157-165 Lowland Street, Holliston, MA

Traffic Impact Assessment

Prepared for Master Paving

Prepared by Howard Stein Hudson

March 2023





TO:	Henrique Oliveira, Master Paving	DATE:	March 23, 2023
FROM:	Keri Pyke, P.E., PTOE Melissa Restrepo	HSH PROJECT NO .:	2022135.00
SUBJECT:	Traffic Impact Assessment 157-165 Lowland Street, Holliston, Massach	nusetts	

Introduction

This memorandum, prepared by *Howard Stein Hudson (HSH)*, describes the traffic impacts of the proposed paving services facility at 157-165 Lowland Street (hereinafter the "Project" or "Project Site") located in Holliston, Massachusetts. This traffic impact assessment follows the methodology provide below:

- The Existing Condition analysis includes an inventory of the existing transportation conditions such as roadway characteristics, site conditions, and crash data. Existing traffic counts were collected at the study area intersection. The traffic data collection effort forms the basis for the transportation analysis conducted as part of this evaluation.
- The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. The long-term transportation impacts are evaluated for the year 2030, based on a seven-year horizon from the year of the filing of this traffic study.
- The No-build (2030) Condition analysis includes general background traffic growth, traffic growth associated with specific developments (not including this Project), and transportation improvements that are planned in the vicinity of the Project Site.
- The Build (2030) Condition analysis includes a net increase in traffic volume due to the addition of Project-generated trip estimates to the traffic volumes developed as part of the No-build (2030) Condition analysis. The transportation study identifies any expected roadway impacts.
- The final part of the transportation study identifies measures to mitigate Project-related impacts and to address any traffic, safety, or construction-related issues that are necessary to accommodate the Project.

Project Description

Currently, the Project Site consists of a former crushing and materials recycling facility. The Project is proposing a new building which will primarily serve as parking storage for paving trucks. The crushing and recycling operations will not be part of the Project at this time.



Study Area

The study area includes one unsignalized intersection, shown in **Figure 1**, at Washington Street/Whitney Street.

Existing Condition

This section includes descriptions of existing study area roadway geometries, intersection traffic control, peak-hour vehicular volumes, and crash data.

Roadway Descriptions

The study area includes the following roadways, which are categorized according to the Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning functional classifications:

Washington Street is classified as a rural minor arterial under Town of Holliston jurisdiction within the study area. It is a two-way, two-lane roadway that generally runs north-south between North Main Street to the north and the Holliston – Milford Town Line to the south. Travel lanes are generally 11 feet wide, and shoulders are 2-8 feet wide. The posted speed limit is 35 miles per hour (mph) in both directions. Sidewalks and on-street parking are not provided within the study area.

Whitney Street is classified as a local roadway under Town of Holliston jurisdiction. It is a two-way, two-lane roadway that generally runs east-west between Hollis Street to the east and Washington Street to the west. At the middle of Whitney Street, it intersects with Jeffrey Avenue where Whitney Street appears to intersect at a right angle while Jeffrey Avenue continues the through direction. Whitney Street is approximately 30 feet wide with no painted centerline or shoulders. The posted speed limit is 25 mph in the westbound direction, and no signs are posted in the eastbound direction. Sidewalks and on-street parking are not provided on either side of the road.





Figure 1. Study Area



HOWARD STEIN HUDSON



Intersection Descriptions

Existing conditions at the study area intersection are described below:

Washington Street/Whitney Street is a three-legged, unsignalized intersection with a commercial driveway approaching from the north. The Washington Street northbound, Washington Street southbound, and Whitney Street westbound approaches each consist of a single left-turn/through/right-turn lane. The Whitney Street westbound approach is stop-controlled and has an approximately six-foot-wide median island. The commercial driveway on the southbound approach allows left-turn/through/right-turn movements and is not stop-controlled. Crosswalks are not provided across any of the approaches.

Data Collection

Turning Movement Counts (TMCs) were recorded during the morning peak hours (7:00 – 9:00 a.m.) and evening peak hours (4:00 – 6:00 p.m.) on Thursday, October 8, 2020. The TMCs included car, heavy vehicle, bicycle, and pedestrian counts at the study area intersection. The results of the counts indicate that the vehicle morning peak hour occurs between 7:00 - 8:00 a.m. and the evening peak hour between 4:30 - 5:30 p.m. The detailed traffic counts are provided in **Appendix A** attached hereto.

SEASONAL ADJUSTMENT

To account for the seasonal variation in traffic volumes throughout the year, data provided by MassDOT, were reviewed. The most recent (2019) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the October 2020 TMCs. The 2019 seasonal adjustment factor for October for roadways like the study area (R4 and R7) is 0.98. This indicates that traffic volumes for October are approximately 2% greater than average traffic volumes for the year. The traffic counts were not adjusted down to reflect average month conditions to provide a conservatively high analysis consistent with the peak-season traffic volumes. The MassDOT 2019 Weekday Seasonal Factors table is provided in **Appendix B** attached hereto.

COVID-19 ADJUSTMENT

Collected data from October 2020 were compared to historical nearby traffic data, pre-pandemic, to evaluate if recent traffic has changed. Counts from March 2020, just before the start of the pandemic, were used at MassDOT count location ID 4815 for comparison. This spot counter is located on Washington Street just east of Whitney Street. Counts along Washington Street were generally lower in October than in March, therefore the counts were adjusted up for this study by approximately 50%. COVID adjustments were determined to provide some general correction for

COVID-19 variation; however, they are not expected to adjust volumes exactly to pre-COVID numbers. Research shows that post-pandemic volumes might not completely recover to pre-COVID patterns.

Existing Traffic Volumes

The existing traffic volumes that were collected in October 2020 were adjusted based on the seasonal and COVID-19 factors to develop the Existing (2022) Condition traffic volumes. The Existing Condition weekday a.m. and p.m. peak hour vehicle volumes are shown in **Figure 2**. Note that the counts collected at this intersection captured part of the existing ABC facility vehicle activity; therefore, the Build Condition analysis, presented under Traffic Operations Analysis in this report, represents a conservative analysis.

Motor Vehicle Collision Data

HSH compiled motor vehicle crash data from the MassDOT crash records on the IMPACT portal for the most recent three-year period for which they are available (2017-2019). No segment crashes occurred along Whitney Street/Jeffrey Avenue, and there were six crashes at the intersection of Washington Street and Whitney Street. No crashes between 2017 – 2019 involved heavy trucks or trailers. Crashes were primarily property damage only under dry conditions in the daylight.

The crash rate for an intersection is based on crashes per million entering vehicles (MEV). At the study area intersection, the crash rate is 0.47 crashes per MEV, lower than the District 3 average of 0.61 crashes per MEV. Crash data are summarized in **Table 1**. The crash rate worksheet is provided in **Appendix C** attached hereto.



Existing a.m. Peak Hour (7:00 a.m 8:00 a.m.)	DRIVEWAY	
WASHINGTON ST ROUTE 16	$ \begin{array}{c} \bullet \bullet \bullet \bullet \\ \bullet \bullet \bullet \bullet \\ \bullet \bullet \bullet \bullet \bullet \\ \bullet \bullet \bullet \bullet $	2
	918→ 24→	
	WHITNEY SI	
Existing p.m. Peak Hour (4:30 p.m 5:30 p.m.)	DRIVEWAY	
WASHINGTON ST		7 8
ROUTE 16	$\begin{array}{c c} 2 \stackrel{\bullet}{\rightarrow} \\ 455 \stackrel{\bullet}{\rightarrow} \\ 42 \stackrel{\bullet}{\rightarrow} \\ \end{array} \begin{array}{c} \uparrow \uparrow \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	
Not to	WHITNEY ST	

Figure 2. Existing Condition Vehicle Volumes, Weekday a.m. and p.m. Peak Hours



		Segment	Intersection				
	Description/Scenario	Whitney Street/Jeffrey Avenue Between Washington St and Lowland St	Washington Street at Whitney Street				
Total Crash	ies	0	6				
	2017	0	1				
Year	2018	0	1				
Soverity	2019	0	4				
Soverity	Property Damage Only	roperty Damage Only 0					
Seventy	Injury	0	1				
	Angle	0	2				
Collision	Rear-end	0	2				
Туре	Sideswipe, opposite direction	0	0				
	Single vehicle crash	0	2				
Time of	Weekday a.m. Peak (7 – 9 a.m.)	0	3				
	Weekday p.m. Peak (4 – 6 p.m.)	0	2				
Day	Weekday Off-Peak	0	1				
Roadway	Dry	0	6				
Surface	Snow	0	0				
Light	Daylight	0	5				
Condition	Dark – roadway not lighted	0	1				
Involving He	eavy Truck/Trailer	0	0				
Crash Rate			0.47				
District Cras	sh Rate	1.20	0.61**				

Table 1.Crash Data Summary

Source: MassDOT, Impact Crash Data Portal **Crashes per million entering vehicles (MEV)

No-build (2030) Condition

The No-build (2030) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with background traffic growth independent of any specific project, traffic associated with other planned specific developments, and planned infrastructure improvements that will affect travel patterns throughout the study area.

Background Traffic Growth

The methodology to account for general background traffic growth, independent of the Project, may be affected by changes in demographics, smaller scale development projects, or projects unforeseen at this time. Based on a review of recent and historic traffic data from the MassDOT MS2 Transportation Data Management System, a traffic growth rate of 1% per year, compounded



annually was selected. This is also consistent with growth rates used for other development projects in the area. The traffic volumes were grown to the Future Year of 2029, as is prescribed in the MassDOT Traffic Impact Study Guidelines.

Specific Development Projects

Based on a review of the Town of Holliston website, the following projects were identified in the Project area. It is assumed that any unidentified projects will be captured by the background growth rate.

- *245 Washington Street (Village on the Green 40B)* This project includes 16 detached single-family homes. The project will have site access via a driveway on Washington Street.
- **555** Hopping Brook Road This project consists of 800,000 square feet (sf) of warehouse space within the Hopping Brook Business Park.
- *194 Lowland Street* This project consists of a vehicle storage facility for approximately 585 cars and a 26-sf security booth.

Roadway Improvement Projects

Based on a review of the Town of Holliston website, no future roadway improvement projects were identified to be completed by 2030 outside of routine maintenance work.

No-build (2030) Traffic Volumes

The 1% per year annual growth rate, compounded annually, was applied to the Existing Condition traffic volumes; then the traffic volumes associated with the background development projects listed previously were added to develop the No-build (2030) Condition traffic volumes. The No-build (2030) peak hour vehicle volumes for the a.m. and p.m. peak hours are shown in **Figure 3**.





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Figure 3. No-build (2030) Condition Vehicle Volumes, Weekday a.m. and p.m. Peak Hours



Build (2030) Condition

The proposed Project will consist of parking exclusively for the paving trucks in a new building. The site plan is shown in **Figure 4**.

Project Trip Generation

Typically, the number of trips expected to be generated by a project are estimated using data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*, 11th Edition. Because this is an atypical use, the ITE Trip Generation Manual does not have land use data that covers this use; therefore, trips for the Project were estimated based on expected facility operations and assumptions based on Proponent-provided data. Based on the type of land use and location of the Project, all trips to the Project Site are expected to be vehicle trips, by car or truck.

As previously described, the Project is seeking to incorporate a new building to serve as parking storage for paving trucks. The following section describes the assumptions that were used to calculate the Project's vehicle trips. A summary of trip generation is shown in **Table 2**.

PAVING TRUCK STORAGE FACILITY

The paving truck storage facility will operate from 6:00 a.m. – 7:00 p.m. Monday through Friday and from 7:00 a.m. – 3:00 p.m. on Saturday. The proposed new building will only serve as parking storage for the paving trucks and equipment (see **Appendix D** for a list of the equipment). The facility will employ a total of 16 employees, which are expected to arrive around 6:00 a.m. and depart after 7:00 p.m. In a typical day, employees will arrive in their own private vehicles, park on-site, and depart in one of the company's paving trucks (one employee per truck). Depending on the work available and the season (typical months of operation are April through November), pavers' trucks may return to the Site before 7:00 p.m. and occasionally (1-2 times per month) between 8:00-9:00 p.m. As shown in **Table 2**, there are expected to be no vehicle trips during the a.m. peak hour and 32 vehicle trips (16 in and 16 out) during the p.m. peak hour. There are expected to be 66 daily vehicle trips (33 in and 33 out).

Time Period/Direction		Paving Truck Storage Facility Total Trips
	In	33
Daily	<u>Out</u>	<u>33</u>
	Total	66
	In	0
a.m. Peak Hour	<u>Out</u>	<u>0</u>
	Total	0
	In	16
p.m. Peak Hour	<u>Out</u>	<u>16</u>
	Total	32

Table 2.Project Vehicle Trip Generation



Figure 4. Site Plan and Driveway Access



Trip Distribution

The trip distribution identifies the various travel paths for vehicles associated with the Project. Based on information provided by the Proponent, it is expected that approximately 50% of truck trips will come from Route 16 east of the Project Site and the remaining 50% of truck trips will come from either I-495 east on Route 16 or I-90 south on Route 126 to the Project Site. The trip distribution percentages were applied to the vehicle trip generation to determine the projectgenerated trips for the weekday a.m. and p.m. peak hours as shown in **Figure 5**.

Build (2030) Traffic Volumes

Project-generated vehicle trips were added to the No-build (2030) Condition vehicular traffic volumes to develop the Build (2030) Condition vehicular traffic volumes. The Build (2030) Condition a.m. and p.m. peak hour traffic volumes are shown in **Figure 6**.





a.m. Peak Hour	DRIVEWAY	Note that the typical morning peak hour is not expected to experience new trips as employees will have departed the Site prior to the start of rush hour.
WASHINGTON ST ROUTE 16		[▶
		-
	WHITNE	
p.m. Peak Hour	DRIVEWAY	ln 16 Out (16)
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	$ \begin{array}{c c} 0 & \rightarrow \\ 0 & \rightarrow \\ 8 & \neg \\ \end{array} $	
Not to scale.	WHITNEY ST	

Figure 5. Project-generated Vehicle Trips, Weekday a.m. and p.m. Peak Hours





a.m. Peak Hour		
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Figure 6. Build (2030) Condition Vehicle Volumes, Weekday a.m. and p.m. Peak Hours



Traffic Operations Analysis

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay experienced by vehicles at intersections and along intersection approaches. The latest Trafficware's Synchro (version 11) software package was used to calculate average delay and associated LOS at all study area intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's *Highway Capacity Manual (HCM)*, 6th *Edition*. The latest HCM edition, 6th, methodology outputs were used.

In accordance with MassDOT guidelines, the peak 15 minutes of data collected during the peak hour were isolated to calculate the peak-hour factors (PHFs) for each approach. In the future conditions, a peak hour factor of 0.88 was applied to all approaches based on MassDOT guidelines for rural areas. The percentage of heavy vehicles was noted for each land group movement.

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. **Table 3,** an excerpt from the HCM, provides LOS criteria for signalized intersections. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst condition, with significant traffic delay. LOS D or better is typically considered desirable during the peak hours of traffic in urban and suburban settings. However, LOS E or LOS F is often typical for a stop-controlled minor street that intersects a major roadway.

Level of Service	Average Stopped Delay (sec.)
	Unsignalized Intersection
Α	0.0–10.0
В	10.1–15.0
C	15.1–25.0
D	25.1–35.0
E	35.1–50.0
F	>50.0

Table 3.Level of Service Criteria

In addition to delay and LOS, the operational capacity and vehicular queues are calculated and used to further quantify traffic operations at intersections. The following describes the other measures.



The volume-to-capacity ratio (v/c ratio) is a measure of congestion at an intersection approach. A v/c ratio below one indicates that the intersection approach has adequate capacity to process the arriving traffic volumes over the course of an hour. A v/c ratio of one or greater indicates that the traffic volume on the intersection approach exceeds capacity.

The 95th percentile queue, measured in feet, denotes the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line. This maximum queue occurs five percent, or less, of the time during the peak hour, and typically does not develop during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a "worst case" condition. Queues at an intersection are generally below the 95th percentile length throughout most of the peak hour. It is also unlikely that 95th percentile queues for each approach to an intersection occur simultaneously.

Table 4 summarizes the LOS, delay, volume to capacity ratio, and queue analysis for the study area intersection during the morning and evening peak hours for the Existing, No-build 2029, and Build 2029 Conditions.

SYNCHRO METHODOLOGY

At unsignalized intersections, it is not uncommon for the minor street approaches to operate at LOS E or F. This is partly due to the conservative gap acceptance time used in the Synchro software for vehicles waiting to enter the main street from a stopped condition. Under these conservative conditions, small and large increases in volumes may show large changes in delay. When activity is more continuous on the main road, drivers are more willing to turn with smaller gaps between vehicles rather than wait for a larger gap. Under normal conditions, this typically would be corrected by collecting actual gap acceptance times through field observations. As discussed previously, the current volumes are lower than pre-pandemic volumes, therefore there is not a reliable way to adjust for actual conditions in the field as current traffic is not comparable to the higher volume conditions represented in the traffic model. Instead, the operations analysis will also be presented for the Existing, No-build (2030), and Build (2030) Conditions where volumes are not adjusted to correct for COVID-19 traffic variation, shown in **Table 5**. Even though levels of traffic are slowly returning, the future traffic is not certain and may be somewhere in between these two analysis scenarios.



Table 4.Operations Analysis Summary (with COVID-19 Adjustment), Weekday a.m. and p.m. Peak Hours

		Existing	Conditi	on	No	-build (20	dition	Build (2030) Condition				
Intersection/Movement	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)
a.m. Peak Hour												
Washington Street/Whitney Street		-	-	-	-	-	-	-	-	-	-	-
Washington St NB left/thru/right	А	0	0	0	А	0	0	0	Α	0	0	0
Washington St SB left/thru/right	В	10.9	0.06	5	В	11.8	0.06	5	В	11.8	0.06	5
Whitney St WB left/thru/right	F	>50.0	0.64	90	F	>50.0	0.91	153	F	>50.0	0.91	153
Driveway EB left/thru/right	А	0	0	0	А	0	0	0	А	0	0	0
				p.m. Pea	k Hour							
Washington Street/Whitney Street	-	-	-	-	-	-	-	-	-	-	-	-
Washington St NB left/thru/right	А	9.6	0	0	В	10.2	0	0	В	10.2	0	0
Washington St SB left/thru/right	А	9.0	0.12	10	А	9.7	0.15	13	Α	9.8	0.16	15
Whitney St WB left/thru/right	F	>50.0	0.67	90	F	>50.0	1.25	193	F	>50.0	1.70	255
Driveway EB left/thru/right	E	45.0	0.08	8	F	>50.0	0.08	8	F	>50.0	0.09	8

Grey shading indicates LOS E or F under the Existing Condition or a change from LOS D or better in a previous condition to LOS E or F.

#=95th percentile volume exceeds capacity; queue may be longer.

~ = Volume exceeds capacity, queue is theoretically infinite.



Table 5.Operations Analysis Summary (without COVID-19 Adjustment), Weekday a.m. and p.m. Peak Hours

		Existing Condition				No-build (2030) Condition				Build (2030) Condition			
Intersection/Movement	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	
a.m. Peak Hour													
Washington Street/Whitney Street	-	-	-	-	-	-	-	-	-	-	-	-	
Washington St NB left/thru/right	Α	0	0	0	А	0	0	0	А	0	0	0	
Washington St SB left/thru/right	Α	9.3	0.04	3	А	9.8	0.04	3	Α	9.8	0.04	3	
Whitney St WB left/thru/right	С	21.9	0.35	38	D	29.5	0.46	58	D	29.5	0.46	58	
Driveway EB left/thru/right	Α	0	0	0	А	0	0	0	Α	0	0	0	
				p.m. Pea	k Hour								
Washington Street/Whitney Street	-	-	-	-	-	-	-	-	-	-	-	-	
Washington St NB left/thru/right	Α	8.6	0	0	А	8.9	0	0	А	8.9	0	0	
Washington St SB left/thru/right	Α	8.4	0.10	8	А	8.8	0.13	10	Α	8.9	0.14	13	
Whitney St WB left/thru/right	D	25.1	0.33	35	Е	45.6	0.53	70	F	>50.0	0.70	100	
Driveway EB left/thru/right	С	24.1	0.04	3	D	33.4	0.03	3	D	34.4	0.03	3	

Grey shading indicates LOS E or F under the Existing Condition or a change from LOS D or better in a previous condition to LOS E or F.

= 95th percentile volume exceeds capacity; queue may be longer.

~ = Volume exceeds capacity, queue is theoretically infinite.



EXISTING CONDITION

All intersection approaches operate at LOS D or better in the Existing Condition except the Whitney Street westbound approach, which operates at LOS F during the a.m. and p.m. peak hours and the driveway opposite of Whitney Street, which operates at LOS E during the p.m. peak hour. Note that without the COVID-19 adjustment, these approaches operate at LOS D, more closely representing the current existing conditions in the field.

NO-BUILD (2030) CONDITION

All intersection approaches continue to operate at similar levels of service in the No-build (2030) Condition as the Existing Condition, except for the Driveway eastbound approach during the p.m. peak hour in the scenario with the COVID-19 adjustments and the Whitney Street westbound approach during the peak hour in the scenario without the COVID-19 adjustments.

BUILD (2030) CONDITION

The intersections and approaches are expected to operate the same in the Build (2030) Condition as in the No-build (2030) Condition except for the increases in delay on the Whitney Street westbound approach. It is not uncommon to experience an increase in delay at a stop-controlled approach; however, the large increase in delay in the scenario with COVID-19 adjustment is likely representative of the model's sensitivity to volume changes without correcting for gap acceptance.

In the Build (2030) Condition, with COVID-19 adjustments, the 95th percentile queue is 255 feet, about 10 vehicles, during the p.m. peak hour, while the scenario without COVID-19 adjustments shows a queue of 100 feet, or four vehicles. The 95th percentile queue is only expected to occur 5% of the time; therefore, even in the worst case with traffic returning to pre-pandemic levels, queues on average are not expected to be longer than seven vehicles. The full Synchro reports for all scenarios are provided in **Appendix D**.

Conclusion

Based on forecasted business operations logistics, the Project is expected to generate 66 daily trips to occur during business operating hours between 6 a.m. and 7 p.m. on a weekday. The typical morning peak hour is not expected to experience new trips as employees will have departed the Project Site prior to the start of rush hour, and the typical evening peak hour is expected to experience 32 new peak hour trips per hour which, on average, is one vehicle every two minutes. Any new truck activity will be focused through the existing Lowland Industrial Park area and is not expected to impact the nearby neighborhood streets. The Project is expected to have a minimal impact on traffic operations in the study area.



Engineers + Planners



Traffic Count Data

Client: Vannesa Methoxha Project #: 621_C81_HSH BTD #: Location 1 Location: Holliston, MA Washington Street (Route 16) Street 1: Whitney Street Street 2: Count Date: 10/8/2020 Day of Week: Thursday Clouds & Sun, 60°F Weather:



Office: 978-746-1259 DataRequest@BostonTrafficData.com www.BostonTrafficData.com

PASSENGER CARS & HEAVY VEHICLES COMBINED

						PASSEN	GER CA	CARS & REAVI VERICLES COMBINED									
	Whitney Street					Parking Lot Driveway				Washington Street (Route 16)				Washington Street (Route 16)			
	Northbound					Southbound			Eastbound				Westbound				
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
7:00 AM	0	2	0	23	0	0	0	0	0	0	150	8	0	12	46	0	
7:15 AM	0	3	0	14	0	0	0	0	0	0	148	4	0	1	44	0	
7:30 AM	0	10	0	18	0	0	0	0	0	0	170	6	0	4	47	0	
7:45 AM	0	5	0	11	0	0	0	0	0	0	144	6	0	10	64	1	
8:00 AM	0	4	0	12	0	0	0	0	0	0	124	10	0	8	65	0	
8:15 AM	0	2	0	10	0	0	0	0	0	0	133	2	0	4	58	0	
8:30 AM	0	0	0	9	0	0	1	0	0	0	124	8	0	4	55	0	
8:45 AM	0	5	0	2	0	0	0	0	0	0	104	8	0	11	55	0	
Whitney Street					Parking Lot Driveway			Washington Street (Route 16)				Washington Street (Route 16)					

						00000				=0.00						
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	11	0	14	0	1	0	2	0	1	54	5	0	21	136	0
4:15 PM	0	9	0	9	0	1	0	1	0	1	78	4	0	11	150	1
4:30 PM	0	4	0	11	0	0	1	0	0	1	82	9	0	19	125	1
4:45 PM	0	7	0	6	0	0	1	1	0	0	68	8	0	39	134	1
5:00 PM	0	10	0	12	0	0	0	0	0	0	79	14	0	26	112	1
5:15 PM	0	5	0	10	0	0	1	0	0	1	74	11	0	24	147	2
5:30 PM	0	2	0	8	0	0	1	2	0	1	78	6	0	19	127	2
5:45 PM	0	8	0	9	0	0	1	0	0	0	81	13	0	13	97	0

AM PEAK HOUR		Whitne	y Street			Parking Lo	t Driveway		Wa	shington St	reet (Route	16)	Wa	shington St	reet (Route	16)
7:00 AM		North	bound			South	bound			Eastb	ound			West	bound	
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
8:00 AM	0	20	0	66	0	0	0	0	0	0	612	24	0	27	201	1
PHF		0.	77			0.	00			0.	90			0.	76	
HV %	0.0%	25.0%	0.0%	18.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.7%	4.2%	0.0%	7.4%	5.0%	0.0%

PM PEAK HOUR		Whitne	y Street			Parking Lo	t Driveway		Wa	shington St	reet (Route	16)	Wa	shington St	reet (Route	16)
4:30 PM		North	bound			South	bound			East	oound			West	bound	
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
5:30 PM	0	26	0	39	0	0	3	1	0	2	303	42	0	108	518	5
PHF		0.	74			0.	50			0.	93			0.	91	
HV %	0.0%	11.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	11.9%	0.0%	4.6%	3.3%	0.0%

Client: Vannesa Methoxha Project #: 621_C81_HSH BTD #: Location 1 Location: Holliston, MA Washington Street (Route 16) Street 1: Whitney Street Street 2: 10/8/2020 Count Date: Day of Week: Thursday Clouds & Sun, 60°F Weather:



Office: 978-746-1259 DataRequest@BostonTrafficData.com www.BostonTrafficData.com

HEAVY VEHICLES

		Whitne	y Street			Parking Lo	ot Driveway		Wa	shington St	reet (Route	16)	Wa	shington St	treet (Route	16)
		North	bound			South	bound			East	bound			West	bound	
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	7	0	0	0	0	0	0	10	0	0	0	0	0
7:15 AM	0	1	0	1	0	0	0	0	0	0	12	0	0	0	3	0
7:30 AM	0	3	0	1	0	0	0	0	0	0	8	0	0	0	3	0
7:45 AM	0	1	0	3	0	0	0	0	0	0	5	1	0	2	4	0
8:00 AM	0	0	0	2	0	0	0	0	0	0	6	2	0	3	6	0
8:15 AM	0	0	0	3	0	0	0	0	0	0	8	1	0	0	2	0
8:30 AM	0	0	0	1	0	0	0	0	0	0	13	0	0	2	6	0
8:45 AM	0	1	0	0	0	0	0	0	0	0	5	1	0	1	4	0
			o			D 11 1					. (5.)	10)		1		4.0)
		V//hitne	v Street			Parking I c	t Driveway		V/a	isninaton St	reet (Route	16)	Wa	sninaton St	reet (Route	16)

		VVIIIIIE	y Sueer			Faiking LC	n Driveway		vva	Shington St	ieer (ivoure	10)	vva	Shington St		10)
		North	bound			South	bound			Easth	bound			West	bound	
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	3	0	0	0	0	0	0	0	0	2	0	0	0	3	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0
4:30 PM	0	3	0	0	0	0	0	0	0	0	4	3	0	1	3	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	5	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	3	4	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	2	1	0	0	5	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	3	0	0	0	1	0

AM PEAK HOUR		Whitne	y Street			Parking Lo	ot Driveway		Wa	shington St	reet (Route	16)	Wa	shington St	reet (Route	16)
7:45 AM		North	bound			South	bound			East	oound			West	bound	
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
8:45 AM	0	1	0	9	0	0	0	0	0	0	32	4	0	7	18	0
PHF		0.	63			0.	00			0.	69			0.	69	

PM PEAK HOUR		Whitne	y Street			Parking Lo	t Driveway		Wa	shington St	reet (Route	16)	Wa	shington St	reet (Route	16)
4:30 PM		North	bound			South	bound			East	bound			West	bound	
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
5:30 PM	0	3	0	0	0	0	0	0	0	0	8	5	0	5	17	0
PHF		0.	.25			0.	00			0.	46			0.	79	

Client:	Vannesa Methoxha
Project #:	621_C81_HSH
BTD #:	Location 1
Location:	Holliston, MA
Street 1:	Washington Street (Route 16)
Street 2:	Whitney Street
Count Date:	10/8/2020
Day of Week:	Thursday
Weather	Clouds & Sun, 60°F



PEDESTRIANS & BICYCLES

									-									
		W	/hitney Stre	et		Park	ing Lot Driv	eway			Washing	ton Street (Route 16)		Washing	ton Street (Route 16)	
			Northbound	ł			Southbound	b				Eastbound	l			Westbound	ł	
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED		Left	Thru	Right	PED	Left	Thru	Right	PED	
7:00 AM	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
8:00 AM	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
8:30 AM	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	
8.45 AM	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	

		V	/hitney Stre Northbound	et		Park	ing Lot Driv Southbound	eway d		Washing	ton Street (I Eastbound	Route 16)		Washing	ton Street (Westbound	Route 16) I	
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5.45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

ſ	AM PEAK HOUR ¹		W	/hitney Stre	et		Park	ing Lot Driv	eway		Washing	ton Street (I	Route 16)		Washing	ton Street (F	Route 16)	
	7:00 AM			Northbound	ł			Southbound	ł			Eastbound				Westbound		
	to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

PM PEAK HOUR ¹		W	/hitney Stre	et		Park	ing Lot Driv	eway		Washing	ton Street (I	Route 16)		Washing	ton Street (I	Route 16)	
4:30 PM			Northbound				Southbound	ł			Eastbound				Westbound		
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	

¹NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.



Engineers + Planners



Adjustment Factors

157-165 LOWLAND STREET, HOLLISTON

Massachusetts Highway Department Statewide Traffic Data Collection 2019 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.22	1.14	1.12	1.06	1.00	0.96	0.87	0.85	0.96	0.99	1.04	1.12	0.85
R2	0.95	0.96	0.98	0.97	0.97	0.93	0.97	0.94	0.96	0.90	0.92	0.93	0.96
R3	1.15	1.06	1.07	1.00	0.89	0.88	0.89	0.89	0.95	0.92	1.02	1.01	0.97
R4-R7	1.09	1.09	1.11	1.02	0.96	0.92	0.89	0.89	0.99	0.98	1.09	1.13	0.98
U1-Boston	1.03	1.01	0.98	0.94	0.94	0.92	0.95	0.93	0.94	0.94	0.97	1.04	0.96
U1-Essex	1.09	1.06	1.03	0.99	0.94	0.90	0.88	0.86	0.93	0.94	0.99	1.06	0.93
U1-Southeast	1.06	1.05	1.01	0.97	0.95	0.93	0.93	0.90	0.94	0.94	0.98	1.04	0.98
U1-West	1.19	1.14	1.09	0.95	0.92	0.89	0.89	0.86	0.91	0.95	0.97	1.07	0.84
U1-Worcester	1.02	1.04	0.97	0.94	0.93	0.91	0.95	0.91	0.93	0.92	0.95	1.10	0.88
U2	1.01	1.00	0.94	0.93	0.91	0.89	0.93	0.90	0.90	0.91	0.94	1.02	0.99
U3	1.06	1.03	0.98	0.94	0.93	0.91	0.95	0.91	0.92	0.93	0.97	1.00	0.98
U4-U7	1.01	1.00	0.95	0.92	0.88	0.86	0.92	0.91	0.92	0.94	0.99	1.04	0.99
Rec - East	1.04	1.16	1.12	0.98	0.92	0.88	0.77	0.81	0.94	1.02	1.08	1.12	0.99
Rec - West	1.30	1.23	1.32	1.18	0.95	0.82	0.70	0.69	0.97	0.96	1.16	1.15	0.98

Round off:

0-999 = 10

>1000 = 100

U = Urban

R = Rural

1 - Interstate

2 - Freeway and Expressway

- 3 Other Principal Arterial
- 4 Minor Arterial

5 - Major Collector

- 6 Minor Collector
- 7 Local Road and Street

Recreational - East Group - Cape Cod (all towns) including the town of Plymouth south of Route 3A (stations

7014,7079,7080,7090,7091,7092,7093,7094,7095,7096,7097,7108 and 7178), Martha's Vineyard and Nantucket.

Recreational - West Group - Continuous Stations 2 and 189 including stations

1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1113, 1114,1116,2196,2197 and 2198.



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Appendix C

Crash Rate Worksheet

157-165 LOWLAND STREET, HOLLISTON



INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN :	Holliston, MA	A		COUNT DA	TE :	10/8/2020
DISTRICT : 3	UNSIGN	ALIZED :	Yes	SIGNA	LIZED :	
		~ IN	FERSECTION	N DATA ~		
MAJOR STREET :		Washington	Street			
MINOR STREET(S) :		Whitney Stre	et			
INTERSECTION DIAGRAM (Label Approaches)	North	Upper-Charles-Rail-Trail (Holliston)	Auction M Auction house	Consignment Delivery arketplace be	ashington St WP	S A
APPROACH :	1	2	3		5	Total Peak
DIRECTION :	EB	WB	NB			Approach Volume
PEAK HOURLY VOLUMES (AM/ PM) :	347	631	65			1,043
"K" FACTOR:	0.090	INTERSE	ECTION ADT APPROACH	(V)= TOTA I VOLUME:	AL DAILY	11,589
TOTAL # OF CRASHES :	6	# OF YEARS :	3	AVERA CRASHES A	GE # OF PER YEAR(、):	2.00
CRASH RATE CALCU	ILATION :	0.47	RATE =	<u>(A*1,</u> (V	000,000) * 365)	
Comments : Project Title & Date:	157-165 Low	land Street				



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List of Equipment

157-165 LOWLAND STREET, HOLLISTON

	Master Paving Cor	р	
<u>Year</u>	Make & Model	Type	
2006	Mack Granite CV	Tri-Axle Dump Truck	
2002	Kenworth T800	Tri-Axle Dump Truck	
2001	Kenworth T800	Tri-Axle Dump Truck	
2000	WesternStar W900	tri-Axle Dump Truck	
2016	Cat 262D	skidsteer	
2014	Cat 262D	skidsteer	
2023	Bomag BW120AD3	Roller	
2005	Bomag BW120AD3	roller	
2006	Beutling B325	roller	
2011	Leeboy 8510B	paver	
2021	Leeboy 1000G	paver	
2018	Rampant Equipment	Trailer	
2016	Lark Utility	trailer	
2004	Cam Utility	trailer	
2013	Ford F350	1 ton Dump	
2019	Ford F350	1 ton Dump	
2022	Cat 420E	Backhoe	

	MIDDLESEX ASPHALT SERVI	ICES INC.	
Year	Make & Model	Type	
2017	567 Peterbilt	Tri-Axle Dump Truck	
2019	567 Peterbilt	Tri-Axle Dump Truck	
2022	567 Peterbilt	Tri-Axle Dump Truck	
2023	567 Peterbilt	tri-Axle Dump Truck	
2018	Bobcat T770	skidsteer	
2010	Bobcat 257b3	skidsteer	
	Dynapac CC1200VI	Roller	
	Dynapac CC900	roller	
	Dynapac CC122	roller	
	Leeboy 8520B	paver	
	Leeboy 8510B	paver	
	Leeboy 1000D	paver	
2020	bb flatbed trailler	trailer	
2003	Interstate	trailer	
2006	Isuzu Box Truck	Box truck	
2022	Ford Maverick	Pickup Truck	



Engineers + Planners



Synchro Reports

	n	ıt	e	rs	e	C	ti	0	n	
1			-	•••	-	-		-		

Movement SEL SET SER NWL NWT NWR NEL NET NER SWL SWT	SWR
Lane Configurations 💠 🛟 🛟	
Traffic Vol, veh/h 0 0 0 20 0 66 0 918 24 27 302	1
Future Vol, veh/h 0 0 0 20 0 66 0 918 24 27 302	1
Conflicting Peds, #/hr 0 0 0 0 0 0 0 0 0 0 0 0	0
Sign Control Stop Stop Stop Stop Stop Stop Free Free Free Free Free	Free
RT Channelized None None I	None
Storage Length	-
Veh in Median Storage, # - 0 0 0 0	-
Grade, % - 0 0 0 0	-
Peak Hour Factor 92 92 92 77 77 77 90 90 90 76 76	76
Heavy Vehicles, % 0 0 0 25 0 18 0 6 4 7 5	0
Mvmt Flow 0 0 0 26 0 86 0 1020 27 36 397	1

Major/Minor	Minor2			Vinor1		M	Major1		N	/lajor2			
Conflicting Flow All	1547	1517	398	1504	1504	1034	398	0	0	1047	0	0	
Stage 1	470	470	-	1034	1034	-	-	-	-	-	-	-	
Stage 2	1077	1047	-	470	470	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.35	6.5	6.38	4.1	-	-	4.17	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.725	4	3.462	2.2	-	-	2.263	-	-	
Pot Cap-1 Maneuver	94	120	656	88	123	263	1172	-	-	646	-	-	
Stage 1	578	563	-	254	312	-	-	-	-	-	-	-	
Stage 2	268	308	-	533	563	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	60	111	656	83	114	263	1172	-	-	646	-	-	
Mov Cap-2 Maneuver	60	111	-	83	114	-	-	-	-	-	-	-	
Stage 1	578	522	-	254	312	-	-	-	-	-	-	-	
Stage 2	181	308	-	495	522	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	0	56.1	0	0.9	
HCM LOS	А	F			

Minor Lane/Major Mvmt	NEL	NET	NERN	IWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1172	-	-	175	-	646	-	-
HCM Lane V/C Ratio	-	-	-	0.638	-	0.055	-	-
HCM Control Delay (s)	0	-	-	56.1	0	10.9	0	-
HCM Lane LOS	А	-	-	F	А	В	А	-
HCM 95th %tile Q(veh)	0	-	-	3.6	-	0.2	-	-

5

Intersection

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		\$			\$			\$			÷	
Traffic Vol, veh/h	0	3	1	26	0	39	2	455	42	108	777	5
Future Vol, veh/h	0	3	1	26	0	39	2	455	42	108	777	5
Conflicting Peds, #/hr	1	0	2	2	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	74	74	74	93	93	93	91	91	91
Heavy Vehicles, %	0	0	0	12	0	0	0	3	12	5	3	0
Mvmt Flow	0	6	2	35	0	53	2	489	45	119	854	5

Major/Minor	Minor2		I	Minor1		Ν	lajor1		Ν	lajor2			
Conflicting Flow All	1638	1633	859	1617	1613	513	859	0	0	534	0	0	
Stage 1	1095	1095	-	516	516	-	-	-	-	-	-	-	
Stage 2	543	538	-	1101	1097	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.22	6.5	6.2	4.1	-	-	4.15	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.608	4	3.3	2.2	-	-	2.245	-	-	
Pot Cap-1 Maneuver	81	102	359	79	105	565	791	-	-	1019	-	-	
Stage 1	261	292	-	524	538	-	-	-	-	-	-	-	
Stage 2	528	526	-	246	291	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	· 61	79	358	61	81	564	791	-	-	1019	-	-	
Mov Cap-2 Maneuver	· 61	79	-	61	81	-	-	-	-	-	-	-	
Stage 1	260	227	-	522	536	-	-	-	-	-	-	-	
Stage 2	476	524	-	184	226	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	45	75.8	0	1.1	
HCM LOS	E	F			

Minor Lane/Major Mvmt	NEL	NET	NERN	IWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	791	-	-	131	98	1019	-	-
HCM Lane V/C Ratio	0.003	-	-	0.671	0.082	0.116	-	-
HCM Control Delay (s)	9.6	0	-	75.8	45	9	0	-
HCM Lane LOS	А	А	-	F	Е	А	А	-
HCM 95th %tile Q(veh)	0	-	-	3.6	0.3	0.4	-	-

Intersection

	0.51	0 -T	055		N 13 A (TT				NED	014/	OWT	014/5
Movement	SEL	SET	SER	NWL	NWI	NWR	NEL	NET	NER	SWL	SWI	SWR
Lane Configurations		- 44			- 44			- 44			- 43	
Traffic Vol, veh/h	0	0	0	26	0	83	0	1031	31	31	364	1
Future Vol, veh/h	0	0	0	26	0	83	0	1031	31	31	364	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	25	0	18	0	6	4	7	5	0
Mvmt Flow	0	0	0	30	0	94	0	1172	35	35	414	1

Major/Minor	Minor2		1	Minor1		ſ	Major1			Major2			
Conflicting Flow All	1722	1692	415	1675	1675	1190	415	0	0	1207	0	0	
Stage 1	485	485	-	1190	1190	-	-	-	-	-	-	-	
Stage 2	1237	1207	-	485	485	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.35	6.5	6.38	4.1	-	-	4.17	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.725	4	3.462	2.2	-	-	2.263	-	-	
Pot Cap-1 Maneuver	71	94	642	67	96	212	1155	-	-	561	-	-	
Stage 1	567	555	-	206	263	-	-	-	-	-	-	-	
Stage 2	217	259	-	522	555	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	37	86	642	63	88	212	1155	-	-	561	-	-	
Mov Cap-2 Maneuver	· 37	86	-	63	88	-	-	-	-	-	-	-	
Stage 1	567	510	-	206	263	-	-	-	-	-	-	-	
Stage 2	120	259	-	480	510	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	0	117.5	0	0.9	
HCM LOS	А	F			

Minor Lane/Major Mvmt	NEL	NET	NERN	IWLn1 S	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1155	-	-	136	-	561	-	-
HCM Lane V/C Ratio	-	-	-	0.911	-	0.063	-	-
HCM Control Delay (s)	0	-	-	117.5	0	11.8	0	-
HCM Lane LOS	А	-	-	F	А	В	А	-
HCM 95th %tile Q(veh)	0	-	-	6.1	-	0.2	-	-

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Lane Configurations 🚯 🤂 🔂
Traffic Vol, veh/h 0 3 1 35 0 51 2 535 48 122 875
Future Vol, veh/h 0 3 1 35 0 51 2 535 48 122 875
Conflicting Peds, #/hr 1 0 2 2 0 1 0 0 0 0
Sign Control Stop Stop Stop Stop Stop Free Free Free Free Free F
RT Channelized None None None No
Storage Length
Veh in Median Storage, # - 0 0 0 0
Grade, % - 0 0 0 0
Peak Hour Factor 88 88 88 88 88 88 88 88 88 88 88 88 88
Heavy Vehicles, % 0 0 0 12 0 0 0 3 12 5 3
Mvmt Flow 0 3 1 40 0 58 2 608 55 139 994

Major/Minor	Minor2		1	Minor1		ľ	Major1		ľ	/lajor2			
Conflicting Flow All	1946	1943	1000	1920	1919	637	1001	0	0	663	0	0	
Stage 1	1276	1276	-	640	640	-	-	-	-	-	-	-	
Stage 2	670	667	-	1280	1279	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.22	6.5	6.2	4.1	-	-	4.15	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.608	4	3.3	2.2	-	-	2.245	-	-	
Pot Cap-1 Maneuver	49	66	298	48	68	481	700	-	-	912	-	-	
Stage 1	207	240	-	447	473	-	-	-	-	-	-	-	
Stage 2	450	460	-	194	239	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	31	43	297	~ 33	44	481	700	-	-	912	-	-	
Mov Cap-2 Maneuver	31	43	-	~ 33	44	-	-	-	-	-	-	-	
Stage 1	206	157	-	445	471	-	-	-	-	-	-	-	
Stage 2	393	458	-	124	157	-	-	-	-	-	-	-	
Annroach	SE			NI\//						SW			
HCM Control Doloy	76.2		¢	210.5						1.2			
HOM CONTINUE Delay, S	70.5		φ	310.5 F			0			1.2			
	Г			Г									
Minor Lane/Major Mvr	nt	NEL	NET	NERN	IWLn1 S	SELn1	SWL	SWT	SWR				
Canagity (yeh/h)		700			74	55	012						

Minor Lane/Major Wivmt	INEL	INET	INERINVLI	SELNI	SVVL	5001	SWR	
Capacity (veh/h)	700	-	- 74	4 55	912	-	-	
HCM Lane V/C Ratio	0.003	-	- 1.32′	0.083	0.152	-	-	
HCM Control Delay (s)	10.2	0	-\$ 310.5	5 76.3	9.7	0	-	
HCM Lane LOS	В	А	- F	F F	А	А	-	
HCM 95th %tile Q(veh)	0	-	- 7.7	7 0.3	0.5	-	-	
Notes								
~: Volume exceeds capacity	\$: De	lay exc	eeds 300s	+: Con	putatior	n Not D	efined	*: All major volume in platoon

Intersection

	0.51	0 -T	055		N 13 A (TT				NED	014/	014/T	014/5
Movement	SEL	SET	SER	NWL	NWI	NWR	NEL	NET	NER	SWL	SWI	SWR
Lane Configurations		- 44			- 44			- 🕀			- 43	
Traffic Vol, veh/h	0	0	0	26	0	83	0	1031	31	31	364	1
Future Vol, veh/h	0	0	0	26	0	83	0	1031	31	31	364	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	25	0	18	0	6	4	7	5	0
Mvmt Flow	0	0	0	30	0	94	0	1172	35	35	414	1

Major/Minor	Minor2		1	Minor1		ſ	Major1			Major2			
Conflicting Flow All	1722	1692	415	1675	1675	1190	415	0	0	1207	0	0	
Stage 1	485	485	-	1190	1190	-	-	-	-	-	-	-	
Stage 2	1237	1207	-	485	485	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.35	6.5	6.38	4.1	-	-	4.17	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.725	4	3.462	2.2	-	-	2.263	-	-	
Pot Cap-1 Maneuver	71	94	642	67	96	212	1155	-	-	561	-	-	
Stage 1	567	555	-	206	263	-	-	-	-	-	-	-	
Stage 2	217	259	-	522	555	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	37	86	642	63	88	212	1155	-	-	561	-	-	
Mov Cap-2 Maneuver	· 37	86	-	63	88	-	-	-	-	-	-	-	
Stage 1	567	510	-	206	263	-	-	-	-	-	-	-	
Stage 2	120	259	-	480	510	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	0	117.5	0	0.9	
HCM LOS	А	F			

Minor Lane/Major Mvmt	NEL	NET	NERN	IWLn1 \$	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1155	-	-	136	-	561	-	-
HCM Lane V/C Ratio	-	-	-	0.911	-	0.063	-	-
HCM Control Delay (s)	0	-	-	117.5	0	11.8	0	-
HCM Lane LOS	А	-	-	F	А	В	А	-
HCM 95th %tile Q(veh)	0	-	-	6.1	-	0.2	-	-

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Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		- 🗘			- 🗘			- 44			- 🗘	
Traffic Vol, veh/h	0	3	1	43	0	59	2	535	56	130	875	6
Future Vol, veh/h	0	3	1	43	0	59	2	535	56	130	875	6
Conflicting Peds, #/hr	1	0	2	2	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage	, # -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	12	0	0	0	3	12	5	3	0
Mvmt Flow	0	3	1	49	0	67	2	608	64	148	994	7

Major/Minor	Minor2		1	Minor1		ľ	/lajor1		1	Major2			
Conflicting Flow All	1973	1970	1000	1942	1941	641	1001	0	0	672	0	0	
Stage 1	1294	1294	-	644	644	-	-	-	-	-	-	-	
Stage 2	679	676	-	1298	1297	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.22	6.5	6.2	4.1	-	-	4.15	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.608	4	3.3	2.2	-	-	2.245	-	-	
Pot Cap-1 Maneuver	47	63	298	~ 46	66	478	700	-	-	905	-	-	
Stage 1	202	235	-	445	471	-	-	-	-	-	-	-	
Stage 2	445	456	-	189	234	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	29	40	297	~ 31	41	478	700	-	-	905	-	-	
Mov Cap-2 Maneuver	29	40	-	~ 31	41	-	-	-	-	-	-	-	
Stage 1	201	148	-	443	469	-	-	-	-	-	-	-	
Stage 2	380	454	-	116	148	-	-	-	-	-	-	-	
Approach	SE			NW			NE			SW			
HCM Control Delay, s	82.4		\$	472.9			0			1.3			
HCM LOS	F			F									
	1						014/						

Minor Lane/Major Mvmt	NEL	NET	NERN	WLn1	SELn1	SWL	SWT	SWR	
Capacity (veh/h)	700	-	-	68	51	905	-	-	
HCM Lane V/C Ratio	0.003	-	-	1.705	0.089	0.163	-	-	
HCM Control Delay (s)	10.2	0	-\$	472.9	82.4	9.8	0	-	
HCM Lane LOS	В	А	-	F	F	А	А	-	
HCM 95th %tile Q(veh)	0	-	-	10.2	0.3	0.6	-	-	
Notes									
~: Volume exceeds capacity	\$: De	lay exc	eeds 30)0s	+: Com	putation	Not D	efined	*: All major volume in platoon

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Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	0	0	0	20	0	66	0	612	24	27	201	1
Future Vol, veh/h	0	0	0	20	0	66	0	612	24	27	201	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control S	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	£ _	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	77	77	77	90	90	90	76	76	76
Heavy Vehicles, %	0	0	0	25	0	18	0	6	4	7	5	0
Mvmt Flow	0	0	0	26	0	86	0	680	27	36	264	1

Major/Minor	Minor2		I	Vinor1		I	Major1		N	Major2			
Conflicting Flow All	1074	1044	265	1031	1031	694	265	0	0	707	0	0	
Stage 1	337	337	-	694	694	-	-	-	-	-	-	-	
Stage 2	737	707	-	337	337	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.35	6.5	6.38	4.1	-	-	4.17	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.725	4	3.462	2.2	-	-	2.263	-	-	
Pot Cap-1 Maneuver	199	231	779	192	235	417	1311	-	-	869	-	-	
Stage 1	681	645	-	398	447	-	-	-	-	-	-	-	
Stage 2	413	441	-	632	645	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	152	220	779	185	223	417	1311	-	-	869	-	-	
Mov Cap-2 Maneuver	· 152	220	-	185	223	-	-	-	-	-	-	-	
Stage 1	681	613	-	398	447	-	-	-	-	-	-	-	
Stage 2	328	441	-	601	613	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	0	21.9	0	1.1	
HCM LOS	А	С			

Minor Lane/Major Mvmt	NEL	NET	NERN	IWLn1 S	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1311	-	-	323	-	869	-	-
HCM Lane V/C Ratio	-	-	-	0.346	-	0.041	-	-
HCM Control Delay (s)	0	-	-	21.9	0	9.3	0	-
HCM Lane LOS	А	-	-	С	Α	Α	А	-
HCM 95th %tile Q(veh)	0	-	-	1.5	-	0.1	-	-

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Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		\$			÷			÷			÷	
Traffic Vol, veh/h	0	3	1	26	0	39	2	303	42	108	518	5
Future Vol, veh/h	0	3	1	26	0	39	2	303	42	108	518	5
Conflicting Peds, #/hr	1	0	2	2	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	74	74	74	93	93	93	91	91	91
Heavy Vehicles, %	0	0	0	12	0	0	0	3	12	5	3	0
Mvmt Flow	0	6	2	35	0	53	2	326	45	119	569	5

Major/Minor	Minor2		1	Minor1		N	Major1		N	Major2			
Conflicting Flow All	1190	1185	574	1169	1165	350	574	0	0	371	0	0	
Stage 1	810	810	-	353	353	-	-	-	-	-	-	-	
Stage 2	380	375	-	816	812	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.22	6.5	6.2	4.1	-	-	4.15	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.608	4	3.3	2.2	-	-	2.245	-	-	
Pot Cap-1 Maneuver	166	191	522	162	196	698	1009	-	-	1171	-	-	
Stage 1	377	396	-	644	634	-	-	-	-	-	-	-	
Stage 2	646	621	-	357	395	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	135	162	521	138	166	697	1009	-	-	1171	-	-	
Mov Cap-2 Maneuver	135	162	-	138	166	-	-	-	-	-	-	-	
Stage 1	376	337	-	642	632	-	-	-	-	-	-	-	
Stage 2	595	619	-	297	336	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	24.1	25.1	0	1.4	
HCM LOS	С	D			

Minor Lane/Major Mvmt	NEL	NET	NERN	WLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1009	-	-	266	196	1171	-	-
HCM Lane V/C Ratio	0.002	-	-	0.33	0.041	0.101	-	-
HCM Control Delay (s)	8.6	0	-	25.1	24.1	8.4	0	-
HCM Lane LOS	А	А	-	D	С	Α	А	-
HCM 95th %tile Q(veh)	0	-	-	1.4	0.1	0.3	-	-

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			v	10	v	v	u	v		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	0	0	0	26	0	83	0	693	31	31	252	1
Future Vol, veh/h	0	0	0	26	0	83	0	693	31	31	252	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage	,# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	25	0	18	0	6	4	7	5	0
Mvmt Flow	0	0	0	30	0	94	0	788	35	35	286	1

Major/Minor	Minor2			Vinor1		ľ	Major1			Major2			
Conflicting Flow All	1210	1180	287	1163	1163	806	287	0	0	823	0	0	
Stage 1	357	357	-	806	806	-	-	-	-	-	-	-	
Stage 2	853	823	-	357	357	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.35	6.5	6.38	4.1	-	-	4.17	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.725	4	3.462	2.2	-	-	2.263	-	-	
Pot Cap-1 Maneuver	161	192	757	155	196	358	1287	-	-	785	-	-	
Stage 1	665	632	-	344	398	-	-	-	-	-	-	-	
Stage 2	357	391	-	616	632	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	· 114	182	757	149	186	358	1287	-	-	785	-	-	
Mov Cap-2 Maneuver	· 114	182	-	149	186	-	-	-	-	-	-	-	
Stage 1	665	599	-	344	398	-	-	-	-	-	-	-	
Stage 2	263	391	-	583	599	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	0	29.5	0	1.1	
HCM LOS	A	D			

Minor Lane/Major Mvmt	NEL	NET	NERN	IWLn1 S	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1287	-	-	268	-	785	-	-
HCM Lane V/C Ratio	-	-	-	0.462	-	0.045	-	-
HCM Control Delay (s)	0	-	-	29.5	0	9.8	0	-
HCM Lane LOS	А	-	-	D	Α	Α	А	-
HCM 95th %tile Q(veh)	0	-	-	2.3	-	0.1	-	-

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Int Delay, s/veh

Movement SEL SET SER NWL NWR NEL NET NER SWL SWT SWR Lane Configurations Image: Configuration in the im
Lane Configurations Image: Configuration in the image: Configuration
Traffic Vol, veh/h 0 3 1 35 0 51 2 367 48 122 589 6 Future Vol, veh/h 0 3 1 35 0 51 2 367 48 122 589 6 Conflicting Peds, #/hr 1 0 2 2 0 1 0 1 0 0 0 0
Future Vol, veh/h 0 3 1 35 0 51 2 367 48 122 589 6 Conflicting Peds, #/hr 1 0 2 2 0 1 0
Conflicting Peds, #/hr 1 0 2 2 0 1 0
Sign Control Stop Stop Stop Stop Stop Stop Stop Free
RT Channelized - - None - - None - - None - - None
Storage Length -
Veh in Median Storage, # - 0 0 0 0 -
Grade, % - 0 0 0 0 -
Peak Hour Factor 88 88 88 88 88 88 88 88 88 88 88 88 88
Heavy Vehicles, % 0 0 0 12 0 0 0 3 12 5 3 0
Mvmt Flow 0 3 1 40 0 58 2 417 55 139 669 7

Major/Minor	Minor2		l	Minor1		Ν	/lajor1		Ν	lajor2			
Conflicting Flow All	1430	1427	675	1404	1403	446	676	0	0	472	0	0	
Stage 1	951	951	-	449	449	-	-	-	-	-	-	-	
Stage 2	479	476	-	955	954	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.22	6.5	6.2	4.1	-	-	4.15	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.608	4	3.3	2.2	-	-	2.245	-	-	
Pot Cap-1 Maneuver	113	136	457	111	141	617	925	-	-	1074	-	-	
Stage 1	315	341	-	570	576	-	-	-	-	-	-	-	
Stage 2	571	560	-	298	340	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	- 86	107	456	90	111	616	925	-	-	1074	-	-	
Mov Cap-2 Maneuver	- 86	107	-	90	111	-	-	-	-	-	-	-	
Stage 1	314	270	-	568	574	-	-	-	-	-	-	-	
Stage 2	515	558	-	232	269	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	33.2	45.6	0	1.5	
HCM LOS	D	E			

Minor Lane/Major Mvmt	NEL	NET	NERN	WLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	925	-	-	182	132	1074	-	-
HCM Lane V/C Ratio	0.002	-	-	0.537	0.034	0.129	-	-
HCM Control Delay (s)	8.9	0	-	45.6	33.2	8.8	0	-
HCM Lane LOS	А	А	-	E	D	А	А	-
HCM 95th %tile Q(veh)	0	-	-	2.8	0.1	0.4	-	-

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Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NÉR	SWL	SWT	SWR
Lane Configurations		- 🗘			- 🗘			- 🗘			- 🗘	
Traffic Vol, veh/h	0	0	0	26	0	83	0	693	31	31	252	1
Future Vol, veh/h	0	0	0	26	0	83	0	693	31	31	252	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage	, # -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	25	0	18	0	6	4	7	5	0
Mvmt Flow	0	0	0	30	0	94	0	788	35	35	286	1

Major/Minor	Minor2			Vinor1		ľ	Major1			Major2			
Conflicting Flow All	1210	1180	287	1163	1163	806	287	0	0	823	0	0	
Stage 1	357	357	-	806	806	-	-	-	-	-	-	-	
Stage 2	853	823	-	357	357	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.35	6.5	6.38	4.1	-	-	4.17	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.35	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.725	4	3.462	2.2	-	-	2.263	-	-	
Pot Cap-1 Maneuver	161	192	757	155	196	358	1287	-	-	785	-	-	
Stage 1	665	632	-	344	398	-	-	-	-	-	-	-	
Stage 2	357	391	-	616	632	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	· 114	182	757	149	186	358	1287	-	-	785	-	-	
Mov Cap-2 Maneuver	· 114	182	-	149	186	-	-	-	-	-	-	-	
Stage 1	665	599	-	344	398	-	-	-	-	-	-	-	
Stage 2	263	391	-	583	599	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	0	29.5	0	1.1	
HCM LOS	А	D			

Minor Lane/Major Mvmt	NEL	NET	NERN	IWLn1 S	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1287	-	-	268	-	785	-	-
HCM Lane V/C Ratio	-	-	-	0.462	-	0.045	-	-
HCM Control Delay (s)	0	-	-	29.5	0	9.8	0	-
HCM Lane LOS	А	-	-	D	Α	Α	А	-
HCM 95th %tile Q(veh)	0	-	-	2.3	-	0.1	-	-

6

Intersection

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		\$			\$			\$			÷	
Traffic Vol, veh/h	0	3	1	43	0	59	2	367	56	130	589	6
Future Vol, veh/h	0	3	1	43	0	59	2	367	56	130	589	6
Conflicting Peds, #/hr	1	0	2	2	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	4 -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	12	0	0	0	3	12	5	3	0
Mvmt Flow	0	3	1	49	0	67	2	417	64	148	669	7

Major/Minor	Minor2		I	Vinor1		Ν	1ajor1		Ν	lajor2			
Conflicting Flow All	1457	1454	675	1426	1425	450	676	0	0	481	0	0	
Stage 1	969	969	-	453	453	-	-	-	-	-	-	-	
Stage 2	488	485	-	973	972	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.22	6.5	6.2	4.1	-	-	4.15	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.22	5.5	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.608	4	3.3	2.2	-	-	2.245	-	-	
Pot Cap-1 Maneuver	109	131	457	107	137	613	925	-	-	1066	-	-	
Stage 1	307	334	-	568	573	-	-	-	-	-	-	-	
Stage 2	565	555	-	291	333	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	80	102	456	86	106	612	925	-	-	1066	-	-	
Mov Cap-2 Maneuver	80	102	-	86	106	-	-	-	-	-	-	-	
Stage 1	306	260	-	566	571	-	-	-	-	-	-	-	
Stage 2	501	553	-	222	259	-	-	-	-	-	-	-	

Approach	SE	NW	NE	SW	
HCM Control Delay, s	34.4	61.6	0	1.6	
HCM LOS	D	F			

Minor Lane/Major Mvmt	NEL	NET	NERN	IWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	925	-	-	171	127	1066	-	-
HCM Lane V/C Ratio	0.002	-	-	0.678	0.036	0.139	-	-
HCM Control Delay (s)	8.9	0	-	61.6	34.4	8.9	0	-
HCM Lane LOS	А	А	-	F	D	А	А	-
HCM 95th %tile Q(veh)	0	-	-	4	0.1	0.5	-	-



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