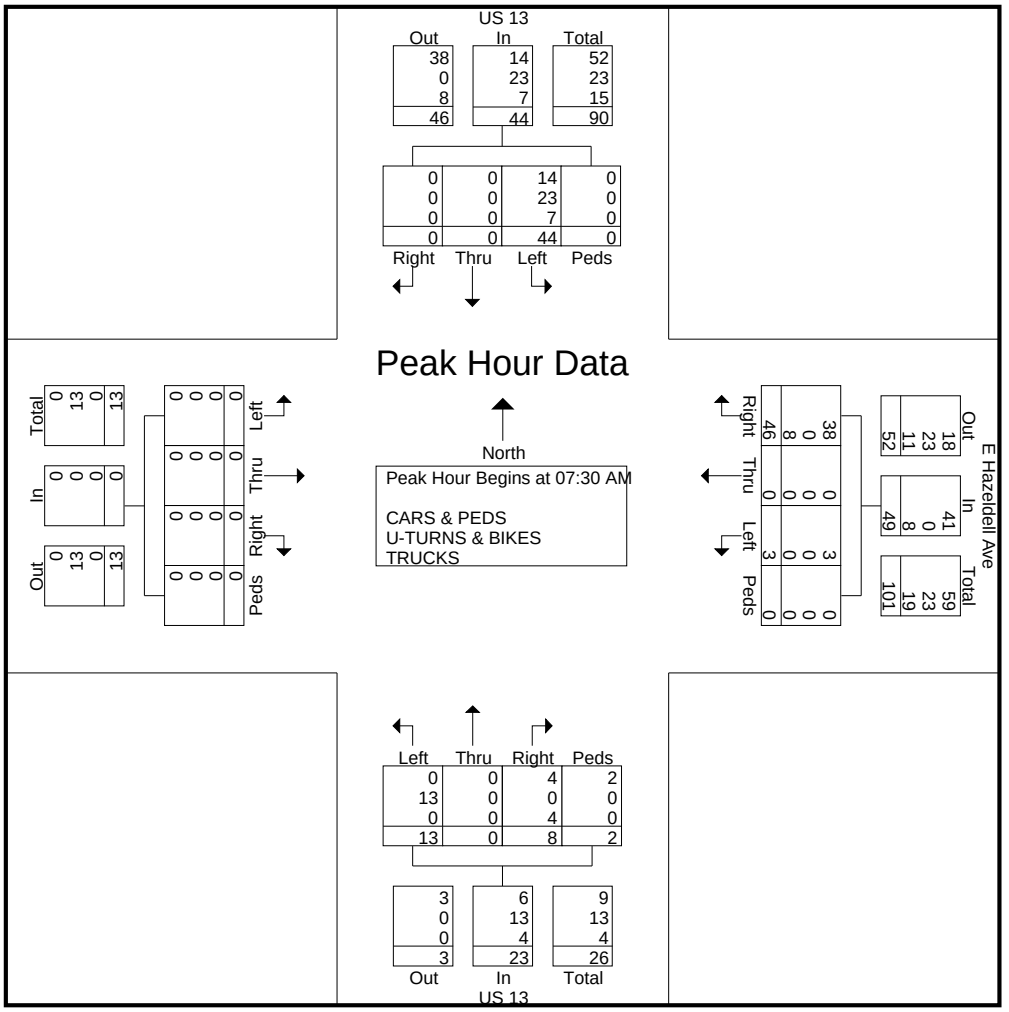
	Eastbound					E Hazeldell Ave Westbound					US 13 Northbound					US 13 Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
TRUCKS	0	0	0	0	0	4	0	32	0	36	0	0	16	0	16	39	0	0	0	39	91
% TRUCKS	0	0	0	0	0	4.8	0	11.9	0	9.9	0	0	17	0	6.7	5.1	0	0	0	5.1	6.6

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Date: Wednesday, October 1, 2014

File Name : US 13 at Hazeldell Ave
Site Code :
Start Date : 10/1/2014
Page No : 3

	Eastbound					E Hazeldell Ave Westbound					US 13 Northbound					US 13 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	**2**	0	16	0	18	4	0	3	**1**	**8**	11	0	0	0	11	37
07:45 AM	0	0	0	0	0	1	0	6	0	7	0	0	**4**	0	4	11	0	0	0	11	22
08:00 AM	0	0	0	0	0	0	0	**20**	0	**20**	**5**	0	0	0	5	**13**	0	0	0	**13**	**38**
08:15 AM	0	0	0	0	0	0	0	4	0	4	4	0	1	1	6	9	0	0	0	9	19
Total Volume	0	0	0	0	0	3	0	46	0	49	13	0	8	2	23	44	0	0	0	44	116
% App. Total	0	0	0	0		6.1	0	93.9	0		56.5	0	34.8	8.7		100	0	0	0		
PHF	.000	.000	.000	.000	.000	.375	.000	.575	.000	.613	.650	.000	.500	.500	.719	.846	.000	.000	.000	.846	.763
CARS & PEDS																					
% CARS & PEDS	0	0	0	0	0	100	0	82.6	0	83.7	0	0	50.0	100	26.1	31.8	0	0	0	31.8	52.6
U-TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	13	0	0	0	13	23	0	0	0	23	36
% U-TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	100	0	0	0	56.5	52.3	0	0	0	52.3	31.0
TRUCKS	0	0	0	0	0	0	0	8	0	8	0	0	4	0	4	7	0	0	0	7	19
% TRUCKS	0	0	0	0	0	0	0	17.4	0	16.3	0	0	50.0	0	17.4	15.9	0	0	0	15.9	16.4

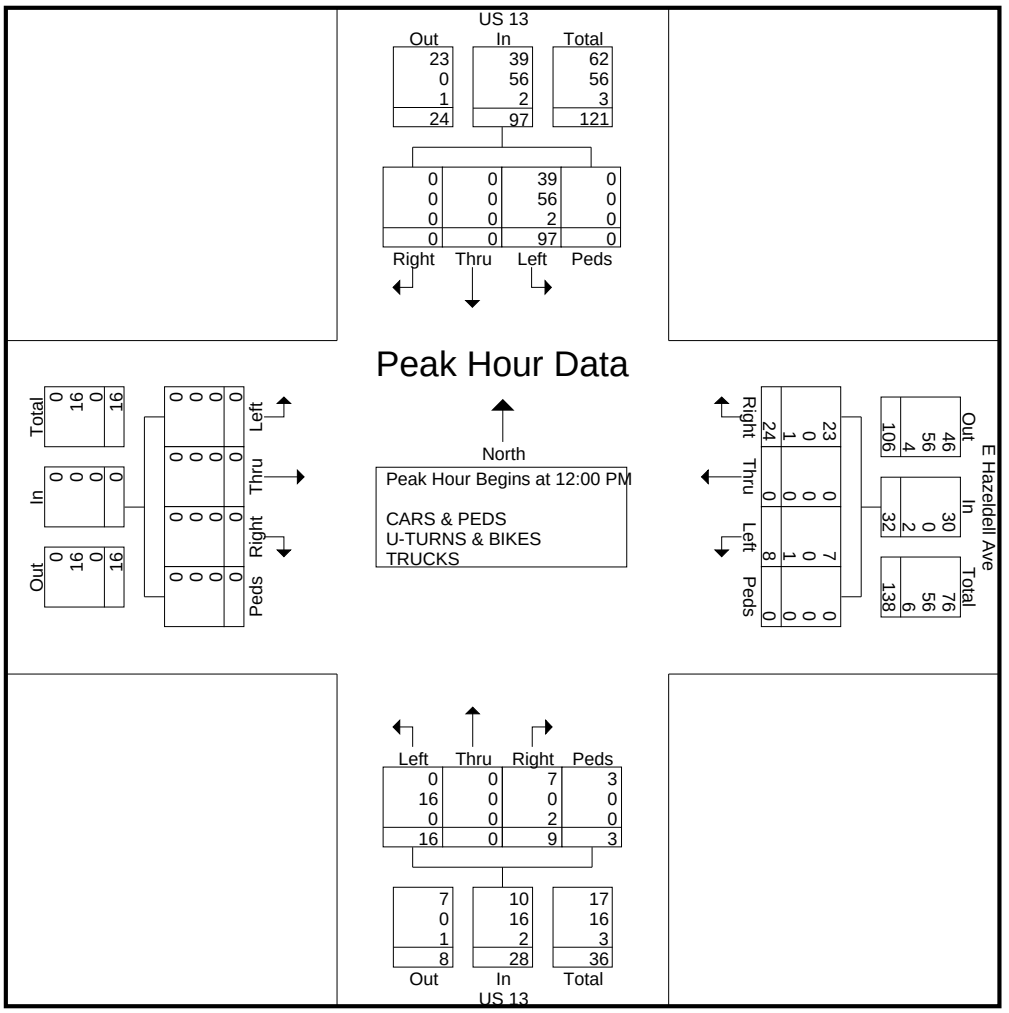


RJM Engineering, Inc.
6031 University Blvd, Suite 209
Ellicott City, MD 21043

Location: Wilmington, DE
Intersection: US 13 at E Hazeldell Ave (Fire Signal)
Date: Wednesday, October 1, 2014

File Name : US 13 at Hazeldell Ave
Site Code :
Start Date : 10/1/2014

	Eastbound					E Hazeldell Ave Westbound					US 13 Northbound					US 13 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	0	0	0	0	0	0	0	6	0	6	2	0	0	0	2	18	0	0	0	18	26
12:15 PM	0	0	0	0	0	2	0	6	0	8	**8**	0	4	0	**12**	23	0	0	0	23	43
12:30 PM	0	0	0	0	0	**3**	0	**7**	0	**10**	3	0	0	1	4	**31**	0	0	0	**31**	**45**
12:45 PM	0	0	0	0	0	3	0	5	0	8	3	0	**5**	**2**	10	25	0	0	0	25	43
Total Volume	0	0	0	0	0	8	0	24	0	32	16	0	9	3	28	97	0	0	0	97	157
% App. Total	0	0	0	0		25	0	75	0		57.1	0	32.1	10.7		100	0	0	0		
PHF	.000	.000	.000	.000	.000	.667	.000	.857	.000	.800	.500	.000	.450	.375	.583	.782	.000	.000	.000	.782	.872
CARS & PEDS																					
% CARS & PEDS	0	0	0	0	0	87.5	0	95.8	0	93.8	0	0	77.8	100	35.7	40.2	0	0	0	40.2	50.3
U-TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	16	0	0	0	16	56	0	0	0	56	72
% U-TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	100	0	0	0	57.1	57.7	0	0	0	57.7	45.9
TRUCKS	0	0	0	0	0	1	0	1	0	2	0	0	2	0	2	2	0	0	0	2	6
% TRUCKS	0	0	0	0	0	12.5	0	4.2	0	6.3	0	0	22.2	0	7.1	2.1	0	0	0	2.1	3.8

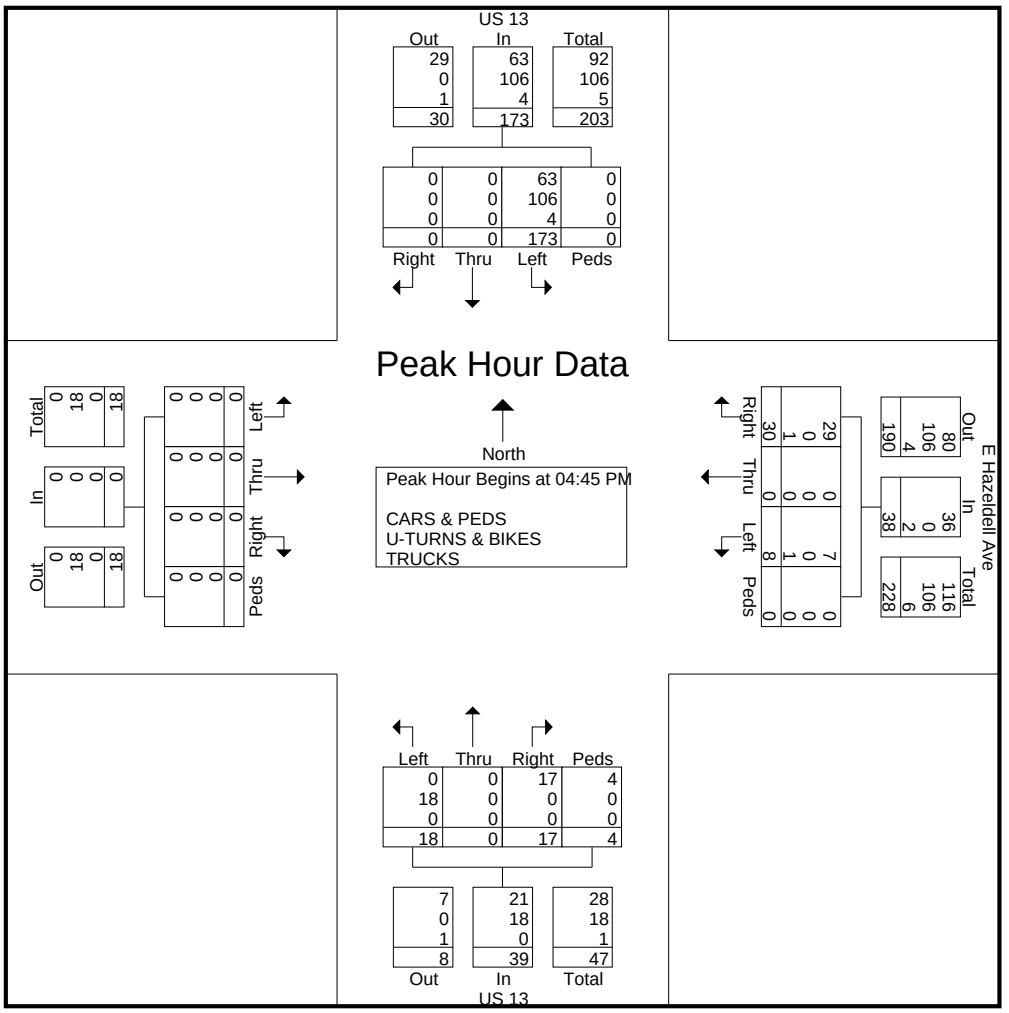


RJM Engineering, Inc.
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Location: Wilmington, DE
Intersection: US 13 at E Hazeldell Ave (Fire Signal)
Date: Wednesday, October 1, 2014

File Name : US 13 at Hazeldell Ave
Site Code :
Start Date : 10/1/2014

	Eastbound					E Hazeldell Ave Westbound					US 13 Northbound					US 13 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	2	0	7	0	9	3	0	5	0	8	39	0	0	0	39	56
05:00 PM	0	0	0	0	0	**3**	0	8	0	11	3	0	**8**	**3**	**14**	**50**	0	0	0	**50**	**75**
05:15 PM	0	0	0	0	0	2	0	4	0	6	**6**	0	2	0	8	39	0	0	0	39	53
05:30 PM	0	0	0	0	0	1	0	**11**	0	**12**	6	0	2	1	9	45	0	0	0	45	66
Total Volume	0	0	0	0	0	8	0	30	0	38	18	0	17	4	39	173	0	0	0	173	250
% App. Total	0	0	0	0		21.1	0	78.9	0		46.2	0	43.6	10.3		100	0	0	0		
PHF	.000	.000	.000	.000	.000	.667	.000	.682	.000	.792	.750	.000	.531	.333	.696	.865	.000	.000	.000	.865	.833
CARS & PEDS																					
% CARS & PEDS	0	0	0	0	0	87.5	0	96.7	0	94.7	0	0	100	100	53.8	36.4	0	0	0	36.4	48.0
U-TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	18	0	0	0	18	106	0	0	0	106	124
% U-TURNS & BIKES	0	0	0	0	0	0	0	0	0	0	100	0	0	0	46.2	61.3	0	0	0	61.3	49.6
TRUCKS	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	4	0	0	0	4	6
% TRUCKS	0	0	0	0	0	12.5	0	3.3	0	5.3	0	0	0	0	0	2.3	0	0	0	2.3	2.4



Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100
Columbia, MD 21046
443-741-3500

Weather: SUNNY
Counted By: HORACE & DEB
Town: NEWARK
County: NEW CASTLE

File Name : US 13 at Wildel Avenue
Site Code : 00000000
Start Date : 3/12/2014
Page No : 1

Groups Printed- VEHS&PEDS

	US 13 From North					WILDEL AVE From East					US 13 From South					WILDEL AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:30 AM	4	114	0	0	118	1	0	6	0	7	4	337	15	0	356	6	0	2	0	8	489
06:45 AM	3	120	0	0	123	3	0	13	0	16	4	423	24	0	451	21	0	1	0	22	612
Total	7	234	0	0	241	4	0	19	0	23	8	760	39	0	807	27	0	3	0	30	1101
07:00 AM	1	100	0	0	101	4	0	10	0	14	2	361	7	0	370	10	0	3	0	13	498
07:15 AM	8	182	0	0	190	1	0	13	0	14	5	499	8	0	512	9	0	2	0	11	727
07:30 AM	3	178	13	0	194	4	0	17	0	21	11	532	10	0	553	9	0	4	0	13	781
07:45 AM	7	202	0	0	209	1	0	5	0	6	7	497	16	0	520	6	0	1	1	8	743
Total	19	662	13	0	694	10	0	45	0	55	25	1889	41	0	1955	34	0	10	1	45	2749
08:00 AM	2	173	3	0	178	0	0	3	1	4	3	513	13	0	529	8	0	2	1	11	722
08:15 AM	2	155	0	0	157	3	0	11	0	14	5	461	11	0	477	6	0	3	1	10	658
08:30 AM	6	174	0	0	180	2	0	1	0	3	3	448	7	0	458	7	0	2	0	9	650
08:45 AM	1	101	1	0	103	0	0	2	0	2	4	426	8	1	439	3	0	3	1	7	551
Total	11	603	4	0	618	5	0	17	1	23	15	1848	39	1	1903	24	0	10	3	37	2581
09:00 AM	4	181	0	0	185	0	0	5	0	5	2	257	11	0	270	6	0	3	0	9	469
09:15 AM	8	201	3	0	212	0	0	3	0	3	6	282	11	0	299	6	0	3	0	9	523
BREAK																					
Total	12	382	3	0	397	0	0	8	0	8	8	539	22	0	569	12	0	6	0	18	992
BREAK																					
11:00 AM	3	112	0	0	115	0	0	3	0	3	6	253	10	0	269	13	0	1	0	14	401
11:15 AM	3	158	11	0	172	0	0	1	0	1	5	315	6	0	326	12	0	8	0	20	519
11:30 AM	1	190	2	0	193	1	0	2	0	3	12	300	4	0	316	24	0	3	0	27	539
11:45 AM	4	239	0	0	243	0	0	1	0	1	11	334	11	1	357	9	0	2	1	12	613
Total	11	699	13	0	723	1	0	7	0	8	34	1202	31	1	1268	58	0	14	1	73	2072
12:00 PM	4	314	1	0	319	0	0	2	0	2	5	288	12	0	305	20	0	4	0	24	650
12:15 PM	2	264	1	0	267	0	0	1	0	1	6	327	12	0	345	3	0	2	0	5	618
12:30 PM	0	312	1	0	313	1	0	5	0	6	4	330	9	0	343	11	0	5	0	16	678
12:45 PM	6	259	0	0	265	0	0	4	2	6	9	312	16	0	337	12	0	4	1	17	625
Total	12	1149	3	0	1164	1	0	12	2	15	24	1257	49	0	1330	46	0	15	1	62	2571

BREAK

Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100
Columbia, MD 21046
443-741-3500

File Name : US 13 at Wildel Avenue
Site Code : 00000000
Start Date : 3/12/2014

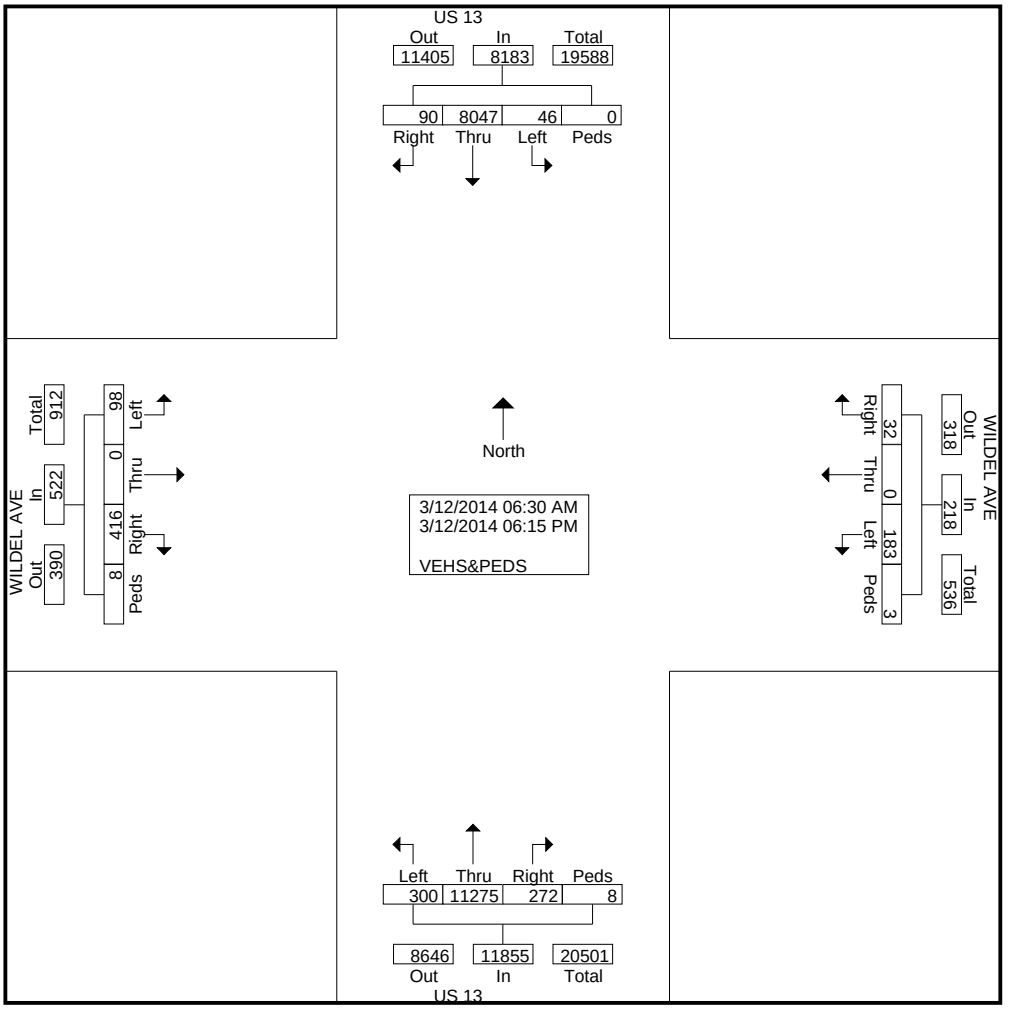
Groups Printed- VEHS&PEDS

	US 13 From North					WILDEL AVE From East					US 13 From South					WILDEL AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:30 PM	3	344	1	0	348	0	0	8	0	8	17	333	11	0	361	22	0	3	1	26	743
03:45 PM	2	358	0	0	360	4	0	8	0	12	13	312	11	0	336	14	0	4	1	19	727
Total	5	702	1	0	708	4	0	16	0	20	30	645	22	0	697	36	0	7	2	45	1470
04:00 PM	3	376	2	0	381	0	0	6	0	6	13	320	3	0	336	37	0	4	0	41	764
04:15 PM	2	339	1	0	342	0	0	6	0	6	11	329	9	2	351	21	0	3	0	24	723
04:30 PM	0	305	1	0	306	0	0	4	0	4	6	320	8	0	334	45	0	6	0	51	695
04:45 PM	2	398	2	0	402	1	0	10	0	11	20	344	6	0	370	15	0	4	0	19	802
Total	7	1418	6	0	1431	1	0	26	0	27	50	1313	26	2	1391	118	0	17	0	135	2984
05:00 PM	0	309	0	0	309	1	0	3	0	4	10	351	4	0	365	19	0	6	0	25	703
05:15 PM	2	430	1	0	433	1	0	8	0	9	13	317	3	0	333	5	0	3	0	8	783
05:30 PM	2	444	1	0	447	1	0	11	0	12	19	332	6	2	359	11	0	2	0	13	831
05:45 PM	2	362	0	0	364	2	0	0	0	2	12	303	7	0	322	9	0	0	0	9	697
Total	6	1545	2	0	1553	5	0	22	0	27	54	1303	20	2	1379	44	0	11	0	55	3014
06:00 PM	0	351	1	0	352	0	0	6	0	6	12	258	10	2	282	9	0	2	0	11	651
06:15 PM	0	302	0	0	302	1	0	5	0	6	12	261	1	0	274	8	0	3	0	11	593
Grand Total	90	8047	46	0	8183	32	0	183	3	218	272	11275	300	8	11855	416	0	98	8	522	20778
Apprch %	1.1	98.3	0.6	0		14.7	0	83.9	1.4		2.3	95.1	2.5	0.1		79.7	0	18.8	1.5		
Total %	0.4	38.7	0.2	0	39.4	0.2	0	0.9	0	1	1.3	54.3	1.4	0	57.1	2	0	0.5	0	2.5	

Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100
Columbia, MD 21046
443-741-3500

File Name : US 13 at Wildel Avenue
Site Code : 00000000
Start Date : 3/12/2014
Page No : 3

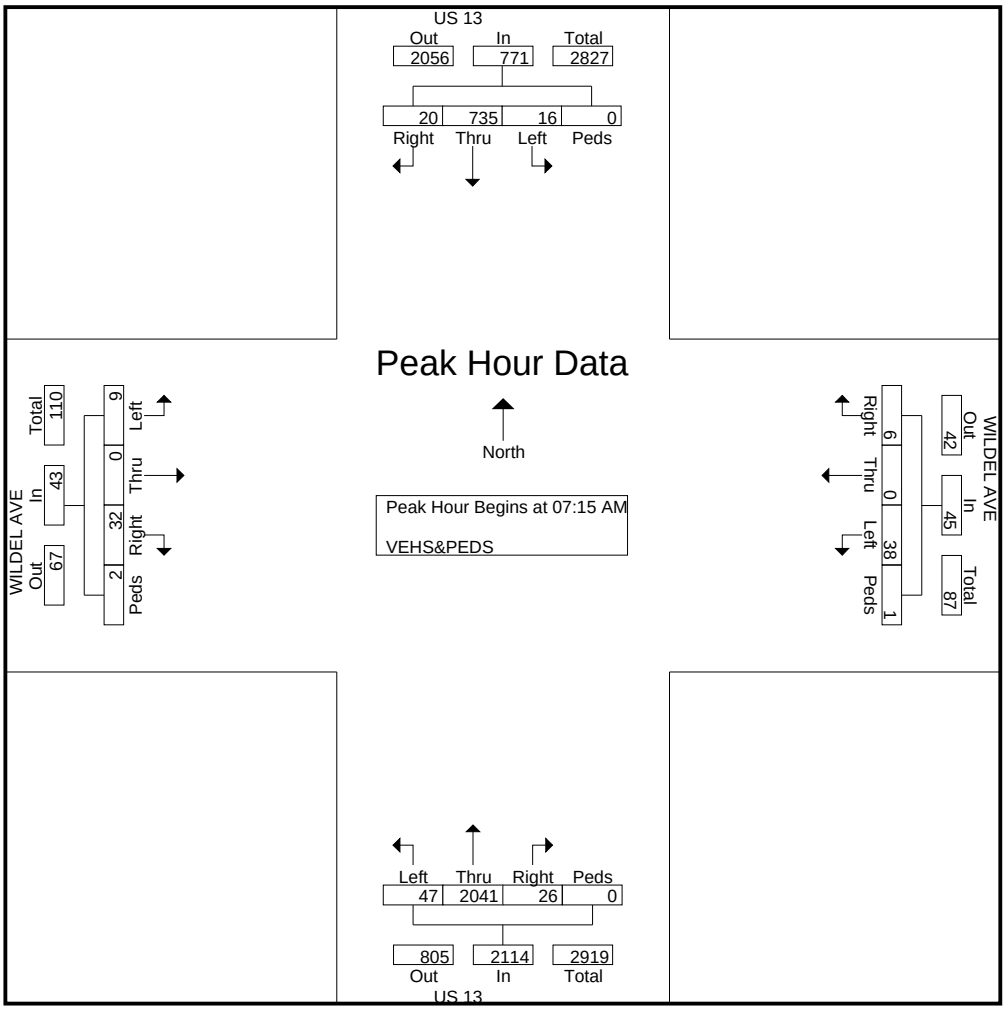


Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100
Columbia, MD 21046
443-741-3500

File Name : US 13 at Wildel Avenue
Site Code : 00000000
Start Date : 3/12/2014
Page No : 4

	US 13 From North					WILDEL AVE From East					US 13 From South					WILDEL AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**8**	182	0	0	190	1	0	13	0	14	5	499	8	0	512	**9**	0	2	0	11	727
07:30 AM	3	178	**13**	0	194	**4**	0	**17**	0	**21**	**11**	**532**	10	0	**553**	9	0	**4**	0	**13**	**781**
07:45 AM	7	**202**	0	0	**209**	1	0	5	0	6	7	497	**16**	0	520	6	0	1	**1**	8	743
08:00 AM	2	173	3	0	178	0	0	3	**1**	4	3	513	13	0	529	8	0	2	1	11	722
Total Volume	20	735	16	0	771	6	0	38	1	45	26	2041	47	0	2114	32	0	9	2	43	2973
% App. Total	2.6	95.3	2.1	0		13.3	0	84.4	2.2		1.2	96.5	2.2	0		74.4	0	20.9	4.7		
PHF	.625	.910	.308	.000	.922	.375	.000	.559	.250	.536	.591	.959	.734	.000	.956	.889	.000	.563	.500	.827	.952

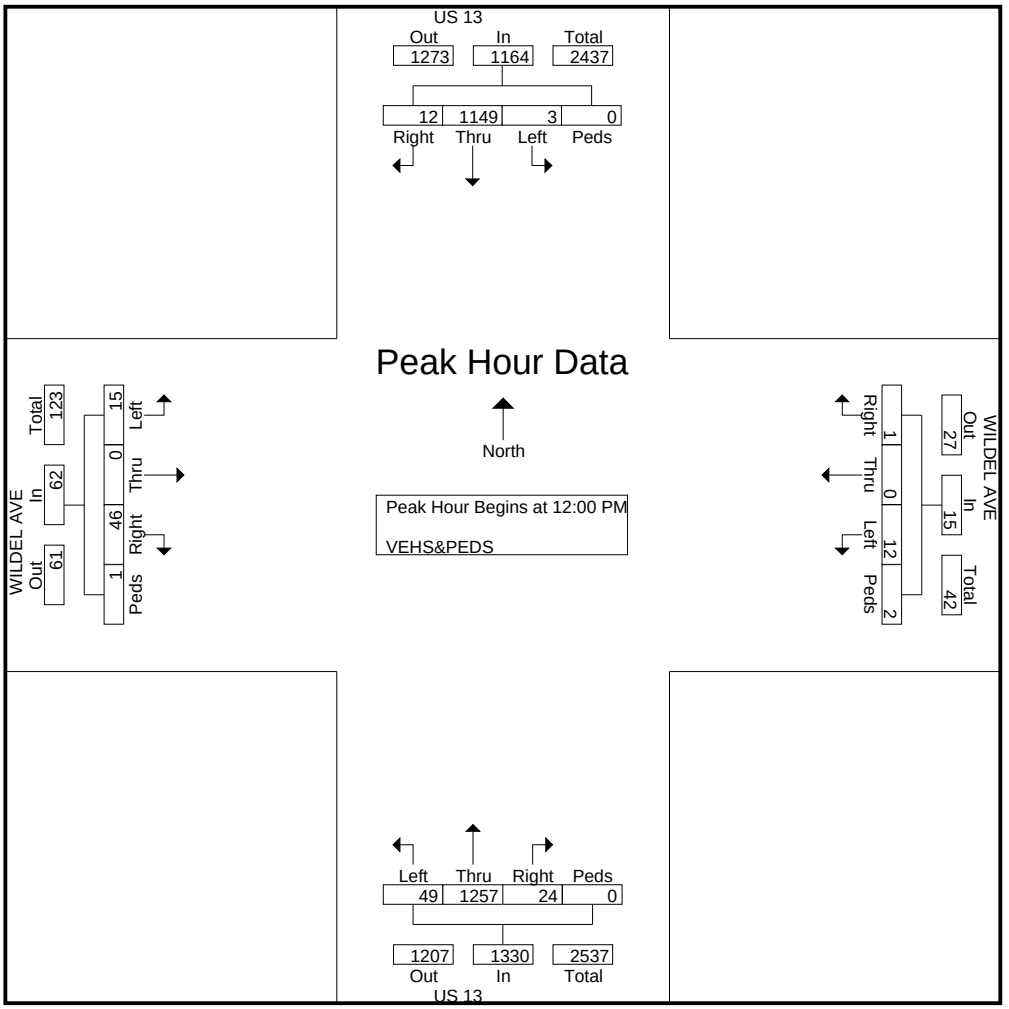


Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100
Columbia, MD 21046
443-741-3500

File Name : US 13 at Wildel Avenue
Site Code : 00000000
Start Date : 3/12/2014
Page No : 5

	US 13 From North					WILDEL AVE From East					US 13 From South					WILDEL AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	4	**314**	**1**	0	**319**	0	0	2	0	2	5	288	12	0	305	**20**	0	4	0	**24**	650
12:15 PM	2	264	1	0	267	0	0	1	0	1	6	327	12	0	**345**	3	0	2	0	5	618
12:30 PM	0	312	1	0	313	**1**	0	**5**	0	**6**	4	**330**	9	0	343	11	0	**5**	0	16	**678**
12:45 PM	**6**	259	0	0	265	0	0	4	**2**	6	**9**	312	**16**	0	337	12	0	4	**1**	17	625
Total Volume	12	1149	3	0	1164	1	0	12	2	15	24	1257	49	0	1330	46	0	15	1	62	2571
% App. Total	1	98.7	0.3	0		6.7	0	80	13.3		1.8	94.5	3.7	0		74.2	0	24.2	1.6		
PHF	.500	.915	.750	.000	.912	.250	.000	.600	.250	.625	.667	.952	.766	.000	.964	.575	.000	.750	.250	.646	.948

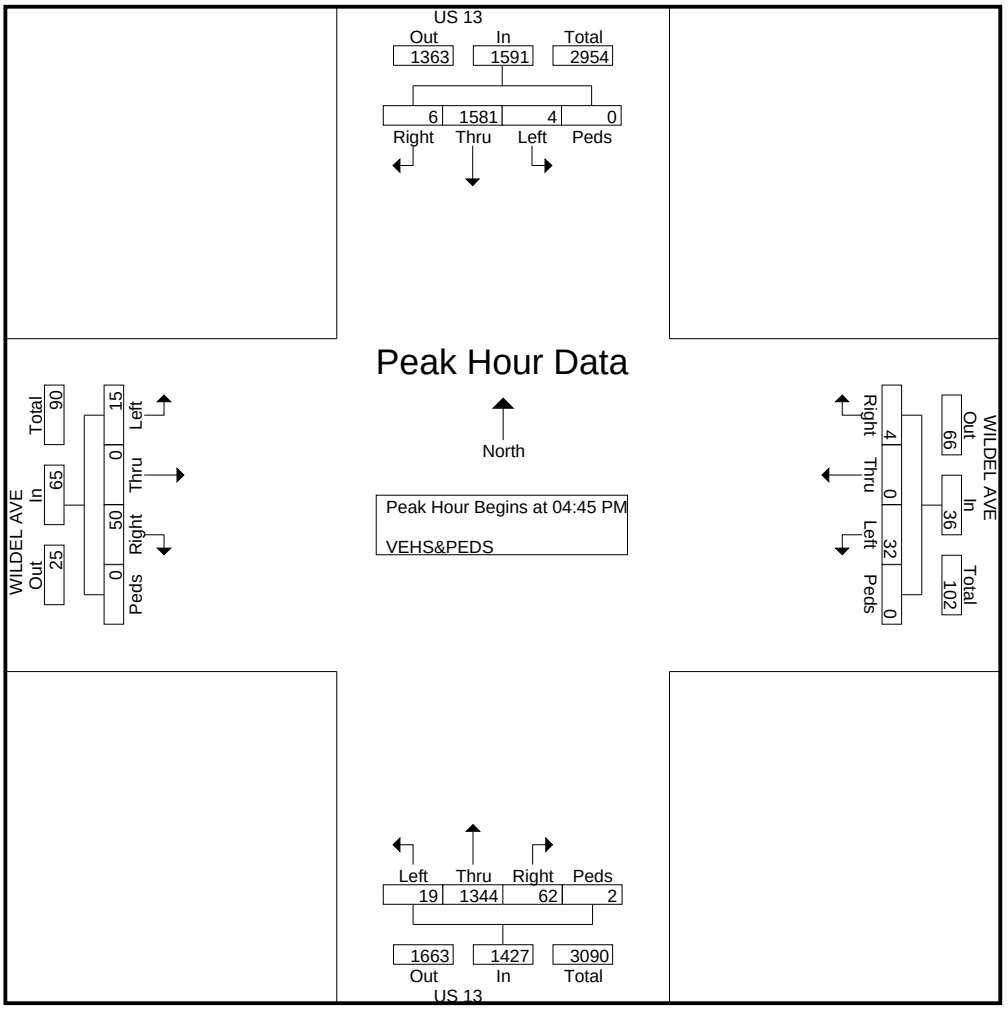


Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100
Columbia, MD 21046
443-741-3500

File Name : US 13 at Wildel Avenue
Site Code : 00000000
Start Date : 3/12/2014
Page No : 6

	US 13 From North					WILDEL AVE From East					US 13 From South					WILDEL AVE From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	**2**	398	**2**	0	402	**1**	0	10	0	11	**20**	344	**6**	0	**370**	15	0	4	0	19	802
05:00 PM	0	309	0	0	309	1	0	3	0	4	10	**351**	4	0	365	**19**	0	**6**	0	**25**	703
05:15 PM	2	430	1	0	433	1	0	8	0	9	13	317	3	0	333	5	0	3	0	8	783
05:30 PM	2	**444**	1	0	**447**	1	0	**11**	0	**12**	19	332	6	**2**	359	11	0	2	0	13	**831**
Total Volume	6	1581	4	0	1591	4	0	32	0	36	62	1344	19	2	1427	50	0	15	0	65	3119
% App. Total	0.4	99.4	0.3	0		11.1	0	88.9	0		4.3	94.2	1.3	0.1		76.9	0	23.1	0		
PHF	.750	.890	.500	.000	.890	1.00	.000	.727	.000	.750	.775	.957	.792	.250	.964	.658	.000	.625	.000	.650	.938



Appendix

Field Observations

QUEUING ANALYSIS

Field Sheet

Whitman, Requardt, and Associates, LLP

LOCATION: US 13 at Memorial Drive

APPROACH: SBL

Recorder: BMW

Date: 6/10/2015 - AM

Weather: Sunny/Warm

W.O.#:

TIME	CYCLE	Queue at Beginning of Green	Maximum Queue	Queues Block?		# Cleared During Protected Phase			# Cleared During Permissive Phase			# Not Cleared
				Lefts	Thrus	Green	Yellow/All Red	Total	Green/Flashing Red	Yellow/All Red	Total	
0:00	**1**	5				4	1	5	n/a		n/a	0
2:00	**2**	4				2	3	5	n/a		n/a	0
3:45	**3**	2				2	0	2	n/a		n/a	0
6:00	**4**	5				3	2	5	n/a		n/a	0
8:00	**5**	5				3	3	6	n/a		n/a	0
9:45	**6**	1				2	0	2	n/a		n/a	0
12:00	**7**	6				4	2	6	n/a		n/a	0
14:00	**8**	5				4	2	6	n/a		n/a	0
16:00	**9**	4				3	1	4	n/a		n/a	0
18:00	**10**	7				4	3	7	n/a		n/a	0
19:45	**11**	4				4	0	4	n/a		n/a	0
22:00	**12**	8				4	2	6	n/a		n/a	2
23:45	**13**	6				1	4	5	n/a		n/a	1
26:00	**14**	5				3	1	4	n/a		n/a	0
28:00	**15**	5				3	2	5	n/a		n/a	0
29:45	**16**	5				3	2	5	n/a		n/a	0
31:45	**17**	6				3	3	6	n/a		n/a	0
34:00	**18**	6				4	2	6	n/a		n/a	0
36:00	**19**	7				3	2	5	n/a		n/a	2
37:45	**20**	8				2	4	6	n/a		n/a	2
40:00	**21**	5				4	1	5	n/a		n/a	0
41:45	**22**	3				3	0	3	n/a		n/a	0
44:00	**23**	5				3	2	5	n/a		n/a	0
45:45	**24**	3				4	1	5	n/a		n/a	0
48:00	**25**	3				3	0	3	n/a		n/a	0
50:00	**26**	8				3	3	6	n/a		n/a	2
52:00	**27**	5				4	1	5	n/a		n/a	0
53:45	**28**	1				1	0	1	n/a		n/a	0
56:00	**29**	3				3	1	4	n/a		n/a	0
57:45	**30**	6				3	3	6	n/a		n/a	0

Cycle #14 - First vehicle in queues ran red light during EB phase (not included in queue)

QUEUING ANALYSIS

Field Sheet

Whitman, Requardt, and Associates, LLP

LOCATION: US 13 at Memorial Drive

APPROACH: SBL

Recorder: BMW

Date: 6/10/2015 - AM

Weather: Sunny/Warm

W.O.#:

TIME	CYCLE	Queue at Beginning of Green	Maximum Queue	Queues Block?		# Cleared During Protected Phase			# Cleared During Permissive Phase			# Not Cleared
				Lefts	Thrus	Green	Yellow/All Red	Total	Green/Flashing Red	Yellow/All Red	Total	
60:00	**31**	5				4	2	6	n/a		n/a	0
	32											
	33											
	34											
	35											
	36											
	37											
	38											
	39											
	40											
	41											
	42											
	43											
	44											
	45											
	46											
	47											
	48											
	49											
	50											
	51											
	52											
	53											
	54											
	55											
	56											
	57											
	58											
	59											
	60											

QUEUING ANALYSIS

Field Sheet

Whitman, Requardt, and Associates, LLP

LOCATION: US 13 at Memorial Drive

APPROACH: SBL

Recorder: BMW

Date: 6/10/2015 - PM

Weather: Sunny/Warm

W.O.#:

TIME	CYCLE	Queue at Beginning of Green	Maximum Queue	Queues Block?		# Cleared During Protected Phase			# Cleared During Permissive Phase			# Not Cleared
				Lefts	Thrus	Green	Yellow/All Red	Total	Green/Flashing Red	Yellow/All Red	Total	
0:00	**1**	8				3	3	6	n/a		n/a	2
2:15	**2**	12				3	4	7	n/a		n/a	5
3:50	**3**	8				3	3	6	n/a		n/a	2
6:00	**4**	11			x	4	4	8	n/a		n/a	3
7:45	**5**	8				4	3	7	n/a		n/a	1
9:45	**6**	3				3	0	3	n/a		n/a	0
12:00	**7**	8				4	3	7	n/a		n/a	1
14:00	**8**	8				3	4	7	n/a		n/a	1
16:00	**9**	6				3	3	6	n/a		n/a	0
17:45	**10**	6				4	2	6	n/a		n/a	0
19:45	**11**	10				4	5	9	n/a		n/a	1
21:40	**12**	7				3	4	7	n/a		n/a	0
24:00	**13**	7				3	4	7	n/a		n/a	0
25:40	**14**	10				4	2	6	n/a		n/a	4
28:00	**15**	13			x	4	4	8	n/a		n/a	5
29:55	**16**	13			x	4	6	10	n/a		n/a	3
32:05	**17**	8				3	4	7	n/a		n/a	1
33:50	**18**	8				3	4	7	n/a		n/a	1
35:55	**19**	13			x	4	4	8	n/a		n/a	5
37:55	**20**	10				4	4	8	n/a		n/a	2
40:00	**21**	7				3	3	6	n/a		n/a	1
42:00	**22**	6				4	2	6	n/a		n/a	0
43:50	**23**	5				4	1	5	n/a		n/a	0
45:55	**24**	7				3	4	7	n/a		n/a	0
47:40	**25**	10			x	3	2	5	n/a		n/a	5
49:55	**26**	10				4	4	8	n/a		n/a	2
52:00	**27**	8				3	2	5	n/a		n/a	3
54:00	**28**	9				4	4	8	n/a		n/a	1
56:10	**29**	7				3	4	7	n/a		n/a	0
57:55	**30**	7				3	3	6	n/a		n/a	1

Cycle #8 - Vehicle left in queue ran red light when NB traffic cleared

southbound left-turn queues occasionally block the left-most through lane; however, motorists by-pass in the adjacent through lane

QUEUING ANALYSIS

Field Sheet

Whitman, Requardt, and Associates, LLP

LOCATION: US 13 at Memorial Drive

Recorder: BMW

Date: 6/10/2015 - PM

Weather: Sunny/Warm

APPROACH: SBL

W.O.#:

TIME	CYCLE	Queue at Beginning of Green	Maximum Queue	Queues Block?		# Cleared During Protected Phase			# Cleared During Permissive Phase			# Not Cleared
				Lefts	Thrus	Green	Yellow/All Red	Total	Green/Flashing Red	Yellow/All Red	Total	
59:55	**31**	6				3	3	6	n/a		n/a	0
	32											
	33											
	34											
	35											
	36											
	37											
	38											
	39											
	40											
	41											
	42											
	43											
	44											
	45											
	46											
	47											
	48											
	49											
	50											
	51											
	52											
	53											
	54											
	55											
	56											
	57											
	58											
	59											
	60											

QUEUING ANALYSIS

Field Sheet

Whitman, Requardt, and Associates, LLP

LOCATION: US 13 at Memorial Drive
AM

Recorder: BMW
Date: 9/1/2015
Weather: Sunny/Warm
W.O.#:

APPROACH: SBL

TIME	CYCLE	Queue at Beginning of Green	Maximum Queue	Queues Block?		# Cleared During Protected Phase			# Cleared During Permissive Phase			# Not Cleared
				Lefts	Thrus	Green	Yellow/All Red	Total	Green/Flashing Red	Yellow/All Red	Total	
0:00	**1**	3				3	0	3	n/a		n/a	
2:15	**2**	3				3	0	3	n/a		n/a	
3:45	**3**	2				3	0	3	n/a		n/a	
6:00	**4**	5				5	0	5	n/a		n/a	
8:00	**5**	8				5	3	8	n/a		n/a	
10:00	**6**	3				3	0	3	n/a		n/a	
11:45	**7**	7				6	1	7	n/a		n/a	
13:45	**8**	3				3	0	3	n/a		n/a	
15:45	**9**	6				6	1	7	n/a		n/a	
18:00	**10**	8				6	2	8	n/a		n/a	
19:45	**11**	5				5	2	7	n/a		n/a	
22:00	**12**	6				6	0	6	n/a		n/a	
23:45	**13**	5				5	2	7	n/a		n/a	
26:00	**14**	5				5	0	5	n/a		n/a	
28:00	**15**	9				7	4	11	n/a		n/a	
30:00	**16**	6				6	0	6	n/a		n/a	
31:45	**17**	1				2	1	3	n/a		n/a	
33:45	**18**	5				5	4	9	n/a		n/a	
35:45	**19**	8				5	4	9	n/a		n/a	
38:00	**20**	7				5	3	8	n/a		n/a	
39:45	**21**	5				5	0	5	n/a		n/a	
41:45	**22**	7				6	1	7	n/a		n/a	
44:00	**23**	5				6	0	6	n/a		n/a	
45:45	**24**	3				3	0	3	n/a		n/a	
48:00	**25**	8				4	4	8	n/a		n/a	
50:00	**26**	9				5	3	8	n/a		n/a	1
51:45	**27**	6				6	1	7	n/a		n/a	
54:00	**28**	4				4	0	4	n/a		n/a	
55:45	**29**	1				1	0	1	n/a		n/a	
57:55	**30**	5				5	0	5	n/a		n/a	

Cycle 27: Vehicle ran the red light during phase 4 (just before the start of Cycle 28)

QUEUING ANALYSIS

Field Sheet

Whitman, Requardt, and Associates, LLP

LOCATION: US 13 at Memorial Drive
AM

Recorder: BMW
Date: 9/1/2015
Weather: Sunny/Warm
W.O.#:

APPROACH: SBL

TIME	CYCLE	Queue at Beginning of Green	Maximum Queue	Queues Block?		# Cleared During Protected Phase			# Cleared During Permissive Phase			# Not Cleared
				Lefts	Thrus	Green	Yellow/All Red	Total	Green/Flashing Red	Yellow/All Red	Total	
60:15	**31**	4				4	0	4			n/a	
	32											
	33											
	34											
	35											
	36											
	37											
	38											
	39											
	40											
	41											
	42											
	43											
	44											
	45											
	46											
	47											
	48											
	49											
	50											
	51											
	52											
	53											
	54											
	55											
	56											
	57											
	58											
	59											
	60											

QUEUING ANALYSIS

Field Sheet

Whitman, Requardt, and Associates, LLP

LOCATION: US 13 at Memorial Drive
PM

APPROACH: SBL

Recorder: BMW
Date: 9/1/2015
Weather: Sunny/Warm
W.O.#:

TIME	CYCLE	Queue at Beginning of Green	Maximum Queue	Queues Block?		# Cleared During Protected Phase			# Cleared During Permissive Phase			# Not Cleared
				Lefts	Thrus	Green	Yellow/All Red	Total	Green/Flashing Red	Yellow/All Red	Total	
0:00	**1**	2				2	0	2	n/a		n/a	
2:15	**2**	8				8	1	9	n/a		n/a	
3:45	**3**	5				5	0	5	n/a		n/a	
5:45	**4**	9				8	3	11	n/a		n/a	
8:00	**5**	4				6	0	6	n/a		n/a	
9:55	**6**	3				3	0	3	n/a		n/a	
12:00	**7**	2				2	0	2	n/a		n/a	
14:00	**8**	9				9	0	9	n/a		n/a	
16:00	**9**	8				9	4	13	n/a		n/a	
18:00	**10**	7				9	1	10	n/a		n/a	
20:00	**11**	7				7	0	7	n/a		n/a	
22:15	**12**	7				9	1	10	n/a		n/a	
24:05	**13**	8				8	2	10	n/a		n/a	
25:45	**14**	6				6	1	7	n/a		n/a	
28:00	**15**	4				5	0	5	n/a		n/a	
29:45	**16**	10		X		7	1	8	n/a		n/a	2
31:55	**17**	9				10	0	10	n/a		n/a	
34:00	**18**	5				5	0	5	n/a		n/a	
35:45	**19**	8				8	0	8	n/a		n/a	
38:00	**20**	7				7	0	7	n/a		n/a	
40:00	**21**	5				6	0	6	n/a		n/a	
42:00	**22**	7				7	0	7	n/a		n/a	
44:15	**23**	9				9	1	10	n/a		n/a	
45:45	**24**	3				3	0	3	n/a		n/a	
48:00	**25**	7				7	0	7	n/a		n/a	
49:45	**26**	6				7	0	7	n/a		n/a	
52:00	**27**	6				6	0	6	n/a		n/a	
55:00	**28**	8				10	1	11	n/a		n/a	
56:35	**29**	4				4	0	4	n/a		n/a	
58:20	**30**	4				5	0	5	n/a		n/a	

QUEUING ANALYSIS

Field Sheet

Whitman, Requardt, and Associates, LLP

LOCATION: US 13 at Memorial Drive
PM

Recorder: BMW
Date: 9/1/2015
Weather: Sunny/Warm
W.O.#:

APPROACH: SBL

TIME	CYCLE	Queue at Beginning of Green	Maximum Queue	Queues Block?		# Cleared During Protected Phase			# Cleared During Permissive Phase			# Not Cleared
				Lefts	Thrus	Green	Yellow/All Red	Total	Green/Flashing Red	Yellow/All Red	Total	
59:45	**31**	4				4	0	4				
	32											
	33											
	34											
	35											
	36											
	37											
	38											
	39											
	40											
	41											
	42											
	43											
	44											
	45											
	46											
	47											
	48											
	49											
	50											
	51											
	52											
	53											
	54											
	55											
	56											
	57											
	58											
	59											
	60											

Summary of Southbound U-Turns at US 13 at Hazeldell Avenue

Time (mm:ss)	SBU (total)	From North	From West	To Wawa	To East on Memorial	To Businesses
6-10-2015 (AM)	2	2	0	1	1	0
2:00	0	0	0	0	0	0
3:45	1	0	1	0	1	0
6:00	1	1	0	1	0	0
8:00	1	1	0	0	1	0
9:45	1	1	0	0	1	0
12:00	1	1	0	0	1	0
14:00	2	2	0	2	0	0
16:00	1	1	0	1	0	0
18:00	0	0	0	0	0	0
19:45	4	4	0	1	3	0
22:00	1	1	0	0	0	1
23:45	2	2	0	2	0	0
26:00	1	1	0	0	1	0
28:00	2	1	1	2	0	0
29:45	4	4	0	1	2	1
31:45	1	1	0	0	1	0
34:00	4	4	0	2	2	0
36:00	2	2	0	1	1	0
37:45	1	1	0	1	0	0
40:00	2	2	0	1	1	0
41:45	2	2	0	2	0	0
44:00	1	1	0	0	1	0
45:45	0	0	0	0	0	0
48:00	0	0	0	0	0	0
50:00	0	0	0	0	0	0
52:00	3	3	0	0	3	0
53:45	2	1	1	0	2	0
56:00	0	0	0	0	0	0
57:45	4	4	0	2	2	0
Totals	46	**43**	3	20	24	2

Summary of Southbound U-Turns at US 13 at Hazeldell Avenue

Time (mm:ss)	SBU (total)	From North	From West	To Wawa	To East on Memorial	To Businesses
6-10-2015 (PM)	7	7	0	2	5	0
2:15	3	3	0	0	3	0
3:50	5	5	0	4	0	1
6:00	4	3	1	2	2	0
7:45	3	3	0	2	1	0
9:45	2	2	0	0	1	1
12:00	2	2	0	1	1	0
14:00	2	2	0	1	0	1
16:00	1	1	0	1	0	0
17:45	4	3	1	0	3	1
19:45	2	1	1	0	0	2
21:40	1	1	0	0	1	0
24:00	6	6	0	3	3	0
25:40	2	2	0	0	1	1
28:00	6	6	0	2	4	0
29:55	2	2	0	2	0	0
32:05	3	3	0	0	3	0
33:50	4	4	0	0	3	1
35:55	7	7	0	2	4	1
37:55	3	3	0	1	2	0
40:00	2	2	0	1	1	0
42:00	6	6	0	0	6	0
43:50	1	1	0	1	0	0
45:55	3	3	0	1	2	0
47:40	5	5	0	1	4	0
49:55	5	5	0	0	5	0
52:00	3	3	0	1	2	0
54:00	6	6	0	0	6	0
56:10	5	5	0	0	4	1
57:55	6	6	0	2	4	0
59:55	1	1	0	1	0	0
Totals	112	**109**	3	31	71	10

Summary of Southbound U-Turns at US 13 at Hazeldell Avenue

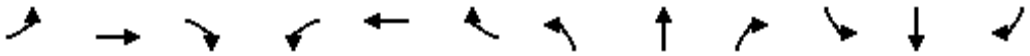
Time (mm:ss)	SBU (total)	From North	From West	To Wawa	To East on Memorial	To Businesses
9-1-2015 (AM)	0	0	0	0	0	0
2:00	3	3	0	0	3	0
3:45	3	3	0	1	2	0
6:00	2	2	0	2	0	0
8:00	2	2	0	1	0	1
10:00	1	1	0	0	1	0
11:45	0	0	0	0	0	0
13:45	0	0	0	0	0	0
15:45	0	0	0	0	0	0
18:00	2	2	0	0	1	1
19:45	0	0	0	0	0	0
22:00	1	1	0	1	0	0
23:45	0	0	0	0	0	0
26:00:00	0	0	0	0	0	0
28:00:00	1	1	0	1	0	0
30:00:00	0	0	0	0	0	0
31:45:00	3	3	0	1	2	0
33:45:00	0	0	0	0	0	0
35:45:00	2	2	0	1	1	0
38:00:00	2	2	0	1	1	0
39:45:00	1	0	1	0	0	1
41:45:00	0	0	0	0	0	0
44:00:00	1	1	0	0	1	0
45:45:00	1	1	0	1	0	0
48:00:00	1	1	0	0	1	0
50:00:00	1	1	0	0	1	0
51:45:00	2	2	0	2	0	0
54:00:00	1	1	0	0	1	0
55:45:00	0	0	0	0	0	0
57:55:00	1	1	0	1	0	0
Totals	31	**30**	1	13	15	3

Summary of Southbound U-Turns at US 13 at Hazeldell Avenue

Time (mm:ss)	SBU (total)	From North	From West	To Wawa	To East on Memorial	To Businesses
9-01-2015 (PM)	1	1	0	0	1	0
2:15	1	1	0	0	1	0
3:45	3	3	0	2	1	0
5:45	2	2	0	0	2	0
8:00	0	0	0	0	0	0
9:55	1	1	0	0	1	0
12:00	0	0	0	0	0	0
14:00	3	2	1	0	2	1
16:00	1	1	0	0	1	0
18:00	3	3	0	1	2	0
20:00	1	0	1	0	0	1
22:15	0	0	0	0	0	0
24:05:00	3	3	0	2	1	0
25:45:00	2	2	0	0	2	0
28:00:00	2	2	0	0	2	0
29:45:00	2	1	1	1	1	0
31:55:00	1	1	0	0	1	0
34:00:00	0	0	0	0	0	0
35:45:00	3	3	0	1	1	1
38:00:00	1	1	0	0	1	0
40:00:00	0	0	0	0	0	0
42:00:00	1	0	1	0	0	1
44:15:00	0	0	0	0	0	0
45:45:00	1	1	0	1	0	0
48:00:00	1	1	0	0	1	0
49:45:00	3	3	0	1	2	0
52:00:00	2	2	0	0	1	1
55:00:00	0	0	0	0	0	0
56:35:00	3	3	0	1	2	0
58:20:00	1	1	0	0	1	0
59:45:00	3	3	0	1	2	0
Totals	45	**41**	4	11	29	5

Appendix

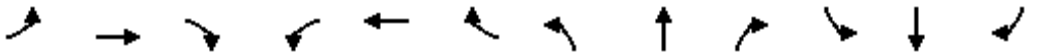
Synchro Output



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	20	20	48	100	101	353	24	1809	330	167	978	24
v/c Ratio	0.15	0.14	0.04	0.53	0.53	0.74	0.09	0.75	0.26	0.69	0.35	0.02
Control Delay	52.9	52.4	0.1	57.8	57.9	16.2	13.6	25.4	0.5	57.1	20.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	52.4	0.1	57.8	57.9	19.6	13.6	25.4	0.5	57.1	20.1	0.0
Queue Length 50th (ft)	15	15	0	75	76	11	7	228	0	131	138	0
Queue Length 95th (ft)	40	26	0	134	91	19	m26	#362	0	202	239	0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	185	199	1215	225	226	506	310	2422	1276	263	2809	1272
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	82	0	15	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.10	0.04	0.44	0.45	0.83	0.08	0.75	0.26	0.63	0.35	0.02

Intersection Summary

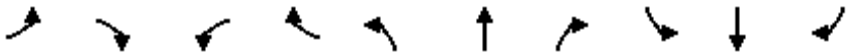
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	7	42	168	10	247	21	1719	264	149	831	15
Future Volume (vph)	24	7	42	168	10	247	21	1719	264	149	831	15
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	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1588	1715	1215	1350	1359	1357	1308	4550	1276	1583	4322	1272
Flt Permitted	0.95	0.98	1.00	0.95	0.96	1.00	0.28	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1588	1715	1215	1350	1359	1357	386	4550	1276	1583	4322	1272
Peak-hour factor, PHF	0.86	0.58	0.88	0.91	0.63	0.70	0.88	0.95	0.80	0.89	0.85	0.63
Adj. Flow (vph)	28	12	48	185	16	353	24	1809	330	167	978	24
RTOR Reduction (vph)	0	0	0	0	0	289	0	0	0	0	0	0
Lane Group Flow (vph)	20	20	48	100	101	64	24	1809	330	167	978	24
Confl. Peds. (#/hr)			9	9					1	1		
Heavy Vehicles (%)	8%	0%	31%	27%	30%	19%	38%	14%	25%	14%	20%	27%
Turn Type	Split	NA	Free	Split	NA	Perm	custom	NA	Free	Prot	NA	Free
Protected Phases	4	4		3	3		5	2 10		1	6	
Permitted Phases			Free			3	2		Free			Free
Actuated Green, G (s)	5.4	5.4	120.0	14.7	14.7	14.7	47.2	57.5	120.0	16.4	69.2	120.0
Effective Green, g (s)	7.4	7.4	120.0	16.7	16.7	16.7	51.2	61.5	120.0	18.4	73.2	120.0
Actuated g/C Ratio	0.06	0.06	1.00	0.14	0.14	0.14	0.43	0.51	1.00	0.15	0.61	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0			6.0	8.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0			4.0	5.0	
Lane Grp Cap (vph)	97	105	1215	187	189	188	216	2331	1276	242	2636	1272
v/s Ratio Prot	0.01	0.01		0.07	c0.07		0.01	c0.40		c0.11	0.23	
v/s Ratio Perm			0.04			0.05	0.04		c0.26			0.02
v/c Ratio	0.21	0.19	0.04	0.53	0.53	0.34	0.11	0.78	0.26	0.69	0.37	0.02
Uniform Delay, d1	53.5	53.5	0.0	48.0	48.0	46.7	20.1	23.7	0.0	48.1	11.8	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.13	0.94	1.00	0.89	1.57	1.00
Incremental Delay, d2	1.4	1.2	0.1	3.7	3.7	1.5	0.3	2.4	0.5	8.4	0.4	0.0
Delay (s)	54.9	54.7	0.1	51.8	51.7	48.1	23.0	24.7	0.5	51.1	19.0	0.0
Level of Service	D	D	A	D	D	D	C	C	A	D	B	A
Approach Delay (s)		24.9			49.4			21.0			23.2	
Approach LOS		C			D			C			C	

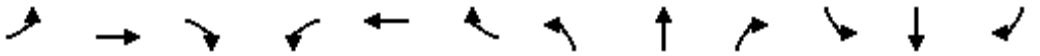
Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



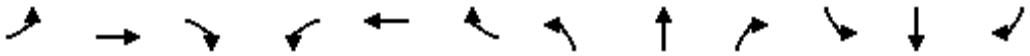
Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	16	36	68	16	64	2022	44	52	1095	32
v/c Ratio	0.08	0.02	0.36	0.01	0.36	0.58	0.03	0.30	0.32	0.02
Control Delay	47.6	0.0	54.1	0.0	55.5	14.9	0.0	79.3	1.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.1	0.0
Total Delay	47.6	0.0	54.1	0.0	55.5	14.9	0.0	89.6	2.0	0.0
Queue Length 50th (ft)	11	0	50	0	47	365	0	43	19	0
Queue Length 95th (ft)	20	0	57	0	73	473	0	30	18	0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	295	1583	295	1583	206	3483	1551	206	3465	1550
Starvation Cap Reductn	0	0	0	0	0	0	0	125	775	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.23	0.01	0.31	0.58	0.03	0.64	0.41	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	32	38	0	6	47	1941	26	16	996	20
Future Volume (vph)	9	0	32	38	0	6	47	1941	26	16	996	20
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		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1583	1770		1583	1770	5085	1551	1770	5085	1550
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770		1583	1770		1583	1770	5085	1551	1770	5085	1550
Peak-hour factor, PHF	0.56	0.92	0.89	0.56	0.92	0.38	0.73	0.96	0.59	0.31	0.91	0.63
Adj. Flow (vph)	16	0	36	68	0	16	64	2022	44	52	1095	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	0	36	68	0	16	64	2022	44	52	1095	32
Confl. Peds. (#/hr)							2		1	1		2
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	NA	Free
Protected Phases							5	2		1	6	
Permitted Phases	3		Free	3		Free			Free			Free
Actuated Green, G (s)	9.5		120.0	9.5		120.0	8.7	72.6	120.0	8.3	72.2	120.0
Effective Green, g (s)	11.5		120.0	11.5		120.0	10.7	76.6	120.0	10.3	76.2	120.0
Actuated g/C Ratio	0.10		1.00	0.10		1.00	0.09	0.64	1.00	0.09	0.64	1.00
Clearance Time (s)	6.0			6.0			6.0	8.0		6.0	8.0	
Vehicle Extension (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	169		1583	169		1583	157	3245	1551	151	3228	1550
v/s Ratio Prot							c0.04	c0.40		0.03	0.22	
v/s Ratio Perm	0.01		0.02	c0.04		0.01			c0.03			0.02
v/c Ratio	0.09		0.02	0.40		0.01	0.41	0.62	0.03	0.34	0.34	0.02
Uniform Delay, d1	49.5		0.0	51.0		0.0	51.7	13.0	0.0	51.7	10.2	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.50	0.15	1.00
Incremental Delay, d2	0.3		0.0	2.1		0.0	2.3	0.9	0.0	1.8	0.3	0.0
Delay (s)	49.8		0.0	53.2		0.0	54.0	13.9	0.0	79.4	1.8	0.0
Level of Service	D		A	D		A	D	B	A	E	A	A
Approach Delay (s)		15.4			43.0			14.9			5.2	
Approach LOS		B			D			B			A	

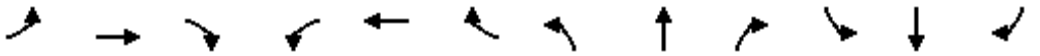
Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	38	52	136	135	260	52	1187	360	261	1903	32
v/c Ratio	0.12	0.23	0.03	0.60	0.58	0.58	0.28	0.56	0.25	0.76	0.65	0.02
Control Delay	50.9	53.2	0.0	59.1	57.6	10.8	20.9	30.1	0.4	53.0	30.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	53.2	0.0	59.1	57.6	10.8	20.9	30.1	0.4	53.0	30.7	0.0
Queue Length 50th (ft)	13	29	0	103	102	0	13	211	0	213	363	0
Queue Length 95th (ft)	37	35	0	122	66	35	m46	328	0	268	528	m0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	242	269	1559	255	263	475	236	2120	1437	376	2922	1615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	26	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.14	0.03	0.53	0.51	0.55	0.22	0.56	0.25	0.69	0.66	0.02

Intersection Summary

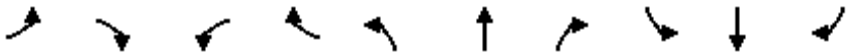
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	18	43	163	9	200	40	1009	331	209	1827	26
Future Volume (vph)	18	18	43	163	9	200	40	1009	331	209	1827	26
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	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1618	1795	1559	1531	1578	1553	1530	4715	1437	1736	4988	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.96	1.00	0.11	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1618	1795	1559	1531	1578	1553	180	4715	1437	1736	4988	1615
Peak-hour factor, PHF	0.90	0.50	0.83	0.66	0.38	0.77	0.77	0.85	0.92	0.80	0.96	0.81
Adj. Flow (vph)	20	36	52	247	24	260	52	1187	360	261	1903	32
RTOR Reduction (vph)	0	0	0	0	0	222	0	0	0	0	0	0
Lane Group Flow (vph)	18	38	52	136	135	38	52	1187	360	261	1903	32
Confl. Peds. (#/hr)			11	11					1	1		
Heavy Vehicles (%)	6%	0%	2%	12%	0%	4%	18%	10%	11%	4%	4%	0%
Turn Type	Split	NA	Free	Split	NA	Perm	custom	NA	Free	Prot	NA	Free
Protected Phases	4	4		3	3		5	2 10		1	6	
Permitted Phases			Free			3	2		Free			Free
Actuated Green, G (s)	7.7	7.7	120.0	15.7	15.7	15.7	40.5	48.8	120.0	21.8	63.9	120.0
Effective Green, g (s)	9.7	9.7	120.0	17.7	17.7	17.7	44.5	52.8	120.0	23.8	67.9	120.0
Actuated g/C Ratio	0.08	0.08	1.00	0.15	0.15	0.15	0.37	0.44	1.00	0.20	0.57	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0			6.0	8.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0			4.0	5.0	
Lane Grp Cap (vph)	130	145	1559	225	232	229	164	2074	1437	344	2822	1615
v/s Ratio Prot	0.01	0.02		c0.09	0.09		0.02	0.25		c0.15	c0.38	
v/s Ratio Perm			0.03			0.02	0.09		c0.25			0.02
v/c Ratio	0.14	0.26	0.03	0.60	0.58	0.17	0.32	0.57	0.25	0.76	0.67	0.02
Uniform Delay, d1	51.3	51.8	0.0	47.9	47.7	44.7	24.6	25.1	0.0	45.4	18.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.92	1.09	1.00	0.92	1.52	1.00
Incremental Delay, d2	0.7	1.3	0.0	5.2	4.3	0.5	1.5	1.1	0.4	7.6	1.0	0.0
Delay (s)	51.9	53.1	0.0	53.1	52.0	45.2	24.2	28.6	0.4	49.3	28.8	0.0
Level of Service	D	D	A	D	D	D	C	C	A	D	C	A
Approach Delay (s)		27.4			49.0			22.1			30.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

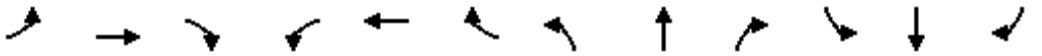
c Critical Lane Group



Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	76	44	4	24	1313	79	8	2143	8
v/c Ratio	0.14	0.05	0.26	0.00	0.16	0.33	0.05	0.06	0.58	0.01
Control Delay	50.8	0.1	53.7	0.0	52.8	6.5	0.1	78.8	1.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	0.1	53.7	0.0	52.8	6.5	0.1	78.8	1.2	0.0
Queue Length 50th (ft)	17	0	32	0	18	116	0	6	12	0
Queue Length 95th (ft)	31	0	55	0	39	226	0	m13	14	m0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	206	1563	205	1583	265	3967	1583	265	3705	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.05	0.21	0.00	0.09	0.33	0.05	0.03	0.58	0.01

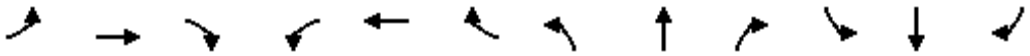
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	50	32	0	4	19	1260	62	4	1907	6
Future Volume (vph)	15	0	50	32	0	4	19	1260	62	4	1907	6
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		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1563	1757		1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770		1563	1757		1583	1770	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.63	0.92	0.66	0.73	0.92	1.00	0.79	0.96	0.78	0.50	0.89	0.75
Adj. Flow (vph)	24	0	76	44	0	4	24	1312	79	8	2143	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	24	0	76	44	0	4	24	1313	79	8	2143	8
Confl. Peds. (#/hr)			2	2								
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	NA	Free
Protected Phases							5	2		1	6	
Permitted Phases	3		Free	3		Free			Free			Free
Actuated Green, G (s)	8.0		120.0	8.0		120.0	5.4	80.4	120.0	1.7	76.7	120.0
Effective Green, g (s)	10.0		120.0	10.0		120.0	7.4	84.4	120.0	3.7	80.7	120.0
Actuated g/C Ratio	0.08		1.00	0.08		1.00	0.06	0.70	1.00	0.03	0.67	1.00
Clearance Time (s)	6.0			6.0			6.0	8.0		6.0	8.0	
Vehicle Extension (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	147		1563	146		1583	109	3576	1583	54	3419	1583
v/s Ratio Prot							c0.01	c0.26		0.00	c0.42	
v/s Ratio Perm	0.01		0.05	c0.03		0.00			c0.05			0.01
v/c Ratio	0.16		0.05	0.30		0.00	0.22	0.37	0.05	0.15	0.63	0.01
Uniform Delay, d1	51.1		0.0	51.7		0.0	53.6	7.1	0.0	56.6	11.1	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.53	0.05	1.00
Incremental Delay, d2	0.7		0.1	1.6		0.0	1.4	0.3	0.1	1.5	0.8	0.0
Delay (s)	51.8		0.1	53.3		0.0	54.9	7.4	0.1	88.0	1.3	0.0
Level of Service	D		A	D		A	D	A	A	F	A	A
Approach Delay (s)		12.5			48.9			7.8			1.6	
Approach LOS		B			D			A			A	

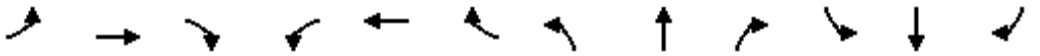
Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	20	20	48	100	101	353	24	1809	305	190	954	24
v/c Ratio	0.15	0.14	0.04	0.53	0.53	0.74	0.09	0.76	0.24	0.75	0.34	0.02
Control Delay	52.9	52.4	0.1	57.8	57.9	16.2	13.7	25.8	0.4	61.7	20.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	52.4	0.1	57.8	57.9	19.6	13.7	25.8	0.4	61.7	20.0	0.0
Queue Length 50th (ft)	15	15	0	75	76	11	7	228	0	150	134	0
Queue Length 95th (ft)	40	26	0	134	91	19	m27	#361	0	#243	234	0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	185	199	1215	225	226	506	311	2394	1276	263	2809	1272
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	82	0	15	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.10	0.04	0.44	0.45	0.83	0.08	0.76	0.24	0.72	0.34	0.02

Intersection Summary

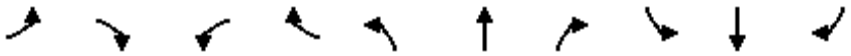
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	7	42	168	10	247	21	1719	244	169	811	15
Future Volume (vph)	24	7	42	168	10	247	21	1719	244	169	811	15
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	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1588	1715	1215	1350	1359	1357	1308	4550	1276	1583	4322	1272
Flt Permitted	0.95	0.98	1.00	0.95	0.96	1.00	0.29	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1588	1715	1215	1350	1359	1357	396	4550	1276	1583	4322	1272
Peak-hour factor, PHF	0.86	0.58	0.88	0.91	0.63	0.70	0.88	0.95	0.80	0.89	0.85	0.63
Adj. Flow (vph)	28	12	48	185	16	353	24	1809	305	190	954	24
RTOR Reduction (vph)	0	0	0	0	0	289	0	0	0	0	0	0
Lane Group Flow (vph)	20	20	48	100	101	64	24	1809	305	190	954	24
Confl. Peds. (#/hr)			9	9					1	1		
Heavy Vehicles (%)	8%	0%	31%	27%	30%	19%	38%	14%	25%	14%	20%	27%
Turn Type	Split	NA	Free	Split	NA	Perm	custom	NA	Free	Prot	NA	Free
Protected Phases	4	4		3	3		5	2 10		1	6	
Permitted Phases			Free			3	2		Free			Free
Actuated Green, G (s)	5.4	5.4	120.0	14.7	14.7	14.7	46.5	56.8	120.0	17.1	69.2	120.0
Effective Green, g (s)	7.4	7.4	120.0	16.7	16.7	16.7	50.5	60.8	120.0	19.1	73.2	120.0
Actuated g/C Ratio	0.06	0.06	1.00	0.14	0.14	0.14	0.42	0.51	1.00	0.16	0.61	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0			6.0	8.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0			4.0	5.0	
Lane Grp Cap (vph)	97	105	1215	187	189	188	217	2305	1276	251	2636	1272
v/s Ratio Prot	0.01	0.01		0.07	c0.07		0.01	c0.40		c0.12	0.22	
v/s Ratio Perm			0.04			0.05	0.04		c0.24			0.02
v/c Ratio	0.21	0.19	0.04	0.53	0.53	0.34	0.11	0.78	0.24	0.76	0.36	0.02
Uniform Delay, d1	53.5	53.5	0.0	48.0	48.0	46.7	20.5	24.2	0.0	48.2	11.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.94	1.00	0.89	1.58	1.00
Incremental Delay, d2	1.4	1.2	0.1	3.7	3.7	1.5	0.3	2.6	0.4	12.4	0.4	0.0
Delay (s)	54.9	54.7	0.1	51.8	51.7	48.1	23.6	25.3	0.4	55.5	18.9	0.0
Level of Service	D	D	A	D	D	D	C	C	A	E	B	A
Approach Delay (s)		24.9			49.4			21.8			24.4	
Approach LOS		C			D			C			C	

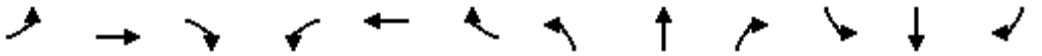
Intersection Summary					
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.71				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	66.8%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group



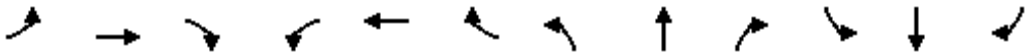
Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	16	36	68	16	64	2022	44	52	1095	32
v/c Ratio	0.08	0.02	0.36	0.01	0.36	0.58	0.03	0.30	0.32	0.02
Control Delay	47.6	0.0	54.1	0.0	55.5	14.9	0.0	79.6	1.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.1	0.0
Total Delay	47.6	0.0	54.1	0.0	55.5	14.9	0.0	89.9	2.0	0.0
Queue Length 50th (ft)	11	0	50	0	47	365	0	43	19	0
Queue Length 95th (ft)	20	0	57	0	73	473	0	30	18	0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	295	1583	295	1583	206	3483	1551	206	3465	1550
Starvation Cap Reductn	0	0	0	0	0	0	0	125	775	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.23	0.01	0.31	0.58	0.03	0.64	0.41	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	32	38	0	6	47	1941	26	16	996	20
Future Volume (vph)	9	0	32	38	0	6	47	1941	26	16	996	20
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		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1583	1770		1583	1770	5085	1551	1770	5085	1550
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770		1583	1770		1583	1770	5085	1551	1770	5085	1550
Peak-hour factor, PHF	0.56	0.92	0.89	0.56	0.92	0.38	0.73	0.96	0.59	0.31	0.91	0.63
Adj. Flow (vph)	16	0	36	68	0	16	64	2022	44	52	1095	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	0	36	68	0	16	64	2022	44	52	1095	32
Confl. Peds. (#/hr)							2		1	1		2
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	NA	Free
Protected Phases							5	2		1	6	
Permitted Phases	3		Free	3		Free			Free			Free
Actuated Green, G (s)	9.5		120.0	9.5		120.0	8.7	72.6	120.0	8.3	72.2	120.0
Effective Green, g (s)	11.5		120.0	11.5		120.0	10.7	76.6	120.0	10.3	76.2	120.0
Actuated g/C Ratio	0.10		1.00	0.10		1.00	0.09	0.64	1.00	0.09	0.64	1.00
Clearance Time (s)	6.0			6.0			6.0	8.0		6.0	8.0	
Vehicle Extension (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	169		1583	169		1583	157	3245	1551	151	3228	1550
v/s Ratio Prot							c0.04	c0.40		0.03	0.22	
v/s Ratio Perm	0.01		0.02	c0.04		0.01			c0.03			0.02
v/c Ratio	0.09		0.02	0.40		0.01	0.41	0.62	0.03	0.34	0.34	0.02
Uniform Delay, d1	49.5		0.0	51.0		0.0	51.7	13.0	0.0	51.7	10.2	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.51	0.15	1.00
Incremental Delay, d2	0.3		0.0	2.1		0.0	2.3	0.9	0.0	1.8	0.3	0.0
Delay (s)	49.8		0.0	53.2		0.0	54.0	13.9	0.0	79.7	1.9	0.0
Level of Service	D		A	D		A	D	B	A	E	A	A
Approach Delay (s)		15.4			43.0			14.9			5.2	
Approach LOS		B			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



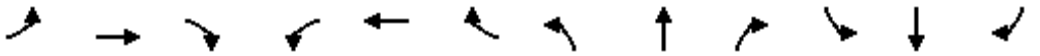
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	38	52	136	135	260	52	1187	250	388	1798	32
v/c Ratio	0.12	0.23	0.03	0.60	0.58	0.58	0.28	0.58	0.17	1.03	0.62	0.02
Control Delay	50.9	53.2	0.0	59.1	57.6	10.8	20.8	31.2	0.3	92.9	30.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	53.2	0.0	59.1	57.6	10.8	20.8	31.2	0.3	92.9	30.1	0.0
Queue Length 50th (ft)	13	29	0	103	102	0	13	212	0	~332	342	0
Queue Length 95th (ft)	37	35	0	122	66	35	m46	329	0	#438	500	m0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	242	269	1559	255	263	475	237	2036	1437	376	2922	1615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	52	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.14	0.03	0.53	0.51	0.55	0.22	0.58	0.17	1.03	0.63	0.02

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

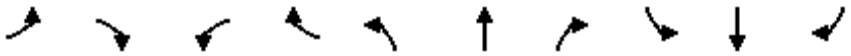
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	18	43	163	9	200	40	1009	230	310	1726	26
Future Volume (vph)	18	18	43	163	9	200	40	1009	230	310	1726	26
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	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1618	1795	1559	1531	1578	1553	1530	4715	1437	1736	4988	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.96	1.00	0.12	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1618	1795	1559	1531	1578	1553	192	4715	1437	1736	4988	1615
Peak-hour factor, PHF	0.90	0.50	0.83	0.66	0.38	0.77	0.77	0.85	0.92	0.80	0.96	0.81
Adj. Flow (vph)	20	36	52	247	24	260	52	1187	250	388	1798	32
RTOR Reduction (vph)	0	0	0	0	0	222	0	0	0	0	0	0
Lane Group Flow (vph)	18	38	52	136	135	38	52	1187	250	388	1798	32
Confl. Peds. (#/hr)			11	11					1	1		
Heavy Vehicles (%)	6%	0%	2%	12%	0%	4%	18%	10%	11%	4%	4%	0%
Turn Type	Split	NA	Free	Split	NA	Perm	custom	NA	Free	Prot	NA	Free
Protected Phases	4	4		3	3		5	2 10		1	6	
Permitted Phases			Free			3	2		Free			Free
Actuated Green, G (s)	7.7	7.7	120.0	15.7	15.7	15.7	38.3	46.6	120.0	24.0	63.9	120.0
Effective Green, g (s)	9.7	9.7	120.0	17.7	17.7	17.7	42.3	50.6	120.0	26.0	67.9	120.0
Actuated g/C Ratio	0.08	0.08	1.00	0.15	0.15	0.15	0.35	0.42	1.00	0.22	0.57	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0			6.0	8.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0			4.0	5.0	
Lane Grp Cap (vph)	130	145	1559	225	232	229	164	1988	1437	376	2822	1615
v/s Ratio Prot	0.01	c0.02		c0.09	0.09		0.02	0.25		c0.22	c0.36	
v/s Ratio Perm			0.03			0.02	0.09		0.17			0.02
v/c Ratio	0.14	0.26	0.03	0.60	0.58	0.17	0.32	0.60	0.17	1.03	0.64	0.02
Uniform Delay, d1	51.3	51.8	0.0	47.9	47.7	44.7	26.0	26.8	0.0	47.0	17.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.09	1.00	0.94	1.55	1.00
Incremental Delay, d2	0.7	1.3	0.0	5.2	4.3	0.5	1.5	1.3	0.3	49.0	0.9	0.0
Delay (s)	51.9	53.1	0.0	53.1	52.0	45.2	26.5	30.4	0.3	93.2	28.2	0.0
Level of Service	D	D	A	D	D	D	C	C	A	F	C	A
Approach Delay (s)		27.4			49.0			25.2			39.2	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	35.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

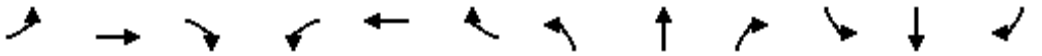
c Critical Lane Group



Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	76	44	4	24	1313	79	8	2143	8
v/c Ratio	0.14	0.05	0.26	0.00	0.16	0.33	0.05	0.06	0.58	0.01
Control Delay	50.8	0.1	53.7	0.0	52.8	6.5	0.1	78.8	1.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	0.1	53.7	0.0	52.8	6.5	0.1	78.8	1.2	0.0
Queue Length 50th (ft)	17	0	32	0	18	116	0	6	12	0
Queue Length 95th (ft)	31	0	55	0	39	226	0	m13	15	m0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	206	1563	205	1583	265	3967	1583	265	3705	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.05	0.21	0.00	0.09	0.33	0.05	0.03	0.58	0.01

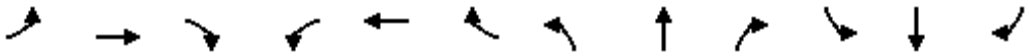
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	50	32	0	4	19	1260	62	4	1907	6
Future Volume (vph)	15	0	50	32	0	4	19	1260	62	4	1907	6
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		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1563	1757		1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770		1563	1757		1583	1770	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.63	0.92	0.66	0.73	0.92	1.00	0.79	0.96	0.78	0.50	0.89	0.75
Adj. Flow (vph)	24	0	76	44	0	4	24	1312	79	8	2143	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	24	0	76	44	0	4	24	1313	79	8	2143	8
Confl. Peds. (#/hr)			2	2								
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	NA	Free
Protected Phases							5	2		1	6	
Permitted Phases	3		Free	3		Free			Free			Free
Actuated Green, G (s)	8.0		120.0	8.0		120.0	5.4	80.4	120.0	1.7	76.7	120.0
Effective Green, g (s)	10.0		120.0	10.0		120.0	7.4	84.4	120.0	3.7	80.7	120.0
Actuated g/C Ratio	0.08		1.00	0.08		1.00	0.06	0.70	1.00	0.03	0.67	1.00
Clearance Time (s)	6.0			6.0			6.0	8.0		6.0	8.0	
Vehicle Extension (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	147		1563	146		1583	109	3576	1583	54	3419	1583
v/s Ratio Prot							c0.01	c0.26		0.00	c0.42	
v/s Ratio Perm	0.01		0.05	c0.03		0.00			c0.05			0.01
v/c Ratio	0.16		0.05	0.30		0.00	0.22	0.37	0.05	0.15	0.63	0.01
Uniform Delay, d1	51.1		0.0	51.7		0.0	53.6	7.1	0.0	56.6	11.1	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.53	0.05	1.00
Incremental Delay, d2	0.7		0.1	1.6		0.0	1.4	0.3	0.1	1.5	0.8	0.0
Delay (s)	51.8		0.1	53.3		0.0	54.9	7.4	0.1	87.8	1.3	0.0
Level of Service	D		A	D		A	D	A	A	F	A	A
Approach Delay (s)		12.5			48.9			7.8			1.6	
Approach LOS		B			D			A			A	

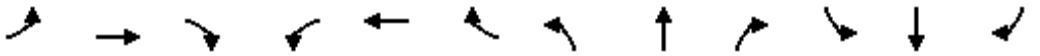
Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	20	20	48	100	101	353	24	1809	305	190	954	24
v/c Ratio	0.15	0.14	0.04	0.53	0.53	0.74	0.09	0.72	0.38	0.47	0.34	0.02
Control Delay	52.9	52.4	0.1	57.8	57.9	16.2	13.6	23.8	10.3	45.3	20.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	52.4	0.1	57.8	57.9	19.6	13.6	23.8	10.3	45.3	20.0	0.0
Queue Length 50th (ft)	15	15	0	75	76	11	7	225	25	76	134	0
Queue Length 95th (ft)	40	26	0	134	91	19	m27	357	102	113	234	0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	185	199	1215	225	226	506	323	2526	804	512	2809	1272
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	82	0	15	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.10	0.04	0.44	0.45	0.83	0.07	0.72	0.38	0.37	0.34	0.02

Intersection Summary

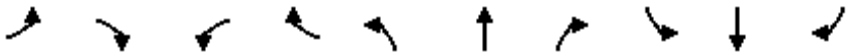
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	7	42	168	10	247	21	1719	244	169	811	15
Future Volume (vph)	24	7	42	168	10	247	21	1719	244	169	811	15
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	4.0	4.0	4.0	4.0	4.0	8.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1588	1715	1215	1350	1359	1357	1308	4550	1274	3072	4322	1272
Flt Permitted	0.95	0.98	1.00	0.95	0.96	1.00	0.29	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1588	1715	1215	1350	1359	1357	396	4550	1274	3072	4322	1272
Peak-hour factor, PHF	0.86	0.58	0.88	0.91	0.63	0.70	0.88	0.95	0.80	0.89	0.85	0.63
Adj. Flow (vph)	28	12	48	185	16	353	24	1809	305	190	954	24
RTOR Reduction (vph)	0	0	0	0	0	289	0	0	150	0	0	0
Lane Group Flow (vph)	20	20	48	100	101	64	24	1809	155	190	954	24
Confl. Peds. (#/hr)			9	9					1	1		
Heavy Vehicles (%)	8%	0%	31%	27%	30%	19%	38%	14%	25%	14%	20%	27%
Turn Type	Split	NA	Free	Split	NA	Perm	custom	NA	Perm	Prot	NA	Free
Protected Phases	4	4		3	3		5	2 10		1	6	
Permitted Phases			Free			3	2		2 10			Free
Actuated Green, G (s)	5.4	5.4	120.0	14.7	14.7	14.7	50.0	60.3	60.3	13.6	69.2	120.0
Effective Green, g (s)	7.4	7.4	120.0	16.7	16.7	16.7	54.0	64.3	58.3	15.6	73.2	120.0
Actuated g/C Ratio	0.06	0.06	1.00	0.14	0.14	0.14	0.45	0.54	0.49	0.13	0.61	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0			6.0	8.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0			4.0	5.0	
Lane Grp Cap (vph)	97	105	1215	187	189	188	229	2438	618	399	2636	1272
v/s Ratio Prot	c0.01	0.01		0.07	c0.07		0.01	c0.40		c0.06	0.22	
v/s Ratio Perm			0.04			0.05	0.04		0.12			0.02
v/c Ratio	0.21	0.19	0.04	0.53	0.53	0.34	0.10	0.74	0.25	0.48	0.36	0.02
Uniform Delay, d1	53.5	53.5	0.0	48.0	48.0	46.7	18.5	21.5	18.1	48.4	11.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	0.97	2.78	0.87	1.58	1.00
Incremental Delay, d2	1.4	1.2	0.1	3.7	3.7	1.5	0.3	2.0	0.9	1.2	0.4	0.0
Delay (s)	54.9	54.7	0.1	51.8	51.7	48.1	22.3	22.8	51.1	43.1	18.9	0.0
Level of Service	D	D	A	D	D	D	C	C	D	D	B	A
Approach Delay (s)		24.9			49.4			26.8			22.4	
Approach LOS		C			D			C			C	

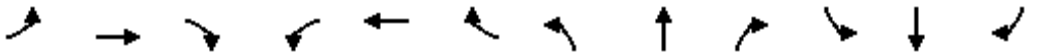
Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



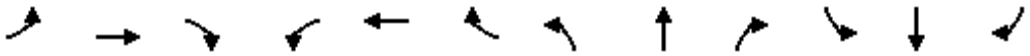
Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	16	36	68	16	64	2022	44	52	1095	32
v/c Ratio	0.08	0.02	0.36	0.01	0.36	0.58	0.03	0.30	0.32	0.02
Control Delay	47.6	0.0	54.1	0.0	55.5	14.9	0.0	79.6	2.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.1	0.0
Total Delay	47.6	0.0	54.1	0.0	55.5	14.9	0.0	89.9	2.0	0.0
Queue Length 50th (ft)	11	0	50	0	47	365	0	43	19	0
Queue Length 95th (ft)	20	0	57	0	73	473	0	30	18	0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	295	1583	295	1583	206	3483	1551	206	3465	1550
Starvation Cap Reductn	0	0	0	0	0	0	0	125	775	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.23	0.01	0.31	0.58	0.03	0.64	0.41	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	32	38	0	6	47	1941	26	16	996	20
Future Volume (vph)	9	0	32	38	0	6	47	1941	26	16	996	20
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		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1583	1770		1583	1770	5085	1551	1770	5085	1550
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770		1583	1770		1583	1770	5085	1551	1770	5085	1550
Peak-hour factor, PHF	0.56	0.92	0.89	0.56	0.92	0.38	0.73	0.96	0.59	0.31	0.91	0.63
Adj. Flow (vph)	16	0	36	68	0	16	64	2022	44	52	1095	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	0	36	68	0	16	64	2022	44	52	1095	32
Confl. Peds. (#/hr)							2		1	1		2
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	NA	Free
Protected Phases							5	2		1	6	
Permitted Phases	3		Free	3		Free			Free			Free
Actuated Green, G (s)	9.5		120.0	9.5		120.0	8.7	72.6	120.0	8.3	72.2	120.0
Effective Green, g (s)	11.5		120.0	11.5		120.0	10.7	76.6	120.0	10.3	76.2	120.0
Actuated g/C Ratio	0.10		1.00	0.10		1.00	0.09	0.64	1.00	0.09	0.64	1.00
Clearance Time (s)	6.0			6.0			6.0	8.0		6.0	8.0	
Vehicle Extension (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	169		1583	169		1583	157	3245	1551	151	3228	1550
v/s Ratio Prot							c0.04	c0.40		0.03	0.22	
v/s Ratio Perm	0.01		0.02	c0.04		0.01			c0.03			0.02
v/c Ratio	0.09		0.02	0.40		0.01	0.41	0.62	0.03	0.34	0.34	0.02
Uniform Delay, d1	49.5		0.0	51.0		0.0	51.7	13.0	0.0	51.7	10.2	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.51	0.16	1.00
Incremental Delay, d2	0.3		0.0	2.1		0.0	2.3	0.9	0.0	1.8	0.3	0.0
Delay (s)	49.8		0.0	53.2		0.0	54.0	13.9	0.0	79.7	1.9	0.0
Level of Service	D		A	D		A	D	B	A	E	A	A
Approach Delay (s)		15.4			43.0			14.9			5.2	
Approach LOS		B			D			B			A	

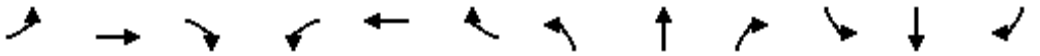
Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	38	52	136	135	260	52	1187	250	388	1798	32
v/c Ratio	0.12	0.23	0.03	0.60	0.58	0.58	0.27	0.54	0.33	0.64	0.62	0.02
Control Delay	50.9	53.2	0.0	59.1	57.6	10.8	20.5	29.7	11.6	43.6	30.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	53.2	0.0	59.1	57.6	10.8	20.5	29.7	11.6	43.6	30.1	0.0
Queue Length 50th (ft)	13	29	0	103	102	0	13	209	0	161	342	0
Queue Length 95th (ft)	37	35	0	122	66	35	49	335	152	188	500	m0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	242	269	1559	255	263	475	243	2203	763	729	2922	1615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	52	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.14	0.03	0.53	0.51	0.55	0.21	0.54	0.33	0.53	0.63	0.02

Intersection Summary

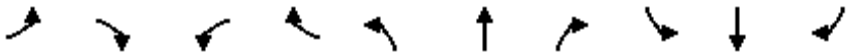
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	18	43	163	9	200	40	1009	230	310	1726	26
Future Volume (vph)	18	18	43	163	9	200	40	1009	230	310	1726	26
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	4.0	4.0	4.0	4.0	4.0	8.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1618	1795	1559	1531	1578	1553	1530	4715	1434	3367	4988	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.96	1.00	0.12	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1618	1795	1559	1531	1578	1553	190	4715	1434	3367	4988	1615
Peak-hour factor, PHF	0.90	0.50	0.83	0.66	0.38	0.77	0.77	0.85	0.92	0.80	0.96	0.81
Adj. Flow (vph)	20	36	52	247	24	260	52	1187	250	388	1798	32
RTOR Reduction (vph)	0	0	0	0	0	222	0	0	148	0	0	0
Lane Group Flow (vph)	18	38	52	136	135	38	52	1187	102	388	1798	32
Confl. Peds. (#/hr)			11	11					1	1		
Heavy Vehicles (%)	6%	0%	2%	12%	0%	4%	18%	10%	11%	4%	4%	0%
Turn Type	Split	NA	Free	Split	NA	Perm	custom	NA	Perm	Prot	NA	Free
Protected Phases	4	4		3	3		5	2 10		1	6	
Permitted Phases			Free			3	2		2 10			Free
Actuated Green, G (s)	7.7	7.7	120.0	15.7	15.7	15.7	42.6	50.9	50.9	19.7	63.9	120.0
Effective Green, g (s)	9.7	9.7	120.0	17.7	17.7	17.7	46.6	54.9	48.9	21.7	67.9	120.0
Actuated g/C Ratio	0.08	0.08	1.00	0.15	0.15	0.15	0.39	0.46	0.41	0.18	0.57	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0			6.0	8.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	4.0			4.0	5.0	
Lane Grp Cap (vph)	130	145	1559	225	232	229	170	2157	584	608	2822	1615
v/s Ratio Prot	0.01	c0.02		c0.09	0.09		0.02	0.25		c0.12	c0.36	
v/s Ratio Perm			0.03			0.02	0.10		0.07			0.02
v/c Ratio	0.14	0.26	0.03	0.60	0.58	0.17	0.31	0.55	0.17	0.64	0.64	0.02
Uniform Delay, d1	51.3	51.8	0.0	47.9	47.7	44.7	23.2	23.6	22.7	45.5	17.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	3.00	0.88	1.55	1.00
Incremental Delay, d2	0.7	1.3	0.0	5.2	4.3	0.5	1.4	1.0	0.6	1.9	0.9	0.0
Delay (s)	51.9	53.1	0.0	53.1	52.0	45.2	24.5	28.1	68.8	42.0	28.2	0.0
Level of Service	D	D	A	D	D	D	C	C	E	D	C	A
Approach Delay (s)		27.4			49.0			34.8			30.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

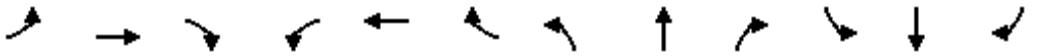
c Critical Lane Group



Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	76	44	4	24	1313	79	8	2143	8
v/c Ratio	0.14	0.05	0.26	0.00	0.16	0.33	0.05	0.06	0.58	0.01
Control Delay	50.8	0.1	53.7	0.0	52.8	6.5	0.1	78.8	1.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	0.1	53.7	0.0	52.8	6.5	0.1	78.8	1.2	0.0
Queue Length 50th (ft)	17	0	32	0	18	116	0	6	12	0
Queue Length 95th (ft)	31	0	55	0	39	226	0	m13	14	m0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	206	1563	205	1583	265	3967	1583	265	3705	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.05	0.21	0.00	0.09	0.33	0.05	0.03	0.58	0.01

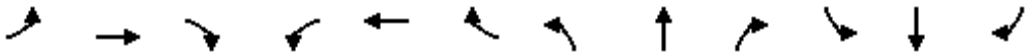
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	50	32	0	4	19	1260	62	4	1907	6
Future Volume (vph)	15	0	50	32	0	4	19	1260	62	4	1907	6
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		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1563	1757		1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770		1563	1757		1583	1770	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.63	0.92	0.66	0.73	0.92	1.00	0.79	0.96	0.78	0.50	0.89	0.75
Adj. Flow (vph)	24	0	76	44	0	4	24	1312	79	8	2143	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	24	0	76	44	0	4	24	1313	79	8	2143	8
Confl. Peds. (#/hr)			2	2								
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	NA	Free
Protected Phases							5	2		1	6	
Permitted Phases	3		Free	3		Free			Free			Free
Actuated Green, G (s)	8.0		120.0	8.0		120.0	5.4	80.4	120.0	1.7	76.7	120.0
Effective Green, g (s)	10.0		120.0	10.0		120.0	7.4	84.4	120.0	3.7	80.7	120.0
Actuated g/C Ratio	0.08		1.00	0.08		1.00	0.06	0.70	1.00	0.03	0.67	1.00
Clearance Time (s)	6.0			6.0			6.0	8.0		6.0	8.0	
Vehicle Extension (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	147		1563	146		1583	109	3576	1583	54	3419	1583
v/s Ratio Prot							c0.01	c0.26		0.00	c0.42	
v/s Ratio Perm	0.01		0.05	c0.03		0.00			c0.05			0.01
v/c Ratio	0.16		0.05	0.30		0.00	0.22	0.37	0.05	0.15	0.63	0.01
Uniform Delay, d1	51.1		0.0	51.7		0.0	53.6	7.1	0.0	56.6	11.1	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.53	0.05	1.00
Incremental Delay, d2	0.7		0.1	1.6		0.0	1.4	0.3	0.1	1.5	0.8	0.0
Delay (s)	51.8		0.1	53.3		0.0	54.9	7.4	0.1	87.9	1.3	0.0
Level of Service	D		A	D		A	D	A	A	F	A	A
Approach Delay (s)		12.5			48.9			7.8			1.6	
Approach LOS		B			D			A			A	

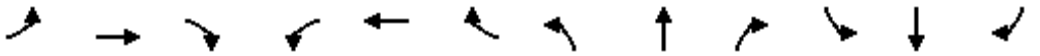
Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	20	20	48	100	101	353	24	1809	305	190	954	24
v/c Ratio	0.15	0.14	0.04	0.53	0.53	0.72	0.28	0.72	0.38	0.47	0.33	0.02
Control Delay	52.9	52.4	0.1	57.8	57.9	14.3	65.3	15.2	3.8	55.7	9.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	52.4	0.1	57.8	57.9	15.1	65.3	15.3	3.8	55.7	9.6	0.0
Queue Length 50th (ft)	15	15	0	75	76	3	20	138	2	77	89	0
Queue Length 95th (ft)	40	26	0	134	91	11	m48	205	52	119	110	0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	185	199	1215	225	226	516	174	2526	804	512	2883	1272
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	34	0	30	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.10	0.04	0.44	0.45	0.73	0.14	0.72	0.38	0.37	0.33	0.02

Intersection Summary

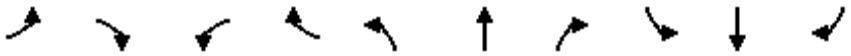
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	7	42	168	10	247	21	1719	244	169	811	15
Future Volume (vph)	24	7	42	168	10	247	21	1719	244	169	811	15
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	4.0	4.0	4.0	2.0	4.0	8.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1588	1715	1215	1350	1359	1357	1308	4550	1274	3072	4322	1272
Flt Permitted	0.95	0.98	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1588	1715	1215	1350	1359	1357	1308	4550	1274	3072	4322	1272
Peak-hour factor, PHF	0.86	0.58	0.88	0.91	0.63	0.70	0.88	0.95	0.80	0.89	0.85	0.63
Adj. Flow (vph)	28	12	48	185	16	353	24	1809	305	190	954	24
RTOR Reduction (vph)	0	0	0	0	0	300	0	0	145	0	0	0
Lane Group Flow (vph)	20	20	48	100	101	53	24	1809	160	190	954	24
Confl. Peds. (#/hr)			9	9					1	1		
Heavy Vehicles (%)	8%	0%	31%	27%	30%	19%	38%	14%	25%	14%	20%	27%
Turn Type	Split	NA	Free	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			Free			3			2			Free
Actuated Green, G (s)	5.4	5.4	120.0	14.7	14.7	14.7	3.8	60.3	60.3	13.6	72.1	120.0
Effective Green, g (s)	7.4	7.4	120.0	16.7	16.7	16.7	5.8	64.3	60.3	15.6	76.1	120.0
Actuated g/C Ratio	0.06	0.06	1.00	0.14	0.14	0.14	0.05	0.54	0.50	0.13	0.63	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	4.0	8.0	8.0	6.0	8.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	0.2	5.0	5.0	4.0	5.0	
Lane Grp Cap (vph)	97	105	1215	187	189	188	63	2438	640	399	2740	1272
v/s Ratio Prot	c0.01	0.01		0.07	c0.07		0.02	c0.40		c0.06	0.22	
v/s Ratio Perm			0.04			0.04			0.13			0.02
v/c Ratio	0.21	0.19	0.04	0.53	0.53	0.28	0.38	0.74	0.25	0.48	0.35	0.02
Uniform Delay, d1	53.5	53.5	0.0	48.0	48.0	46.3	55.4	21.5	17.0	48.4	10.3	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.08	0.58	0.79	1.08	0.84	1.00
Incremental Delay, d2	1.4	1.2	0.1	3.7	3.7	1.1	1.3	2.0	0.9	1.2	0.3	0.0
Delay (s)	54.9	54.7	0.1	51.8	51.7	47.4	61.1	14.5	14.4	53.5	9.0	0.0
Level of Service	D	D	A	D	D	D	E	B	B	D	A	A
Approach Delay (s)		24.9			49.0			15.0			16.0	
Approach LOS		C			D			B			B	

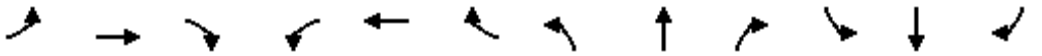
Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



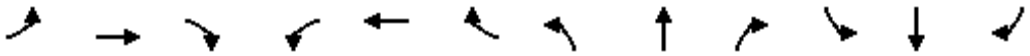
Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	16	36	68	16	64	2022	44	52	1095	32
v/c Ratio	0.08	0.02	0.36	0.01	0.36	0.58	0.03	0.30	0.32	0.02
Control Delay	47.6	0.0	54.1	0.0	55.5	14.9	0.0	77.4	1.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.1	0.0
Total Delay	47.6	0.0	54.1	0.0	55.5	14.9	0.0	87.7	1.6	0.0
Queue Length 50th (ft)	11	0	50	0	47	365	0	43	10	0
Queue Length 95th (ft)	20	0	57	0	73	473	0	30	25	0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	295	1583	295	1583	206	3483	1551	206	3465	1550
Starvation Cap Reductn	0	0	0	0	0	0	0	125	775	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.23	0.01	0.31	0.58	0.03	0.64	0.41	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	32	38	0	6	47	1941	26	16	996	20
Future Volume (vph)	9	0	32	38	0	6	47	1941	26	16	996	20
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		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1583	1770		1583	1770	5085	1551	1770	5085	1550
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770		1583	1770		1583	1770	5085	1551	1770	5085	1550
Peak-hour factor, PHF	0.56	0.92	0.89	0.56	0.92	0.38	0.73	0.96	0.59	0.31	0.91	0.63
Adj. Flow (vph)	16	0	36	68	0	16	64	2022	44	52	1095	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	0	36	68	0	16	64	2022	44	52	1095	32
Confl. Peds. (#/hr)							2		1	1		2
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	NA	Free
Protected Phases							5	2		1	6	
Permitted Phases	3		Free	3		Free			Free			Free
Actuated Green, G (s)	9.5		120.0	9.5		120.0	8.7	72.6	120.0	8.3	72.2	120.0
Effective Green, g (s)	11.5		120.0	11.5		120.0	10.7	76.6	120.0	10.3	76.2	120.0
Actuated g/C Ratio	0.10		1.00	0.10		1.00	0.09	0.64	1.00	0.09	0.64	1.00
Clearance Time (s)	6.0			6.0			6.0	8.0		6.0	8.0	
Vehicle Extension (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	169		1583	169		1583	157	3245	1551	151	3228	1550
v/s Ratio Prot							c0.04	c0.40		0.03	0.22	
v/s Ratio Perm	0.01		0.02	c0.04		0.01			c0.03			0.02
v/c Ratio	0.09		0.02	0.40		0.01	0.41	0.62	0.03	0.34	0.34	0.02
Uniform Delay, d1	49.5		0.0	51.0		0.0	51.7	13.0	0.0	51.7	10.2	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.46	0.12	1.00
Incremental Delay, d2	0.3		0.0	2.1		0.0	2.3	0.9	0.0	1.8	0.3	0.0
Delay (s)	49.8		0.0	53.2		0.0	54.0	13.9	0.0	77.4	1.5	0.0
Level of Service	D		A	D		A	D	B	A	E	A	A
Approach Delay (s)		15.4			43.0			14.9			4.8	
Approach LOS		B			D			B			A	

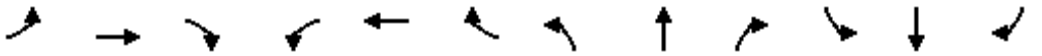
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	38	52	136	135	260	52	1187	250	388	1798	32
v/c Ratio	0.12	0.23	0.03	0.60	0.58	0.58	0.45	0.54	0.33	0.64	0.60	0.02
Control Delay	50.9	53.2	0.0	59.1	57.6	10.8	60.6	22.5	5.6	55.3	17.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	53.2	0.0	59.1	57.6	10.8	60.6	22.5	5.6	55.3	17.9	0.0
Queue Length 50th (ft)	13	29	0	103	102	0	39	170	1	163	178	0
Queue Length 95th (ft)	37	35	0	122	66	35	70	200	66	190	343	m0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	242	269	1559	255	263	475	204	2203	763	729	3011	1615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	54	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.14	0.03	0.53	0.51	0.55	0.25	0.54	0.33	0.53	0.61	0.02

Intersection Summary

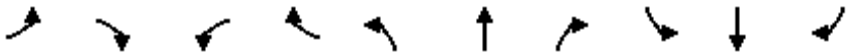
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	18	43	163	9	200	40	1009	230	310	1726	26
Future Volume (vph)	18	18	43	163	9	200	40	1009	230	310	1726	26
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	4.0	4.0	4.0	2.0	4.0	8.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1618	1795	1559	1531	1578	1553	1530	4715	1434	3367	4988	1615
Flt Permitted	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1618	1795	1559	1531	1578	1553	1530	4715	1434	3367	4988	1615
Peak-hour factor, PHF	0.90	0.50	0.83	0.66	0.38	0.77	0.77	0.85	0.92	0.80	0.96	0.81
Adj. Flow (vph)	20	36	52	247	24	260	52	1187	250	388	1798	32
RTOR Reduction (vph)	0	0	0	0	0	222	0	0	144	0	0	0
Lane Group Flow (vph)	18	38	52	136	135	38	52	1187	106	388	1798	32
Confl. Peds. (#/hr)			11	11					1	1		
Heavy Vehicles (%)	6%	0%	2%	12%	0%	4%	18%	10%	11%	4%	4%	0%
Turn Type	Split	NA	Free	Split	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases			Free			3			2			Free
Actuated Green, G (s)	7.7	7.7	120.0	15.7	15.7	15.7	6.2	50.9	50.9	19.7	66.4	120.0
Effective Green, g (s)	9.7	9.7	120.0	17.7	17.7	17.7	8.2	54.9	50.9	21.7	70.4	120.0
Actuated g/C Ratio	0.08	0.08	1.00	0.15	0.15	0.15	0.07	0.46	0.42	0.18	0.59	1.00
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	4.0	8.0	8.0	6.0	8.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	0.2	5.0	5.0	4.0	5.0	
Lane Grp Cap (vph)	130	145	1559	225	232	229	104	2157	608	608	2926	1615
v/s Ratio Prot	0.01	c0.02		c0.09	0.09		0.03	0.25		c0.12	c0.36	
v/s Ratio Perm			0.03			0.02			0.07			0.02
v/c Ratio	0.14	0.26	0.03	0.60	0.58	0.17	0.50	0.55	0.17	0.64	0.61	0.02
Uniform Delay, d1	51.3	51.8	0.0	47.9	47.7	44.7	53.9	23.6	21.5	45.5	16.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.86	1.28	1.14	0.98	1.00
Incremental Delay, d2	0.7	1.3	0.0	5.2	4.3	0.5	1.4	1.0	0.6	1.9	0.7	0.0
Delay (s)	51.9	53.1	0.0	53.1	52.0	45.2	51.6	21.3	28.1	53.8	16.5	0.0
Level of Service	D	D	A	D	D	D	D	C	C	D	B	A
Approach Delay (s)		27.4			49.0			23.5			22.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

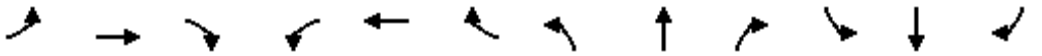
c Critical Lane Group



Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	76	44	4	24	1313	79	8	2143	8
v/c Ratio	0.14	0.05	0.26	0.00	0.16	0.33	0.05	0.06	0.58	0.01
Control Delay	50.8	0.1	53.7	0.0	52.8	6.5	0.1	74.8	1.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	0.1	53.7	0.0	52.8	6.5	0.1	74.8	1.3	0.0
Queue Length 50th (ft)	17	0	32	0	18	116	0	6	13	0
Queue Length 95th (ft)	31	0	55	0	39	226	0	m13	23	m0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	206	1563	205	1583	265	3967	1583	265	3705	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.05	0.21	0.00	0.09	0.33	0.05	0.03	0.58	0.01

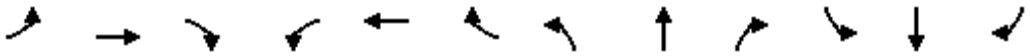
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	0	50	32	0	4	19	1260	62	4	1907	6
Future Volume (vph)	15	0	50	32	0	4	19	1260	62	4	1907	6
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		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770		1563	1757		1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770		1563	1757		1583	1770	5085	1583	1770	5085	1583
Peak-hour factor, PHF	0.63	0.92	0.66	0.73	0.92	1.00	0.79	0.96	0.78	0.50	0.89	0.75
Adj. Flow (vph)	24	0	76	44	0	4	24	1312	79	8	2143	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	24	0	76	44	0	4	24	1313	79	8	2143	8
Confl. Peds. (#/hr)			2	2								
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	NA	Free
Protected Phases							5	2		1	6	
Permitted Phases	3		Free	3		Free			Free			Free
Actuated Green, G (s)	8.0		120.0	8.0		120.0	5.4	80.4	120.0	1.7	76.7	120.0
Effective Green, g (s)	10.0		120.0	10.0		120.0	7.4	84.4	120.0	3.7	80.7	120.0
Actuated g/C Ratio	0.08		1.00	0.08		1.00	0.06	0.70	1.00	0.03	0.67	1.00
Clearance Time (s)	6.0			6.0			6.0	8.0		6.0	8.0	
Vehicle Extension (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	147		1563	146		1583	109	3576	1583	54	3419	1583
v/s Ratio Prot							c0.01	c0.26		0.00	c0.42	
v/s Ratio Perm	0.01		0.05	c0.03		0.00			c0.05			0.01
v/c Ratio	0.16		0.05	0.30		0.00	0.22	0.37	0.05	0.15	0.63	0.01
Uniform Delay, d1	51.1		0.0	51.7		0.0	53.6	7.1	0.0	56.6	11.1	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.44	0.06	1.00
Incremental Delay, d2	0.7		0.1	1.6		0.0	1.4	0.3	0.1	1.5	0.8	0.0
Delay (s)	51.8		0.1	53.3		0.0	54.9	7.4	0.1	83.3	1.4	0.0
Level of Service	D		A	D		A	D	A	A	F	A	A
Approach Delay (s)		12.5			48.9			7.8			1.7	
Approach LOS		B			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	20	20	48	100	101	353	41	1809	305	190	954	24
v/c Ratio	0.15	0.14	0.04	0.53	0.53	0.72	0.39	0.72	0.38	0.47	0.34	0.02
Control Delay	52.9	52.4	0.1	57.8	57.9	14.3	67.7	15.1	3.8	55.7	10.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	52.4	0.1	57.8	57.9	15.1	67.7	15.1	3.8	55.7	10.3	0.0
Queue Length 50th (ft)	15	15	0	75	76	3	34	141	2	77	89	0
Queue Length 95th (ft)	40	26	0	134	91	11	72	206	50	119	110	0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	185	199	1215	225	226	516	195	2526	804	512	2788	1272
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	34	0	30	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.10	0.04	0.44	0.45	0.73	0.21	0.72	0.38	0.37	0.34	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	24	7	42	168	10	247	16	21	1719	244	169	811
Future Volume (vph)	24	7	42	168	10	247	16	21	1719	244	169	811
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	4.0	4.0	4.0		2.0	4.0	8.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00		1.00	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	0.98	1.00	0.95	0.96	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1588	1715	1215	1350	1359	1357		1467	4550	1274	3072	4322
Flt Permitted	0.95	0.98	1.00	0.95	0.96	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1588	1715	1215	1350	1359	1357		1467	4550	1274	3072	4322
Peak-hour factor, PHF	0.86	0.58	0.88	0.91	0.63	0.70	0.92	0.88	0.95	0.80	0.89	0.85
Adj. Flow (vph)	28	12	48	185	16	353	17	24	1809	305	190	954
RTOR Reduction (vph)	0	0	0	0	0	300	0	0	0	145	0	0
Lane Group Flow (vph)	20	20	48	100	101	53	0	41	1809	160	190	954
Confl. Peds. (#/hr)			9	9						1	1	
Heavy Vehicles (%)	8%	0%	31%	27%	30%	19%	2%	38%	14%	25%	14%	20%
Turn Type	Split	NA	Free	Split	NA	Perm	Prot	Prot	NA	Perm	Prot	NA
Protected Phases	4	4		3	3		5	5	2		1	6
Permitted Phases			Free			3				2		
Actuated Green, G (s)	5.4	5.4	120.0	14.7	14.7	14.7		5.6	60.3	60.3	13.6	70.3
Effective Green, g (s)	7.4	7.4	120.0	16.7	16.7	16.7		7.6	64.3	60.3	15.6	74.3
Actuated g/C Ratio	0.06	0.06	1.00	0.14	0.14	0.14		0.06	0.54	0.50	0.13	0.62
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		4.0	8.0	8.0	6.0	8.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0		0.2	5.0	5.0	4.0	5.0
Lane Grp Cap (vph)	97	105	1215	187	189	188		92	2438	640	399	2676
v/s Ratio Prot	c0.01	0.01		0.07	c0.07			0.03	c0.40		c0.06	0.22
v/s Ratio Perm			0.04			0.04				0.13		
v/c Ratio	0.21	0.19	0.04	0.53	0.53	0.28		0.45	0.74	0.25	0.48	0.36
Uniform Delay, d1	53.5	53.5	0.0	48.0	48.0	46.3		54.2	21.5	17.0	48.4	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.09	0.57	0.78	1.08	0.82
Incremental Delay, d2	1.4	1.2	0.1	3.7	3.7	1.1		1.2	2.0	0.9	1.2	0.4
Delay (s)	54.9	54.7	0.1	51.8	51.7	47.4		60.5	14.3	14.1	53.5	9.5
Level of Service	D	D	A	D	D	D		E	B	B	D	A
Approach Delay (s)		24.9			49.0				15.1			16.5
Approach LOS		C			D				B			B

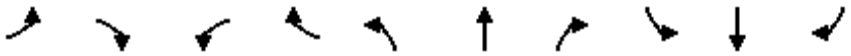
Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



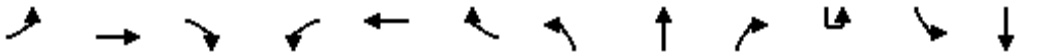
Movement	SBR
Lane Configurations	
Traffic Volume (vph)	15
Future Volume (vph)	15
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1272
Flt Permitted	1.00
Satd. Flow (perm)	1272
Peak-hour factor, PHF	0.63
Adj. Flow (vph)	24
RTOR Reduction (vph)	0
Lane Group Flow (vph)	24
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	27%
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	120.0
Effective Green, g (s)	120.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1272
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.02
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	0.0
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary



Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	16	36	68	16	64	2022	44	78	1095	32
v/c Ratio	0.08	0.02	0.36	0.01	0.36	0.59	0.03	0.42	0.32	0.02
Control Delay	47.6	0.0	54.1	0.0	55.5	15.4	0.0	78.6	1.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.3	0.1	0.0
Total Delay	47.6	0.0	54.1	0.0	55.5	15.4	0.0	167.9	1.8	0.0
Queue Length 50th (ft)	11	0	50	0	47	380	0	64	13	0
Queue Length 95th (ft)	20	0	57	0	73	473	0	40	28	0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	295	1583	295	1583	206	3450	1551	206	3465	1550
Starvation Cap Reductn	0	0	0	0	0	0	0	142	804	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.23	0.01	0.31	0.59	0.03	1.22	0.41	0.02

Intersection Summary



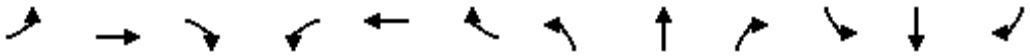
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	9	0	32	38	0	6	47	1941	26	24	16	996
Future Volume (vph)	9	0	32	38	0	6	47	1941	26	24	16	996
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00		1.00	0.91
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770		1583	1770		1583	1770	5085	1551		1770	5085
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770		1583	1770		1583	1770	5085	1551		1770	5085
Peak-hour factor, PHF	0.56	0.92	0.89	0.56	0.92	0.38	0.73	0.96	0.59	0.92	0.31	0.91
Adj. Flow (vph)	16	0	36	68	0	16	64	2022	44	26	52	1095
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	16	0	36	68	0	16	64	2022	44	0	78	1095
Confl. Peds. (#/hr)							2		1		1	
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	Prot	NA
Protected Phases							5	2		1	1	6
Permitted Phases	3		Free	3		Free			Free			
Actuated Green, G (s)	9.5		120.0	9.5		120.0	8.7	71.8	120.0		9.1	72.2
Effective Green, g (s)	11.5		120.0	11.5		120.0	10.7	75.8	120.0		11.1	76.2
Actuated g/C Ratio	0.10		1.00	0.10		1.00	0.09	0.63	1.00		0.09	0.64
Clearance Time (s)	6.0			6.0			6.0	8.0			6.0	8.0
Vehicle Extension (s)	4.0			4.0			4.0	5.0			4.0	5.0
Lane Grp Cap (vph)	169		1583	169		1583	157	3212	1551		163	3228
v/s Ratio Prot							0.04	c0.40			c0.04	0.22
v/s Ratio Perm	0.01		0.02	c0.04		0.01			c0.03			
v/c Ratio	0.09		0.02	0.40		0.01	0.41	0.63	0.03		0.48	0.34
Uniform Delay, d1	49.5		0.0	51.0		0.0	51.7	13.5	0.0		51.7	10.2
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00		1.43	0.14
Incremental Delay, d2	0.3		0.0	2.1		0.0	2.3	0.9	0.0		2.9	0.3
Delay (s)	49.8		0.0	53.2		0.0	54.0	14.5	0.0		77.0	1.7
Level of Service	D		A	D		A	D	B	A		E	A
Approach Delay (s)		15.4			43.0			15.4				6.5
Approach LOS		B			D			B				A

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	20
Future Volume (vph)	20
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	0.98
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1550
Flt Permitted	1.00
Satd. Flow (perm)	1550
Peak-hour factor, PHF	0.63
Adj. Flow (vph)	32
RTOR Reduction (vph)	0
Lane Group Flow (vph)	32
Confl. Peds. (#/hr)	2
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	120.0
Effective Green, g (s)	120.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1550
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.02
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	0.0
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	38	52	136	135	260	80	1187	250	388	1798	32
v/c Ratio	0.12	0.23	0.03	0.60	0.58	0.58	0.56	0.54	0.33	0.64	0.61	0.02
Control Delay	50.9	53.2	0.0	59.1	57.6	10.8	60.0	26.2	11.0	55.3	18.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	53.2	0.0	59.1	57.6	10.8	60.0	26.2	11.0	55.3	18.7	0.0
Queue Length 50th (ft)	13	29	0	103	102	0	62	165	1	163	179	0
Queue Length 95th (ft)	37	35	0	122	66	35	98	268	105	190	345	m0
Internal Link Dist (ft)		598			727			361			587	
Turn Bay Length (ft)	150			350		175	120		300	250		255
Base Capacity (vph)	242	269	1559	255	263	475	214	2203	763	729	2942	1615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	46	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.14	0.03	0.53	0.51	0.55	0.37	0.54	0.33	0.53	0.62	0.02

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	18	18	43	163	9	200	26	40	1009	230	310	1726
Future Volume (vph)	18	18	43	163	9	200	26	40	1009	230	310	1726
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	4.0	4.0	4.0		2.0	4.0	8.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	1.00		1.00	0.91	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	0.96	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1618	1795	1559	1531	1578	1553		1606	4715	1434	3367	4988
Flt Permitted	0.95	1.00	1.00	0.95	0.96	1.00		0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1618	1795	1559	1531	1578	1553		1606	4715	1434	3367	4988
Peak-hour factor, PHF	0.90	0.50	0.83	0.66	0.38	0.77	0.92	0.77	0.85	0.92	0.80	0.96
Adj. Flow (vph)	20	36	52	247	24	260	28	52	1187	250	388	1798
RTOR Reduction (vph)	0	0	0	0	0	222	0	0	0	144	0	0
Lane Group Flow (vph)	18	38	52	136	135	38	0	80	1187	106	388	1798
Confl. Peds. (#/hr)			11	11						1	1	
Heavy Vehicles (%)	6%	0%	2%	12%	0%	4%	2%	18%	10%	11%	4%	4%
Turn Type	Split	NA	Free	Split	NA	Perm	Prot	Prot	NA	Perm	Prot	NA
Protected Phases	4	4		3	3		5	5	2		1	6
Permitted Phases			Free			3				2		
Actuated Green, G (s)	7.7	7.7	120.0	15.7	15.7	15.7		7.8	50.9	50.9	19.7	64.8
Effective Green, g (s)	9.7	9.7	120.0	17.7	17.7	17.7		9.8	54.9	50.9	21.7	68.8
Actuated g/C Ratio	0.08	0.08	1.00	0.15	0.15	0.15		0.08	0.46	0.42	0.18	0.57
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		4.0	8.0	8.0	6.0	8.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0		0.2	5.0	5.0	4.0	5.0
Lane Grp Cap (vph)	130	145	1559	225	232	229		131	2157	608	608	2859
v/s Ratio Prot	0.01	c0.02		c0.09	0.09			0.05	0.25		c0.12	c0.36
v/s Ratio Perm			0.03			0.02				0.07		
v/c Ratio	0.14	0.26	0.03	0.60	0.58	0.17		0.61	0.55	0.17	0.64	0.63
Uniform Delay, d1	51.3	51.8	0.0	47.9	47.7	44.7		53.3	23.6	21.5	45.5	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		0.89	1.00	2.82	1.14	0.96
Incremental Delay, d2	0.7	1.3	0.0	5.2	4.3	0.5		5.7	1.0	0.6	1.9	0.8
Delay (s)	51.9	53.1	0.0	53.1	52.0	45.2		52.9	24.7	61.2	53.8	17.1
Level of Service	D	D	A	D	D	D		D	C	E	D	B
Approach Delay (s)		27.4			49.0				32.2			23.3
Approach LOS		C			D				C			C

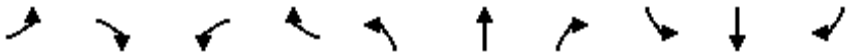
Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	26
Future Volume (vph)	26
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1615
Flt Permitted	1.00
Satd. Flow (perm)	1615
Peak-hour factor, PHF	0.81
Adj. Flow (vph)	32
RTOR Reduction (vph)	0
Lane Group Flow (vph)	32
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	0%
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	120.0
Effective Green, g (s)	120.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1615
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.02
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	0.0
Level of Service	A
Approach Delay (s)	
Approach LOS	

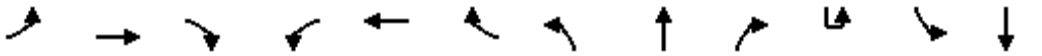
Intersection Summary



Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	76	44	4	24	1313	79	86	2143	8
v/c Ratio	0.14	0.05	0.26	0.00	0.16	0.38	0.05	0.42	0.58	0.01
Control Delay	50.8	0.1	53.7	0.0	52.8	12.4	0.1	78.5	1.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.3	0.0	0.0
Total Delay	50.8	0.1	53.7	0.0	52.8	12.4	0.1	102.8	1.5	0.0
Queue Length 50th (ft)	17	0	32	0	18	198	0	71	20	0
Queue Length 95th (ft)	31	0	55	0	39	267	0	70	32	m0
Internal Link Dist (ft)						2370			60	
Turn Bay Length (ft)	75	75	75	75	800		250	450		
Base Capacity (vph)	206	1563	205	1583	265	3441	1583	265	3705	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	166	7	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.05	0.21	0.00	0.09	0.38	0.05	0.87	0.58	0.01

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	15	0	50	32	0	4	19	1260	62	72	4	1907
Future Volume (vph)	15	0	50	32	0	4	19	1260	62	72	4	1907
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		4.0	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00		1.00	1.00		1.00	1.00	0.91	1.00		1.00	0.91
Frpb, ped/bikes	1.00		0.99	1.00		1.00	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00	0.99		1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770		1563	1757		1583	1770	5085	1583		1770	5085
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770		1563	1757		1583	1770	5085	1583		1770	5085
Peak-hour factor, PHF	0.63	0.92	0.66	0.73	0.92	1.00	0.79	0.96	0.78	0.92	0.50	0.89
Adj. Flow (vph)	24	0	76	44	0	4	24	1312	79	78	8	2143
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	24	0	76	44	0	4	24	1313	79	0	86	2143
Confl. Peds. (#/hr)			2	2								
Turn Type	Perm		Free	Perm		Free	Prot	NA	Free	Prot	Prot	NA
Protected Phases							5	2		1	1	6
Permitted Phases	3		Free	3		Free			Free			
Actuated Green, G (s)	8.0		120.0	8.0		120.0	5.4	71.6	120.0		10.5	76.7
Effective Green, g (s)	10.0		120.0	10.0		120.0	7.4	75.6	120.0		12.5	80.7
Actuated g/C Ratio	0.08		1.00	0.08		1.00	0.06	0.63	1.00		0.10	0.67
Clearance Time (s)	6.0			6.0			6.0	8.0			6.0	8.0
Vehicle Extension (s)	4.0			4.0			4.0	5.0			4.0	5.0
Lane Grp Cap (vph)	147		1563	146		1583	109	3203	1583		184	3419
v/s Ratio Prot							0.01	0.26			c0.05	c0.42
v/s Ratio Perm	0.01		0.05	c0.03		0.00			c0.05			
v/c Ratio	0.16		0.05	0.30		0.00	0.22	0.41	0.05		0.47	0.63
Uniform Delay, d1	51.1		0.0	51.7		0.0	53.6	11.1	0.0		50.6	11.1
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00		1.51	0.08
Incremental Delay, d2	0.7		0.1	1.6		0.0	1.4	0.4	0.1		2.2	0.8
Delay (s)	51.8		0.1	53.3		0.0	54.9	11.5	0.1		78.6	1.7
Level of Service	D		A	D		A	D	B	A		E	A
Approach Delay (s)		12.5			48.9			11.6				4.6
Approach LOS		B			D			B				A

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	SBR
Lane Configurations	
Traffic Volume (vph)	6
Future Volume (vph)	6
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.75
Adj. Flow (vph)	8
RTOR Reduction (vph)	0
Lane Group Flow (vph)	8
Confl. Peds. (#/hr)	
Turn Type	Free
Protected Phases	
Permitted Phases	Free
Actuated Green, G (s)	120.0
Effective Green, g (s)	120.0
Actuated g/C Ratio	1.00
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	1583
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.01
Uniform Delay, d1	0.0
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	0.0
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary