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October 31, 2017

Bonnie Sontag, Chairperson
Newburyport Planning Board
60 Pleasant Street
Newburyport, MA 01950

Re: Second transmittal letter for 92R Merrimac Street application

Dear Ms. Sontag:

On July 19, 2017, we submitted an application to the Planning Board for a special permit and site plan review for 92R Merrimac St. At that time, we submitted the following:

- Denial letter;
- Site plan review application;
- Site plan review checklist;
- Special permit application;
- Architectural plan set dated 06/01/2017;
- Site layout and zoning analysis plan;
- Authorization letter;
- Memo addressing special permit requirements;
- Assessor's card;
- Development team;
- Photos;
- Deed;
- Renderings.

On August 16, 2017, we appeared before the Planning Board to discuss the application in an informal meeting.

Today, in support of our application for a special permit, we are submitting the following additional documents:

- Traffic Impact Assessment;
- Memo comparing 92R Merrimac St. to Horton's Yard (58 Merrimac St.);
- Letter to Peter Binette re public accommodation;

- Public accommodation plan;
- Letter from Essex Natural Heritage;
- Landscaping and lighting plan;
- Chart comparing WWOD to WMU;
- Memo in support of WWOD;
- Revised elevations.

A report on stormwater runoff, potential runoff and sedimentation, an analysis of environmental and community impacts and the compatibility of the proposed development will be submitted at a later date if required.

Please note that we have revised our design to lower the height of the building to 40' and will advise the ZBA that a height variance is no longer necessary.

Our comparison of the requirements of WMU vs. WWOD supports our conclusion that WWOD is the appropriate zoning option for the following reasons:

- The height of the proposed structure has been reduced to 40' and therefore, a height variance is no longer required for WWOD;
- WWOD requires fewer variances than WMU;
- The proposed use in WWOD conforms to the intent of the Zoning Ordinance and Master Plan;
- WMU does not allow for the development of any economically feasible use;
- WMU requires a use variance for any structure over 6 units; and
- Location in the floodplain makes any use other than parking infeasible on the first floor.

We look forward to discussing our applications with the Planning Board. If you have any questions, please contact me at 978-687-6200. Thank you.

Sincerely,
Minco Development Corporation

Louis P. Minicucci, Jr.
Louis P. Minicucci, Jr.
President

LPM/kp

Attachments

92R Merrimac Street
Newburyport, MA
October 31, 2017
Memo Regarding WWOD

XXIV-A - Purpose.

A Waterfront West Overlay District (WWOD) and WWOD special permit (WWOD-SP) are established due to the unique land use, historic, cultural and architectural resources of the properties located along the central waterfront to encourage implementation of the recommendations of the 2001 Master Plan and 2003 Waterfront Strategic Plan, as amended and supplemented from time to time, to:

A: Encourage a building pattern, scale, setbacks, height, density, and design conforming to that now found in the historic downtown business district.

The proposed structure contains 25 total units with an overall building height of 40' and all setbacks are minimized to create a pedestrian friendly environment. The scale, setbacks, height, and density are all similar to that currently found in Newburyport's downtown.

B: Encourage a pattern of building development similar to the existing downtown by eliminating excessive "yard setback requirements," providing mandatory "build-to" lines, and increasing the percentage of a lot area that can be covered by a building.

The proposed side yard and rear setbacks are all designed to create a pedestrian friendly site by placing the building close to the Right of Way and pedestrian pathways. The proposed building will have approximately a 50% percent lot area coverage.

C: Encourage mixed-use buildings with commercial uses on the ground floor and housing and/or offices above.

Due to the site's location in the flood plain there is no proposed commercial or residential use on the first floor. We are providing three floors of housing above a garage.

D: Promote a lively mixed-use waterfront district that will serve Newburyport's citizens and visitors with ample public space and intimately scaled streets and public pedestrian ways with key views to the water from Merrimac Street.

The addition of 25 residential units will promote a significantly more lively use than the existing condition of a one story storage facility and former automobile repair garage. The proposed setbacks, sidewalks, and landscaping all improve pedestrian access over the existing use. The landscaped area on the eastern portion of the site facing the Merrimack River, similar in size and design to the plaza located next to the harbor master's facility, will provide an active public accommodation. The building is oriented perpendicular to the river and the site grade is approximately 12' below Merrimac Street, so key views to the water will not be affected.

E: Maintain and protect marine-dependent uses consistent with the requirements of Commonwealth Chapter 91.

The current use is not a marine-dependent use and the proposed use will not be detrimental to any existing or proposed future marine-dependent uses.

F: Diminish the visual impact of the parked car by discouraging expansive surface parking lots and encouraging structured parking.

The proposed building will have 37 of the 39 total parking spaces in a garage under the structure to avoid an expansive surface parking lot. All parking under the building will be screened with fencing, plantings, and other landscaping.

G: Encourage "shared parking" strategies in mixed-use projects to diminish overall parking requirements.

N/A

H: Provide incentives to construct pedestrian ways to the water such as pedestrian alleys, sidewalk plazas and other public open spaces. Also provide incentives to pool and contribute private open space required by zoning to public open space areas.

The landscaped area on the eastern end of the site provides usable public open space that does not currently exist and will be accessible to the Rail Trail

I: Protect the architectural, cultural, economic and cultural heritage of the waterfront through preservation and adaptive reuse of existing historic structures.

The Historic Commission deemed this building NOT to be historically significant.

J: Encourage affordable housing within an overall density that is generally consistent with the Zoning Ordinances and the downtown districts.

The proposed development will contain 10% or three affordable units. They will be evenly distributed throughout the development and contain the same finishes and fixtures as all other units.

Transportation Impact Assessment

Proposed Residential Development

Newburyport, Massachusetts

Prepared for:

Minco Corporation

North Andover, Massachusetts

Vanasse & Associates, Inc.
Transportation Engineers & Planners
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066

TRANSPORTATION IMPACT ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT
NEWBURYPORT, MASSACHUSETTS

Prepared for:

Minco Corporation
North Andover, Massachusetts

October 2017

Prepared by:

VANASSE & ASSOCIATES, INC.
35 New England Business Center Drive
Suite 140
Andover, MA 01810
(978) 474-8800
www.rdva.com

EXECUTIVE SUMMARY

Vanasse and Associates, Inc. (VAI) has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed 25 unit condominium development to be located off Tournament Wharf (92R Merrimac Street) in Newburyport, Massachusetts. This assessment has been completed in accordance with State and City standards and those of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

- The Project is expected to generate approximately 152 new vehicle trips on an average weekday (76 vehicles entering and 76 exiting), with approximately 18 new vehicle trips (3 vehicles entering and 15 exiting) expected during the weekday morning peak-hour and 20 new vehicle trips (13 vehicles entering and 7 exiting) expected during the weekday evening peak-hour.

- A review of accident data researched from MassDOT indicates that area intersections experience accident rates below state averages indicating safe operations.

- The project will have minimal impact on area traffic operations and vehicle queueing as the expected new traffic to the area is one vehicle every three minutes during the peak periods.

In summary, a safe environment can be maintained with traffic conditions maintained at manageable levels with the following recommendations.

RECOMMENDATIONS

Project Access

Project access is provided primarily by way of one proposed full-access driveway on Tournament Wharf. The following recommendations are offered with respect to the design and operation of the Project site driveway:

- The driveway be placed under STOP-sign (Manual of Uniform Traffic Control Designation R1-1) control, with a painted STOP-bar included.

- Street illumination be provided at the site driveway intersection with Tournament Wharf.

- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the current Manual on Uniform Traffic Devices (MUTCD).[1]

- Signs and landscaping adjacent to the Project site driveway intersection should be designed and maintained so as not to restrict lines of sight.

Transportation Demand Management

The Project site is ideally situated to take advantage of available public transportation opportunities, including the existing bus service operated by the Merrimack Valley Regional Transit Authority (MVRTA) along Merrimac Street, the future MVRTA bus terminal that is to be located off Titcomb Street, and the Massachusetts Bay Transportation Authority (MBTA) Commuter Rail service at Newburyport Station to the south. In addition, the Project site is directly accessible from the Clipper City Rail Trail which provides access to the Newburyport Commuter Rail Station and the trail system along the Merrimack River. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules and fare information will be posted in a central location within the building and/or otherwise made available to residents;

- A "welcome packet" will be provided to new residents detailing available public transportation services, bicycle and walking alternatives, and commuter options available through MassRIDES' and their NuRide program which rewards individuals that choose to walk, bicycle, carpool, vanpool or that use public transportation to travel to and from work;

- Residents will be made aware of the Emergency Ride Home (ERH) program available through MassRIDES, which reimburses employees of a participating MassRIDES employer partner worksite that is registered for ERH and that carpool, take transit, bicycle, walk or vanpool to work;

- Bicycle parking will be provided, including both exterior bicycle racks and interior bicycle parking.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

[1] *Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

INTRODUCTION

Vanasse and Associates, Inc. (VAI) has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed 25 unit condominium development to be located off Tournament Wharf (92R Merrimac Street) in Newburyport, Massachusetts. This assessment has been completed in accordance with State and City standards and those of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project, as well as the intersections of Merrimac Street at Summer Street and Route 1 and Merrimac Street at Market Street and Tournament Wharf.

PROJECT DESCRIPTION

As proposed, the Project will entail the construction of 25 condominium units to be located off of Tournament Wharf (92R Merrimac Street) in Newburyport, Massachusetts. Primary access to the Project site will be provided by way of one proposed full-access driveway on Tournament Wharf. Figure 1 depicts the Project site location.

STUDY METHODOLOGY

This study was: i) prepared in consultation with the City of Newburyport; ii) performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* iii) conducted pursuant to the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and iv) completed in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; public transportation services; observations of traffic flow; and collection of daily and peak period traffic counts. In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon from the current year was selected for analyses consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues. The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

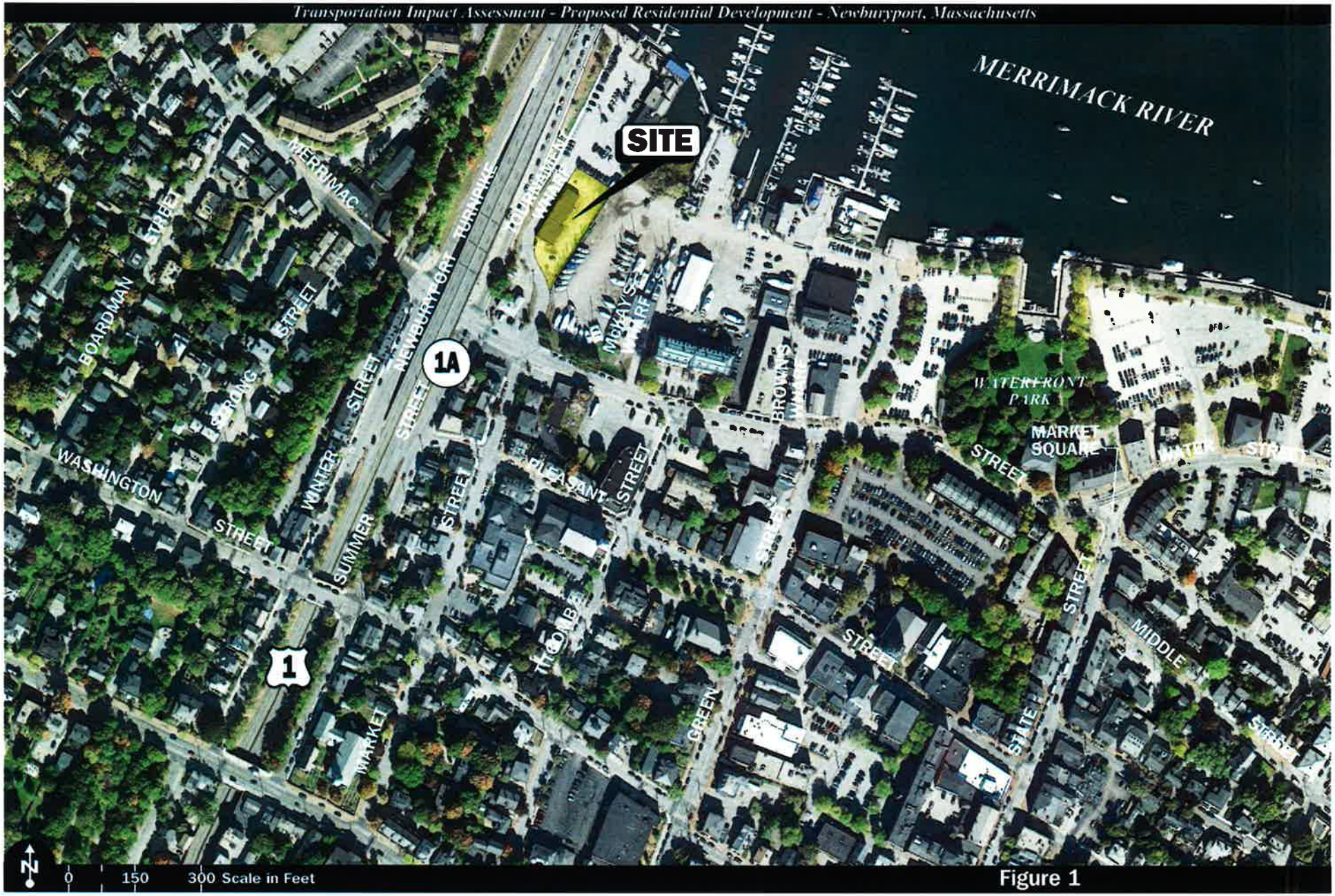

Figure 1

Site Location Map

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in October 2017. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area was selected to contain the major roadway providing access to the Project site including Merrimac Street, as well as the intersections of Merrimac Street at Summer Street and Route 1 and Merrimac Street at Market Street and Tournament Wharf.

The following describes the study area roadways and intersections.

Roadways

Merrimac Street

- Two-lane urban minor arterial roadway under City jurisdiction
- Traverses study area in a general northwest-southeast direction between Spofford Street and Market Square (Merrimac Street/State Street/Water Street)
- Provides two 11 to 25-foot wide travel lanes separated by a double-yellow centerline with no marked shoulders and on-street parking permitted excepted where signed otherwise
- A sidewalk is provided along both sides of the roadway
- Illumination is provided by way of street lights mounted on wood poles
- Posted speed limit is 30 miles per hour (mph)
- Land use consists of the Project site, residential and commercial properties, cultural uses, and public open space.

Intersections

Figure 2 graphically depicts the Existing Lane Use and Travel Lane Widths for the study area intersections.

Legend:

- Ⓢ **Signalized Intersection**
- Ⓤ **Unsignalized Intersection**
- **Sidewalk**
- **Crosswalk**
- XX' **Lane Use and Travel Lane Width**

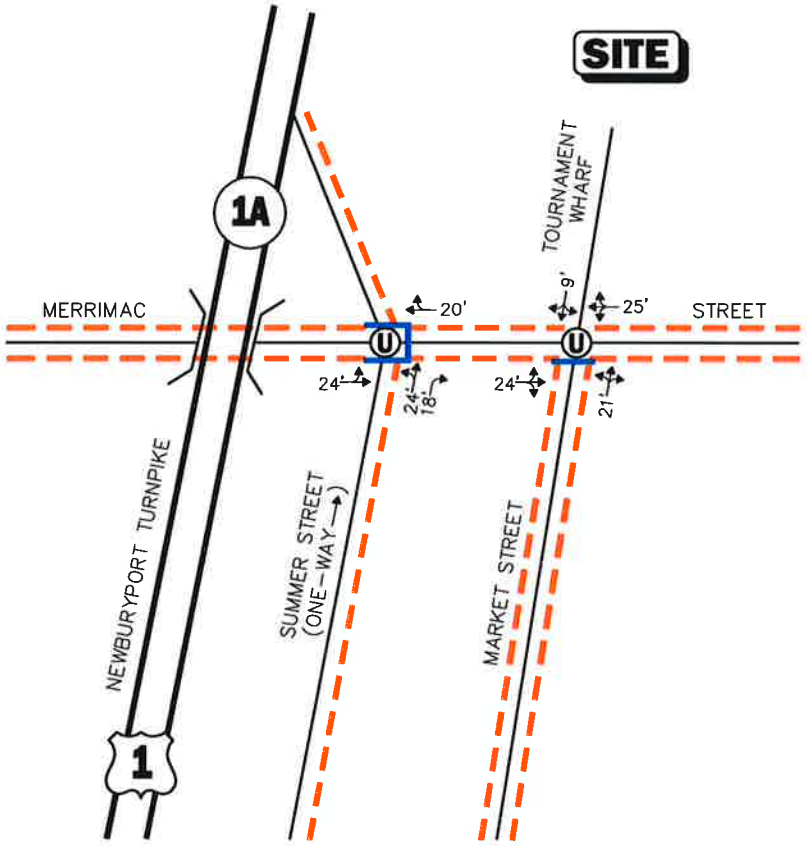

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Figure 2

Existing Intersection Lane Use, Travel Lane Width and Pedestrian Facilities

Vanasse & Associates, Inc.
Transportation Engineers & Planners

EXISTING TRAFFIC VOLUMES

Automatic traffic recorder (ATR) counts, manual turning movement counts (TMCs) and vehicle classification counts were completed in June 2016, as part of the Waterfront West Redevelopment Project and were utilized for this report. The ATR counts were conducted on Merrimac Street in the vicinity of the Project site in order to record weekday daily traffic conditions over an extended period, with weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak period manual TMCs performed at the study intersections. These time periods were selected for analysis purposes as they are representative of the peak traffic volume hours for the adjacent roadway network.

Traffic Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic volume data from MassDOT Continuous Count Station No. 5258 located on I-95 north of Scotland Road in West Newbury were reviewed.[2] Based on a review of this data, it was determined that traffic volumes for the month of June are approximately 5.0 percent above average month conditions. As such, the raw traffic count data that forms the basis of the assessment was not adjusted downward to average-month conditions in order to provide a conservative (above average) analysis condition. The 2016 Existing traffic volumes are summarized in Table 1, with the weekday morning and weekday evening peak-hour traffic volumes graphically depicted on Figure 3. Note that the peak-hour traffic volumes presented in Table 1 were obtained from the aforementioned figures.

Table 1
2016 EXISTING TRAFFIC VOLUMES

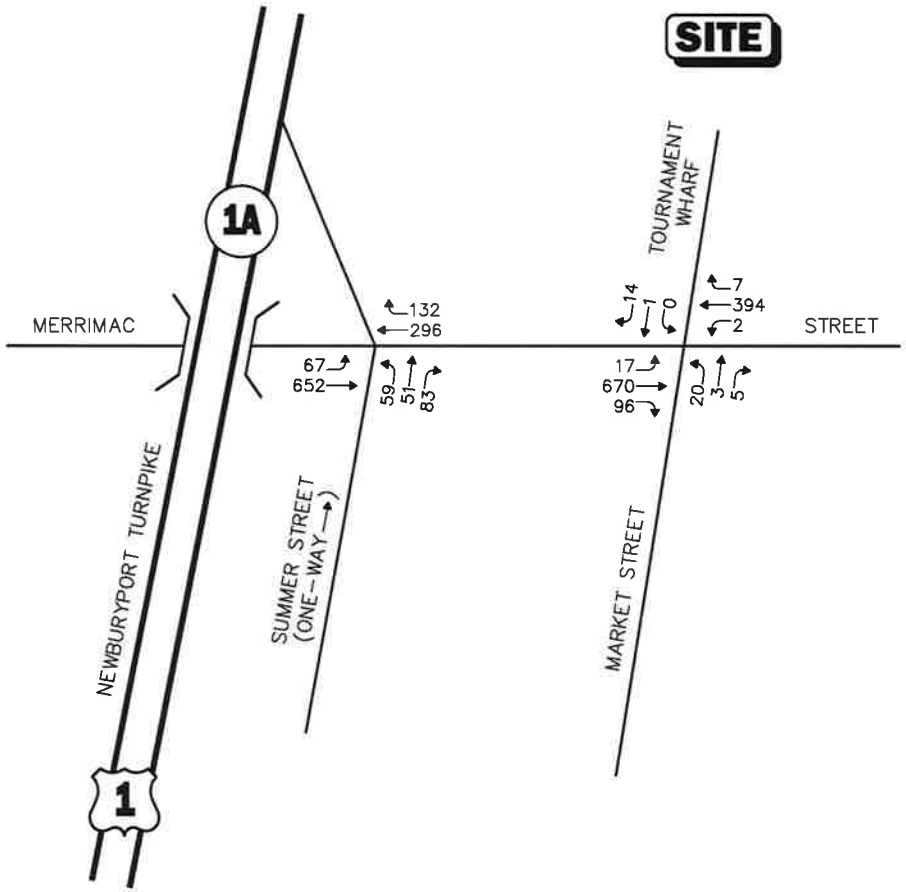
Location/Peak Hour	AWT[a]	Saturday[b]	VPH[c]	K Factor[d]	Directional Distribution[e]
Merrimac Street east of Market Street:	17,265	17,710	--	--	--
Weekday Morning (8:00 – 9:00 AM)	--	--	1,078	6.2	62.6% EB
Weekday Evening (5:00 – 6:00 PM)	--	--	1,398	8.1	50.4% WB

[a]Average weekday traffic in vehicles per day.
[b]Vehicles.
[c]Vehicles per hour.
[d]Percent of daily traffic occurring during the peak hour.
[e]Percent traveling in peak direction.
EB = eastbound; WB = westbound.

As can be seen in Table 1, Merrimac Street in the vicinity of the Project site was found to accommodate approximately 17,265 vehicles on an average weekday (two-way, 24-hour volumes), with approximately 1,078 vehicles per hour (vph) during the weekday morning peak-hour and 1,398 vph during the weekday evening peak-hour.

[2]MassDOT Traffic Volumes for the Commonwealth of Massachusetts; 2015; Continuous Count Station 5258 – I-95, north of Scotland Road, West Newbury, MA.

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR

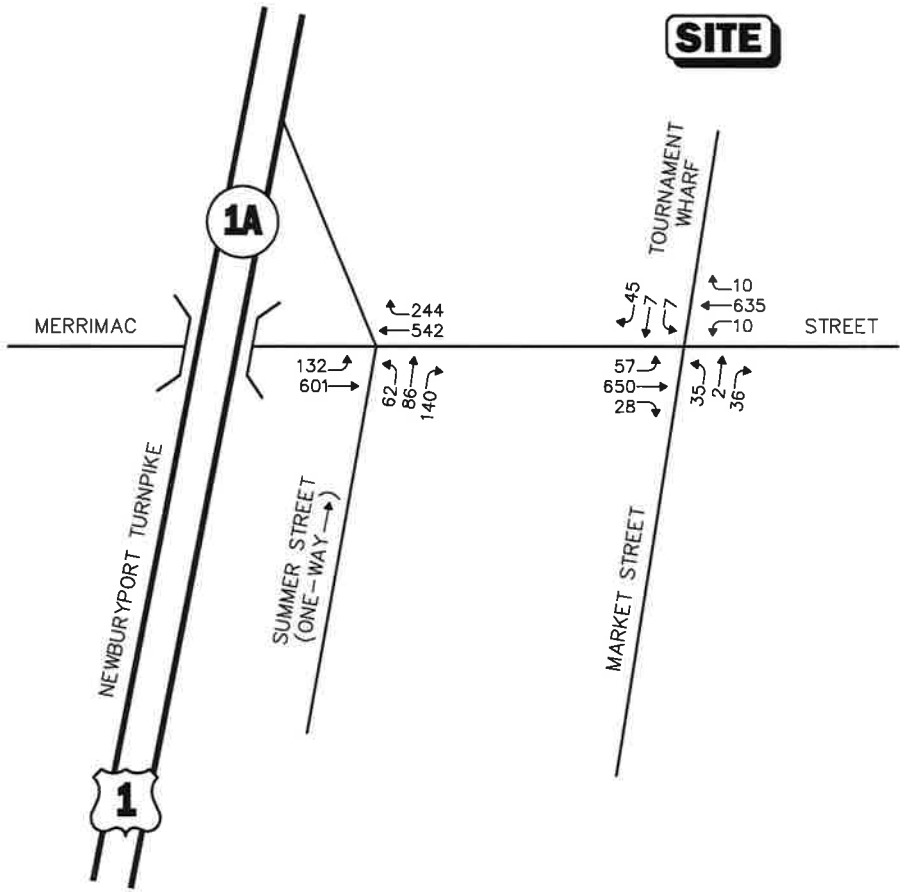


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Figure 3

2016 Existing Weekday Peak Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in October 2017. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of existing and planned future bicycle facilities. In general, sidewalks are provided along one or both sides of the study area roadways, with marked crosswalks provided at the study intersections.

The study area roadways provide sufficient width (combined travel lane and shoulder) to support bicycle travel in a shared traveled-way configuration.[3] In addition, the Clipper City Rail Trail is located immediately adjacent to (west of) the Project site and provides access to the Massachusetts Bay Transportation Authority (MBTA) Newburyport Commuter Rail Station to the south and the trail system along the Merrimack River.

PUBLIC TRANSPORTATION

At present, public transportation services are not directly accessible at the Project site but are provided within the study area by the Merrimack Valley Regional Transit Authority (MVRTA). The MVRTA operates fixed-route bus service along High Street and State Street by way of Route 54, *Amesbury-Newburyport-Salisbury*, which provides service from the Costello Transportation Center in Amesbury and travels along Storey Avenue (Route 113), High Street, Low Street, Graf Road, Broomfield Street, Water Street and State Street, with service to the MBTA Newburyport Commuter Rail Station, Salisbury Center and Salisbury Beach. The closest stop to the Project site for the Route 54 bus is located at the Newburyport Public Library at 94 State Street and within an approximate 9-minute walking distance of the Project site. In addition, Route 53, *Newburyport Summer Shuttle*, operates from May through September and provides service between the Newburyport Commuter Rail Station and Plum Island by way of Graf Road, Low Street, Pond Street, Green Street, Merrimac Street, State Street, High Street, Federal Street and Water Street. The closest stop to the Project site for the Route 53 bus is located at the Merrimac Street/Green Street intersection, an approximate 2-minute walking distance.

As detailed in the preceding section, the Project site is linked to the Route 54 bus stop by way of the sidewalks along Merrimac Street and intersecting roadways, with marked crosswalks provided for crossing Merrimac Street at both Titcomb Street and Green Street (traffic signal control).

In addition, the City and the MVRTA are developing a bus terminal and public parking garage that are to be located near the Project site off Titcomb Street. Once constructed, MVRTA bus services will be conveniently located proximate to the Project site, offering additional opportunities to reduce single-occupant vehicle travel associated with the Project.

[3] A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on Merrimac Street in the vicinity of the Project site over a continuous 72-hour period (Thursday through Saturday, inclusive) in conjunction with the ATR counts. Table 2 summarizes the vehicle travel speed measurements.

Table 2
VEHICLE TRAVEL SPEED MEASUREMENTS

	Merrimac Street	
	Eastbound	Westbound
Mean Travel Speed (mph)	17	19
85th Percentile Speed (mph)	23	24
Posted Speed Limit (mph)	30	30

mph = miles per hour.

As can be seen in Table 2, the mean vehicle travel speed along Merrimac Street in the vicinity of the Project site was found to be 17-19 mph. The average measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be 23-24 mph, which is slightly below the posted speed limit (30 mph). The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances, and is often used in establishing posted speed limits.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2010 through 2014, inclusive) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, and day of occurrence, and presented in Table 3.

Table 3
MOTOR VEHICLE CRASH DATA SUMMARY[a]

	Merrimac Street at Summer Street and Route 1	Merrimac Street at Market Street and Tournament Wharf
Year:		
2010	0	0
2011	3	2
2012	1	2
2013	3	3
2014	0	3
Total	7	10
Average	1.40	2.00
Rate[b]	0.19	0.32
Significant?[c]	No	No
Type:		
Angle	4	6
Rear-End	1	2
Head-On	1	0
Sideswipe	1	1
Fixed Object	0	1
Pedestrian/Bicycle	0	0
Unknown/Other	0	0
Total	7	10
Pavement Conditions		
Dry	6	9
Wet	0	1
Snow	1	0
Icy	0	0
Other	0	0
Unknown	0	0
Total	7	10
Severity:		
Property Damage Only	7	8
Personal Injury	0	2
Fatality	0	0
Total	0	10

[a]Source: MassDOT Safety Management/Traffic Operations Unit records
[b]Crash rate per million vehicles entering the intersection.
[c]The intersection crash rate is significant if it is found to exceed MassDOT statewide or District Crash Rate for the MassDOT Highway Division District in which the intersection is located (District 4).

As can be seen in Table 3, the study area intersections were found to have experienced an average of approximately two (2) or fewer reported motor vehicle crashes over the five-year review period, with the intersection of Merrimac Street at Market Street and Tournament Wharf found to have experienced the largest number of reported crashes (10 total). Further review of the crash data indicates that the majority of the reported collisions resulted in property damage only, and involved angle collisions. All of the study intersections were found to have a motor vehicle crash rate below the MassDOT statewide and Highway Division District 4 average crash rates for an unsignalized intersection, as appropriate. In addition, no fatal motor vehicle crashes were reported within the study area over the five-year review period.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2024, which reflects a seven-year planning horizon from the current year consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2024 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2024 No-Build traffic volumes reflect 2024 Build conditions with the Project.

FUTURE TRAFFIC GROWTH

Future traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic; however, potential population growth and development external to the study area would not be accounted for in the resulting traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

Specific Development by Others

The City of Newburyport Office of Planning and Development was contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this discussion, the following projects were identified for inclusion in this assessment:

- ***Merrimac Ale House, 40 Merrimac Street, Newburyport, Massachusetts.*** This project is currently under construction and entails the redevelopment of the former Davis Auto-Parts building located at 40 Merrimac Street in Newburyport, Massachusetts, to encompass a 13,812 sf restaurant with 442 seats.

- ***MVRTA Intermodal Parking Facility, 90 Pleasant Street and 81-81 Merrimac Street, Newburyport, Massachusetts.*** This proposed project will entail the removal of the existing 27,400± sf commercial building and associated appurtenances located at 90 Pleasant Street and 81-81 Merrimac Street in Newburyport, Massachusetts, to accommodate the construction of a 212± space public parking garage and an MVRTA bus terminal. Access to the site will be provided by way of full access driveways that will intersect the south side of Merrimac Street opposite McKay's Wharf and the west side of Titcomb Street.

- ***Waterfront West Mixed-Use Development, Merrimac Street, Newburyport, Massachusetts.*** This project is proposed to construct 200 condominium units, 100 hotel rooms and 20,000 sf of retail/restaurant.

Traffic volumes associated with the aforementioned specific development projects by others were obtained from the respective traffic studies or using trip-generation information available from the Institute of Transportation Engineers (ITE)[4] for the appropriate land use, and were assigned onto the study area roadway network based on existing traffic patterns where no other information was available. No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine general background traffic growth trends. Based on a review of this data and previous traffic studies, a 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

MassDOT and the City of Newburyport were consulted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2024 within the study area. Based on these discussions, the following roadway improvement project was identified within the study area:

- ***Intersection Improvements – Route 1 at Merrimac Street, Newburyport (MassDOT Project Number 608029).*** This project is being undertaken by MassDOT and entails the installation of traffic control signals at the Route 1 north and southbound on and off-ramp intersections with Merrimac Street, along with associated roadway rehabilitation, drainage improvements, sign and pavement marking installation, and sidewalk and bicycle accommodation improvements. These improvements are currently at the preliminary design stage; a construction date and funding source have not yet been established.

[4] *Trip Generation*, 9th Edition; Institute of Transportation Engineers; Washington, DC; 2012.

- ***MVRTA Intermodal Facility Pedestrian Access Improvements, Newburyport.*** In conjunction with the construction of the MVRTA Intermodal Parking Facility, pedestrian access improvements are proposed in the area at the Merrimac Street/Titcomb Street and Titcomb Street/Pleasant Street intersections that include sidewalk reconstruction, curb extensions, wheelchair ramp installation/reconstruction and the installation of crosswalks. In addition, a 100-foot long bus turn-out is proposed along the south side of Merrimac Street adjacent to the intermodal facility and on-street parking along both Merrimac Street and Titcomb Street will be reconfigured to accommodate the improvements and the driveways that will serve the intermodal facility. These improvements will improve pedestrian accommodations and accessibility in the area and are expected to be complete within the future conditions horizon year of this assessment (2024).

No other roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

No-Build Traffic Volumes

The 2024 No-Build condition peak-hour traffic-volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2016 Existing peak-hour traffic volumes and then superimposing the peak-hour traffic volumes associated with the identified specific development project by others. The resulting 2024 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figure 4.

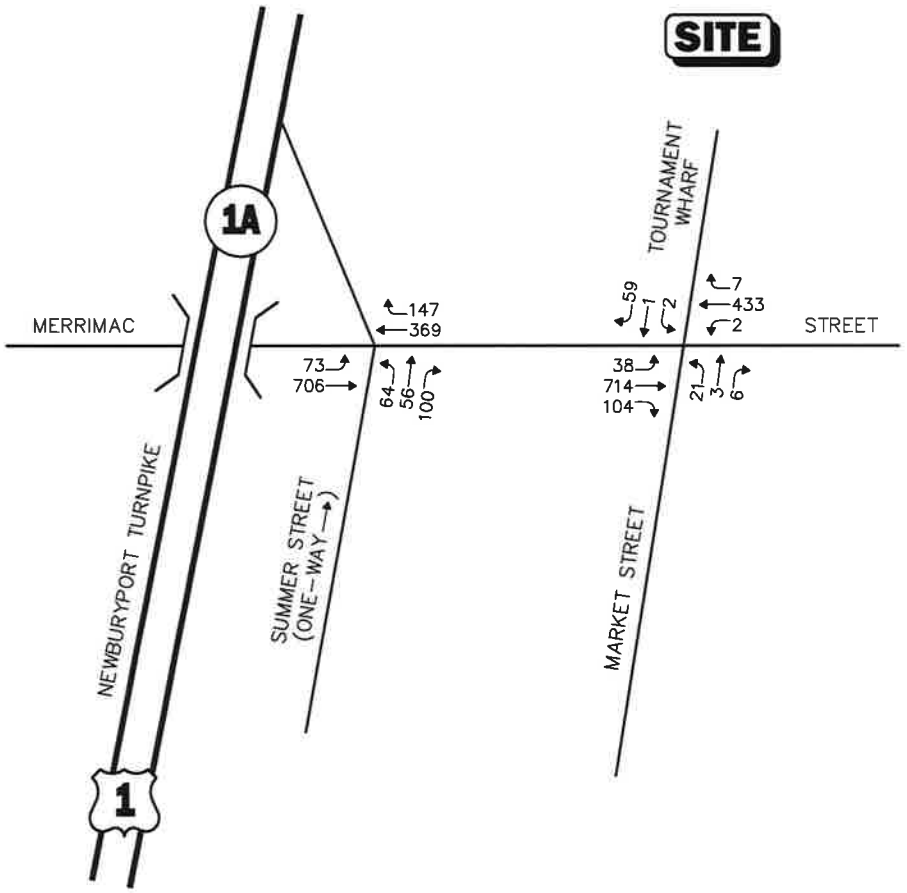
PROJECT-GENERATED TRAFFIC

Design year (2024 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

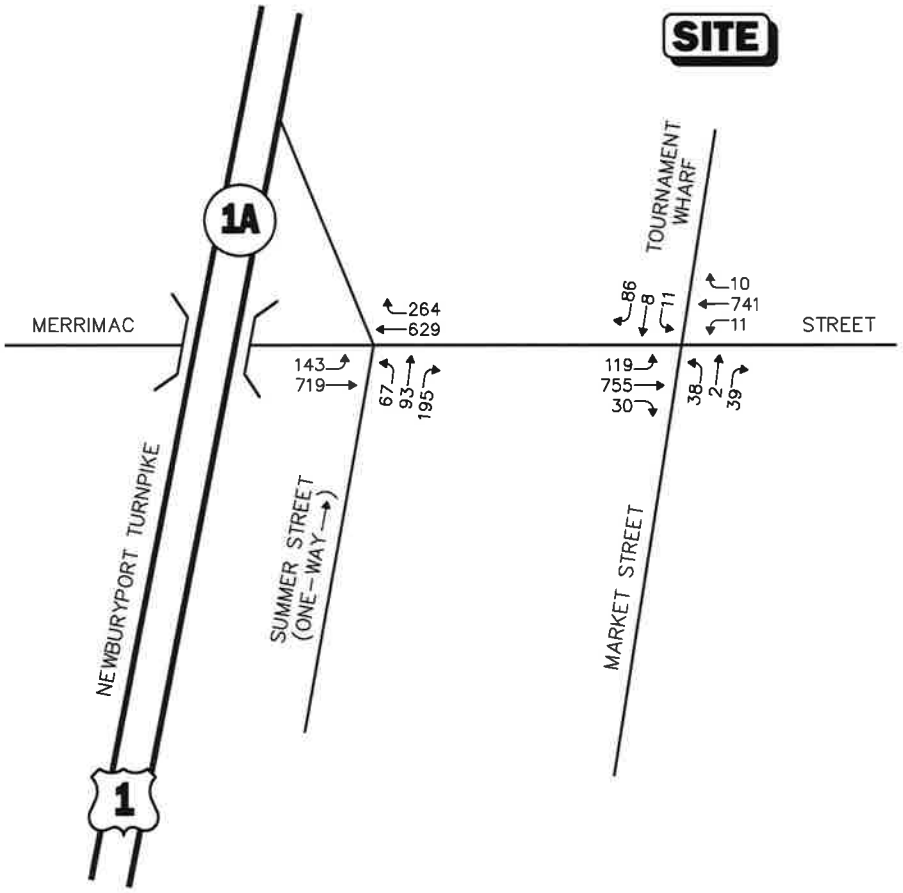
As proposed, the Project will entail the construction of 25 condominium units. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[5] for similar land uses as those proposed were used. ITE Land Use Codes (LUCs) 230 *Residential Condominium/Townhouse* was used to develop the traffic characteristics of the Project. Table 4 summarizes the expected project generated traffic.

[5]Ibid 3.

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR



Not To Scale

Figure 4

2024 No-build
Weekday
Peak Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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Table 4
PROJECT GENERATED TRAFFIC VOLUME SUMMARY

Time Period/Direction	Trips Generated
Average Weekday Daily:	152
Weekday Morning Peak Hour:	
Entering	3
Exiting	15
Total	18
Weekday Evening Peak Hour:	
Entering	13
Exiting	7
Total	20

As can be seen in Table 4, the Project is expected to generate approximately 152 new vehicle trips on an average weekday (76 vehicles entering and 76 exiting), with approximately 18 new vehicle trips (3 vehicles entering and 15 exiting) expected during the weekday morning peak-hour and 20 new vehicle trips (13 vehicles entering and 7 exiting) expected during the weekday evening peak-hour.

Trip Distribution and Assignment

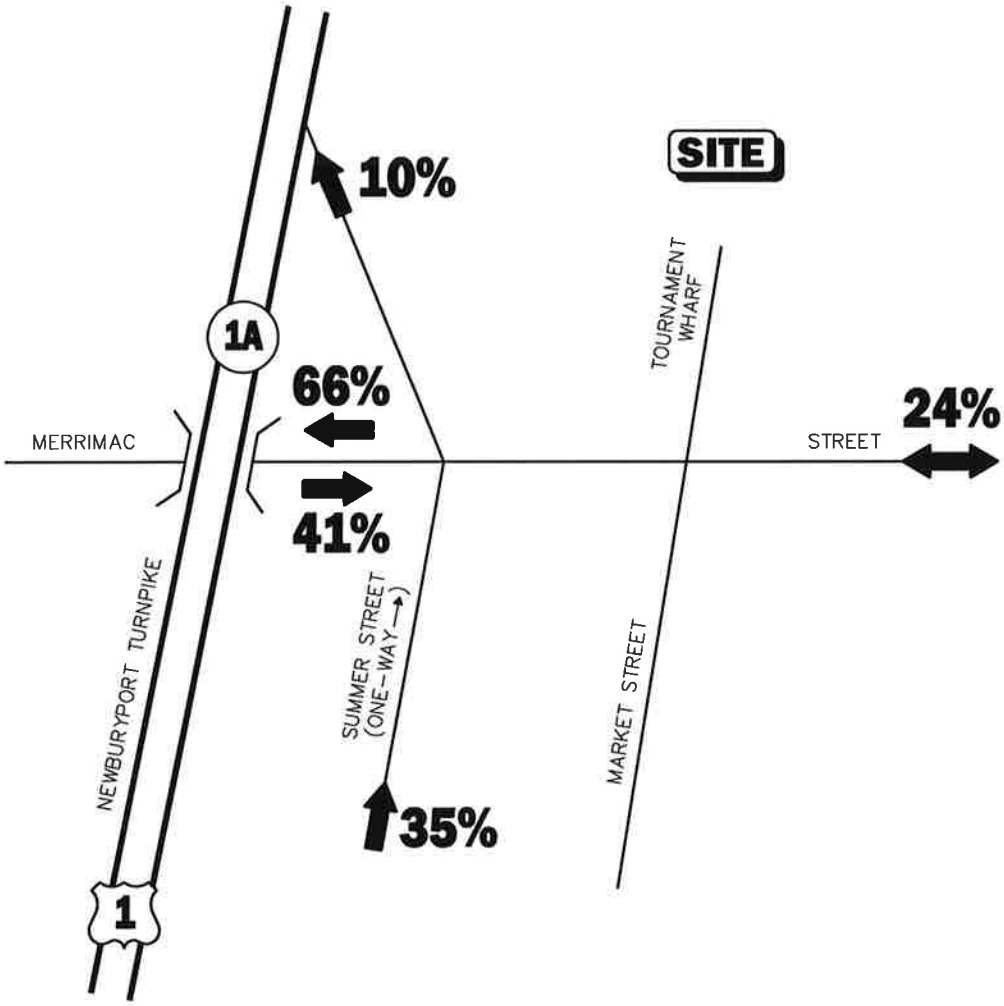
The directional distribution of generated trips to and from the Project site was determined based on a review of Journey to Work data obtained from the U.S. Census for persons residing in the City of Newburyport and then refined based on a review of existing traffic patterns within the study area during the peak periods. The general trip distribution for the Project is summarized in Table 5 and graphically depicted on Figure 5. The additional traffic expected to be generated by the Project was assigned on the study area roadway network as shown on Figure 6.

Table 5
TRIP-DISTRIBUTION SUMMARY

Roadway	Direction To/From	Percent Entering	Percent Exiting
Merrimac Street	West	41	66
Merrimac Street	East	24	24
Route 1	North	0	10
Summer Street	South	35	0
TOTAL		100	100

Legend:

XX	New Trips
(XX)	Pass-by Trips



Not To Scale

Figure 5

Trip Distribution Map

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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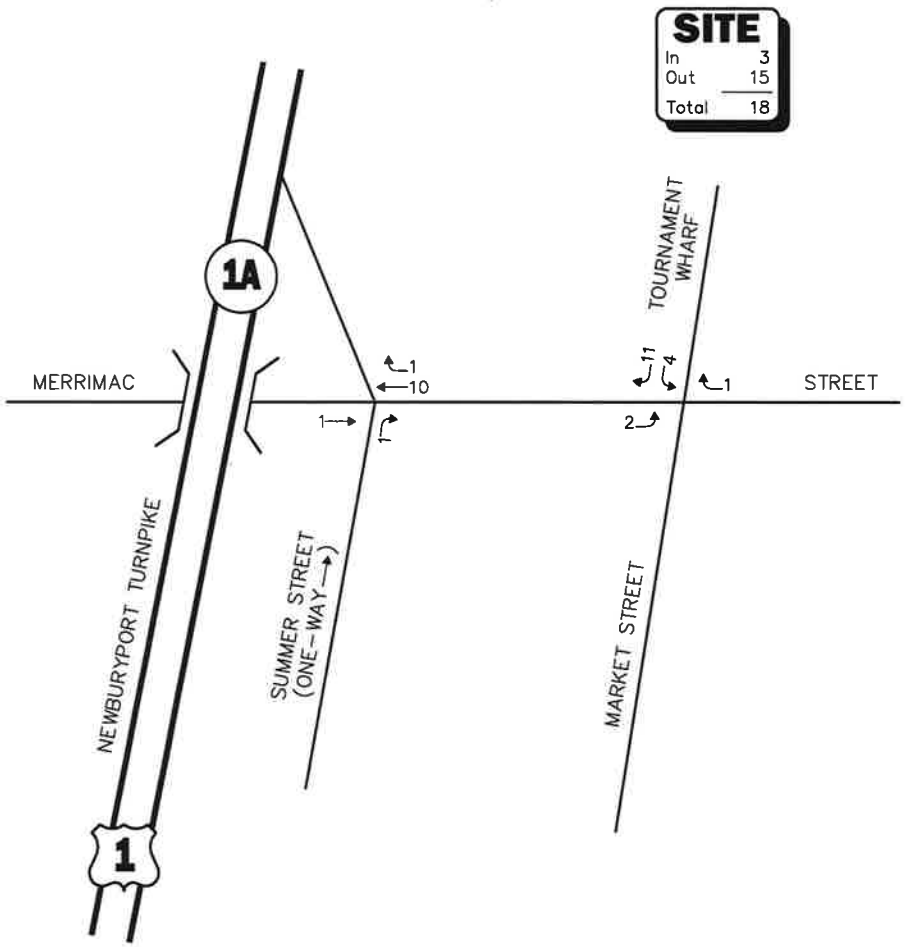
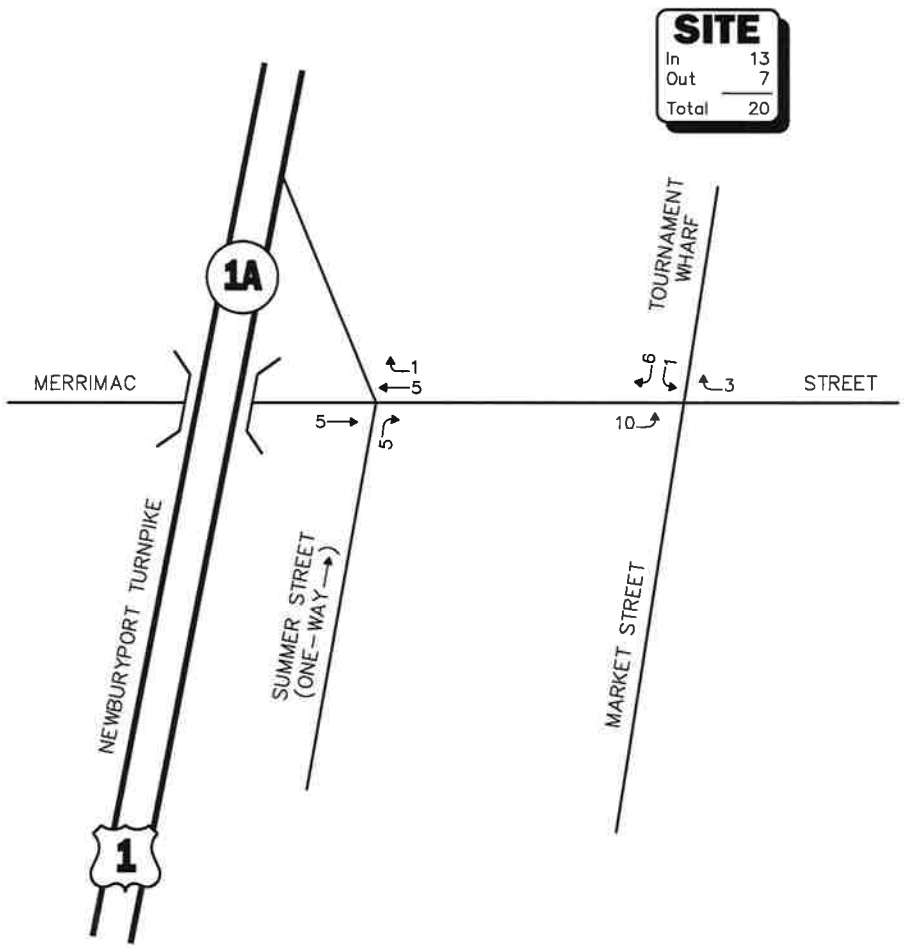
WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR



Not To Scale

Figure 6

Site Generated

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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FUTURE TRAFFIC VOLUMES - BUILD CONDITION

The 2024 Build condition traffic volumes consist of the 2024 No-Build traffic volumes with the additional traffic expected to be generated by the Project added to them. The 2024 Build weekday morning and weekday evening peak-hour traffic-volumes are graphically depicted on Figure 7.

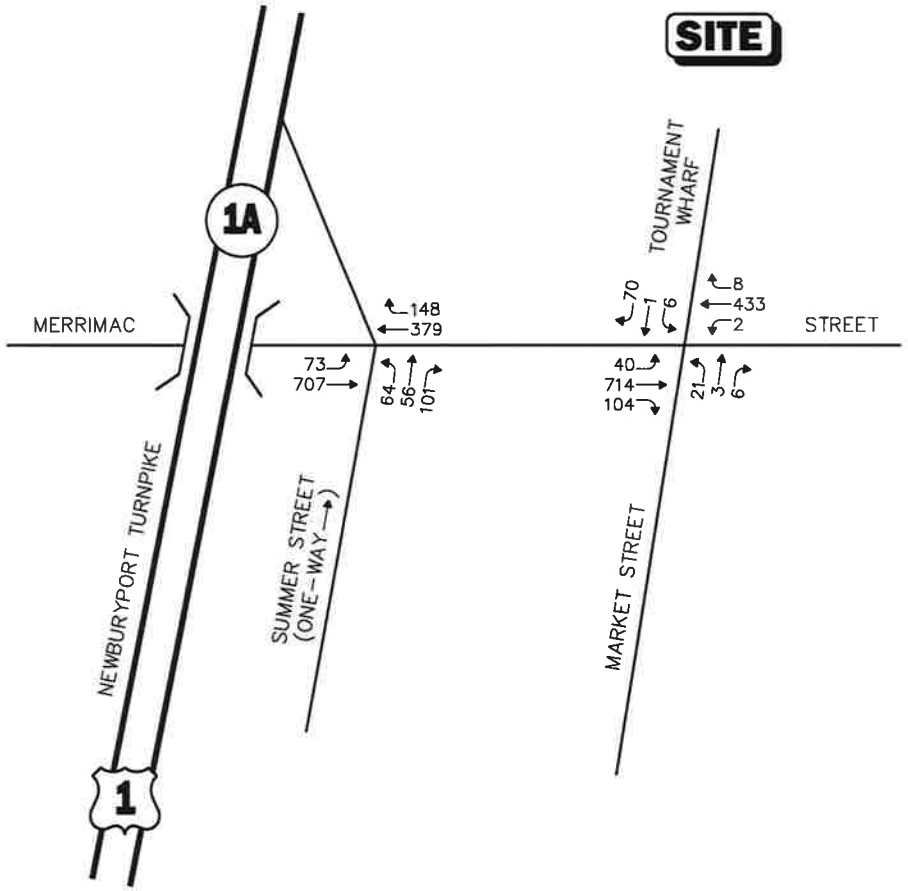
A summary of peak-hour projected traffic-volume increases external to the study area that is the subject of this assessment is shown in Table 6. These volumes are based on the expected increases from the Project.

Table 6
PEAK-HOUR TRAFFIC-VOLUME INCREASES

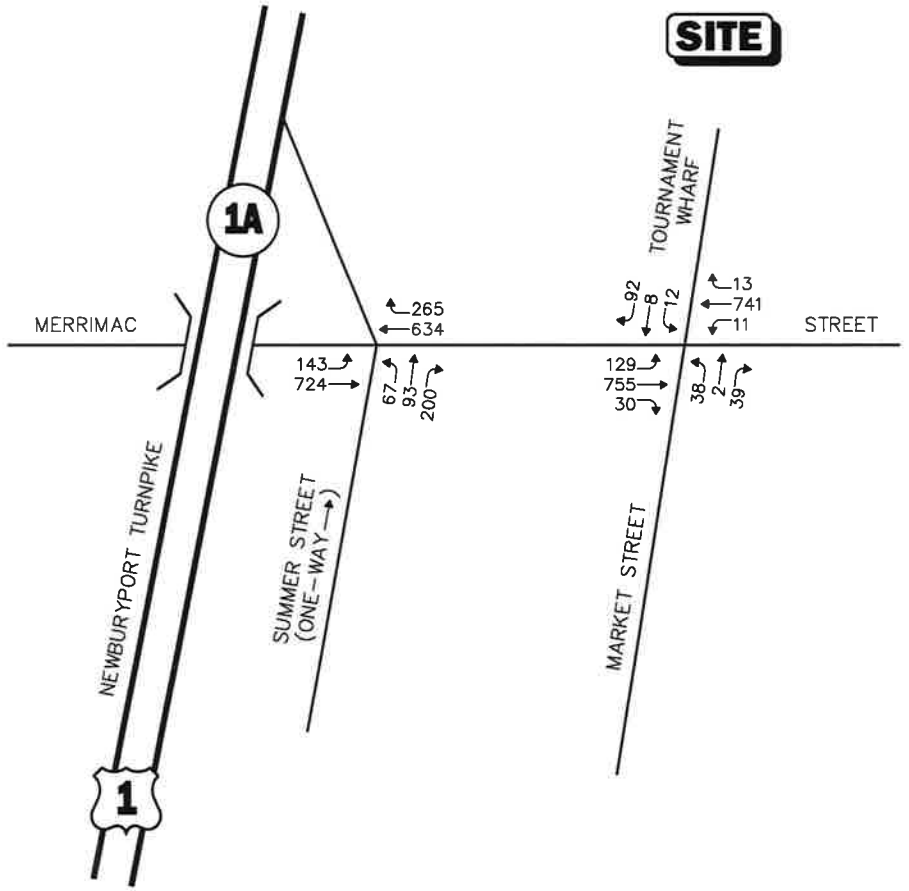
Location/Peak Hour	2024 No-Build	2024 Build	Traffic Volume Increase Over No-Build	Percent Increase Over No-Build
Merrimac Street, east of Market Street:				
Weekday Morning	1,164	1,169	5	0.4
Weekday Evening	1,567	1,571	4	0.3
Merrimac Street, west of Route 1 NB Ramp:				
Weekday Morning	1,212	1,223	11	0.9
Weekday Evening	1,558	1,568	10	0.6
Route 1 Ramp, north of Merrimac Street:				
Weekday Morning	276	277	1	0.4
Weekday Evening	500	501	1	0.2
Summer Street, south of Merrimac Street:				
Weekday Morning	220	221	1	0.5
Weekday Evening	355	360	5	1.4

As shown in Table 6, Project-related traffic-volume increases external to the study area relative to 2024 No-Build conditions are anticipated to range from 0.2 to 1.4 percent during the peak periods.

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR



Not To Scale

Figure 7

2024 build
Weekday
Peak Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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TRAFFIC OPERATIONS ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.[6] The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing congested or constrained operating conditions.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

[6]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual;* Transportation Research Board; Washington, DC; 2010.

Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual*[7]. Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the 2010 *Highway Capacity Manual*. Table 7 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

Table 7
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[a]

Level-Of-Service by Volume-to-Capacity Ratio		Average Control Delay (Seconds Per Vehicle)
v/c ≤ 1.0	v/c > 1.0	
A	F	≤10.0
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	>50.0

[a]Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010; page 19-2.

[7]*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2016 Existing, 2024 No-Build and 2024 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Table 8, with the detailed analysis results presented in the Appendix.

Unsignalized Intersections

Merrimac Street at Summer Street and Route 1

Under Existing conditions, left-turns from Summer Street at this unsignalized intersection were shown to operate at LOS E during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under No-Build and Build conditions, left-turns from Summer Street operate at LOS F during both the weekday morning and weekday evening peak-hours. Under all conditions, right-turns from Summer Street at this unsignalized intersection were shown to operate at LOS C during both the weekday morning and weekday evening peak-hours.

Merrimac Street at Tournament Wharf and Market Street

Under Existing conditions, traffic from Tournament Wharf at this unsignalized intersection were shown to operate at LOS B during the weekday morning peak hour and at LOS D during the weekday evening peak hour. Under No-Build conditions, traffic from Tournament Wharf operate at LOS B during the weekday morning peak hour and at LOS F during the weekday evening peak-hour. Under Build conditions, traffic from Tournament Wharf operate at LOS C during the weekday morning peak hour and at LOS F during the weekday evening peak-hour.

Under Existing conditions, traffic from Market Street at this unsignalized intersection were shown to operate at LOS D during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under No-Build and Build conditions, traffic from Market Street operate at LOS E during the weekday morning peak hour and at LOS F during the weekday evening peak-hour.

Overall, traffic delays as a result of the project will be 2 seconds or less, and vehicle queues will increase by 1 vehicle or less. No change in traffic operations will result from the project.

Impact on Planned Improvements

Merrimac Street at Summer Street and the Route 1 Ramps

Operating conditions for left-turn and through movements from Summer Street at its intersection with Merrimac Street and the Route 1 northbound on-ramp were found to be constrained under existing conditions and independent of the Project. As a result of these existing conditions, MassDOT is in the process of developing preliminary design plans for the installation of a traffic control signal; however, a construction date and funding source have not yet been identified. With the installation of traffic control signals at the Route 1 ramp intersection with Merrimac Street, Summer Street, operating conditions were shown to improve to acceptable conditions. The level-of service results for the signalized intersection of Merrimac Street at Summer Street and Route 1 On-Ramp are summarized in Table 9.

Table 8
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/Peak Hour/Movement	2017 Existing				2024 No-Build				2024 Build			
	Demand[a]	Delay[b]	LOS[c]	Queue[d] 95th	Demand	Delay	LOS	Queue 95th	Demand	Delay	LOS	Queue 95th
Merrimac Street at Summer Street and Route 1 On-Ramp												
Weekday Morning:												
Summer Street NB LT/TH	110	38.2	E	2	120	>50.0	F	2	120	>50.0	F	2
Summer Street NB RT	83	15.5	C	1	100	17.0	C	1	101	17.1	C	1
Merrimac Street EB LT	67	8.6	A	0	73	8.8	A	0	73	8.9	A	0
Weekday Evening:												
Summer Street NB LT/TH	148	>50.0	F	4	160	>50.0	F	6	160	>50.0	F	6
Summer Street NB RT	140	16.5	C	1	195	23.0	C	3	200	23.6	C	3
Merrimac Street EB LT	132	10.6	B	1	143	11.4	B	1	143	11.4	B	1
Merrimac Street at Market Street and Tournament Wharf												
Weekday Morning:												
Market Street NB LT/TH/RT	28	33.8	D	1	30	44.9	E	1	30	46.8	E	1
Tournament Wharf SB LT/TH/RT	15	12.6	B	0	62	13.5	B	0	77	15.5	C	1
Weekday Evening:												
Market Street NB LT/TH/RT	73	>50.0	F	5	79	>50.0	F	9	79	>50.0	F	9
Tournament Wharf SB LT/TH/RT	59	33.3	D	2	105	>50.0	F	5	112	>50.0	F	6

[a]Demand in vehicles per hour.
[b]Average control delay per vehicle (in seconds).
[c]Level-of-Service.
[d]Queue length in vehicles.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Table 9
MITIGATED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-hour/Movement	2024 Build with Mitigation V/C	Delay	LOS	Queue 50th/95th
Merrimac Street at Summer Street and Route 1 On-Ramps				
Weekday Morning:				
Merrimac Street EB LT	0.19	9.5	A	14/23
Merrimac Street EB TH	0.79	17.1	B	175/407
Merrimac Street WB TH/RT	0.43	8.8	A	119/183
Summer Street NB LT	0.16	23.6	C	27/60
Summer Street NB TH	0.13	23.4	C	24/53
Summer Street NB RT	0.06	22.9	C	0/37
Overall	**0.58**	**14.7**	**B**	--
Weekday Evening:				
Merrimac Street EB LT	0.69	19.3	B	22/66
Merrimac Street EB TH	0.80	14.0	B	110/543
Merrimac Street WB TH/RT	0.69	9.9	A	226/444
Summer Street NB LT	0.22	28.5	C	30/60
Summer Street NB TH	0.30	29.0	C	42/78
Summer Street NB RT	0.13	27.8	C	0/51
Overall	**0.70**	**14.9**	**B**	--

[a]Volume-to-capacity ratio.
[b]Percentile delay per vehicle in seconds.
[c]Level-of-Service.
[d]Queue length in vehicles.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Vanasse and Associates, Inc. (VAI) has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed 25 unit condominium development to be located off Tournament Wharf (92R Merrimac Street) in Newburyport, Massachusetts. This assessment has been completed in accordance with State and City standards and those of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

- The Project is expected to generate approximately 152 new vehicle trips on an average weekday (76 vehicles entering and 76 exiting), with approximately 18 new vehicle trips (3 vehicles entering and 15 exiting) expected during the weekday morning peak-hour and 20 new vehicle trips (13 vehicles entering and 7 exiting) expected during the weekday evening peak-hour.

- A review of accident data researched from MassDOT indicates that area intersections experience accident rates below state averages indicating safe operations.

- The project will have minimal impact on area traffic operations and vehicle queueing as the expected new traffic to the area is one vehicle every three minutes during the peak periods.

In summary, a safe environment can be maintained with traffic conditions maintained at manageable levels with the following recommendations.

RECOMMENDATIONS

Project Access

Project access is provided primarily by way of one proposed full-access driveway on Tournament Wharf. The following recommendations are offered with respect to the design and operation of the Project site driveway:

- The driveway be placed under STOP-sign (Manual of Uniform Traffic Control Designation R1-1) control, with a painted STOP-bar included.

- Street illumination be provided at the site driveway intersection with Tournament Wharf.

- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the current Manual on Uniform Traffic Devices (MUTCD).[8]

- Signs and landscaping adjacent to the Project site driveway intersection should be designed and maintained so as not to restrict lines of sight.

Transportation Demand Management

The Project site is ideally situated to take advantage of available public transportation opportunities, including the existing bus service operated by the Merrimack Valley Regional Transit Authority (MVRTA) along Merrimac Street, the future MVRTA bus terminal that is to be located off Titcomb Street, and the Massachusetts Bay Transportation Authority (MBTA) Commuter Rail service at Newburyport Station to the south. In addition, the Project site is directly accessible from the Clipper City Rail Trail which provides access to the Newburyport Commuter Rail Station and the trail system along the Merrimack River. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules and fare information will be posted in a central location within the building and/or otherwise made available to residents;

- A "welcome packet" will be provided to new residents detailing available public transportation services, bicycle and walking alternatives, and commuter options available through MassRIDES' and their NuRide program which rewards individuals that choose to walk, bicycle, carpool, vanpool or that use public transportation to travel to and from work;

- Residents will be made aware of the Emergency Ride Home (ERH) program available through MassRIDES, which reimburses employees of a participating MassRIDES employer partner worksite that is registered for ERH and that carpool, take transit, bicycle, walk or vanpool to work;

- Bicycle parking will be provided, including both exterior bicycle racks and interior bicycle parking.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

[8] *Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

APPENDIX

AUTOMATIC TRAFFIC RECORDER COUNT DATA
MANUAL TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
VEHICLE TRAVEL SPEED DATA
CAPACITY ANALYSIS WORKSHEETS

AUTOMATIC TRAFFIC RECORDER COUNT DATA

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281VOL1

Start Time	16-Jun-16 Thu	WB Morning	WB Afternoon	Hour Totals Morning	Hour Totals Afternoon	EB Morning	EB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		16	127			8	168				
12:15		9	133			8	161				
12:30		9	137			2	154				
12:45		6	133	40	530	9	159	27	642	67	1172
01:00		4	121			4	167				
01:15		3	130			5	170				
01:30		5	133			6	146				
01:45		1	134	13	518	1	167	16	650	29	1168
02:00		0	150			3	117				
02:15		1	167			2	146				
02:30		0	129			3	162				
02:45		2	169	3	615	3	142	11	567	14	1182
03:00		1	152			0	161				
03:15		3	140			4	156				
03:30		3	146			4	169				
03:45		1	155	8	593	1	160	9	646	17	1239
04:00		3	149			1	155				
04:15		5	165			4	139				
04:30		1	149			4	152				
04:45		8	145	17	608	14	170	23	616	40	1224
05:00		7	191			23	141				
05:15		12	171			36	164				
05:30		30	152			40	157				
05:45		40	156	89	670	46	174	145	636	234	1306
06:00		37	149			25	167				
06:15		46	106			36	176				
06:30		63	116			57	165				
06:45		84	116	230	487	85	180	203	688	433	1175
07:00		71	132			83	152				
07:15		94	112			99	147				
07:30		96	117			123	103				
07:45		85	118	346	479	137	134	442	536	788	1015
08:00		106	108			163	115				
08:15		105	133			171	98				
08:30		94	113			177	90				
08:45		95	138	400	492	191	83	702	386	1102	878
09:00		103	99			161	83				
09:15		85	76			165	56				
09:30		88	102			161	48				
09:45		92	69	368	346	144	47	631	234	999	580
10:00		104	65			166	39				
10:15		94	58			147	25				
10:30		118	38			132	27				
10:45		104	36	420	197	162	22	607	113	1027	310
11:00		101	30			163	16				
11:15		115	53			150	14				
11:30		96	21			143	11				
11:45		113	19	425	123	202	15	658	56	1083	179
Total		2359	5658			3474	5770			5833	11428
Percent		29.4%	70.6%			37.6%	62.4%			33.8%	66.2%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281VOL1

Start Time	17-Jun-16 Fri	WB Morning	WB Afternoon	Hour Totals Morning	Hour Totals Afternoon	EB Morning	EB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		22	140			15	193				
12:15		10	135			11	190				
12:30		14	117			10	195				
12:45		7	142	53	534	9	172	45	750	98	1284
01:00		4	126			5	182				
01:15		4	129			15	172				
01:30		2	143			4	160				
01:45		1	161	11	559	4	178	28	692	39	1251
02:00		3	152			2	169				
02:15		0	170			3	131				
02:30		1	155			3	162				
02:45		3	175	7	652	2	182	10	644	17	1296
03:00		2	154			0	167				
03:15		2	173			6	176				
03:30		0	173			2	167				
03:45		1	168	5	668	0	177	8	687	13	1355
04:00		1	135			6	175				
04:15		6	139			7	184				
04:30		4	172			5	144				
04:45		9	154	20	600	13	175	31	678	51	1278
05:00		17	153			13	173				
05:15		16	142			35	178				
05:30		31	143			35	186				
05:45		20	131	84	569	32	187	115	724	199	1293
06:00		34	133			31	189				
06:15		45	142			37	179				
06:30		65	101			51	171				
06:45		77	124	221	500	83	154	202	693	423	1193
07:00		73	135			90	165				
07:15		83	140			95	156				
07:30		90	133			122	139				
07:45		95	144	341	552	130	112	437	572	778	1124
08:00		106	142			167	117				
08:15		127	112			139	87				
08:30		98	124			173	94				
08:45		90	129	421	507	203	82	682	380	1103	887
09:00		99	111			199	81				
09:15		82	116			157	75				
09:30		110	67			156	65				
09:45		101	92	392	386	182	76	694	297	1086	683
10:00		119	112			151	54				
10:15		115	102			145	49				
10:30		111	78			178	45				
10:45		121	93	466	385	160	30	634	178	1100	563
11:00		123	65			146	31				
11:15		136	45			147	36				
11:30		108	27			199	37				
11:45		116	33	483	170	181	15	673	119	1156	289
Total		2504	6082			3559	6414			6063	12496
Percent		29.2%	70.8%			35.7%	64.3%			32.7%	67.3%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281VOL1

Start Time	18-Jun-16 Sat	WB Morning	WB Afternoon	Hour Totals Morning	Hour Totals Afternoon	EB Morning	EB Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		31	115			16	174				
12:15		19	138			6	155				
12:30		17	132			9	166				
12:45		15	105	82	490	16	151	47	646	129	1136
01:00		11	145			7	157				
01:15		16	143			12	166				
01:30		3	129			10	175				
01:45		5	145	35	562	8	170	37	668	72	1230
02:00		6	127			7	157				
02:15		8	143			0	157				
02:30		7	139			3	149				
02:45		4	124	25	533	6	157	16	620	41	1153
03:00		4	169			3	139				
03:15		1	143			6	158				
03:30		3	122			3	160				
03:45		6	145	14	579	0	152	12	609	26	1188
04:00		3	168			5	146				
04:15		3	140			5	153				
04:30		6	145			9	162				
04:45		8	150	20	603	13	169	32	630	52	1233
05:00		8	154			10	146				
05:15		11	151			16	153				
05:30		8	149			24	160				
05:45		14	141	41	595	23	147	73	606	114	1201
06:00		19	126			35	160				
06:15		26	113			49	167				
06:30		43	139			45	158				
06:45		39	120	127	498	75	151	204	636	331	1134
07:00		49	143			68	142				
07:15		55	152			92	126				
07:30		56	126			88	142				
07:45		72	116	232	537	118	121	366	531	598	1068
08:00		73	135			128	110				
08:15		67	130			145	95				
08:30		91	135			134	92				
08:45		95	134	326	534	172	94	579	391	905	925
09:00		110	130			140	78				
09:15		87	130			170	75				
09:30		122	99			170	82				
09:45		117	114	436	473	169	76	649	311	1085	784
10:00		114	100			191	64				
10:15		129	113			187	52				
10:30		118	103			169	39				
10:45		115	83	476	399	196	42	743	197	1219	596
11:00		126	71			122	48				
11:15		97	59			188	31				
11:30		146	48			150	29				
11:45		127	48	496	226	171	26	631	134	1127	360
Total		2310	6029			3389	5979			5699	12008
Percent		27.7%	72.3%			36.2%	63.8%			32.2%	67.8%
Grand Total		7173	17769			10422	18163			17595	35932
Percent		28.8%	71.2%			36.5%	63.5%			32.9%	67.1%
ADT		ADT 17,842		AADT 17,842							

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281VOL1

Start Time	13-Jun-16 WB	EB	Tue WB	EB	Wed WB	EB	Thu WB	EB	Fri WB	EB	Sat WB	EB	Sun WB	EB	Week Average WB	EB
12:00 AM	*	*	*	*	*	*	40	27	53	45	82	47	*	*	58	40
01:00	*	*	*	*	*	*	13	16	11	28	35	37	*	*	20	27
02:00	*	*	*	*	*	*	3	11	7	10	25	16	*	*	12	12
03:00	*	*	*	*	*	*	8	9	5	8	14	12	*	*	9	10
04:00	*	*	*	*	*	*	17	23	20	31	20	32	*	*	19	29
05:00	*	*	*	*	*	*	89	145	84	115	**41**	73	*	*	71	111
06:00	*	*	*	*	*	*	230	203	221	202	127	204	*	*	193	203
07:00	*	*	*	*	*	*	346	**442**	**341**	**437**	232	366	*	*	306	415
08:00	*	*	*	*	*	*	400	**702**	421	682	326	579	*	*	382	654
09:00	*	*	*	*	*	*	368	631	392	**694**	436	649	*	*	399	658
10:00	*	*	*	*	*	*	420	607	466	634	476	**743**	*	*	454	**661**
11:00	*	*	*	*	*	*	**425**	658	**483**	673	**496**	631	*	*	**468**	654
12:00 PM	*	*	*	*	*	*	530	642	534	**750**	490	646	*	*	518	**679**
01:00	*	*	*	*	*	*	518	650	559	692	562	**668**	*	*	546	670
02:00	*	*	*	*	*	*	615	567	652	644	533	620	*	*	600	610
03:00	*	*	*	*	*	*	593	646	**668**	687	579	609	*	*	**613**	647
04:00	*	*	*	*	*	*	608	616	600	678	**603**	630	*	*	604	641
05:00	*	*	*	*	*	*	**670**	636	569	724	595	606	*	*	611	655
06:00	*	*	*	*	*	*	487	**688**	500	693	498	636	*	*	495	672
07:00	*	*	*	*	*	*	479	536	552	572	537	531	*	*	523	546
08:00	*	*	*	*	*	*	492	386	507	380	534	391	*	*	511	386
09:00	*	*	*	*	*	*	346	234	386	297	473	311	*	*	402	281
10:00	*	*	*	*	*	*	197	113	385	178	399	197	*	*	327	163
11:00	*	*	*	*	*	*	123	56	170	119	226	134	*	*	173	103
Lane	0	0	0	0	0	0	8017	9244	8586	9973	8339	9368	0	0	8314	9527
Day	0		0		0		17261		18559		17707		0		17841	
AM Peak	-	-	-	-	-	-	11:00	08:00	11:00	09:00	11:00	10:00	-	-	11:00	10:00
Vol.	-	-	-	-	-	-	425	702	483	694	496	743	-	-	468	661
PM Peak	-	-	-	-	-	-	17:00	18:00	15:00	12:00	16:00	13:00	-	-	15:00	12:00
Vol.	-	-	-	-	-	-	670	688	668	750	603	668	-	-	613	679

Comb. Total	0	0	0	17261	18559	17707	0	17841
ADT	ADT 17,842	AADT 17,842					

MANUAL TURNING MOVEMENT COUNT DATA

Accurate Counts

978-664-2565

N/S Street : Rt 1 / Winter / Summer
E/W Street : Merrimac Street
City/State : Newburyport, MA
Weather : Clear

File Name : 72810001
Site Code : 72810001
Start Date : 6/16/2016
Page No : 1

Groups Printed- Cars - Trucks

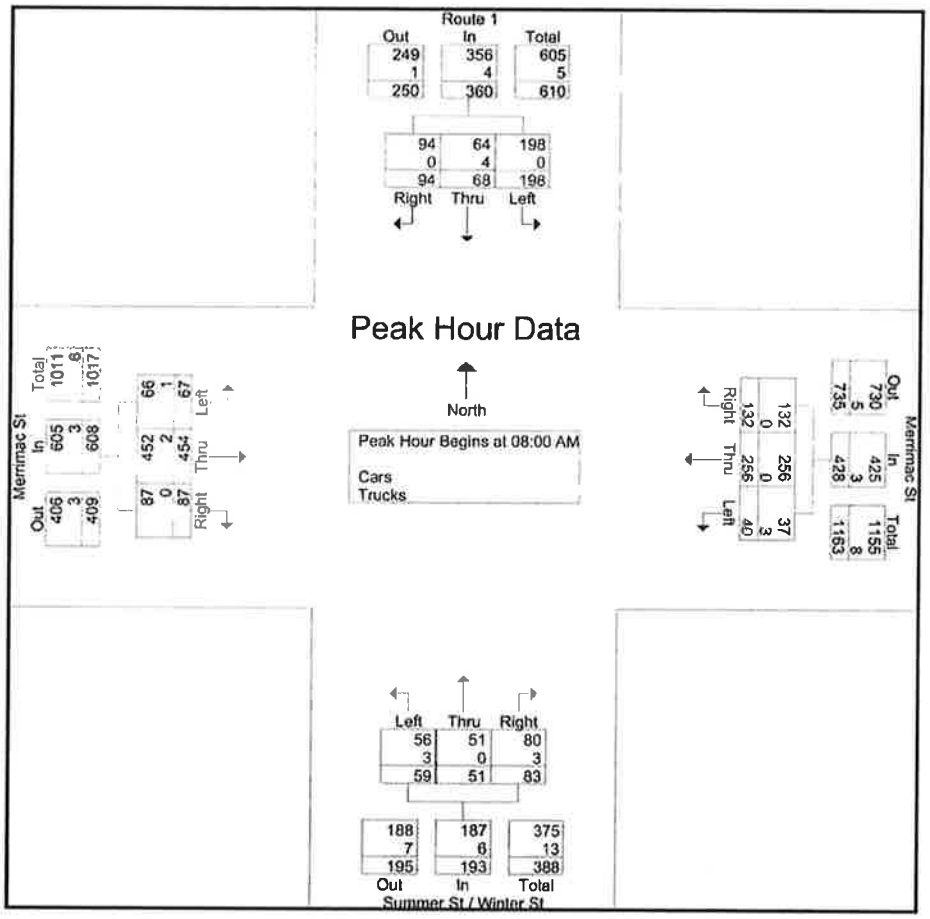
	Route 1 From North			Merrimac St From East			Summer St / Winter St From South			Merrimac St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	28	5	7	7	54	21	14	4	7	9	56	19	231
07:15 AM	16	18	24	7	56	25	13	10	10	14	68	25	286
07:30 AM	48	15	23	10	81	22	10	13	17	12	66	18	335
07:45 AM	42	15	23	12	63	29	14	8	23	17	78	32	356
Total	134	53	77	36	254	97	51	35	57	52	268	94	1208
08:00 AM	51	16	19	6	57	33	15	10	11	13	118	30	379
08:15 AM	58	22	24	10	73	41	17	15	15	11	105	25	416
08:30 AM	46	18	19	13	59	25	11	14	32	20	116	12	385
08:45 AM	43	12	32	11	67	33	16	12	25	23	115	20	409
Total	198	68	94	40	256	132	59	51	83	67	454	87	1589
Grand Total	332	121	171	76	510	229	110	86	140	119	722	181	2797
Apprch %	53.2	19.4	27.4	9.3	62.6	28.1	32.7	25.6	41.7	11.6	70.6	17.7	
Total %	11.9	4.3	6.1	2.7	18.2	8.2	3.9	3.1	5	4.3	25.8	6.5	
Cars	332	112	169	71	509	226	106	84	133	118	717	177	2754
% Cars	100	92.6	98.8	93.4	99.8	98.7	96.4	97.7	95	99.2	99.3	97.8	98.5
Trucks	0	9	2	5	1	3	4	2	7	1	5	4	43
% Trucks	0	7.4	1.2	6.6	0.2	1.3	3.6	2.3	5	0.8	0.7	2.2	1.5

Accurate Counts
978-664-2565

N/S Street : Rt 1 / Winter / Summer
E/W Street : Merrimac Street
City/State : Newburyport, MA
Weather : Clear

File Name : 72810001
Site Code : 72810001
Start Date : 6/16/2016
Page No : 2

	Route 1 From North				Merrimac St From East				Summer St / Winter St From South				Merrimac St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	51	16	19	86	6	57	33	96	15	10	11	36	13	118	30	161	379
08:15 AM	58	22	24	104	10	73	41	124	17	15	15	47	11	105	25	141	416
08:30 AM	46	18	19	83	13	59	25	97	11	14	32	57	20	116	12	148	385
08:45 AM	43	12	32	87	11	67	33	111	16	12	25	53	23	115	20	158	409
Total Volume	198	68	94	360	40	256	132	428	59	51	83	193	67	454	87	608	1589
% App. Total	55	18.9	26.1		9.3	59.8	30.8		30.6	26.4	43		11	74.7	14.3		
PHF	.853	.773	.734	.865	.769	.877	.805	.863	.868	.850	.648	.846	.728	.962	.725	.944	.955
Cars	198	64	94	356	37	256	132	425	56	51	80	187	66	452	87	605	1573
% Cars	100	94.1	100	98.9	92.5	100	100	99.3	94.9	100	96.4	96.9	98.5	99.6	100	99.5	99.0
Trucks	0	4	0	4	3	0	0	3	3	0	3	6	1	2	0	3	16
% Trucks	0	5.9	0	1.1	7.5	0	0	0.7	5.1	0	3.6	3.1	1.5	0.4	0	0.5	1.0



Accurate Counts
978-664-2565

N/S Street : Rt 1 / Winter / Summer
E/W Street : Merrimac Street
City/State : Newburyport, MA
Weather : Clear

File Name : 72810001
Site Code : 72810001
Start Date : 6/16/2016
Page No : 1

Groups Printed- Cars - Trucks

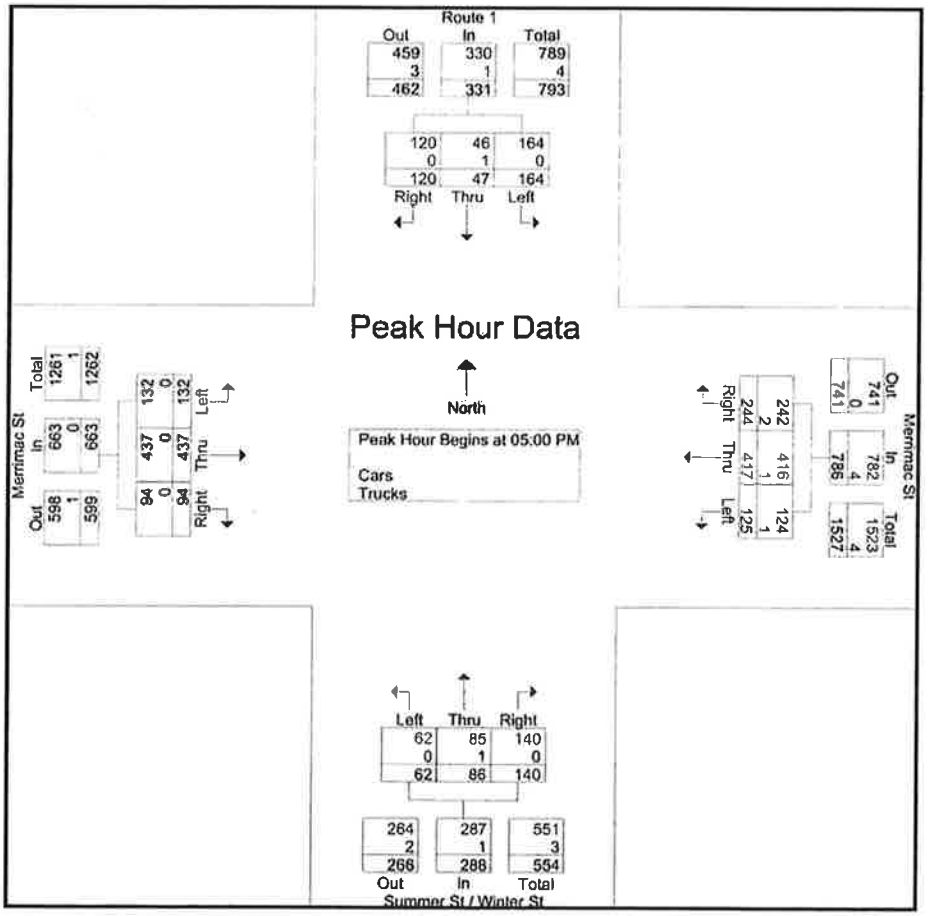
	Route 1 From North			Merrimac St From East			Summer St / Winter St From South			Merrimac St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	37	13	29	18	94	63	20	27	26	38	117	13	495
04:15 PM	46	20	29	26	90	68	12	24	25	46	76	16	478
04:30 PM	24	8	34	18	84	63	18	19	29	38	97	20	452
04:45 PM	40	8	27	15	90	55	17	25	30	39	111	19	476
Total	147	49	119	77	358	249	67	95	110	161	401	68	1901
05:00 PM	39	13	29	37	106	73	17	21	32	41	107	38	553
05:15 PM	45	13	26	39	114	55	14	26	34	31	111	17	525
05:30 PM	42	7	36	24	94	58	16	18	36	30	105	19	485
05:45 PM	38	14	29	25	103	58	15	21	38	30	114	20	505
Total	164	47	120	125	417	244	62	86	140	132	437	94	2068
Grand Total	311	96	239	202	775	493	129	181	250	293	838	162	3969
Apprch %	48.1	14.9	37	13.7	52.7	33.5	23	32.3	44.6	22.7	64.8	12.5	
Total %	7.8	2.4	6	5.1	19.5	12.4	3.3	4.6	6.3	7.4	21.1	4.1	
Cars	310	95	239	201	774	491	129	180	250	293	838	162	3962
% Cars	99.7	99	100	99.5	99.9	99.6	100	99.4	100	100	100	100	99.8
Trucks	1	1	0	1	1	2	0	1	0	0	0	0	7
% Trucks	0.3	1	0	0.5	0.1	0.4	0	0.6	0	0	0	0	0.2

Accurate Counts
978-664-2565

N/S Street : Rt 1 / Winter / Summer
E/W Street : Merrimac Street
City/State : Newburyport, MA
Weather : Clear

File Name : 72810001
Site Code : 72810001
Start Date : 6/16/2016
Page No : 2

	Route 1 From North				Merrimac St From East				Summer St / Winter St From South				Merrimac St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	39	13	29	81	37	106	73	216	17	21	32	70	41	107	38	186	553
05:15 PM	45	13	26	84	39	114	55	208	14	26	34	74	31	111	17	159	525
05:30 PM	42	7	36	85	24	94	58	176	16	18	36	70	30	105	19	154	485
05:45 PM	38	14	29	81	25	103	58	186	15	21	38	74	30	114	20	164	505
Total Volume	164	47	120	331	125	417	244	786	62	86	140	288	132	437	94	663	2068
% App. Total	49.5	14.2	36.3		15.9	53.1	31		21.5	29.9	48.6		19.9	65.9	14.2		
PHF	.911	.839	.833	.974	.801	.914	.836	.910	.912	.827	.921	.973	.805	.958	.618	.891	.935
Cars	164	46	120	330	124	416	242	782	62	85	140	287	132	437	94	663	2062
% Cars	100	97.9	100	99.7	99.2	99.8	99.2	99.5	100	98.8	100	99.7	100	100	100	100	99.7
Trucks	0	1	0	1	1	1	2	4	0	1	0	1	0	0	0	0	6
% Trucks	0	2.1	0	0.3	0.8	0.2	0.8	0.5	0	1.2	0	0.3	0	0	0	0	0.3



Accurate Counts
978-664-2565

N/S Street : Tournament Wharf/ Market St
E/W Street: Merrimac Street
City/State : Newburyport, MA
Weather : Clear

File Name : 72810002
Site Code : 72810002
Start Date : 6/16/2016
Page No : 1

Groups Printed- Cars - Trucks

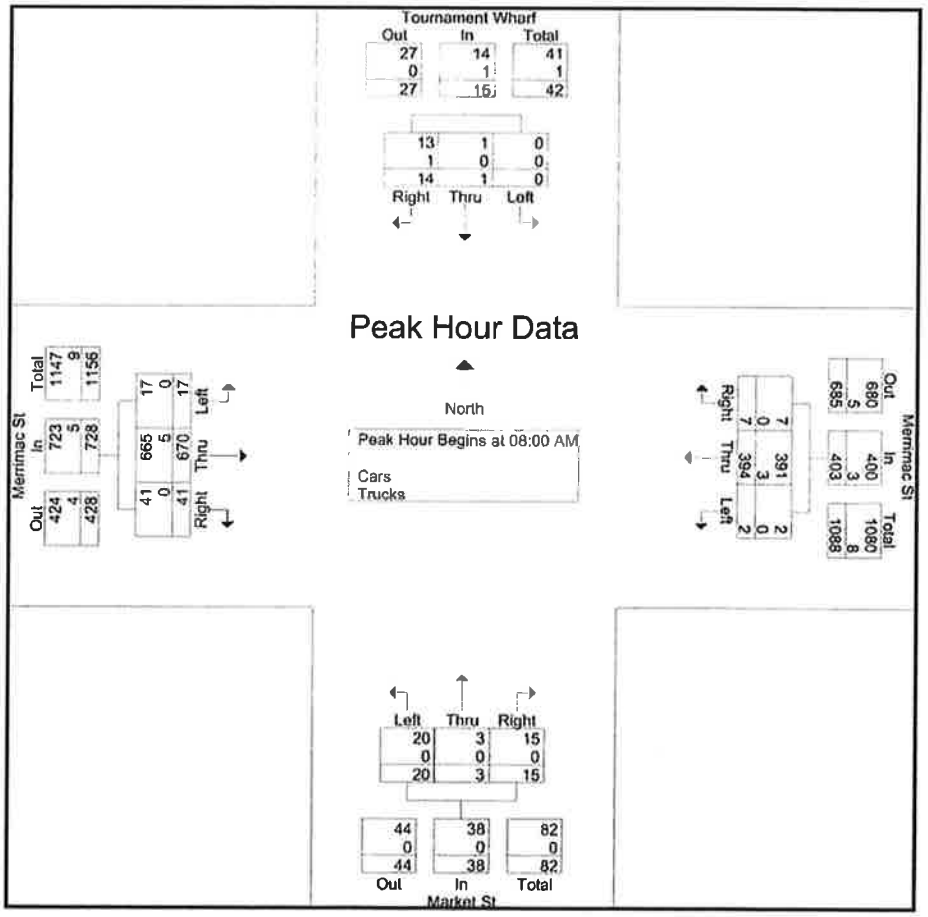
	Tournament Wharf From North			Merrimac St From East			Market St From South			Merrimac St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	77	0	5	1	2	3	87	3	178
07:15 AM	1	1	2	1	81	1	3	0	3	0	86	5	184
07:30 AM	0	0	6	1	91	1	4	0	4	2	120	3	232
07:45 AM	0	0	1	0	102	2	6	0	3	2	124	8	248
Total	1	1	9	2	351	4	18	1	12	7	417	19	842
08:00 AM	0	0	5	0	88	1	1	1	4	4	151	13	268
08:15 AM	0	0	3	1	114	4	10	0	2	5	165	19	323
08:30 AM	0	0	4	0	87	2	3	1	5	4	180	4	290
08:45 AM	0	1	2	1	105	0	6	1	4	4	174	5	303
Total	0	1	14	2	394	7	20	3	15	17	670	41	1184
Grand Total	1	2	23	4	745	11	38	4	27	24	1087	60	2026
Apprch %	3.8	7.7	88.5	0.5	98	1.4	55.1	5.8	39.1	2	92.8	5.1	
Total %	0	0.1	1.1	0.2	36.8	0.5	1.9	0.2	1.3	1.2	53.7	3	
Cars	1	2	22	4	736	10	38	4	27	24	1076	59	2003
% Cars	100	100	95.7	100	98.8	90.9	100	100	100	100	99	98.3	98.9
Trucks	0	0	1	0	9	1	0	0	0	0	11	1	23
% Trucks	0	0	4.3	0	1.2	9.1	0	0	0	0	1	1.7	1.1

Accurate Counts
978-664-2565

N/S Street : Tournament Wharf/ Market St
E/W Street: Merrimac Street
City/State : Newburyport, MA
Weather : Clear

File Name : 72810002
Site Code : 72810002
Start Date : 6/16/2016
Page No : 2

	Tournament Wharf From North				Merrimac St From East				Market St From South				Merrimac St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	5	5	0	88	1	89	1	1	4	6	4	151	13	168	268
08:15 AM	0	0	3	3	1	114	4	119	10	0	2	12	5	165	19	189	323
08:30 AM	0	0	4	4	0	87	2	89	3	1	5	9	4	180	4	188	290
08:45 AM	0	1	2	3	1	105	0	106	6	1	4	11	4	174	5	183	303
Total Volume	0	1	14	15	2	394	7	403	20	3	15	38	17	670	41	728	1184
% App. Total	0	6.7	93.3		0.5	97.8	1.7		52.6	7.9	39.5		2.3	92	5.6		
PHF	.000	.250	.700	.750	.500	.864	.438	.847	.500	.750	.750	.792	.850	.931	.539	.963	.916
Cars	0	1	13	14	2	391	7	400	20	3	15	38	17	665	41	723	1175
% Cars	0	100	92.9	93.3	100	99.2	100	99.3	100	100	100	100	100	99.3	100	99.3	99.2
Trucks	0	0	1	1	0	3	0	3	0	0	0	0	0	5	0	5	9
% Trucks	0	0	7.1	6.7	0	0.8	0	0.7	0	0	0	0	0	0.7	0	0.7	0.8



Accurate Counts

978-664-2565

N/S Street : Tournament Wharf/ Market St
E/W Street: Merrimac Street
City/State : Newburyport, MA
Weather : Clear

File Name : 72810002
Site Code : 72810002
Start Date : 6/16/2016
Page No : 1

Groups Printed- Cars - Trucks

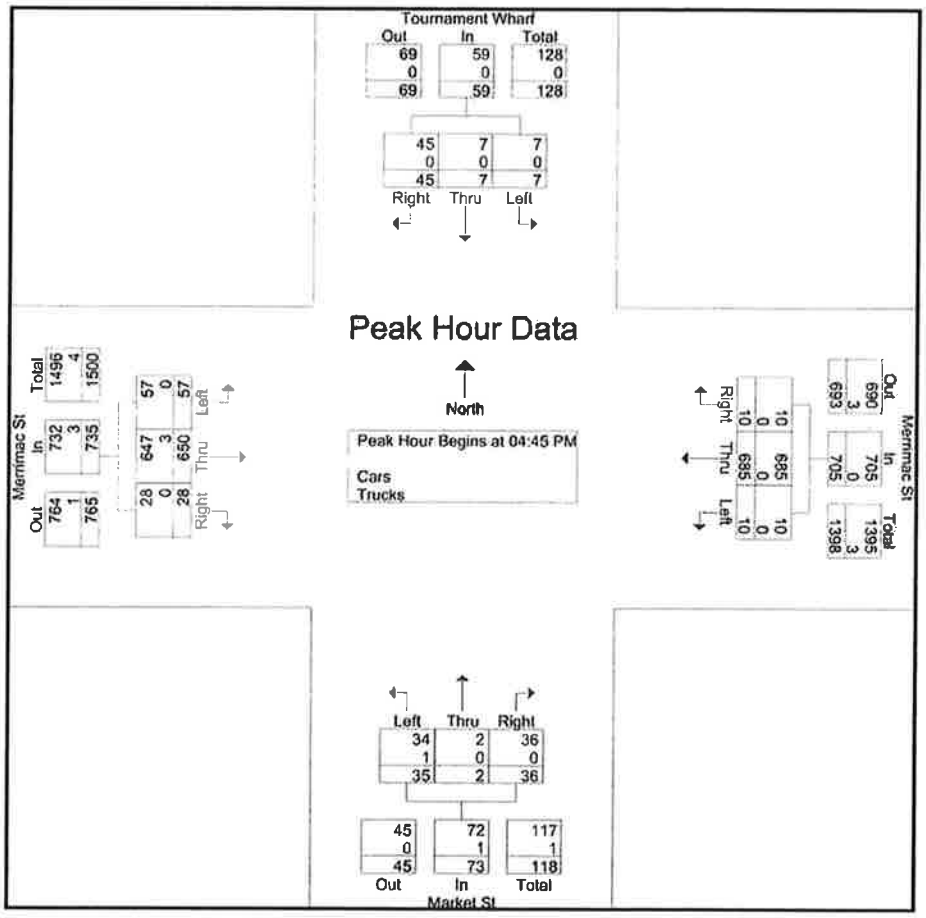
	Tournament Wharf From North			Merrimac St From East			Market St From South			Merrimac St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	1	0	7	0	162	1	4	1	1	20	159	2	358
04:15 PM	1	0	8	1	171	1	9	0	6	15	116	9	337
04:30 PM	0	0	8	0	152	2	8	3	4	8	141	5	331
04:45 PM	2	1	9	2	148	2	9	0	8	8	161	8	358
Total	4	1	32	3	633	6	30	4	19	51	577	24	1384
05:00 PM	1	1	13	3	191	2	12	0	11	14	168	5	421
05:15 PM	3	4	12	3	178	2	8	1	10	23	163	5	412
05:30 PM	1	1	11	2	168	4	6	1	7	12	158	10	381
05:45 PM	0	0	1	0	171	0	6	0	3	2	171	1	355
Total	5	6	37	8	708	8	32	2	31	51	660	21	1569
Grand Total	9	7	69	11	1341	14	62	6	50	102	1237	45	2953
Apprch %	10.6	8.2	81.2	0.8	98.2	1	52.5	5.1	42.4	7.4	89.4	3.3	
Total %	0.3	0.2	2.3	0.4	45.4	0.5	2.1	0.2	1.7	3.5	41.9	1.5	
Cars	9	7	69	11	1340	14	61	6	50	102	1234	45	2948
% Cars	100	100	100	100	99.9	100	98.4	100	100	100	99.8	100	99.8
Trucks	0	0	0	0	1	0	1	0	0	0	3	0	5
% Trucks	0	0	0	0	0.1	0	1.6	0	0	0	0.2	0	0.2

Accurate Counts
978-664-2565

N/S Street : Tournament Wharf/ Market St
E/W Street: Merrimac Street
City/State : Newburyport, MA
Weather : Clear

File Name : 72810002
Site Code : 72810002
Start Date : 6/16/2016
Page No : 2

	Tournament Wharf From North				Merrimac St From East				Market St From South				Merrimac St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	2	1	9	12	2	148	2	152	9	0	8	17	8	161	8	177	358
05:00 PM	1	1	13	15	3	191	2	196	12	0	11	23	14	168	5	187	421
05:15 PM	3	4	12	19	3	178	2	183	8	1	10	19	23	163	5	191	412
05:30 PM	1	1	11	13	2	168	4	174	6	1	7	14	12	158	10	180	381
Total Volume	7	7	45	59	10	685	10	705	35	2	36	73	57	650	28	735	1572
% App. Total	11.9	11.9	76.3		1.4	97.2	1.4		47.9	2.7	49.3		7.8	88.4	3.8		
PHF	.583	.438	.865	.776	.833	.897	.625	.899	.729	.500	.818	.793	.620	.967	.700	.962	.933
Cars	7	7	45	59	10	685	10	705	34	2	36	72	57	647	28	732	1568
% Cars	100	100	100	100	100	100	100	100	97.1	100	100	98.6	100	99.5	100	99.6	99.7
Trucks	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	3	4
% Trucks	0	0	0	0	0	0	0	0	2.9	0	0	1.4	0	0.5	0	0.4	0.3



SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department
5258: Monthly Hourly Volume for June 2015

Location ID: 5258
County: ESSEX
Funcationl Class 1
Location: INTERSTATE 95

Seasonal Factor Group: R1
Daily Factor Group:
Axle Factor Group: R1
Growth Factor Group:

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL
1	310	211	191	302	809	2807	3809	4752	4202	3337	3320	3446	3423	3271	3669	4442	4732	5221	3637	2466	1577	1290	738	539	62501
2	349	213	200	290	731	2535	3594	4677	4187	3226	3071	3141	3148	3295	3924	4515	5164	5411	3783	2396	1790	1398	967	701	62706
3																									
4	391	283	195	289	765	2660	3834	4902	4370	3541	3456	3689	3675	3808	4382	5056	5438	5677	4086	3173	2519	1983	1272	813	70257
5	502	302	205	311	710	2429	3645	4447	4171	3762	4033	4348	4615	4973	5413	5989	6517	6344	5077	4085	2894	2146	1649	1151	79718
6	659	407	228	182	321	782	1550	2551	3317	4333	5087	5352	5489	5162	5124	4857	4746	4403	3626	3056	2828	2432	1808	1155	69455
7	653	427	235	180	209	456	925	1465	2344	3488	4728	5594	5693	5558	5689	5715	5689	5444	4899	3970	3174	2026	1126	623	70310
8	370	236	221	321	922	3000	4089	4883	4398	3568	3649	3657	3475	3874	4005	4725	5122	5387	3855	2602	1872	1284	883	594	66992
9	393	279	245	295	774	2745	3849	4796	4406	3535	3335	3381	3415	3414	4039	4692	5006	5438	3967	2480	1896	1457	1000	638	65475
10	381	282	187	299	790	2676	3893	4627	4510	3670	3727	3688	3484	3648	4234	5053	5442	5581	4085	2876	2259	1786	1143	703	69024
11	442	248	227	270	774	2696	3757	4773	4477	3702	3835	3703	3811	4099	4550	5321	5662	5860	4252	3318	2599	2017	1345	787	72525
12	559	317	218	321	734	2452	3721	4719	4152	3941	4517	4761	4811	5235	5595	6362	6715	6581	5233	4048	3283	2325	1699	1339	83638
13	764	443	246	204	348	790	1636	2783	3872	4707	5564	5698	5485	5113	4999	5010	4953	4902	4105	3400	2817	2305	1817	1231	73192
14	763	512	253	201	258	489	1048	1744	2699	4036	5461	6058	6138	5803	5680	5615	5748	5969	5753	4662	3599	2342	1289	745	76875
15	390	286	177	305	871	2850	3898	4490	4582	3403	3539	3865	3758	3663	3994	4595	4920	5396	3740	2640	1860	1325	990	678	66215
16	395	248	204	310	765	2755	3841	4768	4332	3483	3625	3577	3421	3660	4166	4860	5238	5503	3929	2807	2073	1526	1025	761	67272
17	405	245	213	292	801	2759	3852	4829	4335	3568	3764	3743	3590	3748	4254	4932	5576	5803	4152	3164	2325	1811	1316	749	70226
18	458	276	199	288	810	2705	3819	4854	4391	3730	3892	4037	3888	4003	4523	5233	5695	5794	4417	3280	2467	2055	1278	864	72956
19	525	293	245	288	714	2311	3484	4550	4265	3831	4461	4849	4767	4966	5663	6319	6626	6411	5563	4453	3249	2388	1649	1085	82955
20	735	413	252	249	373	849	1627	2547	3591	4894	5689	5794	5448	5373	5423	4950	5079	4740	4182	3630	2890	2507	2023	1286	74544
21	675	389	225	194	215	369	663	1123	1845	2979	4511	5785	5896	5792	5891	6131	6010	5229	4182	3751	3136	2079	1189	625	68884
22	359	202	178	284	816	2994	4043	5025	4412	3651	4042	4336	4091	4082	4372	5119	5349	5752	4154	2842	2200	1636	1134	638	71711
23	379	242	218	314	775	2788	3861	4808	4378	3681	3673	3855	3698	3829	4264	4878	5394	5326	3570	2635	1966	1506	1126	1022	68186
24	612	266	227	310	814	2732	3889	4837	4523	4022	4165	4267	3902	4147	4557	5381	5914	6008	4494	3241	2653	1937	1557	1111	75566
25	627	286	235	326	783	2699	3809	4708	4355	4069	4383	4583	4587	4531	5103	5579	5972	5994	4920	3826	3035	2319	1478	945	79152
26	720	380	275	292	740	2310	3476	4497	4270	4245	4745	5328	5404	5526	5836	6395	6561	6630	5319	4561	3383	2418	1716	1280	86307
27	656	422	228	247	365	889	1627	2638	3831	4927	5875	6304	5927	5622	5507	5445	5254	5171	4271	3475	2980	2596	1876	1235	77368
28	726	443	226	192	208	356	688	994	1706	2800	4252	5541	6073	5799	5669	5620	5521	5171	4050	3061	2274	1717	1065	686	64838
29	325	226	188	345	859	2884	3881	4608	4332	3789	4219	4383	4268	4085	4594	5153	5510	5820	4061	2950	2201	1679	1115	718	72193
30	393	222	233	304	773	2653	3650	4604	4387	3989	4240	4334	4116	4114	4647	5181	5476	6009	4634	3396	2517	1996	1306	799	73973

Average = 70086.66

Yearly Average = 67,000

67000/70087 = 0.95

VEHICLE TRAVEL SPEED DATA

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

WB

Start	1	4	7	10	13	16	19	22	25	28	31	34	37	40	
Time	3	6	9	12	15	18	21	24	27	30	33	36	39	999	Total
06/16/16	0	0	0	0	0	1	3	9	6	10	8	3	0	0	40
01:00	0	0	0	0	0	0	0	2	3	2	4	1	1	0	13
02:00	0	0	0	0	0	0	0	1	0	2	0	0	0	0	3
03:00	0	0	0	0	0	0	0	1	3	3	0	0	1	0	8
04:00	0	0	0	0	0	0	1	4	5	2	2	3	0	0	17
05:00	0	0	0	0	0	0	5	12	22	26	14	8	2	0	89
06:00	9	0	0	0	0	5	13	33	66	68	26	9	1	0	230
07:00	16	0	0	0	2	6	26	74	95	83	34	9	1	0	346
08:00	30	0	0	1	3	7	48	117	122	56	14	2	0	0	400
09:00	28	0	3	0	5	28	73	120	79	25	7	0	0	0	368
10:00	36	0	1	2	9	41	120	120	70	21	0	0	0	0	420
11:00	32	0	1	0	15	46	148	110	62	9	2	0	0	0	425
12 PM	56	0	2	7	25	112	164	105	51	8	0	0	0	0	530
13:00	44	0	3	7	24	122	156	111	42	8	1	0	0	0	518
14:00	48	1	3	10	52	146	176	126	46	7	0	0	0	0	615
15:00	62	0	5	6	24	92	200	139	54	8	3	0	0	0	593
16:00	52	0	2	9	26	85	203	162	57	12	0	0	0	0	608
17:00	90	4	8	27	49	96	175	168	46	7	0	0	0	0	670
18:00	49	2	2	2	18	75	136	130	58	14	0	1	0	0	487
19:00	32	1	3	5	34	73	159	118	43	10	1	0	0	0	479
20:00	27	0	0	2	8	49	136	175	78	15	2	0	0	0	492
21:00	11	0	0	0	1	6	62	119	108	34	7	0	0	0	346
22:00	1	0	0	1	0	2	14	38	73	56	10	2	0	0	197
23:00	2	0	0	0	0	0	8	32	38	34	8	0	1	0	123
Total	625	8	33	79	295	992	2026	2026	1225	520	143	38	7	0	8017

Daily

15th Percentile :	15 MPH
50th Percentile :	20 MPH
85th Percentile :	25 MPH
95th Percentile :	28 MPH
Mean Speed(Average) :	20 MPH
10 MPH Pace Speed :	18-27 MPH
Number in Pace :	5608
Percent in Pace :	70.0%
Number of Vehicles > 20 MPH :	4634
Percent of Vehicles > 20 MPH :	57.8%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

WB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
06/17/16	0	0	0	0	0	0	4	4	16	20	7	0	2	0	53
01:00	0	0	0	0	0	0	2	0	3	1	2	2	1	0	11
02:00	0	0	0	0	0	0	0	0	2	2	2	1	0	0	7
03:00	0	0	0	0	0	0	0	1	2	0	1	0	1	0	5
04:00	0	0	0	0	0	0	4	2	2	3	6	3	0	0	20
05:00	0	0	0	0	0	0	3	10	18	30	15	6	2	0	84
06:00	4	0	0	0	0	2	15	37	58	68	28	9	0	0	221
07:00	24	0	0	0	0	4	28	61	125	67	25	6	1	0	341
08:00	39	0	2	2	1	7	38	133	118	61	19	1	0	0	421
09:00	33	0	0	1	2	26	87	140	83	13	7	0	0	0	392
10:00	45	1	1	3	17	59	113	125	80	20	2	0	0	0	466
11:00	69	0	2	8	15	58	165	111	41	12	2	0	0	0	483
12 PM	97	0	1	8	31	89	160	115	28	5	0	0	0	0	534
13:00	86	1	3	17	49	103	143	118	28	10	1	0	0	0	559
14:00	68	0	6	12	46	145	196	121	43	13	2	0	0	0	652
15:00	79	2	1	11	42	126	189	160	47	10	1	0	0	0	668
16:00	64	0	7	21	39	118	178	136	28	7	1	1	0	0	600
17:00	88	4	6	25	57	136	116	89	38	7	2	0	0	1	569
18:00	56	0	6	12	34	96	151	86	45	12	2	0	0	0	500
19:00	56	2	9	24	41	139	170	83	24	3	1	0	0	0	552
20:00	44	0	4	8	25	107	163	121	29	4	2	0	0	0	507
21:00	16	0	2	3	5	53	130	113	49	13	2	0	0	0	386
22:00	6	0	0	0	3	35	104	164	51	16	6	0	0	0	385
23:00	1	0	0	1	0	5	19	43	53	37	7	4	0	0	170
Total	875	10	50	156	407	1308	2178	1973	1011	434	143	33	7	1	8586

Daily

15th Percentile :	13 MPH
50th Percentile :	20 MPH
85th Percentile :	25 MPH
95th Percentile :	28 MPH
Mean Speed(Average) :	19 MPH
10 MPH Pace Speed :	16-25 MPH
Number in Pace :	5796
Percent in Pace :	67.5%
Number of Vehicles > 20 MPH :	4328
Percent of Vehicles > 20 MPH :	50.4%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

WB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
06/18/16	0	0	0	0	1	0	4	18	28	18	9	3	1	0	82
01:00	0	0	0	0	0	0	0	3	11	15	2	2	2	0	35
02:00	0	0	0	0	0	0	3	3	8	8	1	2	0	0	25
03:00	0	0	0	0	2	0	0	0	2	4	5	1	0	0	14
04:00	0	0	0	0	0	0	1	1	4	7	6	1	0	0	20
05:00	0	0	0	0	1	1	2	5	10	10	9	2	0	1	41
06:00	3	0	0	0	1	4	8	17	40	38	13	3	0	0	127
07:00	8	0	0	1	1	3	29	60	69	39	20	2	0	0	232
08:00	25	0	2	3	9	24	66	108	72	15	2	0	0	0	326
09:00	38	0	1	3	9	55	124	133	62	11	0	0	0	0	436
10:00	53	0	1	10	34	79	119	123	45	9	2	1	0	0	476
11:00	76	5	4	20	34	103	147	85	17	5	0	0	0	0	496
12 PM	73	0	2	13	55	135	136	52	20	4	0	0	0	0	490
13:00	78	1	7	11	69	150	139	83	19	5	0	0	0	0	562
14:00	72	0	18	27	59	120	136	68	27	6	0	0	0	0	533
15:00	81	0	11	11	60	156	160	85	12	1	1	0	1	0	579
16:00	72	3	6	21	85	143	165	80	25	3	0	0	0	0	603
17:00	81	1	1	9	64	152	182	81	23	1	0	0	0	0	595
18:00	55	0	0	8	43	120	145	87	31	8	1	0	0	0	498
19:00	42	2	1	25	52	119	187	81	26	2	0	0	0	0	537
20:00	31	0	0	0	28	114	207	111	36	7	0	0	0	0	534
21:00	25	1	3	13	18	82	156	122	44	8	1	0	0	0	473
22:00	12	0	0	3	9	48	113	125	58	27	3	1	0	0	399
23:00	3	0	1	0	0	3	23	68	76	40	9	3	0	0	226
Total	828	13	58	178	634	1611	2252	1599	765	291	84	21	4	1	8339

Daily

15th Percentile :	12 MPH
50th Percentile :	19 MPH
85th Percentile :	23 MPH
95th Percentile :	26 MPH
Mean Speed(Average) :	18 MPH
10 MPH Pace Speed :	16-25 MPH
Number In Pace :	5717
Percent In Pace :	68.6%
Number of Vehicles > 20 MPH :	3516
Percent of Vehicles > 20 MPH :	42.2%

Grand Total	2328	31	141	413	1336	3911	6456	5598	3001	1245	370	92	18	2	24942

Overall

15th Percentile :	13 MPH
50th Percentile :	20 MPH
85th Percentile :	24 MPH
95th Percentile :	28 MPH
Mean Speed(Average) :	19 MPH
10 MPH Pace Speed :	16-25 MPH
Number In Pace :	16965
Percent In Pace :	68.0%
Number of Vehicles > 20 MPH :	12478
Percent of Vehicles > 20 MPH :	50.0%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
06/16/16	0	0	0	0	0	2	2	8	7	6	2	0	0	0	27
01:00	0	0	0	0	0	0	1	2	4	5	4	0	0	0	16
02:00	0	0	1	0	0	0	0	2	2	3	2	1	0	0	11
03:00	0	0	0	0	0	0	1	2	4	1	0	1	0	0	9
04:00	0	0	0	0	0	1	6	4	5	4	3	0	0	0	23
05:00	2	0	0	0	4	8	16	32	40	29	9	4	1	0	145
06:00	7	0	0	0	1	3	20	34	60	53	19	6	0	0	203
07:00	19	0	0	3	1	11	42	124	158	67	15	2	0	0	442
08:00	35	0	4	6	22	78	166	221	129	37	4	0	0	0	702
09:00	39	0	1	11	31	107	180	185	64	11	2	0	0	0	631
10:00	42	2	8	10	45	147	162	140	44	6	1	0	0	0	607
11:00	64	4	14	34	57	147	185	112	37	4	0	0	0	0	658
12 PM	82	6	13	24	85	127	164	103	33	5	0	0	0	0	642
13:00	76	1	17	24	80	169	140	100	36	7	0	0	0	0	650
14:00	65	1	9	36	65	116	140	94	34	6	1	0	0	0	567
15:00	81	4	6	26	73	153	170	98	34	1	0	0	0	0	646
16:00	76	2	3	16	58	121	195	107	30	7	1	0	0	0	616
17:00	74	4	9	30	101	155	159	72	27	4	1	0	0	0	636
18:00	56	1	4	22	68	147	204	144	35	6	0	1	0	0	688
19:00	40	0	2	9	34	114	155	130	43	9	0	0	0	0	536
20:00	35	0	1	6	15	57	109	114	38	10	1	0	0	0	386
21:00	12	0	0	0	2	12	45	69	75	14	5	0	0	0	234
22:00	5	0	0	0	1	4	18	33	35	10	7	0	0	0	113
23:00	1	0	0	0	0	1	3	15	17	9	10	0	0	0	56
Total	811	25	92	257	743	1680	2283	1945	991	314	87	15	1	0	9244

Daily

15th Percentile :	12 MPH
50th Percentile :	19 MPH
85th Percentile :	24 MPH
95th Percentile :	26 MPH
Mean Speed(Average) :	19 MPH
10 MPH Pace Speed :	16-25 MPH
Number in Pace :	6238
Percent in Pace :	67.5%
Number of Vehicles > 20 MPH :	4114
Percent of Vehicles > 20 MPH :	44.5%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
06/17/16	0	0	0	0	0	0	6	10	13	11	3	2	0	0	45
01:00	0	0	0	0	0	0	0	10	6	4	3	2	2	1	28
02:00	0	0	0	0	0	0	1	3	2	3	1	0	0	0	10
03:00	0	0	0	0	0	0	2	1	2	2	0	1	0	0	8
04:00	0	0	0	0	2	3	2	6	3	6	9	0	0	0	31
05:00	0	0	0	1	0	5	10	19	32	27	16	5	0	0	115
06:00	6	0	0	0	0	2	15	38	66	60	11	3	0	0	202
07:00	29	0	0	0	1	10	40	107	158	64	25	3	0	0	437
08:00	40	2	9	13	23	55	144	206	141	43	5	1	0	0	682
09:00	58	0	4	20	52	124	231	138	51	13	3	0	0	0	694
10:00	68	0	9	36	79	138	168	105	27	3	1	0	0	0	634
11:00	87	8	27	75	104	132	135	78	22	5	0	0	0	0	673
12 PM	164	35	68	109	127	122	95	23	7	0	0	0	0	0	750
13:00	147	20	53	98	102	109	106	44	12	1	0	0	0	0	692
14:00	90	1	6	33	75	154	169	84	25	5	1	1	0	0	644
15:00	89	9	14	22	85	161	175	87	39	6	0	0	0	0	687
16:00	105	2	18	46	99	133	153	94	25	2	1	0	0	0	678
17:00	121	5	19	51	141	197	118	59	10	2	1	0	0	0	724
18:00	91	14	26	55	119	161	148	61	14	4	0	0	0	0	693
19:00	69	1	6	48	95	170	106	65	11	1	0	0	0	0	572
20:00	32	2	7	9	29	69	102	81	42	7	0	0	0	0	380
21:00	19	0	0	1	12	32	78	94	43	15	3	0	0	0	297
22:00	6	0	0	0	1	12	44	65	34	14	2	0	0	0	178
23:00	3	0	0	0	0	0	12	34	41	23	5	1	0	0	119
Total	1224	99	266	617	1148	1789	2060	1513	826	321	90	19	2	1	9973

Dally

15th Percentile :	7 MPH
50th Percentile :	17 MPH
85th Percentile :	23 MPH
95th Percentile :	26 MPH
Mean Speed(Average) :	17 MPH
10 MPH Pace Speed :	15-24 MPH
Number in Pace :	5744
Percent in Pace :	57.6%
Number of Vehicles > 20 MPH :	3459
Percent of Vehicles > 20 MPH :	34.7%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
06/18/16	0	0	0	0	0	2	5	7	19	9	3	1	1	0	47
01:00	0	0	0	0	0	0	2	8	15	9	3	0	0	0	37
02:00	0	0	0	0	0	0	2	6	3	3	0	2	0	0	16
03:00	0	0	0	0	0	0	2	1	3	5	1	0	0	0	12
04:00	1	0	0	0	0	1	6	1	9	6	3	4	1	0	32
05:00	0	0	0	0	0	2	8	16	19	13	13	2	0	0	73
06:00	2	0	0	1	4	7	20	46	65	40	15	3	1	0	204
07:00	10	0	0	1	3	18	48	102	116	51	16	1	0	0	366
08:00	27	0	0	3	40	77	156	176	74	21	4	1	0	0	579
09:00	50	1	4	19	84	168	169	110	38	6	0	0	0	0	649
10:00	87	7	41	101	154	159	135	48	9	2	0	0	0	0	743
11:00	112	14	39	71	96	103	133	48	13	2	0	0	0	0	631
12 PM	153	61	128	147	76	33	35	8	5	0	0	0	0	0	646
13:00	111	23	54	95	104	152	91	30	3	5	0	0	0	0	668
14:00	122	23	54	38	104	119	99	43	16	2	0	0	0	0	620
15:00	94	6	28	42	106	149	127	45	11	1	0	0	0	0	609
16:00	111	20	54	70	97	117	106	43	12	0	0	0	0	0	630
17:00	103	13	37	44	85	129	123	57	11	4	0	0	0	0	606
18:00	60	3	21	39	88	155	152	86	25	7	0	0	0	0	636
19:00	58	6	5	21	64	132	120	79	41	5	0	0	0	0	531
20:00	33	0	0	5	16	92	117	91	26	11	0	0	0	0	391
21:00	23	0	0	0	12	47	84	80	53	10	2	0	0	0	311
22:00	11	0	0	0	5	11	43	68	45	12	2	0	0	0	197
23:00	5	0	0	2	1	1	16	38	36	23	11	1	0	0	134
Total	1173	177	465	699	1139	1674	1799	1237	667	247	73	15	3	0	9368

Daily

15th Percentile :	6 MPH
50th Percentile :	16 MPH
85th Percentile :	23 MPH
95th Percentile :	26 MPH
Mean Speed(Average) :	16 MPH
10 MPH Pace Speed :	15-24 MPH
Number In Pace :	5090
Percent In Pace :	54.3%
Number of Vehicles > 20 MPH :	2842
Percent of Vehicles > 20 MPH :	30.3%

Grand Total	3208	301	823	1573	3028	5143	6142	4695	2484	882	250	49	6	1	28585

Overall

15th Percentile :	8 MPH
50th Percentile :	18 MPH
85th Percentile :	23 MPH
95th Percentile :	26 MPH
Mean Speed(Average) :	17 MPH
10 MPH Pace Speed :	15-24 MPH
Number in Pace :	16989
Percent in Pace :	59.4%
Number of Vehicles > 20 MPH :	10414
Percent of Vehicles > 20 MPH :	36.4%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

WB, EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
06/16/16	0	0	0	0	0	3	5	17	13	16	10	3	0	0	67
01:00	0	0	0	0	0	0	1	4	7	7	8	1	1	0	29
02:00	0	0	1	0	0	0	0	3	2	5	2	1	0	0	14
03:00	0	0	0	0	0	0	1	3	7	4	0	1	1	0	17
04:00	0	0	0	0	0	1	7	8	10	6	5	3	0	0	40
05:00	2	0	0	0	4	8	21	44	62	55	23	12	3	0	234
06:00	16	0	0	0	1	8	33	67	126	121	45	15	1	0	433
07:00	35	0	0	3	3	17	68	198	253	150	49	11	1	0	788
08:00	65	0	4	7	25	85	214	338	251	93	18	2	0	0	1102
09:00	67	0	4	11	36	135	253	305	143	36	9	0	0	0	999
10:00	78	2	9	12	54	188	282	260	114	27	1	0	0	0	1027
11:00	98	4	15	34	72	193	333	222	99	13	2	0	0	0	1083
12 PM	138	6	15	31	110	239	328	208	84	13	0	0	0	0	1172
13:00	120	1	20	31	104	291	296	211	78	15	1	0	0	0	1168
14:00	113	2	12	46	117	262	316	220	80	13	1	0	0	0	1182
15:00	143	4	11	32	97	245	370	237	68	9	3	0	0	0	1239
16:00	128	2	5	25	84	206	398	269	87	19	1	0	0	0	1224
17:00	164	8	17	57	150	251	334	240	73	11	1	0	0	0	1306
18:00	105	3	6	24	86	222	340	274	93	20	0	2	0	0	1175
19:00	72	1	5	14	68	187	314	248	86	19	1	0	0	0	1015
20:00	62	0	1	8	23	106	245	289	116	25	3	0	0	0	878
21:00	23	0	0	0	3	18	107	188	181	48	12	0	0	0	580
22:00	6	0	0	1	1	6	32	71	108	66	17	2	0	0	310
23:00	3	0	0	0	0	1	11	47	55	43	18	0	1	0	179
Total	1436	33	125	336	1038	2672	4309	3971	2216	834	230	53	8	0	17261

Daily

15th Percentile :	13 MPH
50th Percentile :	20 MPH
85th Percentile :	25 MPH
95th Percentile :	27 MPH
Mean Speed(Average) :	19 MPH
10 MPH Pace Speed :	16-25 MPH
Number in Pace :	11691
Percent in Pace :	67.7%
Number of Vehicles > 20 MPH :	8748
Percent of Vehicles > 20 MPH :	50.7%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

WB, EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
06/17/16	0	0	0	0	0	0	10	14	29	31	10	2	2	0	98
01:00	0	0	0	0	0	0	2	10	9	5	5	4	3	1	39
02:00	0	0	0	0	0	0	1	3	4	5	3	1	0	0	17
03:00	0	0	0	0	0	0	2	2	4	2	1	1	1	0	13
04:00	0	0	0	0	2	3	6	8	5	9	15	3	0	0	51
05:00	0	0	0	1	0	5	13	29	50	57	31	11	2	0	199
06:00	10	0	0	0	0	4	30	76	124	128	39	12	0	0	423
07:00	53	0	0	0	1	14	68	168	283	131	50	9	1	0	778
08:00	79	2	11	15	24	62	182	339	259	104	24	2	0	0	1103
09:00	91	0	4	21	54	150	318	278	134	26	10	0	0	0	1086
10:00	113	1	10	39	96	197	281	230	107	23	3	0	0	0	1100
11:00	156	8	29	83	119	190	300	189	63	17	2	0	0	0	1156
12 PM	261	35	69	117	158	211	255	138	35	5	0	0	0	0	1284
13:00	233	21	56	115	151	212	249	162	40	11	1	0	0	0	1251
14:00	158	1	12	45	121	299	365	205	68	18	3	1	0	0	1296
15:00	168	11	15	33	127	287	364	247	86	16	1	0	0	0	1355
16:00	169	2	25	67	138	251	331	230	53	9	2	1	0	0	1278
17:00	209	9	25	76	198	333	234	148	48	9	3	0	0	1	1293
18:00	147	14	32	67	153	257	299	147	59	16	2	0	0	0	1193
19:00	125	3	15	72	136	309	276	148	35	4	1	0	0	0	1124
20:00	76	2	11	17	54	176	265	202	71	11	2	0	0	0	887
21:00	35	0	2	4	17	85	208	207	92	28	5	0	0	0	683
22:00	12	0	0	0	4	47	148	229	85	30	8	0	0	0	563
23:00	4	0	0	1	0	5	31	77	94	60	12	5	0	0	289
Total	2099	109	316	773	1553	3097	4238	3486	1837	755	233	52	9	2	18559

Daily

15th Percentile :	10 MPH
50th Percentile :	18 MPH
85th Percentile :	24 MPH
95th Percentile :	27 MPH
Mean Speed(Average) :	18 MPH
10 MPH Pace Speed :	16-25 MPH
Number in Pace :	11433
Percent in Pace :	61.6%
Number of Vehicles > 20 MPH :	7787
Percent of Vehicles > 20 MPH :	42.0%

Accurate Counts

978-664-2565

Location : Merrimac Street
Location : East of Market Street
City/State: Newburyport, MA

7281SPD1

WB, EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
06/18/16	0	0	0	0	1	2	9	25	47	27	12	4	2	0	129
01:00	0	0	0	0	0	0	2	11	26	24	5	2	2	0	72
02:00	0	0	0	0	0	0	5	9	11	11	1	4	0	0	41
03:00	0	0	0	0	2	0	2	1	5	9	6	1	0	0	26
04:00	1	0	0	0	0	1	7	2	13	13	9	5	1	0	52
05:00	0	0	0	0	1	3	10	21	29	23	22	4	0	1	114
06:00	5	0	0	1	5	11	28	63	105	78	28	6	1	0	331
07:00	18	0	0	2	4	21	77	162	185	90	36	3	0	0	598
08:00	52	0	2	6	49	101	222	284	146	36	6	1	0	0	905
09:00	88	1	5	22	93	223	293	243	100	17	0	0	0	0	1085
10:00	140	7	42	111	188	238	254	171	54	11	2	1	0	0	1219
11:00	188	19	43	91	130	206	280	133	30	7	0	0	0	0	1127
12 PM	226	61	130	160	131	168	171	60	25	4	0	0	0	0	1136
13:00	189	24	61	108	173	302	230	113	22	10	0	0	0	0	1230
14:00	194	23	72	65	163	239	235	111	43	8	0	0	0	0	1153
15:00	175	6	39	53	166	305	287	130	23	2	1	0	1	0	1188
16:00	183	23	60	91	182	260	271	123	37	3	0	0	0	0	1233
17:00	184	14	38	53	149	281	305	138	34	5	0	0	0	0	1201
18:00	115	3	21	47	131	275	297	173	56	15	1	0	0	0	1134
19:00	100	8	8	48	116	251	307	160	67	7	0	0	0	0	1068
20:00	64	0	0	5	44	206	324	202	62	18	0	0	0	0	925
21:00	48	1	3	13	30	129	240	202	97	18	3	0	0	0	784
22:00	23	0	0	3	14	59	156	193	103	39	5	1	0	0	596
23:00	8	0	1	2	1	4	39	106	112	63	20	4	0	0	360
Total	2001	190	523	877	1773	3285	4051	2838	1432	538	157	36	7	1	17707

Daily

15th Percentile :	8 MPH
50th Percentile :	18 MPH
85th Percentile :	23 MPH
95th Percentile :	26 MPH
Mean Speed(Average) :	17 MPH
10 MPH Pace Speed :	15-24 MPH
Number in Pace :	10763
Percent in Pace :	60.8%
Number of Vehicles > 20 MPH :	6357
Percent of Vehicles > 20 MPH :	35.9%

Grand Total	5536	332	964	1986	4364	9054	12598	10293	5485	2127	620	141	24	3	53527

Overall

15th Percentile :	10 MPH
50th Percentile :	19 MPH
85th Percentile :	24 MPH
95th Percentile :	27 MPH
Mean Speed(Average) :	18 MPH
10 MPH Pace Speed :	16-25 MPH
Number in Pace :	33773
Percent in Pace :	63.1%
Number of Vehicles > 20 MPH :	22892
Percent of Vehicles > 20 MPH :	42.8%

CAPACITY ANALYSIS WORKSHEETS

Merrimac Street at the Route 1 Northbound On-Ramp and Summer Street
Merrimac Street at Market Street and Tournament Wharf

Merrimac Street at the Northbound On-Ramp and Summer Street

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	67	652	0	0	296	132	59	51	83
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	86	86	86	85	85	85
Heavy Vehicles, %	1	0	0	0	1	0	2	0	4
Mvmt Flow	71	694	0	0	344	153	69	60	98

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	498	0	0	694	0	0	1257	1334	694
Stage 1	-	-	-	-	-	-	836	836	-
Stage 2	-	-	-	-	-	-	421	498	-
Critical Hdwy	4.11	-	-	4.1	-	-	6.42	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.518	4	3.336
Pot Cap-1 Maneuver	1071	-	-	911	-	-	189	155	439
Stage 1	-	-	-	-	-	-	425	385	-
Stage 2	-	-	-	-	-	-	662	548	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1071	-	-	911	-	-	176	0	439
Mov Cap-2 Maneuver	-	-	-	-	-	-	176	0	-
Stage 1	-	-	-	-	-	-	397	0	-
Stage 2	-	-	-	-	-	-	662	0	-

Approach	EB	WB	NB
HCM Control Delay, s			
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	176	-	439	1071	-	-	911	-	-
HCM Lane V/C Ratio	0.394	-	0.222	0.067	-	-	-	-	-
HCM Control Delay (s)	38.2	-	15.5	8.6	-	-	0	-	-
HCM Lane LOS	E	-	C	A	-	-	A	-	-
HCM 95th %tile Q(veh)	2	-	1	0	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor	
Conflicting Flow All	
Stage 1	
Stage 2	
Critical Hdwy	
Critical Hdwy Stg 1	
Critical Hdwy Stg 2	
Follow-up Hdwy	
Pot Cap-1 Maneuver	
Stage 1	
Stage 2	
Platoon blocked, %	
Mov Cap-1 Maneuver	
Mov Cap-2 Maneuver	
Stage 1	
Stage 2	

Approach	
HCM Control Delay, s	
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	132	601	0	0	542	244	62	86	140
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	91	91	91	97	97	97
Heavy Vehicles, %	0	0	0	0	0	1	0	1	0
Mvmt Flow	148	675	0	0	596	268	64	89	144

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	864	0	0	675	0	0	1702	1836	675
Stage 1	-	-	-	-	-	-	972	972	-
Stage 2	-	-	-	-	-	-	730	864	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.4	6.51	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.51	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.009	3.3
Pot Cap-1 Maneuver	787	-	-	926	-	-	102	~ 76	457
Stage 1	-	-	-	-	-	-	370	332	-
Stage 2	-	-	-	-	-	-	481	373	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	787	-	-	926	-	-	83	0	457
Mov Cap-2 Maneuver	-	-	-	-	-	-	83	0	-
Stage 1	-	-	-	-	-	-	300	0	-
Stage 2	-	-	-	-	-	-	481	0	-

Approach	EB	WB	NB
HCM Control Delay, s			
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	83	-	457	787	-	-	926	-	-
HCM Lane V/C Ratio	0.77	-	0.316	0.188	-	-	-	-	-
HCM Control Delay (s)	129.7	-	16.5	10.6	-	-	0	-	-
HCM Lane LOS	F	-	C	B	-	-	A	-	-
HCM 95th %tile Q(veh)	4	-	1	1	-	-	0	-	-

Notes

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor	
Conflicting Flow All	
Stage 1	
Stage 2	
Critical Hdwy	
Critical Hdwy Stg 1	
Critical Hdwy Stg 2	
Follow-up Hdwy	
Pot Cap-1 Maneuver	
Stage 1	
Stage 2	
Platoon blocked, %	
Mov Cap-1 Maneuver	
Mov Cap-2 Maneuver	
Stage 1	
Stage 2	

Approach	
HCM Control Delay, s	
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	73	706	0	0	369	147	64	56	100
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	92	92	92	92	92	92
Heavy Vehicles, %	1	0	0	0	1	0	2	0	4
Mvmt Flow	78	751	0	0	401	160	70	61	109

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	561	0	0	751	0	0	1387	1467	751
Stage 1	-	-	-	-	-	-	906	906	-
Stage 2	-	-	-	-	-	-	481	561	-
Critical Hdwy	4.11	-	-	4.1	-	-	6.42	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.518	4	3.336
Pot Cap-1 Maneuver	1015	-	-	868	-	-	158	129	408
Stage 1	-	-	-	-	-	-	394	358	-
Stage 2	-	-	-	-	-	-	622	513	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1015	-	-	868	-	-	146	0	408
Mov Cap-2 Maneuver	-	-	-	-	-	-	146	0	-
Stage 1	-	-	-	-	-	-	364	0	-
Stage 2	-	-	-	-	-	-	622	0	-

Approach	EB	WB	NB
HCM Control Delay, s			
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	146	-	408	1015	-	-	868	-	-
HCM Lane V/C Ratio	0.476	-	0.266	0.077	-	-	-	-	-
HCM Control Delay (s)	50.3	-	17	8.8	-	-	0	-	-
HCM Lane LOS	F	-	C	A	-	-	A	-	-
HCM 95th %tile Q(veh)	2	-	1	0	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor	
Conflicting Flow All	
Stage 1	
Stage 2	
Critical Hdwy	
Critical Hdwy Stg 1	
Critical Hdwy Stg 2	
Follow-up Hdwy	
Pot Cap-1 Maneuver	
Stage 1	
Stage 2	
Platoon blocked, %	
Mov Cap-1 Maneuver	
Mov Cap-2 Maneuver	
Stage 1	
Stage 2	

Approach	
HCM Control Delay, s	
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	143	719	0	0	629	264	67	93	195
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	97	97	97
Heavy Vehicles, %	0	0	0	0	0	1	0	1	0
Mvmt Flow	155	782	0	0	684	287	69	96	201

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	971	0	0	782	0	0	1919	2063	782
Stage 1	-	-	-	-	-	-	1092	1092	-
Stage 2	-	-	-	-	-	-	827	971	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.4	6.51	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.51	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.009	3.3
Pot Cap-1 Maneuver	718	-	-	845	-	-	75	~ 55	397
Stage 1	-	-	-	-	-	-	324	292	-
Stage 2	-	-	-	-	-	-	433	332	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	718	-	-	845	-	-	~ 59	0	397
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 59	0	-
Stage 1	-	-	-	-	-	-	254	0	-
Stage 2	-	-	-	-	-	-	433	0	-

Approach	EB	WB	NB
HCM Control Delay, s			
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	59	-	397	718	-	-	845	-	-
HCM Lane V/C Ratio	1.171	-	0.506	0.216	-	-	-	-	-
HCM Control Delay (s)	287.8	-	23	11.4	-	-	0	-	-
HCM Lane LOS	F	-	C	B	-	-	A	-	-
HCM 95th %tile Q(veh)	6	-	3	1	-	-	0	-	-

Notes

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor	
Conflicting Flow All	
Stage 1	
Stage 2	
Critical Hdwy	
Critical Hdwy Stg 1	
Critical Hdwy Stg 2	
Follow-up Hdwy	
Pot Cap-1 Maneuver	
Stage 1	
Stage 2	
Platoon blocked, %	
Mov Cap-1 Maneuver	
Mov Cap-2 Maneuver	
Stage 1	
Stage 2	

Approach	
HCM Control Delay, s	
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	73	707	0	0	379	148	64	56	101
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	92	92	92	92	92	92
Heavy Vehicles, %	1	0	0	0	1	0	2	0	4
Mvmt Flow	78	752	0	0	412	161	70	61	110

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	573	0	0	752	0	0	1399	1480	752
Stage 1	-	-	-	-	-	-	907	907	-
Stage 2	-	-	-	-	-	-	492	573	-
Critical Hdwy	4.11	-	-	4.1	-	-	6.42	6.5	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.518	4	3.336
Pot Cap-1 Maneuver	1005	-	-	867	-	-	155	127	407
Stage 1	-	-	-	-	-	-	394	357	-
Stage 2	-	-	-	-	-	-	615	507	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1005	-	-	867	-	-	143	0	407
Mov Cap-2 Maneuver	-	-	-	-	-	-	143	0	-
Stage 1	-	-	-	-	-	-	363	0	-
Stage 2	-	-	-	-	-	-	615	0	-

Approach	EB	WB	NB
HCM Control Delay, s			
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	143	-	407	1005	-	-	867	-	-
HCM Lane V/C Ratio	0.486	-	0.27	0.077	-	-	-	-	-
HCM Control Delay (s)	52	-	17.1	8.9	-	-	0	-	-
HCM Lane LOS	F	-	C	A	-	-	A	-	-
HCM 95th %tile Q(veh)	2	-	1	0	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor	
Conflicting Flow All	
Stage 1	
Stage 2	
Critical Hdwy	
Critical Hdwy Stg 1	
Critical Hdwy Stg 2	
Follow-up Hdwy	
Pot Cap-1 Maneuver	
Stage 1	
Stage 2	
Platoon blocked, %	
Mov Cap-1 Maneuver	
Mov Cap-2 Maneuver	
Stage 1	
Stage 2	

Approach	
HCM Control Delay, s	
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	143	724	0	0	634	265	67	93	200
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	97	97	97
Heavy Vehicles, %	0	0	0	0	0	1	0	1	0
Mvmt Flow	155	787	0	0	689	288	69	96	206

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	977	0	0	787	0	0	1931	2075	787
Stage 1	-	-	-	-	-	-	1098	1098	-
Stage 2	-	-	-	-	-	-	833	977	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.4	6.51	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	5.51	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.009	3.3
Pot Cap-1 Maneuver	714	-	-	841	-	-	74	~ 54	395
Stage 1	-	-	-	-	-	-	322	290	-
Stage 2	-	-	-	-	-	-	430	330	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	714	-	-	841	-	-	~ 58	0	395
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 58	0	-
Stage 1	-	-	-	-	-	-	252	0	-
Stage 2	-	-	-	-	-	-	430	0	-

Approach	EB	WB	NB
HCM Control Delay, s			
HCM LOS			-

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	58	-	395	714	-	-	841	-	-
HCM Lane V/C Ratio	1.191	-	0.522	0.218	-	-	-	-	-
HCM Control Delay (s)	297.4	-	23.6	11.4	-	-	0	-	-
HCM Lane LOS	F	-	C	B	-	-	A	-	-
HCM 95th %tile Q(veh)	6	-	3	1	-	-	0	-	-

Notes

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor	
Conflicting Flow All	
Stage 1	
Stage 2	
Critical Hdwy	
Critical Hdwy Stg 1	
Critical Hdwy Stg 2	
Follow-up Hdwy	
Pot Cap-1 Maneuver	
Stage 1	
Stage 2	
Platoon blocked, %	
Mov Cap-1 Maneuver	
Mov Cap-2 Maneuver	
Stage 1	
Stage 2	

Approach	
HCM Control Delay, s	
HCM LOS	

Minor Lane/Major Mvmt

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	707	0	0	379	148	64	56	101	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	12	16	12	12	12	16	12	12	12
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00	1.00			
Frt	1.00	1.00			0.96		1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00			
Satd. Flow (prot)	1728	1900			2057		1770	1900	1760			
Flt Permitted	0.45	1.00			1.00		0.95	1.00	1.00			
Satd. Flow (perm)	816	1900			2057		1770	1900	1760			
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	752	0	0	412	161	70	61	110	0	0	0
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	83	0	0	0
Lane Group Flow (vph)	78	752	0	0	555	0	70	61	28	0	0	0
Heavy Vehicles (%)	1%	0%	0%	0%	1%	0%	2%	0%	4%	0%	0%	0%
Turn Type	Perm	NA			NA		Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)	40.2	40.2			50.0		20.0	20.0	20.0			
Effective Green, g (s)	40.2	40.2			50.0		20.0	20.0	20.0			
Actuated g/C Ratio	0.50	0.50			0.62		0.25	0.25	0.25			
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Lane Grp Cap (vph)	410	954			1285		442	475	440			
v/s Ratio Prot		c0.40			c0.27			0.03				
v/s Ratio Perm	0.10						c0.04		0.02			
v/c Ratio	0.19	0.79			0.43		0.16	0.13	0.06			
Uniform Delay, d1	10.9	16.4			7.7		23.4	23.2	22.9			
Progression Factor	0.80	0.75			1.00		1.00	1.00	1.00			
Incremental Delay, d2	0.7	4.7			1.1		0.2	0.1	0.1			
Delay (s)	9.5	17.1			8.8		23.6	23.4	22.9			
Level of Service	A	B			A		C	C	C			
Approach Delay (s)		16.4			8.8			23.2			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

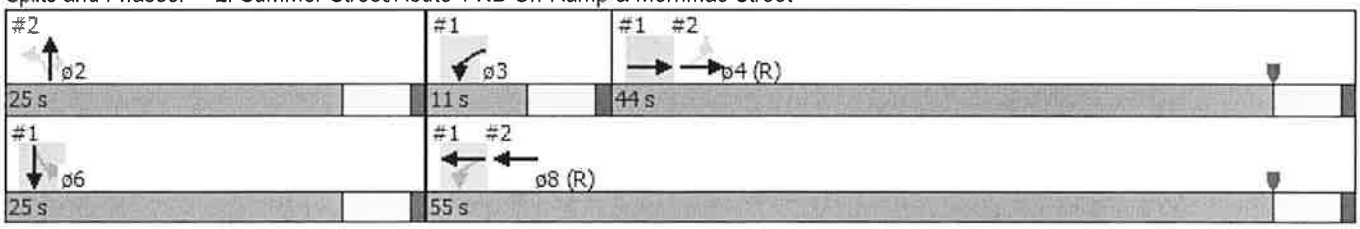
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	707	0	0	379	148	64	56	101	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	16	12	12	12	16	12	12	12
Satd. Flow (prot)	1728	1900	0	0	2057	0	1770	1900	1760	0	0	0
Flt Permitted	0.449						0.950					
Satd. Flow (perm)	816	1900	0	0	2057	0	1770	1900	1760	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					47				110			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			135			263			335	
Travel Time (s)		3.3			3.1			6.0			7.6	
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	0%	1%	0%	2%	0%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	752	0	0	573	0	70	61	110	0	0	0
Turn Type	Perm	NA			NA		Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Detector Phase	4	4			8		2	2	2			
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	21.0	21.0			21.0		21.0	21.0	21.0			
Total Split (s)	44.0	44.0			55.0		25.0	25.0	25.0			
Total Split (%)	55.0%	55.0%			68.8%		31.3%	31.3%	31.3%			
Maximum Green (s)	39.0	39.0			50.0		20.0	20.0	20.0			
Yellow Time (s)	4.0	4.0			4.0		4.0	4.0	4.0			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	C-Max	C-Max			C-Max		None	None	None			
Walk Time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)	10	10			10		10	10	10			
Act Effct Green (s)	41.2	41.2			50.0		20.0	20.0	20.0			
Actuated g/C Ratio	0.52	0.52			0.62		0.25	0.25	0.25			
v/c Ratio	0.19	0.77			0.44		0.16	0.13	0.21			
Control Delay	10.5	17.7			8.3		24.7	24.2	6.4			
Queue Delay	2.2	18.9			0.0		0.1	0.0	0.0			
Total Delay	12.7	36.6			8.3		24.8	24.2	6.4			
LOS	B	D			A		C	C	A			
Approach Delay		34.4			8.3			16.2				
Approach LOS		C			A			B				
Queue Length 50th (ft)	14	175			119		27	24	0			
Queue Length 95th (ft)	m23	#407			183		60	53	37			
Internal Link Dist (ft)		63			55			183			255	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)												
Base Capacity (vph)	420	978			1303		442	475	522			
Starvation Cap Reductn	246	234			0		0	0	0			
Spillback Cap Reductn	0	0			9		74	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.45	1.01			0.44		0.19	0.13	0.21			

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 22.6 Intersection LOS: C
Intersection Capacity Utilization 98.2% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Summer Street/Route 1 NB On-Ramp & Merrimac Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	724	0	0	634	265	67	93	200	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	15	12	11	11	11	12	12	12
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00	1.00			
Frt	1.00	1.00			0.96		1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00			
Satd. Flow (prot)	1745	1837			2001		1745	1818	1561			
Flt Permitted	0.23	1.00			1.00		0.95	1.00	1.00			
Satd. Flow (perm)	421	1837			2001		1745	1818	1561			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	155	787	0	0	689	288	69	96	206	0	0	0
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	169	0	0	0
Lane Group Flow (vph)	155	787	0	0	961	0	69	96	37	0	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%
Turn Type	Perm	NA			NA		Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Actuated Green, G (s)	42.8	42.8			55.7		14.3	14.3	14.3			
Effective Green, g (s)	42.8	42.8			55.7		14.3	14.3	14.3			
Actuated g/C Ratio	0.53	0.53			0.70		0.18	0.18	0.18			
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Lane Grp Cap (vph)	225	982			1393		311	324	279			
v/s Ratio Prot		c0.43			c0.48			c0.05				
v/s Ratio Perm	0.37						0.04		0.02			
v/c Ratio	0.69	0.80			0.69		0.22	0.30	0.13			
Uniform Delay, d1	13.7	15.1			7.1		28.1	28.5	27.6			
Progression Factor	0.58	0.60			1.00		1.00	1.00	1.00			
Incremental Delay, d2	11.3	4.8			2.8		0.4	0.5	0.2			
Delay (s)	19.3	14.0			9.9		28.5	29.0	27.8			
Level of Service	B	B			A		C	C	C			
Approach Delay (s)		14.8			9.9			28.3			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	124.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

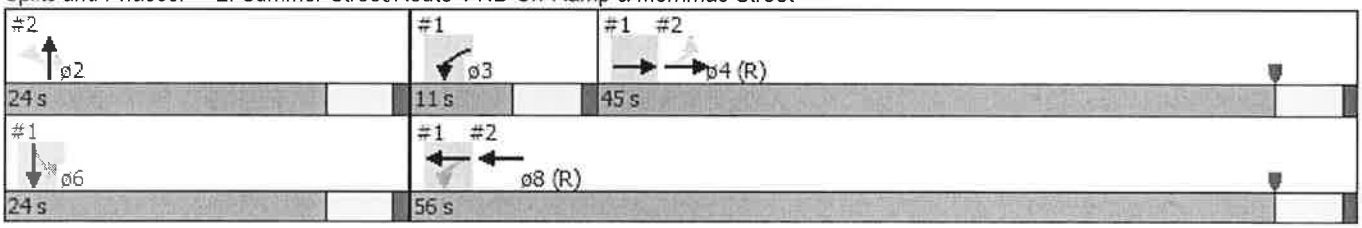
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	724	0	0	634	265	67	93	200	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	15	12	11	11	11	12	12	12
Satd. Flow (prot)	1745	1837	0	0	2001	0	1745	1818	1561	0	0	0
Flt Permitted	0.229						0.950					
Satd. Flow (perm)	421	1837	0	0	2001	0	1745	1818	1561	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					52				206			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			135			314			335	
Travel Time (s)		3.3			3.1			7.1			7.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	787	0	0	977	0	69	96	206	0	0	0
Turn Type	Perm	NA			NA		Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases	4						2		2			
Detector Phase	4	4			8		2	2	2			
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Minimum Split (s)	21.0	21.0			21.0		21.0	21.0	21.0			
Total Split (s)	45.0	45.0			56.0		24.0	24.0	24.0			
Total Split (%)	56.3%	56.3%			70.0%		30.0%	30.0%	30.0%			
Maximum Green (s)	40.0	40.0			51.0		19.0	19.0	19.0			
Yellow Time (s)	4.0	4.0			4.0		4.0	4.0	4.0			
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0			
Recall Mode	C-Max	C-Max			C-Max		None	None	None			
Walk Time (s)	5.0	5.0			5.0		5.0	5.0	5.0			
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0	11.0			
Pedestrian Calls (#/hr)	10	10			10		10	10	10			
Act Effct Green (s)	42.8	42.8			55.7		14.3	14.3	14.3			
Actuated g/C Ratio	0.54	0.54			0.70		0.18	0.18	0.18			
v/c Ratio	0.69	0.80			0.69		0.22	0.30	0.46			
Control Delay	24.3	16.0			10.9		28.2	29.5	7.7			
Queue Delay	4.3	7.0			0.2		0.1	0.0	0.0			
Total Delay	28.6	23.1			11.1		28.3	29.5	7.7			
LOS	C	C			B		C	C	A			
Approach Delay		24.0			11.1			17.2				
Approach LOS		C			B			B				
Queue Length 50th (ft)	22	110			226		30	42	0			
Queue Length 95th (ft)	m#66	#543			444		60	78	51			
Internal Link Dist (ft)		63			55			234			255	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)												
Base Capacity (vph)	225	982			1408		414	431	527			
Starvation Cap Reductn	29	156			0		0	0	0			
Spillback Cap Reductn	0	0			53		69	0	0			
Storage Cap Reductn	0	0			0		0	0	0			
Reduced v/c Ratio	0.79	0.95			0.72		0.20	0.22	0.39			

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 17.4 Intersection LOS: B
Intersection Capacity Utilization 124.6% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Summer Street/Route 1 NB On-Ramp & Merrimac Street



Merrimac Street at Market Street and Tournament Wharf

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	17	670	96	2	394	7	20	3	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	85	85	85	79	79	79
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0
Mvmt Flow	18	698	100	2	464	8	25	4	6

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	472	0	0	798	0	0	1265	1259	748
Stage 1	-	-	-	-	-	-	783	783	-
Stage 2	-	-	-	-	-	-	482	476	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1100	-	-	833	-	-	147	172	416
Stage 1	-	-	-	-	-	-	390	407	-
Stage 2	-	-	-	-	-	-	569	560	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1100	-	-	833	-	-	138	166	416
Mov Cap-2 Maneuver	-	-	-	-	-	-	138	166	-
Stage 1	-	-	-	-	-	-	378	395	-
Stage 2	-	-	-	-	-	-	548	558	-

Approach	EB	WB	NB
HCM Control Delay, s			33.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	160	1100	-	-	833	-	-	495
HCM Lane V/C Ratio	0.222	0.016	-	-	0.003	-	-	0.04
HCM Control Delay (s)	33.8	8.3	0	-	9.3	0	-	12.6
HCM Lane LOS	D	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	1	14
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	75	75	75
Heavy Vehicles, %	0	0	7
Mvmt Flow	0	1	19

Major/Minor	Minor2		
Conflicting Flow All	1260	1305	468
Stage 1	472	472	-
Stage 2	788	833	-
Critical Hdwy	7.1	6.5	6.27
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.363
Pot Cap-1 Maneuver	149	162	585
Stage 1	576	562	-
Stage 2	387	386	-
Platoon blocked, %			
Mov Cap-1 Maneuver	141	157	585
Mov Cap-2 Maneuver	141	157	-
Stage 1	559	560	-
Stage 2	366	374	-

Approach	SB
HCM Control Delay, s	12.6
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	57	650	28	10	685	10	35	2	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	90	90	90	79	79	79
Heavy Vehicles, %	0	1	0	0	0	0	3	0	0
Mvmt Flow	59	677	29	11	761	11	44	3	46

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	772	0	0	706	0	0	1632	1604	692
Stage 1	-	-	-	-	-	-	810	810	-
Stage 2	-	-	-	-	-	-	822	794	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.13	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.527	4	3.3
Pot Cap-1 Maneuver	852	-	-	902	-	-	81	107	447
Stage 1	-	-	-	-	-	-	372	396	-
Stage 2	-	-	-	-	-	-	367	403	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	852	-	-	902	-	-	58	93	447
Mov Cap-2 Maneuver	-	-	-	-	-	-	58	93	-
Stage 1	-	-	-	-	-	-	329	350	-
Stage 2	-	-	-	-	-	-	301	395	-

Approach	EB	WB	NB
HCM Control Delay, s			137.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	103	852	-	-	902	-	-	201
HCM Lane V/C Ratio	0.897	0.07	-	-	0.012	-	-	0.376
HCM Control Delay (s)	137.8	9.5	0	-	9	0	-	33.3
HCM Lane LOS	F	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	5	0	-	-	0	-	-	2

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	7	7	45
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	78	78	78
Heavy Vehicles, %	0	0	0
Mvmt Flow	9	9	58

Major/Minor	Minor2		
Conflicting Flow All	1623	1614	767
Stage 1	789	789	-
Stage 2	834	825	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	83	105	405
Stage 1	387	405	-
Stage 2	365	390	-
Platoon blocked, %			
Mov Cap-1 Maneuver	66	91	405
Mov Cap-2 Maneuver	66	91	-
Stage 1	342	396	-
Stage 2	288	345	-

Approach	SB
HCM Control Delay, s	33.3
HCM LOS	D

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	38	714	104	2	433	7	21	3	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0
Mvmt Flow	40	744	108	2	471	8	23	3	7

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	478	0	0	852	0	0	1388	1360	798
Stage 1	-	-	-	-	-	-	877	877	-
Stage 2	-	-	-	-	-	-	511	483	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1095	-	-	795	-	-	121	150	389
Stage 1	-	-	-	-	-	-	346	369	-
Stage 2	-	-	-	-	-	-	549	556	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1095	-	-	795	-	-	101	139	389
Mov Cap-2 Maneuver	-	-	-	-	-	-	101	139	-
Stage 1	-	-	-	-	-	-	321	343	-
Stage 2	-	-	-	-	-	-	486	554	-

Approach	EB	WB	NB
HCM Control Delay, s			44.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	122	1095	-	-	795	-	-	490
HCM Lane V/C Ratio	0.267	0.036	-	-	0.003	-	-	0.138
HCM Control Delay (s)	44.9	8.4	0	-	9.5	0	-	13.5
HCM Lane LOS	E	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	2	1	59
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	7
Mvmt Flow	2	1	64

Major/Minor	Minor2		
Conflicting Flow All	1361	1410	474
Stage 1	479	479	-
Stage 2	882	931	-
Critical Hdwy	7.1	6.5	6.27
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.363
Pot Cap-1 Maneuver	127	140	580
Stage 1	571	558	-
Stage 2	344	348	-
Platoon blocked, %			
Mov Cap-1 Maneuver	116	130	580
Mov Cap-2 Maneuver	116	130	-
Stage 1	530	556	-
Stage 2	311	323	-

Approach	SB
HCM Control Delay, s	13.5
HCM LOS	B

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	29.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	119	755	30	11	741	10	38	2	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	3	0	0
Mvmt Flow	124	786	31	12	805	11	41	2	42

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	816	0	0	818	0	0	1936	1890	802
Stage 1	-	-	-	-	-	-	1050	1050	-
Stage 2	-	-	-	-	-	-	886	840	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.13	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.527	4	3.3
Pot Cap-1 Maneuver	820	-	-	819	-	-	49	71	387
Stage 1	-	-	-	-	-	-	273	307	-
Stage 2	-	-	-	-	-	-	338	384	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	820	-	-	819	-	-	~ 25	50	387
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 25	50	-
Stage 1	-	-	-	-	-	-	197	221	-
Stage 2	-	-	-	-	-	-	243	374	-

Approach	EB	WB	NB
HCM Control Delay, s			$ 560.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	48	820	-	-	819	-	-	150
HCM Lane V/C Ratio	1.789	0.151	-	-	0.015	-	-	0.761
HCM Control Delay (s)	$ 560.6	10.2	0	-	9.5	0	-	80.6
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	9	1	-	-	0	-	-	5

Notes

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	11	8	86
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	0
Mvmt Flow	12	9	93

Major/Minor	Minor2		
Conflicting Flow All	1907	1901	811
Stage 1	835	835	-
Stage 2	1072	1066	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	53	70	383
Stage 1	365	386	-
Stage 2	269	301	-
Platoon blocked, %			
Mov Cap-1 Maneuver	35	49	383
Mov Cap-2 Maneuver	35	49	-
Stage 1	263	376	-
Stage 2	171	217	-

Approach	SB
HCM Control Delay, s	80.6
HCM LOS	F

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	40	714	104	2	433	8	21	3	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0
Mvmt Flow	42	744	108	2	471	9	23	3	7

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	479	0	0	852	0	0	1399	1365	798
Stage 1	-	-	-	-	-	-	881	881	-
Stage 2	-	-	-	-	-	-	518	484	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1094	-	-	795	-	-	119	149	389
Stage 1	-	-	-	-	-	-	344	367	-
Stage 2	-	-	-	-	-	-	544	555	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1094	-	-	795	-	-	97	137	389
Mov Cap-2 Maneuver	-	-	-	-	-	-	97	137	-
Stage 1	-	-	-	-	-	-	318	339	-
Stage 2	-	-	-	-	-	-	470	553	-

Approach	EB	WB	NB
HCM Control Delay, s			46.8
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	118	1094	-	-	795	-	-	425
HCM Lane V/C Ratio	0.276	0.038	-	-	0.003	-	-	0.197
HCM Control Delay (s)	46.8	8.4	0	-	9.5	0	-	15.5
HCM Lane LOS	E	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	1

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	6	1	70
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	7
Mvmt Flow	7	1	76

Major/Minor	Minor2		
Conflicting Flow All	1365	1414	475
Stage 1	479	479	-
Stage 2	886	935	-
Critical Hdwy	7.1	6.5	6.27
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.363
Pot Cap-1 Maneuver	126	139	580
Stage 1	571	558	-
Stage 2	342	347	-
Platoon blocked, %			
Mov Cap-1 Maneuver	114	128	580
Mov Cap-2 Maneuver	114	128	-
Stage 1	528	556	-
Stage 2	308	321	-

Approach	SB
HCM Control Delay, s	15.5
HCM LOS	C

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	35.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	129	755	30	11	741	13	38	2	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	0	0	3	0	0
Mvmt Flow	134	786	31	12	805	14	41	2	42

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	820	0	0	818	0	0	1962	1914	802
Stage 1	-	-	-	-	-	-	1071	1071	-
Stage 2	-	-	-	-	-	-	891	843	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.13	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.527	4	3.3
Pot Cap-1 Maneuver	818	-	-	819	-	-	47	69	387
Stage 1	-	-	-	-	-	-	266	300	-
Stage 2	-	-	-	-	-	-	336	382	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	818	-	-	819	-	-	~ 22	47	387
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 22	47	-
Stage 1	-	-	-	-	-	-	186	209	-
Stage 2	-	-	-	-	-	-	236	372	-

Approach	EB	WB	NB
HCM Control Delay, s			$ 691.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	42	818	-	-	819	-	-	144
HCM Lane V/C Ratio	2.045	0.164	-	-	0.015	-	-	0.845
HCM Control Delay (s)	$ 691.9	10.3	0	-	9.5	0	-	98.8
HCM Lane LOS	F	B	A	-	A	A	-	F
HCM 95th %tile Q(veh)	9	1	-	-	0	-	-	6

Notes

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	12	8	92
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	92	92	92
Heavy Vehicles, %	0	0	0
Mvmt Flow	13	9	100

Major/Minor	Minor2		
Conflicting Flow All	1929	1922	813
Stage 1	836	836	-
Stage 2	1093	1086	-
Critical Hdwy	7.1	6.5	6.2
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.3
Pot Cap-1 Maneuver	51	68	382
Stage 1	364	385	-
Stage 2	262	295	-
Platoon blocked, %			
Mov Cap-1 Maneuver	33	46	382
Mov Cap-2 Maneuver	33	46	-
Stage 1	254	375	-
Stage 2	161	206	-

Approach	SB
HCM Control Delay, s	98.8
HCM LOS	F

Minor Lane/Major Mvmt

MINCO DEVELOPMENT CORPORATION
231 SUTTON STREET, SUITE 1B
NORTH ANDOVER, MA 01845

978-687-6200 office 978-682-6473 fax

October 31, 2017

Bonnie Sontag, Chairperson
Newburyport Planning Board
60 Pleasant Street
Newburyport, MA 01950

Re: Memo comparing Horton's Yard to 92R Merrimac Street

Dear Ms. Sontag:

On June 27th, we appeared before the Zoning Board of Appeals with a petition for variances for our proposed project at 92R Merrimac St. (Map 48 Lot 4). At that hearing, testimony was given regarding Horton's Yard located at 58 Merrimac St. (Map 48 Lot 15), in which a resident of Horton's Yard stated that Horton's Yard is an abutter to 92R Merrimac St. Although we welcome all opinions given during the ZBA public hearing and anticipate the same at the Planning Board public hearing, Horton's Yard is not an abutter. See attached Assessor's map.

We offer the attached comparison between Horton's Yard and 92R Merrimac St. for your review. Our source for the information regarding Horton's Yard is the Special Permit issued by the ZBA on August 27, 1986 (ZBA File No. 86-049), the Master Deed for Horton's Yard (NERD Book 9603 Page 317), the Declaration of Trust NERD Book 9303 Page 344, the Amended Master Deed (NERD Book 9611 Page 11), the recorded plan (NERD Plan Book 241 Plan 63) and the recorded modified plan (NERD Plan Book 241 Plan 86).

As you may recall, Horton's Yard at 58 Merrimac St. and Merrimac Landing at 1 Merrimac St. were designed by the same architect and are similar in size and appearance, the only major difference being that the second floor units at Horton's Yard are residential and the second floor units at Merrimac Landing are office.

Our architect, GSD Associates, LLC, has prepared the attached cross section showing the relationship of the improvements proposed at 92R Merrimac St. and the improvements permitted at Horton's Yard. Also attached is a chart comparing the two buildings.

As you can see from this comparison, the buildings are similar in several ways. Both are rectangular multistory buildings, are on similar size lots and have a similar residential parking ratio.

However, although 92R Merrimac St. is slightly larger in square footage, Horton's Yard is taller than the building proposed for 92R Merrimac St. (46' vs. 40'). Also, since the mean grade level for 92R Merrimac St. is at least 12' below Merrimac St., its height appears shorter, which makes its apparent height from Merrimac St. to be 28'.

Finally, as it is situated perpendicular to the Merrimack River and Merrimac St. and not parallel to the river and street as is Horton's Yard, its visual impact is lessened.

We look forward to discussing our applications with the Planning Board. If you have any questions, please contact me at 978-687-6200. Thank you.

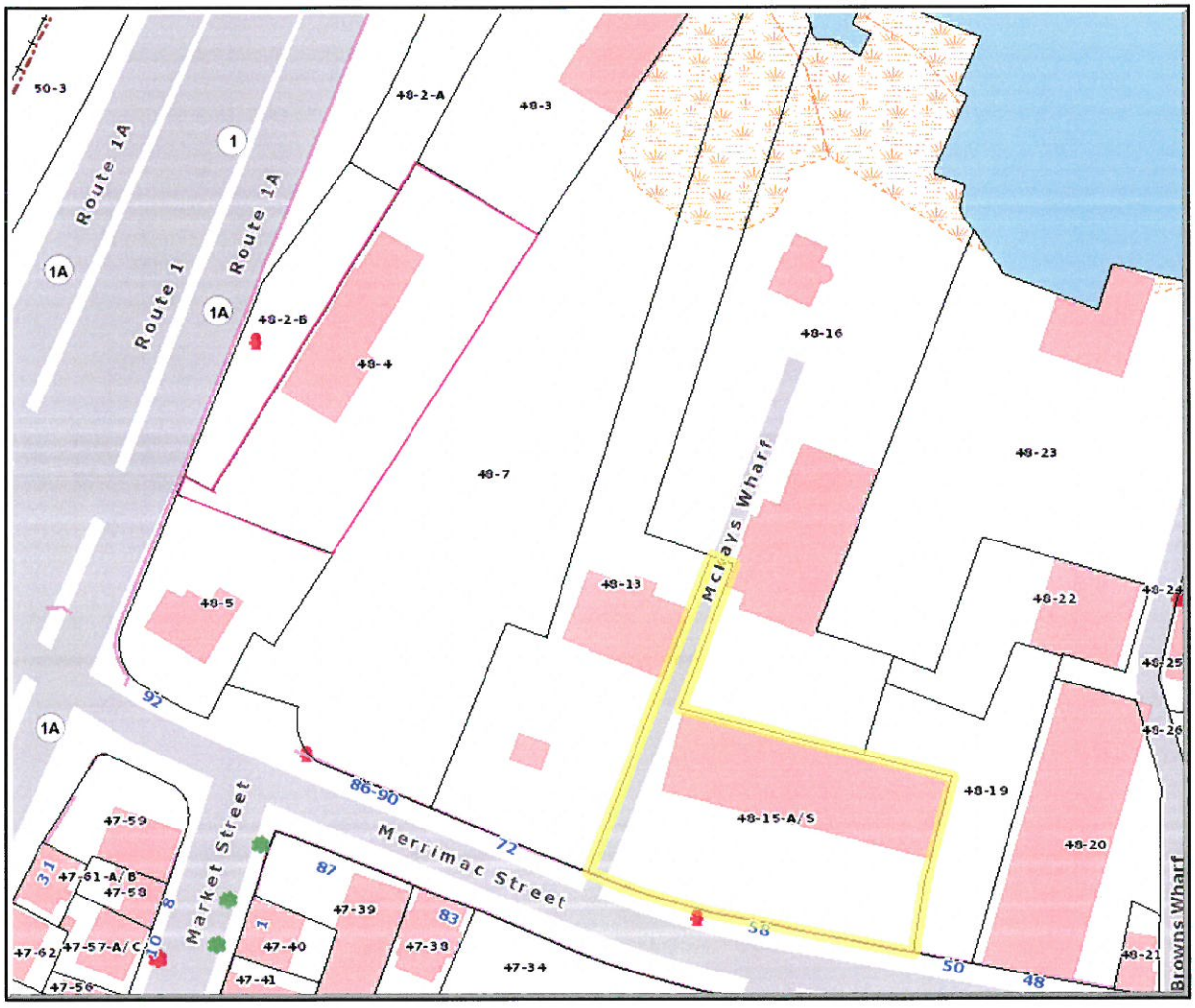
Sincerely,
Minco Development Corporation

Louis P. Minieucci, Jr.
President

LPM/kp

Attachments

Assessor's Map
92R Merrimac St. (Outlined in dark pink)
Horton's Yard (outlined in yellow)



Compare Horton's Yard to 92R Merrimac St.
October 31, 2017

	Horton's Yard	92R Merrimac St.	Notes
Zoning	B-2	WWOD	
Permits	ZBA-SP 1986	ZBA variance PB special permit	
Lot Size (sq.ft.)	26,000	24,952	1
Height (grade level to roof)	58	53	2
Height (first floor to roof)	46	40	3
Size including garage	46,928	49,640	4
# Units Residential	16	25	
# Units Commercial	4	0	5
# Units Total	20	25	
# Parking Spaces Commercial (surface)	28	0	
# Parking Spaces Residential	24	39	6
Parking Ratio (residential)	1.50	1.56	

Note 1: The Horton's Yard lot area varies by the source:
Assessor's record = 0.68 acres or 29,621 SF
Special Permit application = 26,000 SF

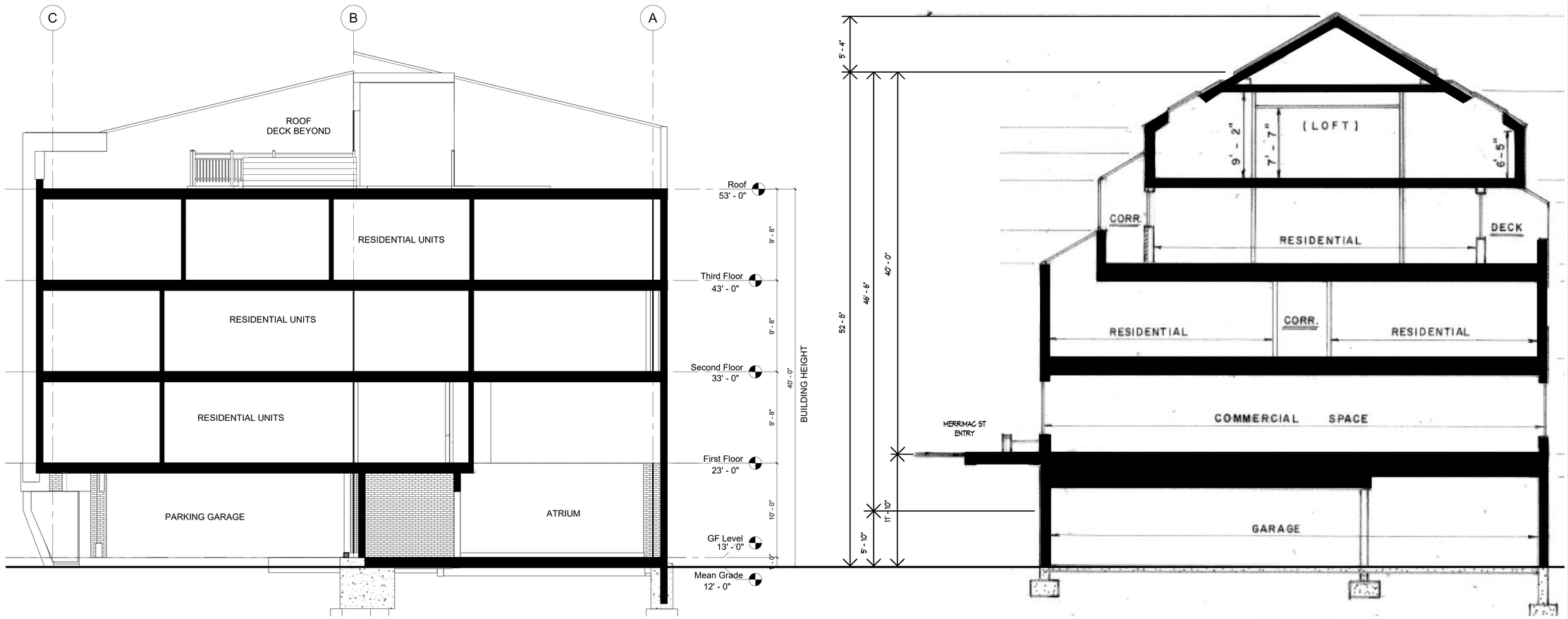
Note 2: Horton's Yard building dimensions are recorded in NERD Plan Bk 241 Plan 63 & Plan Bk 241 Plan 86

Note 3: Horton's Yard height from grade level to roof peak is measured from ground level at the rear of the building

Note 4: Horton's Yard size is an estimate from the recorded plans

Note 5: Horton's Yard originally had 4 commercial units, some of which were subdivided and then recombined

Note 6: At 92R Merrimac St., there are 37 garage spaces and 2 surface spaces; at Horton's Yard, all residential spaces are garage spaces



2 92 Rear Merrimac Section

SCALE: 3/16" = 1'-0"

(FROM CONDOMINIUM DOCUMENTS DEED REFERENCE: 9603 BK 317 PAGE)

architect:
GSD Associates, LLC
146 Main Street
North Andover, MA 01845
Tel: 978-688-5422
www.gsd-assoc.com

consultant:

sheet title:
Ground Floor w/ Public Accommodation

project name:
project:
Proposed Residential Development
92 Merrimac St.
Newburyport, MA

issue date: 10/16/17

revisions:

dr. *chk.*

job number:
GSD-13-130

2c

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92R Merrimac St.
Newburyport

Proposed 25-Unit, Multi Family Structure

Comparison of WMU and WWOD zoning districts for multifamily use (#104)							
	Proposed	**WMU**	**Footnote**	**Variance ?**	**WWOD**	**Footnote**	**Variance ?**
Lot Area	24,829	20,000 sq. ft.	a	YES	174,240 sq. ft.	a	YES
Street Frontage	181	120 feet		NO	60 feet		NO
Height	40	25 feet		YES	35 feet, up to 40 feet	c	NO
Maximum Lot Coverage	50%	40%		YES	N/A		NO
Minimum Area Coverage	50%	N/A		NO	50% outside 100' of River		NO
Minimum Open Space	8,910	1,000 sq. ft.	b	NO	33% of WWOD Area		YES
Minimum Front Yard	40	20 feet		YES	0		NO
Maximum Front Yard	40	N/A		NO	6 feet for 40% of Face		YES
Minimum Side Yard	4	10 feet		YES	0		NO
Minimum Rear Yard	8	20 feet		YES	0		NO
Total Dimensional Variances Required				6			3

Use	WMU	WWOD
Multifamily	SP	SP
Multifamily +20	SP (a)(e)	WWOD SP
Hotel	SP	SP
Elderly Housing	SP (e)	WWOD SP
B&B	SP	SP
US Post Office	P	P
Veterinary Hospital	SP	SP
Public Parking	P	P
Library	P	P
Education	P	P

Dimensional footnotes:

Fn (a) The lot area requirements for multifamily developments are twenty thousand (20,000) square feet for the first four (4) units and four thousand (4,000) square feet for each additional unit. In addition the total maximum number of units allowed per structure is six (6).

Fn (b) Except for the R-1, R-2, R-3 and WMD districts, the minimum open space shall be one thousand (1,000) square feet or a minimum of one hundred fifty (150) square feet per dwelling unit, whichever is greater.

Fn (c) Ground floor must contain a public or commercial use, have frontage on a street perpendicular to the Merrimack River, and must be between Titcomb St and Route 1.

GSD Associates, LLC
146 Main Street, North Andover, MA 01845
Tel: 978-688-5422 Web: www.gsd-assoc.com
Architecture + Design + Planning + Interiors + Development Consulting

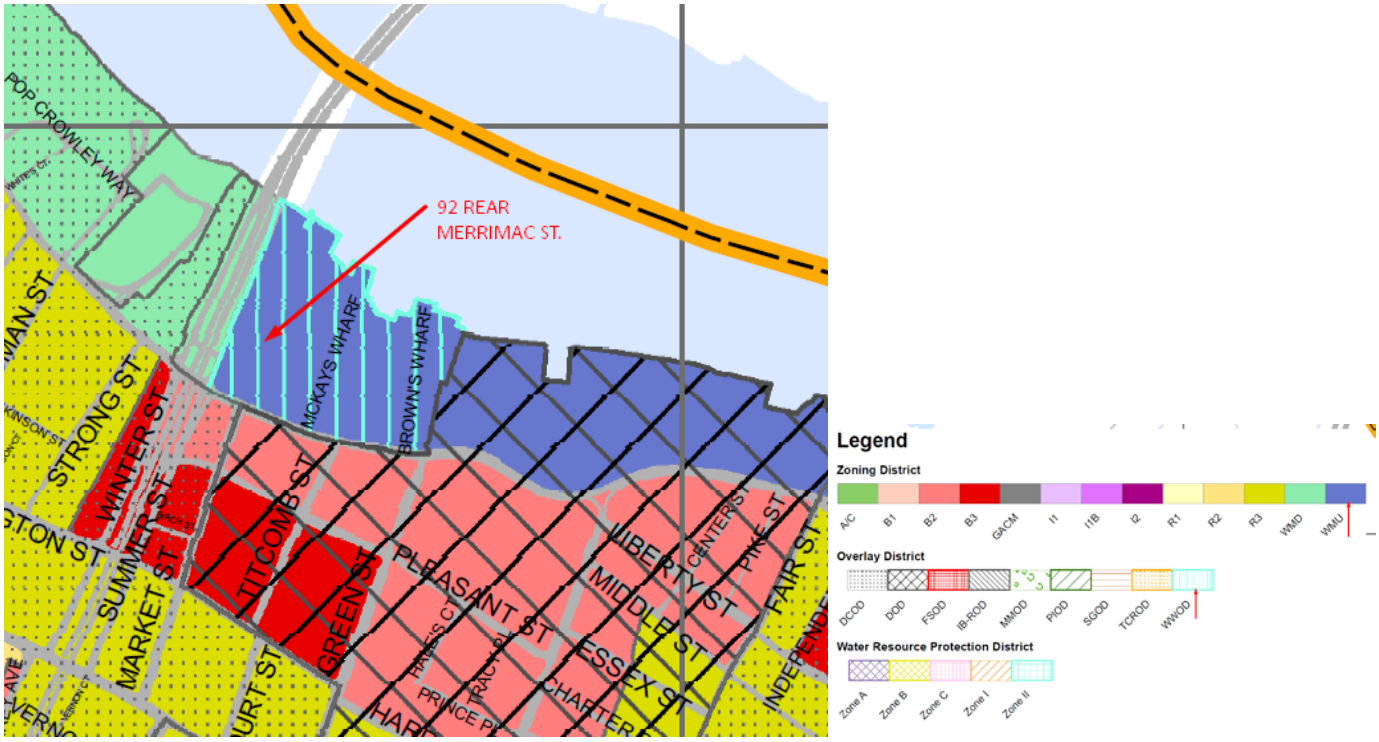
October 26, 2017

Peter Binette, Building Inspector
Building Department
60 Pleasant St
Lower Level
Newburyport, MA 01950

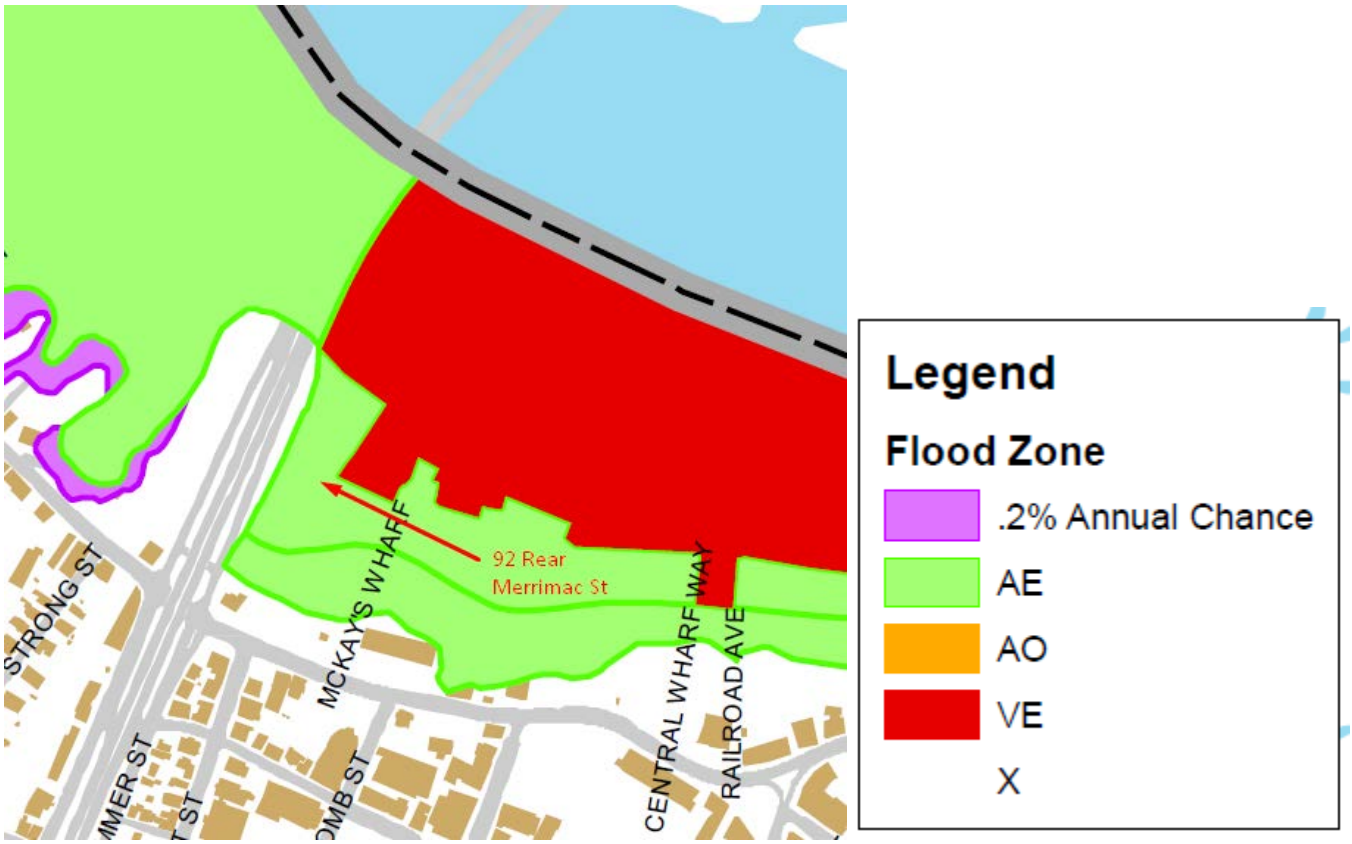
RE: 92 Rear Merrimac St. Newburyport, MA Zoning and Height of Building.

Dear Mr. Binette,

This letter is to follow up on a meeting and discussion a few weeks ago related to the uses at the above-mentioned property.
As we discussed, the property is located in a number of Zoning and overlay districts, the base underlying district is the WMU – Waterfront Mixed Use zoning district. The property is also located in the Floodplain Overlay District, and the WWOD -West Waterfront Overlay District. We are currently preparing documents to present to the ZBA for variances to construct a Residential building under the WWOD regulations.



Partial Newburyport Zoning Map



Newburyport FEMA Flood Map

Flood Overlay District:

As we discussed, the site is also located in an AE Zone on the Floodmap and is therefore in the Floodplain Overlay District. FEMA regulations and the Building code in Section 1612.2 references structural requirements for construction in the Floodplain. The first floor of the proposed building is the ***Lowest Floor*** of the building and is defined in 1612.2 as:

> **LOWEST FLOOR.** The floor of the lowest enclosed area, including basement, but excluding any unfinished or flood-resistant enclosure, usable solely for vehicle parking, building access or limited storage provided that such enclosure is not built so as to render the structure in violation of this section.

This lowest level floor level is permitted to be used for parking and is required by 16.12.5 to have flood hazard documentation (110.3.3). For residential use buildings dry floodproofing is not permitted, floodwater is only permitted to automatically enter and exit this lower level so that hydrostatic forces are equalized. These areas cannot be "dry floodproofed" where water is kept out of the lowest level and engineered to resist the forces of hydrostatic pressure in residential uses. Therefore, a commercial use at this level is not permitted unless the entire lowest level of the structure is located above the base flood elevation.

It is therefore our understanding of the requirements if the Building Code and FEMA regulations that the lowest floor levels below the base flood plain cannot be enclosed and dry floodproofed to be used as commercial space due to the

residential use above. This condition exists throughout much of the entire WWOD district where the existing grades are located at or below the base flood elevations and this flood overlay zone.

West Waterfront Overlay District:
We also discussed the fact that the site is located within the West Waterfront Overlay District. We are proposing to use this district in making our application for the City's entitlement permits to construct this project. There are several variances that we are seeking. However, we had originally discussed seeking a permit for a 45' height variance. We are no longer seeking this 5' variance but will be lowering the building height to 40' in compliance with

Section. XXIV-D - Dimensional and density regulations.

A.

* Maximum building height: Thirty-five (35) feet, except as follows: (a) Forty (40) feet for parking structures located directly along Route 1, as measured to the upper plane of the top floor of the upper parking level but no higher than four (4) levels above grade with an open roof and parapet design and excluding from the measurement of "height" appurtenances normally constructed above such level such as guardrails and light standards; such parking structure shall not be located directly along Merrimac Street; and (b) forty (40) feet for buildings located on streets perpendicular to the Merrimack River between Route 1 and Titcomb St. that include design layout and floor height suitable for ground floor commercial uses or other areas of public accommodation.

The compliance with the above referenced section is based on the intent to provide at the ground level of the building a covered canopy area of public accommodation for picnic benches and general seating off the public trail on the adjacent lot. We have also been in contact with staff from Essex National Heritage Area and they have expressed an interest in providing a kiosk in this area of Public accommodation. Therefore, it is our understanding that this public accommodation area will allow for the 40' height of the building without a need for a variance.

Please let me know if you have any questions regarding this information.

Sincerely,
GSD Associates, LLC

Gregory P. Smith, AIA
Architect

Cc:

ESSEX NATIONAL HERITAGE COMMISSION

10 Federal Street · Suite 12· Salem, MA 01970
978.740.0444 tel ~ 978.744.6473
www.essexheritage.org

October 30, 2017

Louis P. Minicucci, Jr., President
Minco Development Corporation
231 Sutton St., Suite 1B
North Andover, MA 01845

Dear Mr. Minicucci:

As you may know, Essex Heritage is currently engaged in the designation and development of a Scenic Byway program encompassing 14 communities and spanning 90 miles along the North Shore from Newburyport/Salisbury to Lynn. The purpose of the Essex Coastal Scenic Byway is to encourage residents and visitors to explore one of our nation's most picturesque and historically significant regions.

Kate Day of our staff met recently with your engineer, Scott Cameron of the Morin-Cameron Group, to view your proposed redevelopment site at 92R Merrimac St. in Newburyport. They discussed your interest in hosting an Essex Heritage kiosk and/or interpretive signage in the proposed public seating area/pedestrian walkway at this location.

We would be pleased with work with you to further explore this option. Such signage could help familiarize Rail Trail visitors and other pedestrian users of your open space area with the Coastal Byway, showing local and regional attractions.

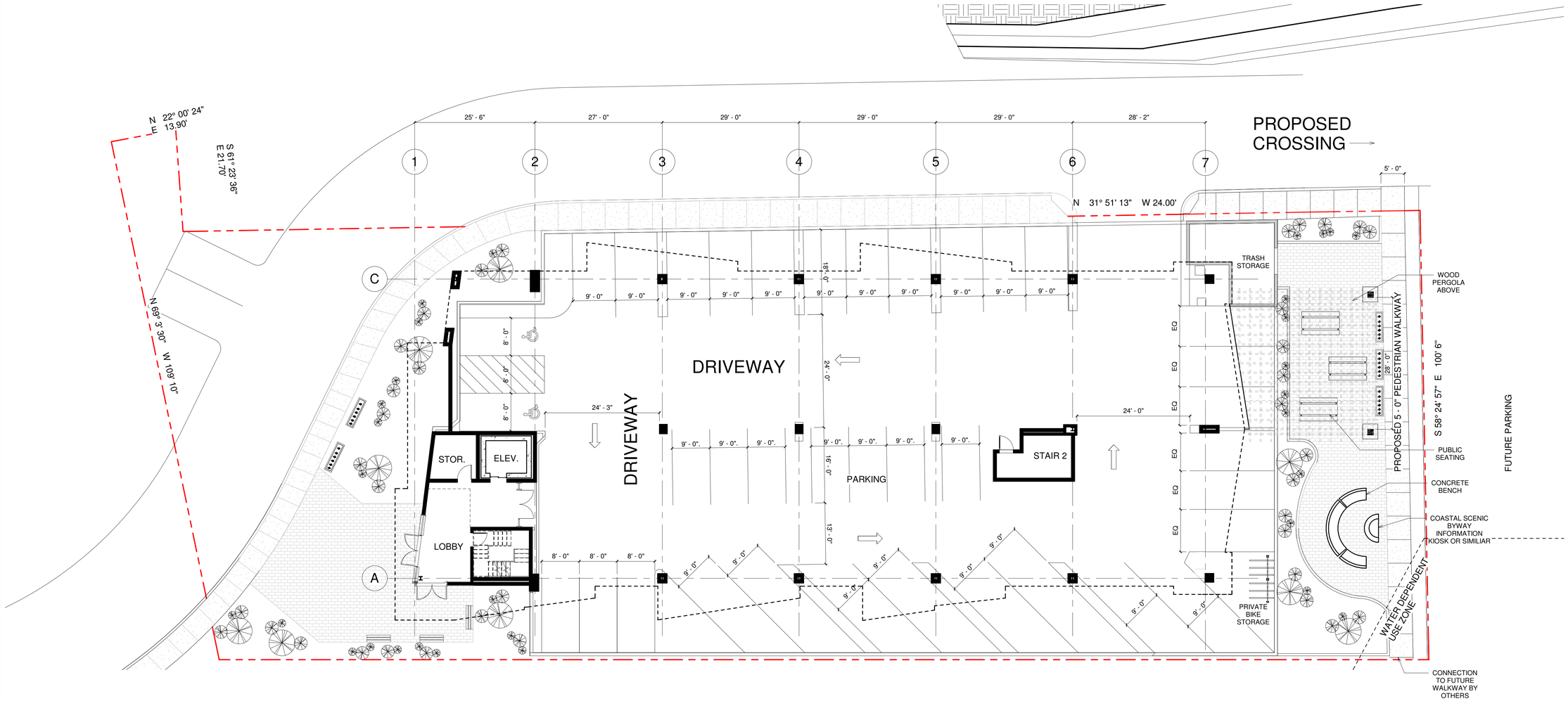
While this discussion is currently in an early and very tentative stage, Essex Heritage is most interested in further exploring this concept with you. Thank you for reaching out to discuss hosting informational materials relating to the Byway at your site. We look forward to learning more about this potential collaboration.

Sincerely,

Annie Harris
Chief Executive Officer

cc: Scott Cameron

Enclosures



1 Public Accommodation Plan

SCALE: 3/32" = 1'-0"

gsd

architect:
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North Andover, MA 01845
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consultant:

sheet title:
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project name:
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Newburyport, MA

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revisions:

dr. *chk.*

job number:
GSD-13-130

2c

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92R Merrimac St.
Newburyport

Proposed 25-Unit, Multi Family Structure

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	Proposed	**WMU**	**Footnote**	**Variance ?**	**WWOD**	**Footnote**	**Variance ?**
Lot Area	24,829	20,000 sq. ft.	a	YES	174,240 sq. ft.	a	YES
Street Frontage	181	120 feet		NO	60 feet		NO
Height	40	25 feet		YES	35 feet, up to 40 feet	c	NO
Maximum Lot Coverage	50%	40%		YES	N/A		NO
Minimum Area Coverage	50%	N/A		NO	50% outside 100' of River		NO
Minimum Open Space	8,910	1,000 sq. ft.	b	NO	33% of WWOD Area		YES
Minimum Front Yard	40	20 feet		YES	0		NO
Maximum Front Yard	40	N/A		NO	6 feet for 40% of Face		YES
Minimum Side Yard	4	10 feet		YES	0		NO
Minimum Rear Yard	8	20 feet		YES	0		NO
Total Dimensional Variances Required				6			3

Use	WMU	WWOD
Multifamily	SP	SP
Multifamily +20	SP (a)(e)	WWOD SP
Hotel	SP	SP
Elderly Housing	SP (e)	WWOD SP
B&B	SP	SP
US Post Office	P	P
Veterinary Hospital	SP	SP
Public Parking	P	P
Library	P	P
Education	P	P

Dimensional footnotes:

Fn (a) The lot area requirements for multifamily developments are twenty thousand (20,000) square feet for the first four (4) units and four thousand (4,000) square feet for each additional unit. In addition the total maximum number of units allowed per structure is six (6).

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