

## **EXHIBITS**

- A. TRAFFIC REPORT**
- B. PAGE 39, TRANSCRIPT OF PLANNING BOARD MEETING  
OCTOBER 22, 2020**
- C. CMG EMAIL, OCTOBER 22, 2020**
- D. NOISE STUDY**
- E. CONSERVATION ORDER OF CONDITIONS**
- F. LANDSCAPE BUFFER RENDERING**
- G. TRUCK ROUTE PLAN**

A

# 194 Lowland Street and 0 Lowland (off) Street, Holliston, MA

## Traffic Impact Study

Prepared for  
**Town of Holliston**

Prepared by  
**Howard Stein Hudson**

On behalf of  
**Auto Dealers Exchange of Concord, LLC**  
dba ADESA Boston

**October 2021**



**HOWARD STEIN HUDSON**

Engineers + Planners



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Appendix A – Traffic Count Data

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# Introduction

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*Howard Stein Hudson (HSH)* has conducted an evaluation of the transportation impacts of the proposed vehicle storage facility at 194 Lowland Street and 0 Lowland (off) Street (hereinafter the “Project” or “Project Site”) located in Holliston, Massachusetts. This transportation study adheres to the Massachusetts Department of Transportation (MassDOT) impact assessment guidelines and follows the methodology below.

- The Existing (2020) Condition analysis includes an inventory of the existing transportation conditions such as roadway characteristics, transit, loading, 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 2028, based on a seven-year horizon from the year of the filing of this traffic study.
- The No-build (2028) 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 (2028) 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 (2028) Condition analysis. This section will also address truck access and route analysis to the Project Site. 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.

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## Project Description

The Project Site is located in the Lowland Industrial Park in Holliston, Massachusetts. The proposed Project consists of a vehicle storage facility for approximately 585 cars and a 260-square-foot (sf) security booth. Car sales from this facility are expected to be completed at ADESA’s Framingham facility, leaving no sales on the Project Site. Trips to the Project Site will be for the delivery of cars for sale and removal of sold cars. This facility will operate as a second location for the Proponent’s business with their main site, ADESA Boston, located at 63 Western Avenue in Framingham, Massachusetts. The Project is expected to accommodate approximately 585 spaces on-site.



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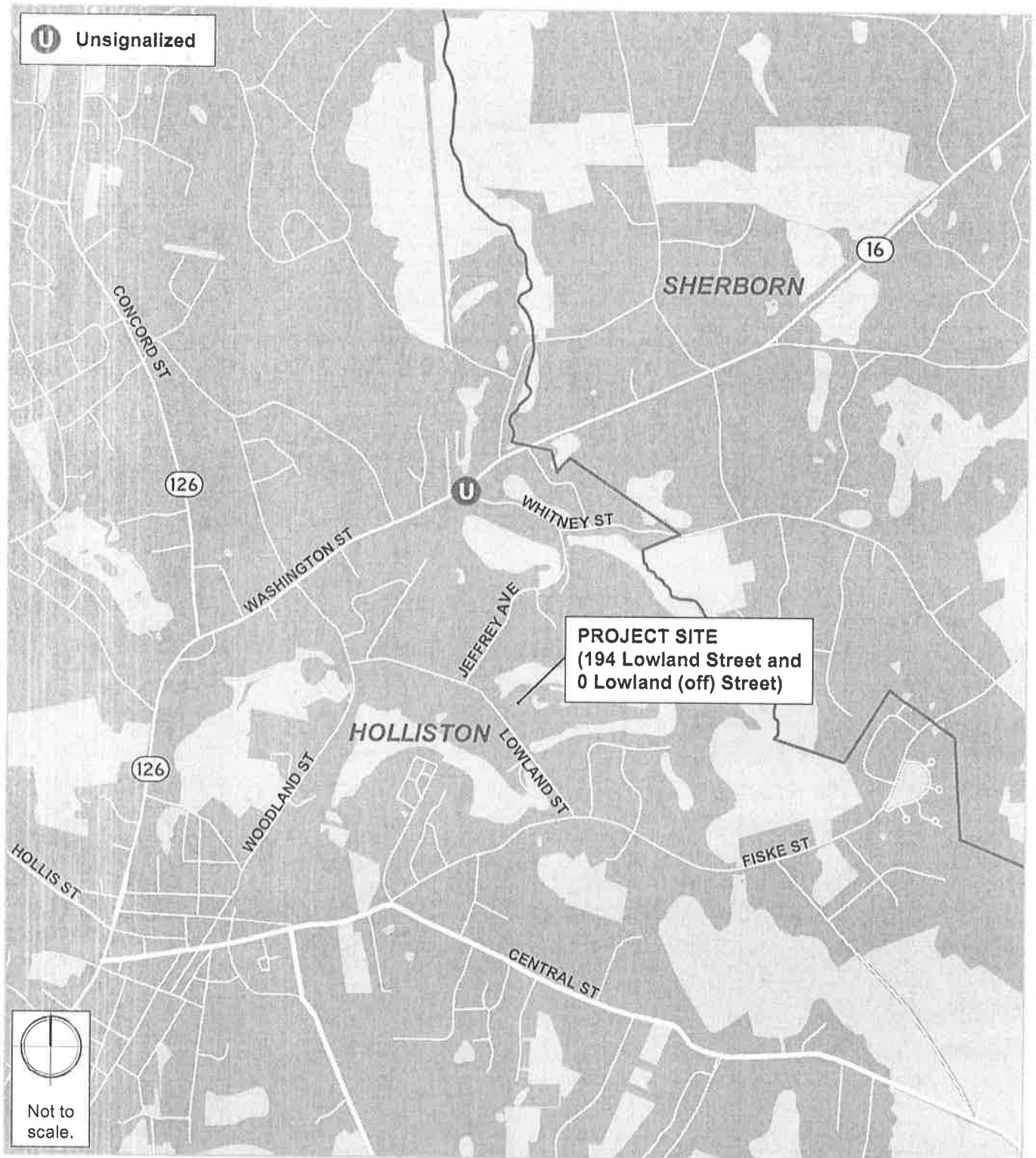
## Study Area

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



Figure 1. *Study Area*







## Existing Condition

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

### Roadway Descriptions

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The study area includes the following roadways, which are categorized according to the 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-foot-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-foot-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.

### Intersection Descriptions

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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.



## Public Transportation

The only fixed route transit service that runs through Holliston is bus route 6 operated by the MetroWest Regional Transit Authority (MWRTA). This service runs along Route 126 from downtown Framingham to south of downtown Holliston at Mission Springs along Washington Street. It uses a Flag Down System where passengers can stop the bus anywhere along the route where it is safe to do so. The MWRTA also offers on-demand van service to seniors on weekdays.

## 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 here to.

## 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 two percent 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 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.



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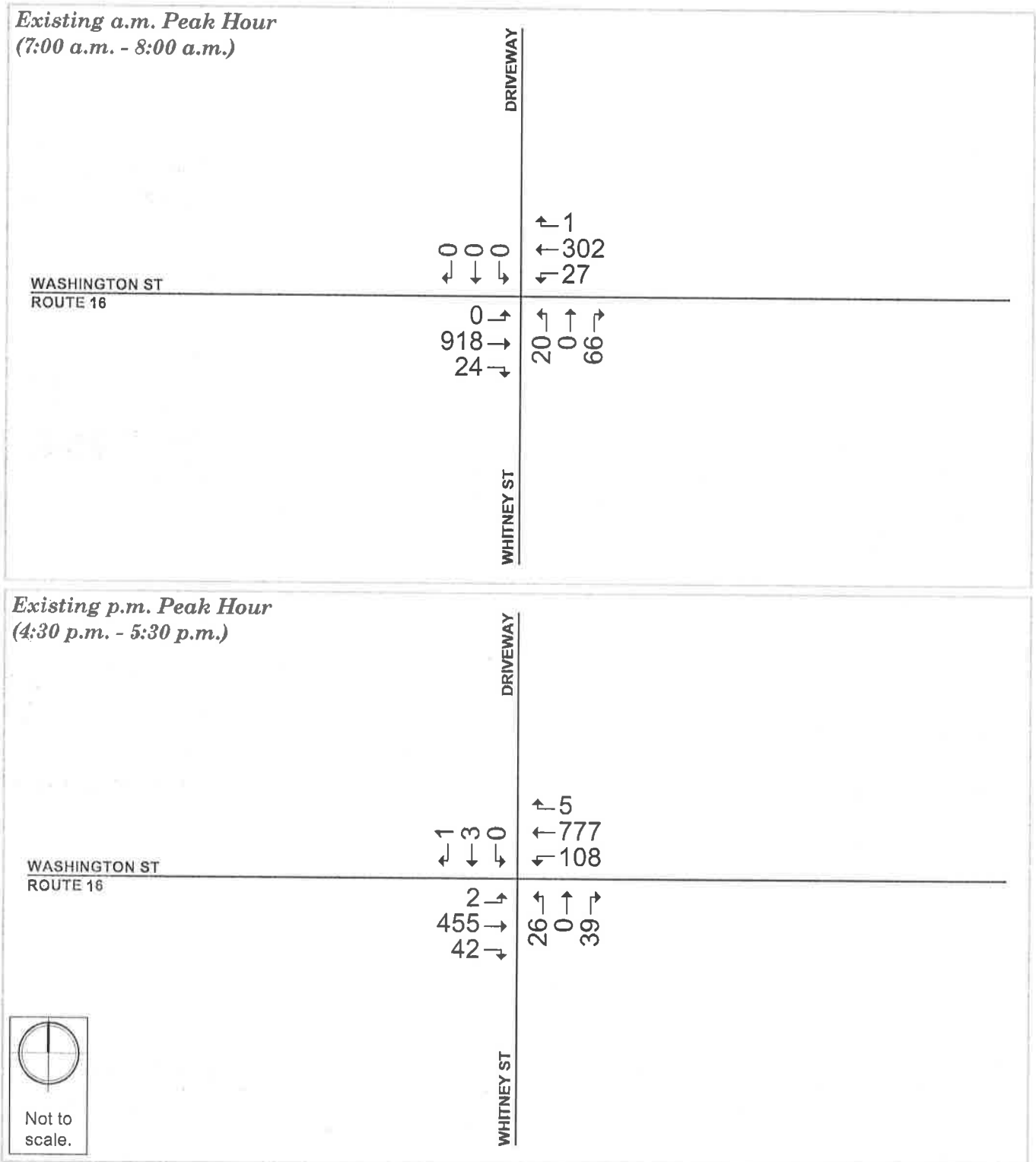
## Existing (2020) Traffic Volumes

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The existing traffic volumes that were collected in October 2020 were adjusted based on the seasonal and COVID-19 factors to develop the Existing (2020) Condition traffic volumes. The Existing (2020) Condition weekday a.m. and p.m. peak hour volumes are shown in **Figure 2**.



Figure 2. *Existing (2020) Condition Traffic Volumes, Weekday a.m. and p.m. Peak Hours*





## Motor Vehicle Collision Data

HSH compiled motor vehicle crash data from the MassDOT Crash Records for the most recent three-year period for which they are available (2016-2018). Crash data are summarized in **Table 1**.

**Table 1. Crash Data Summary**

Description/Scenario		Segment	Intersection
		Whitney St/Jeffrey Ave Between Washington St and Lowland St	Washington Street at Whitney Street
<b>Total Crashes</b>		<b>1</b>	<b>4</b>
Year	2016	1	2
	2017	0	1
	2018	0	1
Severity	Property Damage Only	1	3
	Injury	0	1
Collision Type	Angle	1	1
	Rear-end	0	1
	Sideswipe, opposite direction	0	1
	Single vehicle crash	0	1
Time of Day	Weekday a.m. Peak (7 – 9 a.m.)	1	1
	Weekday p.m. Peak (4 – 6 p.m.)	0	2
	Weekday Off-Peak	0	1
Roadway Surface	Dry	0	4
	Snow	1	0
Light Condition	Daylight	1	3
	Dark – roadway not lighted	0	1
Involving Heavy Truck/Trailer		0	0
Crash Rate		--	0.32
District Crash Rate		1.20	0.61**

Source: MassDOT, Impact Crash Data Portal

\*\*Crashes per million entering vehicles (MEV)

One segment crash occurred along Whitney Street/Jeffrey Avenue and four crashes at the intersection of Washington Street and Whitney Street. No crashes between 2016 – 2018 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 0.32 crashes per MEV, lower than the District 3 average of 0.61 crashes per MEV. The crash rate worksheet is provided in **Appendix C** attached hereto.



## No-build (2028) Condition

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The No-build (2028) 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

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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 2028, as is prescribed in the MassDOT Traffic Impact Study Guidelines.

### Specific Development Projects

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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 sf of warehouse space within the Hopping Brook Business Park.

### Roadway Improvement Projects

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Based on a review of the Town of Holliston website, no future roadway improvement projects were identified to be completed by 2028 outside of routine maintenance work.

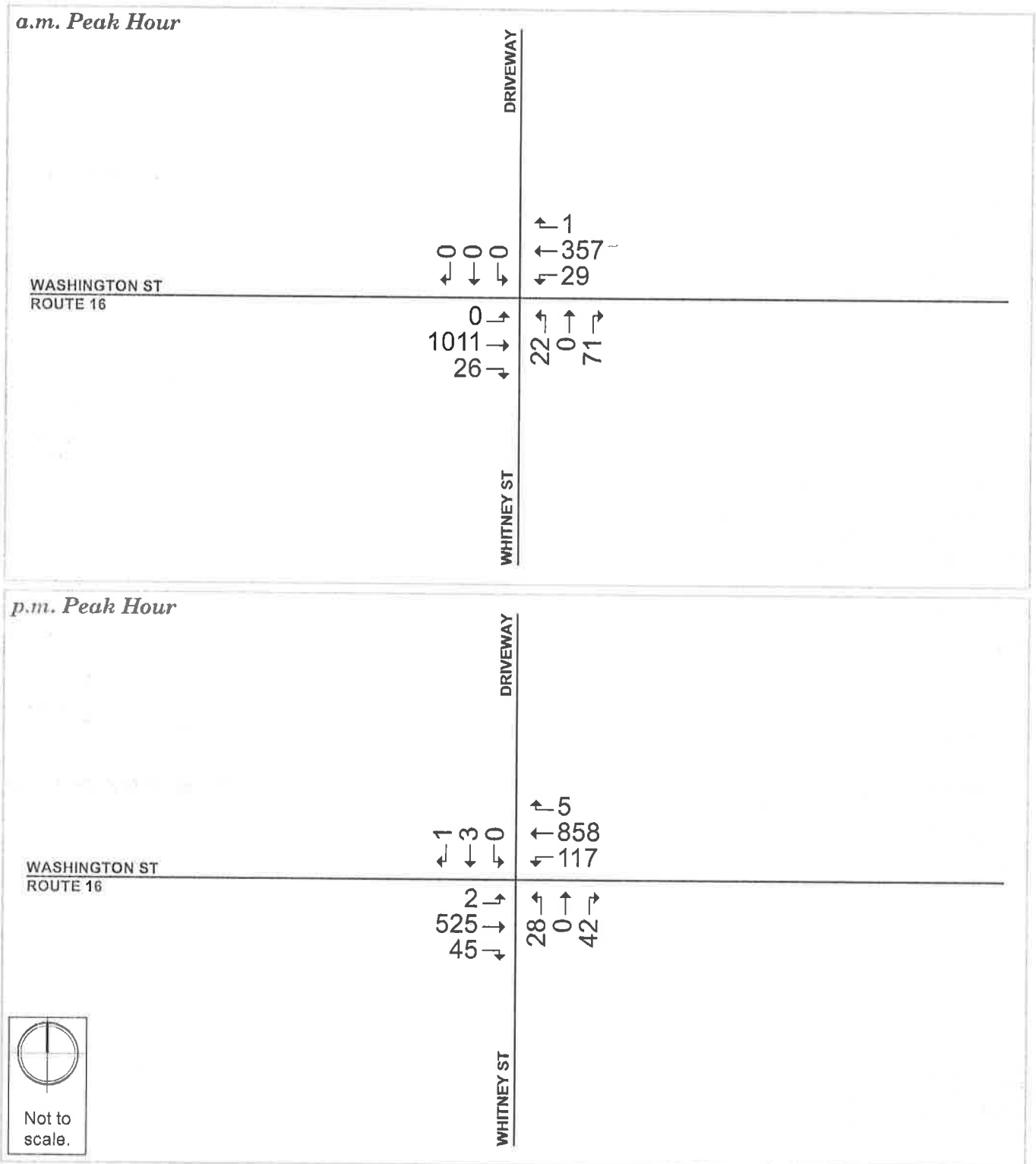
### No-build (2028) Traffic Volumes

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The 1% per year annual growth rate, compounded annually, was applied to the Existing (2020) Condition traffic volumes; then the traffic volumes associated with the background development projects listed previously were added to develop the No-build (2028) Condition traffic volumes. The No-build (2028) peak hour traffic volumes for the a.m. and p.m. peak hours are shown in **Figure 3**.



Figure 3. *No-build (2028) Condition Traffic Volumes, Weekday a.m. and p.m. Peak Hours*





## Build (2028) Condition

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The proposed Project will consist of a vehicle storage facility with access off Lowland Street. The Project Site will store approximately 585 vehicles and have a 260-sf security booth on-site.

### Truck Access

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At the regional level, trucks delivering vehicles from the west will come from I-495 and will exit onto Medway Road West (Route 109), turning right onto Beaver Street and then right onto East Main Street (Route 109) eastbound in Milford, continuing to Whitney Street. On Whitney Street, they will continue onto Jeffrey Street turning left on Lowland Street to the Project Site. Trucks could follow the same route in reverse to get back to I-495. Trucks coming from the east of the Project will remain on Route 16. **Figure 4** shows the regional route that large trucks delivering cars to the Project Site would take. When coming from I-495, trucks delivering vehicles from the west could also come from I-495 and exit onto Medway Road (Route 109). Traveling east on Milford Street (Route 109), they could reach the intersection with Summer Street (Route 126) where they will turn left. Trucks could then continue north and turn right at the intersection with Washington Street. They would then continue east and turn right at the intersection with Whitney Street. From Whitney Street they would continue onto Jeffrey Avenue and turn left at Lowland Street. Trucks will follow the same route in reverse to get back to I-495. All drivers will be given route maps to follow that show the regional roadway access. Trucks will be directed not to use Fiske Street south of the Project Site, which has nighttime weight limit restrictions.

### Loading/Deliveries

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Car deliveries to the Project Site will be completed by nine-car carrier trucks. The proposed design of the entering and exiting site driveways are angled in a way to permit truck movements in and out of Lowland Street from the north only. The driveway design will discourage trucks from accessing the Project Site via Lowland Street to the south. Additional signage will also be placed at the two driveways to direct the flow of vehicles as well as to indicate that vehicles may not exit left via Lowland Street to the south. All vehicles will enter at the southern driveway and exit at the northern driveway. Car unloading activity will take place in the paved area on-site between the two driveways. The proposed site plan and access off Lowland Street are shown in **Figure 5**.



Figure 4. *Truck Routes*

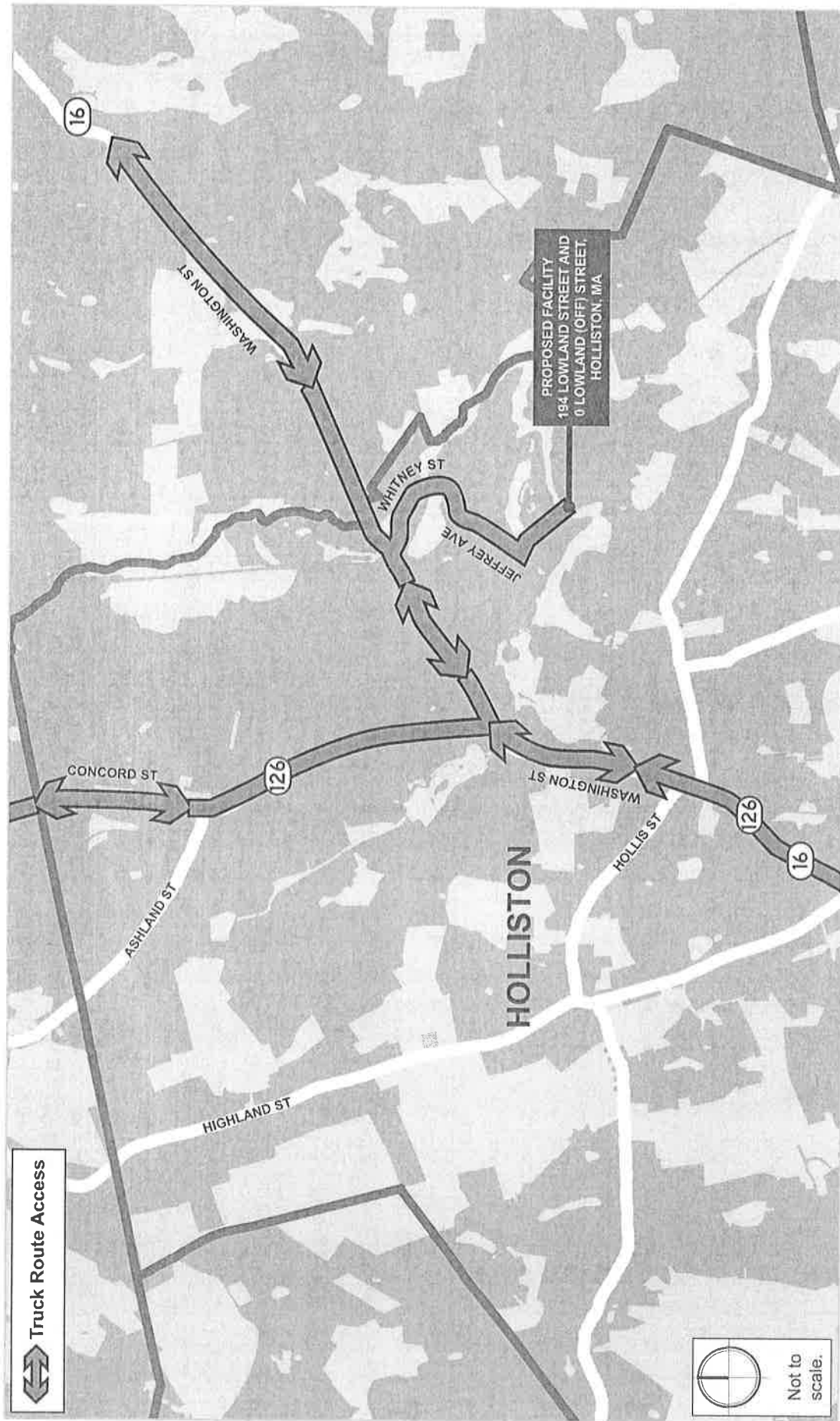
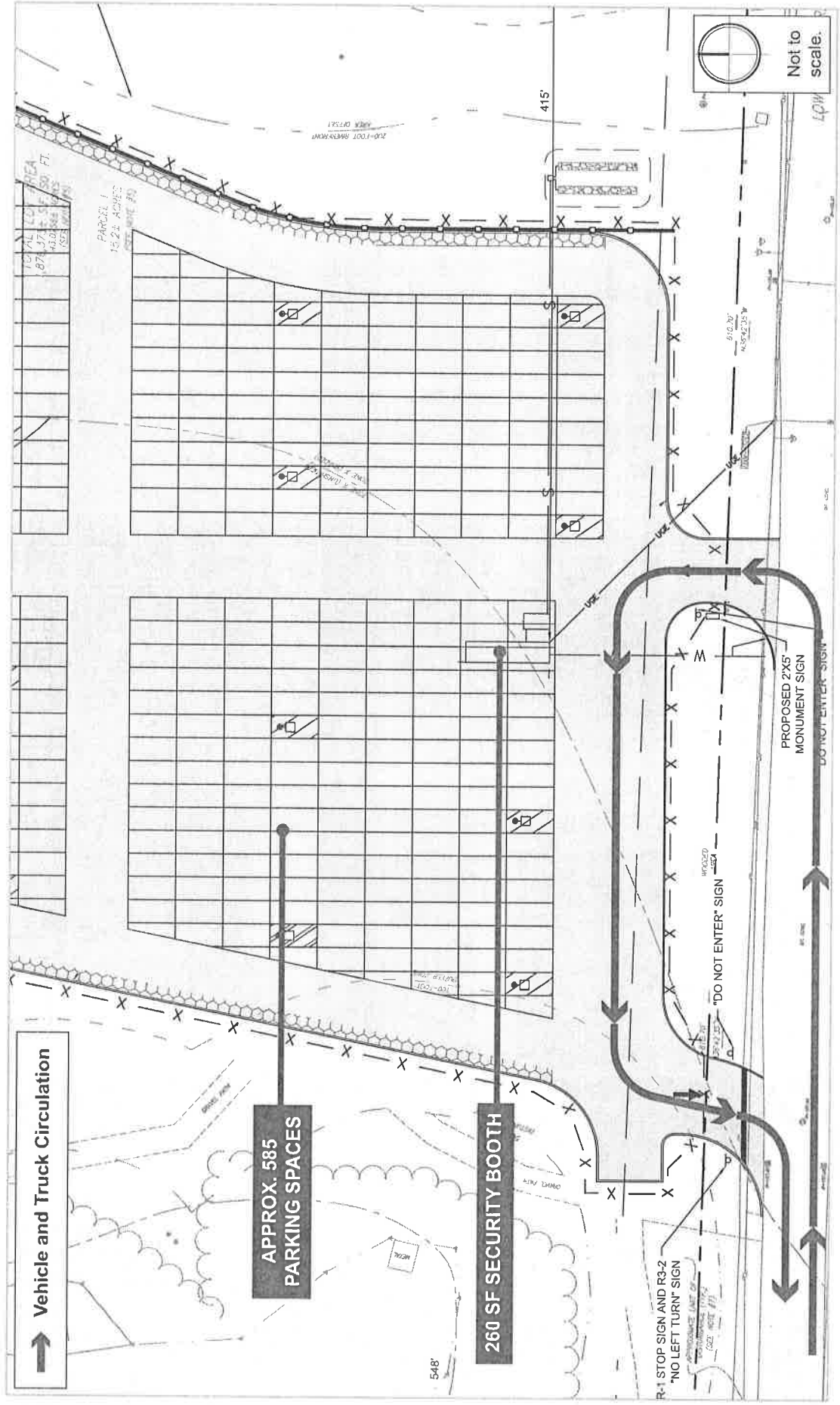


Figure 5. Site Plan and Driveway Access





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## Sight Distance

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Sight distances at the proposed driveways were measured using AutoCAD and provided by Kimley-Horn. To the southeast on Lowland Street, the sight distance is at least 700 feet. To the northwest on Lowland Street, the sight distance is approximately 360 feet. The stopping sight distance (SSD) required for a road that is 45 mph is at least 360 feet based on the *Policy on Geometric Design of Highways and Streets* (AASHTO Green Book). There were no posted speed limit signs identified on Lowland Street; however, based on the classification of this road, it is likely not greater than 45 mph. Therefore, the sight distances meet the AASHTO Green Book requirements.

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## Trip Generation

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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* 10<sup>th</sup> Edition. Instead, trips for the Project were estimated using expected facility operations and assumptions based on client 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.

The following assumptions were used for the Project. An average of 10 nine-car carriers are expected to deliver cars to the Project Site per day. This results in a maximum of 20 trips per day. Car sales are to be completed at ADESA's Framingham facility; therefore, passenger trips arriving to the Project Site are not expected to be for reasons other than to pick-up/remove a sold car from the Project Site. Cars shall be removed from the Project Site with two-car carriers or driven right off the lot by individual drivers. Vehicles driven directly off the Project Site would be removed by ADESA personnel brought to the Site by vans. Vans have a capacity up to eight people; therefore, for every van trip entering and exiting, there could be up to seven additional vehicle trips exiting for a total of nine trips. By comparison, the two-car carriers would only generate two trips, one entering and one exiting, for every two cars sold.

Based on provided car sales information, about 600 cars are expected to be sold per week which results in an average of 120 cars a day for a typically five-day operating week (Monday-Friday). With operations only occurring from 8 a.m. – 5 p.m., the peak hour trips were determined by splitting the daily trips across nine hours for an average of 13 cars removed each hour. For this analysis, it was assumed that two of the two-car carriers and two partially filled vans would be used each hour to remove sold cars off the Site. Two-car carriers would remove four vehicles and produce four total trips. The remaining nine sold cars would require nine employees across two vans for a total of two entering trips and 11 exiting trips. This approach produces 17 trips during the a.m. and p.m. peak hours. A summary of the trip generation is shown in **Table 2**.



**Table 2. Trip Generation**

Time Period/ Direction		Car Storage Facility <sup>2</sup>			
		Vehicles	2-Car Carriers	9-Car Carriers	Total Trips
Daily	In	18	18	10	46
	Out	<u>102</u>	<u>18</u>	<u>10</u>	<u>130</u>
	Total	120	36	20	176
a.m. Peak Hour	In	2	2	1	5
	Out	<u>11</u>	<u>2</u>	<u>1</u>	<u>14</u>
	Total	13	4	2	19
p.m. Peak Hour	In	2	2	1	5
	Out	<u>11</u>	<u>2</u>	<u>1</u>	<u>14</u>
	Total	13	4	2	19

As shown in Table 2, there are expected to be 19 vehicle trips (5 in and 14 out) during the a.m. and p.m. peak hour. Daily there are expected to be 176 vehicle trips (46 in and 130 out).

## 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 25% of truck trips will come from Route 16 east of the Project Site and the remaining 75% of truck trips will come from either I-495 east on Route 16 or I-90 south on Route 126 to the Project Site. Additionally, passenger vehicle trips to and from the Project Site for the purpose of picking up cars that have been sold were allocated with the same distribution as the existing traffic flow conditions. The trip distribution percentages were applied to the vehicle trip generation to determine the project-generated trips for the weekday a.m. and p.m. peak hours as shown in Figure 6.

## Build (2028) Traffic Volumes

Project-generated vehicle trips were added to the No-build (2028) Condition vehicular traffic volumes to develop the Build (2028) Condition vehicular traffic volumes. The Build (2028) Condition a.m. and p.m. peak hour traffic volumes are shown in Figure 7.



Figure 6. *Project-generated Vehicle Trips, Weekday a.m. and p.m. Peak Hours*

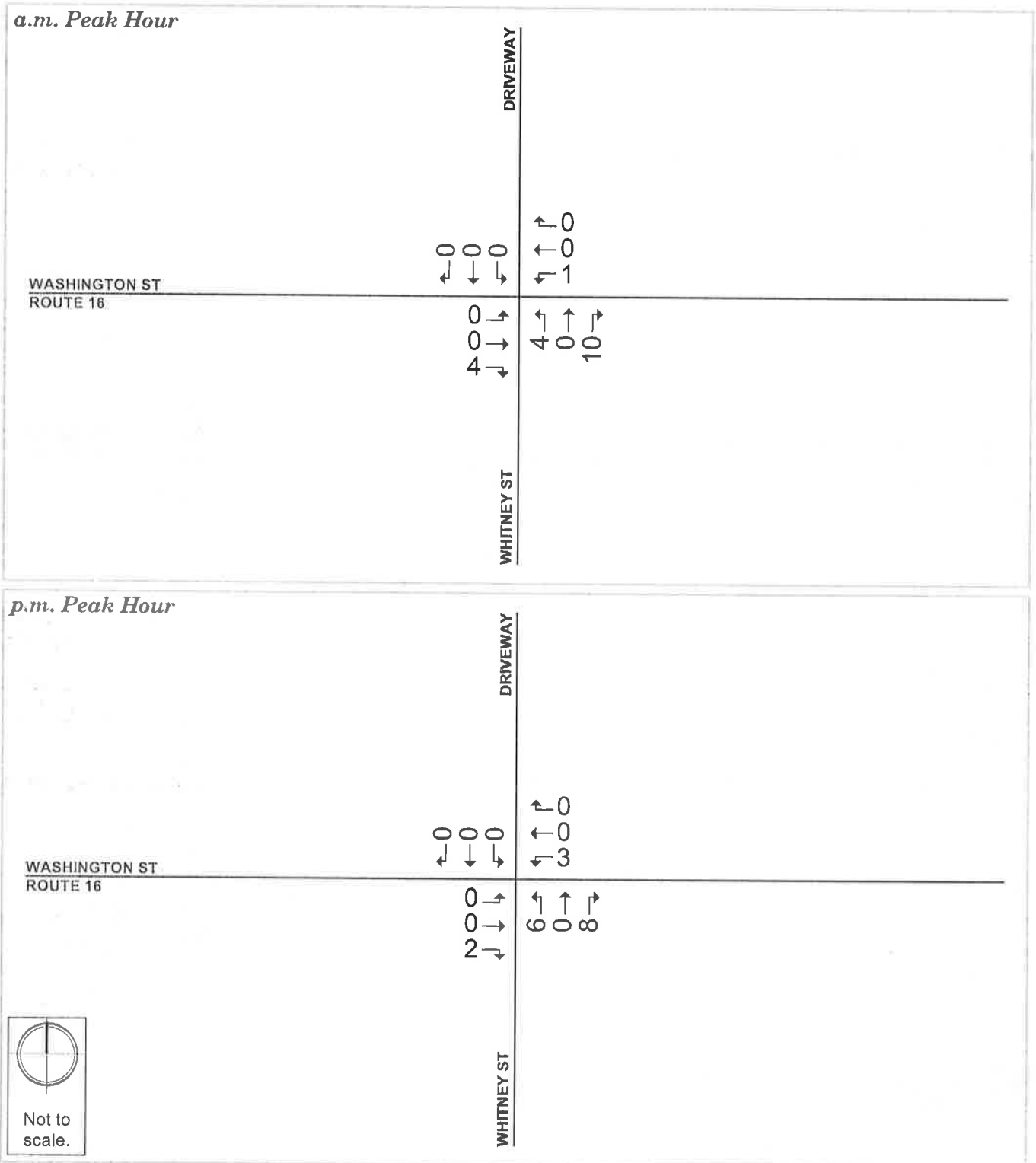
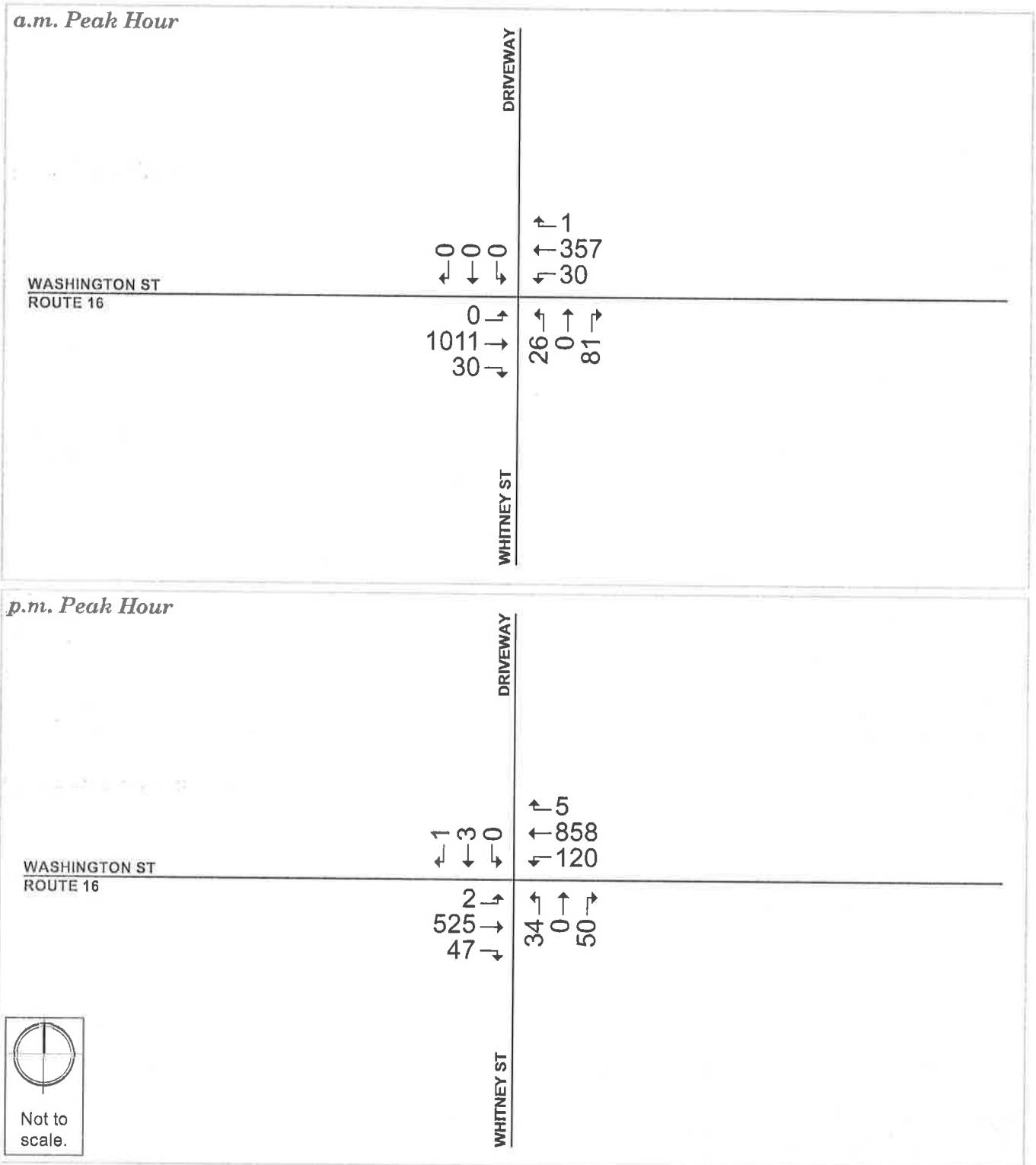




Figure 7. *Build (2028) Condition Traffic Volumes, Weekday a.m. and p.m. Peak Hours*





## 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)*, 6<sup>th</sup> Edition. The latest HCM edition, 6<sup>th</sup>, 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.

**Table 3. Level of Service Criteria**

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

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 95<sup>th</sup> 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 95<sup>th</sup> percentile queue represents what can be considered a “worst case” condition. Queues at an intersection are generally below the 95<sup>th</sup> percentile length throughout most of the peak hour. It is also unlikely that 95<sup>th</sup> 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 2020, No-build 2028, and Build 2028 Conditions.

## SYNCHRO METHODOLOGY

At unsignalized intersections, it is not uncommon for the side-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 quickly turn with smaller gaps between vehicles rather than wait for a larger gap. Under normal conditions, this typically would be corrected for by collecting actual gap acceptance times through field observations. As discussed previously the current volumes are lower than pre-pandemic volumes, therefore we do not have 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 2020, No-build 2028, and Build 2028 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

Intersection/Movement	Existing (2020) Condition			No-build (2028) Condition			Build (2028) Condition		
	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	Condition
a.m. Peak Hour									
Washington Street / Whitney Street	-	-	-	-	-	-	-	-	-
Washington St NB left/thru/right	A	0	0	0	A	0	0	0	0
Washington St SB left/thru/right	B	10.9	0.06	5	B	11.6	0.06	5	0.06
Whitney St WB left/thru/right	F	56.1	0.64	90	F	80.2	0.74	110	0.87
Driveway EB left/thru/right	A	0	0	0	A	0	0	0	0
p.m. Peak Hour									
Washington Street / Whitney Street	-	-	-	-	-	-	-	-	-
Washington St NB left/thru/right	A	9.6	0	0	B	10.1	0	0	0
Washington St SB left/thru/right	A	9.0	0.12	10	A	9.6	0.14	13	0.15
Whitney St WB left/thru/right	F	75.8	0.67	90	F	176.1	0.96	130	1.19
Driveway EB left/thru/right	E	45.0	0.08	8	F	68.7	0.08	5	0.08

# = 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

Intersection/Movement	Existing (2020) Condition			No-build (2028) Condition			Build (2028) Condition		
	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	LOS	Delay (sec)	V/C Ratio	95th % Queue (ft)	LOS
a.m. Peak Hour									
Washington Street / Whitney Street	-	-	-	-	-	-	-	-	-
Washington St NB left/thru/right	A	0	0	0	A	0	0	0	0
Washington St SB left/thru/right	A	9.3	0.04	3	A	9.7	0.04	3	0.04
Whitney St WB left/thru/right	C	21.9	0.35	38	D	25.8	0.38	43	D
Driveway EB left/thru/right	A	0	0	0	A	0	0	0	A
p.m. Peak Hour									
Washington Street / Whitney Street	-	-	-	-	-	-	-	-	-
Washington St NB left/thru/right	A	8.6	0	0	A	8.9	0	0	A
Washington St SB left/thru/right	A	8.4	0.10	8	A	8.8	0.12	10	A
Whitney St WB left/thru/right	D	25.1	0.33	35	D	34.9	0.40	45	E
Driveway EB left/thru/right	C	24.1	0.04	3	D	31	0.03	3	D

# = 95th percentile volume exceeds capacity, queue may be longer.  
~ = Volume exceeds capacity, queue is theoretically infinite.



## EXISTING (2020) CONDITION

All intersection approaches operate at LOS D or better in the Existing (2020) 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 (2028) CONDITION

All intersection approaches continue to operate at similar levels of service in the No-build (2028) Condition as the Existing (2020) Condition.

## BUILD (2028) CONDITION

The intersections and approaches are expected to operate the same in the Build (2028) Condition as in the No-build (2028) 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. For that reason, comparing the No-build (2028) and the Build (2028) Conditions shows that added trips due to the Project only increase delay by about three to six seconds during peak hours. Therefore, Project trips are not expected to have a significant impact on vehicle operations.

In the Build (2028) Condition, with COVID-19 adjustments, the 95<sup>th</sup> percentile queue is 175 feet, about seven vehicles, during the p.m. peak hour, while the scenario without COVID-19 adjustments shows a queue of 63 feet, or three vehicles. The 95<sup>th</sup> 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

---

The Project is proposing a vehicle storage facility for approximately 585 spaces with a 260-sf security booth. Based on forecasted sales and business operations logistics, the Project is expected to generate 176 daily trips to occur during business operating hours between 8 a.m. and 5 p.m. on a weekday. Typical morning and evening peak hours are expected to have about 19 new trips per hour which, on average, is one car every three 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.

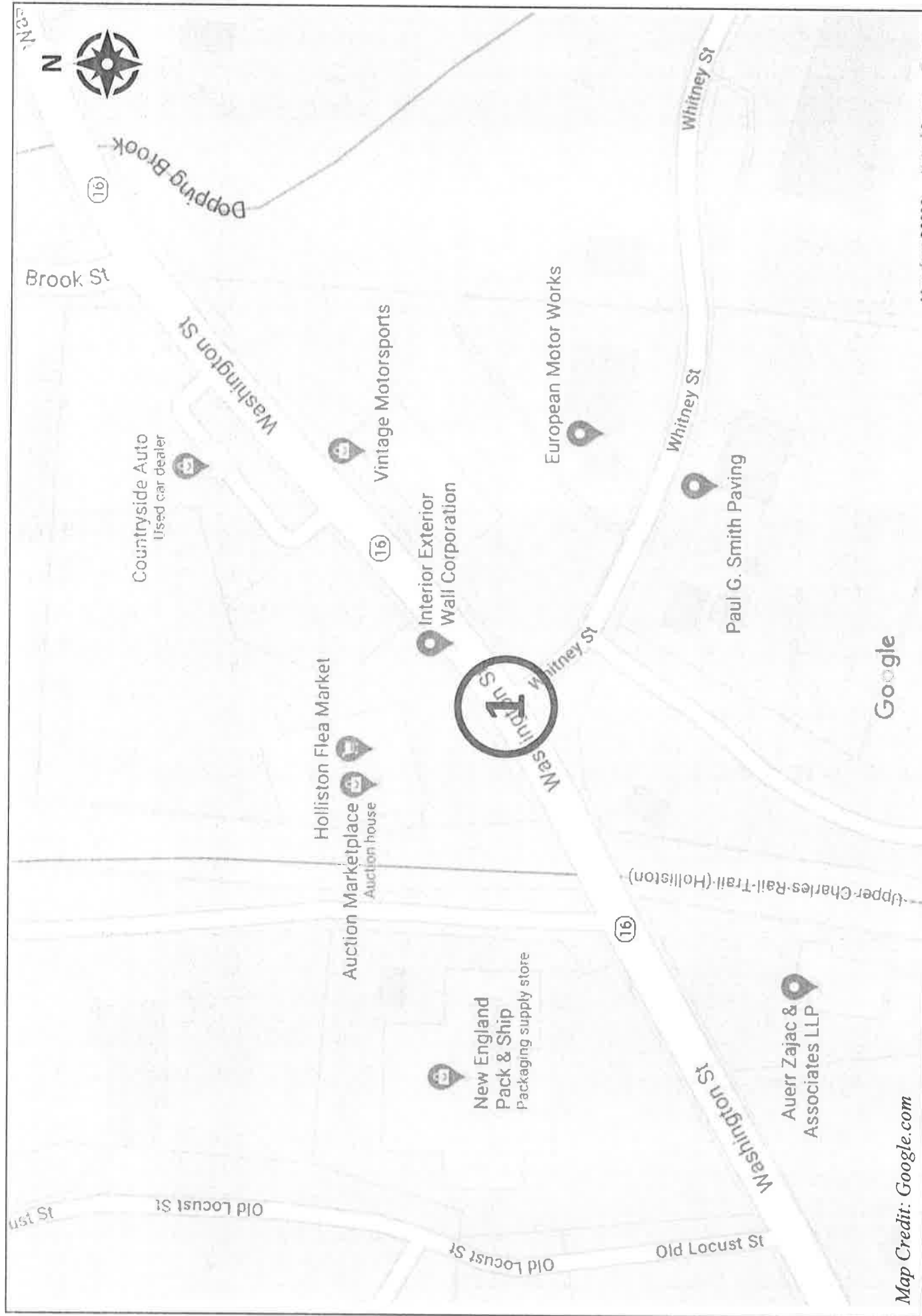


HOWARD STEIN HUDSON

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# Appendix A

## Traffic Count Data



Map Credit: Google.com

<b>BOSTON</b> TRAFFIC DATA	BTD ID: 621_C81_HSH	Holliston, MA	# of TMC's: 01	Map data ©2020	United States	Terms
	Collected on October 8, 2020		# of ATR's: 00	Client: Howard Stein Hudson	Contact: Vannesa Methoxha	

Client: Vanessa 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

# BOSTON

## TRAFFIC DATA

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

### PASSENGER CARS & HEAVY VEHICLES COMBINED

Start Time	Whitney Street Northbound					Parking Lot Driveway Southbound					Washington Street (Route 16) Eastbound					Washington Street (Route 16) Westbound				
	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				

Start Time	Whitney Street Northbound				Parking Lot Driveway Southbound				Washington Street (Route 16) Eastbound				Washington Street (Route 16) Westbound			
	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 7:00 AM to 8:00 AM PHF HV %	Whitney Street Northbound					Parking Lot Driveway Southbound					Washington Street (Route 16) Eastbound					Washington Street (Route 16) Westbound				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right				
	0	20	0	66	0	0	0	0	0	0	612	24	0	27	201	1				
	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%				
	0.77					0.00					0.90					0.76				

PM PEAK HOUR 4:30 PM to 5:30 PM PHF HV %	Whitney Street Northbound					Parking Lot Driveway Southbound					Washington Street (Route 16) Eastbound					Washington Street (Route 16) Westbound				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right				
	0	26	0	39	0	0	3	1	0	2	303	42	0	108	518	5				
	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%				
	0.74					0.50					0.93					0.91				

Client: Vanessa Methoxha  
 Project #: 621\_C81\_HSH  
 BTID #: 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

# BOSTON

## TRAFFIC DATA

P.O. BOX 1723, Framingham, MA 01701  
 Office: 978-746-1259  
 DataRequest@BostonTrafficData.com  
 www.BostonTrafficData.com

### HEAVY VEHICLES

Start Time	Whitney Street Northbound						Parking Lot Driveway Southbound						Washington Street (Route 16) Eastbound						Washington Street (Route 16) Westbound					
	Left			Thru			Left			Thru			Left			Thru			Left			Thru		
	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right
7:00 AM	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Whitney Street Northbound						Parking Lot Driveway Southbound						Washington Street (Route 16) Eastbound						Washington Street (Route 16) Westbound					
	Left			Thru			Left			Thru			Left			Thru			Left			Thru		
	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right	U-Turn	Left	Right
4:00 PM	0	3	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0
4:30 PM	0	3	0	0	0	0	0	0	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	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	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	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	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR		Whitney Street Northbound						Parking Lot Driveway Southbound						Washington Street (Route 16) Eastbound						Washington Street (Route 16) Westbound					
7:45 AM to 8:45 AM		U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right				
		0	1	0	9	0	0	0	0	0	0	0	4	0	0	32	4	0	7	18	0				
PHF		0.63						0.00						0.69						0.69					

PM PEAK HOUR		Whitney Street Northbound						Parking Lot Driveway Southbound						Washington Street (Route 16) Eastbound						Washington Street (Route 16) Westbound					
4:30 PM to 5:30 PM		U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
		0	3	0	0	0	0	0	0	0	0	0	0	0	0	8	5	0	0	5	17	0	0	0	0
PHF		0.25						0.00						0.46						0.79					

Client: Vanessa Methoxha  
 Project #: 621\_C81\_HSH  
 Location 1: Holliston, MA  
 Location 2: Washington Street (Route 16)  
 Street 1: Whitney Street  
 Street 2: Whitney Street  
 Count Date: 10/8/2020  
 Day of Week: Thursday  
 Weather: Clouds & Sun, 60°F



### PEDESTRIANS & BICYCLES

Start Time	Whitney Street Northbound					Parking Lot Driveway Southbound					Washington Street (Route 16) Eastbound					Washington Street (Route 16) Westbound				
	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	

Start Time	Whitney Street Northbound					Parking Lot Driveway Southbound					Washington Street (Route 16) Eastbound					Washington Street (Route 16) Westbound				
	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	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<sup>1</sup>

Start Time	Whitney Street Northbound					Parking Lot Driveway Southbound					Washington Street (Route 16) Eastbound					Washington Street (Route 16) Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM to 8:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	

#### PM PEAK HOUR<sup>1</sup>

Start Time	Whitney Street Northbound					Parking Lot Driveway Southbound					Washington Street (Route 16) Eastbound					Washington Street (Route 16) Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:30 PM to 5:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	

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





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## **Appendix B**

### Adjustment Factors

Covid-19 Adjustment Factor  
 Washington Street east of Whitney Street  
 Average Peak Hour Volumes

		Station ID #4815				Collected Data				Growth Factor	
		March 2020				October 2020					
		A.M.	P.M.			A.M.	P.M.			A.M.	P.M.
Northeast		1266	491			678	342			87%	44%
Southwest		407	976			229	631			78%	55%

Use a Growth of 50% on Existing Data

Use a Growth of 50%  
 on Existing Data

# Massachusetts Highway Department

## 4815\_EB Weekly Volume Report - Mon 03/02/2020 - Sun 03/08/2020

**Location ID:** 4815\_EB  
**Located On:** WASHINGTON STREET  
**Direction:** EB  
**Community:** Holliston  
**AADT:** 10283

**Type:** SPOT  
**EAST OF:** WHITNEY STREET  
**Period:** Mon 03/02/2020 - Sun 03/08/2020

Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Avg	
12:00 AM		11	18					15	
1:00 AM		11	6					9	
2:00 AM		8	9					9	
3:00 AM		26	24					25	
4:00 AM		100	82					91	
5:00 AM		479	486					483	
6:00 AM		1297	1205					1251	
7:00 AM		1289	1243					1266	
8:00 AM		1078	1137					1108	
9:00 AM		639	688					664	
10:00 AM		462	482					472	
11:00 AM	390	388						389	
12:00 PM	333	448						391	
1:00 PM	327	356						342	
2:00 PM	404	427						416	
3:00 PM	420	429						425	
4:00 PM	401	428						415	
5:00 PM	492	489						491	
6:00 PM	290	348						319	
7:00 PM	207	229						218	
8:00 PM	115	125						120	
9:00 PM	78	84						81	
10:00 PM	55	63						59	
11:00 PM	32	28						30	
Total	3544	9242	5380	0	0	0	0		
24HrTotal	8944		9222						9083
AM Pk Hr	6:00								
AM Peak	1297								1297
PM Pk Hr	5:00								
PM Peak	489								489
% Peak Hr	14.03%								14.00%
% Peak Hr	5.50%		14.06%						9.78%

# Massachusetts Highway Department

## 4815\_WB Weekly Volume Report - Mon 03/02/2020 - Sun 03/08/2020

Location ID:	4815_WB
Located On:	WASHINGTON STREET
Direction:	WB
Community:	Holliston
AADT:	9082

Type:	SPOT
EAST OF:	WHITNEY STREET
Period:	Mon 03/02/2020 - Sun 03/08/2020

Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Avg
12:00 AM		31	37					34
1:00 AM		18	12					15
2:00 AM		8	9					9
3:00 AM		15	8					12
4:00 AM		23	10					17
5:00 AM		64	63					64
6:00 AM		209	243					226
7:00 AM		422	392					407
8:00 AM		384	405					395
9:00 AM		261	305					283
10:00 AM		308	273					291
11:00 AM	321	380						351
12:00 PM	353	367						360
1:00 PM	398	405						402
2:00 PM	521	591						556
3:00 PM	809	850						830
4:00 PM	930	991						961
5:00 PM	1011	940						976
6:00 PM	657	671						664
7:00 PM	405	446						426
8:00 PM	251	308						280
9:00 PM	192	213						203
10:00 PM	115	138						127
11:00 PM	60	81						71
<b>Total</b>	<b>6023</b>	<b>8124</b>	<b>1757</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
24HrTotal	7766	8138						7952
AM Pk Hr		7:00						
AM Peak		422						422
PM Pk Hr		4:00						
PM Peak		991						991
% Peak Hr		12.20%						12.00%
% Peak Hr	13.02%	12.18%						12.60%

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.



**HOWARD STEIN HUDSON**

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## **Appendix C**

### **Crash Rate Worksheet**

## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Holliston, MA COUNT DATE : 10/8/2020

DISTRICT : 3 UNSIGNALIZED : ☒ **Yes** SIGNALIZED : ☐

### ~ INTERSECTION DATA ~

MAJOR STREET : Washington Street

MINOR STREET(S) : Whitney Street

**INTERSECTION  
DIAGRAM**  
(Label Approaches)



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB			
PEAK HOURLY VOLUMES (AM/PM) :	347	631	65			1,043

" K " FACTOR :  INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES :  # OF YEARS :  AVERAGE # OF CRASHES PER YEAR ( A ) :

CRASH RATE CALCULATION :

**0.32**

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : \_\_\_\_\_

Project Title & Date: 194 Lowland Street



HOWARD STEIN HUDSON

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## **Appendix D**

### Synchro Reports



Intersection												
Int Delay, s/veh	2.5											
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	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	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	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		Minor1		Major1		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	A	C		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	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	A	-	-	C	A	A	A
HCM 95th %tile Q(veh)	0	-	-	1.5	-	0.1	-

Intersection												
Int Delay, s/veh	2.9											

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	-	-	None	-	-	None	-	-	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		Minor1		Major1		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	C	D		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	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	A	A	-	D	C	A	-
HCM 95th %tile Q(veh)	0	-	-	1.4	0.1	0.3	-

## Intersection

Int Delay, s/veh 2.5

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	0	0	22	0	71	0	680	26	29	248	1
Future Vol, veh/h	0	0	0	22	0	71	0	680	26	29	248	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	25	0	81	0	773	30	33	282	1

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1178	1152	283	1137	1137	788	283	0	0	803	0	0
Stage 1	349	349	-	788	788	-	-	-	-	-	-	-
Stage 2	829	803	-	349	349	-	-	-	-	-	-	-
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	169	199	761	161	203	367	1291	-	-	799	-	-
Stage 1	671	637	-	352	405	-	-	-	-	-	-	-
Stage 2	368	399	-	622	637	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	127	189	761	155	193	367	1291	-	-	799	-	-
Mov Cap-2 Maneuver	127	189	-	155	193	-	-	-	-	-	-	-
Stage 1	671	606	-	352	405	-	-	-	-	-	-	-
Stage 2	287	399	-	592	606	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0	25.8	0	1
HCM LOS	A	D		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1291	-	-	277	-	799	-
HCM Lane V/C Ratio	-	-	-	0.382	-	0.041	-
HCM Control Delay (s)	0	-	-	25.8	0	9.7	0
HCM Lane LOS	A	-	-	D	A	A	A
HCM 95th %tile Q(veh)	0	-	-	1.7	-	0.1	-

Intersection												
Int Delay, s/veh	3.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	3	1	28	0	42	2	360	45	117	578	5
Future Vol, veh/h	0	3	1	28	0	42	2	360	45	117	578	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	-	-	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	32	0	48	2	409	51	133	657	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1390	1390	662	1369	1368	436	663	0	0	460	0	0
Stage 1	926	926	-	439	439	-	-	-	-	-	-	-
Stage 2	464	464	-	930	929	-	-	-	-	-	-	-
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	121	144	465	118	148	625	935	-	-	1085	-	-
Stage 1	325	350	-	578	582	-	-	-	-	-	-	-
Stage 2	582	567	-	308	349	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	95	116	464	98	119	624	935	-	-	1085	-	-
Mov Cap-2 Maneuver	95	116	-	98	119	-	-	-	-	-	-	-
Stage 1	324	282	-	576	580	-	-	-	-	-	-	-
Stage 2	535	565	-	244	281	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	31	34.9	0	1.5
HCM LOS	D	D		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	935	-	-	198	143	1085	-
HCM Lane V/C Ratio	0.002	-	-	0.402	0.032	0.123	-
HCM Control Delay (s)	8.9	0	-	34.9	31	8.8	0
HCM Lane LOS	A	A	-	D	D	A	-
HCM 95th %tile Q(veh)	0	-	-	1.8	0.1	0.4	-

Intersection												
Int Delay, s/veh	3											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	0	0	26	0	81	0	680	30	30	248	1
Future Vol, veh/h	0	0	0	26	0	81	0	680	30	30	248	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	92	0	773	34	34	282	1

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1187	1158	283	1141	1141	790	283	0	0	807	0	0
Stage 1	351	351	-	790	790	-	-	-	-	-	-	-
Stage 2	836	807	-	351	351	-	-	-	-	-	-	-
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	167	198	761	160	202	366	1291	-	-	796	-	-
Stage 1	670	636	-	351	404	-	-	-	-	-	-	-
Stage 2	364	397	-	621	636	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	120	188	761	154	192	366	1291	-	-	796	-	-
Mov Cap-2 Maneuver	120	188	-	154	192	-	-	-	-	-	-	-
Stage 1	670	604	-	351	404	-	-	-	-	-	-	-
Stage 2	272	397	-	589	604	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0	28.2	0	1
HCM LOS	A	D		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1291	-	-	274	-	796	-
HCM Lane V/C Ratio	-	-	-	0.444	-	0.043	-
HCM Control Delay (s)	0	-	-	28.2	0	9.7	0
HCM Lane LOS	A	-	-	D	A	A	A
HCM 95th %tile Q(veh)	0	-	-	2.2	-	0.1	-



Intersection												
Int Delay, s/veh	3.9											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	3	1	34	0	50	2	360	47	120	578	5
Future Vol, veh/h	0	3	1	34	0	50	2	360	47	120	578	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	-	-	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	39	0	57	2	409	53	136	657	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1401	1398	662	1376	1375	437	663	0	0	462	0	0
Stage 1	932	932	-	440	440	-	-	-	-	-	-	-
Stage 2	469	466	-	936	935	-	-	-	-	-	-	-
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	119	142	465	116	147	624	935	-	-	1084	-	-
Stage 1	322	348	-	577	581	-	-	-	-	-	-	-
Stage 2	579	566	-	305	347	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	91	113	464	95	117	623	935	-	-	1084	-	-
Mov Cap-2 Maneuver	91	113	-	95	117	-	-	-	-	-	-	-
Stage 1	321	279	-	575	579	-	-	-	-	-	-	-
Stage 2	524	564	-	240	278	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	31.8	41	0	1.5
HCM LOS	D	E		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	935	-	-	192	139	1084	-
HCM Lane V/C Ratio	0.002	-	-	0.497	0.033	0.126	-
HCM Control Delay (s)	8.9	0	-	41	31.8	8.8	0
HCM Lane LOS	A	A	-	E	D	A	A
HCM 95th %tile Q(veh)	0	-	-	2.5	0.1	0.4	-

Intersection												
Int Delay, s/veh	4.2											
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
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	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		Minor1		Major1		Major2					
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	A	F		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	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	A	-	-	F	A	B	A
HCM 95th %tile Q(veh)	0	-	-	3.6	-	0.2	-

## Intersection

Int Delay, s/veh

5

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	-	-	None	-	-	None	-	-	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		Minor1		Major1		Major2	
Conflicting Flow All	1638	1633	859	1617	1613	513	859	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	-
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	-
Pot Cap-1 Maneuver	81	102	359	79	105	565	791	-
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	-
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	NERNWLn1	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	A	A	-	F	E	A	A
HCM 95th %tile Q(veh)	0	-	-	3.6	0.3	0.4	-



Intersection												
Int Delay, s/veh	5.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	0	0	22	0	71	0	1011	26	29	357	1
Future Vol, veh/h	0	0	0	22	0	71	0	1011	26	29	357	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	25	0	81	0	1149	30	33	406	1

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1678	1652	407	1637	1637	1164	407	0	0	1179	0	0
Stage 1	473	473	-	1164	1164	-	-	-	-	-	-	-
Stage 2	1205	1179	-	473	473	-	-	-	-	-	-	-
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	76	100	648	71	102	220	1163	-	-	575	-	-
Stage 1	576	562	-	213	271	-	-	-	-	-	-	-
Stage 2	227	267	-	531	562	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	45	93	648	67	94	220	1163	-	-	575	-	-
Mov Cap-2 Maneuver	45	93	-	67	94	-	-	-	-	-	-	-
Stage 1	576	520	-	213	271	-	-	-	-	-	-	-
Stage 2	144	267	-	492	520	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0	80.2	0	0.9
HCM LOS	A	F		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1163	-	-	143	-	575	-
HCM Lane V/C Ratio	-	-	-	0.739	-	0.057	-
HCM Control Delay (s)	0	-	-	80.2	0	11.6	0
HCM Lane LOS	A	-	-	F	A	B	A
HCM 95th %tile Q(veh)	0	-	-	4.4	-	0.2	-

Intersection

Int Delay, s/veh 8.4

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	3	1	28	0	42	2	525	45	117	858	5
Future Vol, veh/h	0	3	1	28	0	42	2	525	45	117	858	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	-	-	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	32	0	48	2	597	51	133	975	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1896	1896	980	1875	1874	624	981	0	0	648	0	0
Stage 1	1244	1244	-	627	627	-	-	-	-	-	-	-
Stage 2	652	652	-	1248	1247	-	-	-	-	-	-	-
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	54	70	306	52	73	489	712	-	-	924	-	-
Stage 1	215	248	-	455	479	-	-	-	-	-	-	-
Stage 2	460	467	-	202	247	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	37	48	305	37	50	489	712	-	-	924	-	-
Mov Cap-2 Maneuver	37	48	-	37	50	-	-	-	-	-	-	-
Stage 1	214	169	-	453	477	-	-	-	-	-	-	-
Stage 2	413	465	-	134	169	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	68.7	176.1	0	1.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	712	-	-	83	61	924	-
HCM Lane V/C Ratio	0.003	-	-	0.958	0.075	0.144	-
HCM Control Delay (s)	10.1	0	-	176.1	68.7	9.6	0
HCM Lane LOS	B	A	-	F	F	A	A
HCM 95th %tile Q(veh)	0	-	-	5.2	0.2	0.5	-

Intersection												
Int Delay, s/veh	7.6											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	0	0	0	26	0	81	0	1011	30	30	357	1
Future Vol, veh/h	0	0	0	26	0	81	0	1011	30	30	357	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	92	0	1149	34	34	406	1

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1687	1658	407	1641	1641	1166	407	0	0	1183	0	0
Stage 1	475	475	-	1166	1166	-	-	-	-	-	-	-
Stage 2	1212	1183	-	475	475	-	-	-	-	-	-	-
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	75	99	648	70	101	219	1163	-	-	573	-	-
Stage 1	574	561	-	213	270	-	-	-	-	-	-	-
Stage 2	225	265	-	529	561	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	41	91	648	66	93	219	1163	-	-	573	-	-
Mov Cap-2 Maneuver	41	91	-	66	93	-	-	-	-	-	-	-
Stage 1	574	518	-	213	270	-	-	-	-	-	-	-
Stage 2	130	265	-	488	518	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0	105.7	0	0.9
HCM LOS	A	F		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1163	-	-	140	-	573	-
HCM Lane V/C Ratio	-	-	-	0.869	-	0.059	-
HCM Control Delay (s)	0	-	-	105.7	0	11.7	0
HCM Lane LOS	A	-	-	F	A	B	A
HCM 95th %tile Q(veh)	0	-	-	5.7	-	0.2	-

**Intersection**

Int Delay, s/veh 13.9

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	3	1	34	0	50	2	525	47	120	858	5
Future Vol, veh/h	0	3	1	34	0	50	2	525	47	120	858	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	-	-	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	39	0	57	2	597	53	136	975	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1907	1904	980	1882	1881	625	981	0	0	650	0	0
Stage 1	1250	1250	-	628	628	-	-	-	-	-	-	-
Stage 2	657	654	-	1254	1253	-	-	-	-	-	-	-
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	53	70	306	51	72	488	712	-	-	922	-	-
Stage 1	214	247	-	454	479	-	-	-	-	-	-	-
Stage 2	457	466	-	201	246	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	35	47	305	~ 36	48	488	712	-	-	922	-	-
Mov Cap-2 Maneuver	35	47	-	~ 36	48	-	-	-	-	-	-	-
Stage 1	213	167	-	452	477	-	-	-	-	-	-	-
Stage 2	402	464	-	132	166	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	69.9	254.9	0	1.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NEL	NET	NERNWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	712	-	-	80	60	922	-
HCM Lane V/C Ratio	0.003	-	-	1.193	0.076	0.148	-
HCM Control Delay (s)	10.1	0	-	254.9	69.9	9.6	0
HCM Lane LOS	B	A	-	F	F	A	A
HCM 95th %tile Q(veh)	0	-	-	7	0.2	0.5	-

**Notes**

~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



**HOWARD STEIN HUDSON**

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Shevlin

1           You know, so, you know, I think a lot of the comments  
2       have been addressed and I think, you know, if the information  
3       that is provided as far as the routes and as far as the  
4       volumes could be projected from this site, I -- I think I  
5       identified there this project should be -- should be continued  
6       to be -- to be monit -- monitored and make sure there is  
7       traffic, I think was in the report, make sure that's not going  
8       to go towards Fiske Street, nothing is going to be allowed  
9       there. Drivers going -- are going to be given routes that  
10      they have to take. I believe (inaudible at 1:33:43, low  
11      audio) mentioned that they will be going and giving  
12      information in regards to how they can get to and from the  
13      site and the roadway they should use.

14      So I think everything, you know, to date that has been  
15      provided, you know, as far as capacity and existing safety  
16      that's occurred I think everything has been addressed.

17           MR. THORN: Okay.

18           MR. SHEVLIN: And I'm certainly open for any -- any  
19      questions.

20           MR. THORN: All right. I know, Karen, I didn't know if  
21      there was any -- if Karen at this point had any questions.

22           MS. APUZZO LANGTON: Thank you, Dave. Yeah I do -- I do  
23      actually have a couple.

24           So I think there was a couple things hit upon both  
25      between John and Keri -- Keri, excuse me. And one is that the

C

**Peter Barbieri**

**From:** Brewer, Brian <Brian.Brewer@kimley-horn.com>  
**Sent:** Thursday, October 22, 2020 4:38 PM  
**To:** Peter Barbieri  
**Subject:** FW: CMG Stormwater Peer Review #2 - ADESA Inc. 194 Lowland Street Holliston MA

CAUTION: EXTERNAL EMAIL

It appears we have addressed their comments.

**From:** Dave Faist <dfaist@cmgenv.com>  
**Sent:** Thursday, October 22, 2020 4:36 PM  
**To:** Brewer, Brian <Brian.Brewer@kimley-horn.com>  
**Cc:** 'Karen Sherman (shermank@holliston.k12.ma.us)' <shermank@holliston.k12.ma.us>; Clapp, Ryan <clappr@holliston.k12.ma.us>  
**Subject:** RE: CMG Stormwater Peer Review #2 - ADESA Inc. 194 Lowland Street Holliston MA

Hi Brian,

Yes, the additional information you've provided addresses the few remaining comments from our 10/20/20 comment letter. Thank you for following up.

I'll defer to the Conservation Commission and Planning Board for any final questions they may have.

Best regards,

Dave

David T. Faist, PE  
Principal Engineer  
[DFaist@CMGEnv.com](mailto:DFaist@CMGEnv.com)  
67 Hall Road Sturbridge, MA  
Office (774) 241.0901 – Cell (508) 864.6802

**From:** Brewer, Brian [<mailto:Brian.Brewer@kimley-horn.com>]  
**Sent:** Thursday, October 22, 2020 3:46 PM  
**To:** Dave Faist <dfaist@cmgenv.com>  
**Subject:** RE: CMG Stormwater Peer Review #2 - ADESA Inc. 194 Lowland Street Holliston MA

Hi Dave-

I just wanted to follow-up and see if the information provided below and attached addressed your question/comment regarding the capacity of the Barracuda structures.

I have also attached an updated Sheet 19 that now reflects an 8" orifice to match the Hydrocad model.

Thanks  
Brian



October 22, 2021

Mr. Peter Barbieri  
Fletcher Tilton PC  
161 Worcester Road, 5<sup>th</sup> Floor  
Framingham, MA 01701

Office: 508-532-3517  
e-Mail: [pbarbieri@fletchertilton.com](mailto:pbarbieri@fletchertilton.com)

Subject: Sound Analysis  
Proposed ADESA Boston Vehicle Storage Facility  
0 & 194 Lowland Street, Holliston, MA

Dear Mr. Barbieri,

A vehicle storage facility is proposed to be constructed by Auto Dealers Exchange of Concord, LLC dba ADESA Boston ("ADESA Boston") on currently vacant industrially zoned land at 194 and 0 Lowland Street in Holliston, MA. Figure 1 is a Google Earth image showing the location of the proposed facility and locations of nearby residences. As you have requested, we have evaluated compliance of facility sound levels at nearby residences and have recommended a barrier along the southeast edge of the proposed parking area as discussed later in the report.

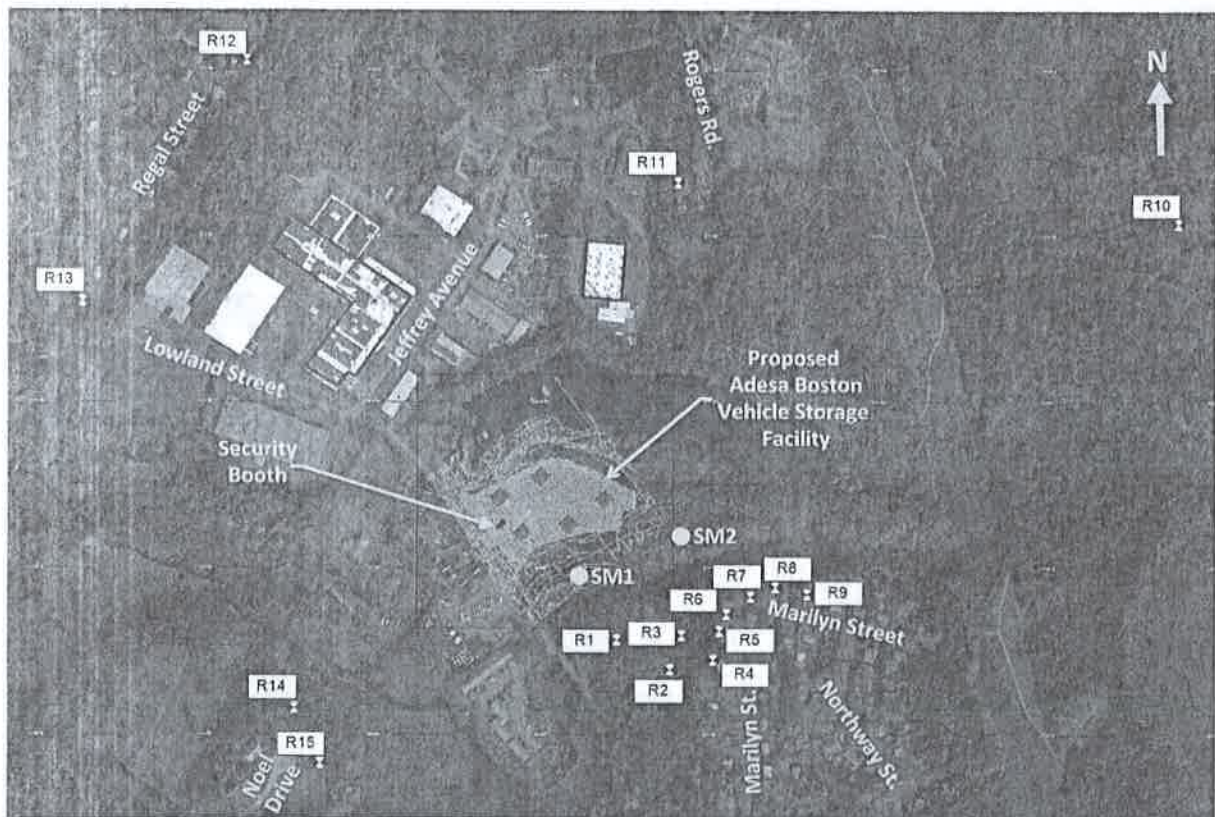


Figure 1. Area plan of the proposed vehicle storage facility  
Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA



This report outlines applicable limits, sound monitoring completed as required to establish these limits, source sound level measurements conducted at ADESA Boston in Framingham, and computer modeling to estimate levels of facility sound transmitted to nearby residences. A glossary of terms used in acoustics and in this report is presented in Appendix A of this report.

Nearest residences are southwest of the site along Lowland and Marilyn streets, 350-800 feet from the proposed facility. The nearest residence is 242 Lowland Street, adjacent to Bogastow Brook.

Automobiles will be brought to the site by 8-car carriers and individually by tow trucks. The facility will operate during daytime hours, from 8:00 AM to 5:00 PM Monday through Friday, and from 8:00 AM to noon on Saturdays, and will be closed on Sundays and holidays.

### Sound Monitoring

To document existing ambient sound levels and to determine the background sound level used to set limits on facility sound in accordance with the 2019 Holliston Zoning By-Laws and the MassDEP Noise Policy, Cavanaugh Tocci monitored sound levels at two locations identified as SM1 and SM2 in Figure 1. Measurements were completed over a seven-day period from Saturday, May 8 to Friday, May 14, 2021. Ambient sound levels at the measurement location are representative of those at nearby residences. During daytime hours, on the days monitored, usual existing industrial activity on nearby properties was audible in the project area. There was little or no industrial activity at night on nearby properties.

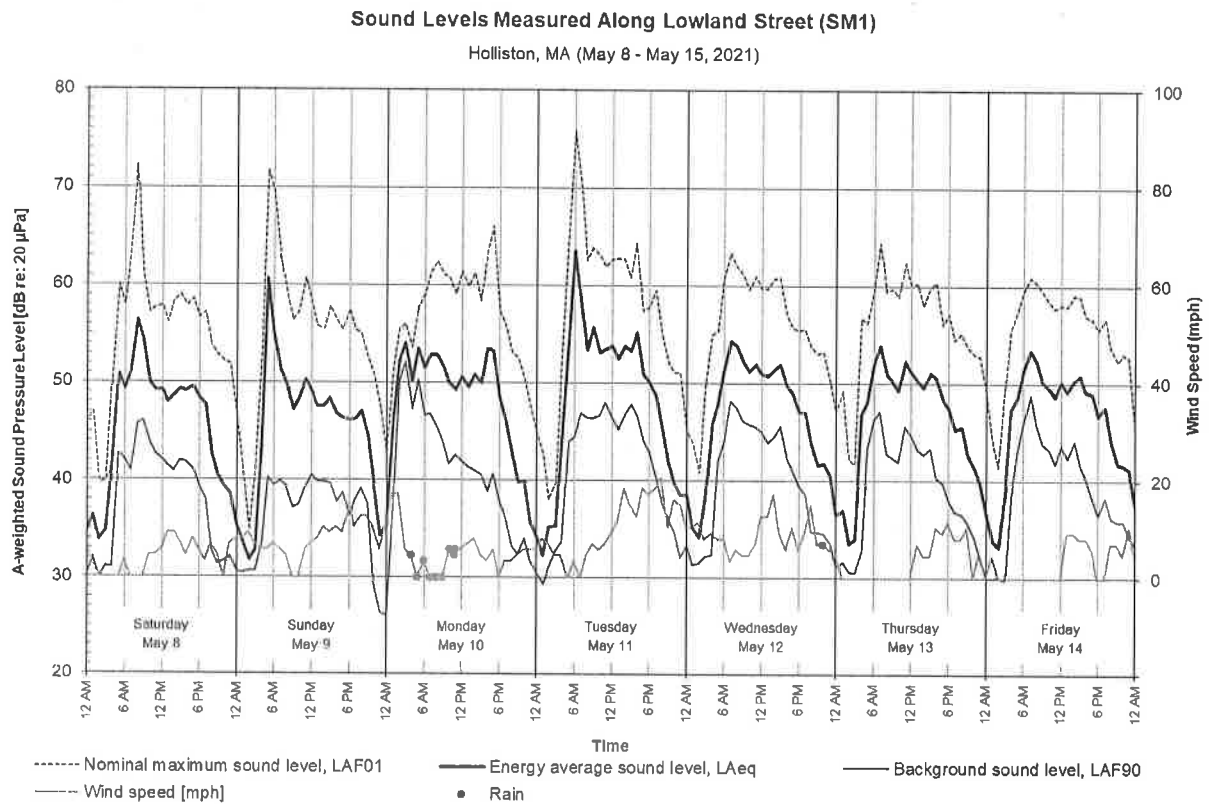
Sound levels were monitored using Rion NL-52 meters set to fast meter response and calibrated before use. The microphone was tripod-mounted with a windscreen 5-6 feet above grade. These instruments and their use conform to IEC 61672 for Class 1 precision sound measurement instrumentation. The meters recorded sound level data onto flash cards that, after the completion of measurements, were removed from the units and downloaded into a PC.

The monitors were programmed to measure several hourly A-weighted sound level descriptors including the 90<sup>th</sup> percentile sound level ( $LAF_{90,1-hr}$ ), equivalent sound level ( $LA_{eq,1-hr}$ ), and first percentile ( $LAF_{01,1-hr}$ ) sound level.

- The 90<sup>th</sup> percentile sound level ( $LAF_{90,1-hr}$ ) is the residual sound level in an area and is the lowest level of sound typically occurring. It is the A-weighted sound level exceeded 90% of each hour monitored. It is of special relevance as the MassDEP Noise Policy defines the background sound level as the lowest  $LAF_{90,1-hr}$  reached.
- The equivalent sound level ( $LA_{eq,1-hr}$ ) is the energy average sound level for each hour monitored.
- The first percentile sound level ( $LAF_{01,1-hr}$ ) is the sound level exceeded one percent of each hour and is representative of the highest sound levels reached in each hour.

Sound monitoring data measured at SM1 and SM2 are shown in Figures 2a and 2b. As with most acoustic environments, sound levels are generally higher during the day than during the night. Weather data have been shown alongside sound monitoring data to identify any occasions when weather conditions might have influenced sound levels. These data are as obtained from the National Weather

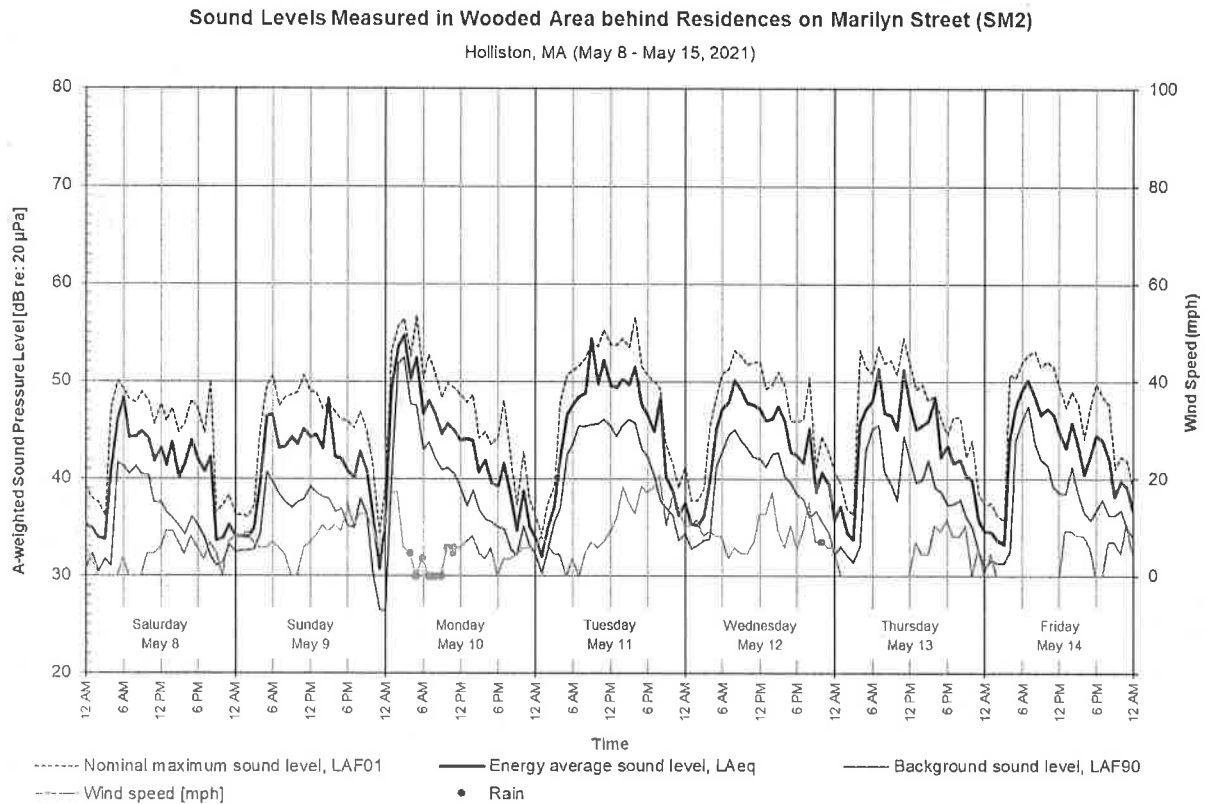
Service's (NWS) Automated Surface Observing Systems (ASOS) program for station OWD (Norwood Memorial Airport)<sup>1</sup>.



**Figure 2a. Sound monitoring data measured at SM1**  
**Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA**

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<sup>1</sup> [https://mesonet.agron.iastate.edu/request/download.phtml?network=MA\\_ASOS](https://mesonet.agron.iastate.edu/request/download.phtml?network=MA_ASOS)



S11

**Figure 2b. Sound monitoring data measured at SM2**  
Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA

Table 1 reports the lowest hourly 90<sup>th</sup> percentile A-weighted sound level measured each day May 8 to 14, 2021 at SM1 and SM2.

Lowest LAF <sub>90,1-hr</sub> during Operating Hours	Sunday, May 9	Monday, May 10	Tuesday, May 11	Wednesday, May 12	Thursday, May 13	Friday, May 14	Saturday, May 15
SM1	41	37	41	45	44	42	42
SM2	38	37	37	44	41	38	38

Operating Hours: 8:00 AM-5:00 PM weekdays, 8:00 AM-noon Saturdays, Closed Sundays & holidays.

**Table 1. Lowest hourly 90<sup>th</sup> percentile A-weighted sound levels measured each day May 8 to 14, 2021  
at SM1 and SM2 during proposed facility operating hours**  
Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA

The lowest measured LAF<sub>90,1-hr</sub> was 37 dBA at both SM1 and SM2. Sound levels during the same period nearer to residences or on residential property are expected be higher because of local activity and equipment serving homes. Hence, as discussed below, the conservatively low background sound level for purposes of establishing a facility sound level limit is 37 dBA.

### Applicable Codes—Stationary Noise Sources

This section outlines codes applicable to sound potentially emitted by the proposed facility. Applicable codes are as follows:

- Holliston Zoning By-Laws (May 6, 2019)
- Commonwealth of Massachusetts 310 CMR 7.10
- Massachusetts Department of Environmental (MassDEP) Noise Policy 90-001

#### *Holliston 2019 Zoning Bylaw*

The Holliston 2019 Zoning By-Law provision setting limits on sound emitted by this project are provided in Section V-N Performance Standards Continued subsection 4 Noise. The provision is as follows:

#### V-N PERFORMANCE STANDARDS

4. Noise. No use shall be permitted within the Town of Holliston which, by reason of excessive noise generated therefrom, would cause nuisance or hazard to persons or property. Exempt from the provisions of this subsection are (a) vehicles not controlled by an owner or occupant of a lot within the town, (b) temporary construction activities occurring during the hours of 7 a.m. to 6 p.m. on weekdays and 8 a.m. to 6 p.m. on Saturday, (c) occasionally used safety signals, warning devices, emergency pressure relief valves, or other such temporary activity, (d) use of power tools and equipment such as lawn mowers, snow blowers, chainsaws, tractors, and similar equipment for the maintenance of property between the hours of 7 a.m. and 8 p.m. on weekdays and 8 a.m. and 6 p.m. on weekends. For the purposes of this by-law the standards in the following shall apply:

Ambient Noise Level. No person shall operate or cause to be operated any source sound in a manner that creates a sound level of 10 dBA above ambient, as set forth in 310 CMR 7.10, measured at the property boundary of the receiving land use nor shall any source produce a pure-tone condition at the property line (or at the nearest inhabited buildings). A pure tone condition exists if the sound pressure level, at any given octave band center frequency, exceeds the levels of the two adjacent octave bands by three (3) or more decibels.

See <http://www.airandnoise.com/MA310CMR710.html> as may be updated by the Mass. DEP. (Amended May 2019 – ATM, Art. 31)

Accordingly, as previously discussed, the measured background sound level in the project area is 37 dBA. Thus, the Holliston 2019 Zoning By-Law limit on sound transmitted from the proposed facility to any residence is 47 dBA.

#### *MassDEP Noise Policy*

The general prohibitions of the Commonwealth of Massachusetts 310 CMR 7.10 U (1) do not establish specific, measurable limits in decibels, which can be used for engineering design purposes, and above which there may be a noise condition. The responsibility and authority for identifying when a condition

of noise exists has been assigned to the Massachusetts Department of Environmental Protection (MassDEP). MassDEP Noise Policy 90-001 (see Appendix B) states the following:

*A source of sound will be considered to be violating the Department's noise regulation (310 CMR 7.10) if the source:*

- 1. Increases the broadband sound level by more than 10 dB(A) above the ambient, or*
- 2. Produces a "pure tone" condition – when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.*

*These criteria are measured both at the property line and at the nearest inhabited residence. Ambient is defined as the background A-weighted sound level that is exceeded 90% of the time measured during equipment operating hours. The ambient may also be established by other means with the consent of the Department.*

It is our understanding that the MassDEP Noise Policy applies to stationary equipment and does not apply to sound produced by vehicles. Nevertheless, we have compared estimated sound levels produced by all sources with the MassDEP Noise Policy limits. As with the Holliston 2019 Zoning By-Law limit, the MassDEP limit for sound transmitted to nearby residences during operating hours is 47 dBA.

### **Computer Modeling**

Computer modeling has been used to estimate sound levels at nearest residences. Estimated sound levels have been compared with Holliston 2019 Zoning By-Law limits on facility sound transmitted to nearest residential uses.

Modeling of facility sound was completed using Cadna/A (Datakustik GmbH, Version 2021 MR 1, 32-bit). Cadna/A is a computer program that implements the modeling techniques of ISO 9613-1 and ISO 9613-2 to estimate source sound levels at community receptor locations. The Cadna model accounts for propagation losses in facility sound associated with distance, shielding by intervening structures, berms, barriers, and topography, and absorption of sound by the atmosphere and porous surfaces.

The Cadna model applies propagation losses to facility equipment sound power levels to estimate sound pressure levels at nearby residences. Sound power level quantifies the amount of sound energy produced by a source and is expressed in decibels referenced to 1 picoWatt (pW or  $10^{-12}$  watts). Sound power levels produced by activities that would occur at the proposed ADESA vehicle storage facility have been determined from measurements of sound produced by a variety of sound sources and activities measured at the ADESA Boston facility in Framingham.

	Octave band center frequencies (Hz)									
Sources	31.5	63	125	250	500	1000	2000	4000	8000	A
Car Carrier Sources										
Ramp Slide	103	102	95	95	100	102	105	99	90	109
Truck Backup Alarm	98	96	87	82	77	76	83	68	54	86
Truck Idle	108	104	98	96	96	93	92	83	71	99
Truck Acceleration	93	105	109	97	95	98	97	92	89	103
Truck Pass-by	96	93	91	89	90	91	90	87	77	96
Tire Strap Ratchet	95	101	100	94	97	92	90	87	79	98
Car On-Loading	98	101	97	94	95	96	93	95	88	101
Car Off-Loading	97	106	103	97	99	100	100	97	88	105
Tow Truck Sources										
Tow-Truck Backup Alarm	99	95	87	83	81	105	82	80	68	105
Tow Truck Pass by	99	97	96	88	89	90	90	87	75	96
Truck Idle	108	104	98	96	96	93	92	83	71	99
Tire Strap Ratchet	95	101	100	94	97	92	90	87	79	98

Table 2. Sound power spectra of facility sources [dB re: 1 pW]  
Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA

Figure 1 identifies 15 nearby residential locations used in this study. Figure 3 shows five facility source groups in the vehicle storage facility. Each source group is comprised to two subgroups labeled CC and TT. CC subgroups are car carrier sources; TT subgroups are tow truck sources. Table 2 lists the individual sources within each subgroup. The following is a brief description of each source type.

- Ramp Slide—Deploying and stowing ramps for movement of vehicles on and off car carrier trailers.
- Truck Backup Alarms—These are tonal types that produced a beeping sound. These have been included in modeling, though the facility incorporates a drive-through arrangement to minimize the need for car carrier and tow trucks operating in reverse. Hence, backup alarms should sound only infrequently.
- Truck Idling—This would occur for brief periods not exceeding 5 minutes after trucks are parked.
- Truck Pass-by—This is the movement of the truck on-site with and without transporting cars to or from the lot.
- Tire Strap Ratchet—This is sound produced by the mechanism releasing or restraining vehicles on car carrier ramps and on tow truck booms.
- Car On-Loading and Off-Loading—Vehicle movement on car carrier ramps.

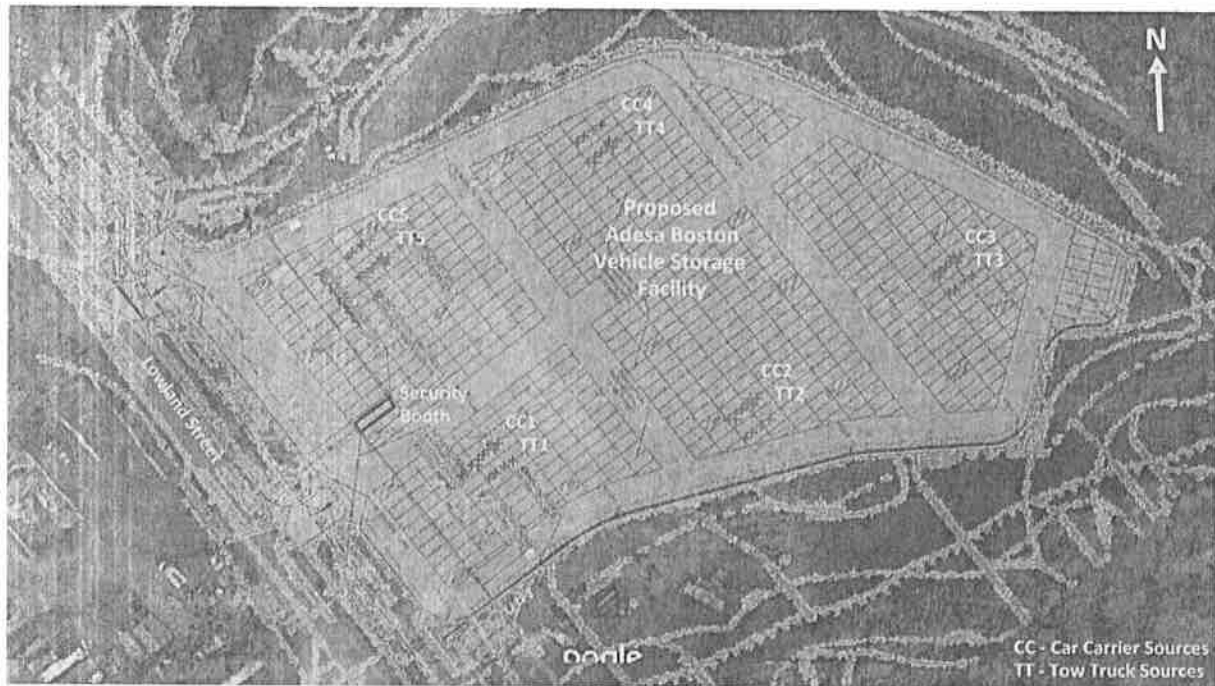


Figure 3. Facility sound source locations used in computer modeling  
Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA

#### Estimated Source Sound Levels

Table 3 presents estimated facility sound levels at residential receptor locations R1-R15. In Table 3, the levels shown in **red** exceed the Holliston 2019 Zoning By-Law limit of 47 dBA. Amounts exceeded range between 1 and 5 dBA. To provide perspective on how these might be perceived, an increase or decrease in sound level by 3 dB is barely perceptible; an increase or decrease of 5 dB is moderately perceptible; an increase or decrease of 10 dB is perceived as a doubling or halving of sound level. Hence, the 1-5 dBA exceeding the 47 dBA limit momentarily would range between nearly imperceptibly to moderately perceptibly exceeding the limit. Often during the day, existing ambient sound levels will mask (be higher than) facility sound levels rendering them even less perceptible. Nevertheless, sound control is recommended and is described below.

Source	Receptor Study Locations														
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
<b>Car Carrier Sources</b>															
Car Off-Load	49	46	47	45	46	46	44	44	42	26	38	34	34	41	40
Car On-Load	44	41	43	40	41	42	39	39	38	22	34	29	30	36	35
Ramp Slide	52	50	51	49	50	50	47	46	44	34	42	36	38	45	44
Tire Strap Ratchet	41	39	40	38	39	39	37	37	36	21	32	27	29	34	33
Truck Acceleration	46	44	45	43	44	44	42	41	40	25	36	31	32	39	38
Truck Backup Alarm	30	27	29	26	27	28	25	23	24	7	20	15	16	22	22
Truck Idle	42	40	41	38	39	40	38	38	36	21	33	28	29	35	34
Truck Pass-by	39	37	38	36	37	37	35	34	32	17	29	24	25	31	31
<b>Tow Truck Sources</b>															
Tire Strap Ratchet	42	39	40	38	39	39	37	35	34	21	32	28	28	34	33
Tow Truck Backup Alarm	50	47	48	46	47	48	45	43	42	32	40	34	35	42	42
Tow Truck Pass-by	39	36	37	35	36	36	34	33	31	17	29	23	24	31	30
Truck Idle	42	39	41	38	39	39	38	37	36	21	33	28	28	35	34

Entries in red are sound levels that exceed the Holliston 2019 Zoning By-Law limit of 47 dBA.

**Table 3. Highest sound levels emitted by each source type at nearby receptor locations: no controls**  
Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA

### Sound Controls

The highest grade elevation of the proposed vehicle storage lot is 161 feet. A barrier having its top-edge elevation at 168 feet (i.e., a minimum of 6 feet above finished pavement elevation) that is approximately 630 feet long and located along the southeast pavement edge as generally shown in Figure 4, will reduce all sound levels to within compliance with Holliston 2019 Zoning By-Law limits at nearby residences. In addition, the barrier must be solid, not slotted such as would be the case with a stockade style fence, and have a surface weight not less than 4 psf, and must not be undercut by more than 2 inches.

Backup alarms will infrequently sound as the facility is designed for trucks to move forward for loading and off-loading vehicles.

Estimated facility sound levels at all fifteen receptor locations with the Figure-4 barrier constructed are listed in Table 4. All entries in Table 4 are at or below the 47 dBA Holliston 2019 Zoning By-Law limit.



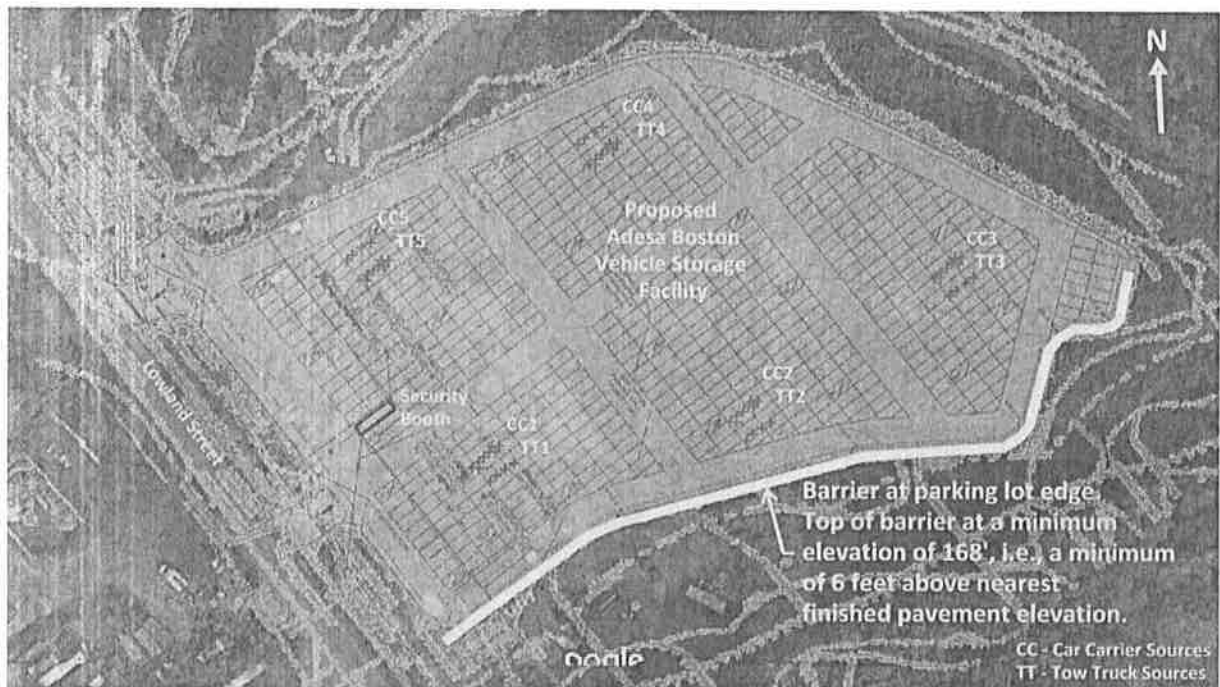


Figure 4. Sound control barrier along southeast pavement edge, with its top-edge at a minimum elevation of 168' i.e., extending a minimum of 6 feet above the nearest pavement elevation  
Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA

Source	Receptor Study Locations														
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
<b>Car Carrier Sources</b>															
Car Off-Load	44	42	44	41	42	42	41	40	38	26	38	34	34	41	40
Car On-Load	39	38	39	37	38	38	36	35	34	22	34	29	30	36	35
Ramp Slide	46	44	45	43	44	45	44	43	41	34	42	36	38	45	44
Tire Strap Ratchet	37	35	36	34	35	35	34	33	32	21	32	27	29	34	33
Truck Acceleration	42	39	40	38	39	39	39	38	36	25	36	31	32	39	38
Truck Backup Alarm	24	21	23	20	21	22	21	20	19	7	20	15	16	22	22
Truck Idle	38	34	36	34	35	35	35	34	32	21	33	28	29	35	34
Truck Pass-by	35	31	33	31	32	32	31	30	29	17	29	24	25	31	31
<b>Tow Truck Sources</b>															
Tire Strap Ratchet	38	35	36	34	35	35	34	33	32	21	32	28	28	34	33
Tow Truck Backup Alarm	43	41	42	40	41	42	41	40	39	32	40	34	35	42	42
Tow Truck Pass-by	34	31	33	30	31	32	31	30	28	17	29	23	24	31	30
Truck Idle	38	35	36	34	35	35	35	34	32	21	33	28	29	35	34

Table 4. Highest sound levels emitted by each source type at nearby receptor locations:  
w/sound control barrier having its top-edge elevation at 168' and located along the southeast pavement edge  
(i.e., having a minimum height above nearest finished pavement of 6 feet)  
Proposed ADESA Boston Vehicle Storage, 0 & 194 Lowland Street, Holliston, MA

Mr. Peter Barbieri, Fletcher Tilton, PC  
Proposed ADESA Boston  
0 & 194 Lowland Street, Holliston, Massachusetts

Page 12  
October 22, 2021

### Conclusions

A vehicle storage facility is proposed to be constructed by ADESA Boston on a currently vacant industrially zoned parcel of land at 194 & 0 Lowland Street in Holliston, MA. This Cavanaugh Tocci report summarizes applicable limits on facility sound, describes monitoring of existing ambient sound levels used to set sound level limits, and compares vehicle storage facility sound levels transmitted to nearby residences with applicable limits.

This study concludes that, without controls, facility sound may exceed Holliston 2019 Zoning By-Law limits by up to 1 to 5 dBA at nearest residences southeast of the site. Construction of a barrier along the southeast pavement edge, having a top-edge elevation of 168' and a length of 630 feet will reduce sound levels by up to 6 dBA to at or within the 47-dBA limit of the Holliston 2019 Zoning By-Law.

\*\*\*

If we can provide any further detail, please do not hesitate to contact us. Thank you.

Sincerely,  
CAVANAUGH TOCCI



Gregory C. Tocci, *Sr. Principal Consultant*



Liam E Maloney, *Staff Consultant*

## **Appendix A**

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### **Glossary**

## Glossary

---

The definitions of acoustical terms used in this appendix are most often based on American National Standards Institute (ANSI) S1.1-1994 Acoustical Terminology.

### *A-Weighting (dBA)*

The filtering of sound that replicates the human hearing frequency response. The human ear is most sensitive to sound at mid frequencies (500 to 4,000 Hz) and is progressively less sensitive to sound at frequencies above and below this range. A-weighted sound level is the most used descriptor to quantify the relative loudness of various types of sounds with similar or differing frequency characteristics.

### *Absorption*

The attenuation (or reduction) of sound level that results when sound propagates through a medium (usually air) or through a dissipative material (sound absorptive material) such as glass fiber or open-cell foam. In the case of sound absorptive materials used in the building industry, attenuation of sound is produced by the conversion of molecular motion, which is sound, into thermal energy due to friction of air molecules with fibrous or cellular materials.

### *Acoustics*

- (1) Acoustics is the science of sound, including its production, transmission, and effects.
- (2) The acoustics of a room are those qualities that together determine its character with respect to the perception of sound.

### *Ambient Noise*

Ambient noise encompasses all sound present in an environment, being usually a composite of sounds from sources near and far.

### *Background Sound*

The lowest sound level typically occurring during a monitoring period. Specifically defined for its purposes by the Massachusetts Department of Environmental Protection (MassDEP) as the A-weighted sound level that is exceeded 90% of the time measured during equipment operating hours. When the ambient sound level is measured in hourly increments, the background sound level is symbolized as  $LAF_{90,1 \text{ hr}}$  where "A" indicates A-weighting, "F" indicates the sound level meter was set to fast meter response, "90, 1-hr" indicates that the level reported is cumulatively exceeded 90% of a one-hour period.

### *Band Pass Filter*

The filtering of sound within specified frequency limits or frequency bands. The audible frequency range is often sub-divided into octave, one-third octave, or other fractions of octave bands. In this study,

sound energy over the audible frequency range is divided into octave bands. The octave band center frequencies listed in tables of the report are 31.5, 63, 250, etc. up to 8,000 Hz.

### *Barriers*

A solid obstacle that blocks the line-of-sight between a sound source and a receiver, thereby providing barrier attenuation, i. e., reducing sound level at the receptor. Sound attenuation provided by barriers is related to the transmission loss through the barrier material and diffraction of sound over and around the barrier. Barriers used to reduce sound at a receiver location be solid, not slatted such as would be the case with a stockade style fence, have a surface weight not less than 4 psf, and must have no or limit undercut depending on application.

### *Community Noise Exposure Level (CNEL)*

The 24-hour energy average sound level where a 10 dB "penalty" is applied to sound occurring at night between 10:00 PM and 7:00 AM, and a 5 dB penalty is applied to sound occurring during evening hours between 7:00 PM and 10:00 PM. The penalties are intended to account for the increased sensitivity of a community to sound occurring during evening and nighttime hours.

### *Day Night Sound Level (DNL, $L_{dn}$ )*

The 24-hour energy average sound level where a 10 dB "penalty" is applied to sound occurring at night between 10:00 PM and 7:00 AM. The 10 dB penalty is intended to account for the increased sensitivity of a community to sound occurring at night.

### *Decibel (dB)*

A dimensionless unit which denotes the ratio between two quantities that are proportional to power, energy, or intensity. One of these quantities is a designated reference by which other quantities of identical units are divided. The sound pressure level in decibels is equal to 10 times the logarithm (to the base 10) of the ratio between the pressure squared divided by the reference pressure squared. The reference pressure used in acoustics is 20 microPascals ( $\mu\text{Pa}$ ).

### *Energy Average Sound Level*

In real-world circumstances, sound levels vary considerably over time. The  $L_{eq}$  is the energy average or equivalent sound level over a monitoring time interval. It is a hypothetical continuous sound level that contains the same sound energy as the actual sound level occurring during the time interval. A letter symbol (such as A or C, i.e.  $LA_{eq}$ ) typically implies A-weighting frequency (i.e., the energy average sound level in dBA). In addition, the duration of measurement is typically stated (i.e.  $LA_{eq,1-hr.}$ ).

### *Frequency*

Frequency is the number of oscillations or cycles per unit time. In acoustics, frequency usually is expressed in units of Hertz (Hz), where one Hertz is equal to one cycle per second. In this study, sound levels have been quantified over ranges or bands of frequency, specifically octave bands.

### *Noise*

Noise is undesired or unwanted sound that is perceived as an annoyance to a receptor.

### *Octave*

The ratio of the upper and lower frequencies of an octave band that equals two. For example, the upper and lower frequencies of the 1,000 Hz octave band are approximately 708 and 1,413 Hz.

### *Octave Band*

Groups of frequencies defined by standards where the upper frequency of each band is equal to twice the lower frequency of each band. Octave bands are usually named by their geometric center frequency. For example, the octave band extending between 44.7 Hz and 89.1 Hz is called the 63 Hz octave band. The octave band extending between 89.1 Hz and 178 Hz is called the 125 Hz octave band. The full complement of octave bands in the audible frequency range is as follows: 31, 63, 125, 250, 500, 1000, 2000, 4000, 8000, and 16,000 Hz.

### *Octave Band Sound Pressure Level*

Sound pressure level for all sound contained within a specified octave band.

### *Percentile Sound Levels*

Besides frequency and level, environmental sounds exhibit a time-varying or temporal characteristic. The temporal character of noise level can be illustrated by considering noise levels that occur near a highway. During the day, traffic sound levels are generally high, increasing to higher peaks when a noisy truck or multi-vehicle platoon passes and decreasing to a lower level between vehicle pass-bys. At night, when traffic volumes are lower, the same variation occurs, but is centered around a lower level.

Environmental sound descriptors are quantifications of sound that combine, into a single value, the three chief features of environmental sound: level, frequency, and temporal characteristics.

The use of A-weighted sound pressure level combines the first two characteristics—level and frequency—into a single number. Then, by averaging A-weighted sound pressure levels over time in various fashions, acoustical descriptors that combine all three features can be developed.

Commonly used descriptors are percentile A-weighted sound levels, A-weighted sound pressure levels exceeded for specific percentages of time within a specific noise monitoring period. For example, the one-hour 50<sup>th</sup> percentile A-weighted sound level, symbolized as the  $LA_{50,1-hr}$ , is the A-weighted sound level cumulatively exceeded a total of 30 minutes out of a continuous 60-minute period. Likewise, the  $LA_{10,20-min}$  is the A-weighted sound level cumulatively exceeded a total of two minutes out of a continuous 20-minute period.

Percentile A-weighted sound levels most often are used to assess the time-varying character of environmental sound. The residual sound level (defined as the nearly constant, low level of sound produced by distant motor vehicle traffic or industrial activity) is indicative of the lowest sound level in a monitoring period. The residual or background sound level is commonly defined as the  $LA_{90}$ , i.e., the A-weighted sound level exceeded 90% of a monitoring time period.

### *Sound*

- (1) Sound is an oscillation in pressure, stress, particle displacement, particle velocity, etc., in a medium.
- (2) Sound is an auditory sensation evoked by the oscillation described above.

### *Sound Pressure*

The sound pressure at a point is the total instantaneous pressure at that point, in the presence of a sound wave, minus the static pressure at that point.

### *Sound Pressure Level*

The sound pressure level, in decibels, of a sound is 20 times the logarithm to the base 10 of the ratio of the sound pressure to the reference pressure. The reference pressure shall be explicitly stated and is defined by standards.

Unless otherwise specified, the sound fields on both sides of the partition are assumed to be diffuse.

### *Spectrum*

A group of sound levels in frequency bands covering a wide frequency range. Generally, this term is used with some modifier indicating the resolution bandwidth, e.g., octave band spectrum or one-third octave band spectrum.



## **Appendix B**

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**Massachusetts Department of  
Environmental Protection (MassDEP)  
Noise Policy 90-001**



*The Commonwealth of Massachusetts*  
*Executive Office of Environmental Affairs*  
*Department of Environmental Quality Engineering*  
*Division of Air Quality Control*  
*One Winter Street, Boston 02108*

February 1, 1990

DAQC Policy 90-001

DIVISION OF AIR QUALITY CONTROL POLICY

This policy is adopted by the Division of Air Quality Control. The Department's existing guideline for enforcing its noise regulation (310 CMR 7.10) is being reaffirmed.

P O L I C Y

A source of sound will be considered to be violating the Department's noise regulation (310 CMR 7.10) if the source:

1. Increases the broadband sound level by more than 10 dB(A) above ambient, or
2. Produces a "pure tone" condition - when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.

These criteria are measured both at the property line and at the nearest inhabited residence. Ambient is defined as the background A-weighted sound level that is exceeded 90% of the time measured during equipment operating hours. The ambient may also be established by other means with the consent of the Department.

Approved: February 1, 1990

Effective: Immediately

*Barbara A. Kwetz*  
Barbara A. Kwetz  
Acting Director  
Division of Air Quality Control

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Massachusetts Adverse Possession Real Estate Law

### Massachusetts Adverse Possession Real Estate Law

Under the Massachusetts Adverse Possession Real Estate Laws, a person may claim that land under title to another now belongs to him or her. If this sounds like something you might like to do; know that the path ahead is not easy. *Cook v Babcock*, 65 Mass. 206 (1853) determined that a person claiming adverse possession must prove “an actual, open, exclusive, and adverse possession of the land”. And, it’s an all or none deal.

#### These are the five components essential for alleged adverse possession in Massachusetts:

1. You are the only possessor of the parcel, you were physically present and acted like you owned it.
2. You exhibited an open possession visible to the land’s owner (notorious).
3. Using the land was suitable for the size, type and your use of the land.
4. You did not have the owner’s permission to possess the land.
5. You possessed the land for an uninterrupted 20 year period. If you just vacationed on the land intermittently, you do not have possession.

In addition, there are a couple of other hurdles to go through. According the Section 31 of Massachusetts General Law Chapter 260, an adverse possession action cannot be undertaken for

public purpose.

However, this section also says that Massachusetts government-owned property has no immunity from the 20-year statute of limitations for recovery of land except as noted above. So a party could bring an adverse possession claim forward on the commonwealth and its political subdivisions – this is not the case in most other jurisdictions.

Another exception to the adverse possession law is found in section 53 of Massachusetts General Law, Chapter 185, which says that a party cannot bring an adverse possession claim against an owner holding title to registered land, easement or other right therein.

Note that an owner cannot bar a claim of adverse possession by citing his not knowing he owned the land. This does not seem fair but the law's intent is to clear dormant land titles in the public interest despite a few owners losing their rights.



Adverse Possession



Real Estate Law



#### PREVIOUS STORY

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Leave Law

(<https://www.pgclawoffice.com/business-law/overview-of-the-new-massachusetts-sick-leave-law/>)

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## **Part III**

COURTS, JUDICIAL OFFICERS AND PROCEEDINGS IN CIVIL CASES

## **Title V**

STATUTES OF FRAUDS AND LIMITATIONS

## **Chapter 260**

LIMITATION OF ACTIONS

## **Section 31**

ACTIONS BY COMMONWEALTH

Section 31. No action for the recovery of land shall be commenced by or in behalf of the commonwealth, except within twenty years after its right or title thereto first accrued, or within twenty years after it or those under whom it claim have been seized or possessed of the premises; but this section shall not apply to the province lands in the town of Provincetown lying north and west of the line fixed by section twenty-five of chapter ninety-one, to the Back Bay lands, so called, in Boston, or to any property, right, title or interest of the commonwealth below high water mark or in the great ponds; provided, further, that this section shall not bar any action by or on behalf of the commonwealth, or any political subdivision thereof, for the recovery of land or interests in land held for conservation, open space, parks, recreation, water protection, wildlife protection or other public purpose.

F

COPY

Clerk



**Massachusetts Department of Environmental Protection**  
**Bureau of Resource Protection - Wetlands**  
**and Holliston Conservation Commission**

**WPA Form 5 – Order of Conditions**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40  
and Holliston Wetlands Administration Bylaw (Article XXX)

Provided by MassDEP:  
**185-889**  
MassDEP File #

eDEP Transaction #  
**Holliston**  
City/Town

**A. General Information**

Please note:  
this form has  
been modified  
with added  
space to  
accommodate  
the Registry  
of Deeds  
Requirements

**Important:**  
When filling  
out forms on  
the  
computer,  
use only the  
tab key to  
move your  
cursor - do  
not use the  
return key.



1. From: Holliston  
Conservation Commission
2. This issuance is for  
(check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:
- Terri Bendes  
a. First Name b. Last Name
- Auto Dealers Exchange of Concord, LLC dba ADESA Boston  
c. Organization
- 13085 Hamilton Crossing Boulevard  
d. Mailing Address
- Carmel IN 46032  
e. City/Town f. State g. Zip Code

4. Property Owner (if different from applicant):
- Michael Brumber  
a. First Name b. Last Name
- DCAB, LLC  
c. Organization
- 157 Lowland Street  
d. Mailing Address
- Holliston MA 01746  
e. City/Town f. State g. Zip Code

5. Project Location:
- 194 Lowland Street (0 Lowland Street) Holliston  
a. Street Address b. City/Town
- Map 12, Block 4 (Map 9, Block 2) Lot 33.1 (Lot 57.1)  
c. Assessor's Map/Plat Number d. Parcel/Lot Number
- Latitude and Longitude, if known: 42.208512°N 71.410080°W  
d. Latitude e. Longitude





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**A. General Information (cont.)**

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):  
Middlesex  
a. County  
11451, 11294, 10554  
b. Certificate Number (if registered land)  
206, 344, 74  
c. Book  
d. Page
7. Dates: July 21, 2020 October 20, 2020 November 10, 2020  
a. Date Notice of Intent Filed b. Date Public Hearing Closed c. Date of Issuance
8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):  
Site Development Plan for ADESA, Holliston (23 Sheets)  
a. Plan Title  
Kimley Horn & Associates, Inc. Brian Brewer #46948  
b. Prepared By  
10/6/2020 c. Signed and Stamped by  
(varies)  
d. Final Revision Date e. Scale
- Stormwater Report 10/6/2020  
Long Term Pollution Prevention and Maintenance Plan 10/6/2020  
f. Additional Plan or Document Title g. Date

**B. Findings**

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

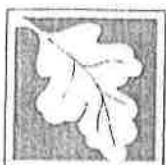
Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

- a. ☒ Public Water Supply b. ☐ Land Containing Shellfish c. ☒ Prevention of Pollution  
d. ☒ Private Water Supply e. ☒ Fisheries f. ☒ Protection of Wildlife Habitat  
g. ☒ Groundwater Supply h. ☒ Storm Damage Prevention i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

- a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
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**B. Findings (cont.)**

**Denied because:**

- b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. A description of the performance standards which the proposed work cannot meet is attached to this Order.
- c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).
3. ☒ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) 66  
a. linear feet

**Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)**

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. <input type="checkbox"/> Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. <input type="checkbox"/> Bordering Vegetated Wetland	a. square feet	b. square feet	c. square feet	d. square feet
6. <input type="checkbox"/> Land Under Waterbodies and Waterways	a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		
7. <input type="checkbox"/> Bordering Land Subject to Flooding	a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. <input type="checkbox"/> Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. <input type="checkbox"/> Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet



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Sq ft between 100-  
200 ft

g. square feet

h. square feet

i. square feet

j. square feet

**B. Findings (cont.)**

**Coastal Resource Area Impacts:** Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. <input type="checkbox"/> Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. <input type="checkbox"/> Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. <input type="checkbox"/> Coastal Beaches	a. square feet	b. square feet	c. <sup>cu yd</sup> nourishment	d. <sup>cu yd</sup> nourishment
14. <input type="checkbox"/> Coastal Dunes	a. square feet	b. square feet	c. <sup>cu yd</sup> nourishment	d. <sup>cu yd</sup> nourishment
15. <input type="checkbox"/> Coastal Banks	a. linear feet	b. linear feet		
16. <input type="checkbox"/> Rocky Intertidal Shores	a. square feet	b. square feet		
17. <input type="checkbox"/> Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18. <input type="checkbox"/> Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. <input type="checkbox"/> Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		
22. <input type="checkbox"/> Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet



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Sq ft between 100-  
200 ft

g. square feet

h. square feet

i. square feet

j. square feet

**B. Findings (cont.)**

\* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. ☐ Restoration/Enhancement \*:

a. square feet of BVW

b. square feet of salt marsh

24. ☐ Stream Crossing(s):

a. number of new stream crossings

b. number of replacement stream crossings

**C. General Conditions Under Massachusetts Wetlands Protection Act**

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
  - a. The work is a maintenance dredging project as provided for in the Act; or
  - b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
  - c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on 11/10/2023 unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.



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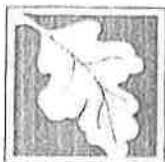
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**C. General Conditions Under Massachusetts Wetlands Protection Act**

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,  
"Massachusetts Department of Environmental Protection" [or, "MassDEP"]  
"File Number                      185-889                      "
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.



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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.
19. The work associated with this Order (the "Project")
  - (1) ☒ Is subject to the Massachusetts Stormwater Standards
  - (2) ☐ Is NOT subject to the Massachusetts Stormwater Standards

**If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

- a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
  - i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
  - ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
  - iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;



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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;
- v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.
- c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:
  - i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and
  - ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.
- d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.
- e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.
- f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.



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**C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)**

- g) The responsible party shall:
  - 1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
  - 2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
  - 3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

**See Attached Special Conditions #20 - #58**

- 20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.





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**D. Findings Under Municipal Wetlands Bylaw or Ordinance**

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No
2. The Holliston Conservation Commission hereby finds (check one that applies):
- a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

1. Municipal Ordinance or Bylaw

2. Citation

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

- b. ☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

Holliston Wetlands Administration Bylaw

Article XXX

1. Municipal Ordinance or Bylaw

2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
- The special conditions relating to municipal ordinance or bylaw are as follows (If you need more space for additional conditions, attach a text document):

**See Attached Project Findings**

**See Attached Special Conditions #20 - #58**



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## E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

11/10/2020

1. Date of Issuance

Please indicate the number of members who will sign this form.

This Order must be signed by a majority of the Conservation Commission.

2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

Christopher Bajdek, Chair

Authorized to sign on behalf of the Holliston  
Conservation Commission pursuant to a vote  
taken on 11/10/2020

☐ by hand delivery on

☐ by certified mail, return receipt  
requested, on

Date

Date

## F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the



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wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the

**G. Recording Information**

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Holliston  
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Holliston  
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

194 & "O" Lowland Street  
Project Location

185-889  
MassDEP File Number

Has been recorded at the Registry of Deeds of:

County	Book	Page
for: Michael Brumber, DCAB, LLC		
Property Owner		

and has been noted in the chain of title of the affected property in:

Book	Page

In accordance with the Order of Conditions Issued on:

11/10/2020  
Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
and Holliston Conservation Commission

**WPA Form 5 – Order of Conditions**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40  
and Holliston Wetlands Administration Bylaw (Article XXX)

Provided by MassDEP:  
**185-889**  
MassDEP File #

eDEP Transaction #

Holliston  
City/Town

Signature of Applicant



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

**Request for Departmental Action Fee  
Transmittal Form**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

Provided by DEP:

**A. Request Information**

1. Location of Project

a. Street Address

b. City/Town, Zip

c. Check number

d. Fee amount

Zip Code

2. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name

Mailing Address

City/Town

State

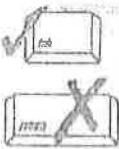
Zip Code

Phone Number

Fax Number (if applicable)

4. DEP File Number:

**Important:**  
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.





**Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands**

DEP File Number:

**Request for Departmental Action Fee  
Transmittal Form**

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**B. Instructions**

1. When the Departmental action request is for (check one):

- ☐ Superseding Order of Conditions – Fee: \$120.00 (single family house projects) or \$245 (all other projects)  
☐ Superseding Determination of Applicability – Fee: \$120  
☐ Superseding Order of Resource Area Delineation – Fee: \$120

**B. Instructions (cont.)**

Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection  
Box 4082  
Boston, MA 02211

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see <http://www.mass.gov/eea/agencies/massdep/about/contacts/>).
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

**TOWN OF HOLLISTON**  
COMMONWEALTH OF MASSACHUSETTS

Christopher Bajdek, Chair  
Rebecca Weissman, Vice Chair  
Jennifer Buttaro  
Shaw Lively



Utah Nickel  
Ann Marie Pilch  
Allen Rutberg

Ryan Clapp, Conservation Agent

**CONSERVATION COMMISSION**  
**Order of Conditions - DEP File #185-889**  
**194 & "0" Lowland Street – Vehicle Staging Parking Lot**  
**Project Findings**

- I. **Notice of Jurisdiction under the Massachusetts Wetlands Protection Act, M.G.L. Ch. 131, s. 40 and Article XXX of Town of Holliston By-Laws.** The Holliston Conservation Commission hereby finds that all or part of the property upon which work is authorized by this Order is subject to jurisdiction under the Massachusetts Wetlands Protection Act, M.G.L. Ch. 131, s. 40 and/or Article XXX of the Town of Holliston By-Laws. Said areas of jurisdiction are as follows:
  - a. **Activities Within the Buffer Zone** (310 CMR 10.02(3)(b), with buffer zones associated with freshwater wetlands associated with a perennial stream (Dopping Brook) ((310 CMR 10.02(1)(a)) and Article XXX S. III), Land Under Waterbodies (310 CMR 10.02(1)(b) and Article XXX S. III), and freshwater wetlands associated with an onsite pond (310 CMR 10.02(1)(a) and Article XXX S. III).
  - b. **Riverfront Area** 310 CMR 10.02(1)(f) associated with Bogastow Brook.
    - i. The only work proposed within the 200' Riverfront Area is replanting/mitigation.

The owner is hereby notified of his or her responsibilities to comply with all provisions of that statute. This condition shall remain in effect in perpetuity and shall survive the issuance of a Certificate of Compliance.

- II. **Project Description.** This Order of Conditions pertains to a project located at #194 & "0" Lowland Street. Said project includes the construction and paving of a vehicle staging parking lot and associated stormwater management structures and site work.
- III. **Mitigation and Replanting.** The area to the southwest on the parcel (towards Bogastow Brook) shall be replanted within the Riverfront Area in accordance with Sheets 21 & 22 on the plans referenced in Section A.8 of this Order of Conditions. Any change in species, number of plantings or locations shall be subject to review and approval by the Conservation Commission and/or its Agent. As proposed, species number and diversity is as follows:
  - a. 13 Eastern Redbud (*Cercis canadensis*)
  - b. 9 Red Oak (*Quercus rubra*)
  - c. 16 Eastern Red Cedar (*Juniperus virginiana*)
  - d. 22 White Spruce (*Picea glauca*)
  - e. 23 White Pine (*Pinus strobus*)
  - f. 12 Eastern White Cedar (*Thuja occidentalis*)

Additionally, the area shall be seeded with New England Erosion Control/Restoration Mix (NERM).

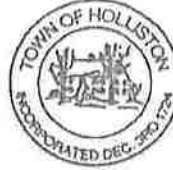
DEP #185-889  
194 & 0 Lowland Street  
Vehicle Staging Parking Lot

- IV. **Subdivision and Grant of Land.** As discussed during the public hearing for this project, the parcel located at #194 & 0 Lowland Street will be subdivided. Those areas not to be constructed upon will be granted to the Town of Holliston as Open Space prior to the issuance of a Certificate of Compliance.

DEP #185-889  
194 & 0 Lowland Street  
Vehicle Staging Parking Lot

**TOWN OF HOLLISTON**  
Commonwealth of Massachusetts

Christopher Bajdek, Chair  
Rebecca Weissman, Vice Chair  
Allen Rutberg  
Utah Nickel



Shaw Lively  
Jennifer Butaro  
Ann Marie Pilch

Ryan Clapp, Conservation Agent

**CONSERVATION COMMISSION**

**Order of Conditions - DEP File #185-889**  
**194 & "0" Lowland Street – ADESA Vehicle Staging**  
**Parking Lot**  
**Special Conditions**

- 20. WORK NOT AUTHORIZED.** Only work explicitly described in the above-referenced plans and Notice of Intent is authorized under this Order of Conditions.
- 21. AUTHORIZED WORK.** This Order of Conditions applies only to work associated with the construction of a vehicle staging parking lot and associated site work at 194 & "0" Lowland street. Any work not covered by this Order: (i) within 100 feet of any mapped wetland as shown on the plans; (ii) within any area subject to the 100 year flood elevation; or (iii) within 200 feet of a perennial stream or river will require a separate filing. Any other additional construction activities proposed within any area subject to jurisdiction by the Commission shall require the filing of a Request for Determination of Applicability (RDA) and/or a new Notice of Intent and receipt of a valid Order of Conditions, prior to the commencement of said activity.
- 22. PLAN CHANGES.** Any changes in the plans referenced in Section A.8 above or change resulting from the following special conditions (including the submittal of additional information), must be submitted to the office of the Holliston Conservation Commission for approval prior to implementation. A copy of such request shall at the same time be sent to the Department of Environmental Protection. One of the following responses will be made by the Commission:
- If the Commission finds, through administrative review, said changes to be insignificant to the interests of the Act, then the Commission will so notify the Applicant in writing.
  - If the Commission finds, through administrative review, said changes to be significant and/or deviate from the original plans, Notice of Intent, or this Order of Conditions, and that the interests of the Act would best be served by the issuance of additional conditions, the Commission will conduct another Public Hearing within 21 days, advertised at the Applicant's expense, in order to take testimony from all interested parties. Within 21 days of the close of the Public Hearing the Holliston Conservation Commission will issue an Amended Order of Conditions. No work shall be undertaken until the Amended Order of Conditions has been recorded in the Registry of Deeds or Land Court in the manner described in Condition #9, and until all administrative appeal periods from the Amended Order of Conditions have elapsed.



- c. If the Commission finds, by majority vote following administrative review, said changes to be significant and would substantially change the nature, scope, purpose, or impact of the project, then the Commission will direct the Applicant to file a new Notice of Intent.
- 23. APPEAL PERIODS.** No work shall commence on-site until all appeal periods have elapsed and a final Order of Conditions has been recorded with the Registry of Deeds, and proof of such recording shall be submitted in writing to the Holliston Conservation Commission.
- 24. CONTRACT/SUBCONTRACT NOTIFICATION.** This Order shall be included in all applicable construction contracts, subcontracts, and specifications with the work proposed and shall supersede any conflicting contract requirements. The Applicant shall assure that all contractors, subcontractors, and personnel performing the permitted work are fully aware of this Order's terms and conditions.
- 25. ON-SITE DOCUMENTS.** A copy of the final approved plans and Order of Conditions shall be kept on-site at all times during construction.
- 26. ADDITIONAL CONDITIONS.** The Commission reserves the right to impose additional conditions on portions of this project to mitigate any impacts which could result from site erosion or any noticeable degradation of surface water quality discharging from the site.
- 27. TRANSFER OF OWNERSHIP.** Within ten (10) calendar days inclusive of the transfer of ownership of the subject property in whole or in part, including lots or buildings conveyed under individual deeds, the Conservation Commission shall be notified in writing of the name and address of the new owner. Within ten (10) calendar days inclusive of such transfer, a sworn affidavit shall be filed with the Holliston Conservation Commission by the new owner that he or she has read and understood the Order of Conditions and terms applicable to the project site and intends to comply with all provisions of the Order. Once said transfer occurs, the new owner shall succeed to all rights and obligations of the Applicant hereunder and the Conservation Commission shall look to and require compliance hereunder from such new owner.
- 28. RIGHT TO INSPECT.** Members and Agents of the Commission and the Department of Environmental Protection reserve the right to enter and inspect the property at all reasonable times, until a Certificate of Compliance is issued, to evaluate compliance with the conditions stated in this Order of Conditions, the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, Sec. 40) as amended, 310 CMR 10.00, and the Local by-law (Article XXX). The Commission may acquire any information, measurements, photographs, observations, and/or materials, or may require the submittal of any data or information deemed necessary by the Commission for that evaluation.
- 29. COORDINATION WITH OTHER DECISIONS AND/OR PERMITS.** This Order of Conditions is not intended to supersede any decisions and/or permits issued by any other entity. Should plan review by any other entity require revisions, the revisions must be filed with the Holliston Conservation Commission pursuant to Special Condition #22 prior to implementation. The inclusion of this condition does not imply that the Conservation Commission takes any position whether such permit should be issued.
- 30. SEVERABILITY.** The invalidity of any section or provision of this Order shall not invalidate any other section or provision thereof, nor shall it invalidate any permit, approval, or determination which previously has been issued by the Commission or any other entity.

#### **PRE-CONSTRUCTION**

31. **NOTIFICATION OF COMMENCEMENT OF WORK.** The Applicant shall notify the Conservation Commission, in writing, 48 hours before any activity commences on the project site and shall advise the Conservation Commission of the name(s) and telephone number(s) of the person(s) on site responsible for compliance with this Order. This list shall be resubmitted if any changes are made to it.
32. **EROSION CONTROL INSTALLATION & INSPECTION.** Prior to the commencement of tree clearing, earthwork or other land disturbance under this Order of Conditions, all erosion control measures (e.g., erosion control barriers and check dams, etc.), shall be installed as shown on the project plan (pages 16-17 on record plan set). The Conservation Commission, or its Agent, shall be notified when the protective measures have been installed for inspection and verification (508-429-0607).
33. **EROSION CONTROL MAINTENANCE AND STOCKPILE.** Prior to any soil disturbance, removal, or stockpiling, the Applicant shall have on the site, an adequate quantity of supplemental haybales, silt fence, and stakes to be used for control of emergency erosion problems. All erosion control measures are to be inspected weekly and after each storm event of 0.5 inch or greater, to ensure the proper functioning of said measures in preventing the introduction of silt in the wetland. Erosion controls must be inspected, cleaned of accumulated material, and repaired as needed. Material collected from the siltation barrier shall be removed as necessary and disposed in an upland area. All erosion control and sedimentation prevention measures shall remain in place and be maintained for the purpose for which they are installed (proper maintenance may require periodic replacement) until the area upgradient is permanently stabilized and a Certificate of Compliance has been issued. In the event that an uncontrollable emergency occurs, such as a heavy rainstorm, causing erosion and sedimentation breakout, the Applicant shall replace such barriers to the standards required by the Order and the satisfaction of the Commission.
34. **REMOVAL OF EROSION/SEDIMENT CONTROLS.** Erosion/sediment controls shall be removed from the site once they are no longer needed. The Applicant shall contact the Commission for authorization prior to removal.
35. **WETLAND PROTECTION.** No work or activity, including the cutting of vegetation, shall take place in a wetland area or buffer zone other than as provided for in this Order of Conditions.

### CONSTRUCTION

36. **LIMIT OF WORK.** The line of the proposed erosion control barrier shall be the Limit of Construction (unless otherwise determined by the contractor and reviewed in the field by the Commission or its agent) beyond which no tree clearing or earth-disturbing activity shall occur or heavy equipment shall be allowed. At no time during or after construction shall fill or other materials be placed, slump or fall beyond the limit of work as shown on the plans. The Applicant shall be responsible for inspecting and maintaining all slopes and embankments.
37. **STABILIZATION.** All disturbed surfaces shall be permanently stabilized with vegetation within fourteen (14) days of final grading except in non-growing seasons where temporary stabilization shall be employed. Under no circumstances shall soil be left unstabilized for periods exceeding thirty (30) days. Preventative controls such as temporary seeding/ bonded fiber matrix or jute covering shall be employed to prevent such an occurrence.
38. **DEWATERING.** There shall be no dewatering on site that will result in the direct discharge of water to any wetland resource area. Any dewatering discharge within 100 feet of a resource area or functional drainage way will be equipped with a filter bag designed for that purpose.

All suction hoses will be kept at the surface of the water to reduce to a minimum the suspension and pumping of silt.

39. **SPILL PREVENTION.** All equipment shall be stored outside the resource area and the 100-foot buffer zone and in such a manner so as not to introduce any pollutants into any wetlands, and in no event shall there be any discharge or spillage of fuel, oil or other pollutants into any resource area. Servicing of equipment (e.g., fueling, changing, adding or applying lubricants or hydraulic fluids, or washing/rinsing of concrete transports) must be done outside resource areas and the 100-foot buffer zone, with the exception of refueling of immobile equipment. Immobile equipment includes, but is not limited to, operating pumps, where removal of the pump would cause unreasonable damage to the resource area or delay to the construction effort. During and after work on this project, the Applicant shall take all reasonable precautions to prevent the discharge or spillage of fuel, oil or other pollutants by ignorance, accident or vandalism. No storage of petroleum products for use during construction (motor oil, gasoline, or diesel fuel, shall be allowed on the site at any time.
40. **SPILL PREVENTION EQUIPMENT.** Measures and equipment must be provided on site sufficient to prevent discharged fluids from reaching wetlands or water bodies, and be readily available for use. These will include, at the applicant's discretion, some combination of the following:
  - a. dikes, berms or retaining walls sufficiently impervious to contain spilled oil;
  - b. sorbent and barrier materials in quantities determined by the contractor to be sufficient to capture the largest reasonably foreseeable spill;
  - c. disposable drums or containers suitable for holding and transporting contaminated materials.
41. **STOCKPILING.** Should any on-site stockpiling be required, all debris, fill and excavated material, construction material, and building material shall be stockpiled at least 50 feet away from any wetland (preferably at least 100 feet away), be located outside of any floodplain and be located to prevent sediment from surface runoff entering the wetlands. At no time shall any debris or other material be buried or disposed of within 50 feet of the wetland boundary as marked on the project plan. All stockpiles to remain in place for more than seven (7) days shall be properly stabilized to prevent erosion and siltation. Preventative control such as additional perimeter erosion control, temporary seeding/ bonded fiber matrix or jute covering shall be employed to prevent such an occurrence.
42. **CONSTRUCTION DEBRIS REMOVAL.** All debris generated during construction from any aspect of this project shall be removed from the site and properly disposed. All stumps, brush, waste and debris shall be removed from the construction site or recycled into usable chips and shall be distributed promptly and in a legal manner. Records as to the destination of all materials to be removed from the site, including, stumps, brush, excess fill, loam, shall be kept and provided to the Commission upon request.
43. **WORK STOPPAGE.** In the event that work ceases on the site for a period of time greater than fifteen (15) business days, and before the erosion control inspections required by the Order have stopped, the Applicant shall notify the Commission. The Applicant will notify the Commission as to what steps will be taken for long term stabilization of the site during the stoppage of work. The Applicant shall re-notify the Commission prior to the re-commencement of work.
44. **TIMELY RESPONSE TO EROSION PROBLEMS.** The Applicant shall move swiftly to control any erosion problems that occur on the site. The Holliston Conservation Commission reserves the right to require additional erosion and/or damage prevention controls it may deem necessary.

45. **CONTROL OF CONSTRUCTION DEBRIS.** No construction debris (paper, wood, metal, concrete, etc.) may be allowed to enter the resource area at any time. Windblown material shall be promptly removed from wetland resource areas.
46. **SEDIMENTATION.** There shall be no sedimentation into wetlands, water bodies or Town of Holliston roads from discharge pipes or surface runoff leaving the site. See following Condition #47.
47. **DAMAGE TO RESOURCE AREAS.** Any damage caused as a direct result of this project to any wetland resource area is the responsibility of the Applicant to repair, restore or replace. Sedimentation or erosion into these areas shall be considered damage to wetland resource areas. The Conservation Commission shall be promptly notified of any damage to wetland resource areas. Following notification, the Applicant must submit a written plan for abatement of the problem and restoration. This plan must be approved by the Conservation Commission prior to its implementation.
48. **SURPLUS EARTH MATERIALS.** It shall be the responsibility of the Applicant to ensure that any and all surplus materials which are not needed for use on the project are lawfully disposed of outside any area subject to protection under M.G.L. c 131, s. 40, unless such disposal area and activity are regulated under either a valid Order of Conditions or Determination of Applicability.
49. **NON-NATIVE PLANT DISPOSAL.** In conducting site clearing, the site contractor shall ensure the proper removal and disposal of all non-native invasive plants encountered in this work. Site contractor shall ensure that invasive plants are not chipped to use on-site as mulch.
50. **LANDSCAPING - NO INVASIVE PLANTS.** Landscaping shall not consist of any exotic invasive listed in the Massachusetts Banned Plants List. For detailed information, please visit: <http://www.mass.gov/agr/farmproducts/prohibitedplantlist.htm>
51. **STORMWATER OPERATION AND MAINTENANCE PLAN.** The Owner/Applicant shall implement and adhere to the Stormwater Operation and Management Plan requirements proposed within the referenced Stormwater Management Report (Kimley Horn, revision date 10/6/2020) and Long Term Pollution Prevention and Maintenance Plan (Kimley Horn, revision date 10/6/2020) throughout the future operation of the completed vehicle storage parking lot. This condition is intended to persist in perpetuity and shall survive the issuance of a Certificate of Compliance.
52. **MAINTENANCE & SUBMISSION OF STORMWATER MANAGEMENT RECORDS.** A complete record of stormwater management activities and, if applicable, necessary maintenance activities, shall be maintained. Such record to include personnel, dates, activities, materials, disposition of collected sediments/debris, and a photographic record. The Applicant shall submit a summary report of these stormwater management records annually to the Commission until the issuance of a Certificate of Compliance. However, the maintenance of a complete record of stormwater management activities is a condition intended to persist in perpetuity and shall survive the issuance of a Certificate of Compliance. At any point subsequent to the issuance of a Certificate of Compliance, the complete record of stormwater management activities shall be made available to the Commission upon written request, and providing one week (5 business days) notice.
53. **LANDSCAPING & MITIGATION PLANTING.** The area to the southwest on the parcel (towards Bogastow Brook) shall be replanted within the Riverfront Area in accordance with Sheets 21 & 22 on the plans referenced in Section A.8 of this Order of Conditions. Any

change in species, number of plantings or locations shall be subject to review and approval by the Conservation Commission and/or its Agent.

#### **POST CONSTRUCTION**

- 54. CERTIFICATE OF COMPLIANCE.** Not more than thirty days following completion of the project, the Applicant shall submit with their request for a Certificate of Compliance, an affidavit prepared by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts, stating that the site has been developed in accordance with the requirements of this Order of Conditions, based upon an on-site inspection and the referenced site plan(s). Prior to issuance of a Certificate of Compliance all drainage structures regulated under this Order of Conditions shall be cleaned of accumulated sediment and debris. Until a Certificate of Compliance is issued by the Conservation Commission, the sign as described in Condition #10 shall remain in place.
- a. As discussed during the public hearing for this project, the parcel located at #194 & "0" Lowland Street shall be subdivided. Those areas not to be constructed upon shall be granted to the Town of Holliston as Open Space prior to the issuance of a Certificate of Compliance.
- 55. AS BUILT.** Upon completion of the project, the Applicant shall submit with their request for a Certificate of Compliance, an As-Built plan for all work within the jurisdiction of the Wetlands Protection Act and Article XXX as regulated by this Order of Conditions. If a project has been completed in accordance with plans stamped by a registered professional engineer, architect, landscape architect or land surveyor, a written statement by such a professional person certifying substantial compliance with the plans and setting forth what deviations, if any, exists from the plans approved in the Order shall accompany the request for a Certificate of Compliance.

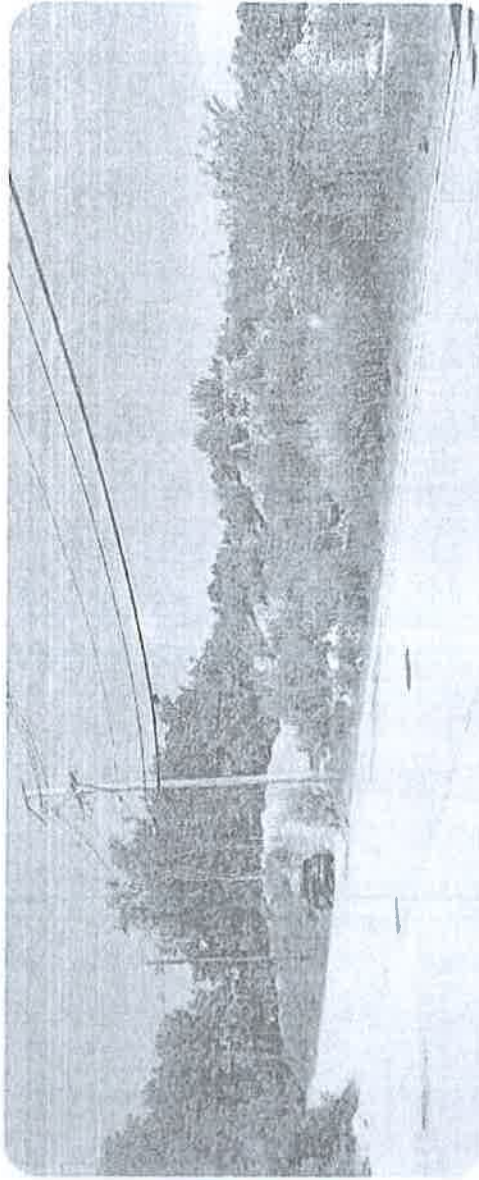
#### **CONDITIONS IN PERPETUITY**

- 56. FERTILIZERS/PESTICIDES/HERBICIDES.** Fertilizers utilized for landscaping and lawn care shall be low phosphate content, slow-release variety, and shall be used in moderation. Pesticides and herbicides shall not be used within 100 feet of the wetland resource area. This condition is intended to apply in perpetuity and will outlive the issuance of a Certificate of Compliance.
- 57. SNOW REMOVAL AND DE-ICING.** At no time shall snow removal result in the direct discharge of snow into the wetlands. Snow storage shall be limited to the designated location on the plan referenced in Section A.8 in this Order. No de-icing materials of any type shall be stored in bulk stockpiles within 100 feet of the wetlands. This condition is intended to apply in perpetuity and will outlive the issuance of a Certificate of Compliance.
- 58. DUMPING PROHIBITED.** There shall be no dumping of leaves, grass clippings, brush, or other debris into the wetland, river/stream/body of water, wetland restoration/mitigation area, or associated buffer zones.

***\*\*END OF SPECIAL CONDITIONS\*\****







EXISTING PERSPECTIVE | VIEW A



PROPOSED PERSPECTIVE | VIEW A



KEY PLAN

**ADESA**

TOWN OF HOLLISTON, MA

LANDSCAPE BUFFER EXHIBIT

JUNE 10, 2021

SCALE: N.T.S.

**Kimley»Horn**

T

Figure 4. *Truck Routes*

