TRANSPORTATION ENGINEERS & PLANNERS

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MEMORANDUM

TO: Travis Ahern

FROM: Robert Smith, P.E.
Michael Pompili, EIT

DATE: April 28, 2022

RE: Traffic Assessment
Highland Street Traffic Operations and Safety
Holliston, MA

McMahon Associates has completed an assessment of traffic operations and pedestrian accommodations for Highland Street in the vicinity of Holliston High School, including the intersections of Highland Street at Prentice Street and Highland Street at Hollis Street. This assessment evaluates existing vehicular and pedestrian conditions, available sight distance, and existing traffic operations within the study area. Based on the findings of the assessment, recommendations were developed for improvements to intersection geometry and traffic control. The study area is depicted graphically in Figure 1.

Study Area Roadway Network

Highland Street generally extends in a north-south direction through the Town of Holliston and is classified as an urban minor arterial under Town jurisdiction. Within the study area, Highland Street provides one travel lane measuring approximately 12 feet wide in each direction. Asphalt sidewalks measuring between five and six feet wide are provided along the east side of Highland Street south of Prentice Street and north of Hollis Street. There are no existing bicycle facilities along Highland Street in the vicinity of the study area. A speed limit of 40 miles per hour (mph) is posted on Highland Street northbound approaching the study area, which reduces to 25 mph approximately 300 feet south of the Prentice Street intersection. Similarly, a speed limit of 40 mph is posted on Highland Street southbound, which reduces to 25 mph approximately 500 feet north of the Hollis Street intersection. Regulatory speed limits on Highland Street are supported by MassDOT Special Speed Regulation No. 822, approved in 1973. Posted speed limits on Highland Street are supplemented with flashing 20 mph school speed limit signs in both directions in the vicinity of Holliston High School; however, under current MassDOT guidelines, 20 mph school speed limits are only permitted in the vicinity of schools which includes grades 1 through 8.

Prentice Street generally extends in an east-west direction through the Town of Holliston and is classified as an urban minor arterial under Town jurisdiction. In the vicinity of its intersection with Highland Street, Prentice Street provides one eastbound travel lane measuring 16 feet wide which widens to approximately 32 feet at the intersection with Highland Street. In the westbound direction, Prentice Street provides one 14-foot-wide travel lane. No bicycle facilities are provided on Prentice Street nearing its intersection with Highland Street. A speed

limit of 35 mph is posted on eastbound Prentice Street approaching the study area, which reduces to 25 mph approximately 300 feet west of the Highland Street intersection. Regulatory speed limits on Prentice Street are supported by MassDOT Special Speed Regulation No. 920, approved in 1974. In addition, a flashing 20 mph school speed limit sign is posted along eastbound Prentice Street approaching the Highland Street intersection. As previously noted, 20 mph school zone speed limits are only permitted in the vicinity of schools which includes grades 1 through 8 under current MassDOT guidelines.

Hollis Street generally extends in a northwest-southeast direction between Highland Street and Washington Street (Routes 16/126) in the Town of Holliston and is classified as an urban minor arterial under Town jurisdiction. Hollis Street generally provides one 14-foot-wide travel lane in each direction and widens to provide one 18-foot-wide westbound left-turn lane and a channelized 12-foot-wide westbound right-turn lane at its intersection with Highland Street. No bicycle facilities are provided on Hollis Street. A speed limit of 35 mph is posted on westbound Hollis Street approaching the study area, which reduces to 30 mph approximately 1,200 feet east of the Highland Street intersection. Regulatory speed limits on Hollis Street are supported by MassDOT Special Speed Regulation No. 920, approved in 1974. In addition, a flashing 20 mph school speed limit sign is posted along westbound Hollis Street approaching the Highland Street intersection. As previously noted, 20 mph school zone speed limits are only permitted in the vicinity of schools which includes grades 1 through 8 under current MassDOT guidelines.

Pedestrian Accommodations

In the vicinity of the study area, an asphalt sidewalk measuring approximately six feet wide extends along the eastern side of Highland Street south of Prentice Street. Between Prentice Street and Hollis Street, no sidewalks are provided along either side of Highland Street. North of Hollis Street, an asphalt sidewalk measuring approximately five feet wide extends along the eastern side of Highland Street.

A five-foot-wide asphalt sidewalk extends along the south side of Prentice Street from its intersection with Highland Street. No sidewalks or other pedestrian accommodations are provided on the north side of Prentice Street in the vicinity of its intersection with Highland Street.

In the vicinity of the study area, an asphalt sidewalk measuring approximately five feet wide extends along the northern side of Hollis Street to its intersection with Highland Street. Approximately 550 feet east of the intersection of Highland Street and Hollis Street, an uncontrolled mid-block crosswalk is provided across Hollis Street to connect the sidewalk on the northern side of the roadway to Holliston High School. This crosswalk is painted red and is not striped for high visibility. Wheelchair ramps at both ends of the crosswalk are asphalt, lack detectable warning panels, and are not ADA-compliant. S2-1 School Crossing signs with crosswalk lines, which do not meet current MUTCD or MassDOT standards, are provided at the crosswalk facing the eastbound and westbound Hollis Street approaches. No advance warning signs are provided along Hollis Street approaching the crosswalk.

At the intersection of Highland Street and Prentice Street, a crosswalk measuring approximately 60 feet long spans the southern leg of the intersection. The crosswalk is painted red and is not striped for high visibility. The crosswalk is accompanied by W11A-2 Pedestrian Crossing signs with crosswalk lines, which do not meet current MUTCD and MassDOT standards, and W16-7P diagonal downward arrows, supplemented by Rectangular Rapid-Flashing Beacons (RRFBs) on both sides of the roadway facing both the northbound and southbound Highland Street approaches. No advance warning signs are provided approaching the crosswalk. An asphalt wheelchair ramp lacking a detectable warning panel is provided at the western end of the crosswalk, and a cement concrete wheelchair ramp with a detectible warning panel is provided at the eastern end of the crosswalk. The eastern wheelchair ramp appears to be compliant with the Americans with Disabilities Act (ADA). No other crosswalks are provided at the intersection.

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Figure 1
Site Location Map
Highland Street Traffic Operations and Safety
Holliston, Massachusetts

Existing Traffic Volumes

Daily Traffic Volumes and Speed

Based on a 24-hour automatic traffic recorder (ATR) count conducted on Tuesday, December 7, 2021, Highland Street carries an unadjusted volume of approximately 10,700 vehicles per day (vpd) (approximately 5,200 vpd northbound and approximately 5,500 vpd southbound). The 85th percentile speed on Highland Street was found to be 33 mph in both the northbound and southbound directions. The results of the ATR are summarized in Table 1.

Table 1: Existing Traffic Volume Summary

Roadway	Direction	Daily Volume[1]	AM Peak[2]	School Peak[3]	PM Peak[4]	85th Percentile Speed
Highland Street	Northbound	5,200	670	360	290	33 mph
	Southbound	5,500	350	670	500	33 mph
	Combined	10,700	1,020	1,030	790	33 mph

1 Daily volume in vehicles per day.

2 AM peak hour volume in vehicles. The AM peak hour occurs between 7:15 AM and 8:15 AM.

3 PM school dismissal peak hour volume in vehicles. The school dismissal peak hour occurs between 2:45 PM and 3:45 PM.

4 PM commuter peak hour volume in vehicles. The PM peak hour occurs between 3:30 PM and 4:30 PM.

Peak Hour Traffic Volumes

Manual turning movement counts (MTMC) were collected at the study area intersections on Tuesday, December 7, 2021. The MTMCs were collected while public schools, including the adjacent Holliston High School, were in session with full in-person learning. The MTMCs were conducted for a 12-hour period, from 7:00 AM to 7:00 PM. The traffic counts are summarized in 15-minute intervals and are provided as an attachment to this report.

The four highest consecutive 15-minute intervals of combined traffic within the study area during the peak periods constitutes as the peak hour for the study area network. Based on the count data, the weekday morning peak hour was identified to occur from 7:15 AM to 8:15 AM. Due to a high volume of traffic activity at Holliston High School following dismissal at 2:43 PM, separate weekday afternoon school dismissal peak (2:45 PM to 3:45 PM) and commuter peak (3:30 PM to 4:30 PM) hours were identified.

Seasonal Adjustment

Based on the available 2019 MassDOT seasonal adjustment factors, volumes in December are approximately 4 percent below an average month. To account for this variation, the counted peak hour traffic volumes were adjusted upward by 4 percent. The seasonally-adjusted December 2021 counts were considered to be representative of 2022 existing conditions. The resulting weekday morning, weekday afternoon school dismissal, and weekday afternoon commuter peak hour traffic volumes are shown in Figures 2, 3, and 4, respectively.

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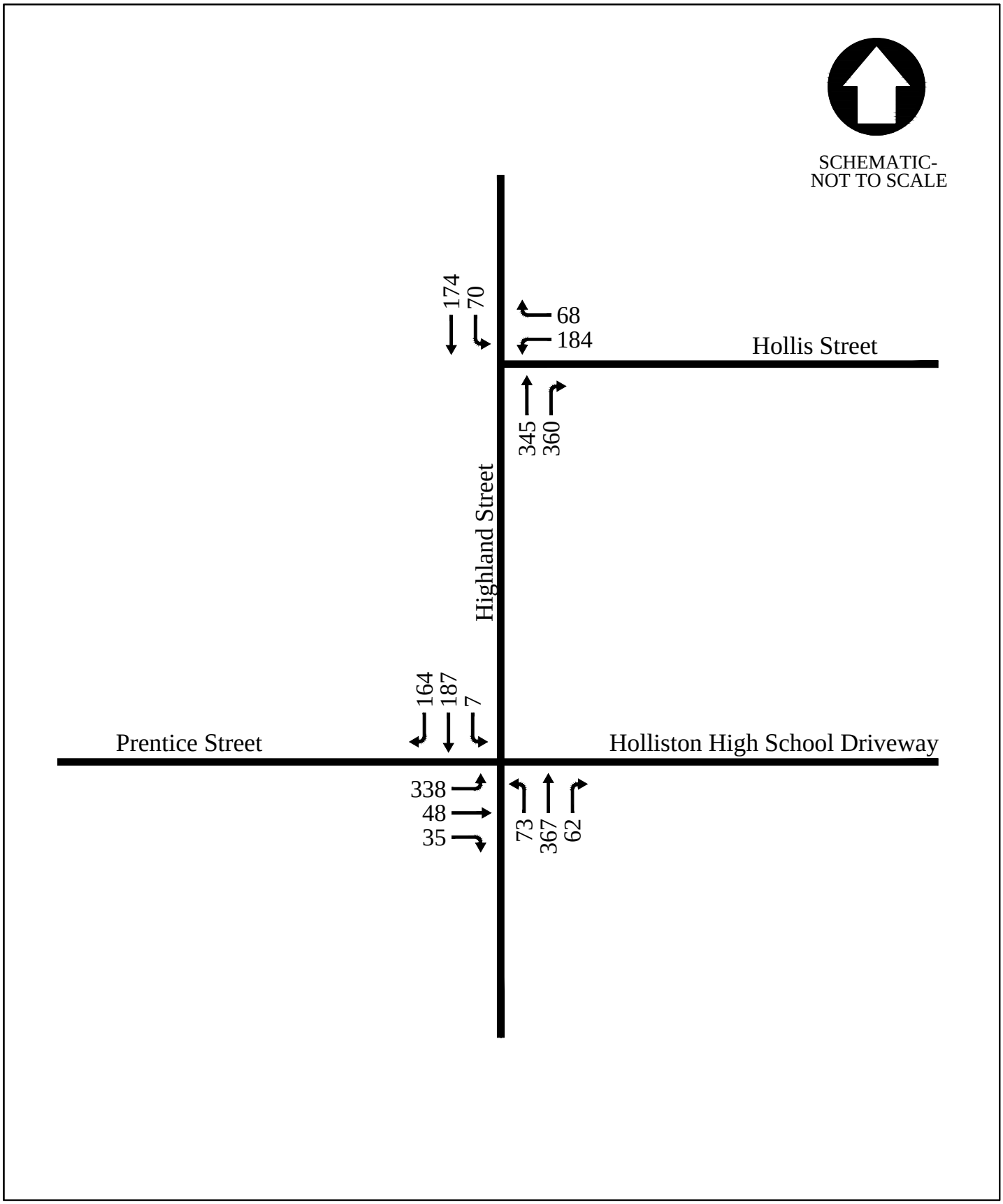

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Figure 2
Weekday Morning
Peak Hour Traffic Volumes
Highland Street Traffic Operations and Safety
Holliston, Massachusetts

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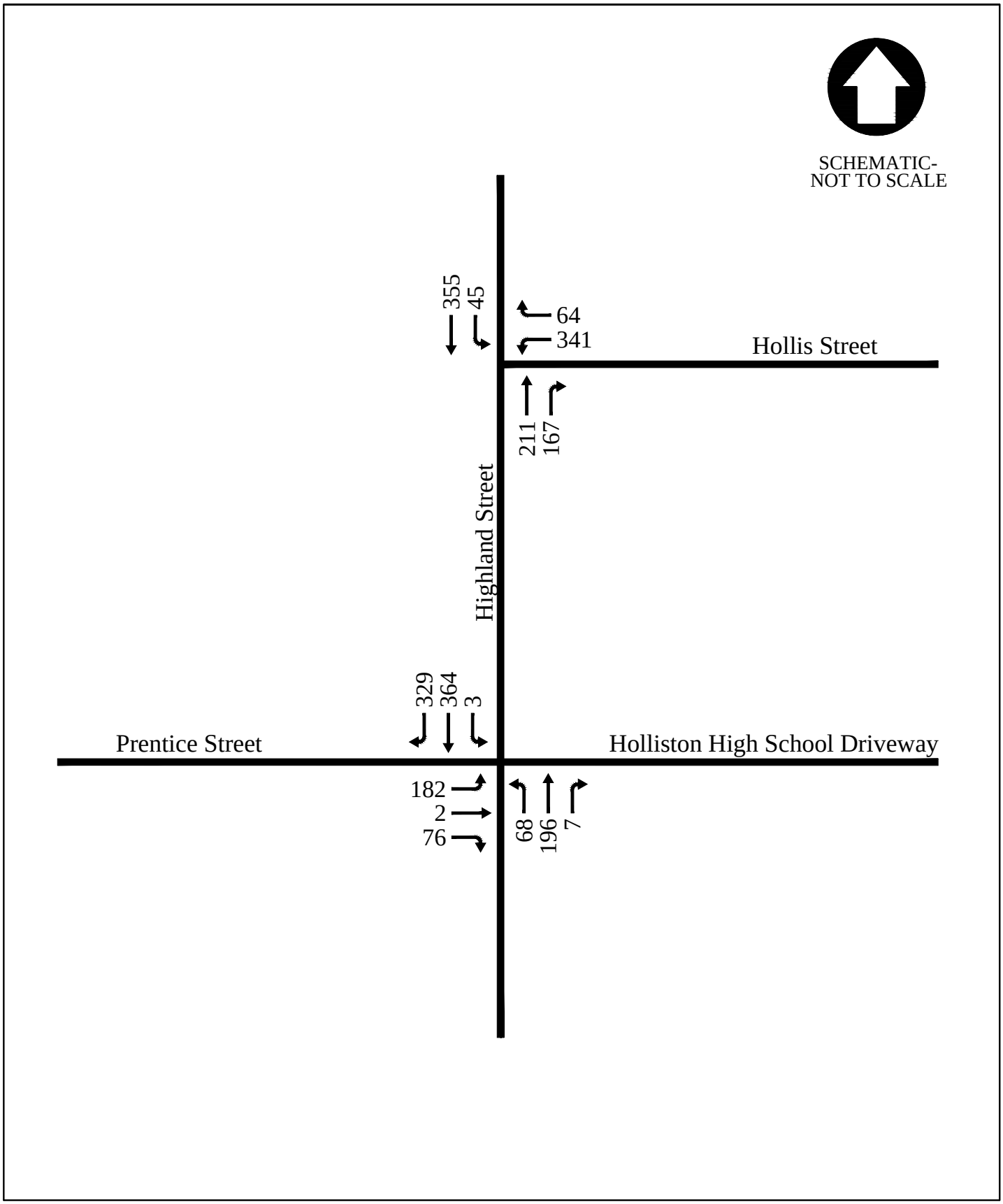

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Figure 3
Weekday Afternoon School Dismissal
Peak Hour Traffic Volumes
Highland Street Traffic Operations and Safety
Holliston, Massachusetts

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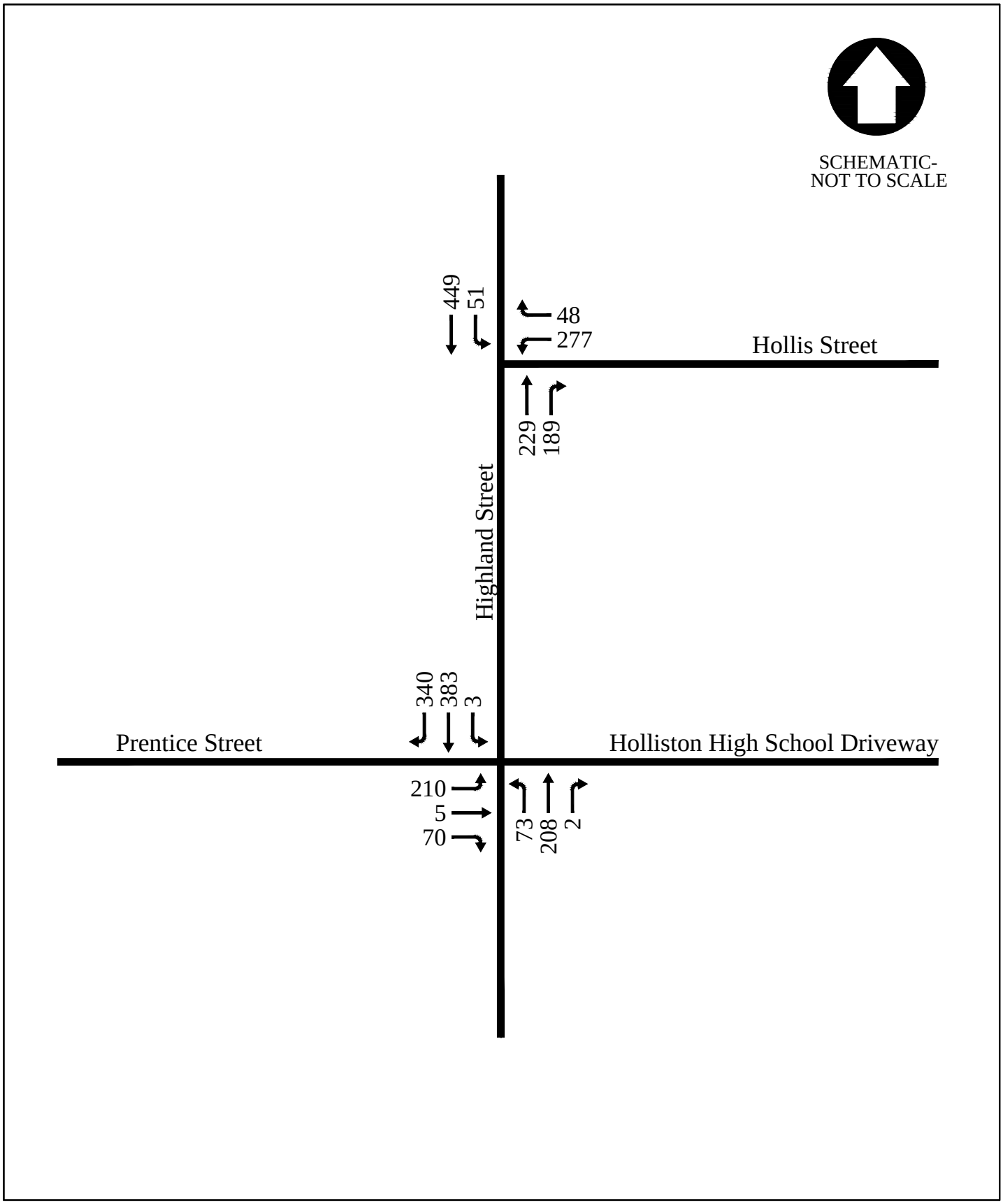

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Figure 4
Weekday Afternoon Commuter
Peak Hour Traffic Volumes
Highland Street Traffic Operations and Safety
Holliston, Massachusetts

Gap Acceptance Study

A gap acceptance study was performed at the intersections of Highland Street at Prentice Street and Highland Street at Hollis Street during the weekday morning peak hour (7:15 AM – 8:15 AM) on Thursday, January 6, 2022 to determine the typical gap accepted by vehicles turning onto Highland Street from the STOP sign controlled minor street approaches. A summary of the data collected during the field visit is provided as an attachment to this memorandum.

Based on the data collected during the field visit, the critical gap for right-turning vehicles from Prentice Street was measured to be approximately 6.3 seconds, and the critical gap for left-turning vehicles was measured to be approximately 5.1 seconds. The critical gap for right-turning vehicles from Hollis Street was measured to be approximately 9.8 seconds, and the critical gap for left-turning vehicles was measured to be approximately 8.2 seconds. The gap acceptance study results were used to calibrate the traffic operations analysis, which is described in more detail below.

Traffic Operations Analysis

Intersection capacity analysis was conducted using Synchro capacity analysis software and SimTraffic microscopic simulation for the study area intersections to evaluate the 2022 Existing traffic conditions during the weekday morning, weekday afternoon school dismissal, and weekday afternoon commuter peak hours. Synchro is a macroscopic traffic model which calculates traffic operations and measures of effectiveness (MOEs) based on mathematical equations presented in the *Highway Capacity Manual* (HCM). SimTraffic is a microscopic model used to simulate traffic operations, in which each vehicle in the traffic system is individually tracked through the model and comprehensive operational measures of effectiveness are collected on every vehicle during each tenth of a second during the simulation. Additionally, while Synchro analyzes each intersection as an independent node free of influence from the larger traffic network, SimTraffic measures the full impact of queuing and blocking from adjacent intersections. Due to the proximity of the study intersections to each other and the potential for queues at one intersection to impact operations at the other, SimTraffic was used to measure MOEs of existing and proposed conditions for this study.

Average delays per vehicle recorded by the SimTraffic model were converted to operating Levels of Service (LOS) based on the thresholds contained in the HCM. LOS is reported on a scale of A to F, with A representing the best conditions (with little or no delay) and F representing the worst operating conditions (long delays and over-capacity conditions). The HCM LOS methodology and SimTraffic capacity analysis results are presented as an attachment to this memorandum. A summary of the capacity analysis under 2022 Existing conditions is provided in Table 2 below.

Table 2: 2022 Existing Capacity Analysis Results

Intersection	Movement		Weekday Morning Peak Hour LOS[1]	Delay[2]	Queue[3]	Weekday Afternoon School Dismissal LOS	Delay	Queue	Weekday Afternoon Commuter Peak Hour LOS	Delay	Queue
Highland Street at	EB	LTR	F	217.8	1293	E	37.0	242	F	219.3	1049
Prentice Street	NB	LTR	A	2.6	80	A	5.3	84	C	15.4	270
	SB	LTR	A	1.6	18	A	2.3	31	A	2.4	58
Highland Street at	WB	LR	C	23.3	186	F	68.8	808	D	30.7	295
Hollis Street	NB	TR	A	4.6	60	A	3.2	11	A	3.6	28
	SB	LT	A	2.4	93	A	1.2	56	A	1.7	109

1 Level-of-Service

2 Average vehicle delay, in seconds

3 95th Percentile queue length, in feet

Based on the results of the SimTraffic analysis, the STOP sign controlled eastbound Prentice Street approach at its intersection with Highland Street is shown to operate at LOS F during the weekday morning and weekday afternoon commuter peak hours, and at LOS E during the weekday afternoon school dismissal peak hour, with simulated queues extending nearly a quarter mile during the weekday morning peak hour. The northbound Highland Street approach is shown to operate at LOS A with minimal queueing during the weekday morning and weekday afternoon school dismissal peak hours due to the lack of traffic control along Highland Street. During the weekday afternoon commuter peak hour, the northbound Highland Street approach operates at LOS C due to occasional blocking of through traffic by a vehicle stopped to turn left into Prentice Street, with queues extending up to approximately 270 feet (11 vehicles). The southbound Highland Street approach is shown to operate at LOS A with minimal queuing during all three peak hours reviewed. Similarly, at the intersection of Highland Street and Hollis Street, the STOP sign controlled westbound Hollis Street approach was shown to operate at LOS C during the weekday morning and weekday afternoon commuter peak hours, and at LOS F during the weekday afternoon school dismissal peak hour due to heavy demand after dismissal at Holliston High School, with queues extending up to approximately 800 feet during the school dismissal period. The northbound and southbound Highland Street approaches to the intersection were shown to operate at LOS A during all three peak hours reviewed due to the lack of traffic control on Highland Street. Queues along the southbound Highland Street approach at Hollis Street were found to extend up to 109 feet (approximately 5 vehicles) due to occasional blocking of through traffic by a vehicle stopped to turn left into Hollis Street.

Sight Distance Review

A field review of sight distance was conducted at the intersections of Highland Street at Prentice Street and Highland Street at Hollis Street. The American Association of State Highway and Transportation Officials (AASHTO) publication, *A Policy on Geometric Design, 2018 Edition*, defines the minimum sight distance at intersections based on the required stopping sight distance (SSD) for vehicles traveling along the main roadway for a given speed. Table 3 summarizes the AASHTO sight distance standards for the 85th percentile speeds on Highland Street and the available sight distance measured at the intersections.

Table 3: Sight Distance Summary

Location	Looking	Speed Limit (mph)	85th % Speed (mph)	SSD[1] Required	ISD[2] Recommended	Sight Distance Measured	Meets Required SSD?	Meets Recommended ISD?
Prentice Street	Left (North)	25	33	230	320	523	Yes	Yes
	Right (South)	25	33	230	365	>610	Yes	Yes
Hollis Street Left-Turn Lane	Left (South)	25	33	230	320	285	Yes	No
	Right (North)	25	33	230	365	316	Yes	No
Hollis Street Right-Turn Lane	Left (South)	25	33	230	320	344	Yes	Yes

1 Stopping sight distance (see AASHTO equations 3-2 and 3-3) for the 85th percentile speed.

2 Intersection sight distance (see AASHTO equations 9-1 and 9-2) for the 85th percentile speeds.

Based on the field review and as shown in Table 3 above, the available intersection sight distances looking left and right for left turns from westbound Hollis Street onto Highland Street do not meet AASHTO guidelines based on the 85th percentile operating speed of 33 mph on Highland Street, indicating a potential risk for angle crashes as turning vehicles on Hollis Street do not have sufficient visibility to identify safe gaps in the traffic stream on Highland Street. However, the AASHTO minimum stopping sight distance for vehicles on Highland Street is met, indicating that approaching vehicles on northbound and southbound Highland Street have sufficient visibility approaching the Hollis Street intersection to reduce speed or stop if a vehicle enters the intersection from Hollis Street. AASHTO recommended intersection sight distances are met for the channelized right turn from Hollis Street to Highland Street, and on the eastbound Prentice Street approach to Highland Street.

Planned Roadway Improvements

The Town of Holliston's five-year Complete Streets Prioritization Plan, approved by MassDOT in October 2021, identifies three potential future projects to improve pedestrian and bicycle accommodations within or in the vicinity of the study area. Based on conversations with the Town, there are currently no engineered design plans or funding available to complete these improvements.

- **Prentice Street Pedestrian, ADA and Bicycle Safety and Mobility Improvements:** Widen Prentice Street 8 feet for an 8-foot-wide shared use path on the north side of Prentice Street from Ash Street to Highland Street (1.8 miles).
- **Hollis Street Sidewalk Pedestrian Connection and Safety Improvements at Holliston High School:** Construct a 5-foot HMA sidewalk with bituminous curb and install ADA-compliant curb ramps between 375 Hollis Street and the east High School entrance (400 linear feet); extend current sidewalk on the south side of Hollis Street east of Mellen Street with 5-foot HMA sidewalk and bituminous curb to the crosswalk at Mellen Street and install ADA-compliant ramps (175 linear feet); upgrade both current crosswalks to high visibility ladder style; add Rectangular Rapid Flashing Beacons (RRFBs).
- **Hollis Street at Highland Street Pedestrian Safety and ADA Improvements:** Install high visibility crosswalks and ADA-compliant curb ramps across Hollis Street at the Highland Street and Hollis Street intersection.

Short-Term Operational Improvements

Traffic Control

To reduce delays and queueing on the STOP sign controlled Prentice Street and Hollis Street approaches at Highland Street, to reduce overall vehicle speeds through the study area, and to address limited intersection sight distance at the Highland Street at Hollis Street intersection, McMahon analyzed the effect of implementing all-way STOP sign control at the study area intersections. To determine if all-way STOP sign control would be appropriate at the study intersections, McMahon performed a warrant analysis based on the criteria for Multi-Way STOP Control (MWSC) provided in the Manual on Uniform Traffic Control Devices (MUTCD). Warrant analysis worksheets are provided as an attachment to this report. Based on the warrant analysis, the intersections of Highland Street at Hollis Street and Highland Street at Prentice Street both satisfy the following criterion for MWSC:

- The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour.

In addition, the intersection of Highland Street at Hollis Street also satisfies the following criterion:

- Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop.

As part of the MWSC warrant analysis, MUTCD traffic signal warrant analysis was also performed. Both the Highland Street at Prentice Street and Highland Street at Hollis Street intersections were found to exceed the four-hour and peak-hour traffic volume thresholds for traffic signal warrants. However, neither intersection was found to meet the eight-hour traffic volume threshold. As MassDOT typically requires the eight-hour traffic signal warrant criteria to be met to justify installation of traffic signals, the study intersections were considered to not have met traffic signal warrant criteria for the purpose of MWSC warrant analysis.

Provision of all-way STOP sign control would improve pedestrian safety at the intersection of Highland Street at Prentice Street by requiring all vehicles to stop at the existing crosswalk across Highland Street. In addition, all-way STOP sign control at the intersection of Highland Street at Hollis Street would mitigate the existing intersection sight distance deficiency for the westbound Hollis Street approach by reducing the required sight distance, as all vehicles on the Highland Street approaches would be required to come to a full stop at the intersection.

Geometric Improvements

As previously noted, sidewalks are not provided on all intersection approaches within the study area, and the only existing crosswalk across Highland Street in the study area, located on the south side of the Highland Street at Prentice Street intersection, is skewed across the roadway, requiring additional time for pedestrians to cross compared with a perpendicular crossing. Additionally, no sidewalks are provided along Highland Street between the Prentice Street and Hollis Street intersections, and the existing sidewalk along Hollis Street is on the north side of the roadway, with no sidewalk along the frontage of Holliston High School. To improve pedestrian connectivity and safety in the study area in the short term, McMahon recommends the following:

- Reduce the corner radii at the Highland Street at Prentice Street intersection and provide a perpendicular crosswalk across the southern Highland Street leg of the intersection.
- Prove a five-foot-wide sidewalk along Highland Street between Prentice Street and Hollis Street. The east side of Highland Street along the Holliston High School frontage is preferred; however, further evaluation of impacts to abutters is required, including landscaping and mailboxes within the Town right-of-way and grading at the proposed back of sidewalk.
- In accordance with the Town's Complete Streets Prioritization Plan, provide marked crosswalks at the Highland Street at Hollis Street intersection to connect the proposed sidewalk to the existing sidewalks on the north side of Hollis Street and the east side of Highland Street north of Hollis Street.
- Provide a minimum five-foot-wide sidewalk along the south side of Hollis Street between Highland Street and the existing mid-block crosswalk across Hollis Street at Holliston High School. This sidewalk should connect with the future sidewalk on the south side of Hollis Street identified in the Town's Complete Streets Prioritization Plan.
- Upgrade signs at the existing mid-block crosswalk on Hollis Street to be compliant with MUTCD and MassDOT standards. Fluorescent yellow-green W11-2 Pedestrian Crossing signs with W16-7P diagonal downward arrow plaques are recommended at the crosswalk. Alternately, the existing Rectangular Rapid Flashing Beacon (RRFB) assemblies at the intersection of Highland Street at Prentice Street may be relocated to the mid-block crosswalk on Hollis Street, as RRFBs would not be required with the Highland Street at Prentice Street intersection under all-way STOP sign control. Fluorescent yellow-green W11-2 Pedestrian Crossing signs with W16-9P "AHEAD" plaques should be provided along the Hollis Street approaches in advance of the crosswalk.
- Provide a marked crosswalk on the north side of the Highland Street at Prentice Steet intersection to connect to the future shared use path identified in the Town's Complete Streets Prioritization Plan.

Conceptual layout of the recommended geometric improvements at the intersection of Highland Street at Prentice Street and the intersection of Highland Street at Hollis Street are depicted graphically in Figures 5 and 6, respectively.

NOTES:

1) NO IMPACTS TO EXISTING DRIVEWAY ANTICIPATED FOR PROPOSED SIDEWALK. PROPOSED SIDEWALK CAN BE REDUCED TO 4'-0" WIDTH FOR A LENGTH OF 200' OR LESS FOR THE SIDEWALK ABUTTING THE PROPERTY IF REQUIRED. THE PROPOSED SIDEWALK WHERE A WIDTH REDUCTION MAY BE REQUIRED AGAINST THE ABUTTING THE PROPERTY IS APPROXIMATELY 170 FEET IN LENGTH.

MEET EXISTING CURB AND PAVEMENT MARKINGS

5'-0" (SEE NOTE 1)

2'-6"

2'-6"

11'-0"

11'-0"

HIGHLAND STREET

HOLLISTON HIGH SCHOOL

MEET EXISTING CURB, SIDEWALK AND PAVEMENT MARKINGS

2'-6"

11'-0"

11'-0"

5'-0"

2'-6"

PRENTICE STREET

5'-0"

2'-6"

MEET EXISTING CURB AND PAVEMENT MARKINGS

2'-6"

11'-0"

11'-0"

0 30 60 100

SCALE: 1" = 30'

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Figure 5	HIGHLAND STREET & PRENTICE STREET CONCEPT	HIGHLAND STREET INTERSECTION CONCEPTS HOLLISTON, MA	McMAHON TRANSPORTATION ENGINEERS & PLANNERS

MEET EXISTING CURB, SIDEWALK AND PAVEMENT MARKINGS

11'-0"

11'-0"

2'-6"

2'-6"

4'-0"

5'-0"

HIGHLAND STREET

HOLLIS STREET

5'-0"

11'-0"

11'-0"

4'-0"

MEET EXISTING CURB AND PAVEMENT MARKINGS

MEET EXISTING CURB AND PAVEMENT MARKINGS

EXTEND PROPOSED SIDEWALK TO HIGH SCHOOL ENTRANCE (RECOMMENDED)

0 30 60 100

SCALE: 1" = 30'

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Figure 6	HIGHLAND STREET & HOLLIS STREET CONCEPT	HIGHLAND STREET INTERSECTION CONCEPTS HOLLISTON, MA	McMAHON TRAFFIC ENGINEERS & PLANNERS

Capacity Analysis

The SimTraffic capacity analysis for the potential all-way STOP control assumes all intersection approaches would provide a single lane for all movements. Capacity analysis results for 2022 Existing traffic volumes under all-way STOP sign control are presented as an attachment to this memorandum, and a summary of the capacity analysis is presented in Table 4 below. A more detailed summary is included as an attachment. As the addition of STOP sign control may be unexpected for drivers on Highland Street, it is recommended that W3-1 Stop Ahead signs be provided along the Highland Street approaches to the study area.

Table 4: 2022 All-Way Stop Control Capacity Analysis

Intersection	Movement		Peak Hour	2022 Existing LOS[1]	2022 Existing Delay[2]	2022 Existing Queue[3]	2022 AWSC LOS	2022 AWSC Delay	2022 AWSC Queue
Highland Street at	EB	LTR	AM	F	217.8	1293	C	15.3	206
Prentice Street			School	E	37.0	242	A	7.8	96
			PM	F	219.3	1049	A	8.2	100
	NB	LTR	AM	A	2.6	80	C	20.0	261
			School	A	5.3	84	A	7.2	75
			PM	C	15.4	270	A	8.9	93
	SB	LTR	AM	A	1.6	18	A	9.9	115
			School	A	2.3	31	C	16.8	288
			PM	A	2.4	58	D	33.6	366
Highland Street at	WB	LR	AM	C	23.3	186	A	7.5	94
Hollis Street			School	F	68.8	808	C	17.3	260
			PM	D	30.7	295	B	10.2	135
	NB	TR	AM	A	4.6	60	B	10.9	145
			School	A	3.2	11	A	8.4	104
			PM	A	3.6	28	A	8.2	130
	SB	LT	AM	A	2.4	93	A	6.9	96
			School	A	1.2	56	B	12.0	171
			PM	A	1.7	109	D	32.8	541

1 Level-of-Service

2 Average vehicle delay, in seconds

3 95th Percentile queue length, in feet

As shown in Table 4, operations on the eastbound Prentice Street approach are projected to improve from LOS F to LOS C during the weekday morning peak hour, from LOS E to LOS A during the weekday afternoon school dismissal peak hour, and from LOS F to LOS A during the weekday afternoon commuter peak hour with the implementation of AWSC. Queues along the eastbound Prentice Street approach are projected to extend up to 100 feet (approximately 5 vehicles) during the weekday morning peak hour, compared with nearly one-quarter mile under existing conditions. With the implementation of AWSC, the northbound Highland Street approach is projected to operate at LOS C during the weekday morning peak hour, and at LOS A during the weekday afternoon school dismissal and commuter peak hours, with queues extending up to 261 feet (approximately 11 vehicles) during the weekday morning peak hour. The southbound Highland Street approach is projected to operate at LOS A during the weekday morning peak hour, LOS C during the weekday afternoon school dismissal peak hour, and LOS D during the weekday afternoon commuter peak hour, with queues extending up to 366 feet (approximately 15 vehicles) during the weekday afternoon commuter peak hour. As the Highland Street at Hollis Street intersection is located approximately 300 feet north of the Highland Street at Prentice Street intersection, southbound queues along Highland Street may extend from Prentice Street into the Hollis Street intersection for brief periods during the weekday afternoon commuter peak hour.

At the intersection of Highland Street and Hollis Street, the westbound Hollis Street approach is shown to improve from LOS C to LOS A during the weekday morning peak hour, from LOS F to LOS C during the weekday afternoon school dismissal peak hour, and from LOS C to LOS B during the weekday afternoon commuter peak hour with the implementation of AWSC. During the weekday afternoon school peak hour, queues along the westbound Hollis Street approach are projected to shorten by almost 500 feet (approximately 20 vehicles) with the implementation of AWSC. Queues along the westbound Hollis Street approach are projected to extend up to 260 feet (approximately 11 vehicles) during the weekday afternoon school dismissal peak hour, compared with over 800 feet (approximately 32 vehicles) under existing conditions. With the implementation of AWSC, the northbound Highland Street approach is projected to operate at LOS B during the weekday morning peak hour and LOS A during the weekday afternoon school dismissal and commuter peak hours. Queue lengths along the northbound Highland Street approach are projected to extend up to 145 feet (approximately 6 vehicles) during the weekday morning peak hour with the implementation of AWSC. The southbound Highland Street approach projected to operate at LOS A during the weekday morning peak hour, LOS B during the weekday afternoon school dismissal peak hour, and LOS D during the weekday afternoon commuter peak hour with the implementation of AWSC. Southbound queues are anticipated to extend up to 541 feet (approximately 22 vehicles) during the weekday afternoon commuter peak hour with the implementation of AWSC, in part due to queue from the Highland Street at Prentice Street intersection extending to the Hollis Street intersection. Outside of the weekday afternoon commuter peak hour, queues on the southbound Highland Street approach at Hollis Street would not be anticipated to exceed 171 feet (approximately 7 vehicles).

Long Term Improvements

The Town has indicated a desire to seek funding from the Massachusetts School Building Authority (MSBA) to reconstruct the Holliston High School campus in the future. As the redevelopment of Holliston High School may change travel patterns at the study intersections, McMahon recommends that the Town complete a traffic study including projected future traffic volumes in conjunction with the school redevelopment plans. Although specific recommendations will depend on future travel patterns, the Town may consider the following potential improvements to the study area in conjunction with the school reconstruction project:

- Signalization of one or both study intersections.
- Reconstruction of one or both study intersections as a roundabout.
- Roadway widening to provide bicycle facilities and/or exclusive turn lanes.

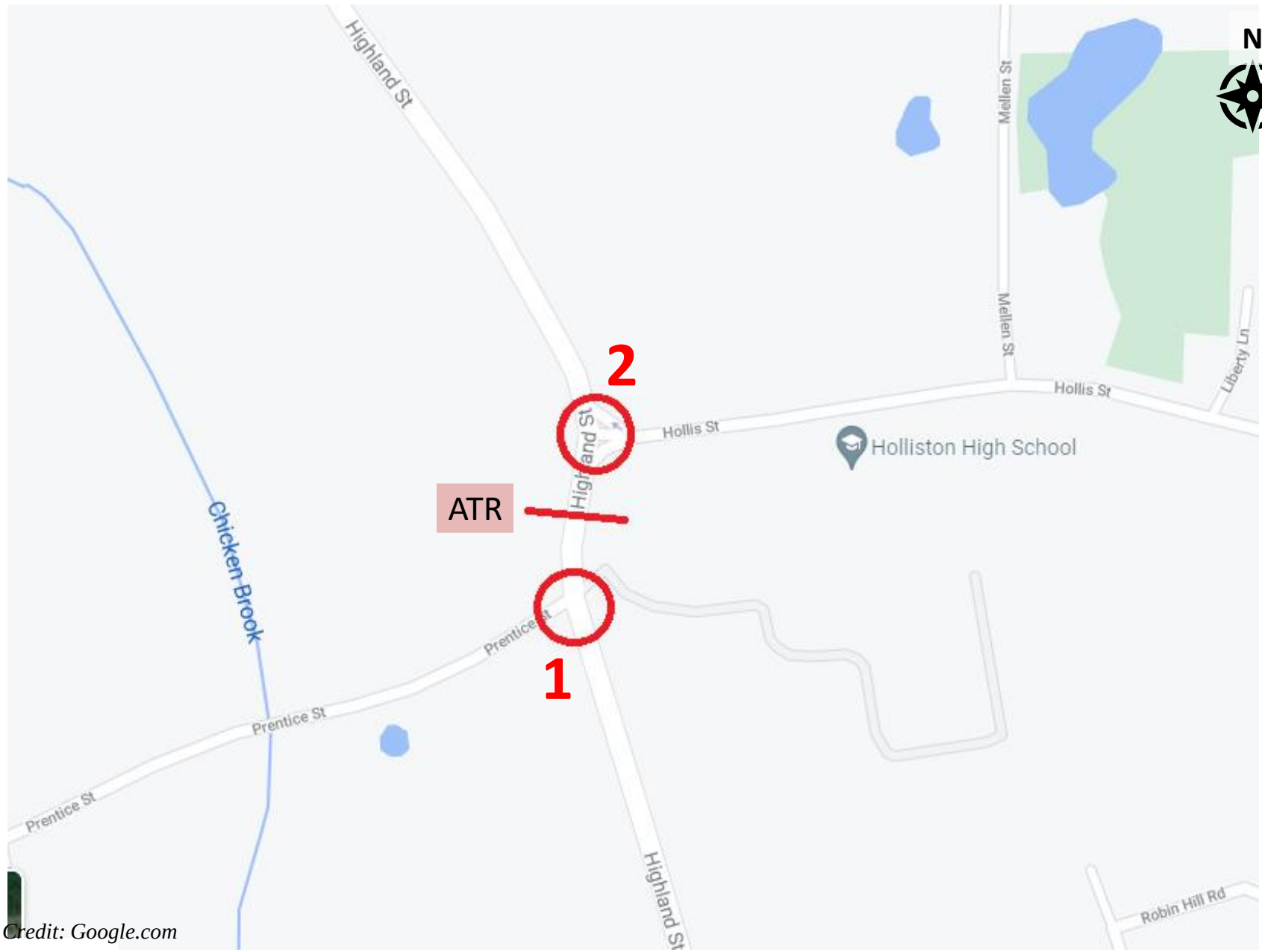
- Realignment of Hollis Street through the existing school property to create a four-way intersection at Prentice Street.

Conclusions

A summary of the findings from this assessment is provided below:

- Highland Street between Prentice Street and Hollis Street carries an average daily traffic volume of approximately 10,700 vehicles per day with an 85th percentile speed of 33 mph in both directions.
- The capacity analysis results indicate the STOP sign controlled minor street approaches operate with long delays and queues during peak periods, particularly the eastbound Prentice Street approach at Highland Street during the weekday morning peak hour and the westbound Hollis Street approach at Highland Street during the weekday afternoon school dismissal peak hour.
- The available sight distance at both study area intersections was measured to meet minimum AASHTO stopping sight distance requirements for the 85th percentile operating speeds on Highland Street. However, available intersection sight distances looking left and right for left turns from westbound Hollis Street onto Highland Street do not meet AASHTO recommendations for the 85th percentile operating speed on Highland Street, indicating a potential risk for angle crashes.
- Both study intersections meet MUTCD warrants for Multi-Way STOP Control. Providing all-way STOP sign control at the study intersections would reduce overall delays and queues during peak periods compared with existing conditions. Southbound Highland Street through the study area may experience congestion during the weekday afternoon commuter peak hour with the implementation of all-way STOP sign control, with southbound queues extending up to 541 feet (approximately 22 vehicles) from the Hollis Street intersection.
- Based on the pedestrian infrastructure inventory completed, pedestrian accommodations in the study area are generally discontinuous and do not meet Americans with Disabilities Act (ADA) requirements. McMahon recommends reducing corner radii and providing additional crosswalks at the study intersections, providing a five-foot-wide sidewalk on the east side of Highland Street between the Prentice Street and Hollis Street intersections, and providing a minimum five-foot-wide sidewalk on the south side of Hollis Street from Highland Street to the existing mid-block crosswalk across Hollis Street at Holliston High School.
- The future reconstruction of Holliston High School may change travel patterns at the study intersections. The Town should conduct an updated traffic study with projected future traffic volumes in conjunction with the school redevelopment project to determine appropriate long term improvements in the study area.

Traffic Count Data



Map Credit: Google.com

BOSTON TRAFFIC DATA	BTD ID: 827_011_MM	Holliston, MA	# of TMC's: 02	Client: McMahon Associates, Inc.
		Collected on December 7, 2021	# of ATR's: 01	Contact: Michael Pompili

Volume Report

Job 827_011_MM_ATR
Area Holliston, MA
Location Highland Street, between Prentice Street & Hollis Street

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

Tuesday, December 7, 2021

Time	Total		NB		SB		Time	Total		NB		SB	
0000	6		1		5		1200	151		70		81	
0015	6		2		4		1215	129		57		72	
0030	4		2		2		1230	134		64		70	
0045	2	18	1	6	1	12	1245	148	562	76	267	72	295
0100	2		0		2		1300	135		63		72	
0115	1		1		0		1315	166		94		72	
0130	1		0		1		1330	144		76		68	
0145	0	4	0	1	0	3	1345	157	602	79	312	78	290
0200	1		1		0		1400	173		75		98	
0215	1		0		1		1415	161		87		74	
0230	0		0		0		1430	231		100		131	
0245	0	2	0	1	0	1	1445	264	829	85	347	179	482
0300	2		1		1		1500	248		94		154	
0315	4		3		1		1515	237		83		154	
0330	3		2		1		1530	278		100		178	
0345	3	12	2	8	1	4	1545	262	1025	93	370	169	655
0400	1		0		1		1600	293		118		175	
0415	8		5		3		1615	269		94		175	
0430	10		8		2		1630	255		73		182	
0445	9	28	7	20	2	8	1645	213	1030	86	371	127	659
0500	17		13		4		1700	243		76		167	
0515	17		10		7		1715	246		90		156	
0530	39		27		12		1730	223		74		149	
0545	65	138	42	92	23	46	1745	190	902	65	305	125	597
0600	73		46		27		1800	190		75		115	
0615	106		74		32		1815	185		73		112	
0630	136		105		31		1830	136		51		85	
0645	188	503	143	368	45	135	1845	121	632	43	242	78	390
0700	171		127		44		1900	123		49		74	
0715	231		165		66		1915	112		51		61	
0730	240		170		70		1930	77		30		47	
0745	281	923	180	642	101	281	1945	75	387	26	156	49	231
0800	261		152		109		2000	66		35		31	
0815	194		117		77		2015	64		31		33	
0830	222		146		76		2030	80		23		57	
0845	168	845	116	531	52	314	2045	55	265	26	115	29	150
0900	169		95		74		2100	46		11		35	
0915	133		83		50		2115	38		16		22	
0930	125		73		52		2130	28		11		17	
0945	136	563	85	336	51	227	2145	35	147	13	51	22	96
1000	135		72		63		2200	34		15		19	
1015	119		64		55		2215	30		7		23	
1030	123		60		63		2230	17		3		14	
1045	163	540	72	268	91	272	2245	7	88	4	29	3	59
1100	152		65		87		2300	12		1		11	
1115	137		69		68		2315	18		7		11	
1130	147		77		70		2330	15		5		10	
1145	142	578	79	290	63	288	2345	10	55	4	17	6	38
							Total	**10678**		**5145**		**5533**	

Classification Report

Job # 827_011_MM_ATR
Area Holliston, MA
Location Highland Street, between Prentice Street & Hollis Street
Direction Northbound
Tuesday, December 7, 2021

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	6	0	6	0	0	0	0	0	0	0	0	0	0	0
0100	1	0	1	0	0	0	0	0	0	0	0	0	0	0
0200	1	0	1	0	0	0	0	0	0	0	0	0	0	0
0300	8	0	6	2	0	0	0	0	0	0	0	0	0	0
0400	20	0	14	6	0	0	0	0	0	0	0	0	0	0
0500	92	0	63	28	0	1	0	0	0	0	0	0	0	0
0600	368	0	278	82	4	4	0	0	0	0	0	0	0	0
0700	642	0	537	91	6	5	2	0	1	0	0	0	0	0
0800	531	1	456	66	3	3	2	0	0	0	0	0	0	0
0900	336	0	262	67	4	2	1	0	0	0	0	0	0	0
1000	268	0	214	47	2	2	3	0	0	0	0	0	0	0
1100	290	0	232	49	2	3	4	0	0	0	0	0	0	0
1200	267	2	213	44	2	2	4	0	0	0	0	0	0	0
1300	312	0	247	53	3	3	5	1	0	0	0	0	0	0
1400	347	3	286	44	8	4	2	0	0	0	0	0	0	0
1500	370	0	307	54	4	3	1	0	0	1	0	0	0	0
1600	371	0	307	56	0	7	1	0	0	0	0	0	0	0
1700	305	0	270	32	1	1	1	0	0	0	0	0	0	0
1800	242	0	216	25	1	0	0	0	0	0	0	0	0	0
1900	156	0	142	13	1	0	0	0	0	0	0	0	0	0
2000	115	0	107	7	1	0	0	0	0	0	0	0	0	0
2100	51	0	42	9	0	0	0	0	0	0	0	0	0	0
2200	29	0	28	1	0	0	0	0	0	0	0	0	0	0
2300	17	0	14	3	0	0	0	0	0	0	0	0	0	0
Total	**5145**	**6**	**4249**	**779**	**42**	**40**	**26**	**1**	**1**	**1**	**0**	**0**	**0**	**0**
	100.00%	**0.12%**	**82.59%**	**15.14%**	**0.82%**	**0.78%**	**0.51%**	**0.02%**	**0.02%**	**0.02%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Classification Report

Job # 827_011_MM_ATR
Area Holliston, MA
Location Highland Street, between Prentice Street & Hollis Street
Direction Southbound
Tuesday, December 7, 2021

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
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Time	Total	Class 1 Motorcycle	Class 2 Passenger Car	Class 3 Vans, Pick up Trucks	Class 4 Bus	Class 5 2 Axle 6 Tires	Class 6 3 Axle Unit	Class 7 4 Axles or more Unit	Class 8 3 or 4 Axle Trailer	Class 9 5 Axle Trailer	Class 10 6 Axle or more Trailer	Class 11 5 Axle or less Multi-Trailer	Class 12 6 Axle Multi-Trailer	Class 13 7 Axle or more Multi-Trailer
0000	12	0	11	1	0	0	0	0	0	0	0	0	0	0
0100	3	0	3	0	0	0	0	0	0	0	0	0	0	0
0200	1	0	1	0	0	0	0	0	0	0	0	0	0	0
0300	4	0	3	1	0	0	0	0	0	0	0	0	0	0
0400	8	0	8	0	0	0	0	0	0	0	0	0	0	0
0500	46	0	38	7	0	1	0	0	0	0	0	0	0	0
0600	135	0	107	25	2	0	1	0	0	0	0	0	0	0
0700	281	0	223	51	3	3	1	0	0	0	0	0	0	0
0800	314	1	261	44	3	4	1	0	0	0	0	0	0	0
0900	227	0	167	48	0	8	1	1	0	2	0	0	0	0
1000	272	0	206	52	1	12	1	0	0	0	0	0	0	0
1100	288	0	214	57	2	9	4	0	0	2	0	0	0	0
1200	295	0	232	47	3	8	3	1	0	1	0	0	0	0
1300	290	1	230	48	3	5	3	0	0	0	0	0	0	0
1400	482	0	384	65	17	11	4	0	0	1	0	0	0	0
1500	655	2	548	87	6	9	3	0	0	0	0	0	0	0
1600	659	0	529	114	1	12	3	0	0	0	0	0	0	0
1700	597	0	500	89	0	7	0	0	1	0	0	0	0	0
1800	390	0	338	44	1	6	0	1	0	0	0	0	0	0
1900	231	0	198	30	0	3	0	0	0	0	0	0	0	0
2000	150	0	132	17	0	1	0	0	0	0	0	0	0	0
2100	96	0	76	18	0	2	0	0	0	0	0	0	0	0
2200	59	0	49	8	0	2	0	0	0	0	0	0	0	0
2300	38	0	29	7	0	2	0	0	0	0	0	0	0	0
Total	**5533**	**4**	**4487**	**860**	**42**	**105**	**25**	**3**	**1**	**6**	**0**	**0**	**0**	**0**
	100.00%	**0.07%**	**81.10%**	**15.54%**	**0.76%**	**1.90%**	**0.45%**	**0.05%**	**0.02%**	**0.11%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Speed Report

Job 827_011_MM_ATR
Area Holliston, MA
Location Highland Street, between Prentice Street & Hollis Street
Dir Northbound
Tuesday, December 7, 2021

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
0000	6	0	0	0	0	0	2	3	1	0	0	0	0	0	0	0	0
0100	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
0200	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
0300	8	0	0	0	1	2	1	2	2	0	0	0	0	0	0	0	0
0400	20	0	0	0	0	3	6	3	6	1	1	0	0	0	0	0	0
0500	92	0	0	0	1	25	24	30	5	7	0	0	0	0	0	0	0
0600	368	0	0	0	5	99	137	98	28	1	0	0	0	0	0	0	0
0700	642	0	0	0	15	204	304	88	30	1	0	0	0	0	0	0	0
0800	531	1	9	6	10	130	208	149	17	1	0	0	0	0	0	0	0
0900	336	0	0	0	5	105	111	79	35	1	0	0	0	0	0	0	0
1000	268	0	0	0	5	86	87	63	26	1	0	0	0	0	0	0	0
1100	290	0	0	0	6	82	106	72	22	2	0	0	0	0	0	0	0
1200	267	0	0	2	12	75	105	63	9	1	0	0	0	0	0	0	0
1300	312	0	0	2	10	87	121	72	18	2	0	0	0	0	0	0	0
1400	347	0	0	0	13	107	153	61	13	0	0	0	0	0	0	0	0
1500	370	0	1	1	11	129	150	67	10	1	0	0	0	0	0	0	0
1600	371	0	0	3	8	135	160	54	11	0	0	0	0	0	0	0	0
1700	305	0	0	0	5	106	133	54	6	1	0	0	0	0	0	0	0
1800	242	0	0	0	2	70	104	55	9	2	0	0	0	0	0	0	0
1900	156	0	0	0	2	33	48	52	19	2	0	0	0	0	0	0	0
2000	115	0	0	0	4	23	40	37	10	1	0	0	0	0	0	0	0
2100	51	0	0	0	1	16	14	16	3	1	0	0	0	0	0	0	0
2200	29	0	0	0	0	6	9	8	6	0	0	0	0	0	0	0	0
2300	17	0	0	0	0	7	3	4	3	0	0	0	0	0	0	0	0
Total	**5145**	**1**	**10**	**14**	**116**	**1530**	**2026**	**1132**	**289**	**26**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
	100.00%	**0.02%**	**0.19%**	**0.27%**	**2.25%**	**29.74%**	**39.38%**	**22.00%**	**5.62%**	**0.51%**	**0.02%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Maximum = 45.2 mph, Minimum = 4.3 mph, Mean = 27.4 mph
85% Speed = 32.66 mph, 95% Speed = 35.40 mph, Median = 26.84 mph
10 mph Pace = 22 - 32, Number in Pace = 3774 (73.47%)
Variance = 21.27, Standard Deviation = 4.61 mph

Speed Report

Job 827_011_MM_ATR
Area Holliston, MA
Location Highland Street, between Prentice Street & Hollis Street
Dir Southbound
Tuesday, December 7, 2021

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

Time	Total	Speed Bins (mph)															
		0 5	5 10	10 15	15 20	20 25	25 30	30 35	35 40	40 45	45 50	50 55	55 60	60 65	65 70	70 75	75 80
0000	12	0	0	0	1	1	4	3	2	1	0	0	0	0	0	0	0
0100	3	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0
0200	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
0300	4	0	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0
0400	8	0	0	0	0	0	3	2	0	3	0	0	0	0	0	0	0
0500	46	0	0	0	0	7	8	12	15	3	1	0	0	0	0	0	0
0600	135	0	0	0	2	12	48	48	20	5	0	0	0	0	0	0	0
0700	281	0	0	0	4	50	144	70	11	2	0	0	0	0	0	0	0
0800	314	2	5	5	5	66	129	81	20	1	0	0	0	0	0	0	0
0900	227	0	0	0	2	31	91	72	28	3	0	0	0	0	0	0	0
1000	272	0	0	0	3	48	106	84	31	0	0	0	0	0	0	0	0
1100	288	0	0	0	4	52	126	71	33	2	0	0	0	0	0	0	0
1200	295	0	0	1	6	58	126	79	24	1	0	0	0	0	0	0	0
1300	290	0	0	0	2	45	137	78	25	3	0	0	0	0	0	0	0
1400	482	0	0	5	25	104	219	106	23	0	0	0	0	0	0	0	0
1500	655	0	1	5	10	138	313	149	38	1	0	0	0	0	0	0	0
1600	659	0	1	2	14	139	303	179	19	2	0	0	0	0	0	0	0
1700	597	0	0	1	5	123	271	162	35	0	0	0	0	0	0	0	0
1800	390	0	0	0	2	64	185	107	30	2	0	0	0	0	0	0	0
1900	231	0	0	0	0	27	97	77	28	2	0	0	0	0	0	0	0
2000	150	0	0	0	0	21	74	35	17	2	1	0	0	0	0	0	0
2100	96	0	0	2	3	15	33	22	20	1	0	0	0	0	0	0	0
2200	59	0	0	0	1	7	22	16	12	1	0	0	0	0	0	0	0
2300	38	0	0	0	0	2	15	9	9	2	1	0	0	0	0	0	0
Total	**5533**	**2**	**8**	**21**	**89**	**1011**	**2454**	**1464**	**444**	**37**	**3**	**0**	**0**	**0**	**0**	**0**	**0**
	100.00%	**0.04%**	**0.14%**	**0.38%**	**1.61%**	**18.27%**	**44.35%**	**26.46%**	**8.02%**	**0.67%**	**0.05%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Maximum = 46.1 mph, Minimum = 2.1 mph, Mean = 28.5 mph
85% Speed = 33.44 mph, 95% Speed = 36.24 mph, Median = 28.13 mph
10 mph Pace = 23 - 33, Number in Pace = 4126 (74.79%)
Variance = 21.00, Standard Deviation = 4.58 mph

Client:	Michael Pompili
Project #:	827_011_MM
BTD #:	Location 1
Location:	Holliston, MA
Street 1:	Highland Street
Street 2:	Prentice Street/High School Drive
Count Date:	12/7/2021
Day of Week:	Tuesday
Weather:	Clouds & Sun, 40°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway 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	10	58	2	0	1	20	22	0	70	2	9	0	0	0	0
7:15 AM	0	17	73	10	0	0	35	30	0	93	4	3	0	0	0	0
7:30 AM	0	20	81	11	0	1	34	37	0	90	8	13	0	0	0	0
7:45 AM	0	15	104	12	0	2	51	45	0	76	22	7	0	0	0	0
8:00 AM	0	18	95	27	0	4	60	46	0	66	12	11	0	0	0	0
8:15 AM	0	18	66	2	0	0	46	32	0	53	1	13	0	0	0	0
8:30 AM	0	18	76	0	0	0	52	25	0	69	0	10	0	0	0	0
8:45 AM	0	10	63	0	0	0	30	23	0	50	0	14	0	0	0	0
9:00 AM	0	14	44	0	0	0	40	32	0	51	0	16	0	0	0	0
9:15 AM	0	9	35	0	0	0	26	23	0	48	0	16	0	0	0	0
9:30 AM	0	9	26	0	0	0	30	22	0	47	0	8	0	0	0	0
9:45 AM	0	5	42	0	0	0	28	23	0	43	0	10	0	0	0	0
10:00 AM	0	9	44	0	0	0	37	27	0	29	0	10	0	0	0	0
10:15 AM	0	9	32	0	0	0	25	31	0	33	0	12	0	0	0	0
10:30 AM	0	9	31	0	0	0	37	26	0	29	0	16	0	0	0	0
10:45 AM	0	13	34	0	0	0	45	46	0	38	0	13	0	0	0	0
11:00 AM	0	23	27	0	0	0	40	46	0	38	0	9	0	0	0	0
11:15 AM	0	11	30	0	0	0	26	42	0	42	0	13	0	0	0	0
11:30 AM	0	14	38	0	0	0	34	35	0	40	0	13	0	0	0	0
11:45 AM	0	8	36	0	0	0	34	29	0	44	0	15	0	0	0	0
12:00 PM	0	13	41	0	0	0	42	39	0	28	0	10	0	0	0	0
12:15 PM	0	16	27	0	0	0	31	41	0	30	0	14	0	0	0	0
12:30 PM	0	17	23	0	0	0	29	41	0	41	0	15	0	0	0	0
12:45 PM	0	11	34	0	0	0	35	40	0	40	0	18	0	0	0	0
1:00 PM	0	10	23	0	0	0	35	39	0	41	0	13	0	0	0	0
1:15 PM	0	16	39	0	0	0	35	39	0	56	0	13	0	0	0	0
1:30 PM	0	7	36	0	0	0	37	31	0	39	0	13	0	0	0	0
1:45 PM	0	16	42	0	0	0	41	37	0	38	0	17	0	0	0	0
2:00 PM	0	20	37	3	0	0	56	42	0	38	0	13	0	0	0	0
2:15 PM	0	23	54	2	0	0	47	27	0	35	1	12	0	0	0	0
2:30 PM	0	9	59	1	0	5	63	64	0	40	2	16	0	0	0	0
2:45 PM	0	16	45	4	0	1	94	84	0	39	1	23	0	0	0	0
3:00 PM	0	21	47	1	0	0	84	72	0	49	1	19	0	0	0	0
3:15 PM	0	17	42	1	0	0	76	83	0	42	0	15	0	0	0	0
3:30 PM	0	11	54	1	0	2	96	77	0	45	0	16	0	0	0	0
3:45 PM	0	14	39	1	0	0	92	77	0	53	4	18	0	0	0	0
4:00 PM	0	29	60	0	0	1	86	88	0	57	1	11	0	0	0	0
4:15 PM	0	16	47	0	0	0	94	85	0	47	0	22	0	0	0	0
4:30 PM	0	17	29	0	0	0	92	90	0	44	0	25	0	0	0	0
4:45 PM	0	20	38	0	0	0	72	64	0	48	0	25	0	0	0	0
5:00 PM	0	15	38	0	0	0	74	96	0	40	0	18	0	0	0	0
5:15 PM	0	17	45	0	0	0	73	83	0	48	0	25	0	0	0	0
5:30 PM	0	12	37	0	0	0	76	73	0	38	0	14	0	0	0	0
5:45 PM	0	21	34	0	0	0	67	64	0	34	0	19	0	0	0	0

AM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
7:15 AM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
8:15 AM	**0**	**70**	**353**	**60**	**0**	**7**	**180**	**158**	**0**	**325**	**46**	**34**	**0**	**0**	**0**	**0**
PHF	**0.86**				**0.78**				**0.91**				**0.00**			
HV %	**0.0%**	**8.6%**	**0.6%**	**3.3%**	**0.0%**	**0.0%**	**3.3%**	**5.1%**	**0.0%**	**2.8%**	**8.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

MID PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
1:00 PM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
2:00 PM	**0**	**49**	**140**	**0**	**0**	**0**	**148**	**146**	**0**	**174**	**0**	**56**	**0**	**0**	**0**	**0**
PHF	**0.81**				**0.94**				**0.83**				**0.00**			
HV %	**0.0%**	**0.0%**	**1.4%**	**0.0%**	**0.0%**	**0.0%**	**1.4%**	**4.8%**	**0.0%**	**6.3%**	**0.0%**	**7.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
3:30 PM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:30 PM	**0**	**70**	**200**	**2**	**0**	**3**	**368**	**327**	**0**	**202**	**5**	**67**	**0**	**0**	**0**	**0**
PHF	**0.76**				**0.97**				**0.91**				**0.00**			
HV %	**0.0%**	**2.9%**	**2.5%**	**0.0%**	**0.0%**	**33.3%**	**0.5%**	**2.1%**	**0.0%**	**5.4%**	**0.0%**	**1.5%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Michael Pompili
Project #:	827_011_MM
BTD #:	Location 1
Location:	Holliston, MA
Street 1:	Highland Street
Street 2:	Prentice Street/High School Drive
Count Date:	12/7/2021
Day of Week:	Tuesday
Weather:	Clouds & Sun, 40°F

BOSTON TRAFFIC DATA
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HEAVY VEHICLES

	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway 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	0	3	0	0	0	0	1	0	4	0	1	0	0	0	0
7:15 AM	0	3	1	0	0	0	0	2	0	2	0	0	0	0	0	0
7:30 AM	0	0	1	1	0	0	2	3	0	3	0	0	0	0	0	0
7:45 AM	0	1	0	1	0	0	0	3	0	0	4	0	0	0	0	0
8:00 AM	0	2	0	0	0	0	4	0	0	4	0	0	0	0	0	0
8:15 AM	0	1	0	0	0	0	3	2	0	1	0	0	0	0	0	0
8:30 AM	0	1	0	0	0	0	1	2	0	2	0	1	0	0	0	0
8:45 AM	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0
9:00 AM	0	1	1	0	0	0	1	1	0	1	0	1	0	0	0	0
9:15 AM	0	0	1	0	0	0	0	2	0	2	0	0	0	0	0	0
9:30 AM	0	2	0	0	0	0	2	0	0	1	0	0	0	0	0	0
9:45 AM	0	0	2	0	0	0	1	1	0	4	0	1	0	0	0	0
10:00 AM	0	0	1	0	0	0	1	3	0	3	0	0	0	0	0	0
10:15 AM	0	2	0	0	0	0	0	3	0	2	0	2	0	0	0	0
10:30 AM	0	1	0	0	0	0	2	0	0	1	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0
11:00 AM	0	0	1	0	0	0	2	2	0	4	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	1	3	0	2	0	2	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	2	0	2	0	1	0	0	0	0
11:45 AM	0	0	1	0	0	0	2	0	0	2	0	1	0	0	0	0
12:00 PM	0	2	2	0	0	0	1	2	0	1	0	0	0	0	0	0
12:15 PM	0	1	0	0	0	0	1	4	0	2	0	1	0	0	0	0
12:30 PM	0	1	1	0	0	0	2	2	0	2	0	1	0	0	0	0
12:45 PM	0	1	1	0	0	0	0	3	0	3	0	1	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	1	0	5	0	1	0	0	0	0
1:15 PM	0	0	2	0	0	0	1	2	0	4	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	1	4	0	1	0	3	0	0	0	0
2:00 PM	0	2	2	0	0	0	0	3	0	2	0	1	0	0	0	0
2:15 PM	0	1	3	1	0	0	0	3	0	5	0	1	0	0	0	0
2:30 PM	0	0	2	0	0	4	2	3	0	4	0	0	0	0	0	0
2:45 PM	0	1	1	2	0	1	5	5	0	1	0	0	0	0	0	0
3:00 PM	0	1	2	0	0	0	3	2	0	6	0	0	0	0	0	0
3:15 PM	0	0	1	1	0	0	1	3	0	0	0	1	0	0	0	0
3:30 PM	0	0	2	0	0	1	2	2	0	2	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	2	0	5	0	1	0	0	0	0
4:00 PM	0	2	2	0	0	0	0	2	0	4	0	0	0	0	0	0
4:15 PM	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	2	2	0	2	0	1	0	0	0	0
4:45 PM	0	0	0	0	0	0	2	3	0	2	0	1	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	2	0	0	0	1	2	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0

AM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
7:15 AM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
8:15 AM	**0**	**6**	**2**	**2**	**0**	**0**	**6**	**8**	**0**	**9**	**4**	**0**	**0**	**0**	**0**	**0**
PHF	**0.63**				**0.70**				**0.81**				**0.00**			

MID PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
12:00 PM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
1:00 PM	**0**	**5**	**4**	**0**	**0**	**0**	**4**	**11**	**0**	**8**	**0**	**3**	**0**	**0**	**0**	**0**
PHF	**0.56**				**0.75**				**0.69**				**0.00**			

PM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
2:15 PM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
3:15 PM	**0**	**3**	**8**	**3**	**0**	**5**	**10**	**13**	**0**	**16**	**0**	**1**	**0**	**0**	**0**	**0**
PHF	**0.70**				**0.64**				**0.71**				**0.00**			

Client:	Michael Pompili
Project #:	827_011_MM
BTD #:	Location 1
Location:	Holliston, MA
Street 1:	Highland Street
Street 2:	Prentice Street/High School Drive
Count Date:	12/7/2021
Day of Week:	Tuesday
Weather:	Clouds & Sun, 40°F

BOSTON TRAFFIC DATA
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PEDESTRIANS & BICYCLES

	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
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	2	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
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	2
3:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	7	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	0	0	0	0	0
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	0	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

AM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
7:15 AM																
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
8:15 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0

MID PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
1:00 PM																
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Prentice Street Eastbound				High School Driveway Westbound			
3:30 PM																
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:30 PM	0	0	0	14	0	0	0	2	0	0	0	0	0	0	0	3

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

Client:	Michael Pompili
Project #:	827_011_MM
BTD #:	Location 2
Location:	Holliston, MA
Street 1:	Highland Street
Street 2:	Hollis Street
Count Date:	12/7/2021
Day of Week:	Tuesday
Weather:	Clouds & Sun, 40°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street 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	0	59	68	0	9	27	0	0	0	0	0	0	18	0	4
7:15 AM	0	0	91	76	0	9	33	0	0	0	0	0	0	30	0	14
7:30 AM	0	0	88	82	0	12	38	0	0	0	0	0	0	33	0	10
7:45 AM	0	0	82	99	0	20	51	0	0	0	0	0	0	49	0	11
8:00 AM	0	0	71	86	0	26	44	0	0	0	0	0	0	65	0	30
8:15 AM	0	0	64	53	0	11	45	0	0	0	0	0	0	34	0	12
8:30 AM	0	0	89	58	0	10	52	0	0	0	0	0	0	22	0	4
8:45 AM	0	0	66	49	0	11	28	0	0	0	0	0	0	24	0	16
9:00 AM	0	0	52	41	0	5	47	0	0	0	0	0	0	27	0	10
9:15 AM	0	0	48	37	0	8	31	0	0	0	0	0	0	17	0	11
9:30 AM	0	0	36	36	0	4	32	0	0	0	0	0	0	21	0	5
9:45 AM	0	0	47	39	0	6	29	0	0	0	0	0	0	23	0	3
10:00 AM	0	0	50	22	0	8	39	0	0	0	0	0	0	24	0	8
10:15 AM	0	0	37	26	0	3	35	0	0	0	0	0	0	21	0	7
10:30 AM	0	0	42	18	0	4	44	0	0	0	0	0	0	19	0	9
10:45 AM	0	0	36	35	0	13	40	0	0	0	0	0	0	51	0	10
11:00 AM	0	0	35	31	0	4	57	0	0	0	0	0	0	29	0	11
11:15 AM	0	0	34	38	0	6	36	0	0	0	0	0	0	34	0	7
11:30 AM	0	0	39	38	0	11	34	0	0	0	0	0	0	35	0	11
11:45 AM	0	0	31	47	0	10	42	0	0	0	0	0	0	23	0	5
12:00 PM	0	0	37	33	0	4	45	0	0	0	0	0	0	35	0	14
12:15 PM	0	0	37	20	0	2	41	0	0	0	0	0	0	32	0	11
12:30 PM	0	0	27	36	0	9	45	0	0	0	0	0	0	27	0	10
12:45 PM	0	0	38	37	0	7	53	0	0	0	0	0	0	22	0	11
1:00 PM	0	0	33	31	0	4	44	0	0	0	0	0	0	28	0	9
1:15 PM	0	0	45	49	0	7	39	0	0	0	0	0	0	35	0	6
1:30 PM	0	0	44	33	0	8	40	0	0	0	0	0	0	28	0	14
1:45 PM	0	0	42	37	0	9	43	0	0	0	0	0	0	33	0	9
2:00 PM	0	0	45	31	0	8	59	0	0	0	0	0	0	40	0	10
2:15 PM	0	0	48	37	0	13	55	0	0	0	0	0	0	18	0	6
2:30 PM	0	0	57	45	0	11	68	0	0	0	0	0	0	64	0	19
2:45 PM	0	0	53	30	0	13	67	0	0	0	0	0	0	113	0	20
3:00 PM	0	0	52	40	0	6	75	0	0	0	0	0	0	81	0	16
3:15 PM	0	0	43	43	0	7	88	0	0	0	0	0	0	67	0	10
3:30 PM	0	0	55	44	0	17	111	0	0	0	0	0	0	67	0	16
3:45 PM	0	0	50	44	0	17	104	0	0	0	0	0	0	65	0	9
4:00 PM	0	0	59	55	0	7	97	0	0	0	0	0	0	78	0	13
4:15 PM	0	0	56	38	0	8	119	0	0	0	0	0	0	56	0	8
4:30 PM	0	0	32	40	0	10	111	0	0	0	0	0	0	71	0	8
4:45 PM	0	0	45	44	0	7	86	0	0	0	0	0	0	46	0	6
5:00 PM	0	0	40	34	0	6	103	0	0	0	0	0	0	66	0	2
5:15 PM	0	0	47	44	0	8	92	0	0	0	0	0	0	62	0	6
5:30 PM	0	0	40	31	0	4	87	0	0	0	0	0	0	62	0	10
5:45 PM	0	0	39	30	0	8	73	0	0	0	0	0	0	54	0	7

AM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
7:15 AM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
8:15 AM	**0**	**0**	**332**	**343**	**0**	**67**	**166**	**0**	**0**	**0**	**0**	**0**	**0**	**177**	**0**	**65**
PHF			**0.93**				**0.82**				**0.00**				**0.64**	
HV %	**0.0%**	**0.0%**	**1.5%**	**3.2%**	**0.0%**	**3.0%**	**4.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.0%**	**0.0%**	**1.5%**

MID PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
10:45 AM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
11:45 AM	**0**	**0**	**144**	**142**	**0**	**34**	**167**	**0**	**0**	**0**	**0**	**0**	**0**	**149**	**0**	**39**
PHF			**0.93**				**0.82**				**0.00**				**0.77**	
HV %	**0.0%**	**0.0%**	**1.4%**	**4.9%**	**0.0%**	**11.8%**	**2.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.0%**	**0.0%**	**10.3%**

PM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
3:30 PM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:30 PM	**0**	**0**	**220**	**181**	**0**	**49**	**431**	**0**	**0**	**0**	**0**	**0**	**0**	**266**	**0**	**46**
PHF			**0.88**				**0.94**				**0.00**				**0.86**	
HV %	**0.0%**	**0.0%**	**3.2%**	**7.2%**	**0.0%**	**2.0%**	**0.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**3.0%**	**0.0%**	**8.7%**

Client:	Michael Pompili
Project #:	827_011_MM
BTD #:	Location 2
Location:	Holliston, MA
Street 1:	Highland Street
Street 2:	Hollis Street
Count Date:	12/7/2021
Day of Week:	Tuesday
Weather:	Clouds & Sun, 40°F

BOSTON TRAFFIC DATA
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HEAVY VEHICLES

	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street 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	0	5	3	0	1	1	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	1	3	0	1	1	0	0	0	0	0	0	2	0	1
7:30 AM	0	0	2	2	0	1	3	0	0	0	0	0	0	1	0	0
7:45 AM	0	0	2	2	0	0	1	0	0	0	0	0	0	2	0	0
8:00 AM	0	0	0	4	0	0	3	0	0	0	0	0	0	2	0	0
8:15 AM	0	0	1	2	0	0	1	0	0	0	0	0	0	2	0	1
8:30 AM	0	0	0	4	0	0	1	0	0	0	0	0	0	2	0	0
8:45 AM	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	2
9:00 AM	0	0	2	0	0	1	1	0	0	0	0	0	0	1	0	0
9:15 AM	0	0	1	2	0	0	1	0	0	0	0	0	0	1	0	2
9:30 AM	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	0
9:45 AM	0	0	2	4	0	1	1	0	0	0	0	0	0	1	0	0
10:00 AM	0	0	1	3	0	1	1	0	0	0	0	0	0	3	0	3
10:15 AM	0	0	1	1	0	0	1	0	0	0	0	0	0	2	0	0
10:30 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1
10:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	1	4	0	0	3	0	0	0	0	0	0	1	0	1
11:15 AM	0	0	1	0	0	1	1	0	0	0	0	0	0	3	0	1
11:30 AM	0	0	0	3	0	1	0	0	0	0	0	0	0	2	0	2
11:45 AM	0	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	3	1	0	0	1	0	0	0	0	0	0	2	0	1
12:15 PM	0	0	0	2	0	0	1	0	0	0	0	0	0	3	0	0
12:30 PM	0	0	1	2	0	1	2	0	0	0	0	0	0	2	0	1
12:45 PM	0	0	1	3	0	0	1	0	0	0	0	0	0	1	0	1
1:00 PM	0	0	0	5	0	0	1	0	0	0	0	0	0	0	0	1
1:15 PM	0	0	3	3	0	0	3	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	1	1	0	0	0	0	0	0	4	0	0
2:00 PM	0	0	2	2	0	0	0	0	0	0	0	0	0	3	0	2
2:15 PM	0	0	2	5	0	1	3	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	3	4	0	1	4	0	0	0	0	0	0	5	0	2
2:45 PM	0	0	1	1	0	0	2	0	0	0	0	0	0	8	0	2
3:00 PM	0	0	2	4	0	0	2	0	0	0	0	0	0	3	0	0
3:15 PM	0	0	2	0	0	1	0	0	0	0	0	0	0	4	0	0
3:30 PM	0	0	4	1	0	0	2	0	0	0	0	0	0	3	0	0
3:45 PM	0	0	0	5	0	1	1	0	0	0	0	0	0	2	0	2
4:00 PM	0	0	2	5	0	0	0	0	0	0	0	0	0	2	0	1
4:15 PM	0	0	1	2	0	0	1	0	0	0	0	0	0	1	0	1
4:30 PM	0	0	0	2	0	0	1	0	0	0	0	0	0	3	0	0
4:45 PM	0	0	2	3	0	0	2	0	0	0	0	0	0	1	0	0
5:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
5:15 PM	0	0	1	1	0	0	1	0	0	0	0	0	0	2	0	0
5:30 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	1	0	0
5:45 PM	0	0	2	1	0	1	0	0	0	0	0	0	0	1	0	0

AM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
7:00 AM																
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**	**0**	**10**	**10**	**0**	**3**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**1**
PHF	**0.63**				**0.56**				**0.00**				**0.50**			

MID PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
12:30 PM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
1:30 PM	**0**	**0**	**5**	**13**	**0**	**1**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**
PHF	**0.75**				**0.67**				**0.00**				**0.50**			

PM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
2:15 PM																
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
3:15 PM	**0**	**0**	**8**	**14**	**0**	**2**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**4**
PHF	**0.79**				**0.65**				**0.00**				**0.50**			

Client:	Michael Pompili
Project #:	827_011_MM
BTD #:	Location 2
Location:	Holliston, MA
Street 1:	Highland Street
Street 2:	Hollis Street
Count Date:	12/7/2021
Day of Week:	Tuesday
Weather:	Clouds & Sun, 40°F

BOSTON TRAFFIC DATA
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PEDESTRIANS & BICYCLES

	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
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
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0
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	0	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

AM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
7:15 AM																
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MID PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
10:45 AM																
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PEAK HOUR	Highland Street Northbound				Highland Street Southbound				Eastbound				Hollis Street Westbound			
3:30 PM																
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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.

4/21/2022

Gap Study Data

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

DATE:	1/6/22
TIME:	8:18 AM
PROJECT/#:	Highland St Operations + Safety
PERFORMED BY:	L. Miller + ZRD
INTERSECTION:	Highland @ Hollis

RIGHT TURNS

Time (s)	# of Times	Accepted Gaps
0.0-4.0	IIII	
4.0-5.5	1	
5.5-6.5		
6.5-10.0	11	9.83 8.10
10.0-14.0	1	13.6
14.0-17.0		
17.0-21.0		
21.0-24.0		
24.0+		

LEFT TURNS

Time (s)	# of Times	Accepted Gaps
0.0-4.0	1	
4.0-5.5		
5.5-6.5		
6.5-7.1		
7.1-10.0	11	8.19 9.05
10.0-14.0	1	12.35
14.0-17.0		
17.0-21.0		
21.0-24.0		
24.0+	11	>24

NOTES: few small gaps during review period and few turning vehicles, actual accepted gaps could be smaller

DATE:	1/6/22
TIME:	7:50 AM
PROJECT/#:	Highland St. Operations + Safety
PERFORMED BY:	L. Miller + ZRD
INTERSECTION:	Highland @ Prentice

RIGHT TURNS

Time (s)	# of Times	Accepted Gaps
0.0-4.0		
4.0-5.5		
5.5-6.5	1	6.3
6.5-10.0	1	9.95
10.0-14.0		
14.0-17.0		
17.0-21.0	1	17.9
21.0-24.0		
24.0+		

LEFT TURNS

Time (s)	# of Times	Accepted Gaps
0.0-4.0	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 11	
4.0-5.5	111	5.13
5.5-6.5	1	5.72
6.5-7.1	11	6.55 6.95
7.1-10.0	1	7.18
10.0-14.0	1	12.58
14.0-17.0		
17.0-21.0	1	17.03
21.0-24.0		
24.0+		29.21

NOTES: right turn operates as channelized turn lane
very few right turns observed during AM peak

Capacity Analysis Methodology and **Results**

3: Highland Street & Prentice Street/High School Driveway Performance by lane

Lane	EB	NB	SB	All
Movements Served	LTR	LTR	LTR	
Denied Del/Veh (s)				0.3
Total Del/Veh (s)	217.8	2.6	1.6	71.5

6: Highland Street & Hollis Street Performance by lane

Lane	WB	NB	SB	All
Movements Served	LR	TR	LT	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	23.3	4.6	2.4	8.1

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	74.5

Intersection: 3: Highland Street & Prentice Street/High School Driveway

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	1387	101	42
Average Queue (ft)	752	32	4
95th Queue (ft)	1293	80	18
Link Distance (ft)	2379	652	307
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Highland Street & Hollis Street

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	224	86	164
Average Queue (ft)	100	16	32
95th Queue (ft)	186	60	93
Link Distance (ft)	1271	307	491
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

3: Highland Street & Prentice Street/High School Driveway Performance by lane

Lane	EB	NB	SB	All
Movements Served	LTR	LTR	LTR	
Denied Del/Veh (s)				0.2
Total Del/Veh (s)	37.0	5.3	2.3	10.8

6: Highland Street & Hollis Street Performance by lane

Lane	WB	NB	SB	All
Movements Served	LR	TR	LT	
Denied Del/Veh (s)				0.2
Total Del/Veh (s)	68.8	3.2	1.2	25.6

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	33.4

Intersection: 3: Highland Street & Prentice Street/High School Driveway

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	306	99	75
Average Queue (ft)	135	39	7
95th Queue (ft)	242	84	31
Link Distance (ft)	784	654	307
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Highland Street & Hollis Street

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	1112	31	112
Average Queue (ft)	292	1	15
95th Queue (ft)	808	11	56
Link Distance (ft)	1271	307	491
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

3: Highland Street & Prentice Street/High School Driveway Performance by lane

Lane	EB	NB	SB	All
Movements Served	LTR	LTR	LTR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	219.3	15.4	2.4	51.7

6: Highland Street & Hollis Street Performance by lane

Lane	WB	NB	SB	All
Movements Served	LR	TR	LT	
Denied Del/Veh (s)				0.3
Total Del/Veh (s)	30.7	3.6	1.7	9.8

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	57.4

Intersection: 3: Highland Street & Prentice Street/High School Driveway

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	1074	490	87
Average Queue (ft)	500	86	16
95th Queue (ft)	1049	270	58
Link Distance (ft)	1157	657	307
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Highland Street & Hollis Street

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	401	68	200
Average Queue (ft)	141	5	25
95th Queue (ft)	295	28	109
Link Distance (ft)	1271	307	491
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

3: Highland Street & Prentice Street/High School Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.4	0.5	0.0	0.3
Total Del/Veh (s)	15.3	20.0	9.9	15.7

6: Highland Street & Hollis Street Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.1
Total Del/Veh (s)	7.5	10.9	6.9	9.5

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	23.4

Intersection: 3: Highland Street & Prentice Street/High School Driveway

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	287	308	158
Average Queue (ft)	110	139	63
95th Queue (ft)	206	261	115
Link Distance (ft)	1157	657	307
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Highland Street & Hollis Street

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	125	188	138
Average Queue (ft)	60	96	59
95th Queue (ft)	94	145	96
Link Distance (ft)	1271	307	818
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

3: Highland Street & Prentice Street/High School Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.3	0.2	0.7	0.5
Total Del/Veh (s)	7.8	7.2	16.8	12.8

6: Highland Street & Hollis Street Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.4	0.0	0.4	0.3
Total Del/Veh (s)	17.3	8.4	12.0	12.6

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	23.3

Intersection: 3: Highland Street & Prentice Street/High School Driveway

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	107	99	312
Average Queue (ft)	61	45	172
95th Queue (ft)	96	75	288
Link Distance (ft)	784	654	306
Upstream Blk Time (%)			0
Queuing Penalty (veh)			3
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Highland Street & Hollis Street

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	354	164	249
Average Queue (ft)	110	61	83
95th Queue (ft)	260	104	171
Link Distance (ft)	1271	306	490
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 3

3: Highland Street & Prentice Street/High School Driveway Performance by approach

Approach	EB	NB	SB	All
Denied Del/Veh (s)	0.2	0.3	7.1	4.1
Total Del/Veh (s)	8.2	8.9	33.6	22.7

6: Highland Street & Hollis Street Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.5	0.3
Total Del/Veh (s)	10.2	8.2	32.8	19.0

Total Network Performance

Denied Del/Veh (s)	4.0
Total Del/Veh (s)	38.1

Intersection: 3: Highland Street & Prentice Street/High School Driveway

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	152	99	315
Average Queue (ft)	59	59	252
95th Queue (ft)	100	93	366
Link Distance (ft)	1157	657	306
Upstream Blk Time (%)			4
Queuing Penalty (veh)			30
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Highland Street & Hollis Street

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	146	155	832
Average Queue (ft)	83	75	199
95th Queue (ft)	135	130	541
Link Distance (ft)	1271	306	817
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 30

Multi-Way Stop **Warrant Analysis**

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

Multi-Way Stop Control (MWSC)
Warrant Analysis Worksheet

Project:	Highland Street Traffic Operations and Safety		
Major Rd:	Highland Street		
Minor Rd:	Prentice Street		
Date:	4/14/2022	**Jurisdiction:**	Town of Holliston
PN:	Y21997.21	**Analysis Year:**	2021

Warrant Analysis Summary

Criterion A - Traffic Signals

A.1 - Signal warrants met?	**No**
A.2 - Plans to install signal?	**No**

Criterion A
Not Met

Criterion B - Crash History

B - No. of correctible crashes:	**2**

Criterion B
Not Met

Criterion D - 80% Volumes

Criterion B met?	**No**
Criterion C met at 80%?	**Yes**

Criterion D
Not Met

Other Criteria

A - LT Conflicts?	**No**
B - Ped Conflicts?	**No**
C - Sight Distance Issues?	**No**
D - Operational Issues?	**No**
E - Other?	**No**

Other Criteria
Not Met

Criterion C - Minimum Volumes

Major street 85th percentile speed: **33** mph

	Major Total (≥300 vph)	Minor Total (≥200 vph)	
7:00 AM	691	397	X
8:00 AM	711	299	X
9:00 AM	408	240	X
10:00 AM	455	180	
11:00 AM	473	214	X
12:00 PM	480	196	
1:00 PM	483	230	X
2:00 PM	756	221	X
3:00 PM	908	264	X
4:00 PM	928	281	X
5:00 PM	825	236	X
6:00 PM	0	0	

C.1 - Major total threshold met (8 hrs)?	**Yes**
C.2 - Minor total threshold met (8 hrs)?	**Yes**
C.3 - Threshold reduction?	**No**

Criterion C
Met

MWSC Warrants Results

Met

McMAHON TRANSPORTATION ENGINEERS & PLANNERS

Multi-Way Stop Control (MWSC)
Warrant Analysis Worksheet

Project:	Highland Street Traffic Operations and Safety		
Major Rd:	Highland Street		
Minor Rd:	Hollis Street		
Date:	4/14/2022	**Jurisdiction:**	Town of Holliston
PN:	Y21997.21	**Analysis Year:**	2021

Warrant Analysis Summary

Criterion A - Traffic Signals

A.1 - Signal warrants met?	**No**
A.2 - Plans to install signal?	**No**

Criterion A
Not Met

Criterion B - Crash History

B - No. of correctible crashes:	**3**

Criterion B
Not Met

Criterion D - 80% Volumes

Criterion B met?	**No**
Criterion C met at 80%?	**Yes**

Criterion D
Not Met

Other Criteria

A - LT Conflicts?	**No**
B - Ped Conflicts?	**No**
C - Sight Distance Issues?	**Yes**
D - Operational Issues?	**No**
E - Other?	**No**

Other Criteria
Met

Criterion C - Minimum Volumes

Major street 85th percentile speed: **33** mph

	Major Total (≥300 vph)	Minor Total (≥200 vph)	
7:00 AM	844	169	
8:00 AM	763	207	X
9:00 AM	498	117	
10:00 AM	452	149	
11:00 AM	493	155	
12:00 PM	471	162	
1:00 PM	508	162	
2:00 PM	640	290	X
3:00 PM	796	331	X
4:00 PM	814	286	X
5:00 PM	686	269	X
6:00 PM	0	0	

C.1 - Major total threshold met (8 hrs)?	**Yes**
C.2 - Minor total threshold met (8 hrs)?	**No**
C.3 - Threshold reduction?	**No**

Criterion C
Not Met

MWSC Warrants Results

Met

Traffic Signal Warrant Analysis

HCS7 Warrants Report

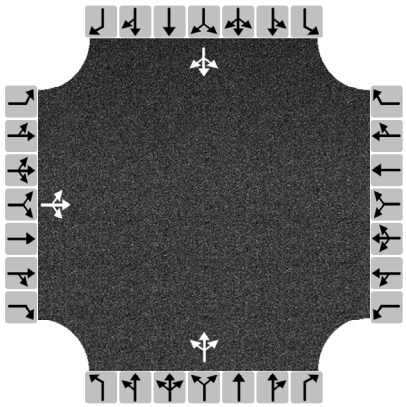
Project Information

Analyst	ZRD	Date	4/14/2022
Agency	McMahon Associates	Analysis Year	2022
Jurisdiction		Time Period Analyzed	2022 Existing
Project Description	Highland Street Traffic Operations and Safety - Prentice Street		

General

Major Street Direction	North-South	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	0	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	6000		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	0	0	0	1	0	0	1	0
Lane Usage		LTR						LTR			LTR	
Vehicle Volumes Averages (veh/h)	171	4	52	0	0	0	53	167	6	1	188	176
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	10

HCS7 Warrants Report

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (100%)	4A (100%)	4B (100%)
07 - 08	691	397	1088	0	0	Yes	Yes	No	Yes	Yes	No	Yes	No	No
08 - 09	711	299	1010	0	0	Yes	Yes	No	Yes	Yes	No	No	No	No
09 - 10	408	239	647	0	0	No	Yes	No	No	No	No	No	No	No
10 - 11	455	180	635	0	0	No	Yes	No	No	No	No	No	No	No
11 - 12	473	214	687	0	0	No	Yes	No	No	No	No	No	No	No
12 - 13	480	196	676	0	0	No	Yes	No	No	No	No	No	No	No
13 - 14	483	230	713	0	0	No	Yes	No	No	No	No	No	No	No
14 - 15	756	220	976	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
15 - 16	908	262	1170	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	928	280	1208	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	825	236	1061	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	7118	2753	9871	0	0	6	11	4	6	6	0	3	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	✔
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	✓
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	✓
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

HCS7 Warrants Report

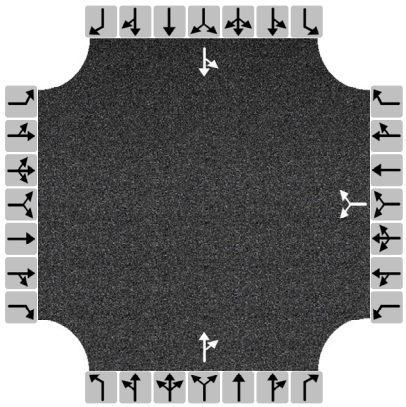
Project Information

Analyst	ZRD	Date	4/14/2022
Agency	McMahon Associates	Analysis Year	2022
Jurisdiction		Time Period Analyzed	2022 Existing
Project Description	Highland Street Traffic Operations and Safety - Hollis Street		

General

Major Street Direction	North-South	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	0	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	6000		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	0	0	0	0	0	0	1	0	0	1	0
Lane Usage					LR			TR			LT	
Vehicle Volumes Averages (veh/h)	0	0	0	154	0	37	0	180	157	32	210	0
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	10

HCS7 Warrants Report

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (100%)	4A (100%)	4B (100%)
07 - 08	844	169	1013	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	763	207	970	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
09 - 10	498	117	615	0	0	No	No	No	No	No	No	No	No	No
10 - 11	452	149	601	0	0	No	Yes	No	No	No	No	No	No	No
11 - 12	493	155	648	0	0	No	Yes	No	No	No	No	No	No	No
12 - 13	471	162	633	0	0	No	Yes	No	No	No	No	No	No	No
13 - 14	508	162	670	0	0	Yes	Yes	No	No	No	No	No	No	No
14 - 15	640	290	930	0	0	Yes	Yes	No	Yes	Yes	No	No	No	No
15 - 16	796	331	1127	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	814	286	1100	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	686	269	955	0	0	Yes	Yes	No	Yes	Yes	No	No	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	6965	2297	9262	0	0	7	10	4	6	6	0	2	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	✔
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	✓
Warrant 3: Peak Hour	✔
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	✓
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	