



## Transportation—Executive Summary



This traffic and transportation section of the North Canal Neighborhood Master Plan Study addresses existing conditions and future conditions in the study area with both potential future traffic demand and circulation and safety improvement options. A potential future development scenario was developed for the purpose of evaluating future roadway and intersection capacity in the study area. Based on the evaluation of the potential development scenario and improvement options, recommendations were made for transportation improvements in the North Canal area to be included into the North Canal Neighborhood Master Plan. The study area is defined generally by North Street on the east, Boston Street/Grove Street on the west, Federal and Essex Streets on the south, and School Street on the north. Existing and future conditions traffic analysis calculations and results are provided in Appendices C and D, respectively.

### Existing Conditions

Earth Tech performed traffic turning movement and classification counts between 7:00 and 9:00 AM and 4:00 and 6:00 PM on Thursday March 27, 2003 at the following five locations:

- North Street/Commercial Street/Franklin Street
- Mason Street/Flint Street
- Grove Street/Mason Street/Harmony Grove Road
- Boston Street/Grove Street/Nichols Street
- Mason Street/Tremont Street

New automatic traffic recorder (ATR) counts were taken in March 2003 at Mason Street west of Flint Street and Federal Street west of North Street. For the remaining study intersections and roadways traffic counts were obtained from recent studies conducted into the area. The AM peak hour at study intersections generally occurs between 7:30 and 8:30 AM and the PM peak hour occurs between 4:30 and 5:30 PM.

Daily traffic volumes range from just under 40,000 vehicles per day (vpd) on North Street north of Bridge Street to less than 2,500 vpd on Federal Street west of North Street. Boston Street experiences daily traffic volumes over 20,000 vpd. The daily traffic volume on Bridge Street at North Street is approximately 20,000 vpd, while at Boston Street the Bridge Street daily traffic is approximately 15,000 vpd. Collector roadways experiencing daily volumes around 10,000 vehicles include Mason Street west of North Street (11,265); Tremont Street (10,149); Flint Street (9,971); and Harmony Grove Road (9,288).

Several of the study intersections have experienced high numbers of reported accidents over the three-year period from 1999 to 2001, including North Street/Bridge Street, Boston Street/Bridge Street/Proctor Street/Goodhue Street, and North Street/Franklin Street/Commercial Street.

Level of Service analysis was performed for the study intersections for the AM and PM peak hours.

The results show that the signalized intersections generally operate at acceptable conditions overall in both peak hours, although side street approaches often suffer delay and congestion. At the unsignalized study intersections, the minor (Stop controlled) approaches operate at with long delays (LOS E or F) in both peak hours.

The MBTA Salem Station provides commuter rail service to the study area. The Salem Station is located on the Eastern Route Main Line, the Rockport Commuter Rail Line, and the Ipswich/Newburyport Line.

There are generally seven MBTA bus routes that serve the project study area: #450, #451, #455, #456, #459, #465, #468.

A detailed evaluation of existing transportation conditions is provided in Appendix C.

### Future Conditions

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Based on meetings with the North Canal Neighborhood Working Group, transportation issues in the study were identified. Potential improvement options were then developed that would help to mitigate existing and future deficiencies and accommodate future potential growth in the North Canal area. Traffic conditions and operations were evaluated for a long-term scenario 15 years in the future (2018). Traffic volume projections and assignments and intersection level of service analysis was performed for the future scenario assuming the transportation improvements options, plus the future development program tested as part of the North Canal Neighborhood Master Plan. The transportation improvement options included intersection and roadway operations and safety measures for both motorists and pedestrians. The most significant transportation options identified and tested include the extension of Commercial Street to the east, west, and south, and a new Hanson Street connection between Boston Street and Goodhue Street. The list of transportation improvement options evaluated include:

- Extend Commercial Street to Mason Street and Flint Street
- Connect Commercial Street to Salem Station and extend to Bridge Street
- Make Flint Street one-way southbound
- Connect Goodhue Street to Boston Street via Hanson Street
- Provide pedestrian connections to North Canal, Mason Street, and Franklin Neighborhoods
- Signalize North Street/Franklin Street/Commercial Streets and Mason/Tremont Streets
- No eastbound left turn to Goodhue Street from Bridge Street
- Provide "Free" westbound right turn from Bridge Street to Goodhue Street

- Provide pedestrian signals at Boston Street/Bridge Street
- Safety improvements and gateway treatment at Grove Street/Harmony Grove Road/Mason Street

The following transportation projects are proposed by others and were assumed for analysis in this study:

- North Street Improvements
- Salem Trail Court Expansion and associated traffic improvements
- MBTA Salem Parking Garage

***These projects are assumed only for the purposes of evaluating future volume and capacity of roadways and intersections in the study area and should not be considered part of the North Canal neighborhood Master Plan.***

The future No-Build traffic volumes included these projects and a general background growth rate of 1.0 percent per year over 15 years. The future traffic volumes were re-assigned to the traffic network in the study area assuming the traffic improvement options were in place.

In order to test roadway and intersection capacity for a future long-term development scenario, a hypothetical development program was developed for the North Canal Neighborhood Master Plan. This development program was created as the starting point to test future transportation conditions and does not represent the recommended land use for the North Canal Neighborhood Master Plan. The future development program tested consists of the approximately 500 residential units and approximately 430,000 square feet of office, retail, industrial, and storage uses. These projects are estimated to generate approximately 700 vehicle trips during the weekday commuter AM peak hour and approximately 850 trips in the PM peak hour. These trips were distributed and assigned to the study roadway network and added to the future No-Build traffic volumes to create the 2018 Build condition.

Analysis results show that Commercial Street, Boston Street, and Hanson Street would experience the largest increases in traffic volumes under the 2018 Build condition with between 300 and 500 additional vehicles in the peak hours. Peak hour traffic volumes on North Street and Bridge Street (west) would increase by 200 to 300 vehicles. On Franklin Street, Harmony Grove Road, Mason Street (west), and Grove/Goodhue Streets traffic volumes would increase by 100 to 200 vehicles in the peak hours.

Flint Street would experience the largest reduction in traffic volume in the Build condition with 200 to 300 fewer vehicles in the peak hour. Mason Street (east of Tremont), Goodhue Street, Grove Street, and the southbound North Street off-ramp would experience 100 to 200 fewer vehicles in the peak hour.

***Through-traffic from Commercial Street extension onto Tremont Street would not be permitted, resulting in no additional traffic volumes on Tremont Street.***

Future traffic volume increases/decreases on study roadways is summarized in Table ES-1.

The following intersections are expected to improve under the Build condition and operate at acceptable conditions (LOS D or better) in the peak hours as a result of the future improvement options:

- Boston Street/Grove Street/Nichols Street
- Bridge Street/MBTA Driveway/Northbound off-ramp
- Bridge Street/Southbound Ramps
- Mason Street/Grove Street/Harmony Grove Road
- Mason Street/Flint Street

As a signalized intersection, North Street/Commercial Street/Franklin Street would exacerbate queuing and delay on North Street and is considered to operate unacceptably. The

intersections of Boston Street/Hanson Street and Flint Street/Commercial Street would operate at acceptable conditions.

The intersections of North Street/School Street, North Street/Mason Street, and Boston Street/Pope Street would continue to experience delay and queuing. However, peak period parking prohibition on North Street may provide additional capacity.

Level of Service calculations for the future conditions are provided in Appendix D.

### **Transportation Recommendations**

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A set of comprehensive transportation recommendations were developed based on the analysis results of the improvement options. The transportation recommendations have been separated into those improvements that can be implemented immediately to address existing safety and operations issues and those that would most likely be implemented in the long-term, including those measures that would directly affect the proposed development of the North Canal Neighborhood. Both physical measures and policy measures are recommended.

### **Short-Term Transportation Recommendations**

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1. **New traffic and pedestrian signals at North Street and Mason Street.** This measure will improve safety for both pedestrians and motorists at this location. Specifically left turn movements will be protected which should reduce angle collisions. This measure is included as part of the City's North Street improvement project.
2. **Provide "Free" westbound right turn from Bridge Street to Goodhue Street.** This measure will remove the westbound right-turn traffic from the Boston Street/Goodhue Street intersection, improving overall intersection operations.

3. **Provide pedestrian signals at Boston Street and Bridge Street.** This will improve pedestrian safety when crossing streets at this intersection.
4. **Provide pedestrian signal at North Street/Franklin Street/Commercial Street.** This measure will provide a safe crossing of North Street between Commercial and Franklin Streets. Due to operational and safety issues at this location, a full traffic signal is not recommended. This may impact the level of future development that could occur on Franklin Street. Because activation of the pedestrian signal would be intermittent, the impact to the traffic flow on North Street would be less significant. This measure could be considered for inclusion in the City's North Street improvement project.
5. **New pedestrian connection between Franklin Street, Bridge Street, and MBTA station.** This measure would formalize the current informal pathway on the east side of North Street connecting Franklin Street with the MBTA parking lot. A new pedestrian or multi-use path would encourage non-automobile trips and provide a better alternative than walking on the elevated North Street structure. The intersection of the MBTA driveway at Bridge Street is proposed to be signalized as part of the Trail Court Expansion project (see below). Pedestrian signals could be implemented as part of those improvements, further improving pedestrian circulation and safety in this area.
6. **Replace four-way intersection at Grove Street/Harmony Grove Road/Mason Street with Roundabout.** A roundabout at this location will help to reduce accidents at this wide intersection caused by poor sight distance and speeding. It could be designed aesthetically to serve as a gateway into the North Canal Neighborhood.
7. **Develop Traffic Calming Program for Franklin Street Neighborhood.** Traffic currently uses streets in the Franklin Street Neighborhood as a cut-through to bypass congestion on North Street during peak periods. A Traffic Calming Program would help to discourage cut-through traffic and/or slow vehicle speeds. Any traffic calming devices and measures would need to be considered through a joint city and neighborhood process before implementation.
8. **Prohibit on-street parking on North Street during peak periods.** This measure would increase capacity during peak hours which would help reduce delay on North Street and in-turn discourage traffic to cut-through neighborhoods. This policy measure will need to be developed by the City of Salem and MassHighway and will need to consider parking impacts for residents and businesses. This measure should include both sides of North Street.
9. **Support four-lane cross-section of Bridge Street between Flint Street and Washington Street.** MassHighway is currently developing concepts for a widening of Bridge Street in this area to four lanes. Existing and future traffic volumes indicate a need for four travel lanes in peak periods in this area. While future circulation projects may slightly lower existing traffic volumes on Bridge Street, future growth would more than off-set any minor reductions. It is important to note that there is an opportunity to provide input into the state's design process that would allow flexibility in the design of the roadway. Examples may include, a landscaped median and allowance of on-street parking during off-peak periods. The design of Bridge Street should be coordinated with improvements at the North Street ramps intersections proposed as part of the Trial Court expansion (see below). The informal parking that currently occurs along Bridge Street would be relocated to the MBTA station parking.
10. **Coordinate circulation and signalization improvements at the North Street/Bridge Street Interchange.** The ramps and intersections at this location are recognized as having operational

and safety deficiencies. Improvement options for this interchange have been recently developed as part of the Trial Court Expansion state environmental process. The Trial Court proposed improvements will have to go through the planning and design processes with local and state agencies. The Trail Court project will need to coordinate with other nearby projects and groups, such as the North Canal Neighborhood Master Planning effort and the MBTA. Alternative solutions will need to be developed as part of that process. While the details of the North/Bridge interchange improvements have yet to be developed, it is recommended that improvements to this area be coordinated with the City of Salem and the Working Group. Long-Term Improvement #4 below discusses circulation and operations measures recommended in this area as part of the North Canal Neighborhood Master Plan.

It is recommended that any improvements at this location include pedestrian crossing and safety measures.

11. **New pedestrian connections from Mason Street and Federal Street to North Canal.** This measure will improve pedestrian circulation and access to the North Canal area and from the north neighborhoods to the downtown.

### **Long-Term Transportation Recommendations**

1. **Extend Commercial Street north to Mason Street.** The goal of this measure is to direct traffic as efficiently as possible to and from Harmony Grove Road to the west. An extension of Commercial Street west would serve both site traffic and commuter traffic to/from the MBTA station and reduce traffic volumes on easterly Mason Street. While there are options to connect to Mason Street, it appears that an intersection at Tremont Street may be the most feasible at this time. Connecting a Commercial Street extension at this location would include design measures to pre-

vent through-traffic to and from Tremont Street and Commercial Street extension by allowing only left and right turns. If preventing through-traffic is not feasible, other alignment options will have to be pursued (see below). An element of this option would be to designate the extension as one-way northbound, which could operate as a one-way pair with the Flint Street one-way southbound option.

Other options of connecting with Harmony Grove Road include:

- Extend Commercial Street west to Flint Street where inbound traffic would utilize the proposed southbound Flint Street circulation option and outbound traffic would proceed westbound on Bridge Street to Goodhue Street to Grove Street to Harmony Grove Road (see below).
- Extend Commercial Street west along rail right-of-way to Grove Street. While this alignment is direct, there are potential conflicts with future use of the right-of-way by the MBTA and property acquisition issues. This option would first require Commercial Street to be extended to Flint Street as described in Long Term Improvement #2 below.

2. **Extend Commercial Street west to Flint Street north of Bridge Street.** This measure would provide east-west circulation through the project site. Its main function would be to provide access to and from the North Canal area and inbound motorists. If Long-Term Improvement #1 (above) is not pursued, this extension of Commercial Street would also serve motorists outbound to Harmony Grove Road.
3. **Extend Commercial Street east underneath North Street to connect with the MBTA station surface parking and internal roadway system.** This measure would primarily serve motorists traveling southbound on North Street to turn right onto



Commercial Street and continue into the MBTA site without traveling through the North/Bridge interchange. In coordination with this measure, a consideration would be to not allow any northbound traffic north of existing Commercial Street to North Street.

**4. Extend Commercial Street south to Bridge Street.**

This measure would allow North Canal site traffic to access Bridge Street without having to travel on North Street. From a traffic operations and pedestrian crossing standpoint, the best alignment would be to intersect Bridge Street across from the southbound North Street ramps, forming the fourth (north) leg of an intersection that could be signalized in the future. An alignment creating a new intersection between the two North Street Ramps/Bridge Street intersections is less desirable. In an effort to centralize traffic crossings of Bridge Street and not increase the single at-grade railroad crossing in this area, it is recommended that the existing MBTA station driveway on Bridge Street be replaced with the proposed connection to Bridge Street at the southbound North Street ramps. MBTA motorists would then access Bridge Street via the proposed extension of Commercial Street east (Long-Term Improvement #3) under the North Street Bridge embankment. This measure should proceed in conjunction with any improvements being considered for the North Street/Bridge Street interchange (see Short-Term Improvement #10 above).

**5. Connect Goodhue Street with Boston Street via a new Hanson Street connection.**

This improvement would provide a new two-way connection between Boston Street and Goodhue Street. The current one-way westbound connection on Grove Street is very narrow and passes through a residential area. The new connection would allow southbound vehicles on Boston Street to make a left turn into the Goodhue Street area, thereby eliminating the difficult left turn from Boston Street to Goodhue Street. Truck access would also be improved by this measure. It is noted that this measure (or at another

location) could happen sooner if the Flyntan property is redeveloped.

- 6. Make Flint Street one-way southbound between Bridge Street and Mason Street.** This improvement could be done in combination with extending Commercial Street to Flint Street (Long-Term Improvement #2). This measure would reduce traffic on residential Flint Street by approximately 4,000 vehicles per day and improve safety at the intersection of Flint Street and Mason Street. Northbound traffic would seek alternative routes via Goodhue Street and North Street-Mason Street (see measures above that address these areas).

**TABLE ES-1**

**Future Traffic Volumes Changes on Roadways Resulting from Future Development, Background Traffic, and Roadway Improvements (Build Condition)**

Study Roadway	Change in Traffic Volume	
	Peak Hour Volume	Percent %
North Street (North)	+250	+12%
Bridge Street (East)	+75	+5%
Bridge Street (West)	+250	+20%
Boston Street	+375	+18%
Flint Street	-300	-30%
Mason Street (East)	-100	-12%
Mason Street (West)	+100	+12%
Tremont Street	0	0%
Goodhue Street	+100	+28%
Harmony Grove Road	+125	+14%
Franklin Street	+ <sup>(1)</sup>	+ <sup>(1)</sup>
Commercial Street	+500	>100%

<sup>(1)</sup> Future traffic dependent on traffic calming devices which would discourage cut-through traffic.



FIGURE ES-1

Recommended short-term and long-term transportation improvements.



